

City of Redding 2015 Urban Water Management Plan



June 2016

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LIST OF ABBREVIATIONS AND ACRONYMS

ACID	Anderson-Cottonwood Irrigation District
AADF	Average Annual Daily Flow
ADWF	Average Dry Weather Flow
AF	Acre-feet (volume equaling one acre of water one foot deep)
AAF	Annual Acre-feet
Baseline use	Base Daily Per Capita Use
BMP	Best Management Practice
Bureau	United States Bureau of Reclamation
CCF	One hundred cubic feet
CCWWTP	Clear Creek Wastewater Treatment Plant
CGWMP	Coordinated Groundwater Management Plan
CSD	Community Services District
CUWCC	California Urban Water Conservation Council
CII	Commercial/Industrial/Institutional (water users)
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DMM	Demand Management Measure
DWR	(California) Department of Water Resources
EDC	Economic Development Corporation
FDA	Food and Drug Administration
ft ²	Square feet
FWMP	Federal Water Management Plan
GPCD	Gallons Per Capita per Day
GPM	Gallons Per Minute
HE	Household Equivalent
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
M & I	Municipal & Industrial
pph	persons per household
PPM	Parts Per Million
RAWC	Redding Area Water Council
RGWB	Redding Groundwater Basin
RMC	(City of) Redding Municipal Code
SCWA	Shasta County Water Agency
SWWTP	Stillwater Wastewater Treatment Plant
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
target	Water Use Target
WRMS	Water Resource Managers of Shasta (County)
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

In 1983 the California Legislature approved Assembly Bill 797, Division 6, Part 2.6, Sections 10610 – 10656 of the California Water Code. This legislation, the Urban Water Management Planning Act, requires urban water suppliers providing water for municipal purposes to more than 3,000 service connections or supplying more than 3,000 acre-feet (AF) of water annually to prepare and adopt an Urban Water Management Plan (UWMP) every five years.

An UWMP supports long-term water resource planning in order to ensure that adequate water supplies are available to meet existing and future water demands. The UWMP describes the City of Redding (City) water system and includes information about water supply sources, historical and projected water use, water quality, and water shortage contingency measures. The 2015 UWMP plan builds on the 2010 and 2005 version by taking into account Senate Bill x7-7, which established a statewide goal of 20 percent water use reduction by the year 2020. Accordingly, this UWMP includes calculation of the City's 10-year base (average) use, current and projected water use per capita, and specific water use targets for 2015 through 2035. Effective 2016, urban retail water suppliers who do not meet the water conservation requirements established by Senate Bill x7-7 are not eligible for state water grants or loans. Therefore, this UWMP proposes continuation and implementation of conservation policies and programs toward the goal of meeting interim (2015) and compliance (2020) per capita water use targets.

Service Area and System Description

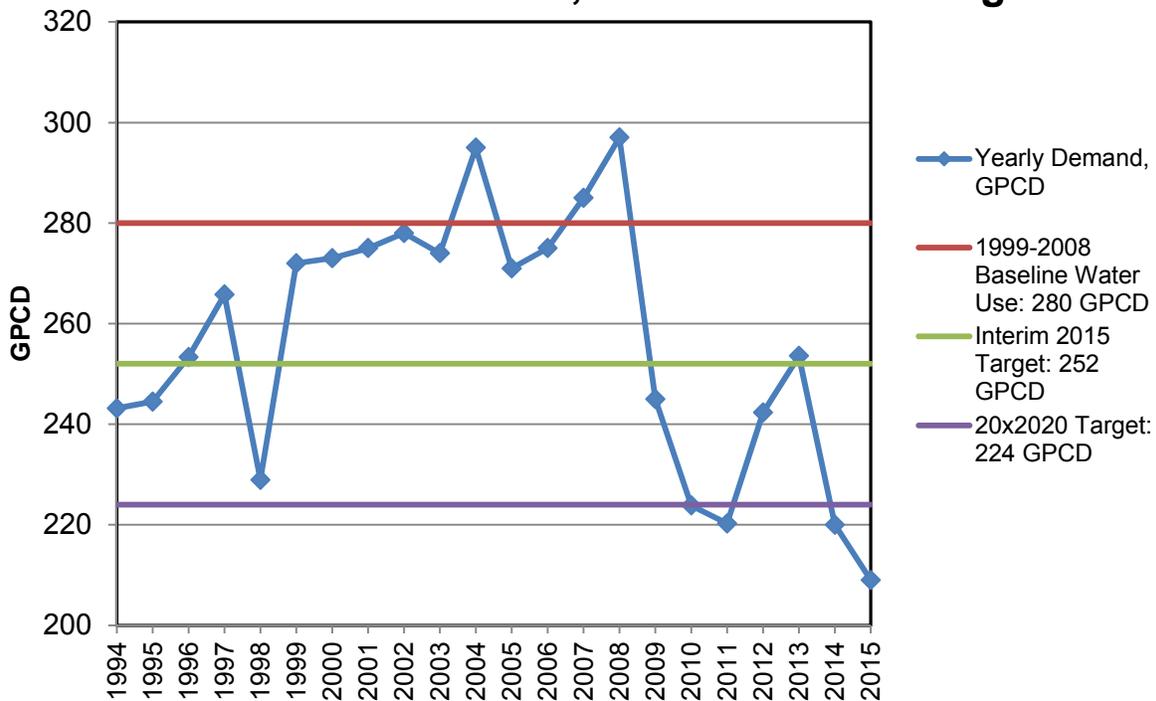
The City of Redding, located at the northern end of California's Central Valley, experiences hot, dry summers and cool, rainy winters. Summer temperature regularly exceeds 100 °F and 75-90% of the annual 34 inches of precipitation falls during the months of November through April. Accordingly, five-fold increases in water demand during summer months are not uncommon. In 2015, the City supplied almost 19,001 acre-feet (AF) of retail water to approximately 91,000 people by means of about 29,000 residential and commercial accounts. The customer base is primarily urban and residential and includes no agricultural accounts. The City's two largest water demand sectors for the years 2011-2015 were Single-Family Residential (63%) and Commercial/ Institutional (24%).

Water Demand and Water Use Targets

The Water Conservation Act of 2009 stipulates explicit methods for calculating gross and per capita water use. The City's base historical per capita use rate (baseline use) is a 10-year per capita average for the years 1999-2008. Targets for 2015 and 2020 are 90% and 80% of the baseline use, respectively (see *Table ES-1*). Various factors, but particularly the recent economic downturn, contributed to significantly reduced water use during 2009 and 2010—from a high of 278 gallons per capita per day (GPCD) in calendar year 2004 to a low of 209 GPCD in 2015 (*Figure ES-1*). However, if 2009-2010 water use trends continue and implementation of Best Management Practices (BMPs) outlined in Section 7 of this UWMP occur, the City is likely to meet its interim and compliance water use targets. Meeting the calculated targets would allow the City to remain eligible for State water grants and loans result in both greater water supply reliability and increased flexibility in planning for development.

