



**Golden State
Water Company**
A Subsidiary of American States Water Company

FINAL REPORT

2015 Urban Water Management Plan *Southwest*

Corporate Office
630 E. Foothill Blvd.
San Dimas CA 91773



Kennedy/Jenks Consultants

September 2016

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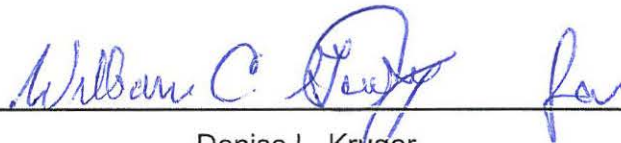
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Notice of Adoption

A meeting to solicit public comments on the 2015 Urban Water Management Plan for the Golden State Water Company Southwest System was held on August 17, 2016 at 6:00 p.m. at the Hawthorne Memorial Center in Hawthorne, California. Notice of this meeting was published in accordance with Section 6066 of the Government Code in the Long Beach Press-Telegram on August 4, 2016 and August 10, 2016, the Daily Breeze on August 5, 2016 and August 10, 2016, and the Los Angeles Times on August 5, 2016 and August 12, 2016.

Copies of the Urban Water Management Plan were made available to the public at the Golden State Water Company Customer Service Office in Gardena, California and on its website (www.gswater.com) prior to the public hearing; plans were open to comments for 30 days.

Golden State Water Company, hereby, adopts the 2015 Urban Water Management Plan for the Southwest System.



Denise L. Kruger
Senior Vice President, Regulated Utilities
Golden State Water Company

September 12, 2016

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Abbreviations

µg/L	micrograms per liter
AF	acre-feet
AFY	acre-feet per year
Act	Urban Water Management Planning Act
AMR	automatic meter reading
APA	Allowed Pumping Allocation
AWWA	American Water Works Association
BMPs	best management practices
Cal EMA	California Emergency Management Agency
CBMWD	Central Basin Municipal Water District
ccf	hundred cubic feet
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
COG	Council of Governments
Council or CUWCC	California Urban Water Conservation Council
CPUC	California Public Utilities Commission
CRA	Colorado River Aqueduct
D/DBP	disinfectant/disinfection by-product
DDW	Division of Drinking Water, State Water Resources Control Board
DMM	Demand Management Measure
DOF	Department of Finance
DSC	Discovery Science Center
DWF	dry weather flow
DWR	Department of Water Resources (California)
DWR Guidebook	DWR Guidebook for Urban Water Suppliers

EPRP	Emergency Preparedness Response Plan
ETo	evapotranspiration
GIS	Geographic Information System
GPCD	gallons per capita day
gpd	gallons per day
gpm	U.S. gallons per minute
GSWC	Golden State Water Company
HAA5	5 Haloacetic Acids
HCD	Housing and Community Development
HECW	high efficiency clothes washers
HET	high efficiency toilets
ILI	infrastructure leakage index
IRP	Integrated Resources Plan
JWPCP	Joint Water Pollution Control Plant
LACDPW	Los Angeles County Department of Public Works
LACSD	Sanitation Districts of Los Angeles County
MAF	million acre-feet per year
MCL	maximum contaminant level
Metropolitan	Metropolitan Water District of Southern California
MF	multi-family
mgd	million gallons per day
MOU	Memorandum of Understanding (Regarding Urban Water Conservation in California)
MWD	Municipal Water District with reference to any of the member agencies of the Metropolitan Water District of Southern California
N/A	not available, not applicable
NAICS	North American Industry Classification System

O&M	operation and maintenance
RHNA	Regional Housing Needs Allocation
RTP	Regional Transportation Plan
SBX7-7	Senate Bill X7-7, The Water Conservation Act of 2009
SCAG	Southern California Association of Governments
SD	Science Discover
SF	single-family
SWP	State Water Project
TAF	thousand acre-feet per year
TTHM	total trihalomethanes
ULFT	ultra-low-flush-toilet
USEPA	U.S. Environmental Protection Agency
UWMP	Urban Water Management Plan
VOC	volatile organic compound
WAP	Water Action Plan
WBIC	weather-based irrigation controllers
WBMWD	West Basin Municipal Water District
WBRWP	West Basin Recycled Water Project
WLCD	Water Loss Control Department
WRCC	Western Regional Climate Center
WRDSC	Water Replenishment District of Southern California
WSAP	Water Supply Allocation Plan
WSDM	Water Surplus and Drought Management Plan
WSO	Weather Service Office
WSS	WaterSense Specification
WWTP	Wastewater Treatment Plant

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Definitions

Chapter 2, Part 2.6, Division 6 of the California Water Code provides definitions for the preparation of the Urban Water Management Plans.

CHAPTER 2. DEFINITIONS

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

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

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

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

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

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

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

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

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

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Chapter 1: Introduction

Golden State Water Company (GSWC) is an investor-owned public utility company, which owns 39 water systems throughout California regulated by the California Public Utilities Commission (CPUC). This Urban Water Management Plan (UWMP) has been prepared for the Southwest System.

Located in Los Angeles County, the Southwest System serves the Cities of Gardena and Lawndale, parts of the cities of Carson, Compton, El Segundo, Redondo Beach, Hawthorne and Inglewood, and portions of unincorporated parts of Los Angeles County. The service area is primarily characterized by residential land use, with some commercial and industrial land use. Figure 1-1 illustrates the location of the Southwest System.

1.1 Background and Purpose

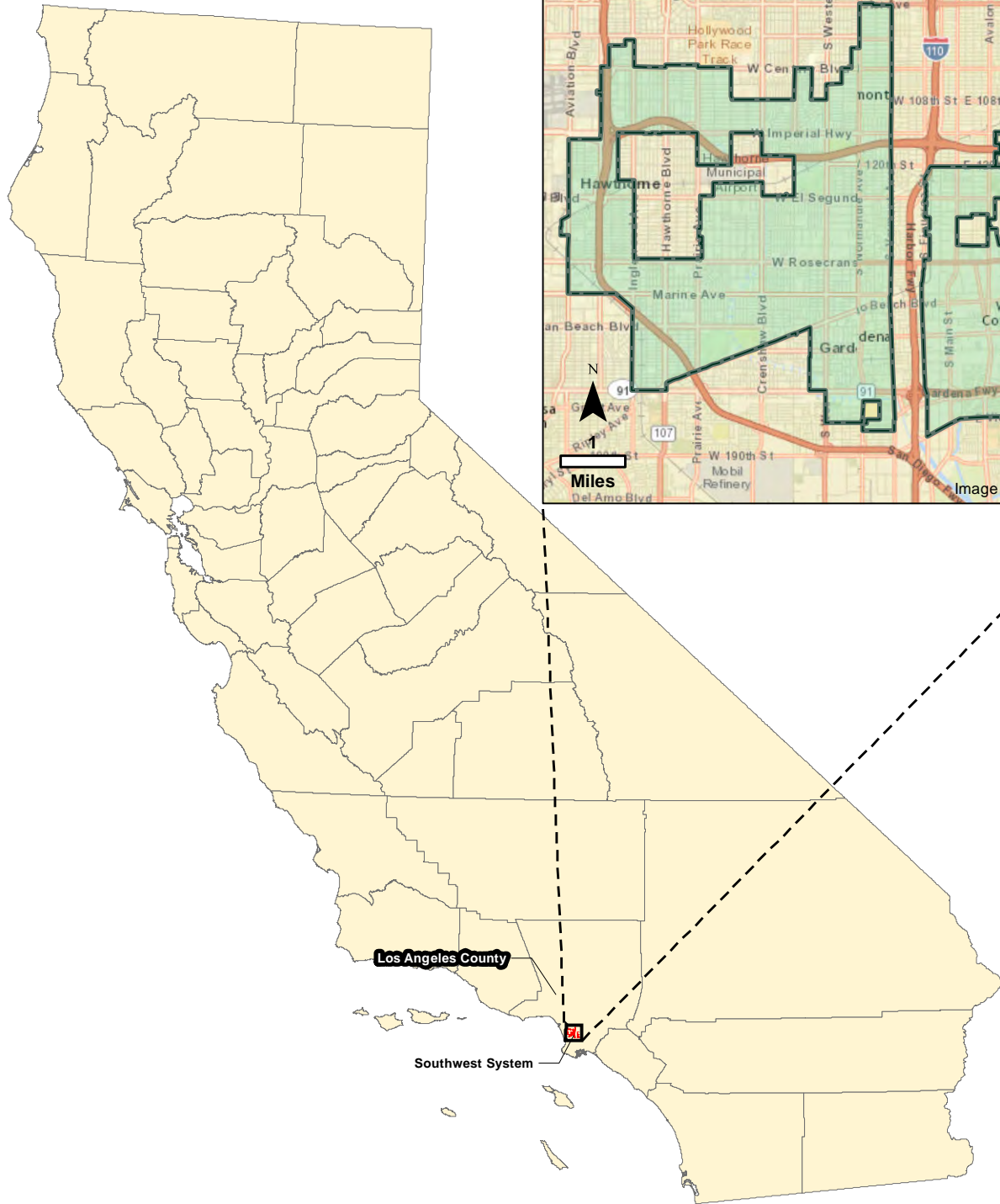
This UWMP has been prepared for the GSWC Southwest System in compliance with Division 6, Part 2.6, of the California Water Code (CWC, Code), Sections 10608 through 10657. The original bill requiring preparation of an UWMP was enacted in 1983.

Urban water suppliers having more than 3,000 service connections or supplying more than 3,000 acre-feet per year (AFY) for retail or wholesale uses are required to submit a UWMP every five years to the California Department of Water Resources (DWR). GSWC prepared an UWMP for the Southwest System in 1985, 1990, 1995, 2000, 2005, and 2010. This 2015 UWMP is an update to the 2010 plan.


It is the purpose of this UWMP to provide the supporting documentation to meet the stated concerns and declarations of the Urban Water Management Planning Act of 1983 (Act). The portion of the Act that describes the concerns of the legislature is in Section 10610.2.

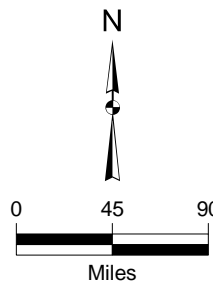
The Act requires reporting agencies to describe its water supply reliability under single dry-year, multiple dry-year, and average year conditions, with projected information in five-year increments for a minimum of 20 years. One of the purposes of this UWMP is to ensure the efficient use of available water supplies, as required by the Act. The Act states that urban water suppliers should make every effort to assure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The UWMP describes the availability of water and discusses water use, reclamation, and water conservation activities. This UWMP concludes that the water supplies available to the Southwest System's customers are adequate over the next 25-year planning period.

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Legend

 Southwest System Boundary



Kennedy/Jenks Consultants
Golden State Water Company
2015 Urban Water Management Plan

**Southwest System
Location Map**

K/J 1570027.00
September 2016

Figure 1-1

1.2 Urban Water Management Planning and the California Water Code

1.2.1 Urban Water Management Planning Act of 1983

The Act became part of the CWC with the passage of Assembly Bill 797 during the 1983–1984 regular session of the California legislature. Subsequently, assembly bills between 1990 and 2014 amended the Act to include additional data and reporting requirements. The Act describes the contents of the UWMP as well as how urban water suppliers should adopt and implement the UWMP and was updated most recently by SB 1420 and AB 2067.

This UWMP addresses all subjects required by Section 10631 of the Act as defined by Section 10630, which permits “levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.” All applicable sections of the Act are discussed in this UWMP, with chapters of the UWMP and DWR Guidebook Checklist cross-referenced against the corresponding provision of the Act. Additionally, a completed copy of the 2015 Urban Water Management Plan Checklist organized by subject is included as Appendix A.

1.2.2 Applicable Changes to the Water Code since 2010 UWMPs

Since 2010, four legislative bills (Assembly Bill 2409 in 2010, Senate Bill 1036 in 2014, Assembly Bill 2067 in 2014, and Senate Bill 1420 in 2014) have made changes to the Water Code affecting requirements and guidance for UWMP development. A summary list of the topical changes is provided below:

- Demand Management Measures, CWC Section 10631(f)(1) and (2)
- Submittal Date, CWC Section 10621(d)
- Electronic Submittal, CWC Section 10644(a)(2)
- Standardized Forms, CWC Section 10644(a)(2)
- Water Loss, CWC Section 10631(e)(1)(J) and (e)(3)(A) and (B)
- Estimating Future Water Savings, CWC Section 10631(e)(4)
- Voluntary Reporting of Energy Intensity, CWC Section 10631.2(a) and (b)
- Defining Water Features, CWC Section 10632(b)

1.2.3 Water Conservation Act of 2009 (SBX7-7) (Appendix B)

Senate Bill No. 7 (SBX7-7), which became law in November 2009, requires increased emphasis on water demand management and requires the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. Retail urban water suppliers are required to report their Baseline Daily Per Capita Water Use (Baseline GPCD), 2015 interim Urban Water Use Target, 2020 Urban Water Use Target, and Compliance Daily per Capita Water Use. The Baseline GPCD, Targets, and methodologies are presented in Chapter 5.

1.3 Urban Water Management Plans in Relation to Other Planning Efforts

Regulated by the CPUC, GSWC pursues and develops planning documents in conjunction with CPUC requirements and approval. The CPUC adopted the 2005 Water Action Plan (WAP) in December 2005 and an updated 2010 WAP in October 2010 (CPUC 2005, 2010). The WAP is a general policy document. Specific implementation of policies and programs, along with modifications to CPUC ratemaking policies, and other programs including conservation, long-term planning, water quality and drought management programs are ongoing.

The purpose of the 2010 WAP update was to establish renewed focus on the following elements:

1. Maintain the highest standards of water quality;
2. Promote water infrastructure investment;
3. Strengthen water conservation programs to a level comparable to those of energy utilities;
4. Streamline CPUC regulatory decision-making;
5. Set rates that balance investment, conservation, and affordability; and
6. Assist low-income ratepayers.

GSWC has been actively involved with the CPUC in suggesting optimal approaches to the WAP. In particular, the GSWC has suggested specific implementation measures and modifications to certain CPUC rate setting practices so that regulated utilities are able as a practical matter to achieve the policy objectives of the WAP. These efforts are intended to include further investment in local resource optimization, reduced reliance on imported supplies, enhanced conservation, and intensification of company-wide efforts to optimize water resource mix, including planned water supply projects and programs to meet the long-term water supply needs of GSWC's customers.

GSWC is currently updating the Southwest System Water Master Plan, expected to be final by July 2016. The Water Master Plan and this UWMP were developed concurrently and are consistent in representing the Southwest System's historical and projected water supply and demand.

1.4 UWMP Organization

The 2015 UWMP serves as an update to the 2010 UWMP and draws extensively from that report; however, this plan has been restructured in response to legislative changes discussed above and new requirements presented in the 2015 UWMP Guidebook for Urban Water Suppliers (DWR Guidebook) developed by DWR (DWR 2016a).

GSWC has organized its 2015 UWMP following DWR's recommended outline from the DWR Guidebook. GSWC has also elected to present data in this UWMP using the DWR Tables as presented in the DWR Guidebook.

1.5 UWMPs and Grant or Loan Eligibility

Beginning in 2016, urban retail water suppliers must comply with water conservation requirements in the Water Conservation Act of 2009 (SBX7-7) in order to be eligible for State of California water grants and loans. Retail water suppliers can meet these requirements through:

1. Meeting its 2015 Interim Urban Water Use Target and reporting compliance in the 2015 UWMP, or
2. Submitting documentation qualifying its entire service area as a disadvantaged community.

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Chapter 2: Plan Preparation

2.1 Basis for Preparing a Plan

CWC 10617

“Urban water supplier” means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems...

CWC 10620

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

CWC 10621

- (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero, except as provided in subdivision (d).*
- (d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.*

In accordance with the CWC, urban water suppliers with 3,000 or more service connections or supplying 3,000 or more acre-feet per year are required to prepare an Urban Water Management Plan every five years.

The Southwest System has historically supplied greater than 3,000 acre-feet of water per year and currently serves approximately 53,000 connections, thus meeting the threshold for UWMP preparation.

GSWC prepared this UWMP with the assistance of its consultant, Kennedy/Jenks Consultants, as permitted by the following section of the Act:

Section 10620.

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

2.1.1 Public Water Systems

CWC 10644

- (a)(2) *The plan, or amendments to the plan, submitted to the department ... shall include any standardized forms, tables, or displays specified by the department.*

CWC 10608.52

- (a) *The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.*
- (b) *At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24... The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.*

California Health and Safety Code 116275

- (h) *"Public Water System" means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.*

The Southwest System is an investor-owned public utility, meeting the definition of a Public Water System. GSWC owns 39 water systems throughout California, of which, 17 are required to prepare 2015 UWMPs. GSWC typically prepares planning documents by system and has elected to prepare individual UWMPs for each of its 17 systems meeting the connection or water supply threshold for an urban water supplier.

Table 2-1: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
CA1910155	Golden State Water Company - Southwest	52,996	26,938
TOTAL		52,996	26,938
NOTES: 1. Volume is in AF. 2. Volume of water supplied is for potable water only. Recycled water is supplied by West Basin Municipal Water District and is not included in this table. Raw water is not used within the Southwest System.			

2.2 Regional Planning

GSWC regularly coordinates with other agencies, cities, and counties as part of its regular business operations and planning efforts. The Southwest System is not currently involved in any regional coordination efforts, such as Integrated Regional Water Management, but plans to continue to prioritize coordination with other agencies during its planning processes.

2.3 Individual or Regional Planning and Compliance

Water suppliers can choose to develop an individual UWMP or work together with an Integrated Regional Water Management (IRWM) group, wholesaler, or other retailers to develop a Regional UWMP or Regional Alliance. GSWC has elected to develop an individual UWMP for the Southwest System.

Table 2-2: Plan Identification	
<input checked="checked" type="checkbox"/>	Individual UWMP
<input type="checkbox"/>	Regional UWMP (RUWMP)
NOTES:	

2.4 Fiscal or Calendar Year and Units of Measure

CWC 1608.20

(a)(1) Urban retail water suppliers...may determine the targets on a fiscal year or calendar year basis.

GSWC reports on a calendar year basis and has included water use and planning data for the entire calendar year of 2015. Water volumes are reported in acre-feet (AF) throughout this UWMP. Table 2-3 summarizes the selected reporting method and unit of measure below.

Table 2-3: Agency Identification	
<input type="checkbox"/>	Agency is a wholesaler
<input checked="" type="checkbox"/>	Agency is a retailer
Fiscal or Calendar Year (select one)	
<input checked="" type="checkbox"/>	UWMP Tables Are in Calendar Years
<input type="checkbox"/>	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Day that the Fiscal Year Begins	
Day	Month
Units of Measure Used in UWMP (select one)	
<input checked="" type="checkbox"/>	Acre Feet (AF)
<input type="checkbox"/>	Million Gallons (MG)
<input type="checkbox"/>	Hundred Cubic Feet (CCF)
NOTES:	

2.5 Coordination and Outreach

The 2015 UWMP requirements for agency coordination include specific timetables and requirements as presented in this chapter. During the preparation of the UWMP, documents that have been prepared over the past several years by GSWC and other entities were reviewed and information from those documents incorporated, as applicable, into this UWMP. The list of references is provided at the end of this document.

2.5.1 Wholesale and Retail Coordination

CWC 10631

- (j) *An urban water supplier that relies 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).*

Retail agencies are required to provide their wholesaler(s) with their projected water demand. The Southwest System receives treated water from West Basin Municipal Water District (WBMWD) and Central Basin Municipal Water District (CBMWD) as discussed in further detail in Chapter 6. GSWC has informed WBMWD and CBMWD of the projected water use as documented in Table 2-4 and included in Appendix B.

Table 2-4: Water Supplier Information Exchange	
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.	
Wholesale Water Supplier Name	
West Basin Municipal Water District	
Central Basin Municipal Water District	
NOTES:	

2.5.2 Coordination with Other Agencies and the Community

CWC 10620

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

CWC 10642

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.

Table 2-5 lists the agencies with which coordination occurred while preparing this 2015 UWMP. The initial coordination began in February 2016, which included the distribution of notification letters and requests for information. Each notification letter was followed up with a telephone call as necessary to obtain supporting data and coordinate preparation of the UWMP. Table 2-5 also provides a list of agencies that were provided public hearing notifications and access to the draft UWMP and is discussed in further detail in Chapter 10.

Table 2-5: Coordination with Agencies							
Agency	Contacted for Assistance	Participated in UWMP Development	Commented on the Draft	Attended Public Meetings	Received Copy of the Draft	Sent Notice of Intent to Adopt	Not Involved/ No Information
Southern California Association of Governments	✓						
City of Carson	✓	✓			✓	✓	
City of Compton	✓				✓	✓	
City of El Segundo	✓				✓	✓	
City of Gardena	✓				✓	✓	
City of Hawthorne	✓	✓			✓	✓	
City of Inglewood	✓				✓	✓	
City of Lawndale	✓				✓	✓	
City of Redondo Beach	✓	✓			✓	✓	
City of Los Angeles	✓						
West Basin Municipal Water District	✓	✓				✓	
California Water Service Company	✓					✓	
Liberty Utilities	✓	✓				✓	
Los Angeles County Sanitation District	✓	✓				✓	
Park Water Company	✓	✓				✓	
Central Basin Municipal Water District	✓	✓					
Los Angeles Department of Water and Power	✓				✓	✓	
County of Los Angeles	✓	✓			✓	✓	
NOTES:							

2.5.3 Notice to Cities and Counties

CWC 10621 (b)

Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before 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.

Notifications of preparation of the plan were provided to cities and counties within which GSWC provides water at least 60 days in advance of the public hearing as required by the Act. Copies of the draft plan were available to the public for review at GSWC's Southwest office and posted on GSWC's website. Additional information and documentation regarding notification and the Plan adoption process is presented in Chapter 10.

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Chapter 3: System Description

3.1 General Description

CWC Section 10631

Describe the service area of the supplier.

The Southwest System is located in Los Angeles County and serves the Cities of Gardena and Lawndale, parts of the cities of Carson, Compton, El Segundo, Redondo Beach, Hawthorne and Inglewood, and portions of unincorporated parts of Los Angeles County. Figure 3-1 illustrates the customer service area of Southwest System. The service area is primarily characterized by residential land use, with some commercial and industrial land use.

3.2 Service Area Climate

CWC Section 10631

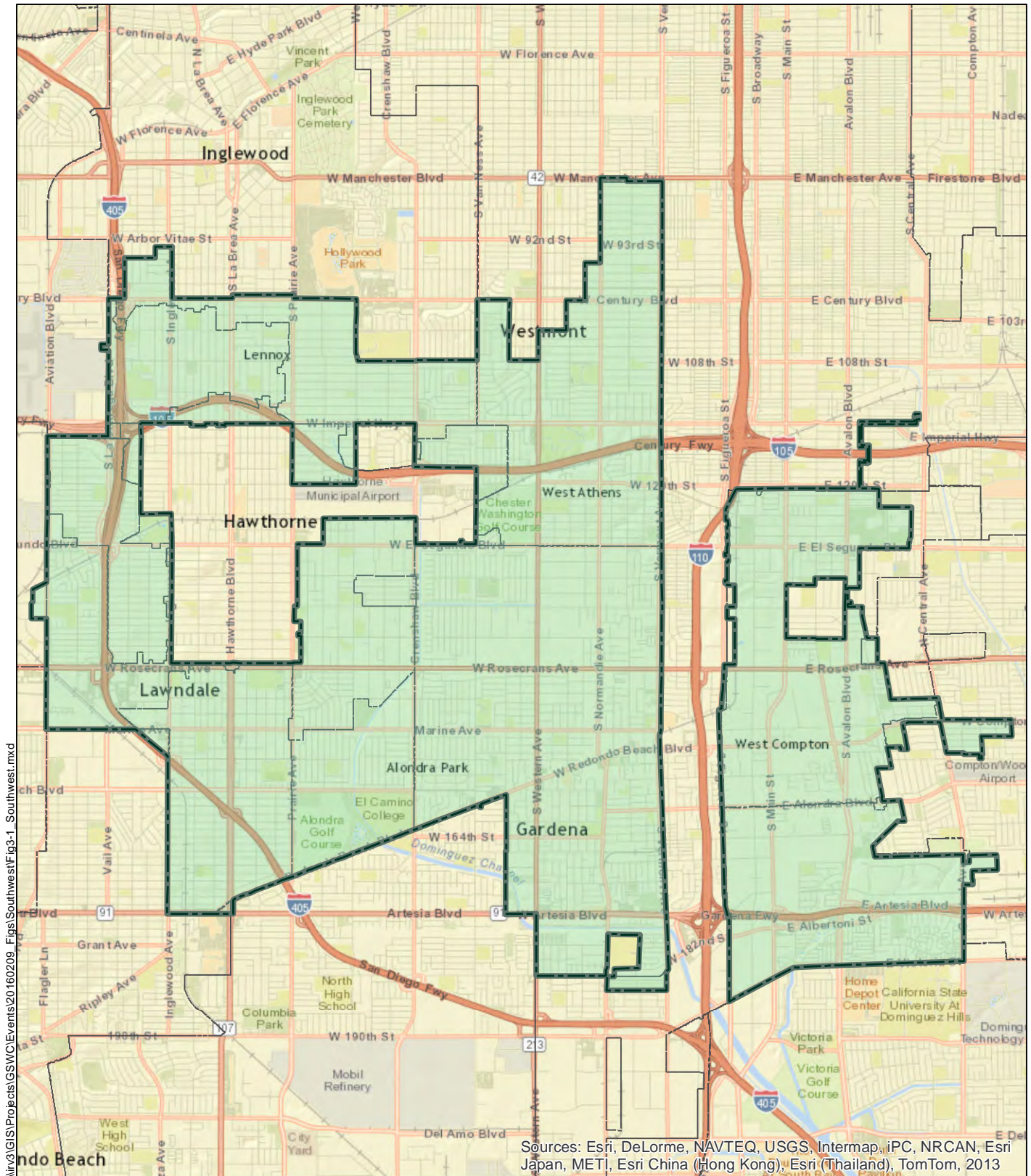
Describe the service area of the supplier, including... climate...

Southwest System has cool, humid winters and warm, moderately humid summers. Western Regional Climate Center (WRCC) has maintained 30 years of historical climate records for some cities. WRCC does not have station within the Southwest System and therefore the Los Angeles Weather Service Office (WSO) Airport station, 15 miles from the Southwest System, was utilized for the climate data analysis.

The WRCC's website (www.wrcc.dri.edu) maintains historical climate records for the past 79 years for Los Angeles WSO Airport Station.

In the winter, the lowest average monthly temperature is approximately 48 degrees Fahrenheit. The highest average monthly temperature reaches approximately 76 degrees Fahrenheit in the summer. The rainy season is typically from November to March. Monthly precipitation during the winter months ranges from 1 to 3 inches. Low humidity occurs in the summer months from May to October. The moderately hot and dry weather during the summer months typically results in moderately high water demand.

Similar to the WRCC in the Southwest System, the California Irrigation Management Information System (CIMIS) website (<http://www.cimis.water.ca.gov>) tracks and maintains records of evapotranspiration (ETo) for only a few cities (DWR 2016b). ETo statistics used for this system come from the Long Beach station, which is 16 miles from Southwest System, and is based on 16 years of climate records. ETo is a standard measurement of environmental parameters that affect the water use of plants. ETo is given in inches per day, month, or year and is an estimate of the ETo from a large field of well-watered, cool-season grass that is 4- to 7-inches tall. Figure 3-2 presents the monthly average precipitation, ETo, maximum temperature, and minimum temperature. As the figure indicates in correlation to high temperatures and low humidity, a greater quantity of water is evaporated during July and August, which may result in high water demand.



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Legend

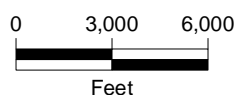


Southwest System Boundary



City Boundary

N



Kennedy/Jenks Consultants

Golden State Water Company
2015 Urban Water Management Plan

Southwest System Service Area

K/J 1570027.00
September 2016

Figure 3-1

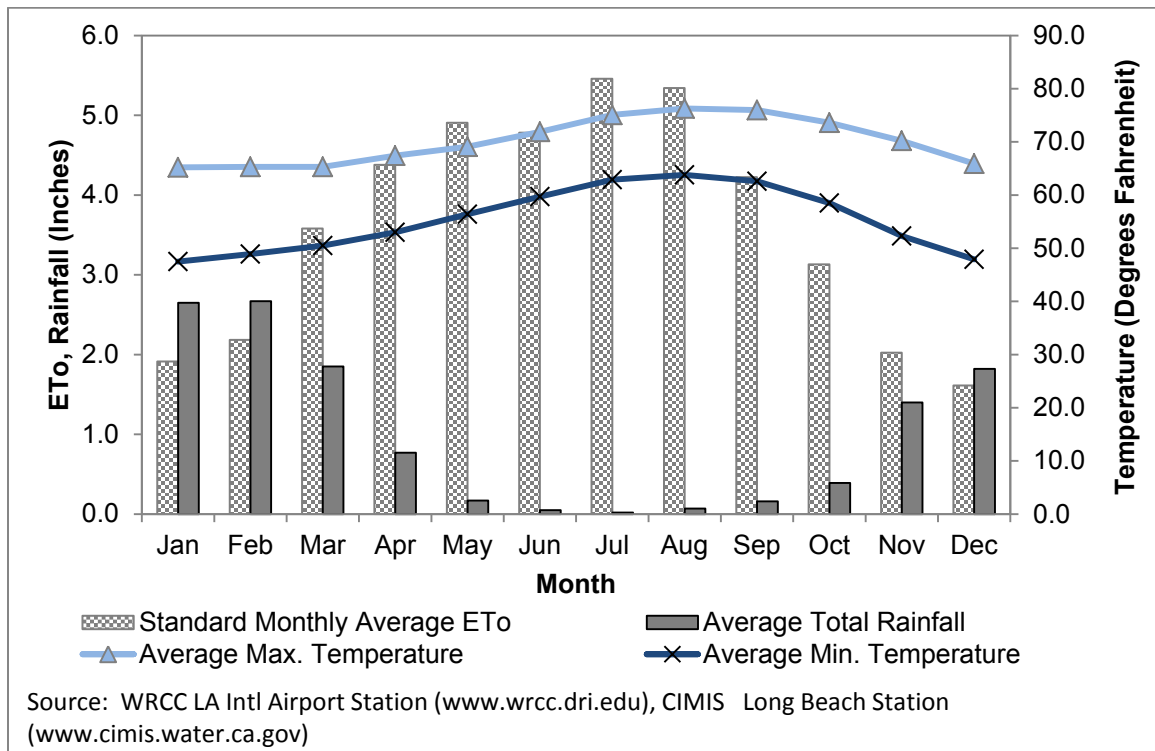


Figure 3-2: Monthly Average Climate Data at for Southwest System

3.3 Service Area Population and Demographics

CWC Section 10631

Describe the service area of the supplier, including 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 and shall be in five-year increments to 20 years or as far as data is available.

3.3.1 SCAG Population Projection Development Methodology

In 2015 the estimated population of the Southwest service area was 275,369, according to the DWR Population Tool and methodology described in Chapter 5. The following sections discuss population and other demographics that will influence water use.

Population, housing, and employment projections were developed for the Southwest System using the Southern California Association of Governments (SCAG) population, housing, and employment data. SCAG updated its projections in 2012 for population, household, and employment growth through the year 2035 using 2010 U.S. Census data. SCAG's methodology is described below, followed by the derivation of population projections for the Southwest System. Similar to the 2010 UWMP projections, the population projections use 2010 U.S. Census data.

The SCAG is a regional planning agency that provides demographic and economic data analysis for Imperial County, Los Angeles County, Orange County, Riverside County, San Bernardino County, and Ventura County. SCAG's Integrated Growth Forecasting process uses

a variety of estimates and projections from the federal and state governments. Sources include the U.S. Department of Labor, Internal Revenue Service (IRS), U.S. Citizenship and Immigration Services, U.S. Department of Health and Human Services, California Department of Finance (DOF), California Employment Development Department, and information received through the Intergovernmental Review process. On a regional level, the SCAG forecast uses a cohort component model to project birth and death rates based on demographic factors and estimates migration based on economic fluctuations. Projected growth of an individual jurisdiction is assumed to be proportionate to the jurisdiction's historic contribution to county growth.

A detailed explanation of the population, household and employment projection process employed by SCAG can be found in the report: "Growth Forecast", a supplemental report to the SCAG "Regional Transportation Plan, 2012-2035".

3.3.2 Historical and Projected Population

SCAG city level projections were used to determine projected population from 2020 to 2040. The Southwest System serves the Cities of Gardena and Lawndale, parts of the cities of Carson, Compton, El Segundo, Redondo Beach, Hawthorne and Inglewood, and portions of unincorporated parts of Los Angeles County. The SCAG historic growth rate for the City of Hawthorne more closely matches that of the Southwest System's historic population growth rate than that for the surrounding cities or unincorporated areas. Therefore, the SCAG growth rate for 2015 through 2035 for the City of Hawthorne was used to project the population, household, and employment of the Southwest System. This methodology applies the SCAG growth rate to a consistent system boundary through 2040; therefore, it is assumed that the projected population accounts for system in-fill only and does not include geographic growth such as tariff area expansion. Table 3-1 presents the current and projected population for the Southwest System.

Table 3-1: Population – Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040(opt)
	275,369	282,455	289,326	296,365	303,576	310,961
NOTES: 1. 2015 population estimated using the DWR Online Population Tool. 2. Projected population based on SCAG population growth rate for the City of Hawthorne.						

3.3.3 Other Demographic Factors

CWC 10631

Describe the service area of the supplier, including...other demographic factors affecting the supplier's water management planning.