Table ES-1 Per Capita Baseline use and Targets – GPCD		
Parameter	Calculation Method	Target
Baseline use	1999-2008 calendar year average	280
Interim (2015) Water Use Target	90% of Baseline use	252
Compliance (2020) Water Use Target	80% of Baseline use	224

Figure ES-1 City of Redding Historic Yearly Water Demand & 2015, 2020 Water Use Targets



Water Supplies

The City of Redding supplies its municipal water system from three primary sources:

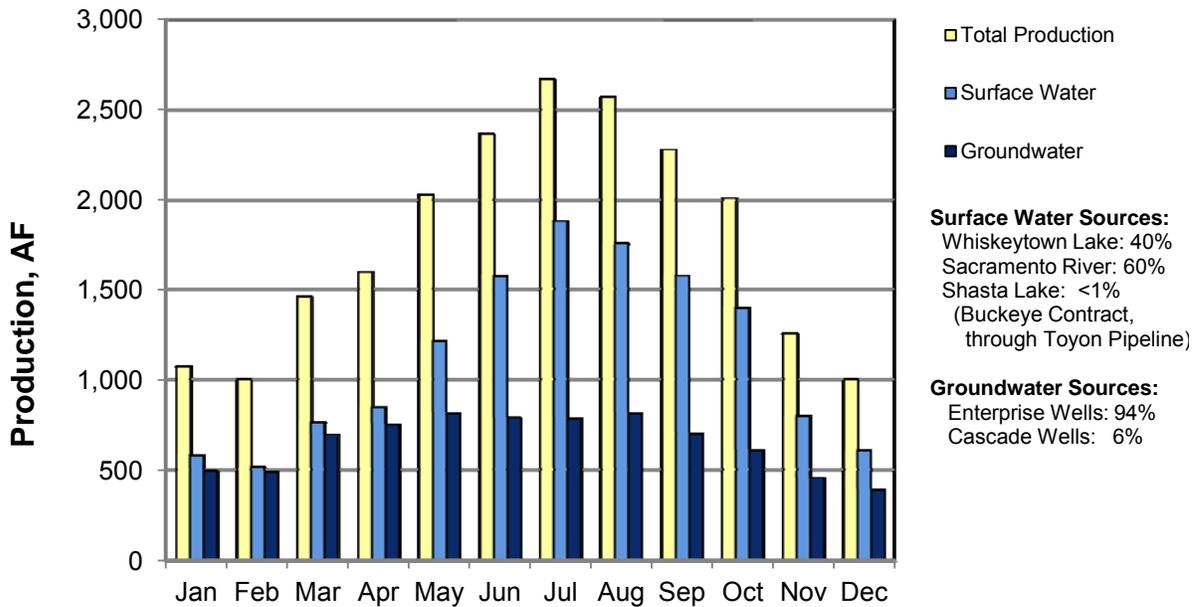
1. Surface water drawn from the Sacramento River upstream of the Diestelhorst Bridge and treated at the Foothill Water Treatment Plant just south of Eureka Way. The Redding Contract with the United States Bureau of Reclamation (Bureau) combines pre-1914 water rights with Central Valley Project (CVP) water to equal a supply of 21,000 acre-feet per year (AFY).
2. Surface water drawn from Whiskeytown Lake through the Spring Creek Conduit to the Buckeye Water Treatment Plant in Old Shasta. Up to 6,140 AFY are available from this source through the City’s Buckeye Contract with the Bureau.
3. Groundwater pumped from the Redding Groundwater Basin by seventeen wells which

are located primarily in the Enterprise zone. Under current operational criteria these wells can supply the City with 11,000 AFY—with an additional 2,400 AFY of capacity from two new wells planned by the year 2020. Groundwater wells typically supply about 30% of total annual water production.

4. The City has recently negotiated yearly transfers of up to 4,000 AF from Anderson-Cottonwood Irrigation District (ACID) as an insurance water supply.

Monthly demand and relative contributions to supply (2015) are illustrated in *Figure ES-2*—note increased overall demand during the summer months. Due to geographic, contractual, and economic factors, the City has no plan to pursue water desalination or water recycling as future water supply sources.

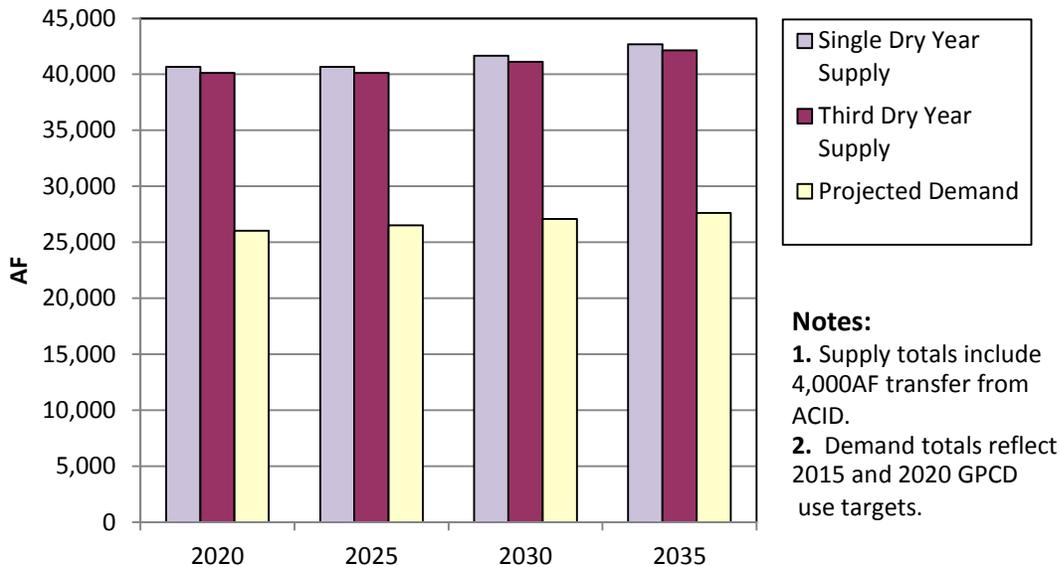
Figure ES-2: City of Redding Monthly Water Production by Source, 2015



Supply Reliability and Shortage Contingency

Both of the City’s surface water contracts with the Bureau—the Redding and Buckeye Contracts—contain provisions for reduced water allotments during dry water years for Lake Shasta. Estimates of dry year water supply sufficiency were determined using population projections through 2035 and assumptions that 2015 and 2020 per capita targets will be met and sustained during the subsequent decade. Results indicate that the City’s diversity of supply sources will be more than sufficient to meet projected demand, even during multiple dry year events (see *Figure ES-3*), through the 2035 planning horizon.

Figure ES-3: City of Redding Projected Water Demands and Supplies, Dry Years



Proposed Water Conservation Measures

California water purveyors are required in their UWMPs to submit descriptions of specific actions—Demand Management Measures (DMMs)—that will be taken in order to reduce overall water demand. As a Bureau contractor, the City also must prepare and submit a Federal Water Management Plan (FWMP) every five years. The FWMP requires contractors to identify and implement Best Management Practices (BMPs)—policies and programs that result in conservation of water resources. DWR allows substitution of Bureau BMPs for DMMs, and Section 7 of this UWMP provides detailed descriptions of the City’s proposed and existing BMPs.

The City’s proposed/existing BMPs are divided into two categories (see Section 7 for a complete list and descriptions):

1. Foundational—expected as common practice for all water purveyors. Examples of foundational BMPs include:
 - o Conservation pricing—water is metered and billed for the amount of water delivered.
 - o A designated Water Conservation Specialist
 - o Community and school educational outreach
2. Programmatic—unique, targeted efforts by agencies that might seek water use reduction for a certain demographic, season, end use, time of day, etc.—examples of the City’s existing/proposed programmatic BMPs include:
 - o Onsite leak detection assistance for customers
 - o Water-use audits to investigate higher-than-ordinary meter reads
 - o Technical landscape resources and training
 - o Water-saving devices available to customers
 - o Water audits for commercial and institutional customers in order to identify potential water-saving policies, practices, and technologies.

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SECTION 1- INTRODUCTION

In 1983 the California Legislature approved Assembly Bill 797, Division 6, Part 2.6, Sections 10610 – 10656 of the California Water Code. This legislation, the Urban Water Management Planning Act, requires urban water suppliers providing water for municipal purposes to more than 3,000 service connections or supplying more than 3,000 acre-feet of water annually to prepare and adopt an Urban Water Management Plan (UWMP) which is filed with the State Department of Water Resources (DWR) in years ending in five and zero. The UWMP supports long-term water resource planning to ensure that adequate water supplies are available to meet existing and future water demands.

The City of Redding is a retail water supplier and served approximately 29,000 residential and commercial accounts with almost 23,000 acre-feet of water in 2010. The UWMP addresses the City's water system and includes information about water supply sources, historical and projected water use and water shortage contingency measures.

In addition, the 2010 UMWP has been developed to comply with Senate Bill x7-7, the Water Conservation Act of 2009, which requires all water suppliers to increase water use efficiency. The legislation set a goal of reducing urban water use by 20% by December 31, 2020, and of making incremental progress towards this goal by reducing per capita water use by at least 10% by December 31, 2015. Urban water suppliers must include in their 2010 water management plans the baseline daily per capita water use, the 2020 water use target, the interim water use target, and compliance per capita water use—calculated according to methodologies developed by the DWR. Effective 2016, urban retail water suppliers who do not meet the water conservation requirements established by Senate Bill x7-7 are not eligible for state water grants or loans. It is the City's intent that implementation of the UWMP will enhance the efficiency of water use while achieving the City's 2015 and 2020 targets.

SECTION 2 – PLAN PREPARATION

(Water Code Section 10620 - 10621)

2.1 Coordination within the City

The City of Redding is a full-service City that provides Electric, Solid Waste, Storm Drain, Wastewater, and Water services in addition to Engineering, Planning and other municipal services. The Urban Water Management Plan (UWMP) contains elements that may affect other departments or require input from them; therefore, other City departments were contacted for assistance in the completion of this plan or asked to comment on the draft (see *Table 1*). Preparation of this UWMP was coordinated by Water Utility Staff—see **Appendix A** for contact information.

2.2 Planning Documents

In addition to consulting with other City Departments, the following sources were utilized in the preparation of this document:

City of Redding 2010 Urban Water Management Plan
 City of Redding 1982, 2000 and 2012 Water Master Plans
 Redding Area 2016 Watershed Sanitary Survey
 City of Redding Water Utility 2002 Source Water Assessment, Groundwater Sources
 City of Redding Water Utility 2001 Source Water Assessment, Surface Water Sources
 City of Redding General Plan Document (2000)
 City of Redding General Plan Natural Resources Element 2009 Update
 City of Redding Municipal Code
 City of Redding Water Utility Proforma
 City of Redding Water Utility 2014 Consumer Confidence Report
 The Redding Metro Report
 City of Redding 2004 Federal Water Management (Conservation) Plan
 California Urban Water Conservation Council 2015 Annual Report
 Coordinated AB 3030 Groundwater Management Plan for the Redding Groundwater Basin (1998)
 Miscellaneous Water Utility Documents
 Guidebook to Assist Urban Water Suppliers to Prepare a 2015 Urban Water Management Plan
 Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use
 Water Conservation Act of 2009 (Senate Bill X7-7)
 Stillwater Wastewater Treatment Plant Facilities Plan (2007)
 DWR Bulletin 118—2003 Update (Groundwater Basin Update)
 Redding Basin Water Resources Management Plan Environmental Impact Report (2007)

2.3 Interagency Coordination

In developing a UWMP, the City of Redding Water Utility has asked for assistance and solicited comments from local water suppliers, public agencies and non-profits, citizens' groups, and other interested stakeholders. All water sources are shared in common with other urban and agricultural interests in the area and as such, their participation in the process is a valuable element in addressing the water needs of the Redding area. The City of Redding Water Utility maintains working relationships with other local water providers through membership and participation in the Redding Area Water Council (RAWC) and the Water Resource Managers of Shasta County (WRMS). *Table 1* identifies neighboring local water agencies and indicates their

level of involvement in the City of Redding’s urban water management planning process. **Appendix A** lists contact information for agencies listed in *Table 1*. Of the 37 recipients at the departments, organizations, businesses and government agencies listed in Table 1 who were sent a draft version of the 2015 UWMP in April 2016, four responded with comments.