The City of Hawthorne was chosen as demographically representative of the Southwest System. According to 2010 U.S. Census Data, the median age of the City of Hawthorne's residents is 31.5 years. The City of Hawthorne has an average household size of 2.94 and a

median household income of approximately \$44,384 in 2014 dollars (2010-2014 American Community Survey 5-Year Estimates).

According to SCAG data for Hawthorne, population is expected to increase by a total of 14 percent from 2008 to 2035, which translates to a 0.5 percent growth rate per year. The number of households is expected to grow seven (7) percent during the same period, which equates to an annual household growth rate of 0.3 percent. Employment is expected to grow six (6) percent during the same period, which equates to an annual employment growth rate of 0.2 percent.

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Chapter 4: System Water Use

4.1 Recycled versus Potable and Raw Water Demand

The 2015 UWMP reports recycled, potable (drinking), and raw water demands separately. All water demands in the Southwest System are met by treated drinking water and recycled water for landscape. Therefore, water demands reported in this chapter are for drinking water only. Recycled water is discussed in Chapter 6.

4.2 Water Uses by Sector

CWC 10631

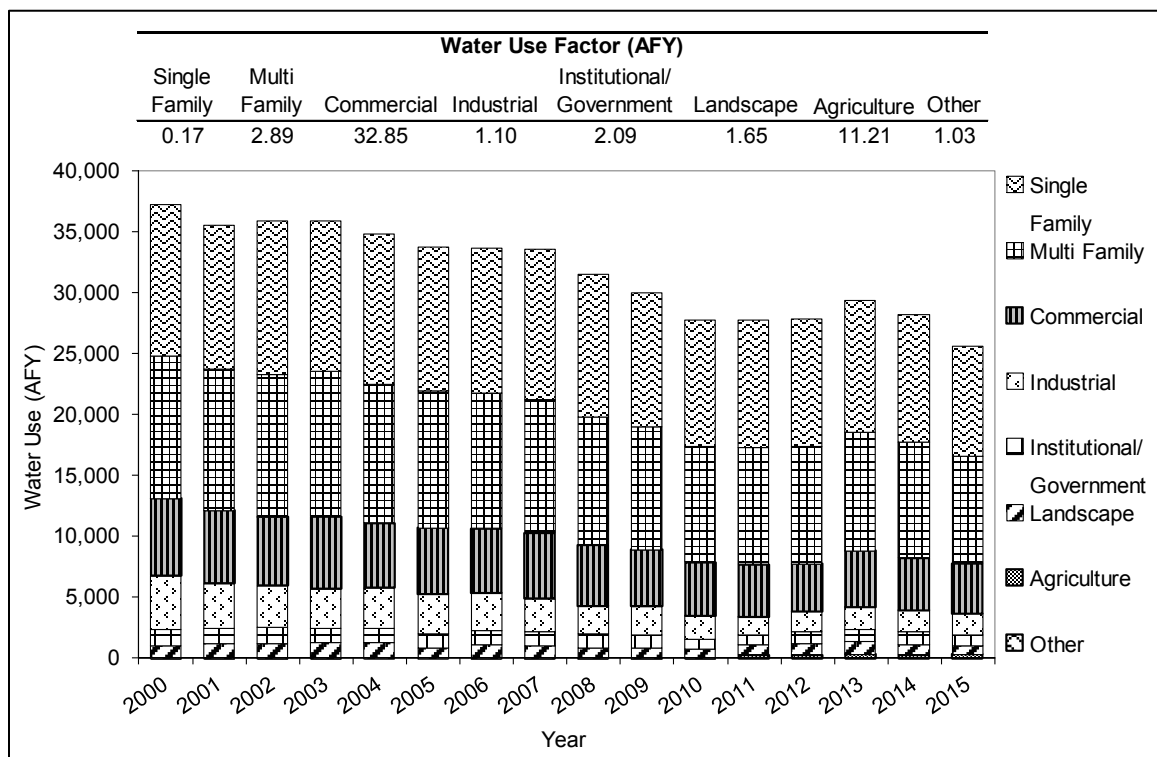
- (e)(1) *Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:*
- (A) *Single-family residential.*
 - (B) *Multifamily.*
 - (C) *Commercial.*
 - (D) *Industrial.*
 - (E) *Institutional and governmental.*
 - (F) *Landscape.*
 - (G) *Sales to other agencies.*
 - (H) *Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.*
 - (I) *Agricultural...*
- (2) *The water use projections shall be in the same five-year increments described in subdivision (a).*

Historical connections and sales data from 1994 to 2015 were analyzed in order to provide an overview of historical water usage trends for the Southwest System. Connection and water sales data were grouped using the assigned North American Industry Classification System (NAICS) codes into the eight applicable DWR categories: single-family, multi-family, commercial, industrial, institutional/government, landscape, agricultural irrigation, and other. For the Southwest System, other water uses include customer accounts that are inactive or idle. Table 4-1 presents the 2015 water use for the Southwest System broken down by the DWR categories, as well as estimated 2015 losses.

Table 4-1: Demands for Potable and Raw Water			
Use Type	2015 Actual		
	Additional Description (as needed)	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	9,027
Multi-Family		Drinking Water	8,784
Commercial		Drinking Water	4,133
Industrial		Drinking Water	1,770
Institutional/Governmental		Drinking Water	904
Landscape		Drinking Water	672
Agricultural irrigation		Drinking Water	378
Other		Drinking Water	10
Losses		Drinking Water	1262
TOTAL			26,938
NOTES: 1. Volume is in AFY 2. Potable demands only. Raw water is not used within the Southwest System. 3. 2015 losses are preliminary and estimated as the volume of potable water entering the distribution system minus metered uses.			

For each category, the average water use factor for each DWR category was calculated by dividing the water use by the number of water service connections. The resulting value for each DWR category is the water use factor.

The period from 2008 through 2013 was considered representative of the Southwest System's average water demand as GSWC implemented tiered water rates beginning in 2008. Water use for recent years 2014-2015 was considered atypical due to mandatory conservation imposed by the Governor's drought emergency declarations. Table 4-1 presents the Southwest System's historical water use from 2000 through 2015 and calculated water use factors (using 2008-2013) for each DWR category.



Note: Water Use Factor is calculated using 2008-2013 water use.

Figure 4-1: Historic Water Use and Water Use Factors by Category

Figure 4-1 shows a decline in water use beginning in 2007 with an approximate 19 percent decline from 2008 to 2015. The recent decline in water use is not yet fully understood, but may be a result of several factors including implementation of tiered water rates, changes in plumbing codes, the economic downturn beginning in 2008 and the statewide drought beginning in 2012.

4.2.1 Water Use Projections

Growth projections for the number of service connections and water use were calculated for the year 2020 through 2040 in 5-year increments using a SCAG-based approach.

The SCAG-based water use projections are based on the population and housing growth rates described in Chapter 3, which used the City of Hawthorne as representative of the Southwest System. SCAG (Hawthorne) household projections were used to determine the growth in single-family and multi-family service connections for the years 2020, 2025, 2030, 2035, and 2040. For example, the percent growth rate in households from the year 2015 to year 2020 was multiplied by the number of service connections in 2015 to obtain a projection of the number of connections in the year 2020. Similarly, employment growth projections were used to determine the growth for commercial, industrial, institutional/government, agricultural irrigation, landscape, and other service connections.

Figure 4-2 shows the Southwest System's historical total retail water service connections from 1994 through 2015 and the projected total retail water service connections from 2020 through 2040 employing the SCAG-based rate.

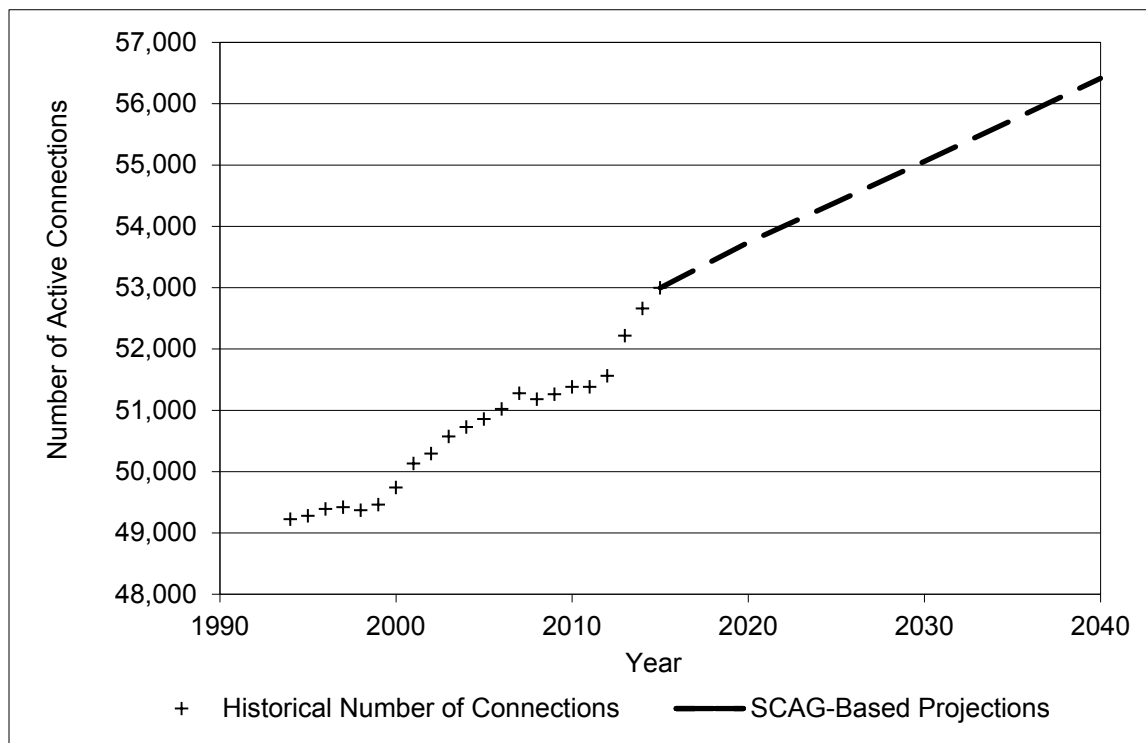


Figure 4-2: Historical and Projected Connections

The SCAG-based methodology applies a growth rate to a consistent system boundary through 2040; therefore, it is assumed that the metered service connection growth rate accounts for system in-fill only and does not include geographic growth such as tariff area expansion.

The projected water use for the Southwest System's retail service area was calculated by applying the corresponding water use factors presented in Section 4.2.2 to the projected number of retail service connections in each DWR category. Table 4-2 summarizes the projected retail water demand through the year 2040 based on the SCAG-based growth rate.

Table 4-2: Demands for Potable and Raw Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use <i>Report To the Extent that Records are Available</i>				
		2020	2025	2030	2035	2040-opt
Single Family		11,324	11,463	11,604	11,746	11,891
Multi-Family		10,004	10,127	10,252	10,379	10,506
Commercial		4,724	4,775	4,828	4,882	4,936
Industrial		1,851	1,872	1,893	1,913	1,936
Institutional/Governmental		993	1,004	1,016	1,027	1,039
Landscape		1,074	1,088	1,103	1,117	1,131
Agricultural irrigation		263	296	329	361	394
Other		23	24	24	24	25
Losses		2,017	2,043	2,069	2,095	2,122
TOTAL		32,271	32,692	33,116	33,545	33,980
NOTES: 1. Volume is in AFY 2. Potable demands only. Raw water is not used within the Southwest System. 3. Water use projected based on 2015 connection data, SCAG housing and employment growth rates, and 2008-2013 average water use factors. Losses are projected based on a historical average of 6 percent loss.						

Table 4-3 presents the total current (2015) and projected water demands for the Southwest System through 2040.

Table 4-3: Total Water Demands						
	2015	2020	2025	2030	2035	2040 (opt)
Potable and Raw Water	26,938	32,271	32,692	33,116	33,545	33,980
Recycled Water Demand	393	809	809	809	809	809
TOTAL WATER DEMAND	27,332	33,080	33,500	33,925	34,354	34,789
NOTES: 1. Volume is in AFY 2. Potable and recycled water demands only.						

4.3 Distribution System Water Losses

CWC 10631

- (e)(1) Quantify, to the extent records are available, past and current water use over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:...
- (J) Distribution system water loss
- (3)(A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.
- (B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

System losses must be incorporated when projecting total water demand. System losses are defined as the difference between annual water production and annual sales. Included are system losses due to leaks, reservoir overflows, or inaccurate meters, and other water used in operations such as system flushing and filter backwashing.

Beginning with the 2015 UWMPs, water retailers must report distribution system loss based on the American Water Works Association's Water Audit Software (version 5.0). This assessment was completed for 2014 and is provided in Appendix C; it shows that in the year 2014, losses were approximately 507 AF (see Table 4-4).

Table 4-4: Water Loss Summary Most Recent 12 Month Period Available	
Reporting Period Start Date	Volume of Water Loss
01/2014	507
NOTES: 1. Volume is in AF. 2. Water loss audit conducted for 2014.	

In the Southwest System, from 1997 through 2015, estimated system water losses (the difference between production and sales) have averaged approximately six (6) percent of total water sales; therefore, this rate was incorporated into the water demand projections.

4.4 Estimating Future Water Savings

CWC 10631

- (e)(4)(A) If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.*
- (B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following: (i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections. (ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.*

Future water savings due to codes, standards, ordinances, or transportation and land use plans are not considered in these water use projections (see Table 4-5 in Section 4.5).

4.5 Water Use for Lower Income Households

CWC 10631.1

- (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.*

California Health and Safety Code 50079.5

- (a) "Lower income households" means persons and families whose income does not exceed the qualifying limits for lower income families... In the event the federal standards are discontinued, the department shall, by regulation, establish income limits for lower income households for all geographic areas of the state at 80 percent of area median income, adjusted for family size and revised annually.*

Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the General Plan Housing Element of any city and county in the service area of the supplier (see Table 4-5).

Table 4-5: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections?	No
If "Yes" to above, state the section or page number where citations of the codes, ordinances, etc... utilized in demand projections are found.	Location in UWMP _____
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES: Volume is in AFY	

General Plan Housing Elements rely on the Regional Housing Needs Allocation (RHNA) generated by the State Department of Housing and Community Development (HCD) to allocate the regional need for housing to the regional Council of Governments (COG) (or a HCD for cities and counties not covered by a COG) for incorporation into housing element updates. Before the housing element is due, the HCD determines the total regional housing need for the next planning period for each region in the state and allocates that need. The COGs then allocate to each local jurisdiction its "fair share" of the RHNA, broken down by income categories; very low, low, moderate, and above moderate, over the housing element's planning period.

The City of Hawthorne last updated its General Plan Housing Element in 2013. A lower income household is defined as a household with income that is 80 percent of median family income for that jurisdiction, adjusted for family size. The City's Housing Element identifies the target number of low-income households from 2014 to 2021 as 14.8 percent and very low or extremely low-income households as 25.0 percent. However, it is unknown what percentage of the low-income and very low-income households are within GSWC's Southwest service area. For this reason, it is not possible to project water use for lower income households separately from overall residential demand. However, to remain consistent with the intent of the SB-1087 legislation and to comply with the UWMP Act, an effort has been made to identify those water use projections for future single and multi-family households based on the aggregate percentage of both the low-income and very low-income categories. The total of low- and very low income housing need of 39.8 percent was used to estimate demand projections as shown in Table 4-6 below.

Table 4-6: Low-Income Projected Water Demands					
	2020	2025	2030	2035	2040
Single-Family Residence	914	970	1,026	1,082	1,140
Multi-Family Residence	486	535	584	635	686
Total	1,400	1,504	1,610	1,717	1,826
NOTES: Volume is in AF.					

GSWC will not deny or conditionally approve water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- GSWC specifically finds that it does not have sufficient water supply.
- GSWC is subject to a compliance order issued by the State Department of Public Health that prohibits new water connections.
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services.

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Chapter 5: SBX7-7 Baselines and Targets

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the *20 by 2020 Water Conservation Plan* (DWR 2010). Consistent with SBX7-7, each retail water supplier must determine and report its existing baseline water consumption and establish water use targets in gallons per capita per day (GPCD), and compare actual water use against the target; reporting began with the 2010 UWMP.

In the 2015 UWMP retail water agencies must demonstrate compliance with the target established for 2015 and demonstrate that the agency is on track to achieve its 2020 target. Compliance is done through completion of the DWR SBX7-7 Verification Tables submitted as Appendix D of the 2015 UWMP.

5.1 Guidance for Wholesale Agencies

For purposes of identifying baselines and targets, the following definition applies:

CWC 10608.12

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

CWC 10608.36

Urban wholesale water suppliers shall include in the urban water management plans. .. an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

The Southwest System does not supply wholesale water; however, the Central Basin Municipal Water District and West Basin Municipal Water District supplies the Southwest System with wholesale water. GSWC provided the Central Basin Municipal Water District and West Basin Municipal Water District with current and projected water demands and SBX7-7 targets, to aid in their assessment of present and future water conservation measures, programs, and policies.

5.2 Updating Calculations from 2010 UWMP

CWC 10608.20

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

Methodologies DWR 2011, Methodology 2 Service Area Population

Page 27 - Water suppliers may revise population estimates for baseline years between 2000 and 2010 when 2010 census information becomes available. DWR will examine discrepancy between the actual population estimate and DOF's projections for 2010; if significant discrepancies are discovered, DWR may require some or all suppliers to update their baseline population estimates.

The Southwest System first reported its Baseline Daily Per Capita Water Use (Baseline GPCD) in its 2010 UWMP; however, at the time the 2010 UWMP was prepared, complete 2010 Census data was not available. Therefore, for the 2015 UWMP, the Southwest System is required to recalculate baseline and target water use using 2010 Census data. The following sections summarize the calculations, which can be found in Attachment D.

5.3 Baseline Periods

CWC 10608.20

- (e) *An urban retail water supplier shall include in its urban water management plan due in 2010. . . the baseline daily per capita water use...along with the bases for determining those estimates, including references to supporting data.*
- (g) *An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).*

Two water use baselines must be calculated prior to establishing target conservation water use. The first baseline is the average gross water use for a continuous period ending no earlier than December 31, 2004 and no later than December 31, 2010. This default baseline period is 10 years. If at least ten percent of the 2008 gross water use was met by recycled water, then this baseline period may be extended to include an additional 5 years. The Southwest System's recycled water use was less than 10 percent of gross water use in 2008; therefore, the first baseline period for the Southwest System is 10 years from 1997 to 2006.

The second baseline must be the average gross water use for a continuous 5-year period ending no earlier than December 31, 2007 and no later than December 31, 2010. The Southwest System 5-year baseline is from 2003 to 2007.

5.4 Service Area Population

CWC 10608.20

- (e) *An urban retail water supplier shall include in its urban water management plan due in 2010 the baseline per capita water use, ... along with the bases for determining those estimates, including references to supporting data.*
- (f) *When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.*

CWC10644

- (a)(2) *The plan ... shall include any standardized forms, tables or displays specified by the department.*

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. The population for the Southwest System was calculated for 2010 and 2015 using the DWR online population tool. This was accomplished using a Geographic Information System (GIS) interface to derive population. By adding shape files for the entity service area boundaries or public water system boundary in 2010, population is derived using U.S. Census Bureau census tract data from that census year. Then, along with Southwest System production and service connections, the DWR population tool derives a persons-per-connection number, which is used to determine population in the intervening years between 1990 and 2010.

The historic population presented in Chapter 3 was estimated using the DWR Population Tool. The population for the baseline period used for calculating the Baseline GPCD can be found in SBX7-7 Verification Table 3 in Appendix D. See Appendix E for the DWR Population Tool inputs and outputs.

5.5 Gross Water Use

CWC 10608.12

- (g) *“Gross Water Use” means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:*
 - (1) *Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier*
 - (2) *The net volume of water that the urban retail water supplier places into long term storage*
 - (3) *The volume of water the urban retail water supplier conveys for use by another urban water supplier*
 - (4) *The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.*

California Code of Regulations Title 23 Division 2 Chapter 5.1 Article

Section 596 (a) An urban retail water supplier that has a substantial percentage of industrial water use in its service area is eligible to exclude the process water use of existing industrial water customers from the calculation of its gross water use to avoid a disproportionate burden on another customer sector.

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010, or

a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use Calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. The Southwest System supplied water for agriculture use during the period 1995 to 2010, and chose to include agricultural water use in the Base Daily Water Use Calculation. Therefore, agricultural water use will factor into the Southwest System's SBX7-7 calculations.

5.6 Baseline Daily per Capita Water Use

CWC 10608.12

(b) *"Base daily per capita water use" means any of the following:*

- (1) *The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*
- (2) *For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*
- (3) *For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.*

Daily per capita water use is calculated for each year within the baseline periods in Section 5.3 using the service area population in Section 5.4 and gross water use in Section 5.5. For the 2015 Southwest UWMP the calculated Baseline (or Base) GPCDs are:

- 10-year average (1997-2006): 128 GPCD
- 5-year average (2003-2007): 127 GPCD

The 10-year and 5-year Baseline GPCD calculations are presented in SBX7-7 Verification Table 5 in Appendix D.

5.7 2015 and 2020 Targets

CWC 10608.20

- (e) *An urban retail water supplier shall include in its urban water management plan due in 2010. . . urban water use target, interim urban water use target,...along with the bases for determining those estimates, including references to supporting data (10608.20(e)).*

CWC 10608.20

- (g) *An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan.*

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's Base Daily Water Use.
2. Per capita daily water use estimated using the sum of the following:
 - a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
 - b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.
 - c. For CII uses, a ten percent reduction in water use from the baseline commercial, industrial, and institutional/government water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft 20 by 2020 Water Conservation Plan. The Southwest System falls within the South Coast Region (target for this region is 149 GPCD).
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
 - a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
 - b. A 20 percent savings on all unmetered uses.
 - c. A 10 percent savings on baseline CII use.
 - d. A 21.6 percent savings on current landscape and water loss uses.

The Southwest System's 2010 UWMP used Compliance Method 3 to set the Compliance Water Use Target. For the 2015 UWMP, the GSWC will not change its selected compliance methodology for the Southwest System and continue to use Compliance Method 3 with a 2020 compliance target of 142 GPCD (see SBX7-7 Verification Table 7-E in Appendix D).

5.7.1 5-Year Baseline – 2020 Target Confirmation

CWC 10608.22

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

The selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use ending no earlier than 2007 and no later than 2010. The Maximum Allowable GPCD use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as its target.

The minimum retail water use reduction compliance target is calculated as 95 percent of the 5-year Baseline GPCD, or 121 GPCD, which is less than the selected compliance target of 142 GPCD. Therefore, the Compliance Water Use Target for the Southwest System is 121 GPCD (see SBX7-7 Verification Table 7-F in Appendix D).

5.7.2 Baselines and Targets Summary

The interim and compliance water use targets are provided per Section 10608.20(e) of the Act. Table 5-1 summarizes the SBX7-7 baselines calculations.

Table 5-1: Baselines Calculations				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
1	1997	262,936	38,009	129
2	1998	260,151	36,353	125
3	1999	258,536	37,499	129
4	2000	259,135	38,484	133
5	2001	260,909	36,539	125
6	2002	261,779	37,566	128
7	2003	263,201	36,723	125
8	2004	263,847	36,857	125
9	2005	264,582	38,580	130
10	2006	265,298	38,751	130
10-15 Year Average Baseline GPCD				128
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
1	2003	263,201	36,723	125
2	2004	263,847	36,857	125
3	2005	264,582	38,580	130
4	2006	265,298	38,751	130
5	2007	266,162	37,752	127
5 Year Average Baseline GPCD				127
2015 Compliance Year GPCD				
2015		275,369	26,936	87
NOTES: This table is based on DWR SBX7-7 Table 5, also provided in Appendix D.				

Table 5-2 shows the Compliance Water Use Target for the GSWC Southwest System is 121 GPCD. The Interim Water Use Target for 2015 is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD and is 124 GPCD. The implementation plan for achieving the targets is described in Chapter 9, Demand Management Measures.

Table 5-2: Baselines and Targets Summary					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	1997	2006	128	124	121
5 Year	2003	2007	127		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES: Based on DWR Table 5-1.					

5.8 2015 Compliance Daily per Capita Water Use (GPCD)

CWC 10608.12

- (e) "Compliance daily per-capita water use" means the gross water use during the final year of the reporting period...

CWC 10608.24

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

CWC 10608.20

- (e) An urban retail water supplier shall include in its urban water management plan due in 2010 . . . compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

The Southwest System's 2015 GPCD was calculated by using the DWR population tool. Once population was derived from 2010, 2015 could be extrapolated by using the 2010 persons-per-connections factor. With 2015 production and connection data, a supplier can then calculate their 2015 consumption to determine if they have met their 2015 interim target.

The Southwest System's water use in 2015 was 87 GPCD, well below the SBX7-7 2015 interim target of 124 GPCD and the 2020 target of 121 GPCD. GSWC anticipates continuing to meet its 2020 target through current and future Demand Management Measures as described in Chapter 9.

GSWC's continued commitment to complying with the Urban MOU and implementation of all DMMs (described in Chapter 9) should provide sufficient water savings to continue to meet the 2020 target water use. GSWC is developing a companywide approach that will include assessment of options such as accelerating the current programs, and adding additional programmatic, regulatory and information-based activities to meet the requirements of SBX7-7. This systematic approach may allow GSWC to administer overall conservation program operations from a centralized location while allowing local resources for direct implementation of BMPs and other water savings practices. Funding for all conservation activities is subject to approval by the CPUC before programs can be implemented. Some of the programs that may be considered by GSWC include financial incentives, regulatory approaches, and information elements.

5.8.1 2015 Adjustments of 2015 Gross Water Use

CWC 10608.24

- (d)(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:
- (A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.
 - (B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.
 - (C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.
- (2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

Methodology Document, Methodology 4

This section discusses adjustments to compliance-year GPCD because of changes in distribution area caused by mergers, annexation, and other scenarios that occur between the baseline and compliance years.

The Southwest System gross water use for 2015 achieves the calculated interim target of 124 GPCD. No adjustments are being made to the 2015 gross water use for the Southwest System (see Table 5-3).

Table 5-3: 2015 Compliance					
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments to 2015 GPCD Enter "0" for adjustments not used From Methodology 8		2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		TOTAL Adjustments	Adjusted 2015 GPCD		
87	124	0	87	87	Yes
*All values are in Gallons per Capita per Day (GPCD)					
NOTES: Based on DWR Table 5-2.					

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Chapter 6: System Supplies

This chapter addresses the water supply sources of the Southwest System of GSWC. Currently, the water supply sources for the Southwest System include imported water, GSWC operated groundwater wells, and recycled water.

6.1 Purchased or Imported Water

Water is purchased from the Central Basin Municipal Water District (CBMWD) and the West Basin Municipal Water District (WBMWD), which are both large purveyors of water in southern California that obtain their imported water supplies from the Metropolitan Water District of Southern California (Metropolitan). CBMWD and WBMWD provide water to several agencies, including GSWC. GSWC obtains water from these districts for several systems including the Southwest System. Water imported from CBMWD and WBMWD is delivered to the Southwest System through the following connections:

- Metropolitan CB-4 connection with a design capacity of 4,488 gallons per minute (gpm)
- Metropolitan CB-55 connection with a design capacity of 6,727 gpm
- Metropolitan WB-1 connection with a design capacity of 4,488 gpm
- Metropolitan WB-2A connection with a design capacity of 8,960 gpm
- Metropolitan WB-11 connection is offline with a design capacity of 2,244 gpm
- Metropolitan WB-12 connection with a design capacity of 2,244 gpm
- Metropolitan WB-13 connection with a design capacity of 2,244 gpm
- Metropolitan WB-15 connection with a design capacity of 11,212 gpm
- Metropolitan WB-25A connection with a design capacity of 2,243 gpm
- Metropolitan WB-25B connection with a design capacity of 2,243 gpm
- Metropolitan WB-30 connection with a design capacity of 3,366 gpm
- Metropolitan WB-31 connection with a design capacity of 5,610 gpm
- Metropolitan WB-33 connection with a design capacity of 4,488 gpm

The two connections with CBMWD have a combined maximum capacity of 11,215 gpm (18,057 AFY), and the eleven connections with WBMWD have a combined maximum capacity of 47,098 gpm (76,020 AFY). Together, these connections have a total capacity of 58,313 gpm (83,304 AFY). Between 2011 and 2015 total purchased water quantities ranged from 12,440 AF to 21,023 AF. It should be noted that the connection capacity to deliver imported water to GSWC is significantly higher than the projected imported water supply that is expected to meet normal year demands.

GSWC entered into 5-year purchase agreements with both WBMWD and CBMWD, effective January 1, 2008 through December 31, 2012. The agreements were extended an additional two years to December 31, 2014. The agreements were both based on a two tier rate structure: Tier 1 for quantities purchased within the agreement allocation and Tier 2 for supply purchase in excess of the agreement quantity. Effective January 1, 2015 through December 31, 2024, both CBMWD and WBMWD entered into new ten-year purchase agreements with Metropolitan Water District (MWD). For the first five years of the new purchase agreement terms, WBMWD staff recommended to not enter into agreement with customer agencies. However, at the five-year mark staff will reevaluate the need to have purchase order agreements with the customer agencies. CBMWD did not enter into purchased water agreements with its customer agencies but instead staff recommended a Tier 1 budget for each agency establishing annual Tier 1 water purchase limits. These limits are shared by all of GSWC's systems served by CBMWD.

Metropolitan is responsible for meeting all drinking water standards as water leaves the treatment plants and at all inter-connections.

6.2 Groundwater

The Southwest System is supplied by two active, GSWC-owned wells in the Central Subbasin of the Coastal Plain of Los Angeles Groundwater Basin (commonly referred to as the "Central Basin"), and 10 active, GSWC-owned wells in the West Coast Subbasin of the Coastal Plain of Los Angeles Groundwater Basin (commonly referred to as the "West Coast Basin").

6.2.1 Basin Description

CWC 10631

- (b) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*
 - (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater.*

The two groundwater basins are shown on Figure 6-1 and described in the following subsections.

6.2.1.1 Central Basin

The Southwest System's wells are located within the adjudicated Central Basin Watermaster Service Area, which overlies about 227 square miles of the Central Basin in the southeastern part of the Los Angeles Coastal Plain in Los Angeles County. The Central Basin Watermaster Service Area is bounded by the Newport-Inglewood Uplift on the southwest, the Los Angeles-Orange County line on the southeast, and an irregular line that approximately follows Stocker Street, Martin Luther King Boulevard, Alameda Street, Olympic Boulevard, the boundary between the City of Los Angeles and unincorporated East Los Angeles, and the foot of the Merced and Puente Hills on the north. Within the Central Basin, groundwater provides a significant portion of the water supply (Central Basin Watermaster, 2014).



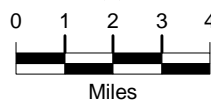
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Legend



Southwest System Boundary

N



Kennedy/Jenks Consultants

Golden State Water Company
2015 Urban Water Management Plan

Groundwater Basin Map

K/J 1570027.00
September 2016

Figure 6-1

The Central Basin is subdivided into four areas: The Los Angeles forebay, the Montebello forebay, the Whittier area, and the Central Basin pressure area. The Los Angeles forebay is located in the northern part of the Central Basin where the Los Angeles River enters the Basin through the Los Angeles Narrows. The Montebello forebay extends southward from where the San Gabriel River enters the Central Basin through the Whittier Narrows. The Montebello forebay is considered the most important area of recharge in the Central Basin (DWR, 2004a). Both forebay areas have unconfined groundwater conditions and aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer systems of the Central Basin (DWR, 1961). The Whittier area extends south and southwest from the Puente Hills to the axis of the Santa Fe Springs-Coyote Hills uplift. The Whittier area contains up to 1,000 feet of freshwater-bearing sediments (DWR, 2004a). The Central Basin pressure area contains many aquifers of permeable sands and gravels separated by semi-permeable to low permeability sandy-clay to clay. Aquifers in the Central Basin pressure area extend approximately 2,200 feet below the surface (DWR, 1961). The aquifers in the Whittier area and Central Basin pressure area are generally confined, but areas with semi-permeable aquitards allow some interaction between aquifers (DWR, 2004a).

The main freshwater-bearing aquifers are contained within the Holocene alluvium and the Pleistocene Lakewood and San Pedro Formations. The main productive aquifers within the Basin are the Gardena and Gage aquifers in the Lakewood Formation and the Silverado, Lynwood, and Sunnyside aquifers in the San Pedro Formation (DWR, 1961). The Gardena and Gage aquifers are primarily comprised of sand and gravel and have a total maximum thickness of 280 feet (DWR, 2004a). Aquifers within the San Pedro Formation are comprised of coarse sand, gravel, and sandy gravel and have a combined maximum thickness of 800 feet (DWR, 2004a).

Recharge occurs from percolation of precipitation, stream flow, and return flow of applied waters (e.g., irrigation), from artificial recharge activities at spreading grounds, and injection of imported water into the Alamitos Barrier Project (a seawater intrusion barrier located in the southeastern part of the Basin). Recharge of the Basin occurs in the forebay areas due to the presence of permeable sediments, whereas the pressure area is overlain by less permeable silt and clay units that preclude significant recharge. Purchased water from Metropolitan and recycled water from the Whittier and San Jose Treatment Plants are used for recharge in the spreading grounds in the Montebello forebay area. The total groundwater storage capacity of the Central Basin is approximately 13,800,000 AF (DWR, 1961). Groundwater flow is predominantly from the foothills northeast of the Central Basin towards the ocean to the southwest.

The two groundwater wells for the Southwest System located in the Central Basin meet all current State and Federal drinking water standards.