Table 1 Coordination and Public Involvement							
Agency Department	Participated in UWMP Development	Contacted for Assistance	Sent Copy of Draft	Commented on Draft	Attended Public Meeting	Sent Notice of Intent to Adopt	Not Involved No Information
CITY OF REDDING							
Assistant City Manager			X				
Community Services			X				
Development Services		X	X				
Housing		X	X				
Industrial Waste		X	X				
Public Works		X	X	X			
Redding Electric Utility			X				
Planning			X				
Public Works Storm Drain Utility		X	X	X			
Public Works Wastewater Utility		X	X				
Water Utility	X	X	X	X			
WATER SUPPLIERS							
Anderson Cottonwood Irrigation District			X				
Bella Vista Water District			X				
Centerville CSD			X				
City of Anderson			X				
City of Shasta Lake			X				

**Table 1
Coordination and Public Involvement (continued)**

Agency	Participated in UWMP Development	Contacted for Assistance	Sent Copy of Draft	Commented on Draft	Attended Public Meeting	Sent Notice of Intent to Adopt	Not Involved No Information
WATER SUPPLIERS							
Clear Creek CSD			X				
Mountain Gate CSD			X				
Shasta CSD			X				
OTHER STAKEHOLDERS							
CH2M Hill			X	X			
Greater Redding Chamber of Commerce			X				
McConnell Foundation			X				
Pace Engineering			X				
Redding Rancheria			X				
Sharrah Dunlap Sawyer, Inc			X				
Shasta Builders Exchange			X				
Shasta EDC			X				
Sierra Pacific Industries			X				
Turtle Bay Exploration Park			X				
WaterWorks Engineers			X				
Wheelabrator Shasta Energy Company			X				

**Table 1
Coordination and Public Involvement (continued)**

Agency	Participated in UWMP Development	Contacted for Assistance	Sent Copy of Draft	Commented on Draft	Attended Public Meeting	Sent Notice of Intent to Adopt	Not Involved No Information
GOVERNMENT AGENCIES							
Western Shasta Resource Conservation District			X				
United States Bureau of Reclamation		X	X				
Department of Water Resources		X	X				
California Water Resources Control Board			X				
Public Library			X				
Shasta County Public Works		X	X	X			
CSD – Community Services District EDC – Economic Development Corporation							

Source: **Appendix A**

2.4 Public Participation

(Water Code Section 10640 – 10645)

Public participation in the development of this UWMP was encouraged through direct e-mails, posting on the City’s website, and notices of public hearing. The public hearing was held on June 21, 2016 with public notices of the hearing appearing in the Redding newspaper, *The Record Searchlight*, on June 7, and June 14, 2016 (see **Appendix A**). Shasta County was notified that the City’s UWMP was under review and modification (see **Appendix A**). Copies of the draft UWMP were made available for public review at City Hall—in the Public Works office and at the Public Works Field Operations Office, 20055 Viking Way, Building #3. The draft UWMP was also available for public review on the City’s website (see Notice of Public Meeting and Public Review Availability Documentation in **Appendix A**).

2.5 Plan Adoption and Implementation

The City of Redding prepared this update of its UWMP during 2016. The UWMP will be submitted to the DWR and a copy sent to the California State Library and to Shasta County within 30 days of adoption (**Appendix A**). A copy of the City Council agenda and signed *Resolution of Plan Adoption* is included in **Appendix A**. This UWMP includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 - Urban Water Management Planning—see UWMP Completed Checklist in **Appendix M**. The implementation of conservation measures discussed in Section 7 will be coordinated by the City's Water Conservation Specialist with sufficient lead time to reach Interim 2015 water conservation targets.

SECTION 3: SYSTEM DESCRIPTION

3.1 City Service Area

The City of Redding lies along the banks of the Sacramento River about 150 miles north of Sacramento and 100 miles south of the Oregon border in the County of Shasta in Northern California. It sits at the far northern end of the Sacramento Valley where the foothills meet the Cascade Mountain Range. Mountains to the north, east and west surround Redding, which has an average elevation of approximately 550 feet MSL. *Figure 1* (following page) shows the physical location of Redding and Shasta County. The City of Redding is one of three incorporated cities within the county and serves as the county seat.

The City of Redding began building its own water system in 1937 and was granted a water permit by the State Board of Health on December 31, 1937. In 1941, the City purchased the California Water Service Company, which had served portions of the City, and integrated components of both operations into a citywide distribution system. In 1976, the Enterprise Public Utility District (EPUD) and the Cascade Community Services District (CCSD) were annexed into the City. The water systems from both these special districts, which were supplied by groundwater wells, were integrated into the City's water system with the construction of major cross-town transmission mains. Currently, the City serves water to both City and county residents as per the Local Agency Formation Commission (LAFCO) guidelines. The total service area is approximately 53 square miles and total population served is approximately 91,000. Some areas of the City are served by neighboring water districts which are shown in *Figure 2* (**Appendix I**).

FIGURE 1

Physical Location of Shasta County - Northern California



3.2 Climate

The Redding area has hot, dry summers and cool, rainy winters typical of a Mediterranean-type climate. Summer temperatures over 100 °F occur and subfreezing winter temperatures are common. Average annual precipitation (1996-2008) is 34.23 inches and occurs mostly during winter months. About 75-90% of the total rainfall falls between November 1st and April 30th. Relative humidity is generally low to moderate.

Average wind velocity is 5.8 miles per hour. The predominant wind direction is from the North-Northwest. *Table 2*, below, presents average precipitation, temperatures, and evapo-transpiration data.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Total Precipitation (inches) ¹	5.93	6.24	3.26	2.53	1.84	0.53	0.14	0.12	0.52	1.78	4.37	6.96	34.23
Avg. max temp (°F) ¹	54.7	58.8	65.6	70.1	81.1	90.7	99.0	97.0	90.5	77.7	62.8	55.2	75.3
Avg. min temp (°F) ¹	37.4	39.6	42.7	46.0	54.2	61.5	65.9	63.1	57.7	49.0	41.9	37.3	49.7
Average ETo ²	1.04	1.81	3.46	5.03	6.62	7.91	8.73	7.40	5.75	4.06	1.80	1.13	54.74

Sources:

(1) National Weather Service, Redding Municipal Airport, California, 1996-2008; data obtained from <http://www.wrcc.dri.edu/summary/rdd.ca.html>– Climate Summary;

(2) California Irrigation Management Information System (CIMIS), Reference EvapoTranspiration (Eto) Zones; data obtained from Information Center, ET overview, Station 008; <http://www.cimis.water.ca.gov/cimis/infoEtoOverview.jsp>