6.2.1.2 West Coast Basin

The adjudicated West Coast Basin underlies 160 square miles in the southwestern part of the Los Angeles Coastal Plain in Los Angeles County. The Basin is bounded on the west by Santa Monica Bay, on the north by the Ballona Escarpment, on the east by the Newport-Inglewood Uplift, and on the south by San Pedro Bay and the Palos Verdes Hills. A substantial portion of the water supply for the area overlying the Basin is pumped directly from groundwater storage (DWR, 2014).

The main freshwater-bearing aquifers are contained within the Holocene alluvium and the Pleistocene Lakewood and San Pedro Formations. The most productive aquifers within the Basin are the Gardena and Gage aquifers in the Lakewood Formation and the Silverado,

Lynwood, and the unnamed aquifers in the San Pedro Formation (DWR, 1961). The Gardena and Gage aquifers are comprised primarily of fine to coarse sand and gravel and have a total maximum thickness of 320 feet (DWR, 2004b). Wells completed in the Gage aquifer typically produces water at rates ranging from 100 to 1300 gpm. The aquifers within the San Pedro Formation are comprised of coarse sand, gravel, and sandy gravel; and have a combined maximum thickness of 1200 to 1400 feet (DWR, 2004b). The Silverado aquifer, underlying most of the West Coast Basin, is the most productive aquifer in the Basin, yielding approximately 80 to 90 percent of the groundwater extracted annually (DWR, 2004b).

Natural recharge to the West Basin's groundwater supply is mostly underflow from the Central Basin, through the Newport-Inglewood fault zone. Injection wells in the West Coast Basin Barrier and Dominguez Gap Barrier create mounds of freshwater that help protect the West Coast Basin from seawater intrusion. Other minor sources of recharge include percolation of precipitation, irrigation return flow from fields and lawns, and other applied surface waters (DWR, 2004b). The storage capacity of the primary water producing aquifer, the Silverado aquifer, is estimated to be 6,500,000 AF (DWR, 2004b). Groundwater levels have risen approximately thirty feet since the Basin was adjudicated in 1961 (DWR, 2004b). Injection along the West Coast Basin Barrier and Dominguez Gap Barrier causes groundwater to flow inland from the coast.

The groundwater wells for the Southwest System in the West Coast Basin meet all current State and Federal drinking water standards; however there are impacts from manganese (Mn), hydrogen sulfide (H₂S), and iron.

- **Manganese.** Five wells within the Southwest System are affected by Mn, four of which have a California secondary Maximum Contaminant Level (MCL) of 50 micrograms per liter (µg/L). In order to address the Mn issue, four out of the five affected wells have existing treatment processes, including pyrolusite media and dual media filtration.
- **Hydrogen Sulfide Odor.** H₂S is another naturally occurring constituent within the Southwest System affecting 6 of the total 14 wells. Currently H₂S is unregulated, however the odor is being reduced by oxidation with chlorine.
- **Iron.** Iron levels are closely monitored in the Southwest System. No wells currently exceed the California secondary MCL of 300 µg/L.

6.2.2 Groundwater Management

CWC 10631

- (b) *...If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*
- (1) *A copy of any groundwater management plan adopted by the urban water supplier... or any other specific authorization for groundwater management.*
 - (2) *...For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.*

Under the Sustainable Groundwater Management Act of 2014 (SGMA), the Central Basin and West Coast Basin are exempted from the requirement to form a Groundwater Sustainability Agency since they are adjudicated basins.

6.2.2.1 Central Basin Adjudication

In 1965, the Central Basin was adjudicated in the case *Central and West Basin Water Replenishment District vs. Charles E. Adams, et al* (Superior Court, County of Los Angeles, Case no. 786656). The Central Basin Judgment (Appendix H) limits the amount of groundwater each party can extract annually from the Basin. This limit is referred to as the “Allowed Pumping Allocation” (APA), which is a fraction of each party’s water rights and is monitored by a court-appointed Watermaster. The Watermaster administers and enforces the terms of the Judgment and reports annually to the Court on significant groundwater-related events that occur in the Basin. In 2013, the Third Amended Judgment was accepted by the Court. The Third Amended Judgment modified the structure of the Watermaster from being administered by DWR to a three panel structure: an administrative body administering Watermaster accounting and reporting, a water rights panel made up of seven water right holders, and a storage panel. The amendment now allows storage in the basin by the water right holders. The Court also retained jurisdiction to monitor ongoing management of the Basin, including the conjunctive use of Basin storage space, to assure the Basin will be capable of supplying sufficient water to meet local needs, including future growth and development.

The Central Basin adjudication limit (total of the allowed pumping allocations of each party) for groundwater extraction across the entire basin is 217,367 AFY. GSWC maintains an APA of 16,439 AFY. GSWC’s APA is shared between all of their systems that extract groundwater from the Central Basin: Norwalk, Florence-Graham, Hollydale, Willowbrook, Artesia, Bell/Bell Gardens, and portions of the Southwest System. GSWC reports total groundwater extractions (on a per-well basis) to the Watermaster.

Three agencies, Los Angeles County Department of Public Works (LACDPW), Water Replenishment District of Southern California (WRDSC), and CBMWD, work with the water producers to ensure that the APA is available to the pumpers in the Central Basin. LACDPW operates and maintains the Rio Hondo and San Gabriel spreading grounds in the Montebello forebay. LACDPW diverts and recharges storm flows from the Rio Hondo and San Gabriel Rivers, highly treated wastewater from the Sanitation Districts of Los Angeles County (LACSD) (Whittier and San Jose Wastewater Reclamation Plants), and purchased water from Metropolitan (including both State Water Project [SWP] water and Colorado River water). LACDPW, in conjunction with Orange County Water District, WRDSC, City of Long Beach and GSWC, operates and maintains the Alamitos Barrier Project to recharge imported water into this injection barrier, which is designed to prevent seawater intrusion into the Central Basin. WRDSC collects a replenishment assessment from all groundwater producers in the Basin to pay for water supplies to replenish the Basin. Annually, by statute, WRDSC is required to determine replenishment requirements. WRDSC pays CBMWD for imported and recycled water for recharge into the Central Basin.

6.2.2.2 West Coast Basin Adjudication

In 1961, the West Coast Basin was adjudicated in the case *California Water Service Company, et al vs. City of Compton, et al* (Superior Court, County of Los Angeles, Case No. 506806, Appendix H). The West Coast Basin Judgment limits the amount of groundwater each party can extract annually from the Basin. Groundwater producers held by the Judgment have the right to annually pump the volume of water as decided in the adjudication. These limits are monitored by a court-appointed Watermaster. The Watermaster administers and enforces the terms of the

Judgment and reports annually to the Court on significant groundwater-related events that occur in the Basin. The Court also retained jurisdiction to monitor ongoing management of the Basin, including the conjunctive use of Basin storage space, to assure the Basin will be capable of supplying sufficient water to meet local needs, including future growth and development. In 2014, an Amended Judgment was accepted by the Court. The Amended Judgment modified the structure of the Watermaster from being administered by DWR to a three panel structure: an administrative body administering Watermaster accounting and reporting, a water rights panel made up of members of the West Basin Water Association, and a storage panel. The amendment now allows storage in the basin by the water right holders. The Court also retained jurisdiction to monitor ongoing management of the Basin, including the conjunctive use of Basin storage space, to assure the Basin will be capable of supplying sufficient water to meet local needs, including future growth and development.

The West Coast Basin adjudication limit for groundwater extraction across the entire basin is 64,468 AFY. GSWC maintains legal rights to 7,502 AFY. GSWC reports monthly groundwater extractions (on a per-well basis) to the Watermaster.

Three agencies, LACDPW, WRDSC, and WBMWD, collaborate with the groundwater producers such as GSWC to ensure that the APA is available to be pumped from wells in the West Coast Basin. LACDPW operates and maintains the West Coast Barrier Project and Dominguez Gap Barrier Projects, which maintain groundwater levels at the coast line to prevent seawater intrusion. LACDPW injects a combination of equal parts of highly treated wastewater from the WBMWD's water recycling plant located in El Segundo and imported water from Metropolitan (including both SWP water and Colorado River water). WBMWD is expanding the West Basin recycled water plant to allow up to 100 percent recycled water injection into the West Coast Basin Barrier Project. LACDPW injects imported water from Metropolitan (including both SWP water and Colorado River water) into the Dominguez Gap Barrier Project. The project currently is permitted for up to 6 million gallons per day of recycled water to be injected into the barrier with a 50 percent blend with potable water over a 60 month running average. Plans are underway to increase the permitted amount to 100 percent by 2018 WRDSC collects a replenishment assessment from all groundwater producers in the Basin to pay for water supplies to replenish the Basin, which is through the injection barrier. By statute, WRDSC is required to determine replenishment requirements annually. WRDSC pays WBMWD for imported and recycled water for recharge into the West Coast Basin.

6.2.3 Overdraft Conditions

CWC 10631

(b)(2) 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.

Prior to adjudication, groundwater supply in the Central Basin and West Coast Basin was threatened by overdraft. The basins are now adjudicated and managed by their respective Watermasters, which have halted the overdraft.

6.2.4 Historical Groundwater Pumping

CWC 10631

(b)...If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

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

Table 6-0 lists the wells, along with the well capacity, status, and water quality assessment for the Southwest System. GSWC currently operates 10 active wells in the Southwest System, eight of which are in the West Coast Basin, and the remaining two are in the Central Basin. The Southwest System has a total normal year active well capacity of 10,865 gpm (17,525 AFY), of which 8,715 gpm (14,057 AFY) is in the West Coast Basin, and 2,150 gpm (3,468 AFY) is in the Central Basin.

GSWC has historically obtained leases to augment its APA in the Central Basin, averaging 4,190 AFY from 1999 to 2015. GSWC has also historically leased groundwater pumping rights in the West Coast Basin, averaging 5,336 AFY over the last ten years. Leases for additional groundwater in both the Central Basin and West Coast Basin are renewed annually, on an as-needed basis, and after an evaluation of the economic benefits to rate payers. In each year, between 27,392 AFY and 61,067 AFY of available APA has not been pumped in the Central Basin and between 31,678 and 39,889 AFY of adjudicated rights has not been pumped in the West Coast Basin. A portion of this unpumped water could be available for GSWC to lease, on an annual basis, to augment their Central Basin APA and/or West Coast Basin water rights and support overall water supply reliability. Water transfers and exchanges may also be undertaken as part of conjunctive use storage programs to be developed.

Table 6-1 shows the groundwater pumping history for the Southwest System from calendar years 2011 through 2015. The total groundwater pumping for the Southwest System has ranged from 5,915 AFY to 16,377 AFY.

Table 6-0: Well Name and Capacity, and Water Quality Assessment						
Well	Design Well Capacity (gpm) ⁽¹⁾	Design Well Capacity (AFY)	Status	Water Quality Issue/Concern	Existing Treatment	Recommendations
Central Basin						
Belhaven No. 3	950	1,532	Active	None	None	
Belhaven No. 4	1,200	1,936	Active	None	None	
West Coast Basin						
Ballona No. 4	600	968	Active	H ₂ S Odor	None	Continue monitoring and possibly install future H ₂ S odor removal
Ballona No. 5	800	1,290	Active	H ₂ S Odor	None	Continue monitoring and possibly install future H ₂ S odor removal
Compton-Doty No. 1	600	968	Active	None	None	
Dalton No. 1	800	1,290	Active	None	None	
Dalton No. 2 ⁽²⁾	2,500	4,030	In Construction			
Doty No. 1	700	1,129	Active	Mn, H ₂ S Odor	Removal with Pyrolusite Media for Mn, and H ₂ S odor removal	
Doty No. 2	1,000	1,613	Active	Mn, H ₂ S Odor	Removal with Pyrolusite Media for Mn, and H ₂ S odor removal	
Goldmedal No. 1	1,000	1,613	Active	Mn	Dual media filter for Mn removal	
Southern No. 5	900	1,452	Active	Mn	Dual media filter for Mn removal	
Southern No. 6	1,065	1,718	Active	Mn	None	Continue monitoring and possibly install Mn treatment system in the future
Yukon No. 4	0	0	Inactive	H ₂ S Odor	Free chlorination for H ₂ S odor removal	See section 5.2.2
Yukon No. 5	0	0	Inactive	H ₂ S Odor	Free chlorination for H ₂ S odor removal	See section 5.2.2
129 th St. No. 2	1,250	2,016	Active	None	None	
Total Capacity	10,865	17,525				
Note: 1. Design production capacity is provided; actual annual average and instantaneous pumping capacity may vary for each well. 2. Dalton Well 2 is in construction and will be operational by the end of 2016. Design capacity may vary slightly at the time that it is put into service.						

Table 6-1: Groundwater Volume Pumped						
Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	Central Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	3,260	3,250	2,920	2,861	430
Alluvial Basin	West Coast Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	13,116	12,732	12,738	13,333	5,484
TOTAL		16,377	15,981	15,658	16,194	5,915
NOTES: Volume is in AFY.						

6.3 Surface Water

The Southwest System purchases surface water through CBMWD and WBMWD as described in Section 6.1, but does not self-supply surface water. Therefore this section is intentionally left blank.

6.4 Stormwater

In the Southwest System service area, stormwater is managed by the Cities of Carson, Compton, El Segundo, Gardena, Hawthorne, Inglewood, Lawndale, and Redondo Beach, and the County of Los Angeles. GSWC does not have infrastructure for beneficial reuse of stormwater. Therefore, this section is intentionally left blank.

6.5 Wastewater and Recycled Water

6.5.1 Recycled Water Coordination

CWC 10633

The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.

WBMWD, acting as the recycled water wholesaler, is the lead agency in the implementation of the recycled water plan and distribution network. GSWC provides data to WBMWD for its use in planning a potential recycled water distribution system expansion and identifying additional recycled water customers.

The City of Los Angeles provides a reliable supply of recycled water that meets California recycled water quality standards set forth in Title 22 of the California Code of Regulations.

6.5.2 Wastewater Collection, Treatment, and Disposal

CWC 10633

- (a) (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.

CWC 10633

- (b) (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.

Wastewater in the Southwest System is collected by gravity sewers and lift stations owned by the Cities of Compton, El Segundo, Gardena, Hawthorne, Inglewood, Lawndale, and Redondo Beach, as well as by LACSD. The wastewater is transported through trunk sewers to the LACSD's Joint Water Pollution Control Plant (JWPCP), in Carson, California.

The JWPCP provides both primary and secondary wastewater treatment for an average dry weather flow (DWF) of 280 million gallons per day (mgd). The JWPCP has a design capacity of 400 mgd. The plant serves a population of approximately 3.5 million people throughout Los Angeles County. The treated wastewater is disinfected with hypochlorite and discharged to the Pacific Ocean through a network of outfalls. These outfalls extend 1.5 miles off the coast of Southern California near the Palos Verdes Peninsula to a depth of 200 feet.

Because the JWPCP treats wastewater for a larger population than exists in the Southwest System, an estimated per capita wastewater generation factor was used to calculate the volume of wastewater generated by the customers in the Southwest System in Table 6-2. The wastewater generation factor is based on the population served and the 2015 volumes collected for the JWPCP.

JWPCP only provides primary and secondary treatment, and does not meet recycled water quality standards. Therefore, 100 percent of the wastewater flow generated in the Southwest System is discharged into the Pacific Ocean through LACSD's network of outfalls. The discharge point is not located within the Southwest System service area; therefore, Table 6-3 is left blank.

Table 6-2: Wastewater Collected Within Service Area in 2015

Wastewater Collection			Recipient of Collected Wastewater		
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?
Sanitation Districts of Los Angeles County	Estimated	24,676	Sanitation Districts of Los Angeles County	Joint Water Pollution Control Plant	No
Total Wastewater Collected from Service Area in 2015:		24,676			
NOTES: Units are in AF.					

Table 6-3: Wastewater Treatment and Discharge Within Service Area in 2015

<input checked="" type="checkbox"/>	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.								
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 volumes			
						Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Total						0	0	0	0
NOTES:									

6.5.3 Recycled Water System

CWC 10633

(c) (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.

Although the wastewater generated in the Southwest System is treated by LACSD and 100 percent of the wastewater flow is discharged to the Pacific Ocean, the Southwest System receives recycled water that originates in the City of Los Angeles' Hyperion WWTP. This recycled water source is provided by WBMWD.

WBMWD acquires, controls, distributes, and sells recycled water to several cities, agencies, and customers in the greater Los Angeles area. The Southwest System currently receives recycled water from WBMWD as part of the district's West Basin Recycled Water Project (WBRWP). The WBRWP collects secondary effluent from the Hyperion WWTP and treats it to meet Title 22 recycled water standards at WBMWD's West Basin Water Recycling Facility in El Segundo, California. The recycled water produced by WBMWD is used throughout the region for beneficial uses such as landscape irrigation, industrial applications (including cooling water and boiler feed water), and other purposes such as groundwater injections to control seawater intrusion.

Records show that the average recycled water used in the Southwest System from 2011 through 2015 was 438 AFY, and the maximum (in year 2014) was 557 AFY. Given that this maximum demand was met by the WBMWD supply, the value of 557 AFY is assigned as the current potential recycled water use for the Southwest System. The total potential recycled water use for the Southwest System is calculated as the sum of the existing potential recycled water use (557 AFY) and the future potential use (252 AFY) resulting from projects identified in the Plan, which would take effect in 2020.

6.5.4 Recycled Water Beneficial Uses

CWC 10633

- (d) *(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.*

CWC 10633

- (e) *(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.*

WBMWD owns all of the existing recycled water pipelines that fall within the boundaries of the Southwest System and is planning to expand its distribution system to continue offsetting potable water demands in its service area. In 2009 WBMWD completed their *Capital Implementation Master Plan (CIMP)* which includes planned recycled water projects. The capital improvement projects identified within the Southwest System for phased construction in fiscal years 2015 through 2030 and the associated increased in recycled water demand are summarized below:

- Rowley Park, 31 AFY
- Fukai (Recreation) Park, 7 AFY
- Freeman Park, 3 AFY
- Bell Park, 3 AFY
- Arthur Lee Johnson Memorial Park (South Garden Park) , 33 AFY
- Thornburg Park, 4 AFY
- Serra High School, 18 AFY
- Vermont Medians, 24 AFY
- LAUSD - Peary Jr High, 20 AFY
- Prime Wheel, 27 AFY (Industrial Use)
- One Hundred Fifty Third Street E, 3 AFY
- Crescendo Charter School, 1 AFY
- C Star Nursery, 14 AFY
- Moneta Nursery, 8 AFY
- Veterans Park and Sports Complex, 27 AFY
- Stevenson Park, 29 AFY

The potential customers identified for these projects, with a total increase in demand of 252 AFY by 2020, are primarily parks, schools and other facilities that would use the recycled water for landscape irrigation.

Although there is great potential to increase recycled water use in their service area, there are challenges and limitations in connecting customers. The WBMWD CIMP lists likelihood of project completion, use type, and service area (WBMWD, 2009). However, if and when additional customers are identified, GSWC will work with WBMWD to determine the feasibility of increasing the potential recycled water use for the Southwest System and additional demands will be updated in future UWMPs. Estimates of additional potential recycled water use are shown in Table 6-4.

Table 6-4: Current and Projected Retailers Provided Recycled Water Within Service Area*								
<input type="checkbox"/>	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:		West Basin Municipal Water District						
Name of Agency Operating the Recycled Water Distribution System:		West Basin Municipal Water District						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		N/A						
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040 (opt)
Landscape irrigation (excludes golf courses)	Parks, schools, medians, nurseries	Tertiary	393	782	782	782	782	782
Industrial use	Prime Wheel	Tertiary	0	27	27	27	27	27
		Total:	393	809	809	809	809	809
<i>IPR - Indirect Potable Reuse</i>								
NOTES: Volume is in AFY.								

Due partly to the economic downturn and a plateau in demand, the actual volume of recycled water delivered in the Southwest System was 393 AF in 2015, which was higher than the demand projected in the 2010 UWMP (see Table 6-5).

Table 6-5: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
Use Type	2010 Projection for 2015	2015 actual use
Landscape irrigation (excludes golf courses)	187	393
Industrial use	187	0
Total	374	393

Currently, WBMWD's recycled water is distributed to customers for non-potable applications including landscape irrigation, commercial and industrial processes, and indirect potable reuse through groundwater replenishment (WBMWD, 2016). Indirect potable reuse serves two purposes as it prevents seawater intrusion into the groundwater aquifers, as well as replenishing the water that is removed by drinking water wells. The WBMWD 2015 Urban Water Management Plan contains additional information regarding recycled beneficial reuse.

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

CWC 10633

- (f) (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.

CWC 10633

- (g) (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.

GSWC works with WBMWD in a variety of programs intended to enhance regional water supply. As discussed in Section 6.2.2, WBMWD is currently evaluating projects that would benefit the Southwest System, including the expanded use of recycled water for groundwater replenishment. See WBMWD's 2015 UWMP for details.

Furthermore, GSWC provides data to WBMWD for planning system expansion and identifying large landscape water users. Once identified, GSWC works with the wholesaler in meeting with customers and explaining the benefits of using recycled water. GSWC also participates in the local workshops held by the wholesalers and distributes conservation materials and literature, including a discussion of recycled water and its benefits at local community events.

Table 6-6 provides a summary of the actions performed by GSWC to encourage recycled water use and the resulting projected use. For the Southwest System, it is assumed that the financial incentives of using recycled water account for 100 percent of the recycled water sales. The CPUC encourages recycled water use and is currently conducting a proceeding to evaluate targets for recycled water use, and potential penalties for not participating in the program. Additional program actions, such as this, may support increased recycled water use within the service area in the future.

Table 6-6: Methods to Expand Future Recycled Water Use			
<input type="checkbox"/>	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Financial Incentives		2020	416
Total			416
NOTES: Volume is in AFY.			

6.6 Desalinated Water Opportunities

CWC 10631

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

Wholesalers providing water to the Southwest System are actively pursuing seawater desalination projects. Water produced by these desalination projects would increase the total available water supply for the wholesalers and would, in-turn, improve the reliability of water supply for the Southwest System. However, the amount of desalinated water that will be available for the Southwest System has not been quantified. The following discussion summarizes the desalination plans of water wholesalers.

Metropolitan and its member agencies view seawater desalination as a component of a diversified water supply portfolio. Recent and continuous breakthroughs in membrane technology have helped to reduce desalination costs, leading to the consideration of desalination among the alternative resource options outlined in Metropolitan's 2010 Integrated Resources Plan (IRP) Update. This updated plan describes a diversified regional strategy to include recycled water, groundwater recharge, and seawater desalination in its portfolio of methods to ensure robust water supply reliability. In 2001, Metropolitan established the Seawater Desalination Program to encourage its member agencies to develop desalination projects, and in the 2004 IRP Update established a target goal of up to 150,000 AFY of desalination capacity from its retailers by 2025. In 2014, Metropolitan included desalination projects in its Local Resources Program. This is an important component of the total estimated water supply production for the region. (Metropolitan, 2016)

Metropolitan is also involved in efforts to assess current desalination projects and to compare project features and applicability to Southern California. Furthermore, Metropolitan, in association with member agencies, is involved in assessing established and emerging desalination treatment technologies, pretreatment alternatives, and brine disposal issues, as well as the permitting and regulatory approvals associated with the delivery of desalinated seawater to regional and local distribution systems. (Metropolitan, 2016)

WBMWD is also involved in researching new water supplies in support of Metropolitan's desalination initiative, and sees ocean water desalination as an economically viable source of future water supply. In 2002, WBMWD initiated piloting efforts and operated a 40,000 gallons per day (gpd) seawater desalination pilot project with a goal of identifying optimal performance conditions and evaluating water quality. The data obtained from this pilot project indicate that the treatment approach of utilizing microfiltration pretreatment and reverse osmosis provides a reliable water quality that meets all state and federal drinking water standards (WBMWD, 2016).

WBMWD is planning to install a full-scale seawater desalination plant with a capacity of between 20,000 and 70,000 AFY by 2023, and as a first step operated the Oceanwater Desalination Demonstration Facility from November 2010 to January 2015. The demonstration project produced 100,000 gpd and was used to evaluate the water quality, performance and treatment stability; optimize operational performance utilizing full scale process equipment; and acquire the necessary data to achieve regulatory compliance and approval. In addition, WBMWD has developed an Ocean Water Desalination Program Master Plan to evaluate supply availability, water demands, siting alternatives, intake and discharge facilities, treatment process

engineering and technological requirements, conveyance and distribution requirements, system integration and treated water quality requirements, environmental and permitting requirements, power supply development, capital and O&M costs, project delivery, and operational requirements. In 2015, WBMWD began preparing the Draft Environmental Impact Report for a desalination facility located at the NRG El Segundo Generating Station (WBMWD, 2016).

CBMWD is land locked without direct access to the ocean and therefore does not view desalination as a practical nor economically feasible water supply option at this time. Additionally, seawater barriers are not employed within CBMWD's service area, so recovery and desalination of brackish groundwater is not a viable potential water resource. However, CBMWD could provide financial assistance to other SWP contractors or wholesalers such as WBMWD in the construction of their seawater desalination facilities in exchange for SWP supplies.

6.7 Exchanges or Transfers

CWC 10631

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

No specific transfer or exchange opportunities have been identified for the Southwest System at this time. Water transfers and exchanges may be undertaken as part of future conjunctive use storage programs.

6.7.1 Emergency Interties

GSWC maintains emergency connections with several adjoining municipalities to provide emergency supplemental water sources. GSWC has emergency connections with the following entities:

- City of Inglewood: six emergency connections with design capacities of 9,200 gpm (14,847 AFY)
- City of Hawthorne: three emergency connections with design capacities of 3,500 gpm (5,635 AFY)
- Liberty Utilities (formerly Park Water Company): two emergency connections with design capacities of 1,250 gpm (1,017 AFY)
- California Water Services Company: one emergency connection

Liberty Utilities' service area is adjacent to GSWC's service area, and therefore may likely be impacted by the same emergency as GSWC and be unable to supply water during an emergency. The emergency connections are subject to the availability of the respective water systems.

6.8 Future Water Projects

CWC 10631

- (g) ...The urban water supplier shall include a detailed description of expected future projects and programs... 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.

GSWC plans to purchase and store water in the Central Basin and/or the West Coast Basin in accordance with the Third Amended Judgment. Implementation of storage programs may involve constructing new wells and other infrastructure improvements. Supply associated with a conjunctive use storage program in the Central and West Coast Basins is not determined. In addition, as part of its ongoing Capital Improvement Program, GSWC constructs new wells, pipelines, and treatment systems as needed to maintain its supply and meet distribution system requirements.

Another potential long-term water supply transfer opportunity that GSWC is evaluating is the Cadiz Valley Water Conservation, Recovery and Storage Project (Cadiz Project). The project is designed to capture and conserve thousands of acre-feet of native groundwater currently being lost to evaporation through an aquifer system beneath Cadiz's property in eastern San Bernardino County, California. By implementing established groundwater management practices, the project will create a new, sustainable annual water supply for project participants. In addition, the project offers storage capacity that can be used by participants to carry-over – or “bank” – annual supplies, without the high rates of evaporative loss suffered by local surface reservoirs.

The Cadiz Project will produce up to 50,000 AFY for fifty years. GSWC is one of five entities that have expressed an interest in receiving water from the project. In 2009, GSWC signed a letter of intent to purchase up to 5,000 AFY and committed to paying a share of the cost of the project's environmental evaluation. GSWC continues to evaluate the economics and technical feasibility of this project.

Table 6-7: Expected Future Water Supply Projects or Programs

<input type="checkbox"/>	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.				
<input checked="" type="checkbox"/>	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.				
6-18	Provide page location of narrative in the UWMP				
Name of Future Projects or Programs	Joint Project with other agencies?	Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to
NOTES:					

6.9 Summary of Existing and Planned Sources of Water

CWC 10631

- (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision 10631 (a).*
- (4) (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.*

As described in the preceding sections, current water supply sources for the Southwest System include imported water, GSWC-operated groundwater wells, and recycled water. Imported water is purchased from WBMWD and CBMWD. WBMWD and CBMWD obtain their imported water supplies from Metropolitan. Recycled water is also supplied by WBMWD. GSWC operates several groundwater wells within the Southwest System, and has adjudicated allowed groundwater pumping allocations in both the West Coast Basin and Central Basin. In addition to adjudicated groundwater pumping rights, GSWC also has the ability to lease groundwater rights when they are available. Table 6-8 summarizes the actual water supplied for the Southwest System in 2015.

In 2015, imported water made up approximately 77 percent of the available supply, 22 percent of the supply is from GSWC groundwater pumping and 1 percent is provided by recycled water sources. In future years, imported water could be as great as 80 percent or higher depending on groundwater allocations, the availability to lease additional groundwater rights, and groundwater quality considerations. Therefore, GSWC is actively pursuing the availability of a reliable, cost effective supply of imported water through the implementation of conjunctive use storage programs in the Central and West Coast basins. Storage programs could utilize water imported from WBMWD and CBMWD or water imported from other suppliers.

Table 6-8: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
<i>May use each category multiple times.</i>		Actual Volume	Water Quality	Total Right or Safe Yield (optional)
Purchased or Imported Water	Central Basin Municipal Water District	3,627	Drinking Water	
Purchased or Imported Water	West Basin Municipal Water District	17,397	Drinking Water	
Groundwater	Central Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	430	Drinking Water	
Groundwater	West Coast Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	5,484	Drinking Water	
Recycled Water	West Basin Municipal Water District	393	Recycled Water	
Total		27,331		0
NOTES: Volume is in AF.				

Table 6-9 summarizes the planned water supplies available to GSWC for the Southwest System that will meet their projected water demands during normal water year conditions. The availability of water from each source is estimated through the year 2040, in accordance with GSWC's long-term water supply planning projections and those of its wholesale suppliers. GSWC's groundwater rights and future leases within the Central Basin are shared among all GSWC systems in the basin; therefore, the actual pumping amounts for wells in each system could vary based on GSWC's overall system management. Access to local groundwater and imported water affords GSWC flexibility to meet demands in all of its systems. In addition to GSWC's APA in the Central Basin and adjudicated rights in the West Coast Basin, GSWC also has the ability to annually lease groundwater rights, if needed and available. Leased groundwater quantities are determined annually for all GSWC systems that obtain groundwater from the basin. While quantifiable estimates of groundwater leases are not available for future years, projections are based on historical pumping amounts, including leased groundwater, and assume that available unpumped groundwater will continue to be available as in the past.

GSWC's water supply is projected to increase by about 27 percent from 2015 to 2040 to meet projected water demands, with most of this demand being met by imported water obtained from WBMWD and CBMWD, and leased groundwater.

Table 6-9: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply <i>Report To the Extent Practicable</i>				
<i>May use each category multiple times.</i>		2020	2025	2030	2035	2040 <i>(opt)</i>
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	Central Basin Municipal Water District	2,800	2,800	2,800	2,800	2,800
Purchased or Imported Water	West Basin Municipal Water District	13,371	13,792	14,216	14,645	15,080
Groundwater	Central Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	3,100	3,100	3,100	3,100	3,100
Groundwater	West Coast Subbasin in the Coastal Plain of Los Angeles Groundwater Basin	7,502	7,502	7,502	7,502	7,502
Groundwater	West Coast Subbasin in the Coastal Plain of Los Angeles Groundwater Basin (leased water)	5,498	5,498	5,498	5,498	5,498
Recycled Water	Purchased from WBMWD	809	809	809	809	809
Total		33,080	33,501	33,925	34,354	34,789

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Chapter 7: Water Supply Reliability Assessment

As discussed in the preceding sections, the Southwest System current water supply sources include imported Metropolitan water from WBMWD and CBMWD, local groundwater, and recycled water. Therefore, conditions in local and distant areas can impact the reliability of supplies. The following discussion summarizes the reliability of GSWC's water supply sources for the Southwest System. In general, GSWC's supply is expected to be highly reliable through 2040. This reliability is a result of the following:

- Adjudicated groundwater rights in the Central and West Coast basins;
- Availability of contractual purchases of leased groundwater;
- Benefits of conjunctive use storage programs to be developed in accordance with the Central and West Coast Basin Judgments;
- Water supplies available from the supplemental supplier, Metropolitan, projected to be highly reliable;
- Conservation derived supply; and
- Availability of recycled water.

7.1 Constraints on Water Sources

CWC 10631

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

CWC 10634

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

Supply reliability for the Southwest System is based on the reliability of imported Metropolitan water and local groundwater. Metropolitan has implemented several resource management strategies to optimize the use of its available resources during both surpluses and droughts to minimize the probability of severe shortages, as well as shortage allocations. Factors that might affect the supply of water from Metropolitan have already been taken into account by Metropolitan, WBMWD, and CBMWD in the supply projections, therefore legal, environmental, water quality, or other constraints to the imported water supply are not anticipated.

GSWC's groundwater rights are adjudicated and its groundwater lease rights are contractual. Legal and environmental constraints to groundwater supply are not anticipated. As the Central and West Coast Basins are adjudicated no changes to groundwater management are anticipated from the future implementation of the SGMA. Contaminants are present in groundwater wells and well head treatment is used to treat the water, however changes to groundwater quality that would constrain supply are not anticipated.

7.2 Reliability by Type of Year

CWC 10631

- (c)(1) *Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:*
- (A) *an average water year,*
 - (B) *a single dry water year,*
 - (C) *multiple dry water years.*

Table 7-1 reports base years for average year, single dry year, and three consecutive multiple dry years for the Southwest System, based on groundwater reliability as the largest supply source. The normal year water supply represents the expected supply under average hydrologic conditions, the dry year supply represents the expected supply under the single driest hydrologic year, and the multiple dry year supply represents the expected supply during a period of three consecutive dry years. The base years were determined based on groundwater reliability, as groundwater is the largest supply source in recent history.

For groundwater reliability analysis, local precipitation data from 1950 through 2014 were reviewed. As the West Coast Basin is recharged largely from underflow from the Central Basin, precipitation data obtained from the WRCC Whittier City Yard (Station 049660) is assumed to be representative of conditions for both groundwater basins. Precipitation data was evaluated from water year (WY) 1949-50 (October 1 to September 30, 1950) through WY 2013-14 (October 1, 2013 to September 30, 2014). The normal water year was based on DWR's description of the median water year over the period of record. The median annual precipitation between WY 1950 and WY 2014 at Whittier City was 12.1 inches. Based on the median precipitation, the normal water year was WY 1997. Water year 2006-2007 was the single driest year with 4.03-inches of precipitation. The multiple dry year period of WY 1959 through WY 1961 recorded the lowest 3-year total of precipitation.

Table 7-1: Bases of Water Year Data

Year Type	Base Year	Available Supplies if Year Type Repeats	
		Agency may provide volume only, percent only, or both	
		Volume Available	% of Average Supply
Average Year	1997		100%
Single-Dry Year	2007		100%
Multiple-Dry Years 1st Year	1959		100%
Multiple-Dry Years 2nd Year	1960		100%
Multiple-Dry Years 3rd Year	1961		100%
NOTES:			

7.3 Supply and Demand Assessment

CWC 10635

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

Groundwater from the West Coast Basin and Central Basin is operated to store surplus waters (storm water, recycled water, and imported water) when these waters are available, and then to draw down the basin in drier years to meet the requirements of the APA established under the West Coast and Central Basin Judgments. Continued diligence by the pumpers, WRDSC, LACDPW, and CBMWD is expected to ensure the reliability of the Central and West Coast Basin groundwater supplies. The Basins have proven to be very reliable under extreme climate conditions for over 40 years and are expected to remain reliable through 2040. Moreover, effective management of the Basins in accordance with amendments to the existing court Judgments would greatly enhance the entire region's water supply reliability, allowing programs to be implemented at a lower cost. The reliability analysis for groundwater supply includes analysis of the availability of groundwater right leases. Each year there has been an unpumped balance in the Central Basin, including dry years, so the availability of leases each year is assumed to be reliable.

WBMWD and CBMWD have determined that they can meet their projected water demands for these years, so the supply is equal to the projected demands. Imported water supplies, whether

from Metropolitan or other parties in conjunctive use storage programs that are anticipated to be developed, are expected to be highly reliable and able to meet demands through 2040.

The supply and demand presented in Table 7-2 through Table 7-4 are not adjusted for conservation. However, conservation measures, including requirements to comply with SBX7-7, implemented within the Southwest System are expected to reduce demands. In dry years, GSWC's Water Shortage Contingency Plan may be used, further reducing demands.

7.3.1 Normal Water Year Analysis

Table 7-2 summarizes the service supply reliability assessment for a normal water year based on water supply and water demand projections. Purchased water provided by CBMWD and WBMWD and local groundwater from the Central Basin and West Coast Basin are expected to be highly reliable to meet the projected demands during normal water year conditions through 2040.

Table 7-2: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals (autofill from Table 6-9)	33,080	33,501	33,925	34,354	34,789
Demand totals (autofill from Table 4-3)	33,080	33,501	33,925	34,354	34,789
Difference	0	0	0	0	0
NOTES: Volume is in AFY.					

7.3.2 Single-Dry Year Analysis

Table 7-3 demonstrates the reliability of water supplies to meet projected annual water demands for the Southwest System in a single dry year. As described previously in this chapter, purchased water provided by CBMWD and WBMWD and local groundwater from the Central Basin and West Coast Basin are expected to be highly reliable to meet the projected demands in a single dry year through 2040. Actual demand may be lower due to short-term conservation measures and implementation of the Water Shortage Contingency Plan.

Table 7-3: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	33,080	33,501	33,925	34,354	34,789
Demand totals	33,080	33,501	33,925	34,354	34,789
Difference	0	0	0	0	0
NOTES: Volume is in AFY.					

7.3.3 Multiple-Dry-Year Analysis

Table 7-4 presents the projected multiple dry year water supply and demand assessment for the Southwest System. It is assumed that the multiple dry year water supplies are the same as those for the normal years because Metropolitan (through CBMWD and WBMWD) intends to meet projected imported demands under all anticipated hydrologic conditions. The third year of the multiple dry year water supply projection represents the end of each 3-year multiple dry year period as required for the multiple dry year analysis. CBMWD and WBMWD have determined that they can meet projected water demands for multiple dry years, so the water supply is projected to equal the demand.

Water supplies are sufficient to meet the projected water demand for each multiple dry year period because:

- CBMWD and WBMWD have determined that they can meet projected water demands for the multiple dry year periods;
- Groundwater from the Central and West Coast Basins is expected to be highly reliable in multiple dry years, and;
- Recycled water is expected to be available during all hydrologic conditions because it is not subject to hydrologic variations.

In summary, GSWC, Metropolitan, CBMWD and WBMWD have implemented and will continue to implement projects to ensure that imported water demands can be met under normal, single-dry, and multiple-dry years.

Table 7-4: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	33,080	33,501	33,925	34,354	34,789
	Demand totals	33,080	33,501	33,925	34,354	34,789
	Difference	0	0	0	0	0
Second year	Supply totals	33,080	33,501	33,925	34,354	34,789
	Demand totals	33,080	33,501	33,925	34,354	34,789
	Difference	0	0	0	0	0
Third year	Supply totals	33,080	33,501	33,925	34,354	34,789
	Demand totals	33,080	33,501	33,925	34,354	34,789
	Difference	0	0	0	0	0
NOTES: Volume is in AFY.						

7.4 Regional Supply Reliability

CWC 10620

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

WBMWD and CBMWD, the local wholesalers who supply imported water to GSWC, are largely pass-through entities which obtain nearly all their imported water from Metropolitan. Significant additional supply reliability detail may be obtained from the CBMWD and WBMWD 2015 UWMPs and Metropolitan's 2015 Regional Urban Water Management Plan. Recycled water is one of the cornerstones of CBMWD's and WBMWD's efforts to augment local supplies and reduce dependence on imported water. The use of recycled water assists in meeting demand for non-potable applications such as landscape irrigation, commercial and industrial processes, and seawater barriers (CBMWD, 2016; WBMWD 2016).

Additionally, Metropolitan, the source of the water imported through WBMWD and CBMWD, has undertaken several planning initiatives to broaden its water resources reliability, including an increased focus on local resources. Metropolitan's Integrated Resources Plan, completed in 1996, and updated in 2004, 2010, and 2015, included assessments of potential future regional demand projections based upon anticipated population and economic growth as well as conservation potential. The IRP also includes regional supply strategies and implementation plans to better manage resources, meet anticipated demand, and ensure overall system reliability. The draft 2015 IRP increases support of member agency local resource development (Metropolitan, 2016).

Any water extracted from the Central Groundwater Basin requires water rights. GSWC has a total APA of 16,439 AFY in the Central Basin that is divided between all of their systems in the Basin. GSWC maintains a legal right to pump their Central Basin APA each year. Historically, GSWC has leased up to an additional 7,366 AFY in the Central Basin, averaging 4,190 AFY from 1999 to 2015. If GSWC's actual demands exceed the adjudicated limits, GSWC can use leased rights to increase their allowed pumping. GSWC has a total APA of 7,502 AFY in the West Coast Basin. GSWC maintains a legal right to pump their adjudicated rights each year. Historically, GSWC has leased up to 6,651 AFY in the West Coast Basin. If GSWC's actual demands exceed the adjudicated limits, GSWC can use leased rights to increase their allowed pumping.

One of the key tools that could be used to ensure future supply reliability is groundwater storage. The Amended Judgments to the Central Basin and West Coast Basin Adjudications now provides the groundwater producers, cities and regulated water utilities, having extraction rights in the Central and West Coast Groundwater Basins now allows storage in the basin by the water rights holders.

Chapter 8: Water Shortage Contingency Planning

This chapter addresses the requirements in Section 10632 of the Act for the water shortage contingency analysis including stages of actions, prohibitions on end uses, penalties/charges/other prohibitions, consumption reduction methods, determining water shortage reductions, revenue and expenditure impacts, resolution or ordinance, catastrophic supply interruption, and minimum supply over the next three years.

CWC 10632

- (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier.*

8.1 Stages of Action

CWC 10632

- (a)(1) 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.*

The Act requires documentation of actions to be undertaken during a water shortage. GSWC has developed actions to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply. The CPUC has jurisdiction over GSWC because GSWC is an investor-owned water utility. Section 357 of the California Water Code requires that suppliers subject to regulation by the CPUC secure its approval before imposing water consumption regulations and restrictions required by water supply shortage emergencies. Implementation of the actions is dependent upon approval of the CPUC, especially for implementing mandatory water use restrictions.

GSWC Water Shortage Contingency Plan - Activation Overview

The GSWC must receive approval from the CPUC before it can activate demand reduction measures that impact customers. Several steps must first occur before GSWC can impose measures to reduce customer water demands. Steps are taken in the context that each water shortage condition triggering stages of action is different and unique. The water shortage contingency plan information below represents GSWC's response to the current drought conditions (2012-2016), and could be updated as needed. The typical steps for activating GSWC water shortage response are as follows:

Step 1: GSWC determines water shortage conditions exist (due to supply shortfalls, state cutbacks, or emergency conditions).

Step 2: GSWC requests CPUC approval of Rule 14.1 to establish three (3) broad categories of conservation policy as follows:

- Rule 14.1 A. Conservation-Non-Essential or Unauthorized Water Use – Voluntary – GSWC authorized to implement without additional CPUC advice.
- Rule 14.1 A. Conservation-Non-Essential or Unauthorized Water Use – Mandatory but without fines or surcharge tariff – GSWC required to file Tier 1 Advice Letter requesting authorization to institute a Schedule 14.1 Stage.
- Rule 14.1 B. Staged Mandatory Rationing of Water Usage – Includes authorization of fines and surcharge tariff - GSWC required to file Tier 2 Advice Letter requesting authorization to institute a Schedule 14.1 Stage.

Step 3: GSWC receives CPUC approval of Rule 14.1 and necessary Schedule 14.1 as needed for each water system based on water shortage conditions and need. GSWC will request approval of Schedule 14.1 as deemed necessary to meet actual shortage condition water use reduction targets for each of its systems, including the Southwest System.

Step 4: GSWC would deactivate Schedule 14.1 in effect if water shortage conditions or need no longer exist.

GSWC has grouped the actions to be taken during a given water shortage condition into five stages, based on the Schedule 14.1 approved by the CPUC for the Southwest System during the current drought conditions (see Appendix F). The five-stage response approach contained in the current Southwest System water shortage contingency plan provides GSWC with flexibility to address any given water shortage condition up to the 50 percent shortage level condition. Table 8-1 provides an overview of the staged response GSWC could follow during a given water shortage condition including sequential stages (I-V) based on shortage severity, relative supply conditions for each stage, likely Schedule 14.1 policy activation, and percent shortage reduction levels. The stages would be implemented based on specific conditions and need to meet water service and system revenue requirements. A water shortage declaration would be made by the American States Water Company Board. The water shortage stage determination during a water supply shortage will be made by an authorized government agency or official.

Table 8-1: Stages of WSCP		
Stage	Complete Both	
	Percent Supply Reduction ¹	Water Supply Condition
I	Up to 10%	Alert
II	11-20%	Moderate
III	21-30%	Severe
IV	31-40%	Critical
V	41-50%	Catastrophic
¹ One stage in the WSCP must address a water shortage of 50%.		
NOTES: Table based on DWR Guidebook Table 8-1.		

The actions to be undertaken during each stage cannot be implemented until necessary Board and CPUC approvals have been executed. The types of measures that may be implemented in each stage include, but are not limited to, the following:

Stage I (up to 10 percent shortage) – Water alert conditions are declared and voluntary conservation is encouraged. The drought situation is explained to the public and governmental bodies. GSWC explains the possible subsequent water shortage stages in order to forecast possible future actions for the customer base. The focus is on customers with high per capita water usage to achieve proportionally greater reduction than those with low use. The activities performed by GSWC during this stage include, but are not limited to:

- Public information campaign consisting of distribution of literature, speaking engagements, website updates, bill inserts, and conversation messages printed in local newspapers.
- Educational programs in area schools.
- Conservation Hotline, a toll-free number with trained Conservation Representatives to answer customer questions about conservation and water use efficiency.
- Voluntary outdoor irrigation restrictions including limiting number of watering days per week, and time when irrigation can occur (e.g., between 7:00 p.m. and 8:00 a.m.).
- Discussion of equitable water waste response policy.

Stage II (11 - 20 percent shortage) – Stage II is a moderate shortage and will be implemented if the Stage I restrictions are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official and will include all actions undertaken in Stage I. In addition, GSWC may propose voluntary conservation allotments and/or require mandatory conservation rules. The severity of actions depends upon the percentage of shortage and customer response. The level of voluntary or mandatory water use reduction requested from the customers is also based on the severity. It should be noted that prior to implementation of any mandatory reductions, GSWC must obtain approval from the CPUC. If necessary, GSWC may also support passage of drought ordinances by appropriate governmental agencies or officials. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stage I.
- Establishing customer baseline use period to be used as basis for usage reductions.
- Usage in excess of customer baseline to be charged at regular rate plus a drought emergency surcharge (to be determined as approved by the CPUC).

Stage III (21 - 30 percent shortage) – Stage III is a severe shortage that entails or includes allocations and mandatory conservation rules. Stage III will be implemented if the Stage II allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official. This phase becomes effective upon notification to customers by the GSWC that water usage is to be reduced by a mandatory percentage. GSWC implements mandatory reductions after receiving approval from the CPUC. Rate changes are implemented to penalize excessive water usage. Water use restrictions are put into effect, i.e.,

prohibited uses can include restrictions of daytime hours for watering, excessive watering resulting in gutter flooding, using a hose without a positive shutoff device, use of decorative fountains with non-recirculating pumps, washing down sidewalks or patios, not repairing leaks in a timely manner, etc. GSWC monitors water production weekly for compliance with necessary reductions. The use of flow restrictors is implemented if abusive practices are persistent and documented. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages I and II.
- Adherence to customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

Stage IV (31 - 40 percent shortage) – This is a critical shortage that includes all steps taken in prior stages regarding allocations and mandatory conservation. Stage IV will be implemented if the Stage III allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages I-III.
- Possible reductions in customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).

Stage V (41 - 50 percent shortage) – This is an emergency shortage that includes all steps taken in prior stages regarding allotments and mandatory conservation. This stage will be implemented in the event that the source of supply for the Southwest System is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes. All activities are intensified and production is monitored daily by GSWC for compliance with necessary reductions. The activities performed by GSWC during this stage include, but are not limited to:

- All measures implemented in Stages I-IV.
- Possible reductions in customer baselines and actual water use reductions.
- Usage in excess of customer baseline to be charged at regular rate plus an additional drought emergency surcharge amount (to be determined as approved by the CPUC).
- GSWC may update current water shortage condition response measures based on CPUC approvals and direction, state policy directives, emergency conditions, or to improve customer response.

8.2 Prohibitions on End Uses

CWC 10632

- (a)(4) 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.
- (5) 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.

The Act requires an analysis of mandatory prohibitions, penalties, and consumption reduction methods against specific water use practices which may be considered excessive during water shortages. Given that GSWC is an investor-owned entity, it does not have the authority to pass any ordinance enacting specific prohibitions or penalties. In order to enact or rescind any prohibitions or penalties, GSWC would seek approval from the CPUC to enact or rescind Rule No. 14.1, Mandatory Conservation and Rationing, as well as Rule 11 which prohibits the waste of water (both are included in Appendix F) . When Rule No. 14.1 has expired or is not in effect, mandatory conservation and rationing measures will not be in force.

Rule No. 14.1 details the various prohibitions and sets forth water use violation fines, charges for removal of flow restrictors, as well as establishes the period during which mandatory conservation and rationing measures will be in effect. The prohibitions on various wasteful water uses, include, but are not limited to, the hose washing of sidewalks and driveways using potable water, and cleaning for filling decorative fountains. Table 8-2 summarizes the various prohibitions and the stages during which the prohibition becomes mandatory.

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
II-V	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
II-V	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
II-IV	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
II-V	Other - Prohibit use of potable water for washing hard surfaces		Yes
II-V	Landscape - Prohibit certain types of landscape irrigation		Yes
II-V	Other - Prohibit use of potable water for construction and dust control		Yes
II-V	Water Features - Restrict water use for decorative water features, such as fountains		Yes
II-V	Pools - Allow filling of swimming pools only when an appropriate cover is in place.		Yes
NOTES: Table based on DWR Guidebook Table 8-2.			

In addition to prohibitions during water supply shortage events requiring a voluntary or mandatory program, GSWC will make available to its customers water conservation kits as required by GSWC's Rule No. 20. GSWC will notify all customers of the availability of conservation kits and literature.

8.2.1 Landscape Irrigation

Landscape irrigation reductions focus on less watering and reducing or avoiding water waste during irrigation. Landscape irrigation reductions may vary by user class or customer type depending on water shortage conditions and ability to meet overall water use reduction targets. Water allocation or budget concepts may be applied by GSWC to equitably reduce landscape water use while minimizing customer impact. Any landscape irrigation reduction policies require approval by the CPUC before GSWC can implement such measures.

8.2.2 Commercial, Industrial, and Institutional (CII)

The CII category of customers is diversified and may require a tailored approach for meeting specified water use reduction targets. This could include focusing on landscape irrigation, process water, business practices, or other means to meet CII water use reduction targets. The ability of CII customers to conserve water during a water shortage condition would be considered depending on which stage has been triggered and how much water use has already been reduced during previous stages. GSWC would work collaboratively with CII customers since water use cutbacks can impact business operations and solvency.

8.2.3 Water Features and Swimming Pools

Water shortage response would focus on health and safety issues and tempering these uses based on the severity of the water shortage condition. The relative total water use from these sources would be a consideration for how water feature and swimming pool uses could be curtailed during specific water shortage conditions. Generally swimming pool filling and refilling would be impacted in the later stages of a water shortage condition. Water features are a relatively small discretionary use.

8.2.4 Defining Water Features

GSWC would identify water features and estimate water use to be treated as a potential target for future demand reductions required during a water shortage condition.

CWC 10632

- (b) Commencing with the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

Health and Safety Code Section 115921

As used in this article the following terms have the following meanings:

- (a) "Swimming pool" or "pool" means any structure intended for swimming or recreational bathing that contains water over 18 inches deep. "Swimming pool" includes in-ground and aboveground structures and includes, but is not limited to, hot tubs, spas, portable spas, and non-portable wading pools.

GSWC will begin collecting this information in its service areas, including the Southwest System, to be considered for use in response to future water shortage conditions.

8.2.5 Other

Other measures may be considered as required to meet specific water shortage conditions.

8.3 Penalties, Charges, Other Enforcement of Prohibitions

CWC 10632

(a)(6) Penalties or charges for excessive use, where applicable.

In addition to prohibitions, Rule No. 14.1 provides penalties and charges for excessive water use. The enactment of these penalties and charges is contingent on approval of Rule 14.1 implementation by the CPUC. When the rule is in effect, violators receive one verbal and one written warning after which a flow-restricting device may be installed on the violator's service connection for a reduction of up to 50 percent of normal flow or 6 ccf per month, whichever is greater. Table 8-3 summarizes the penalties and charges and the stage during which they take effect.

Table 8-3: Summary of Penalties and Charges for Excessive Use	
Penalties or Charges	Stage When Penalty Takes Effect
Penalties for not reducing consumption	III-V
Charges for excess use	III-V
Flat fine; Charge per unit over allotment	III-V
Flow restriction	III-V
Termination of service	III-V

8.4 Consumption Reduction Methods

CWC 10632

(a)(5) 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.

In addition to prohibitions and penalties, GSWC can use other consumption reduction methods to reduce water use up to 50 percent. Based on the requirements of the Act, Table 8-4 summarizes the methods that can be used by GSWC in order to enforce a reduction in consumption, where necessary (subject to CPUC approval). The following table may be updated as required if updates are approved by the CPUC.

Table 8-4: Summary of Consumption Reduction Methods		
Consumption Reduction Method	Stage When Method Takes Effect	Projected Reduction Percentage
Demand reduction program	All Stages	N/A
Reduce pressure in water lines; Flow restriction	III-V	21-50%
Restrict building permits; Restrict for only priority uses	IV-V	31-50%
Use prohibitions	II-V	11-50%
Water shortage pricing; Per capita allotment by customer type	II-V	11-50%
Plumbing fixture replacement	All Stages	N/A
Voluntary rationing	I-II	0-20%
Mandatory rationing	III-V	21-50%
Incentives to reduce water consumption; Excess use penalty	III-V	21-50%
Water conservation kits	All Stages	N/A
Education programs	All Stages	N/A
Percentage reduction by customer type	III-V	21-50%
NOTES:		

8.4.1 Categories of Consumption Reduction Methods

GSWC may consider implementing the following Categories of Consumption Reduction Methods on an as-needed basis to meet future water shortage condition response targets. GSWC's water shortage planned responses would be amended for the Southwest System depending on which stage has been triggered, which categories are already implemented, and what additional water savings must be achieved.

Table 8-5 summarizes the consumption reduction methods GSWC may consider during future water shortage conditions (subject to CPUC approval).

Table 8-5: Stages of WSCP - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
I-V	Expand Public Information Campaign	
III-V	Offer Water Use Surveys	
III-V	Decrease Line Flushing	
III-V	Reduce System Water Loss	
III-V	Increase Water Waste Patrols	
III-V	Implement or Modify Drought Rate Structure or Surcharge	
NOTES: Table based on DWR Guidebook Table 8-3.		

8.5 Determining Water Shortage Reductions

CWC 10632

(a)(9) *A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

The Act asks for an analysis of mechanisms for determining actual reduction in water use when the Water Shortage Contingency Plan is in effect. Table 8-6 lists the mechanisms used by GSWC to monitor water use and the quality of data expected.

Table 8-6: Water-Use Monitoring Mechanisms	
Mechanisms for Determining Actual Reductions	Type and Quality of Data Expected
Customer meter readings	Hourly/daily/monthly water consumption data for a specific user depending on frequency of readings
Production meter readings	Hourly/daily/monthly water production depending on frequency of readings; correlates to water use plus system losses

In addition to the specific actions that GSWC can undertake to verify levels of water use and conservation achieved, GSWC can monitor long-term water use through regular meter readings, which gives GSWC the ability to flag exceptionally high usage for verification of water loss or abuse. Additional monitoring may be undertaken as needed depending on water shortage conditions or need to improve the precision of monitoring efforts.

8.6 Revenue and Expenditure Impacts

CWC 10632

(a)(7) *An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), 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.*

The Act 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. Because GSWC is an investor-owned water utility and, as such, is regulated by the CPUC, the CPUC may authorize it to establish memorandum accounts (i.e., rate stabilization accounts) to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. Utilities with CPUC-approved water management plans may be authorized to implement a surcharge to recover revenue shortfalls or unplanned expenses recorded in their drought memorandum accounts.

Table 8-7 provides a summary of actions with associated revenue reductions.

Table 8-7: Summary of Actions and Conditions that Impact Revenue	
Type	Anticipated Revenue Reduction
Reduced sales	Reduction in revenue will be based on the decline in water sales and the corresponding quantity tariff rate
Recovery of revenues with CPUC-approved surcharge	Higher rates may result in further decline in water usage and further reduction in revenue

Table 8-8 provides a summary of actions and conditions that impact expenditures.

Table 8-8: Summary of Actions and Conditions that Impact Expenditures	
Category	Anticipated Cost
Increased staff cost	Salaries and benefits for new hires required to administer and implement water shortage program
Increased O&M cost	Operating and maintenance costs associated with alternative sources of water supply
Increased cost of supply and treatment	Purchase and treatment costs of new water supply

Table 8-9 summarizes the proposed measures to overcome revenue impacts.

Table 8-9: Proposed Measures to Overcome Revenue Impacts	
Names of Measures	Summary of Effects
Obtain CPUC-approved surcharge	Allows for recovery of revenue shortfalls brought on by water shortage conditions
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of revenue shortfall

Table 8-10 provides a summary of the proposed measures to overcome expenditure impacts.

Table 8-10: Proposed Measures to Overcome Expenditure Impacts	
Names of Measures	Summary of Effects
Obtain CPUC-approved surcharge	Allows for recovery of increased expenditures brought on by water shortage conditions
Penalties for excessive water use	Obtain CPUC approval to use penalties to offset portion of increased expenditures

Any CPUC approved rate surcharges are imposed based on specific conditions and need, and are deactivated when the condition no longer exists and/or is no longer needed.

8.6.1 Drought Rate Structures and Surcharges

GSWC can pursue CPUC approval of drought surcharges if water shortage conditions persist and the demand reductions needed are significant enough to warrant special rate increases to meet system revenue requirements. GSWC received CPUC approval of drought surcharges during the current extended drought condition. Rate stabilization fund balances were not adequate to cover the lower revenues from significant demand reductions experienced during the drought. These drought surcharge revenues allowed GSWC to meet system revenue requirements while meeting demand reduction targets. Drought surcharges would be discontinued when triggered water shortage conditions are deactivated and no longer in effect.

8.6.2 Use of Financial Reserves

Being a regulated utility under the CPUC – GSWC is not allowed a financial reserve account. GSWC has General Rate Cases (GRCs) approved covering three years of rate schedules that include the cost of providing service in each water system, accounting for operation and maintenance, repair and replacement, and capital improvement costs required to meet all regulations and provide sustainable water service to customers. The rate case determining water charges during the 2013-2015 period are included in Appendix F. For extended water shortage conditions, GSWC would also likely request CPUC approval of Memorandum Accounts to track emergency or unforeseen costs during the extended demand reduction period. The tracked costs would later be reviewed by the CPUC and recovered through drought surcharges to generate additional revenues during extended demand reduction periods. Per CPUC rate making policy, GSWC financial reserves are not allowed to be addressed in the CPUC GRC process.

8.6.3 Other Measures

GSWC may consider other measures as required to meet water shortage conditions.

8.7 Resolution or Ordinance

CWC 10632

(a)(8) A draft water shortage contingency resolution or ordinance.

Appendix F contains the GSWC Rule No. 14.1 policy, Schedule 14.1 and Rule 20 for the Southwest System.

8.8 Catastrophic Supply Interruption

CWC 10632

(a)(3) 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.

The Act requires documentation of actions to be undertaken by the water supplier to prepare for, and implement during, a catastrophic interruption of water supplies. A catastrophic interruption constitutes a proclamation of a water shortage and could result from any event (either natural or man-made) that causes a water shortage severe enough to classify as either a Stage IV or Stage V water supply shortage condition.

In order to prepare for catastrophic events, GSWC has prepared an Emergency Preparedness Response Plan (EPRP) in accordance with other state and federal regulations. The purpose of this plan is to design actions necessary to minimize the impacts of supply interruptions due to catastrophic events.

The EPRP coordinates overall company response to a disaster in any and all of its districts. The EPRP also provides details on actions to be undertaken during specific catastrophic events. Table 8-11 provides a summary of actions cross-referenced against specific catastrophes for three of the most common possible catastrophic events: regional power outage, earthquake, and malevolent acts.

In addition to specific actions to be undertaken during a catastrophic event, GSWC performs maintenance activities, such as annual inspections for earthquake safety, and budgets for emergency items, such as auxiliary generators, to prepare for potential events.

Table 8-11: Summary of Actions for Catastrophic Events	
Possible Catastrophe	Summary of Actions
Regional power outage	<ul style="list-style-type: none">• Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water.• Establish water distribution points and ration water if necessary.• If water service is restricted, attempt to provide potable water tankers or bottled water to the area.• Make arrangements to conduct bacteriological tests, in order to determine possible contamination.• Utilize backup power supply to operate pumps in conjunction with elevated storage.

Table 8-11: Summary of Actions for Catastrophic Events	
Possible Catastrophe	Summary of Actions
Earthquake	<ul style="list-style-type: none"> Assess the condition of the water supply system. Complete the damage assessment checklist for reservoirs, water treatment plants, wells and boosters, system transmission and distribution. Coordinate with California Office of Emergency Services or fire district to identify immediate firefighting needs. Isolate areas that will take the longest to repair and/or present a public health threat. Arrange to provide emergency water. Prepare report of findings, report assessed damages, advise as to materials of immediate need and identify priorities including hospitals, schools and other emergency operation centers. Take actions to preserve storage. Determine any health hazard of the water supply and issue any “Boil Water Order” or “Unsafe Water Alert” notification to the customers, if necessary. Cancel the order or alert information after completing comprehensive water quality testing. Make arrangements to conduct bacteriological tests, in order to determine possible contamination.
Malevolent acts	<ul style="list-style-type: none"> Assess threat or actual intentional contamination of the water system. Notify local law enforcement to investigate the validity of the threat. Get notification from public health officials if potential water contamination Determine any health hazard of the water supply and issue any “Boil Water Order” or “Unsafe Water Alert” notification to the customers, if necessary. Assess any structural damage from an intentional act. Isolate areas that will take the longest to repair and or present a public health threat. Arrange to provide emergency water.

8.9 Minimum Supply Next Three Years

CWC 10632

(a)(2) *An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.*

The Act requires 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 GSWC's water supply.

Table 8-12: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	26,938	26,938	26,938
NOTES: 1. Volume is in AFY. 2. Table based on DWR Guidebook Table 8-4.			

Table 8-12 summarizes the minimum volume of water available from all sources during the next three years based on multiple-dry water years and normal water year. The driest three-year historic sequence is provided in Chapter 7. The water supply quantities for 2016 to 2018 are calculated by linearly interpolating between the projected water supplies of 2015 and 2020 for normal years. The water supplies for 2015 and 2020 are presented in Chapter 6.

It is assumed that the multiple-dry year supplies will be the same as those for the normal years because imported water supplies will meet projected imported water demands under all anticipated hydrologic conditions. It should be noted that the active connection capacity to deliver imported water from WBMWD and CBMWD is significantly higher than the projected imported water supply required to meet projected demands.

GSWC's supply for the Southwest System is expected to be highly reliable from 2016 to 2018. This reliability is a result of:

- Adjudicated groundwater rights in the West Coast and Central basins,
- Benefits of conjunctive use storage programs in accordance with the terms of amendments to the existing court Judgments,
- Reliability of Metropolitan water supplies imported through WBMWD and CBMWD, which are expected to be 100 percent reliable, and
- Availability of recycled water.

Projected CBMWD and WBMWD imported water values are calculated assuming groundwater is provided within the APA only. Leased groundwater rights as obtained in the future will result in groundwater constituting a greater percentage of total water supply to the system.

Chapter 9: Demand Management Measure

This Chapter addresses the Demand Management Measure (DMM) requirements of the Act for the Southwest System and includes a description of utility-based and other DMMs being implemented, DMMs implemented over the past five years, and an overview of DMMs planned for implementation over the next five years to reliably meet SBX7-7 water use targets by 2020.

9.1 Demand Management Measures for Retail Agencies

CWC 10631

(f)(A)... The narrative shall describe the water demand management measure that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

Sections 9.1.1 through 9.1.6 provide a narrative description of utility-based DMMs that GSWC has been implementing since its 2010 UWMPs were developed and adopted. GSWC is currently implementing all of these DMMs as standard practices. Section 9.1.7 provides a narrative description of other DMMs being implemented in the Southwest System that impact total water demands.

9.1.1 Water Waste Prevention Ordinances

Although GSWC does not have rule-making authority, it supports member agencies and local cities in efforts to adopt ordinances that will reduce water waste. For GSWC, this provision is implemented through CPUC-approved rules provided in Appendix F, including Rule No. 14.1, the Water Conservation and Rationing Plan, Rule 20, prohibition of water waste, and Rule 11, Discontinuance and Restoration of Service.

The CPUC's methodology for water utilities to implement Rule No. 14.1 is documented in Standard Practice U-40-W, "Instructions for Water Conservation, Rationing, and Service Connection Moratoria." Rule No. 14.1 sets forth water use violation fines, charges for flow restrictors, and the period during which mandatory conservation and rationing measures will be in effect. Water conservation restrictions include:

- Use of potable water for more than minimal landscaping.
- Use through a broken or defective water meter.

- Use of potable water which results in flooding or runoff in gutters or streets.
- Use of potable water for washing private cars or commercial aircrafts, cars, buses, boats, or trailers, except at a fixed location where water is properly maintained to avoid wasteful use.
- Use of potable water for washing buildings, structures, driveways, street cleaning or other hard-surfaced areas.
- Use of potable water to irrigate turf, lawns, gardens or ornamental landscaping.
- Use of potable water for construction purposes.
- Use of potable water for filling or refilling of swimming pools.

Rule No. 20 (approved in 2015) discourages wasteful use of water and promotes use of water saving devices. The stated purpose of the rule is to “ensure that water resources available to the utility are put to a reasonable beneficial use and that the benefits of the utility's water supply and service extend to the largest number of persons.” Together, Rules 11, 14.1 and 20 prohibit negligent or wasteful use of water, create a process for mandatory conservation and rationing, and promote the use of water-saving devices. Although GSWC does not have rule-making authority, it supports member agencies and local cities in efforts to adopt ordinances that will reduce water waste. This BMP is implemented through CPUC-approved rules provided in Appendix F, including: Rule No. 14.1, the Water Conservation and Rationing Plan, and Rule 11, Discontinuance and Restoration of Service.