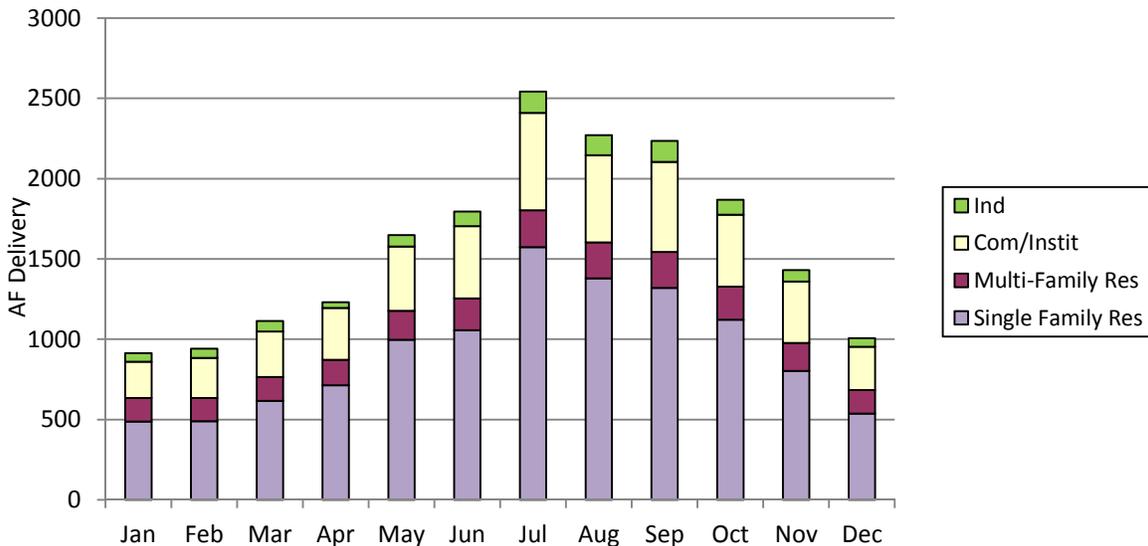
Redding’s climate, particularly it’s hot, dry summers, create a pattern of annual water use that is highlighted by large increases in consumption during the months of May through October, generally peaking in August. Increases in landscape watering and the use of seasonal recreational facilities such as swimming pools are the primary reasons for summertime demand increases (see *Table 3* and *Figure 3*).

Table 3
2015 Monthly Water Consumption by Customer Type – AF

Customer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Single-Family Residential	487	490	617	714	997	1057	1573	1380	1320	1122	802	537	11096
Multi-Family Residential	147	143	148	158	179	197	231	222	223	206	174	146	2174
Commercial/ Governmental/ Institutional	225	250	284	323	401	450	605	544	561	448	383	269	4743
Industrial	54	59	65	36	72	92	134	125	132	92	72	55	988
Total	913	942	1114	1231	1649	1796	2543	2271	2236	1868	1431	1007	19001

Source: *Monthly Customer Service Reports on Billing*

Figure 3: City of Redding 2015 Monthly Water Use by Sector



3.3 Service Area Population

Redding was founded in 1872 and incorporated in 1887 at the northern terminus of the California and Oregon Railroad. The City's early growth was stimulated by the railroad and by the move of the county seat from Shasta in 1884. Mining played a major role in the economic life of Redding around the turn of the century, but declined as the twentieth century progressed. In 1938, the construction of Shasta Dam provided another stimulus to growth in Redding. The construction boom after World War II boosted the lumber industry, which became the mainstay of Redding's economy. In more recent years, retail trade, construction, government and health services, educational and tourism have become more significant activities as lumber industry volumes have declined. Redding has become a major regional center for shopping, health care, education, and government. Year 2015 and projected future service area populations are presented in *Table 4*.

**Table 4
Population Projections**

	2015	2020	2025	2030	2035
Service Area Population	91,053	92,457	94,105	96,109	98,114

Source: *City of Redding 2016 Draft Water Master Plan – Table 3-5, Demand Projection Summary*

3.4 Water Use by Customer Type – Past, Current and Future

Water demand over the last 40 years has increased greatly due to expansion of the service area and development inside the City. One noteworthy expansion was the annexation of the Enterprise area in November of 1976. About 20,000 people were added to the service area. Once annexation occurred, per capita water consumption substantially decreased due to the fact that the Enterprise region of the City was primarily residential with relatively small irrigation and landscaping water demands.

In order to determine the future needs of a water system, it is first necessary to establish the limits of the service area and to estimate the population for that area at various times in the future. The water service area for Redding, shown in *Figure 2 (Appendix I)*, was determined mainly by constraints such as: outlying water district boundaries; Redding's contract boundaries with the United States Bureau of Reclamation (Bureau); natural boundaries such as rivers, ridges, and other topographical features; the City's General Plan; and engineering considerations such as pressure limits and supply limitations. Any further expansion would generally be an encroachment into another water agency's jurisdiction where, in many cases, water system facilities already exist. Because expansion beyond the service boundary is unlikely, population growth and development inside the service area are primary the factors that will determine future water consumption.

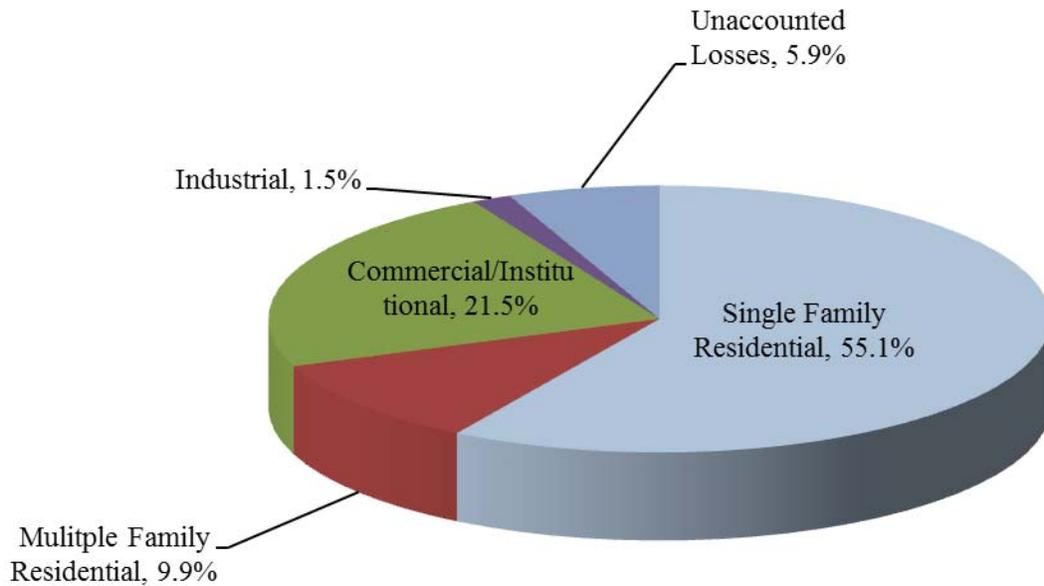
Among the planning assumptions used to determine future demand:

- The long-term growth rate for water service connections will approximate overall population growth. In other words, population and housing growth are proxy measures for growth of all water user types (residential, commercial, public, etc.)
- Growth in the Redding urban area from 2015 to 2035 will vary between 0.2 percent and 0.45 percent per year, resulting in a population of approximately 98,000 in 2035. (see *Table 4*).
- The average person per household (pph) remains steady at 2.36 pph per the General Plan. The ratio of population to water service connections remains generally constant at 3.2 persons per connection.
- Projected average annual daily per capita demand is assumed to meet the 2015 and 2020 water use targets as calculated in Section 4.2 and the 2020 target is assumed to be maintained through the year 2035. These per capita targets are multiplied by City population projections (*Table 4*) to obtain estimates of future water demand.