9.1.2 Metering

CWC 526

- (a) Notwithstanding any other provisions of law, an urban water supplier that, on or after January 1, 2004, receives water from the federal Central Valley Project under a water service contract or subcontract... shall do both of the following:*
- (1) On or before January 1, 2013, install water meters on all service connections to residential and nonagricultural commercial buildings... located within its service area.*

CWC 527

- (a) An urban water supplier that is not subject to Section 526 shall do both the following:*
- (1) Install water meters on all municipal and industrial service connections located within its service area on or before January 1, 2025.*

All customers of the Southwest System are metered and billed by volume on a monthly basis. GSWC follows the requirements of CPUC General Order 103-A which prescribes minimum water system design, operation and maintenance (O&M) standards for water utilities including requirements for meter calibration, testing, and replacement activities.

GSWC will continue meter maintenance practices in accordance with CPUC General Order 103-A. More than 50 percent of Southwest System meters are less than 10 years old.

GSWC complies with this DMM and no additional activities are anticipated.

9.1.3 Conservation Pricing

All metered customers in the Southwest System are charged volumetrically for water service. Effective September 1, 2009 GSWC implemented a tiered conservation pricing rate structure for residential customers as approved by the CPUC for the Southwest System. The current rate structure (included as Appendix F) for residential customers has a fixed charge as well as volumetric escalating pricing tiers, depending on customer usage. Non-residential customers have a fixed charge and a constant volumetric charge. Implementation of this revised pricing policy is the result of GSWC's collaboration with CPUC to implement conservation tiered rates for residential customers of investor-owned utilities. Tiered rates are consistent with the CPUC's 2010 Water Action Plan.

Since 2009, GSWC has been instituting third tier pricing structures and increasing volumetric charges for residential customers to cover water system costs.

GSWC will be submitting a General Rate Case filing with the CPUC in 2017 which includes proposed rates over the next three years based on volumetric charges for customers in the Southwest Rate Making Area. If approved, this rate adjustment will allow GSWC to adjust volumetric revenues and maintain a conservation-oriented rate structure that encourages efficient water use today and in the future.

GSWC has updated its Customer Information System (CIS) companywide. The new system allows access to total fixed and volumetric charge data. GSWC can utilize this data to track water use patterns and determine if annual revenue requirements will be met for a given water system.

GSWC is planning for the process of filing a General Rate Case (2017) application to adjust volumetric charges for residential and CII metered customers in its systems based on water system costs. If approved, the tiered rates for residential and uniform rates for CII accounts are expected to maintain water savings incentives and increase participation in DMM programs in many of GSWC's systems.

9.1.4 Public Education and Outreach

9.1.4.1 Public Information Programs

GSWC administers public information programs for the Southwest customers. GSWC had a 2015 annual budget of \$30,808 for public outreach in Region II which includes the Southwest System. GSWC provides conservation brochures and literature, activity booklets, public outreach displays, community presentations and water conservation information by issuing press releases, publishing quarterly newsletters and using door tags and bill inserts. Customers can learn about rebates and other conservation programs on GSWC's website, which provides links to Metropolitan's website for detailed information.

9.1.4.2 School Education Programs

GSWC sponsors a school conservation education programs in Region II elementary schools reaching more than 5,000 students, as implemented by The Discovery Science Center (DSC). Students learn about conservation practices and receive a free conservation kit that includes a water survey, 1.5 gpm high-efficiency low-flow shower head, 1.5 gpm kitchen sink aerator and 1.0 gpm bathroom aerators, leak detection dye tablets, a watering gauge, and step-by-step instructions. The students are given homework assignments to complete a water survey audit form and replace inefficient showerheads and aerators with water-saving devices provided in

the kit. The program has been a very effective way for GSWC to reach a large number of customers and educate students, who in turn educate their parents about water use efficiency practices and high-efficiency low-flow plumbing devices.

Results from the program are tracked, and a comprehensive Program Summary Report is generated at the end of each school year. This report documents the estimated reduction in water usage that was achieved through the retrofits and provides data on the percentage of students who participated in the program.

GSWC recognizes the value in increased customer awareness of the various DMM programs that are available. To that end, GSWC will review opportunities to enhance its outreach program over the next three (3) years to supplement DSC's existing public education efforts. Public information measures that will be evaluated include additional direct mail fliers, increased outreach participation at community functions, and an improved conservation website.

GSWC plans to continue to implement the DSC program and use internal staff to conduct its school education programs. GSWC's school education programs will continue to include annual reports, classroom education, and distribution and installation of a conservation kits received through the school education program.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

GSWC has an active Water Loss Control Program. Water losses are monitored by the Operations Engineering Department by reviewing the annual Distribution System Water Audits conducted in each water system. GSWC tracks both real and apparent losses as part of its on-going water loss control efforts. If the Operations Engineer determines from the annual water audit analysis that a leak detection survey is needed, GSWC will contract with a qualified leak detection company to perform the survey using the most current leak detection technology.

GSWC has been performing annual Distribution System Water Audits, consistent with American Water Works Association (AWWA) M36 methodology, since its 2010 UWMPs. If annual audit results indicate water losses would exceed water system goals, a full audit is triggered to identify water loss sources and determine impacts on overall system water losses.

For Calendar Year 2014, GSWC implemented the AWWA M36 Standard Water Audit methodology using version 5.0 of the water audit software. The approach consists of a component analysis of metered water sources, metered water demands, quantification of water losses (apparent and real), and calculation of non-revenue water as a percent of total system flows. Results of the analysis, which are included in Appendix A, show an infrastructure leakage index (ILI) of -0.73. According to general guidelines, an ILI of 1.0 to 3.0 is appropriate for systems where water resources are costly to develop or purchase, ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability, and operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand. The initial evaluation suggests that the Southwest System will review the water audit analysis with a focus on determining whether production and customer metering data contains any errors that is skewing results, as defined by AWWA methodology.

GSWC will continue to annually implement the Standard Audit and Water Balance worksheets procedures following the AWWA M36 protocol for calendar years 2015-2019, taking measurable

steps to validate water audit data by October 2017. Data validation will improve data accuracy while cost-effectively reducing the ILI and non-revenue water through repair of leaks and other measures.

GSWC used version 5.0 of the AWWA Water Audit software for its system water audit evaluations, and will use the current software for all future evaluations (subject to AWWA software updates) which includes metrics for evaluating the validity of the system data. GSWC already has a comprehensive work order management system in place that documents leak locations and repair history which provides a solid foundation for future water loss control actions.

9.1.6 Water Conservation Program Coordination and Staffing Support

GSWC maintains a fully staffed Water Use Efficiency Department with a companywide Water Use Efficiency Manager, Water Conservation Analyst and one Water Conservation Coordinator to administer conservation programs and support wholesaler programs. GSWC also utilizes a number of consultants to support program development and implementation on an as-needed basis.

9.1.7 Other Demand Management Measures

GSWC intends to continue to plan and implement other DMM programs in the Southwest System using both GSWC only programs as well as collaborative regional programs with partners with similar interests. The benefits of regional programs includes sharing administrative costs and responsibilities, promoting customer rebate programs, and conducting outreach/education programs offered to Southwest System customers. GSWC will continue to support regional activities if cost-effective and will focus on improving customer outreach and promoting awareness of available DMM programs.

As previously mentioned, once the next rate case is approved by the CPUC in 2017, GSWC will develop a prioritized water use efficiency program and implementation schedule for all customer service areas in the company focusing on systems that do not appear to be consistently meeting SBX7-7 2020 water use reduction targets. Specific DMM program activities will be implemented that are both locally cost-effective and/or cost-effective to implement on a companywide basis. At this time, cost-effectiveness in the Southwest System will be based on the avoided cost of water.

9.1.7.1 Residential Assistance Programs

GSWC has an audit program targeting high-use single-family (SF) and multi-family (MF) residential customers. GSWC identifies these customers based on billing data and may contact them to offer free audits. Audits may also be offered to walk-in customers at the local customer service area office. Additional home audits are conducted as part of the school education program (Section 9.1.4.2). High-efficiency devices are available for free to customers at the GSWC office, online, and are also distributed to students as part of the free conservation kits they receive in the school education program.

Over the next 3 years, GSWC will continue distributing high-efficiency showerheads and aerators to customers, and offer audits to high-use SF and MF customers until saturation requirements are satisfied for this DMM program.

Effectiveness of implementation of this program is evaluated by GSWC by tracking customer participation rates in surveys and distribution of high-efficiency showerheads and devices. The following water savings estimates were developed accepted water savings assumptions:

Residential Assistance Surveys: SF surveys are estimated to save 40 gpd and MF surveys are estimated to save 20 gpd. It is estimated that GSWC will save more than 2,000 ac-ft over the next 10 years if program targets are met.

Plumbing Retrofit kits: It is estimated that 7.7 gpd per unit is conserved from installation of low flow showerheads and 1.5 gpd for a faucet aerator. It is estimated that GSWC will save more than 400 AFY over the next 10 years if program targets are met.

Program effectiveness and per capita use will continue to be monitored based on meter readings and billing data. Follow-up calls may be made to offer audits and other assistance to high-use customers.

9.1.7.2 Landscape Water Surveys

GSWC offers large landscape water surveys to high water-use SF and MF customers throughout the company. Since residential surveys include a landscape component, participation rates are included in the residential assistance program summary above. The third tier of metered rates for residential customers has resulted in higher participation rates, and funding has been designated to improving program marketing.

Residential assistance survey programs have a landscape component to them and are being implemented concurrently based on customer demand and funding availability.

9.1.7.3 High-Efficiency Clothes Washers

GSWC customers are eligible to participate in the High Efficiency Clothes Washer (HECW) rebate program provided by Metropolitan, which has been available since 2003. Metropolitan has supplemented its HECW rebate using state or federal grants whenever possible. The water efficiency of clothes washers is represented by the “water factor,” which is a measure of the amount of water used to wash a standard load of laundry. Washers with a lower water factor save more water. Metropolitan has continued to transform the market by changing its program requirement to lower water factors. The program eligibility requirement is currently set at water factor 3.7 which saves over 11,000 gallons per year per washer over a conventional top loading washer. GSWC does not contribute funds to the HECW rebate program. The GSWC conservation webpage advertises the rebates and provides a link to the Metropolitan website for full program details.

GSWC intends to continue to participate in the HECW rebate program administered by Metropolitan and to increase program participation will enhance marketing efforts to raise customer awareness that the program is being offered. GSWC will develop an updated conservation website, and prominently include HECW rebate incentive on future program marketing and on the gswater.com website.

Metropolitan tracks customer participation in the HECW rebate program and estimates that over 21 gallons per day are saved for each HECW installed. It is estimated that GSWC will save a total of approximately 870 ac-ft from HECWs installed over the next 10 years if program targets are met.

9.1.7.4 WaterSense Specification (WSS) Toilets

GSWC customers have been eligible to participate in the Premium High Efficiency Toilet (PHET) rebate program since 2016, administered by Metropolitan since 2008. Metropolitan has provided incentives for toilet programs since 1988, including ULFT and HET rebates. Currently, Metropolitan only provides funding for Premium High-Efficiency Toilets (PHETs that use 1.1 gallon per flush or less), which is almost 20 percent less than ultra-low-flush toilets (1.6 gallons per flush). HETs are the current standard defined by the Green Code standards approved in 2011. Metropolitan uses the EPA's WaterSense list of tested toilets in its programs as qualifying models. The GSWC webpage for Southwest advertises the rebates and provides a link to the Metropolitan website for full details.

GSWC intends to continue to participate in the PHET rebate program administered by Metropolitan as described above. GSWC will also evaluate augmenting existing public outreach efforts through enhanced website features to inform customers about current incentive opportunities and increase program participation.

Metropolitan tracks PHET rebate program customer participation to measure overall program effectiveness. It is estimated that 30 and 38 gallons per day are saved in SF and MF units, respectively. It is estimated that GSWC will save over 1,000 ac-ft from PHET installations completed over the next 10 years if program targets are met.

9.1.7.5 WaterSense Specification for Residential Development

Integration of WaterSense Specification (WSS) fixtures for new development will be accelerated by the 2010 California Green Building Standards Code (CAL Green Code), which became effective in January 2011. The CAL Green Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design. Local jurisdictions, at a minimum, must adopt the mandatory measures; the CAL Green Code also identifies voluntary measures that set a higher standard of efficiency for possible adoption.

As an investor-owned utility, GSWC does not have regulatory authority and cannot adopt ordinances or regulations; however, it does support standards that will achieve a reduction in indoor water use including implementation and use of WSS fixtures as well as adoption of the CAL Green Code by local jurisdictions, including Los Angeles County. GSWC will continue to support incentive programs for water efficient devices and standards.

9.1.7.6 Commercial, Industrial, and Institutional DMMs

The Commercial, Industrial, and Institutional (CII) programs are implemented by the Metropolitan Water District of Southern California (Metropolitan), through the SoCal Water\$mart Program, on behalf of GSWC in Southwest. GSWC customers are eligible to participate in Metropolitan's Commercial Rebate Program. Qualifying customers are eligible for plumbing fixture, landscape equipment, food equipment, HVAC equipment, and medical and dental equipment rebates to help encourage water efficiency and conservation. Devices available for rebates include: premium high-efficiency toilets, zero water and ultra-low water urinals, plumbing flow control valves, irrigation controllers, rotating nozzles for pop-up spray heads, large rotary nozzles, in-stem flow regulators, soil moisture sensor systems, connectionless food steamers, air-cooled ice machines, cooling tower conductivity controllers and cooling tower pH controllers, dry vacuum pumps, and laminar flow restrictors.

GSWC's goal for the next 3 years is to focus on advertising, education and outreach programs, including CII rebates, as described elsewhere in this chapter. GSWC will contribute to

participate in the Metropolitan program as required to meet program goals and targets. GSWC estimates it can save more than 300 ac-ft /yr over the next ten years with customer incentives. GSWC will also evaluate implementing additional CII water savings programs, such as industrial process water use reductions.

Effectiveness of the CII program will be evaluated by tracking multiple parameters, including program participation, metered CII water use, high water users, and measuring water savings from specific CII activities where practicable to show significant water savings.

9.1.7.7 Large Landscape

GSWC's large landscape program consists of identifying high-use customers providing information, offering large landscape surveys, voluntary landscape water use budgets, or landscape training. Where available, GSWC customers may be eligible for free landscape water audits and rebates for weather based irrigation controllers or efficient irrigation nozzles. An increase in tiered rate pricing and program marketing are expected to maintain program participation rates over the next 3 years.

GSWC will work to increase program participation at schools and other institutional accounts to establish landscape water budgets and decrease overall water use. Additionally, GSWC will discuss with Metropolitan specific measures that could be implemented to encourage broader interest in the multiple CII programs that are currently being offered.

GSWC will continue to offer large landscape water use surveys to customers without dedicated irrigation meters. Devices such as weather based irrigation controllers (WBIC) and precision nozzles will also be rebated to mix-metered high water use customers who have been determined not to be water efficient.

GSWC will track increased customer participation in the CII large landscape survey and rebate programs depending on funding availability. It is estimated that over 3,000 AF could be conserved over the next 10 years if program participation rates are achieved.

9.1.7.8 Financial Incentives

Ongoing and/or additional financial incentives may be offered directly to customers by GSWC or in partnership with other agencies:

1. HECW rebates: Clothes washer rebates are already being implemented by Metropolitan on behalf of GSWC and will continue to provide measurable water savings.
2. Zero and low-flow urinal rebates: Rebates would include CII fixtures such as zero consumption and ultra-low volume urinals as well as CII specific HETs.
3. Expansion of fixture rebates to CII and MF customers in all systems: currently, the toilet rebate programs are only available to CII and MF customers in select systems. GSWC will evaluate expansion of the programs to all customers and there will be increased focus on marketing to large Home Owner Association accounts.
4. Larger variety of fixture rebates: This may include hot water distribution tanks and grey water systems.

5. Expansion of large landscape program: GSWC will be evaluating the effectiveness of the current landscape program and making adjustments depending on the results. If the program is found to be successful at meeting reduction targets, the program may be accelerated and more devices will be offered, such as direct install of weather based irrigation controllers and precision nozzles.

9.1.7.9 Building Code/New Standards

GSWC supports the CAL Green Code, adopted January 2011 as well as SB407 (Plumbing Retrofit on Resale) and standard updates for toilets, washers and other water efficient products approved for use on the market. New standard activity is captured in GSWC's DMM program information and tracking efforts.

9.1.7.10 Information/Tracking

Information and tracking represents a new element to the existing programs focusing on collecting and processing information and ensuring that the programs are on track to meet water savings goals. These activities will assist in DMM program design by providing more robust information about customers and their water use patterns. The immediate priorities include:

1. Automatic Meter Reading (AMR): GSWC currently follows the requirements of CPUC General Order 103-A, which prescribe minimum water system design, operation and maintenance standards for water utilities, and includes requirements for calibrating, testing frequency, and replacing water meters. GSWC will continue to follow this standard and consider the use of AMR in its systems as a priority to obtain real time data for water usage and identify customer-side leaks. This information can also help GSWC monitor the impacts of existing programs, make adjustments where necessary and develop new programs.
2. Water Use Tracking Tools: Another priority, GSWC will consider plans to design and develop database tracking tools for water savings associated with its conservation plans and increase flexibility in adding or changing program elements.

GSWC is developing a companywide approach that will include DMM program assessment with consideration for accelerating or modifying current programs, adding new programs, and discontinuing programs that are not effective or meeting water saving goals. This systematic approach may enable GSWC to do more with less and consider alternative program delivery options subject to approval by the CPUC before program can be implemented.

9.2 Implementation over the Past Five Years

CWC 10631

- (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:*
- (1)(A) ... a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years.*

This section requires the supplier to provide a description of all DMMs that have been implemented over the past five years from 2011 through 2015. The Southwest System has been actively implementing DMMs over the past five years through both local and regional

programs in collaboration with Metropolitan Water District (Metropolitan). A description including budget, narrative, and water savings information follows for DMMs implemented during the 2011-2015 period in accordance with the Act.

9.2.1 Past DMM Program Budget Expenditures (2011-2015)

Table 9-1 summarizes GSWC's actual DMM expenditures over the past five years for Region II which includes the Southwest System. The DMM budget is constrained by CPUC rate case approvals establishing allowable DMM expenditures for each water system.

Table 9-1: DMM Program Budget – Actual Expenditures Summary Table (2011-2015)					
Program/Item	2011	2012	2013	2014	2015
WaterWise/School Education	\$200,000	\$150,000	\$96,320	\$96,320	
HET Distribution	\$200,599	\$52,195	\$88,720	\$10,518	\$285,685
Partnership Programs/Residential	\$71,986	\$125,656	\$0	\$23,455	-\$7,642
Partnership Programs/CII	\$107,005	\$25,014	\$0	\$775	
Audit-Direct Install	\$0	\$71,678	\$84,874	\$181,139	\$65,260
Conservation Kits	\$58,062	\$82,384	\$94,638	\$2,921	\$10,065
Public Information	\$0	\$0	\$21,043	\$21,671	\$30,808
Turf Removal	\$0	\$0	\$0	\$11,774	
Total Annual Expenditures	\$637,652	\$506,927	\$385,595	\$348,573	\$384,176
NOTES: Based on GSWC annual reports filed with the CPUC from 2011 through 2015.					

The annual budget is established by the CPUC rate case approvals and actual expenditures based on DMM program activity levels experienced in each water system. Annual expenditures vary by system by year depending on budget availability, DMM participation rates, outreach and marketing efforts, and impacts from regional programs.

9.2.2 Past DMM Narrative Summary (2011-2015)

Table 9-2 summarizes the GSWC DMM program implementation over the past five years for the Southwest System which includes both GSWC and regional DMM programs. A narrative description of past DMM programs is provided in Section 9.1.1 through 9.1.7, and summarized below.

The Southwest System DMMs are described in more detail in section 9.1.7.

DMMs implemented over the past five years have helped GSWC meet its SBX7-7 interim 2015 water use target of 124 GPCD for the Southwest System with 2015 actual water use of only 87 GPCD in part also due to the SWRCB drought water use reduction regulations.

Table 9-2: DMM Narrative Summary Table (2011-2015)					
Program/Item	2011	2012	2013	2014	2015
Public Information/Outreach Program (*)	Yes	Yes	Yes	Yes	Yes
HET Rebate Program (*)	Yes	Yes	Yes	Yes	Yes
HEW Rebate Program (*)	Yes	Yes	Yes	Yes	Yes
Residential/CII Partnership Programs (*)	Yes	Yes	Yes	Yes	Yes
Audits (CII/Residential)	Yes	Yes	Yes	Yes	Yes
Conservation Kits/Devices	Yes	Yes	Yes	Yes	Yes
School Education Program (*)	Yes	Yes	Yes	Yes	Yes
NOTES: (*) = joint GSWC/Metropolitan DMM Program					

9.2.3 Past DMM Water Savings Over The Past Five Years

Table 9-3 summarizes the estimated water savings on both an annual and lifetime (i.e., over the useful life of the device) basis for the DMMs implemented over the past five years in Region II, which includes the Southwest System, as described above.

Table 9-3: DMM Program Water Savings Summary Table (2011-2015)					
Savings Period	2011	2012	2013	2014	2015
Annual Water Savings – Acre Feet	415	200	595	174	340
Lifetime Water Savings – Acre Feet	2,610	1,848	3,765	1,762	4,965
Source: CPUC program documents 2011-2015.					

The DMM program savings in Region II improves overall water use efficiency and enables GSWC to reliably meet established water use targets during normal and dry years in the Southwest System.

9.3 Planned Implementation to Achieve Water Use Targets

CWC 10631

- (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
- (1)(A)... The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

In planning for future DMM programs, GSWC would consider the following factors: current efficiency level of specific water systems, cost-effective program design and implementation, sustainability of water savings, and ability to meet future water use targets. DMM programs are an important long term strategy to enable GSWC to provide affordable water service to customers. While meeting water use targets is important, it isn't the only consideration in planning future DMM programs.

The Southwest System has a 2020 water use target of 121 GPCD. Meeting this target on a reliable basis is more likely with future DMMs that maintain an efficient customer base and water system. In this regard, the planned 2016-2018 DMM programs are consistent with approved CPUC funding approvals and would continue current programs already in place during this period. Future DMM programs beyond the currently approved General Rate Case (GRC) would be updated as needed based on evaluating water savings, cost-effectiveness, market saturation and ability to meet future water use targets.

As an investor-owned utility, GSWC's ability to obtain funding and implement DMM programs is contingent on approval of the GRC by the CPUC which covers a three (3) year rate cycle. GSWC is currently in the process of reviewing and evaluating its existing DMM programs as follows:

- In 2017, GSWC will be submitting a GRC with the CPUC which will facilitate further development of cost-effective DMM programs during the 2019-2021 period that reliably save water and ensure sustainable compliance with SBX7-7 in all water systems preparing UWMPs.
- Subject to approval GSWC will conduct a baseline water use efficiency study of each of its districts to quantify market saturation of DMMs to date, assess the effectiveness of current DMM programs, identify emerging DMM opportunities and technologies, and identify cost-effective DMM programs that can be implemented during the upcoming 2019-2021 GRC period. Results of the baseline study will be available by 2017 and will enable GSWC to design cost-effective programs that target water savings in specific areas while meeting DMM goals and SBX7-7 requirements. The study would provide a basis for assessing company-wide DMM programs and focus on targeting DMM programs as appropriate for each district depending on market saturation levels, funding availability, local wholesaler and regional participation levels, and SBX7-7 target objectives.

9.3.1 Planned DMM Budget (2016-2020)

Table 9-4 summarizes GSWC's projected DMM annual budget consistent with expenditures approved by the CPUC in its most recent GRC for Region II which includes the Southwest System. The expenditures are based on CPUC rate case approvals establishing allowable DMM expenditures for each district or rate making area.

The actual annual budgets for 2019 and 2020 will be established by the CPUC upon approval of the 2017 GRC. Actual DMM expenditures will be based on DMM program activity levels experienced in each water system which can be highly variable depending on local, regional and state-wide issues and conditions. Annual Metropolitan DMM program expenditures will augment approved GSWC DMM budgets to assist in achieving program target participation rates, adequate public information and marketing outreach, and synergies from regional programs.

Table 9-4: DMM Program Budget – Projected Expenditures Summary (2016-2020)					
Program/Item	2016	2017	2018	2019	2020
Discovery Science Center School Education Program	\$96,000	\$96,000	\$96,000	TBD	TBD
Conservation Devices – Outdoor	\$12,257	\$12,257	\$12,257	TBD	TBD
CARW—Ultra High Efficiency Toilet (UHET) Direct Install	\$56,678	\$56,678	\$56,678	TBD	TBD
Direct Install - CII (UHET, Aerators)	\$115,215	\$115,215	\$115,215	TBD	TBD
Free Sprinkler Nozzles - Residential	\$8,000	\$8,000	\$8,000	TBD	TBD
Free Sprinkler Nozzles – Commercial	\$15,000	\$15,000	\$15,000	TBD	TBD
Large Landscape Audits	\$34,498	\$34,498	\$34,498	TBD	TBD
CII Audits	\$15,000	\$15,000	\$15,000	TBD	TBD
Community Partnership Events	\$4,453	\$4,453	\$4,453	TBD	TBD
Regional Partner Programs	\$20,360	\$20,360	\$20,360	TBD	TBD
Marketing	\$8,546	\$8,546	\$8,546	TBD	TBD
Misc. and Customer Promotional Items	\$3,504	\$3,504	\$3,504	TBD	TBD
Total Annual Projected Expenditures	\$389,511	\$389,511	\$389,511	TBD	TBD
NOTES: 1. The 2016-2018 data is based on GSWC information from the 2014 GRC impacting the 2016-2018 period. 2. The 2019-2020 expenditures will be based on the outcome of the upcoming 2017 GRC.					

9.3.2 Planned DMM Narrative Summary (2016-2020)

Table 9-5 summarizes the GSWC planned DMM program implementation over the next three (3) years (as determined by currently approved GRCs). For Region II, which includes the Southwest System, this includes both GSWC and regional Metropolitan DMM programs.

The Southwest System other DMMs are described in more detail in section 9.1.7.

DMMs planned to be implemented over the 2016-2018 period will help GSWC continue to reliably meet its 2020 water use target of 121 GPCD for the Southwest System.

Table 9-5: DMM Narrative Summary Table (2016-2020)					
Program/Item	2016	2017	2018	2019	2020
Public Information/Outreach Program (*)	Yes	Yes	Yes	TBD	TBD
PHET Rebate Program (*)	Yes	Yes	Yes	TBD	TBD
HECW Rebate Program (*)	Yes	Yes	Yes	TBD	TBD
Residential/CII Partnership Programs (*)	Yes	Yes	Yes	TBD	TBD

Table 9-5: DMM Narrative Summary Table (2016-2020)					
Program/Item	2016	2017	2018	2019	2020
Audits (CII/Residential)	Yes	Yes	Yes	TBD	TBD
Conservation Kits/Devices	Yes	Yes	Yes	TBD	TBD
School Education Program (*)	Yes	Yes	Yes	TBD	TBD
NOTES: (*) = joint GSWC/Metropolitan DMM Program					

9.3.3 Planning For Future DMM Programs

GSWC plans to conduct a baseline water use efficiency study of each of its districts to quantify market saturation of DMMs to date, assess the effectiveness of current DMM programs, identify emerging DMM opportunities and technologies, and identify cost-effective DMM programs that can be implemented during the 2019-2021 GRC period. Results of the baseline study will be available by 2018 and will enable GSWC to define DMM programs that target water savings in specific areas while meeting DMM goals and SBX7-7 targets. The study would provide a basis for optimizing the allocation of approved DMM budgets, assessing company-wide programs, and focusing DMMs as appropriate for each district depending on cost-effectiveness, funding availability, local wholesaler and regional participation levels, and SBX7-7 target objectives. The estimated budget for this study would be approximately \$400,000 based on similar studies that have been completed by other agencies. Findings from already completed reports (e.g., market saturation studies) will provide a cost-effective basis to complete the GSWC study. The one-time cost of the study, estimated to be \$1.50-2.00/connection, would be shared on a per connection basis with a focus on GSWC systems required to complete UWMPs and not meeting their specific SBX7-7 2020 water use targets.

9.4 Members of the California Urban Water Conservation Council

CWC 10631

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

In 1991, GSWC became a signatory to the MOU regarding water conservation in California and a member of the CUWCC, establishing a firm commitment to the implementation of the Best Management Practices (BMPs) or DMMs. By becoming a signatory, GSWC committed to implement a specific set of locally cost-effective conservation practices in its service areas. In order to facilitate efficient BMP reporting for GSWC across their water systems spread throughout California, several BMP "Reporting Units" were established. The Metro BMP Reporting Unit is equivalent to the Southwest System.

The CUWCC MOU and associated BMPs have been revised by the CUWCC frequently, including the provision for the flex track and water use target compliance methods for signatories. The original utility-based (foundational) DMMs described in section 9.1.1 through 9.1.6 of this chapter represent standard practices in most utilities that GSWC has been implementing for many years. Future direction on BMP implementation for GSWC will be affected by the SBX7-7 legislation, which establishes future water use targets for suppliers.

GSWC has been implementing the foundational BMPs since the 2010 UWMP cycle and plans to continue to implement the foundational BMPs as part of its on-going DMM implementation program.

Other cost-effective BMPs and/or DMMs may be implemented by GSWC (subject to CPUC approval) as needed to meet SBX7-7 water use targets in all GSWC water systems that are required to complete 2015 UWMPs.

BMP Reporting

GSWC has historically filed BMP reports through the online CUWCC BMP reporting database as part of its UWMP preparation process. Because the CUWCC BMP reporting database system was not operating effectively at the time GSWC was preparing its 2015 UWMPs, the 2013-14 BMP reports continue to be filed with the CUWCC. GSWC is complying with DMM requirements of the Act through a narrative approach as depicted in Sections 9.1 through 9.3 of this Chapter.

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Chapter 10: Plan Adoption, Submittal, and Implementation

This chapter describes GSWC's actions to meet the requirements of the Act pertaining to public review and availability. GSWC must provide at least 60-day notice prior to changing or adopting the plan, must conduct a public hearing prior to adoption, must properly notice the public hearing, must make the document available for public review, and make the final plan available to the public within 30-days of adoption. Further, the adopted plan must be submitted to DWR, cities and counties, and State Library within 30-days of adoption.

10.1 Inclusion of All 2015 Data

GSWC is reporting on a calendar year basis and has included water use and planning data for the entire 2015 calendar year. The Southwest System Distribution System Water Audit was based on the AWWA M36 methodology and used the AWWA Water Audit Software (version 5.0) to conduct the water audit based on calendar year 2014 data and information.

10.2 Notice of Public Hearing

GSWC provided notice to cities, counties, and the community of the Public Hearing held prior to adoption of the 2015 UWMP for the Southwest System. GSWC considered public input received before adopting the 2015 UWMP.

10.2.1 Notice to Cities and Counties

CWC 10621

- (b) Every urban water supplier required to prepare a plan shall... at least 60 days prior to the public hearing on the plan ... 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.*

CWC 10642

...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.

Notifications indicating preparation of the 2015 UWMP for the Southwest System were provided to cities and counties within which GSWC provides water at least 60 days in advance of the public hearing as required by the Act. Copies of the draft plan were available to the public for review at GSWC's Customer Service Office and posted on GSWC's website. Appendix G contains the following:

- Copy of the public hearing notice from the local newspaper,
- Screen capture of website posting of public hearing notice,
- Notifications and follow-up correspondence provided to cities and counties, and
- Meeting minutes from the 2015 UWMP public hearing.

The following cities and counties were notified as indicated in Table 10-1:

Table 10-1: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
City of Carson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Compton	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of El Segundo	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Gardena	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Hawthorne	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Inglewood	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Lawndale	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Redondo Beach	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Los Angeles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
County Name	60 Day Notice	Notice of Public Hearing
Los Angeles County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
NOTES: Based on DWR Guidebook Table 10-1		

10.2.2 Notice to the Public

CWC 10642

...Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection... 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...

Government Code 6066

Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.

GSWC conducted a Public Hearing on August 17, 2016 prior to adopting its 2015 UWMP for the Southwest System. GSWC filed six legal public notices in local newspapers within 14 days of the Public Hearing to inform the public of the upcoming Public Hearing and to make the 2015 UWMP available for public review and comment. The first three notices were published on August 4, 2016 and August 5, 2016, within 14 days before the public hearing, and the second three notices were published on August 10, 2016 and August 12, 2016, within 7 days before the Public Hearing. The public notices were published in three newspapers: the Long Beach Press-Telegram, the Daily Breeze, and the Los Angeles Times. GSWC also published a notice to the public about the upcoming Public Hearing on its website (www.gswater.com). A copy of the public notice placed in the newspapers is included in Appendix G.

10.3 Public Hearing and Adoption

CWC 10642

...Prior to adopting a plan, the urban water supplier shall hold a public hearing thereon.

CWC 10608.26

- (a) *In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:*
- (1) *Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.*
 - (2) *Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.*
 - (3) *Adopt a method, pursuant to subdivision (b) of Section 10608.20 for determining its urban water use target.*

The GSWC conducted a Public Hearing, held at the Hawthorne Memorial Center in Hawthorne, California, on August 17, 2016 prior to adopting its 2015 UWMP for the Southwest System. The purpose of the Public Hearing was to allow community input regarding GSWC's implementation plan, to consider the economic impacts of GSWC's implementation plan, and to adopt a method for complying with SBX7-7 for determining its urban water use target. The Public Hearing was opened and closed, with public comments documented and considered for inclusion into the 2015 UWMP.

10.3.1 Adoption

CWC 10642

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

GSWC considered public comments received at the August 17, 2016 Public Hearing. GSWC adopted its 2015 UWMP for the Southwest System on September 12, 2016, considering public comments received during the Public Hearing. The Plan was adopted by the GSWC Vice President of Regulated Utilities, in accordance with GSWC procedure for adopting planning documents.

10.4 Plan Submittal

CWC 10621

(d) An urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

CWC 10644

(a)(1) 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.

CWC 10635

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

GSWC adopted its 2015 UWMP for the Southwest System on September 12, 2016. A copy of GSWC's Final 2015 UWMP for the Southwest System was submitted to DWR, the California State Library, and any city or county within the supplier's service area within 30 days of adoption.

10.4.1 Submitting a UWMP to DWR

GSWC submitted the adopted 2015 UWMP for its Southwest System to DWR through the DWR online submittal process, including completed DWR Tables and Final 2015 UWMP document within 30 days of when the 2015 UWMP for the Southwest System was adopted by GSWC.

10.4.2 Electronic Data Submittal

GSWC submitted completed DWR Tables included in its 2015 UWMP for the Southwest System through the DWR online submittal process established by DWR to receive all UWMP submittals. Copies of submittal records received by DWR for the Southwest System 2015 UWMP data and information are included in Appendix I.

10.4.3 Submitting a UWMP to the California State Library

GSWC prepared and submitted a copy of its adopted 2015 UWMP for the Southwest System to the California State Library within 30 days of adopting its 2015 UWMP.

10.4.4 Submitting a UWMP to Cities and Counties

GSWC prepared and submitted a copy of its adopted 2015 UWMP for the Southwest System to all cities and counties receiving water service through the Southwest Water System within 30 days of adopting its 2015 UWMP.

10.5 Public Availability

CWC 10645

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

The GSWC's adopted Final 2015 UWMP for the Southwest System was made available to the public at the GSWC's Southwest Customer Service Office and on the GSWC website within 30-days after adoption by GSWC. This plan includes all information necessary to meet the applicable requirements of California Water Code.

10.6 Amending an Adopted UWMP

CWC 10621

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

CWC 10644

- (a)(1) 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.*

Copies of the GSWC's 2015 UWMP for the Southwest System, including any changes or amendments, was submitted to DWR, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption by GSWC.

10.7 Implementation

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

GSWC is committed to the implementation of this UWMP concurrent with the scheduled activities identified herein as required by Section 10643 of the Act. Each system is managed through GSWC District offices and is afforded staff with appropriate regulatory approval to properly plan and implement responses identified in this document and other key planning efforts to proactively address water supply reliability challenges. Furthermore, each region of GSWC has a conservation coordinator that oversees the implementation of Demand Management Measures (DMMs) through GSWC participation in the California Urban Water Conservation Council's (Council or CUWCC) Memorandum of Understanding (MOU).

GSWC is committed to implementation of the projects, plans, and discussions provided within this document. However, it is important to note that execution of the plan is contingent upon the regulatory limitations and approval of the CPUC and other state agencies. Additionally, this document merely presents the water supply, reliability, and conservation programs known and in effect at the time of adoption of this plan.

GSWC understands the limited nature of water supply in California and is committed to optimizing its available water resources. This commitment is demonstrated through GSWC's use of water management tools throughout the company to promote the efficient use of water supplies from local sources, wherever feasible. GSWC takes steps to procure local reliable water supplies wherever feasible and cost effective to minimize dependence on importations from other regions. GSWC is a regular participant in regional water resources planning efforts, and has developed internal company water resource and master plans, as well as cost effective water conservation programs that enable GSWC to meet future water use targets.

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Appendix A

DWR Guidebook Urban Water Management Plan Checklist

Appendix A: UWMP Checklist

This checklist is developed directly from the Urban Water Management Planning Act and SB X7-7. It is provided to support water suppliers during preparation of their UWMPs. The UWMP Checklist is organized according subject matter. In the event that information or recommendations in these tables are inconsistent with, conflict with, or omit the requirements of the Act or applicable laws, the Act or other laws shall prevail.

Each water supplier submitting an UWMP can also provide DWR with the UWMP location of the required element by completing the last column of either checklist. This will support DWR in its review of these UWMPs. The completed form can be included with the UWMP.

If an item does not pertain to a water supplier, then state the UWMP requirement and note that it does not apply to the agency. For example, if a water supplier does not use groundwater as a water supply source, then there should be a statement in the UWMP that groundwater is not a water supply source.

Checklist Arranged by Subject

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Section 2.1
10620(d)(2)	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.	Plan Preparation	Section 2.5.2	Section 2.5.2
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	Section 2.5.2
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 3.1
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.2
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 3.3
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.3.3

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 3.3
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Sections 4.2 and 4.3
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 4.3
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 4.5
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	App D
10608.20(e)	Retail suppliers shall 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.	Baselines and Targets	Chapter 5 and App E	Sections 5.3, 5.4, 5.7, 5.8, and App D
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply is the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 5.7.1
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Section 5.8 and App D
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	Section 5.8.1
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	Section 5.1
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	App D

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Section 6.9
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Sections 6.2.1, 6.2.2, and 6.2.4
10631(b)(1)	Indicate whether a groundwater management plan has 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.	System Supplies	Section 6.2.2	Section 6.2.2
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 6.2.1
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 6.2.2
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	Section 6.2.3
10631(b)(3)	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	System Supplies	Section 6.2.4	Section 6.2.4
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Section 6.9
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Section 6.7
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	Section 6.8
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 6.6
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	Section 2.5.1

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	Section 2.5.1
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Section 6.5.1
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Section 6.5.2
10633(b)	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.	System Supplies (Recycled Water)	Section 6.5.2.2	Section 6.5.2
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 6.5.3
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Section 6.5.4
10633(e)	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.	System Supplies (Recycled Water)	Section 6.5.4	Section 6.5.4
10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.5.5
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.5.5
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 7.4

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 7.2
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 7.2
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	Section 7.1
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Section 7.1
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Chapter 8 and Section 8.1
10632(a)(2)	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.	Water Shortage Contingency Planning	Section 8.9	Section 8.9
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Section 8.8
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 8.2
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Sections 8.2 and 8.4
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 8.3

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Section 8.6
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Section 8.7
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Section 8.5
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Sections 9.2 and 9.3
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	Section 9.4
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Section 10.3
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Sections 10.2.1 and 2.5.3
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Sections 10.4 and 2.1

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Section 10.4
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Sections 10.2.2 and 10.3
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Sections 10.2.1
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Section 10.3.1
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Sections 10.4 and 10.6
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Sections 10.4 and 10.6
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Sections 10.4.1 and 10.4.2
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 10.5

Appendix B

Documentation of Water Use Projections Submittal

17 May 2016

Memorandum

To: Kevin Hunt, Associate General Manager
Jonathan Tat, Engineering & Operations Manager
Central Basin Municipal Water District
6252 Telegraph Road
Commerce, CA 90040

From: Mike Downey, Project Manager
Kennedy/Jenks Consultants

Subject: Golden State Water Company – Southwest System
2015 Urban Water Management Plan Demand Projections
K/J 1570027*00

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The Southwest System currently obtains its water supply from local groundwater, recycled water, and purchased water from West Basin Municipal Water District (WBMWD) and Central Basin Municipal Water District (CBMWD). The purpose of this memorandum is to provide CBWMD with the following preliminary information for use in the development of 2015 UWMPs:

- Population estimates, historical and projections.
- GSWC's demand projections in 5-year increments from 2015-2040, including demand irrespective of source.
- SBX7-7 baseline, target, and methodology used.
- Southwest System's water supply sources.

The information provided in this memorandum is preliminary and may be different from what is presented in the adopted 2015 GSWC Southwest UWMP. If you have any questions or concerns please feel free to contact Mike Downey with Kennedy/Jenks Consultants at mikedowney@kennedyjenks.com or (916) 858-2700.

Population Estimates

Projections for the Southwest System's population from 2020 to 2040 were determined using the Southern California Association of Governments (SCAG) city-level projections. The current and projected population can be found in DWR Table 3-1 below.

Memorandum

Central Basin Municipal Water District

17 May 2016

1570027*00

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Table 3-1 Retail: Population - Current and Projected

	2015	2020	2025	2030	2035	2040 _(opt)
Population Served	275,369	282,455	289,326	296,365	303,576	310,961

NOTES:

1. 2015 population estimated using the DWR Online Population Tool.
2. Projected population based on SCAG population growth rate for the City of Hawthorne.

Demand Projections

Projected water demand utilized SCAG growth projections applied to 2015 service connection numbers combined with its respective historical customer average water use. The projected water demand is found in DWR Table 4-3 below.

Table 4-3 Retail: Total Water Demands

	2015	2020	2025	2030	2035	2040 _(opt)
Potable and Raw Water <i>From Tables 4-1 and 4-2</i>	26,936	32,248	32,668	33,091	33,521	33,955
Recycled Water Demand <i>From Table 6-4</i>	398	824	824	824	824	824
TOTAL WATER DEMAND	27,335	33,072	33,492	33,915	34,345	34,779

NOTES:

1. Units are in AFY
2. Potable and recycled water demands only.

SB X7-7 Baseline and Targets

The Southwest System first reported its Baseline Daily Per Capita Water Use in its 2010 UWMP; however, at the time the 2010 UWMP was prepared, full 2010 Census data was not available. Therefore, for the 2015 UWMP, the Southwest System is required to recalculate baseline and target water use using 2010 Census data.

Memorandum

Central Basin Municipal Water District

17 May 2016

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For the 2015 GSWC Southwest System, a 10-year baseline was used and Compliance Method 3 was selected for updating urban water use targets. The interim and compliance water targets as required per Section 10608.20(e) of SBX7-7 are presented below in DWR Table 5-1.

Table 5-1 Baselines and Targets Summary					
<i>Retail Agency or Regional Alliance Only</i>					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	1997	2006	128	124	121
5 Year	2003	2007	127		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES:					

Water Supply

Southwest System Water supply sources and volumes for 2015 are shown in Table 6-8 below. If additional information regarding Southwest System supplies is needed, please contact Kennedy/Jenks.

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield (optional)
Purchased or Imported Water		21,023	Drinking Water	
Groundwater		5,915	Drinking Water	
Recycled Water		398	Recycled Water	
Total		26,938		0
NOTES: Volume is in AF.				

17 May 2016

Memorandum

To: Fernando Paludi, Associate General Manager
Leighanne Kirk, Senior Water Resources Planner
West Basin Municipal Water District
17140 S. Avalon Blvd., Suite 210
Carson, CA 90746-1296

From: Mike Downey, Project Manager
Kennedy/Jenks Consultants

Subject: Golden State Water Company – Southwest System
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K/J 1570027*00

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The Southwest System currently obtains its water supply from local groundwater, recycled water, and purchased water from West Basin Municipal Water District (WBMWD) and Central Basin Municipal Water District (CBMWD). The purpose of this memorandum is to provide WBMWD with the following preliminary information for use in the development of 2015 UWMPs:

- Population estimates, historical and projections.
- GSWC's demand projections in 5-year increments from 2015-2040, including demand irrespective of source.
- SBX7-7 baseline, target, and methodology used.
- Southwest System's water supply sources.

The information provided in this memorandum is preliminary and may be different from what is presented in the adopted 2015 GSWC Southwest UWMP. If you have any questions or concerns please feel free to contact Mike Downey with Kennedy/Jenks Consultants at mikedowney@kennedyjenks.com or (916) 858-2700.

Population Estimates

Projections for the Southwest System's population from 2020 to 2040 were determined using the Southern California Association of Governments (SCAG) city-level projections. The current and projected population can be found in DWR Table 3-1 below.

Memorandum

West Basin Municipal Water District

17 May 2016

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Memorandum

West Basin Municipal Water District

17 May 2016

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Recycled Water		398	Recycled Water	
Total		26,938		0
NOTES: Volume is in AF.				

Appendix C

American Water Works Association Water Audits

AWWA Free Water Audit Software v5.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Ray Burk		
Email Address:	Ray.Burk@gswater.com		
Telephone Ext.:	562-907-9200 ext. 421		
Name of City / Utility:	Golden State Water Company - Southwest		
City/Town/Municipality:			
State / Province:	California (CA)		
Country:	USA		
Year:	2014	Calendar Year	
Audit Preparation Date:	7/8/2015		
Volume Reporting Units:	Acre-feet		
PWSID / Other ID:			

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

	Value can be entered by user
	Value calculated based on input data
	These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions

The current sheet.
Enter contact information and basic audit details (year, units etc)

Reporting Worksheet

Enter the required data on this worksheet to calculate the water balance and data grading

Comments

Enter comments to explain how values were calculated or to document data sources

Performance Indicators

Review the performance indicators to evaluate the results of the audit

Water Balance

The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard

A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix

Presents the possible grading options for each input component of the audit

Service Connection Diagram

Diagrams depicting possible customer service connection line configurations

Definitions

Use this sheet to understand the terms used in the audit process

Loss Control Planning

Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits

Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements

Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org



AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
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?	Click to access definition
+	Click to add a comment

Water Audit Report for: **Golden State Water Company - Southwest**
Reporting Year: **2014** **1/2014 - 12/2014**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	+	?	9	16,194.000	acre-ft/yr
Water imported:	+	?	9	12,471.000	acre-ft/yr
Water exported:	+	?			acre-ft/yr

Pcnt:	Value:						
+	?	9	0.00%	<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr
+	?	9	0.00%	<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr
+	?			<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **28,665.000** acre-ft/yr

AUTHORIZED CONSUMPTION

Billed metered:	+	?	9	28,201.000	acre-ft/yr
Billed unmetered:	+	?			acre-ft/yr
Unbilled metered:	+	?	7	232.000	acre-ft/yr
Unbilled unmetered:	+	?		358.313	acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: **28,791.313** acre-ft/yr

Check input values; WATER SUPPLIED should be greater than AUTHORIZED CONSUMPTION

Click here: ?
for help using option
buttons below

Pcnt:	Value:			
1.25%	<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr

Use buttons to select
percentage of water supplied
OR
value

Pcnt:	Value:			
0.25%	<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr

1.50%	<input checked="" type="radio"/>	<input type="radio"/>		acre-ft/yr
	<input type="radio"/>	<input checked="" type="radio"/>	2.000	acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

-126.313 acre-ft/yr

Apparent Losses

Unauthorized consumption: **71.663** acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	7	432.990	acre-ft/yr
Systematic data handling errors:	+	?	7	2.000	acre-ft/yr

Apparent Losses: **506.652** acre-ft/yr

Check input values; APPARENT LOSSES should be less than WATER LOSSES

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **-632.965** acre-ft/yr

WATER LOSSES: **-126.313** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **464.000** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	9	438.0	miles
Number of <u>active AND inactive</u> service connections:	+	?	8	53,311	
Service connection density:	?			122	conn./mile main

Are customer meters typically located at the curbstop or property line? **Yes**

Average length of customer service line: **+** **?**

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: **+** **?** **8** **75.0** psi

(length of service line, beyond the property boundary,
that is the responsibility of the utility)

COST DATA

Total annual cost of operating water system:	+	?	8	\$51,606.824	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	8	\$5.80	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	8	\$1,313.00	\$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 81 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption

2: Unbilled metered

3: Customer metering inaccuracies



AWWA Free Water Audit Software: System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.
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Water Audit Report for: **Golden State Water Company - Southwest**

Reporting Year: **2014** **1/2014 - 12/2014**

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 81 out of 100 ***

System Attributes:

Apparent Losses:	506.652	acre-ft/yr
+ Real Losses:	(632.965)	acre-ft/yr
= Water Losses:	(126.313)	acre-ft/yr

? Unavoidable Annual Real Losses (UARL): **870.87** acre-ft/yr

Annual cost of Apparent Losses: **\$1,280,047**

Annual cost of Real Losses: **-\$831,083** Valued at **Variable Production Cost**
Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:

Non-revenue water as percent by volume of Water Supplied:	1.6%	
Non-revenue water as percent by cost of operating system:	2.4%	Real Losses valued at Variable Production Cost

Operational Efficiency:

Apparent Losses per service connection per day:	8.48	gallons/connection/day
Real Losses per service connection per day:	-10.60	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	-0.14	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL): **-632.96** acre-feet/year

? Infrastructure Leakage Index (ILI) [CARL/UARL]: **-0.73**

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline



AWWA Free Water Audit Software: User Comments

WAS v5.0

American Water Works Association.
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Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	
Audit Item	Comment
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	



AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.
Copyright © 2014, All Rights Reserved.Water Audit Report for: **Golden State Water Company - Southwest**Reporting Year: **2014****1/2014 - 12/2014**Data Validity Score: **81**

Own Sources (Adjusted for known errors) 16,194.000	System Input 28,665.000	Water Exported 0.000	Billed Water Exported				Revenue Water 0.000
		Water Supplied 28,665.000	Authorized Consumption 28,791.313	Billed Authorized Consumption 28,201.000	Billed Metered Consumption (water exported is removed) 28,201.000	Revenue Water 28,201.000	
					Billed Unmetered Consumption 0.000		
				Unbilled Authorized Consumption 590.313	Unbilled Metered Consumption 232.000	Non-Revenue Water (NRW) 464.000	
					Unbilled Unmetered Consumption 358.313		
			Water Losses -126.313		Apparent Losses 506.652		Unauthorized Consumption 71.663
							Customer Metering Inaccuracies 432.990
				Systematic Data Handling Errors 2.000			
				Real Losses -632.965		Leakage on Transmission and/or Distribution Mains Not broken down	
		Leakage and Overflows at Utility's Storage Tanks Not broken down					
Leakage on Service Connections Not broken down							



AWWA Free Water Audit Software: Dashboard

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The graphic below is a visual representation of the Water Balance with bar heights proportional to the volume of the audit components

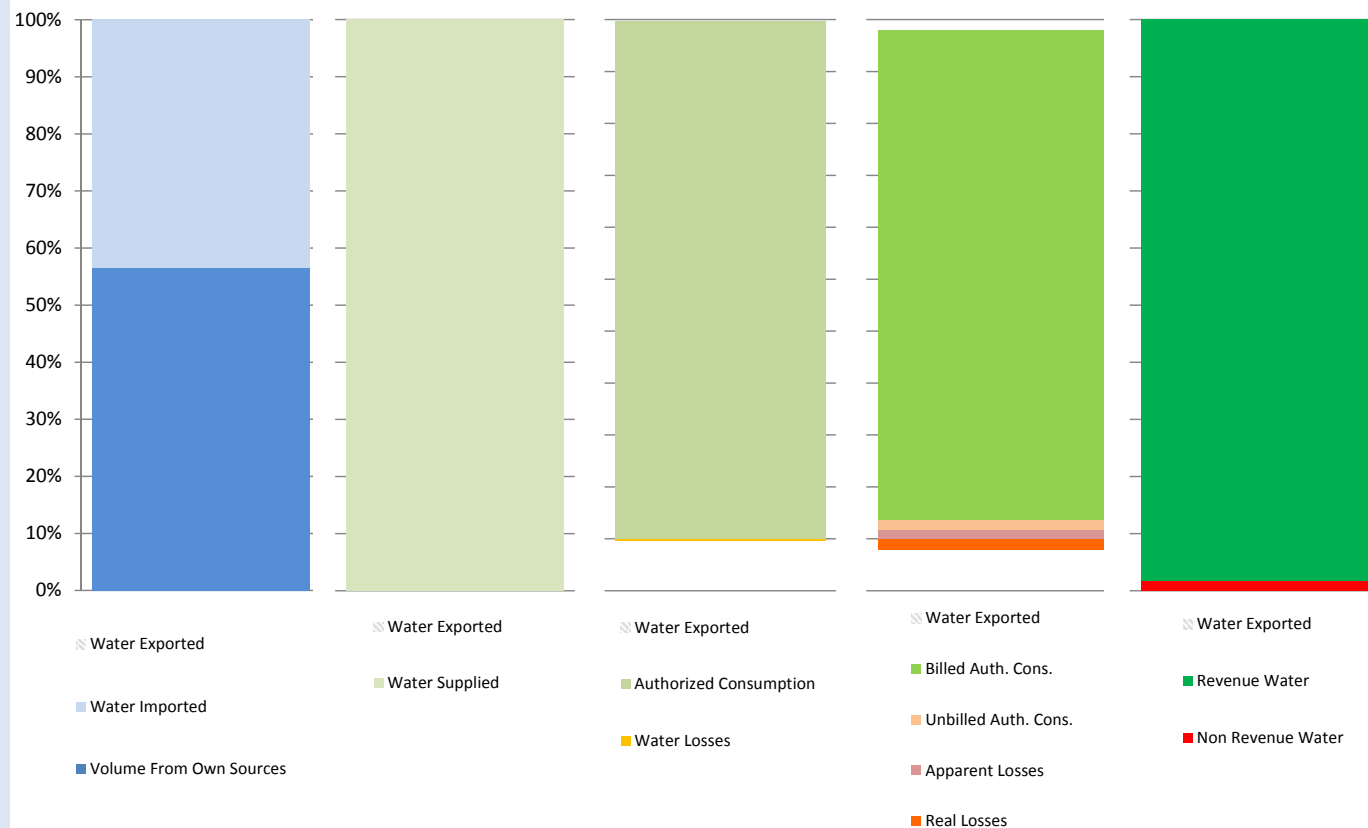
Water Audit Report for: **Golden State Water Company - Southwest**

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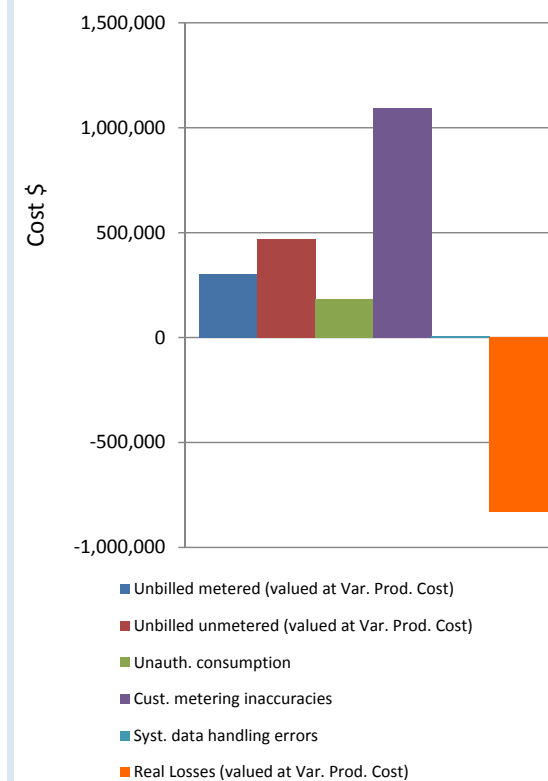
Data Validity Score: **81**

☐ Show me the VOLUME of Non-Revenue Water

☒ Show me the COST of Non-Revenue Water



Total Cost of NRW = \$1,224,044





AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

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The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, <u>at least 90% of the source flow is derived from metered sources.</u> Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		<u>to qualify for 2:</u> Organize and launch efforts to collect data for determining volume from own sources	<u>to qualify for 4:</u> Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		<u>to qualify for 6:</u> Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		<u>to qualify for 8:</u> Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		<u>to qualify for 10:</u> Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		<u>to maintain 10:</u> Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system; tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		<u>to qualify for 2:</u> Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	<u>to qualify for 4:</u> Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		<u>to qualify for 6:</u> Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		<u>to qualify for 8:</u> Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		<u>to qualify for 10:</u> Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		<u>to maintain 10:</u> Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-maintained and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: (Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)		<u>to qualify for 2:</u> Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	<u>To qualify for 4:</u> Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		<u>to qualify for 6:</u> Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		<u>to qualify for 8:</u> Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		<u>to qualify for 10:</u> Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		<u>to maintain 10:</u> Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined. Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Exporter. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.)		to qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined. Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		<p><u>to qualify for 2:</u> Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.</p>	<p><u>to qualify for 4:</u> Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.</p>		<p><u>to qualify for 6:</u> Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.</p>		<p><u>to qualify for 8:</u> Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.</p>		<p><u>to qualify for 10:</u> Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities, at least every five years.</p>		<p><u>to maintain 10:</u> Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.</p>
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records exist, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducted by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	<p><u>to qualify for 2:</u> Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.</p>	<p><u>to qualify for 4:</u> Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.</p>		<p><u>to qualify for 6:</u> Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.</p>		<p><u>to qualify for 8:</u> Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.</p>		<p><u>to qualify for 10:</u> Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.</p>		<p><u>to maintain 10:</u> Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.</p>
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		<p><u>to qualify for 2:</u> Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.</p>	<p><u>to qualify for 4:</u> Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.</p>		<p><u>to qualify for 6:</u> Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts</p>		<p><u>to qualify for 8:</u> Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.</p>		<p><u>to qualify for 10:</u> Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.</p>		<p><u>to maintain 10:</u> Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.</p>
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	<p>Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.</p>	<p>Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.</p>	Conditions between 2 and 4	<p>Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.</p>	Conditions between 4 and 6	<p>Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.</p>	Conditions between 6 and 8	<p>Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.</p>	Conditions between 8 and 10	<p>Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.</p>
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		<p><u>to qualify for 2:</u> Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.</p>	<p><u>to qualify for 4:</u> Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.</p>		<p><u>to qualify for 6:</u> Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.</p>		<p><u>to qualify for 8:</u> Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.</p>		<p><u>to qualify for 10:</u> Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.</p>		<p><u>to maintain 10:</u> Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.</p>
Unbilled unmetered:		<p>Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.</p>	<p>Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.</p>	Conditions between 2 and 4	<p>Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).</p>	Default value of 1.25% of system input volume is employed	<p>Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.</p>	Conditions between 6 and 8	<p>Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.</p>	Conditions between 8 and 10	<p>Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.</p>
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		<p><u>to qualify for 5:</u> Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use.</p> <p><u>to qualify for 2:</u> Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).</p>	<p><u>to qualify for 5:</u> Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use.</p> <p><u>to qualify for 4:</u> Evaluate the documentation of events that have been observed. Meet with user groups (ex: fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).</p>		<p><u>to qualify for 5:</u> Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, unmetered consumption is usually a relatively small quantity component, and other larger-quantity components should take priority.</p>	<p><u>to qualify for 6 or greater:</u> Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.</p>	<p><u>to qualify for 8:</u> Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.</p>		<p><u>to qualify for 10:</u> Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.</p>		<p><u>to maintain 10:</u> Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.</p>
APPARENT LOSSES											

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing accounts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	Note: The number of Service Connections does not include fire hydrant leads/lines connecting the hydrant to the water main	to qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	to qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		to qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		to qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		to qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		to maintain 10: Continue with standardization and random field validation to improve knowledge of system.
	Note: if customer water	Gratings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gratings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									Either of two conditions can be met for a grading of 10:

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Average length of customer service line:	meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Worksheet asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet. b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		<u>to qualify for 2:</u> Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	<u>to qualify for 4:</u> Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		<u>to qualify for 6:</u> Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		<u>to qualify for 8:</u> Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		<u>to qualify for 10:</u> Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		<u>to maintain 10:</u> Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breach pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breach pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:		<u>to qualify for 2:</u> Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	<u>to qualify for 4:</u> Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		<u>to qualify for 6:</u> Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		<u>to qualify for 8:</u> Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		<u>to qualify for 10:</u> Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		<u>to maintain 10:</u> Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis, or: 2) Water supply is entirely purchased as bulk water imported, and the unit purchase cost - including all applicable marginal supply costs - serves as the variable production cost. If all applicable marginal supply costs are not included in this figure, a grade of 10 should not be selected.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgeable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively



Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, L_p , for the three most common piping configurations.

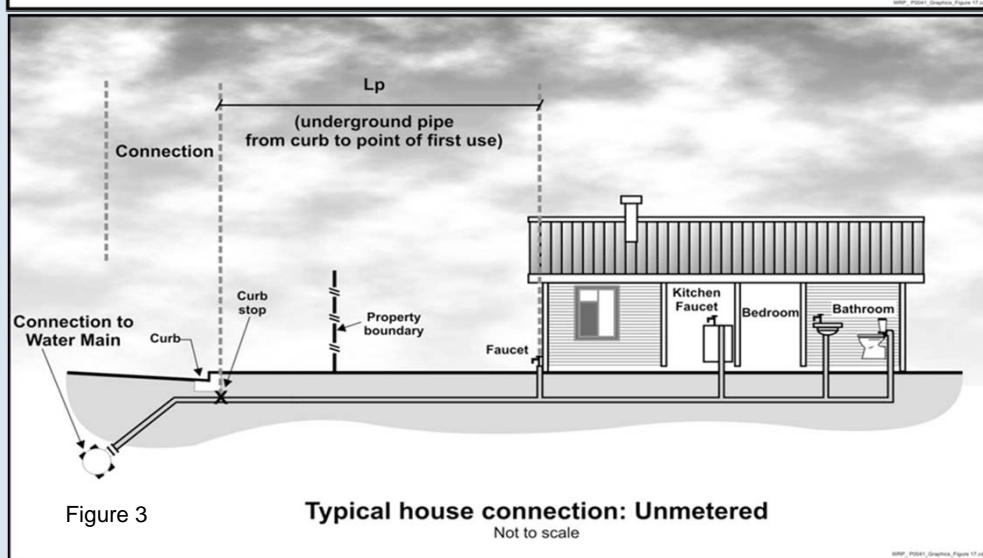
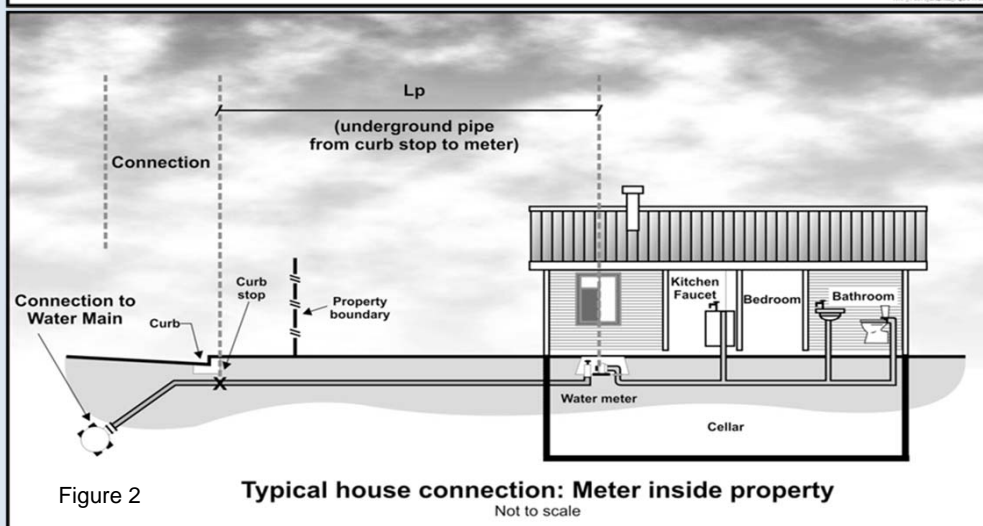
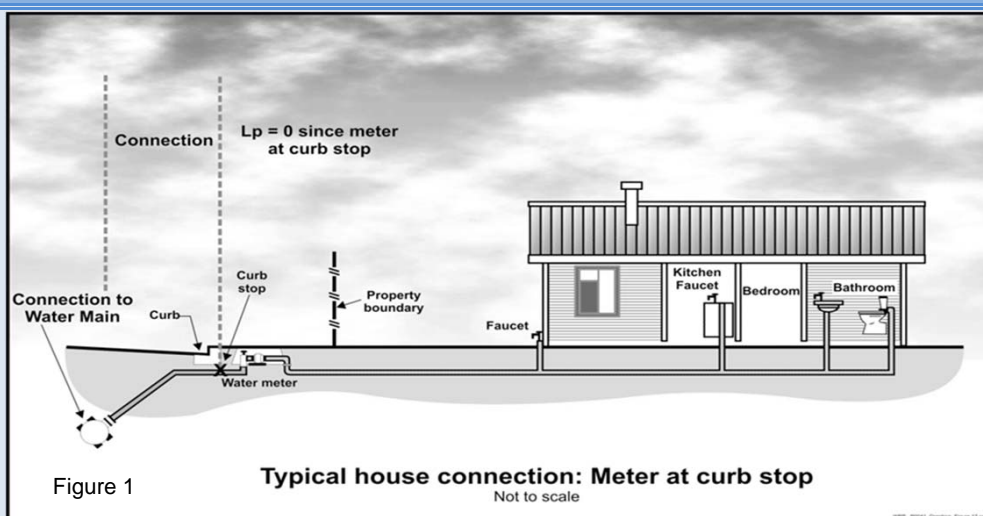
Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration $L_p = 0$ since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where L_p is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building, where L_p is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the L_p will vary notably in a community of different structures, therefore the average L_p value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

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AWWA Free Water Audit Software: Definitions

WAS v5.0

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Item Name	Description
Apparent Losses Find	<p>= unauthorized consumption + customer metering inaccuracies + systematic data handling errors</p> <p>Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use).</p> <p>NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.</p>
AUTHORIZED CONSUMPTION Find	<p>= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption</p> <p>The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes.</p> <p>Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.</p> <p>Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)</p>
View Service Connection Diagram Average length of customer service line Find	<p>This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping.</p> <p>If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10.</p> <p>If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system.</p> <p>Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.</p>
Average operating pressure Find	<p>This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.</p>
Billed Authorized Consumption	<p>All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.</p>
Billed metered consumption Find	<p>All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component. The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.</p>
Billed unmetered consumption Find	<p>All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined <u>by utility policy</u> to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.</p>

Item Name	Description
Customer metering inaccuracies Find	<p>Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger.</p> <p>The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for <u>all</u> customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly.</p> <p>Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.</p>
Customer retail unit cost Find	<p>The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, <u>but only if</u> these charges are based upon the volume of potable water consumed.</p> <p>For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer.</p> <p>Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either \$/1,000 gallons, \$/hundred cubic feet, or \$/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, \$.</p>
Infrastructure Leakage Index (ILI) Find	<p>The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.</p>
Length of mains Find	<p>Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as:</p> <p>Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]</p>
NON-REVENUE WATER Find	<p>= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.</p>
Number of <u>active</u> AND <u>inactive</u> service connections Find	<p>Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hydrants should be included in the "Length of mains" parameter.</p>
Real Losses Find	<p>Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.</p>
Revenue Water	<p>Those components of System Input Volume that are billed and have the potential to produce revenue.</p>
Service Connection Density Find	<p>=number of customer service connections / length of mains</p>

Item Name	Description
<p>Systematic data handling errors</p> <p>Find</p>	<p>Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports.</p> <p>Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.</p> <p>Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. <u>Data Transfer Errors</u> result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors.</p> <p>Apparent losses also occur from <u>Data Analysis Errors</u> in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system.</p> <p>Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors.</p> <p>If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the Billed Authorized Consumption volume. However, if the auditor <u>has</u> investigated the billing system and its controls, and <u>has</u> well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. <u>Note:</u> negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.</p>
<p>Total annual cost of operating the water system</p> <p>Find</p>	<p>These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.</p>
<p>Unauthorized consumption</p> <p>Find</p>	<p>Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system.</p> <p>Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.</p>
<p>Unavoidable Annual Real Losses (UARL)</p> <p>Find</p>	<p>UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP</p> <p>where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres)</p> <p>The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both.</p> <p>NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If,</p> <p><u>in gallons:</u> (Lm x 32) + Nc < 3000 or P < 35psi</p> <p><u>in litres:</u> (Lm x 20) + Nc < 3000 or P < 25m</p> <p>then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.</p>

Item Name	Description
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.
Unbilled metered consumption	Metered consumption which is authorized by the water utility, but, for any reason, is <u>deemed by utility policy</u> to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.
Unbilled unmetered consumption	<p>Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case. This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value.</p> <p>If the water utility <u>has</u> carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities.</p> <p>Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.</p>
Units and Conversions	<p>The user may develop an audit based on one of three unit selections:</p> <p>1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet</p> <p>Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes):</p> <div><div>Enter Units:</div><div>Convert From...</div><div>=</div><div>Converts to....</div></div> <div><div>1</div><div>Million Gallons (US)</div><div>3.06888329</div><div>Acre-feet</div></div> <p>(conversion factor = 3.06888328973723)</p>
Use of Option Buttons	<p>To use the default percent value choose this button</p> <p>To enter a value choose this button and enter the value in the cell to the right</p> <div><div>Pcnt:</div><div>Value:</div><div>1.25%</div><div></div></div> <p>NOTE: For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above.</p> <p>If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).</p>
Variable production cost (applied to Real Losses)	<p>The cost to produce and supply the next unit of water (e.g., \$/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable.</p> <p>It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost.</p> <p>The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.</p>
Volume from own sources	<p>The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of <u>treated</u> drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.</p>

Item Name	Description
Volume from own sources: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.</p>
Water exported <input type="button" value="Find"/>	<p>The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water.</p> <p>Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.</p>
Water exported: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.</p>
Water imported <input type="button" value="Find"/>	<p>The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.</p>
Water imported: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.</p>
WATER LOSSES <input type="button" value="Find"/>	<p>= apparent losses + real losses</p> <p>Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.</p>



AWWA Free Water Audit Software: Determining Water Loss Standing

WAS v5.0

American Water Works Association,
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Water Audit Report for: Golden State Water Company - Southwest

Reporting Year: 2014 1/2014 - 12/2014

Data Validity Score: 81

Water Loss Control Planning Guide

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	Level II (26-50)	Level III (51-70)	Level IV (71-90)	Level V (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service
For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.					