- Future water demand by sector is estimated based on the assumption that the historically constant mix of service connection types within the City will continue to exist at 2015 proportions.

The General Plan identifies land use designations within major categories (sectors), which also can be used to track water usage. *Figure 4*, below, illustrates percentages of total service area water use by various sectors during the years 2011-2015. In 2014 the City subcontracted the customer services and stopped tracking statistics for the Landscape/Recreational and Other Sectors.

Figure 4: City of Redding Percent Water Use by Sector, 2011-2015



Residential Sector

The single largest sector of customers is the Residential Sector, which includes both Single-Family and Multi-Family designations. Eight residential categories are identified in the General Plan and these provide for a full range of housing types for City inhabitants.

Commercial Sector

The General Plan includes eight commercial land use designations: Limited Office, General Office, Neighborhood Commercial, Shopping Center, Regional Commercial, General Commercial, Mixed-use Core and Heavy Commercial. These land-use designations range from small, neighborhood-serving commercial projects to commercial projects that are regional in scale. There is a mix of commercial customers, ranging from markets, small restaurants, insurance offices, beauty shops, and gas stations to office buildings, regional shopping centers, high-volume restaurants, hotels and other facilities serving both the permanent and visitor population.

Industrial Sector

The General Plan includes two industrial designations: General Industry and Heavy Industry. The Industrial land use classifications allow different types of warehousing, manufacturing, or processing businesses to be located in appropriate areas by accommodating a variety of manufacturing and employment activities ranging from small, employee-intensive businesses to large, capital-intensive businesses.

Institutional/Governmental Sector

The City has a relatively stable institutional/governmental sector. Redding has become a major regional center for government (federal, state, and local), healthcare, and education. This sector is expected to keep pace with the growth of the city. The Commercial and Institutional/Governmental Sectors are quantified in the same category by COR customer services.

Landscape/Recreational Sector

This sector is comprised primarily of community parks and golf courses. Landscape and Recreational customer demand is expected to increase in proportion to the growing population. However, in 2014 along with a change in management of Customer Service, usage in this sector is no longer being tracked independently.

SECTION 4 – SYSTEM DEMANDS

4.1- Actual Water Deliveries

Data illustrating actual water deliveries, by sector, for calendar years 2005 (*Table 5*), 2010 (*Table 6*), and 2015 (*Table 7*) are presented below. All water deliveries by the City of Redding are metered, and no non-metered deliveries are planned

**Table 5
2005 Water Deliveries**

Water Use Sectors	Metered				Not Metered	Total
	# of Accounts	Volume (AAF)	% of Total Volume	% of Total Connections	# of Accounts	Volume (AAF)
Single-Family residential	22,359	14,987	60	82	0	14,987
Multi-Family residential	1,607	2,263	9	6	0	2,263
Commercial/ Institutional/ Governmental	2,790	6,410	26	10	0	6,410
Industrial	141	148	1	1	0	148
Landscape/Other	322	1,262	4	1	0	1,262
Total	27,219	25,070	100	100	0	25,070

Source: DWR Public Water System Statistics 2005 report

**Table 6
2010 Water Deliveries**

Water Use Sectors	Metered				Not Metered	Total
	# of Accounts	Volume (AAF)	% of Total Volume	% of Total Connections	# of Accounts	Volume (AAF)
Single-Family residential	23,021	14,011	61	82	0	14,011
Multi-Family residential	1,905	2,328	10	7	0	2,328
Commercial/ Institutional/ Governmental	2,782	5,634	25	10	0	5,634
Industrial	169	173	<1	<1	0	173
Landscape/Other	335	811	4	1	0	811
Total	28,212	22,957	100	100	0	22,957

Source: DWR Public Water System Statistics 2010 report.

Table 7
Water Deliveries—Actual, 2015 - AAF

Water Use Sectors	Metered				Not Metered	Total
	# of Accounts	Volume (AAF)	% of Total Volume	% of Total Connections	# of Accounts	Volume (AAF)
Single-Family residential	23714	11095	58.4	81.6	0	11095
Multi-Family residential	2192	2174	11.4	7.6	0	2174
Commercial/ Institutional/ Governmental	2718	4744	25.0	9.4	0	4744
Industrial	398	988	5.2	1.4	0	988
Landscape/Other						
Total	29022	19001				19001

Source: Customer Service Report 911

4.2 Calculation of Base Period Average Daily Use

Since the City of Redding did not deliver any recycled water in 2008, UWMP guidelines (*Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use*, p. 31) specify that in preparation of this UWMP the City must use a continuous 10-year period to calculate Base Daily Per Capita Use (baseline use). The chosen 10-year period can end no earlier than December 31, 2004 and no later than December 31, 2010. A required additional check involves calculating the baseline use for a continuous 5-year period ending no earlier than December 31, 2007, and no later than December 31, 2010 (*Methodologies*, p. 32).

For Redding, the most advantageous periods were 1999-2008 for calculation of our 10-year baseline use and 2004-2008 for the 5-year base period, as summarized in *Table 8*. *Table 9* and *Table 10* present Redding's 10-year average baseline use as 280 gallons per capita per day (GPCD) and its 5-year value is 285 GPCD. All baseline use calculations in this report refer to calendar years, not fiscal or water years, and were completed using the assumption of 0% meter error. For consistency, future calculations to determine compliance must also use calendar-year data and assume 0% meter error.

**Table 8
Base Period Ranges**

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	27,145	AF
	2008 total volume of delivered recycled water	0	AF
	2008 recycled water as a percent of total deliveries	0	%
	Number of years in base period	10	years
	Year beginning base period range	1999	
	Year ending base period range	2008	
5-year base period	Year beginning base period range	2004	
	Year ending base period range	2008	

Sources: Stillwater WWTP staff; *Guideline for Preparing 2010 UWMP, Section M*

**Table 9
Base Daily Per Capita Water Use—10-year Range**

Base period year		Distribution System Population	System Gross Water Use [AFY]	System Gross Water Use [millions of gallons]	Annual Daily Per Capita Water Use [GPCD]
Sequence Year	Calendar Year				
Year 1	1999	78,427	23,929	7,798	272
Year 2	2000	79,593	24,328	7,928	273
Year 3	2001	85,000	26,225	8,547	275
Year 4	2002	86,300	26,915	8,772	278
Year 5	2003	87,300	26,742	8,715	274
Year 6	2004	85,703	28,285	9,218	295
Year 7	2005	88,459	26,882	8,716	271
Year 8	2006	89,973	27,760	9,047	275
Year 9	2007	90,045	28,706	9,355	285
Year 10	2008	90,491	30,133	9,820	297
10-year baseline use [GPCD]: (average of yearly values)					280

Source: *DWR Water System Statistics reports, 1999-2008*

Note:

Assumptions used here which will also be used in future compliance calculations:

- 1) Data is for calendar years.
- 2) Water meter error is 0%.