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities in gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI
(without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		



AWWA Free Water Audit Software: Examples of Completed and Validated Audits

WAS v5.0

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Example 1a: Million Gallons:

Example 1b: Million Gallons:
Performance IndicatorsExample 2a: Megalitres:
Reporting WorksheetExample 2b: Megalitres:
Reporting Worksheet

Example Audit 1a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association.
Copyright © 2014. All Rights Reserved.[Click to access definition](#)
[Click to add a comment](#)Water Audit Report for: **City of Asheville (01-11-010)**
Reporting Year: **2013** 7/2012 - 6/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Enter grading in column 'E' and 'J'

Volume from own sources:	+	?	7	7,352.880	MG/Yr	PcntL	3	Value:	285.450	MG/Yr
Water imported:	+	?	n/a	0.000	MG/Yr					MG/Yr
Water exported:	+	?	n/a	0.000	MG/Yr					MG/Yr

Master Meter Error Adjustments

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **7,067.430** MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	+	?	8	4,782.250	MG/Yr
Billed unmetered:	+	?	n/a	0.000	MG/Yr
Unbilled metered:	+	?	7	27.757	MG/Yr
Unbilled unmetered:	+	?	8	157.790	MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: **4,967.797** MG/Yr

Click here: [?](#)
for help using option
buttons below

Pcnt: **0.25%** Value: **157.790** MG/Yr

Use buttons to select
percentage of water
supplied
OR
value

Pcnt: **0.25%** Value: **157.790** MG/Yr

2.26% **0.25%** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,099.633 MG/Yr

Apparent Losses

Unauthorized consumption: **17.669** MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	7	111.220	MG/Yr
Systematic data handling errors:	+	?	5	11.956	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **140.844** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **1,958.789** MG/Yr**WATER LOSSES:** **2,099.633** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **2,285.180** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	4	1,236.5	miles
Number of active AND inactive service connections:	+	?	7	55,256	
Service connection density:	?			45	conn./mile main

Are customer meters typically located at the curbstop or property line? **Yes**Average length of customer service line: **145.3** psi (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: **145.3** psi

COST DATA

Total annual cost of operating water system:	+	?	10	\$33,630,676	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	10	\$3.22	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	6	\$335.94	\$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources**2: Variable production cost (applied to Real Losses)****3: Unauthorized consumption**



Example Audit 1b:

AWWA Free Water Audit Software: System Attributes and Performance Indicators

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American Water Works Association
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Water Audit Report for: **City of Asheville (01-11-010)**

Reporting Year: **2013** **7/2012 - 6/2013**

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

Apparent Losses:	140.844	MG/Yr	
+	Real Losses:	1,958.789	MG/Yr
=	Water Losses:	2,099.633	MG/Yr

? Unavoidable Annual Real Losses (UARL): 794.34 MG/Yr

Annual cost of Apparent Losses: \$606,265

Annual cost of Real Losses: \$658,036

Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:

{	Non-revenue water as percent by volume of Water Supplied:	32.3%	Real Losses valued at Variable Production Cost
	Non-revenue water as percent by cost of operating system:	3.9%	

Operational Efficiency:

{	Apparent Losses per service connection per day:	6.98	gallons/connection/day
	Real Losses per service connection per day:	97.12	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.67	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL): 1,958.79 million gallons/year

? Infrastructure Leakage Index (ILI) [CARL/UARL]: 2.47

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline



Example Audit 2a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association
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[Click to add a comment](#)

Water Audit Report for: **The City of Calgary**Reporting Year: **2013** 1/2013 - 12/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MEGALITRES (THOUSAND CUBIC METRES) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: 7 174,324.000 ML/Yr
Water imported: n/a 0.000 ML/Yr
Water exported: 7 8,190.131 ML/Yr

Master Meter Error Adjustments

Pcnt: 7 1.00% ML/Yr
Value: ML/Yr
Pcnt: 7 1.00% ML/Yr
Value: ML/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 164,488.979 ML/Yr

AUTHORIZED CONSUMPTION

Billed metered: 6 125,111.268 ML/Yr
Billed unmetered: 8 3,503.386 ML/Yr
Unbilled metered: 7 166.157 ML/Yr
Unbilled unmetered: 6 1,444.000 ML/Yr

Click here: [?](#)
for help using option
buttons below

Pcnt: Value: 1,444.000 ML/Yr

Use buttons to select
percentage of water
supplied
OR
value

AUTHORIZED CONSUMPTION: 130,224.811 ML/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

34,264.168 ML/Yr

Apparent Losses

Unauthorized consumption: 411.222 ML/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: 6 1,265.429 ML/YrSystematic data handling errors: 312.778 ML/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 1,989.429 ML/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **32,274.739 ML/Yr****WATER LOSSES: 34,264.168 ML/Yr**

NON-REVENUE WATER

NON-REVENUE WATER: 35,874.325 ML/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: 8 4,945.0 kilometers
Number of active AND inactive service connections: 8 312,075
Service connection density: 63 conn./km main

Are customer meters typically located at the curbstop or property line? No (length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line: 8 12.0 metres

Average operating pressure: 8 50.8 metres (head)

COST DATA

Total annual cost of operating water system: 9 \$169,973,759 \$/Year
Customer retail unit cost (applied to Apparent Losses): 9 \$2.35 \$/1000 litres
Variable production cost (applied to Real Losses): 9 \$73.54 \$/Megalitre ☒ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources**2: Billed metered****3: Customer metering inaccuracies**



Example Audit 2b:

AWWA Free Water Audit Software: System Attributes and Performance Indicators

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Water Audit Report for: **The City of Calgary**

Reporting Year: **2013** **1/2013 - 12/2013**

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

Apparent Losses:	1,989.429	ML/Yr
+ Real Losses:	32,274.739	ML/Yr
= Water Losses:	34,264.168	ML/Yr

? Unavoidable Annual Real Losses (UARL): 8,015.57 ML/Yr

Annual cost of Apparent Losses: \$4,675,159

Annual cost of Real Losses: \$75,845,637 Valued at **Customer Retail Unit Cost**
Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial: { Non-revenue water as percent by volume of Water Supplied: 21.8%
Non-revenue water as percent by cost of operating system: 49.6% Real Losses valued at Customer Retail Unit Cost

Operational Efficiency: { Apparent Losses per service connection per day: 17.47 litres/connection/day
Real Losses per service connection per day: 283.34 litres/connection/day
Real Losses per length of main per day*: N/A
Real Losses per service connection per day per meter (head) pressure: 5.58 litres/connection/day/m

From Above, Real Losses = Current Annual Real Losses (CARL): 32,274.74 ML/year

? Infrastructure Leakage Index (ILI) [CARL/UARL]: 4.03

* This performance indicator applies for systems with a low service connection density of less than 20 service connections/kilometre of pipeline



AWWA Water Audit Software Version 5.0 Developed by the Water Loss Control Committee of the American Water Works Association August, 2014

This software is intended to serve as a basic tool to compile a preliminary, or “top-down”, water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or “bottom-up”, water audit using the same water audit methodology.

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- AWWA Water Audits and Loss Control Programs, M36 Publication, 3rd Edition, 2009
- Service Connection Diagrams courtesy of Ronnie McKenzie, WRP Pty Ltd.

VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the required data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknowledgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.

Appendix D

DWR SBX7-7 Verification Tables

Appendix D: SBX7-7 Verification Tables

SB X7-7 Table 0: Units of Measure Used in UWMP*

(select one from the drop down list)

Acre Feet

*The unit of measure must be consistent with Table 2-3

NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	36,062	Acre Feet
	2008 total volume of delivered recycled water	0	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period ¹	10	Years
	Year beginning baseline period range	1997	
	Year ending baseline period range ²	2006	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range ³	2007	

¹ If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

² The ending year must be between December 31, 2004 and December 31, 2010.

³ The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates

Method Used to Determine Population (may check more than one)	
<input type="checkbox"/>	1. Department of Finance (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
<input type="checkbox"/>	2. Persons-per-Connection Method
<input checked="" type="checkbox"/>	3. DWR Population Tool
<input type="checkbox"/>	4. Other DWR recommends pre-review

NOTES:

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1997	262,936
Year 2	1998	260,151
Year 3	1999	258,536
Year 4	2000	259,135
Year 5	2001	260,909
Year 6	2002	261,779
Year 7	2003	263,201
Year 8	2004	263,847
Year 9	2005	264,582
Year 10	2006	265,298
5 Year Baseline Population		
Year 1	2003	263,201
Year 2	2004	263,847
Year 3	2005	264,582
Year 4	2006	265,298
Year 5	2007	266,162
2015 Compliance Year Population		
2015		275,369
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *

	Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Into Distribution System <i>Fm SB X7-7 Table(s) 4-A</i>	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>Fm SB X7-7 Table 4-B</i>	Water Delivered for Agricultural Use	Process Water <i>Fm SB X7-7 Table(s) 4-D</i>	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1997	38009	0	0	0	0	0	38,009
Year 2	1998	36353	0	0	0	0	0	36,353
Year 3	1999	37499	0	0	0	0	0	37,499
Year 4	2000	38484	0	0	0	0	0	38,484
Year 5	2001	36539	0	0	0	0	0	36,539
Year 6	2002	37566	0	0	0	0	0	37,566
Year 7	2003	36723	0	0	0	0	0	36,723
Year 8	2004	36857	0	0	0	0	0	36,857
Year 9	2005	38580	0	0	0	0	0	38,580
Year 10	2006	38751	0	0	0	0	0	38,751
10 - 15 year baseline average gross water use								25,024
5 Year Baseline - Gross Water Use								
Year 1	2003	36,723	0	0	0	0	0	36,723
Year 2	2004	36,857	0	0	0	0	0	36,857
Year 3	2005	38,580	0	0	0	0	0	38,580
Year 4	2006	38,751	0	0	0	0	0	38,751
Year 5	2007	37,752	0	0	0	0	0	37,752
5 year baseline average gross water use								37,733
2015 Compliance Year - Gross Water Use								
2015		26,936	0	0	0	0	0	26,936
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES: Volume is in AF unless otherwise specified								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source		Groundwater		
This water source is:				
<input checked="" type="checkbox"/>	The supplier's own water source			
<input type="checkbox"/>	A purchased or imported source			
Baseline Year <i>Fm SB X7-7 Table 3</i>		Volume Entering Distribution System	Meter Error Adjustment <i>* Optional (+/-)</i>	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997	6099		6,099
Year 2	1998	9044		9,044
Year 3	1999	9711		9,711
Year 4	2000	11031		11,031
Year 5	2001	13282		13,282
Year 6	2002	14995		14,995
Year 7	2003	14538		14,538
Year 8	2004	12611		12,611
Year 9	2005	9888		9,888
Year 10	2006	10307		10,307
5 Year Baseline - Water into Distribution System				
Year 1	2003	14538		14,538
Year 2	2004	12611		12,611
Year 3	2005	9888		9,888
Year 4	2006	10307		10,307
Year 5	2007	11839		11,839
2015 Compliance Year - Water into Distribution System				
2015		5915		5,915
<i>* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document</i>				
NOTES: Volume is in AF unless otherwise specified				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source		Purchased		
This water source is:				
<input type="checkbox"/>		The supplier's own water source		
<input checked="" type="checkbox"/>		A purchased or imported source		
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Entering Distribution System	Meter Error Adjustment * <i>Optional</i> (+/-)	Corrected Volume Entering Distribution System	
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1997	31910		31,910
Year 2	1998	27309		27,309
Year 3	1999	27788		27,788
Year 4	2000	27453		27,453
Year 5	2001	23257		23,257
Year 6	2002	22570		22,570
Year 7	2003	22185		22,185
Year 8	2004	24246		24,246
Year 9	2005	28691		28,691
Year 10	2006	28444		28,444
5 Year Baseline - Water into Distribution System				
Year 1	2003	22185		22,185
Year 2	2004	24246		24,246
Year 3	2005	28691		28,691
Year 4	2006	28444		28,444
Year 5	2007	25913		25,913
2015 Compliance Year - Water into Distribution System				
2015	21,022			21,022
* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document				
NOTES: Volume is in AF unless otherwise specified				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1997	262,936	38,009	129
Year 2	1998	260,151	36,353	125
Year 3	1999	258,536	37,499	129
Year 4	2000	259,135	38,484	133
Year 5	2001	260,909	36,539	125
Year 6	2002	261,779	37,566	128
Year 7	2003	263,201	36,723	125
Year 8	2004	263,847	36,857	125
Year 9	2005	264,582	38,580	130
Year 10	2006	265,298	38,751	130
10-15 Year Average Baseline GPCD				128
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2003	263,201	36,723	125
Year 2	2004	263,847	36,857	125
Year 3	2005	264,582	38,580	130
Year 4	2006	265,298	38,751	130
Year 5	2007	266,162	37,752	127
5 Year Average Baseline GPCD				127
2015 Compliance Year GPCD				
2015		275,369	26,936	87
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day Summary From Table SB X7-7 Table 5	
10-15 Year Baseline GPCD	128
5 Year Baseline GPCD	127
2015 Compliance Year GPCD	87
NOTES:	

SB X7-7 Table 7: 2020 Target Method		
Select Only One		
Target Method		Supporting Documentation
<input type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D
<input checked="" type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1	
20% Reduction	
10-15 Year Baseline GPCD	2020 Target GPCD
128	102
NOTES:	

SB X7-7 Table 7-E: Target Method 3

Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
<input type="checkbox"/>		North Coast	137	130
<input type="checkbox"/>		North Lahontan	173	164
<input type="checkbox"/>		Sacramento River	176	167
<input type="checkbox"/>		San Francisco Bay	131	124
<input type="checkbox"/>		San Joaquin River	174	165
<input type="checkbox"/>		Central Coast	123	117
<input type="checkbox"/>		Tulare Lake	188	179
<input type="checkbox"/>		South Lahontan	170	162
<input checked="" type="checkbox"/>	100%	South Coast	149	142
<input type="checkbox"/>		Colorado River	211	200
Target <i>(If more than one region is selected, this value is calculated.)</i>				142
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD <i>From SB X7-7 Table 5</i>	Maximum 2020 Target*	Calculated 2020 Target <i>Fm Appropriate Target Table</i>	Confirmed 2020 Target
127	121	142	121
* Maximum 2020 Target is 95% of the 5 Year Baseline GPCD			
NOTES:			

SB X7-7 Table 8: 2015 Interim Target GPCD

Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	2015 Interim Target GPCD
121	128	124
NOTES:		

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments <i>(in GPCD)</i>					2015 GPCD <i>(Adjusted if applicable)</i>	Did Supplier Achieve Targeted Reduction for 2015?
		Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD		
87	124	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	0	87	87	YES
NOTES:								

Appendix E

DWR Population Tool



Please print this page to a PDF and include as part of your UWMP submittal.

Confirmation Information

Generated By	Water Supplier Name	Confirmation #	Generated On
Jennifer Lau	Golden State Water Company - Southwest	8093015372	5/19/2016 11:35:23 AM

Boundary Information

Census Year	Boundary Filename	Internal Boundary ID
1990	No Boundary Selected	N/A
2000	No Boundary Selected	N/A
2010	GSWC_Southwest.kml	1104
1990	No Boundary Selected	N/A
2000	No Boundary Selected	N/A
2010	GSWC_Southwest.kml	1104
1990	No Boundary Selected	N/A
2000	No Boundary Selected	N/A
2010	GSWC_Southwest.kml	1104
1990	No Boundary Selected	N/A
2000	No Boundary Selected	N/A
2010	GSWC_Southwest.kml	1104

Baseline Period Ranges

10 to 15-year baseline period

Number of years in baseline period:

Year beginning baseline period range:

Year ending baseline period range¹: 2006

5-year baseline period

Year beginning baseline period range:

Year ending baseline period range²: 2007

¹ The ending year must be between December 31, 2004 and December 31, 2010.

² The ending year must be between December 31, 2007 and December 31, 2010.

Persons per Connection

Year	Census Block Level Total Population	Number of Connections *	Persons per Connection
1990	0	<input type="text" value="5.90"/>	5.90
1991	-	-	5.90
1992	-	-	5.90
1993	-	-	5.90
1994	-	-	5.90
1995	-	-	5.90
1996	-	-	5.90
1997	-	-	5.90
1998	-	-	5.90
1999	-	-	5.90
2000	0	<input type="text" value="5.90"/>	5.90
2001	-	-	5.90
2002	-	-	5.90
2003	-	-	5.90
2004	-	-	5.90
2005	-	-	5.90
2006	-	-	5.90
2007	-	-	5.90
2008	-	-	5.90
2009	-	-	5.90
2010	267,997	<input type="text" value="45453"/>	5.90
2015	-	-	5.90 **

Population Using Persons-Per-Connection

Year		Number of Connections *	Persons per Connection	Total Population
10 to 15 Year Baseline Population Calculations				
Year 1	1997	44750	5.90	263,852
Year 2	1998	44276	5.90	261,057
Year 3	1999	44001	5.90	259,436
Year 4	2000		5.90	
Year 5	2001	44405	5.90	261,818
Year 6	2002	44553	5.90	262,690
Year 7	2003	44795	5.90	264,117
Year 8	2004	44905	5.90	264,766
Year 9	2005	45030	5.90	265,503
Year 10	2006	45152	5.90	266,222
5 Year Baseline Population Calculations				
Year 1	2003	44795	5.90	264,117
Year 2	2004	44905	5.90	264,766
Year 3	2005	45030	5.90	265,503
Year 4	2006	45152	5.90	266,222
Year 5	2007	45299	5.90	267,089
2015 Compliance Year Population Calculations				
2015		46866	5.90 **	276,328

[Hide Print Confirmation](#)

QUESTIONS / ISSUES? CONTACT THE WUEdata HELP DESK

Appendix F

Select CPUC Water Conservation and Rationing Rules and Regulations

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

A. Customer's Request for Discontinuance of Service

1. A customer may have service discontinued by giving not less than two day's advance notice thereof to the utility. Charges for service may be required to be paid until the requested date of discontinuance or such later date as will provide not less than the required two days' advance notice.
2. When such notice is not given, the customer will be required to pay for service until two days after the utility has knowledge that the customer has vacated the premises or otherwise has discontinued water service.

B. Discontinuance of Service by Utility

1. For Nonpayment of Bills

- a. Past-Due Bills. When bills are rendered monthly or bimonthly, they will be considered past due if not paid within 19 days from the date of mailing. The utility shall allow every residential customer at least 19 days from the date of mailing its bill for services, postage prepaid, to make payment of the bill. The utility may not discontinue residential service for nonpayment of a delinquent account unless the utility first gives notice of the delinquency and impending discontinuance, at least 10 days prior to the proposed discontinuance, by means of a notice mailed, postage prepaid, to the customer to whom the service is provided if different than to whom the service is billed, not earlier than 19 days from the date of mailing the utility's bill for services. The 10-day discontinuance of service notice shall not commence until five days after the mailing of the notice.
- b. When a bill for water service has become past due and a 10-day discontinuance of residential service notice or a 7-day discontinuance of residential service notice for nonpayment has been issued, service may be discontinued if bill is not paid within the time required by such notice. The customer's service, however, will not be discontinued for nonpayment until the amount of any deposit made to establish credit for that service has been fully absorbed.

(T)

(Continued)

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

- c. Any customer, residential as well as nonresidential, who has initiated a billing complaint or requested an investigation within 5 days of receiving a disputed bill or who has, before discontinuance of service made a request for extension of the payment period of a bill asserted to be beyond the means of the customer to pay in full within the normal period for payment, shall not have residential water service discontinued for nonpayment during the pendency of an investigation by the utility of such customer complaint or request and shall be given an opportunity for review of the complaint, investigation, or request by a review manager of the utility. The review shall include consideration of whether a residential customer shall be permitted to make installment payments on any unpaid balance of the delinquent account over a reasonable period of time, not to exceed 12 months. Such service shall not be discontinued for nonpayment for any customer complying with an installment payment agreement entered into with the utility, provided the customer also keeps current his account for water service as charges accrue in each subsequent billing period. If a residential customer fails to comply with an installment payment agreement, the utility will give a 10-day discontinuance of service notice before discontinuing such service, but such notice shall not entitle the customer to further investigation by the utility.
- d. Any customer whose complaint or request for an investigation pursuant to subdivision (c) has resulted in an adverse determination by the utility may appeal the determination to the Commission. Any subsequent appeal of the dispute or complaint to the Commission shall be in accordance with the Commission adopted Rules of Practice and Procedure.
- e. Service to a residential water customer will not be discontinued for nonpayment when the customer has previously established to the satisfaction of the utility that:

(Continued)

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

e. (Continued)

- (1) The customer is elderly (age 62 or over) or handicapped,* or upon certification of a licensed physical or surgeon that to discontinue water will be life threatening to the customer; and

*Proof of age must be supported by certificate of birth, driver's license, passport or other reliable document. Proof of handicap must be by certification from a licensed physician, surgeon, public health nurse or social worker.

- (2) The customer is temporarily unable to pay for such service in accordance with the provisions of the utility's tariffs; and
- (3) The customer is willing to arrange installment payments satisfactory to the utility, over a period not to exceed 12 months, including arrangements for prompt payment of subsequent bills.

However, service may be discontinued to any customer who does not comply with an installment payment agreement or keep current his account for water service as charges accrue in each subsequent billing period.

- (f) A customer's residential service may be discontinued for nonpayment of a bill for residential service previously rendered him at any location served by the utility.

A nonresidential service may be discontinued for nonpayment of a bill for residential as well as nonresidential service previously rendered him at any location served by the utility.

The discontinuance of service notice as set forth in subdivision (b) will be given in both cases stated above before discontinuance of service takes place.

(Continued)

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

f. (Continued)

Residential services will not, however, be discontinued for nonpayment of bills for separate nonresidential service.

- g. Service will not be discontinued by reason of delinquency in payment for service on any Saturday, Sunday, legal holiday, or at any time during which the business offices of the utility are not open to the public.

- h. Where water service is provided to residential users in a multi-unit residential structure, mobilehome park, or permanent residential structures in a labor camp, where the owner, manager, or operator is listed by the utility as the customer of record, the utility will make every good faith effort to inform the users, when the account is in arrears, that service will be discontinued. Notice will be in as prescribed in subdivision (a) above, and in Rules Nos. 5 and 8. (T)

- (1) Where said users are individually metered. (N)

The utility is not required to make service available to these users unless each user agrees to the terms and conditions of service and meets the requirement of the law and the utility's rules and tariffs. However, if one or more users are willing and able to assume responsibility for subsequent charges by these users to the account to the satisfaction of the utility, and if there is a practical physical means, legally available to the utility of selectively providing services to these users who have met the requirements of the utility's rules and tariffs, the utility will make service available to these users. For these selected users establishment of credit will be as prescribed in Rule No. 6, except that where prior service for a period of time is a condition for establishing credit with the utility, proof that is acceptable to the utility of residence and prompt payment of rent or other credit obligation during that period of time is a satisfactory equivalent. (N)

(Continued)

ISSUED BY

Date Filed: July 29, 1993Advice Letter No. 925-W

F. E. WICKS

Effective Date: September 7, 1993

Decision No. _____

President

Resolution No. W 3770

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

h. (Continued)

(2) Where said users are master metered.

(N)

The utility is not required to make service available to these users unless each user agrees to the terms and conditions of service, and meets the requirements of the law and the utility's rules and tariffs and the following:

The same Rule 11, item B.1.h. (1) above which applies to individually metered users also applies to master metered users, except a representative may act on the behalf of a master metered user, and the utility will not discontinue service in any of the following situations:

- (a) During the pendency of an investigation by the utility of a master-meter customer dispute or complaint.
- (b) When the master-metered customer has been granted an extension of the period for repayment of a bill.
- (c) For an indebtedness owned by the master metered customer to any other person or corporation or when the obligation represented by the delinquent account or any other indebtedness was incurred with a person or corporation other than the utility demanding payment therefor.
- (d) When a delinquent account relates to another property owned, managed, or operated by the master-metered customer.
- (e) When a public health or building officer certifies that determination would result in a significant threat to the health or safety of the residential occupants or the public. Proof of age or handicap are described in Rule 11.B.1.e.

(N)

(Continued)

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

- i. A reasonable attempt must be made by the utility to personally contact an adult person on the residential customer's premises either by telephone, or in person, at hours prior to discontinuance. For elderly or handicapped residential customers, the utility shall provide at least 48 hours' notice by telephone or in person. For these customers, if telephone or personal contact cannot be made, a notice of discontinuance of service shall be posted in a conspicuous location at the service address at least 48 hours prior to discontinuance. Such notice shall be independent of and in addition to, other notices(s) as may be prescribed in the utility's tariffs. (C)
(N)
(N)
(N)
- j. Residential Customer's Remedies Upon Receipt of Discontinuance Notice.
 - (1) If upon receipt of a 10 day discontinuance notice, a residential customer is unable to pay, he must contact the utility before discontinuance of service to make payment arrangements to avoid discontinuance of service.
 - (2) If, after contacting the utility, the residential customer alleges to the Commission an inability to pay and that he is unable to make payment arrangements with the utility he should write to the Commission's Consumer Affairs Branch (CAB) to make an informal complaint. This action must be taken within the 10-day discontinuance of service notice.
 - (3) The CAB's resolution of the matter will be reported to the utility and the residential customer within ten business days after receipt of the informal complaint. If the customer is not satisfied with such resolution, he must file, within ten business days after the date of the CAB's letter, a formal complaint with the Commission under Public Utilities Code Section 1702 on a form provided by the CAB.

(Continued)

Advice Letter No. 925-W

Decision No. _____

ISSUED BY

F. E. WICKS

President

Date Filed July 29, 1993

Effective Date September 7, 1993

Resolution No. W 3770

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Discontinuance of Services by Utility (Continued)

1. For Nonpayment of Bills (Continued)

j. Residential Customer's Remedies Upon Receipt of Discontinuance Notice.

- (4) Failure of the residential as well as the nonresidential customer to observe these time limits shall entitle the utility to insist upon payment or, upon failure to pay, to discontinue the customer's service.

k. Designation of a Third-Party Representative (Elderly or Handicapped only)

- (1) Customer must inform utility if he desires that a third party receive discontinuance or other notices on his behalf.
- (2) Utility must be advised of name, address and telephone number of third party with a letter from third party accepting this responsibility.
- (3) Only customers who certify that they are elderly or handicapped are entitled to third-party representation.*

2. For Noncompliance with Rules

The utility may discontinue service to any customer for violation of these rules after it has given the customer at least five days' written notice of such intention. Where safety of water supply is endangered, service may be discontinued immediately without notice.

3. For Waste of Water

- a. Where negligent or wasteful use of water exists on customer's premises, the utility may discontinue the service if such practices are not remedied within five days after it has given the customer written notice to such effect.

(Continued)

- * Proof of age must be supported by certificate of birth, driver's license, passport or other reliable document. Proof of handicap must be by certification from a licensed physician, public health nurse or social worker.

ISSUED BY

Date Filed July 29, 1993Advice Letter No. 925-W**F. E. WICKS**Effective Date September 7, 1993

Decision No. _____

President

Resolution No. W 3770

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

B. Continuance of Services by Utility (Continued)

3. For Waste of Water (Continued)

- b. In order to protect itself against serious and unnecessary waste or misuse of water, the utility may meter any flat rate service and apply the regularly established meter rates where the customer continues to misuse or waste water beyond five days after the utility has given the customer written notice to remedy such practices.

4. For Unsafe Apparatus or Where Service is Detrimental or Damaging to the Utility or its Customers

If an unsafe or hazardous condition is found to exist on the customer's premise, or if the use of water thereon by apparatus, appliances, equipment or otherwise is found to be detrimental or damaging to the utility or its customers, the service may be shutoff without notice. The utility will notify the customer immediately of the reasons for the discontinuance and the corrective action to be taken by the customer before service can be restored.

5. For Fraudulent Use of Service

When the utility has discovered that a customer has obtained service by fraudulent means, or has diverted the water service for unauthorized use, the service to that customer may be discontinued without notice. The utility will not restore service to such customer until that customer has complied with all filed rules and reasonable requirements of the utility and the utility has been reimbursed for the full amount of the service rendered and the actual cost to the utility incurred by reason of the fraudulent use.

C. Restoration of Service

1. Reconnection Charge

Where service has been discontinued for violation of these rules or for nonpayment of bills, the utility may charge \$25.00 for reconnection of service during regular working hours or \$37.50 (l) for reconnection of service at other than regular working hours when the customer has requested that the reconnection be made at other than regular working hours.

(Continued)

ISSUED BY

Date Filed August 12, 2004Advice Letter No. 1173-W**F. E. WICKS**Effective Date September 21, 2004Decision No. 04-03-039

President

Resolution No. _____

Rule No. 11DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

C. Restoration of Service (Continued)

2. To be Made During Regular Working Hours

The utility will endeavor to make reconnections during regular working hours on the day of the request, if the conditions permit; otherwise reconnections will be made on the regular working day following the day the request is made.

3. To Be Made at Other Than Regular Working Hours

When a customer has requested that the reconnection be made at other than regular working hours, the utility will reasonably endeavor to so make the reconnection if practicable under the circumstances.

4. Wrongful Discontinuance

A service wrongfully discontinued by the utility, must be restored without charge for the restoration to the customer within 24 hours.

D. Refusal to Serve

1 Conditions for Refusal

The utility may refuse to serve an applicant for service under the following conditions:

- a. If the applicant fails to comply with any of the rules as filed with the Public Utilities Commission.
- b. If the intended use of the service is of such a nature that it will be detrimental or injurious to existing customers.
- c. If, in the judgment of the utility, the applicant's installation for utilizing the service is unsafe or hazardous, or of such nature that satisfactory service cannot be rendered.

(Continued)

Rule No. 11

DISCONTINUANCE AND RESTORATION OF SERVICE

(Continued)

C. Restoration of Service (Continued)

1. Conditions for Refusal (Continued)

- d. Where service has been discontinued for fraudulent use, the utility will not serve an applicant until it has determined that all conditions of fraudulent use or practice has been corrected.

2. Notification to Customers

When an applicant is refused service under the provisions of this rule, the utility will notify the applicant promptly of the reason for the refusal to service and of the right of applicant to appeal the utility's decision to the Public Utilities Commission.

ISSUED BY

F. E. WICKS

President

Date Filed July 29, 1993

Effective Date September 7, 1993

Resolution No. W 3770

Advice Letter No. 925-W

Decision No. _____

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 1 of 6
(N)

A. APPLICABILITY

This schedule applies to all water customers in the Southwest System of the Southwest Customer Service Area (CSA) served under Tariff Schedule ME-1-R and ME-1-NR. This schedule is only effective in times of mandatory rationing, as required by Rule No. 14.1, and only for the period noted in the Special Conditions section below. The drought emergency surcharges listed in this schedule are in addition to the regular water use charges under the current Schedules referenced above as authorized by the Commission.

B. TERRITORY

This schedule is applicable to customers in the Southwest System of the Southwest Customer Service Area only.

C. MANDATORY WATER USE REDUCTION AND DROUGHT EMERGENCY SURCHARGES

In response to the Governor's Executive Order (B-29-15) the State Water Resources Control Board (Water Board) imposed restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016. These restrictions will require water consumers to reduce usage as compared to the amount they used in 2013. Golden State Water Company (GSWC) consumers reduced usage in 2014, but will need to achieve additional water conservation in 2015-16 to achieve the statewide goal.

These restrictions are designed to strongly encourage those customers with high per capita usage to achieve proportionally greater reduction than those with low use. The annual mandated reduction for this area is 12%. The following stages will be implemented as needed to achieve the annual mandated reduction. The utility may implement Stage 2 and the associated Drought Emergency Surcharge without first implementing Stage 1 if warranted by the mandated reduction.

(N)

(Continued)

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 2 of 6
(N)

Stage 1

Outdoor irrigation is restricted to two days per week:

Addresses Ending In:	Watering Days
Even Numbers (0, 2, 4, 6, 8)	Sunday and Wednesday
Odd Numbers (1, 3, 5, 7, 9)	Tuesday and Saturday

Additional restrictions:

All outdoor irrigation must occur between the hours of 7 pm and 8 am.

Failure to comply with these restrictions may result in the installation of a flow restrictor device along with associated fees for installation and removal.

If conditions warrant, GSWC will change the number of watering days and the specific day of watering after first notifying its customers in accordance with Rule 14.1.

Stage 2

Will be implemented if the Stage 1 restrictions are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 1, the following allocations and drought emergency surcharges are in effect:

1. All customers will have their baseline established using the 2013 usage data for their premise or an area wide average baseline for similar usage if 2013 data does not exist (e.g. new customer accounts).
2. The customer's allocation will be based on the 2013 baseline less 12%.
3. No allocation will be set less than eight (8) Ccf per monthly billing period or sixteen (16) Ccf per bi-monthly billing period.
4. All usage in excess of the customer's allocation will be charged at the regular rate plus a drought emergency surcharge of \$2.50 per ccf.

(N)

(Continued)

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 3 of 6

Stage 3

Will be implemented if the Stage 2 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

(N)

In addition to the restrictions identified in Stage 1, the following allocations are in effect:

1. All customers will have their baseline established using the 2013 usage data for their premise or an area wide average baseline for similar usage if 2013 data does not exist (e.g. new customer accounts).
2. The customer's allocation will be based on the 2013 baseline less 12%.
3. No allocation will be set less than eight (8) Ccf per monthly billing period or sixteen (16) Ccf per bi-monthly billing period.
4. All usage in excess of the customer's allocation will be charged at the regular rate plus a drought emergency surcharge of \$5.00 per ccf.

Stage 4

Will be implemented if the Stage 3 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 1, the following allocations are in effect:

1. All customers will have their baseline established using the 2013 usage data for their premise or an area wide average baseline for similar usage if 2013 data does not exist (e.g. new customer accounts).
2. The customer's allocation will be based on the 2013 baseline less 12%.
3. No allocation will be set less than eight (8) Ccf per monthly billing period or sixteen (16) Ccf per bi-monthly billing period.
4. All usage in excess of the customer's allocation will be charged at the regular rate plus a drought emergency surcharge of \$10.00 per ccf.

(N)

(Continued)

ISSUED BY

Date Filed: June 4, 2015

Advice Letter No. 1604-WA

R. J. SPROWLS

Effective Date: June 1, 2015

Decision No. _____

President

Resolution No. W-5034

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 4 of 6

(N)

D. FLOW RESTRICTOR CHARGES

The charge for installation and removal of a flow-restricting device shall be:

<u>Connection Size</u>	<u>Charges</u>
5/8" to 1".....	\$150.00
1-1/2" to 2".....	\$200.00
3" and larger.....	\$300.00

The flow restrictor will remain installed for a minimum of 7 days.

E. EXEMPTION AND APPEALS PROCESS

Any customer who seeks a variance from any of the provisions of this voluntary water conservation and mandatory rationing plan shall notify the utility in writing, explaining in detail the reason for such a variation. The utility shall respond to each such request in writing.

The appeals form is available online at GSWC website: www.gswater.com/appeal, the Southwest CSA office located at 1600 W. Redondo Beach Blvd., Suite 101, Gardena, CA, 90247 or by calling 1-800-999-4033.

(N)

(Continued)

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 5 of 6
(N)

F. SPECIAL CONDITIONS

1. A Tier 2 advice letter will have to be filed with the Commission to activate any of the Stages of Mandatory Water Use Reduction and Drought Emergency Surcharges listed in this schedule.
2. The active Stage of Mandatory Water Use Reduction and Drought Emergency Surcharges is to remain in effect until a Tier 2 advice letter is filed with the Commission to activate a different Stage or when Schedule 14.1-SW is deactivated.
3. Water use violation fines and/or Drought Emergency Surcharges must be separately identified on each bill.
4. All bills are subject to reimbursement fee set forth on Schedule No. UF.
5. All monies collected by the utility through water use violation fines and/or Drought Emergency Surcharges shall not be accounted for as income, but shall be accumulated in the WRAM and lost revenue portion tracked in the Water Conservation Memorandum Account (WCMA) for non-WRAM tariffs.
6. No Customer shall use utility-supplied water for non-essential or unauthorized uses as defined below:
 - a. The application of potable water to outdoor landscapes in a manner that causes runoff such that water flow onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures.
 - b. The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

(N)

(Continued)

SCHEDULE 14.1-SW

STAGED MANDATORY CONSERVATION AND RATIONING

Page 6 of 6
(N)

- c. The use of potable water for washing buildings, structures, sidewalks, walkways, patios, tennis courts, or other hard-surfaced, non-porous areas.
 - d. The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.
 - e. The use of potable water for watering outside plants, lawn, landscape, and turf area during certain hours prohibited by applicable laws, during and up to 48 hours after measurable rainfall (0.1" or more).
 - f. GSWC will promptly notify customers when aware of leaks within the customer's control; the failure to repair any leaks, breaks, or other malfunction resulting in water waste in a customer's domestic or outdoor water system within forty-eight (48) hours of notification by the utility, unless other, specific arrangements are made with and agreed to by the utility.
 - g. The serving of water, other than upon request, in eating and drinking establishments, including but not limited to restaurants, hotels, cafes, bars, or other public places where food or drink are served and/or purchased.
 - h. Hotels/motels must provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option.
 - i. The use of potable water for irrigation of ornamental turf on public street medians.
 - j. The use of potable water for irrigation outside of newly constructed homes and buildings that is not delivered by drip or micro spray systems.
 - k. Commercial, industrial, and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water use in an amount consistent with the mandated reduction.
 - l. Further Reduction in or the complete prohibition of any other use of water declared non-essential, unauthorized, prohibited, or unlawful by an authorized government or regulatory agency or official.
 - m. Use of potable water for watering streets with trucks, or other vehicles, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
7. The outdoor irrigation restriction does not apply to trees or edible vegetation watered solely by drip or microspray systems.

(N)

ISSUED BY

Date Filed: June 4, 2015

Advice Letter No. 1604-WA

R. J. SPROWLS

Effective Date: June 1, 2015

Decision No. _____

President

Resolution No. W-5034

Rule No. 20WATER CONSERVATIONA. Purpose

The purpose of this rule is to ensure that water resources available to the utility are put to a reasonable beneficial use and that the benefits of the utility's water supply and service extend to the largest number of persons.

B. Waste of Water Discouraged

Refer to Rule 11 B. (3).

C. Use of Water-Saving Devices and Practices

Each customer of the utility is encouraged to install water saving devices to reduce the quantity of water used within the residence. Each customer is further encouraged to adopt such other water usage and re-usage practices and procedures as are feasible and reasonable. (T)

D. Water-Saving Kits

The utility will make available, without initial cost to the customer, for use in each residence receiving water service from the utility, a water-saving kit containing the following:

- (1) A device or devices for reducing faucet and shower flow rates; (D)
- (2) A dye tablet or tablets for determining if a toilet tank leaks; (T)
- (3) Other devices and programs from time to time approved by the utility; (T)
- (4) Installation and other instructions and information pertinent to conserving water. (T)

ISSUED BY

R. J. SPROWLS

President

Date Filed: February 2, 2015Effective Date: February 2, 2015

Resolution No. _____

Advice Letter No. 1591-W

Decision No. _____

Appendix G

Public Hearing Notice, Notifications, and Meeting Minutes



March 1, 2016

Saied Naaseh, Planning Manager
John Raymond, Economic Development Director
City of Carson
701 E. Carson St., Dept CD
Carson, CA 90745

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Saied Naaseh and John Raymond:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

Please review the enclosed figure showing the Southwest system service area and advise whether there are any issues that should be considered by GSWC in preparation of this UWMP. Items for consideration may include land developments anticipated between 2015 and 2040 within or immediately adjacent to the water system. Please also provide any pertinent supporting documentation. We will be happy to provide you with an electronic copy of the 2010 UWMP at your request.

We appreciate timely attention to the information requested above and ask you to provide a response no later than **18 March 2016**. Kennedy/Jenks Consultants is preparing the UWMP under contract with GSWC and will be contacting you directly within the next few weeks to follow up on this request. In the meantime, should you have any questions or concerns please feel free to contact Mike Downey with Kennedy/Jenks Consultants at mikedowney@kennedyjenks.com or (916) 858-2700.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Glen W. C. Kau
Director of Public Works/Municipal Utilities
City of Compton
205 South Willowbrook Avenue
Compton, CA 90220

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Glen W. C. Kau:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Lifan Xu
Principal Civil Engineer, Public Works
City of El Segundo
350 Main Street
El Segundo, CA 90245

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Lifan Xu:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Mitchell Landsdell
City Manager
City of Gardena
1700 West 162nd Street, Room 112
Gardena, CA 90247

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Mitchell Landsdell:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Gregg McClain, Planning Department Director
Arnold Shadbehr, Interim City Manager/PW Director
City of Hawthorne
4455 West 126th Street
Hawthorne, CA 90250

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Gregg McClain and Arnold Shadbehr:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Christ Jackson
Planning Manager
City of Inglewood
One Manchester Boulevard
Inglewood, CA 90301

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Christ Jackson:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Frank Senteno
Public Works Director
City of Lawndale
14717 Burin Avenue
Lawndale, CA 90260

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Frank Senteno:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Wisam Altowaiji
City Engineer
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Wisam Altowaiji:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 1, 2016

Martin L. Adams, Sr. Assistant General Manager – Water
David R. Pettijohn, Director of Water Resources
Delon Kwan, Manager of Water Resources Development
City of Los Angeles Department of Water and Power
111 North Hope Street, Rooms 1455 & 1460

Los Angeles, CA 90012

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Martin L. Adams, David R. Pettijohn and Delon Kwan:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

Please review the enclosed figure showing the Southwest system service area and advise whether there are any issues that should be considered by GSWC in preparation of this UWMP. Items for consideration may include land developments anticipated between 2015 and 2040 within or immediately adjacent to the water system. Please also provide any pertinent supporting documentation. We will be happy to provide you with an electronic copy of the 2010 UWMP at your request.

We appreciate timely attention to the information requested above and ask you to provide a response no later than **18 March 2016**. Kennedy/Jenks Consultants is preparing the UWMP under contract with GSWC and will be contacting you directly within the next few weeks to follow up on this request. In the meantime, should you have any questions or concerns please feel free to contact Mike Downey with Kennedy/Jenks Consultants at mikedowney@kennedyjenks.com or (916) 858-2700.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



March 23, 2016

Gail Farber, Director of Public Works
Angela George, Asst. Deputy Director, Watershed Management Division
County of Los Angeles
P.O. Box 1460
Alhambra, CA 91802-1460

Subject: Golden State Water Company - Southwest System
2015 Urban Water Management Plan Preparation Notification and Information Request
K/J 1570027*00

Dear Gail Farber and Angela George:

Golden State Water Company (GSWC) is currently in the process of preparing its 2015 Urban Water Management Plan (UWMP) for the Southwest system as required by State of California Law through the Urban Water Management Planning Act. The UWMP Act requires that Urban Water Retailers document water supply, reliability and other issues through the year 2040. This letter is provided as your official notice of UWMP preparation and request for information since your agency has governmental jurisdiction, possibly including land use planning over the Southwest system area. The UWMP process is intended to be a collaborative effort between all project stakeholders to the extent practicable.

Please review the enclosed figure showing the Southwest system service area and advise whether there are any issues that should be considered by GSWC in preparation of this UWMP. Items for consideration may include land developments anticipated between 2015 and 2040 within or immediately adjacent to the water system. Please also provide any pertinent supporting documentation. We will be happy to provide you with an electronic copy of the 2010 UWMP at your request.

We appreciate timely attention to the information requested above and ask you to provide a response no later than **9 April 2016**. Kennedy/Jenks Consultants is preparing the UWMP under contract with GSWC and will be contacting you directly within the next few weeks to follow up on this request. In the meantime, should you have any questions or concerns please feel free to contact Mike Downey with Kennedy/Jenks Consultants at mikedowney@kennedyjenks.com or (916) 858-2700.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



July 11, 2016

Saied Naaseh, Planning Manager
John Raymond, Economic Development Director
City of Carson
701 E. Carson St., Dept CD
Carson, CA 90745

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Saied Naaseh
John Raymond:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

The UWMP's will be available for public review prior to the public hearing and can be reviewed during normal business hours. Please call (310) 767-8200 to make an appointment to view the plan at:

Southwest Customer Service Office
1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

A public hearing to solicit comments on the draft UWMP will be held at 6:00 p.m. on Wednesday, August 17, 2016 and take place at:

City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Glen W. C. Kau
Director of Public Works/Municipal Utilities
City of Compton
205 South Willowbrook Avenue
Compton, CA 90220

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Glen W. C. Kau:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

The UWMP's will be available for public review prior to the public hearing and can be reviewed during normal business hours. Please call (310) 767-8200 to make an appointment to view the plan at:

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Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Lifan Xu
Principal Civil Engineer, Public Works
City of El Segundo
350 Main Street
El Segundo, CA 90245

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Lifan Xu:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

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Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Mitchell Landsdell
City Manager
City of Gardena
1700 West 162nd Street, Room 112
Gardena, CA 90247

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Mitchell Landsdell:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

The UWMP's will be available for public review prior to the public hearing and can be reviewed during normal business hours. Please call (310) 767-8200 to make an appointment to view the plan at:

Southwest Customer Service Office
1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Gregg McClain, Planning Department Director
Arnold Shadbeh, Interim City Manager/PW Director
City of Hawthorne
4455 West 126th Street
Hawthorne, CA 90250

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Gregg McClain and Arnold Shadbeh:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

The UWMP's will be available for public review prior to the public hearing and can be reviewed during normal business hours. Please call (310) 767-8200 to make an appointment to view the plan at:

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3901 W El Segundo Blvd
Hawthorne, CA 90250

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Christ Jackson
Planning Manager
City of Inglewood
One Manchester Boulevard
Inglewood, CA 90301

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Christ Jackson:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

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1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Frank Senteno
Public Works Director
City of Lawndale
14717 Burin Avenue
Lawndale, CA 90260

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Frank Senteno:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

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1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Wisam Altowaiji
City Engineer
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Wisam Altowaiji:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

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Southwest Customer Service Office
1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Martin L. Adams, Sr. Assistant General Manager – Water
David R. Pettijohn, Director of Water Resources
Delon Kwan, Manager of Water Resources Development
City of Los Angeles Department of Water and Power
111 North Hope Street, Rooms 1455 & 1460
Los Angeles, CA 90012

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Martin L. Adams, David R. Pettijohn and Delon Kwan:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

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Gardena, CA 90247

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Hawthorne, CA 90250

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Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager



July 11, 2016

Gail Farber, Director of Public Works
Angela George, Asst. Deputy Director, Watershed Management Division
County of Los Angeles
P.O. Box 1460
Alhambra, CA 91802-1460

Subject: Notification of Public Hearing for the 2015 Urban Water Management Plan
(UWMP) Golden State Water Company – Southwest Water System

Dear Gail Farber and Angela George:

Golden State Water Company (GSWC) is providing you this notice pursuant to Water Code, section 10621, subdivision (b) of the Act, which requires an urban water supplier to notify any city or county within which it provides water that it is reviewing its plan and considering changes to the plan for the following water system(s): Southwest.

The UWMP's will be available for public review prior to the public hearing and can be reviewed during normal business hours. Please call (310) 767-8200 to make an appointment to view the plan at:

Southwest Customer Service Office
1600 W Redondo Beach Blvd, Suite 101
Gardena, CA 90247

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City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

In the meantime, should you have any questions or concerns please feel free to contact me at bob.mcvicker@gswater.com or (714) 535-7711 x265, or contact Planning Engineer Divya Agrawalla at divya.agrawalla@gswater.com or (714) 535-7711 x236.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

URBAN WATER MANAGEMENT PLANS

Golden State Water Company is holding required public hearings in the summer of 2016 for public comment on the 2015 Urban Water Management Plans (UWMP). These are prepared by California's urban water suppliers to support their long-term planning goals to ensure that adequate water supplies are available to meet existing and future water demands. The plans are for water systems that serve 3,000 or more service connections or supply 3,000 or more acre-feet of water per year. Not all of Golden State Water's systems meet those criteria.

To view the 2015 UWMP for your water system, please select your community from the menu below (if your community is not listed, no UWMP is required for your system):



GO

Here is the schedule and timeline of UWMP meetings and locations for Golden State Water:

System(s)	Date	Time	Location
Bay Point	Mon., June 13	6:00 PM	Ambrose Rec Center, District Board Room; 3105 Willow Pass Road; Bay Point, CA 94565
Cordova	Tue., June 14	6:00 PM	Golden State Water; 3005 Gold Canal Drive; Rancho Cordova, CA 95670
Barstow	Wed., June 15	6:00 PM	Hampton Inn & Suites; 2710 Lenwood Road; Barstow, CA 92311
Culver City	Wed., June 15	6:00 PM	Veteran's Memorial Complex, Room C; 4117 Overland Avenue; Culver City, CA 90230
Bell-Bell Gardens, Florence-Graham	Tue., July 12	5:30 PM	Bell Community Center; 6250 Pine Ave.; Bell, CA 90201
Artesia, Norwalk	Mon., July 18	6:00 PM	Artesia Community Center; 18750 Clarkdale Avenue; Artesia, CA 90701
Orcutt	Tue., July 19	6:00 PM	Radisson Hotel; Challenger Room; 3455 Skyway Drive; Santa Maria, CA 93455
Simi Valley	Wed., July 20	6:00 PM	Golden State Water; 4680 E. Los Angeles Ave., Suite H; Simi Valley, CA 93063
Claremont, San Dimas, South Arcadia, South San Gabriel	Thu., Aug. 11	6:30 PM	Senior Citizen Community Center; 201 E. Bonita Avenue; San Dimas, CA 91773
Southwest	Wed., Aug. 17	6:00 PM	Hawthorne Memorial Center 3901 W El Segundo Blvd Hawthorne, CA 90250
Placentia-Yorba Linda	Wed., Aug. 24	6:00 PM	Placentia-Yorba Linda Unified School District (Board Room) 1301 E. Orangethorpe Ave. Placentia, CA 92870
West Orange	Tue., Aug. 30	6:00 PM	Cypress Senior Center (Arts & Crafts Room) 9031 Grindlay St, Cypress, CA 90630

Hard copies of the UWMPs are available for inspection at your CSA office Monday through Friday, 8 am to 4 pm.

Please send all comments to:

Golden State Water Company
Attn: Bob McVicker
1920 W. Corporate Way
Anaheim, CA 92801

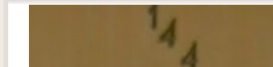
Or by e-mail to: bob.mcvicker@gswater.com

Sign up for the Golden State e-Newsletter



Sign up for e-Newsletter

Submit your Questions and Suggestions



Submit



Notice of Public Hearing

In conformance with the California Urban Water Management Planning Act, Golden State Water Company is hosting a public hearing on August 17, at 6:00 p.m., at the Hawthorne Memorial Center, 3901 W El Segundo Blvd, Hawthorne, CA 90250, to solicit comments on the Urban Water Management Plans (UWMPs) for the company's Southwest water system.

The UWMPs are available for public review online at www.gswater.com/UWMP. Please call 1-800-999-4033 to make an appointment to view the plan at the following location:

Southwest Customer Service Office
1600 W. Redondo Beach Blvd., #101
Gardena, CA 90247

For more information about Golden State Water Company, visit www.gswater.com

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Special Services Available in Phoenix

DECLARATION

I am a resident of Los Angeles County, over the age of eighteen years and not a party to any or interested in the matter noticed.

The notice, of which the annexed is a printed copy appeared in the:

L.A.TIMES-FULL RUN

On the following dates:

8/5/16 & 8/12/16

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at Los Angeles, California, this

12th day of AUGUST 2016

Notice of Public Hearing

In conformance with the California Urban Water Management Planning Act, Golden State Water Company is hosting a public hearing on August 17, at 6:00 p.m., at the Hawthorne Memorial Center, 3901 W El Segundo Blvd, Hawthorne, CA 90250, to solicit comments on the Urban Water Management Plans (UWMPs) for the company's Southwest water system.

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Southwest Customer Service Office
1600 W. Redondo Beach Blvd., #101
Gardena, CA 90247

For more information about Golden State Water Company, visit www.gswater.com

Signature

2910920

*"The only Public Notice which is justifiable
from the standpoint of true economy and the public interest,
is that which reaches those who are affected by it"*



Long Beach Press-Telegram

727 Pine Avenue
Long Beach, CA 90844
562-499-1236
Fax: 562-499-1391
legals@presstelegram.com

5005621

CALIFORNIA NEWSPAPER SERVICE
ORDER PROCESSING
PO BOX 60460
LOS ANGELES, CA 90060

FILE NO. 2910926

PROOF OF PUBLICATION (2015.5 C.C.P.)

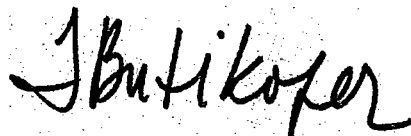
STATE OF CALIFORNIA County of Los Angeles

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principle clerk of the printer of the Long Beach Press-Telegram, a newspaper of general circulation, printed and published daily in the City of Long Beach, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of County of Los Angeles, State of California, on the date of March 21, 1934, Case Number 370512. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

08/04/2016, 08/10/2016

I certify (or declare) under the penalty of perjury that the foregoing is true and correct.

Executed at Long Beach, LA Co. California,
this 12th day of August, 2016.



Signature

The Long Beach Press-Telegram, a newspaper of general circulation, is delivered to and available in but not limited to the following cities:
Long Beach, Lakewood, Bellflower, Cerritos, Downey, Norwalk, Artesia, Paramount, Wilmington, Compton, South Gate, Los Alamitos, Seal Beach, Cypress, La Palma, Lynwood, San Pedro, Hawaiian

(Space below for use of County Clerk Only)

Legal No. **0010831126**

Notice of Public Hearing

In conformance with the California Urban Water Management Planning Act, Golden State Water Company is hosting a public hearing on August 17, at 6:00 p.m., at the Hawthorne Memorial Center, 3901 W El Segundo Blvd, Hawthorne, CA 90250, to solicit comments on the Urban Water Management Plans (UWMPs) for the company's Southwest water system.

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Southwest Customer Service Office
1600 W. Redondo Beach Blvd., #101
Gardena, CA 90247

For more information about Golden State Water Company, visit www.gswater.com
8/4, 8/10/16

CNS-2910926#

PRESS TELEGRAM



* A 0 0 0 0 0 4 1 9 1 5 9 0 *

Daily Breeze

21250 Hawthorne Blvd, Ste 170
Torrance, CA 90503-4077
310-543-6635
Fax: 310-316-6827

5005705

CALIFORNIA NEWSPAPER SERVICE TP
PO BOX 60460
LOS ANGELES, CA 90060

FILE NO. 2910956

PROOF OF PUBLICATION (2015.5 C.C.P.)

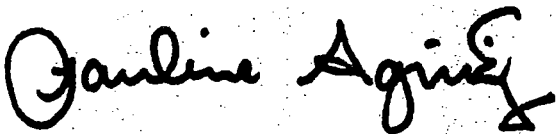
STATE OF CALIFORNIA
County of Los Angeles

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of THE DAILY BREEZE, a newspaper of general circulation, printed and published in the City of Torrance*, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of County of Los Angeles, State of California, under the date of June 10, 1974, Case Number SWC7146. The notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

08/05/2016, 08/10/2016

I certify (or declare) under the penalty of perjury that the foregoing is true and correct.

Dated at Torrance, California
On this 10th day of August, 2016.



Signature

*The Daily Breeze circulation includes the following cities: Carson, Compton, Culver City, El Segundo, Gardena, Harbor City, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Lomita, Long Beach, Manhattan Beach, Palos Verdes Peninsula, Palos Verdes, Rancho Palos Verdes, Rancho Palos Verdes Estates, Redondo Beach, San

(Space below for use of County Clerk Only)

Legal No.

0010830927

Notice of Public Hearing
In conformance with the California Urban Water Management Planning Act, Golden State Water Company is hosting a public hearing on August 17, at 6:00 p.m., at the Hawthorne Memorial Center, 3901 W El Segundo Blvd, Hawthorne, CA 90250, to solicit comments on the Urban Water Management Plans (UWMPs) for the company's Southwest water system. The UWMPs are available for public review online at www.gswater.com/UWMP. Please call 1-800-999-4033 to make an appointment to view the plan at the following location:
Southwest Customer Service Office
1600 W. Redondo Beach Blvd., #101
Gardena, CA 90247
For more information about Golden State Water Company, visit www.gswater.com
8/5, 8/10/16
CNS-2910956#
THE DAILY BREEZE





Sign-in Sheet

E-mail

Bob McVicker GSWC 714-535-7711 x265 bob.mcvicker@gswater.com

Kate Nutting GSWC 310-767-8200 x500 knutting@gswater.com

2015 Urban Water Management Plan Public Hearing Southwest System

Agency: Golden State Water Company

Date: August 17, 2016, 6:00 PM

Location: City of Hawthorne Memorial Center
3901 W El Segundo Blvd
Hawthorne, CA 90250

No meeting minutes were recorded since there was no attendance by the public.

Appendix H

Groundwater Basin Water Rights Stipulation/Judgment

Appendix H: Judgments

Third Amended Judgment

December 23, 2013

Central Basin Area Adjudication
Central and West Basin Water Replenishment District, etc. v. Charles E. Adams, et al.
City of Lakewood v. Charles E. Adams, et al.
County of Los Angeles Superior Court case No. 786,656

WILLIAM F. KRUSE (CSP # 09031)
LAGERLOF, SENECA, GORNEY & KRUSE, LLP
260 N. Lake Avenue, 18th Floor
Pasadena, CA 91101-4108
626/793-9400, FAX 626/793-5900

Attorneys for:
CITY OF LAKEWOOD,
CITY OF LONG BEACH

DEC 23 2013
Sheryl R. Carter, Clerk/Clerk/Chief
By: [Signature] Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

CENTRAL AND WEST BASIN WATER
REPLENISHMENT DISTRICT, etc.,
Plaintiff,
vs.
CHARLES E. ADAMS, et al.,
Defendant
CITY OF LAKEWOOD, a municipal
corporation,
Cross-Complainant
vs.
CHARLES E. ADAMS, et al.,
Cross-Defendants.

Case No. 786,656

THIRD AMENDED JUDGMENT
(Declaring and establishing
water rights in Central Basin,
requiring restrictions
thereon in excess of
specified quantities
and providing for the storage and
extraction of stored water.)
Assigned for all purposes to
Hon. Abraham Khan
Dept. 51

1
THIRD AMENDED JUDGMENT

http://www.wrd.org/watermaster/Central_Basin_Third_Amended_Judgment_Signed_Original.PDF

Amended Judgment

December 5, 2014

West Coast Basin Area Adjudication
California Water Service Company, et al. v. City of Compton, et al.
County of Los Angeles Superior Court case No. C 506 806

DEC 03 2014
STEPHANIE OSLER HASTING (State Bar No. 188716)
RUSSELL M. McLOTHLIN (State Bar No. 20826)
JONATHAN C. SANDLER (State Bar No. 27332)
BROWNSTEIN HYATT FARRER SCHRECK, LLP
1020 State Street
Santa Barbara, CA 93101
Telephone (805) 965-7000, Fax: (805) 965-4333
shastings@bhfa.com
rmcclouthlin@bhfa.com
jsandler@bhfa.com
jhsf@bhfa.com

Attorneys for Defendant
GOLDEN STATE WATER COMPANY

DEC 05 2014
Sheryl R. Carter, Clerk/Clerk/Chief
By: [Signature] Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

CALIFORNIA WATER SERVICE
COMPANY, et al.,
Plaintiff,
vs.
CITY OF COMPTON, et al.,
Defendant.

Case No. C 506 806
(Related to Case No. C 786656)
Assigned for All Purposes to the
Honorable Kenneth S. Freeman (Dept. 310)
AMENDED JUDGMENT
Action Filed: 7/21/1945

1
AMENDED JUDGMENT

http://www.wrd.org/watermaster/West_Coast_Basin_Amended_Judgment_Signed_Original.pdf

Appendix I

Documentation of Submittal to Library, Cities and Counties



September 30, 2016

California State Library
Government Publications Section
P.O. Box 942837
Sacramento, CA 94237-0001
Attn: Coordinator, Urban Water Management Plans

Subject: Submittal of the Golden State Water Company (GSWC) 2015 Urban Water Management Plan (UWMP) – South Arcadia, San Dimas, Claremont, South San Gabriel, Southwest, Placentia-Yorba Linda and West Orange Systems

To Whom It May Concern:

This transmittal letter submits the GSWC 2015 UWMPs for the South Arcadia, San Dimas, Claremont, South San Gabriel, Southwest, Placentia-Yorba Linda and West Orange Systems. GSWC prepared these UWMPs consistent with the Water Conservation Act of 2009 (Water Code sections 10608 to 10608.64) and the Urban Water Management Planning Act (Water Code sections 10610 to 10656).

GSWC adopted the UWMPs in September 2016. Pursuant to California Water Code Section 10644, enclosed are PDF versions of the GSWC 2015 UWMPs for the South Arcadia, San Dimas, Claremont, South San Gabriel, Southwest, Placentia-Yorba Linda and West Orange Systems.

Please contact me at (714) 535-7711 x265 or at bob.mcvicker@gswater.com with any questions on the 2015 GSWC Urban Water Management Plans.

Very truly yours,

GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager

Enclosure



September 30, 2016

Saied Naaseh, Planning Manager
John Raymond, Economic Development Director
City of Carson
701 E. Carson St., Dept CD
Carson, CA 90745

RE: Golden State Water Company – 2015 Urban Water Management Plan

Golden State Water Company (GSWC) adopted the 2015 Urban Water Management Plan (UWMP) for the Southwest Water System following a public hearing on 8/17/2016. The 2015 UWMP was adopted in September 2016, in accordance with the Urban Water Management Planning Act and filed with the DWR and the California State Library.

Pursuant to Section 10644(a) of the California Water Code, GSWC is required to file a copy of the adopted 2015 UWMP with any city or county within which GSWC provided water. Enclosed for your files is one PDF copy of GSWC's adopted 2015 UWMP for the Southwest Water System. It can also be found on our website at www.gswater.com.

If you have any questions, you can contact me at (714) 535-7711 x265 or bob.mcvicker@gswater.com.

Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Glen W. C. Kau
Director of Public Works/Municipal Utilities
City of Compton
205 South Willowbrook Avenue
Compton, CA 90220

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Lifan Xu
Principal Civil Engineer, Public Works
City of El Segundo
350 Main Street
El Segundo, CA 90245

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Mitchell Landsdell
City Manager
City of Gardena
1700 West 162nd Street, Room 112
Gardena, CA 90247

RE: Golden State Water Company – 2015 Urban Water Management Plan

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GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Gregg McClain
Arnold Shadbeh
Planning Department Director
Interim City Manager/PW Director
City of Hawthorne
4455 West 126th Street
Hawthorne, CA 90250

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Chris Jackson, Economic & Community Development Dept Manager
Mindy Wilcox, Planning Manager
City of Inglewood
One West Manchester Boulevard, 4th Floor
Inglewood, CA 90301

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Frank Senteno
Public Works Director
City of Lawndale
14717 Burin Avenue
Lawndale, CA 90260

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Wisam Altowaiji
City Engineer
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Martin L. Adams, Sr. Assistant General Manager – Water
David R. Pettijohn, Director of Water Resources
Delon Kwan, Manager of Water Resources Development
City of Los Angeles Department of Water and Power
111 North Hope Street, Rooms 1455 & 1460
Los Angeles, CA 90012

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



September 30, 2016

Gail Farber, Director of Public Works
Angela George, Asst. Deputy Director, Watershed Management Division
County of Los Angeles
P.O. Box 1460
Alhambra, CA 91802-1460

RE: Golden State Water Company – 2015 Urban Water Management Plan

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Very truly yours,
GOLDEN STATE WATER COMPANY

Robert R. McVicker, P.E., D.WRE
Planning Manager
Enclosure



Golden State
Water Company
A Subsidiary of American States Water Company