Table 10
Base Daily Per Capita Water Use—5-year Range

Base period year		Distribution System Population	Daily System Gross Water Use [AF]	Daily System Gross Water Use [MGD]	Annual Daily Per Capita Water Use [GPCD]
Sequence Year	Calendar Year				
Year 1	2004	85,703	28,285	9,218	295
Year 2	2005	88,459	26,882	8,716	271
Year 3	2006	89,973	27,760	9,047	275
Year 4	2007	90,045	28,706	9,355	285
Year 5	2008	90,491	30,133	9,820	297
5-year Baseline use [GPCD]: (average of yearly values)					285

Source: DWR Water System Statistics reports, 2004-2008

Note:

Assumptions used here which will also be used in future compliance calculations:

- 1) Data is for calendar years.
- 2) Water meter error is 0%.

Once a district’s 10-year baseline use is calculated (*Table 9*), the Water Conservation Bill of 2009 provides the option of four methodologies for calculating Interim (2015) and 2020 per capita water use targets (targets):

Method 1: 80% (2020) and 90% (2015) of 10-year baseline use

Method 2: Involves calculating/estimating, and then summing, daily per capita use volumes for indoor use, landscaped areas, and Commercial/Industrial/Institutional (CII) purposes. Due to prohibitive data and labor requirements in estimating landscaped area within the service area, Method 2 calculations were not undertaken in this UWMP.

Method 3: 95% of Department of Water Resources (DWR) Target for the Sacramento River Hydrologic Region (see *Figure 5*) or 95% of the 5-year baseline use (*Table 10*), whichever is lower.

Method 4: Identifies water savings through selected conservation practices in each of three sectors—residential, CII, and landscape—and subtracts them from the 10-year baseline use. Researching other 2010 UWMPs indicated that Method 4 method generally yields targets at or below those of Method 1 and, in addition, results in decreased flexibility since specific conservation measures must be specified in the calculation. For these reasons, 2015 and 2020 targets using Method 4 were not determined.

Per DWR instructions in *Methodologies*—and using the 10-year baseline use value calculated above (*Table 9*)—urban water use targets for the City of Redding were calculated using Methods 1 and 3, as summarized in *Table 11*. The result from Method 1, 224 GPCD, was selected as the City’s 20 x 2020 target.

Table 11
2020 Urban Water Use Target Calculation

CALCULATE URBAN WATER USE TARGET		Value	Units
1	10-year Base Daily Per Capita Use (1/1/1999 through 12/31/2008, see <i>Table 8</i>)	280	GPCD
Method 1: 80% of Baseline Use			
2	Urban Water Use Target = 0.80 x Line 1 =	224	GPCD
Method 3: 95% of Regional Target			
7	Target for Sacramento River Hydrologic Region (2010 UWMP Guidebook) =	176	GPCD
	Urban Water Use Target = 0.95 x Line 7 =	167	GPCD
SELECTED 2020 URBAN WATER USE TARGET:		224	GPCD

Sources: *Table 8; 2010 Urban Water Management Plan Guidebook*

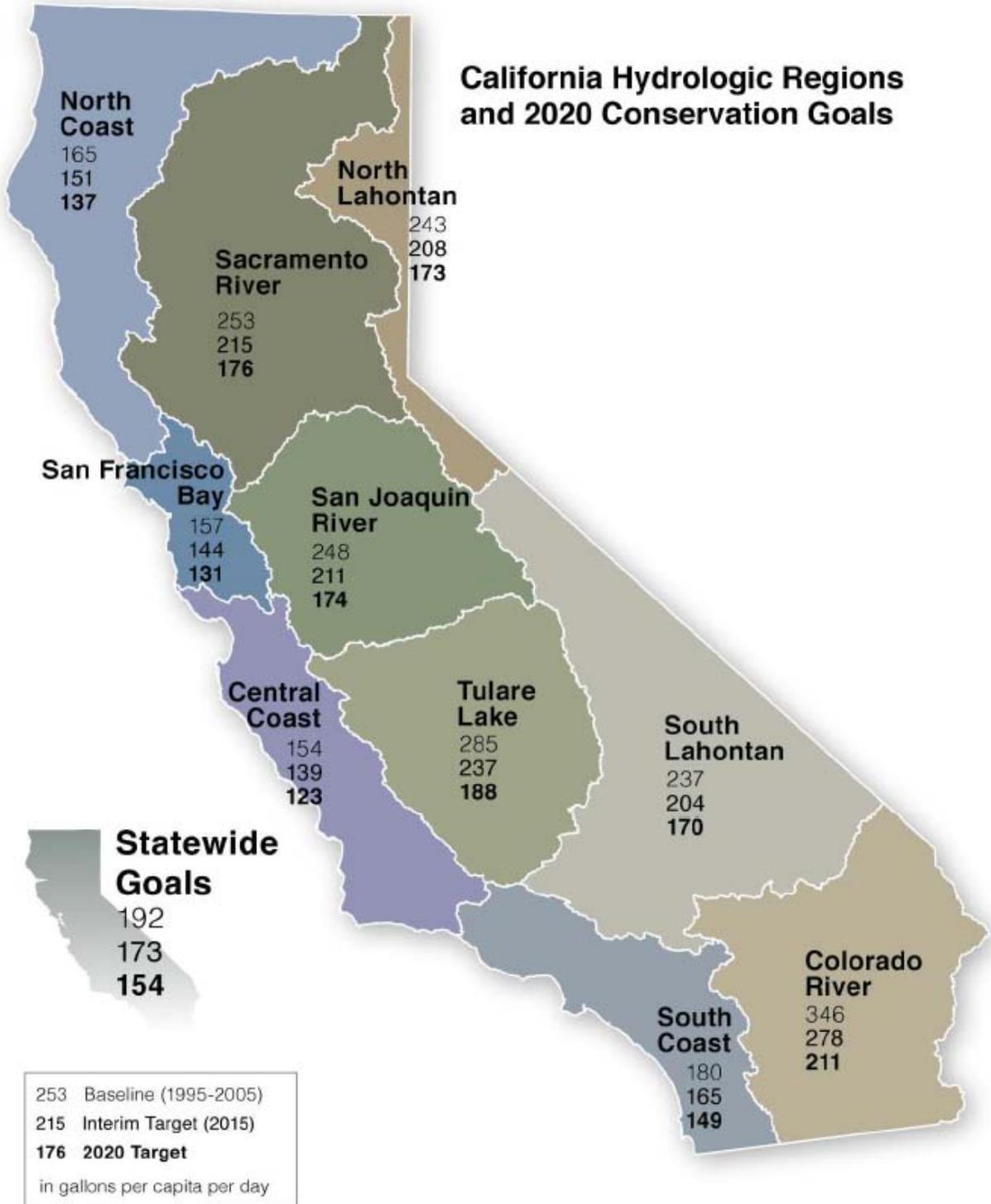
The final step was to check (*Table 12*) that the City's 2020 target falls below a minimum reduction value—defined in Senate Bill X7-7 as 95% of the 5-year baseline use (*Table 10*). This check exists in order not to penalize districts or cities that have implemented aggressive conservation measures on their own initiative. Many such California water suppliers have already reduced water use to 80% of their 10-year baseline and therefore prefer to make use of their hydrologic region targets (*Figure 5*) and Method 3 to determine their 2020 targets. As summarized in *Table 12*, no adjustment was needed to the City's 2020 target of 224 GPCD and the City of Redding's 2015 interim target is 252 GPCD. *Figure 6* illustrates recent annual GPCD water use levels compared to the City's 10-year baseline use and calculated targets.

Table 12
2020 Urban Water Use Target and Interim Target Check

1	10-year Base Daily Per Capita Use (<i>Table 8</i>) =	280	GPCD
2	5-year Base Daily Per Capita Use = (1/1/2004 through 12/31/2008, see <i>Table 9</i>)	285	GPCD
3	Since Line 2 > 100 GPCD, calculate 95% of Line 2 =	270.5	GPCD
4	2020 Urban Water Use Target (Method 1, <i>Table 10</i>)	224	GPCD
Since Line 4 < Line 3, no adjustment to target is needed:			
5	2020 Urban Water Use Target =	224	GPCD
6	2015 Interim Urban Water Use Target = (Line 1 + Line 5)/2 =	252	GPCD

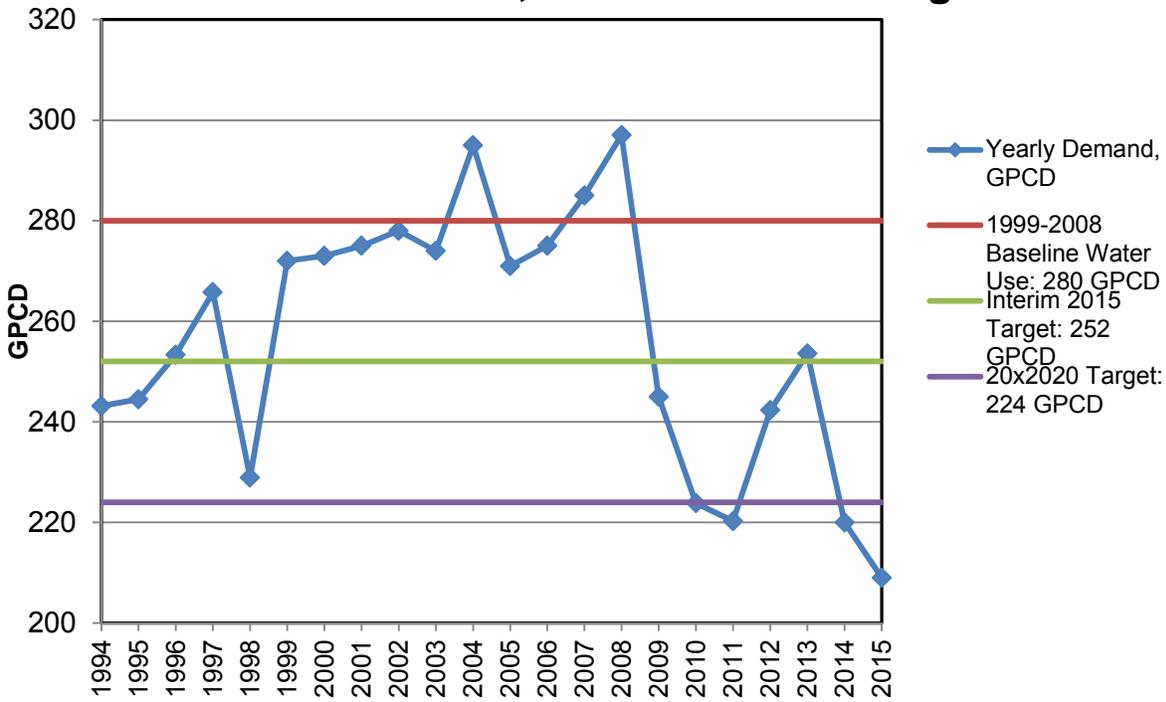
Sources: *Table 10; 2010 Urban Water Management Plan Guidebook*

Figure 5: California Hydrologic Regions and 2020 Conservation Goals (GPCD)



Source: 2010 Urban Water Management Plan Guidebook, p.D-11

Figure 6: City of Redding Historic Yearly Water Demand & 2015, 2020 Water Use Targets



In addition, results presented in **Appendix E**—two Excel worksheets developed by the California Urban Water Conservation Council (CUWCC) to aid in the completion of CUWCC 2010 required reporting—corroborate the accuracy of the calculations in this section as well as the downward 2009-2010 trend in GPCD demand illustrated in *Figure 6*.

4.3 Water Demand Projections

Projected water deliveries for the years 2020, 2025, 2030, and 2035 were determined by using the targets calculated in *Table 10* and *Table 11* according to the following methodology:

- “Unaccounted system losses” equals 5.9% of total production, determined by finding the ten-year average (2001-2010) of yearly differences between total water production and total metered deliveries. In other words, 94.1% of total water production is assumed to be delivered to customers and 5.9% is lost due to causes such as leaks, distribution system flushing to remove iron and manganese deposits and fire suppression efforts.
- For the year 2015, total delivery volume was calculated as the product of projected population (*Table 2*) and the Interim (2015) Urban Water Use Target (see *Table 11*) minus unaccounted for system losses:

$$2015 \text{ Total Delivery Volume} = [2015 \text{ target (GPCD)} \times \text{projected population}] \times 0.941$$

- For the year 2020, total delivery volume was calculated as the product of projected population (*Table 2*) and the Urban Water Use Target (*Table 11*) minus unaccounted for system losses:

$$2020 \text{ Total Delivery Volume} = [2020 \text{ target (GPCD)} \times \text{projected population}] \times 0.941$$

- The number of total metered connections was calculated based on the assumption (*City of Redding Water Master Plan 2012*) that average persons/connection will remain constant at approximately 3.2.
- 2010 sector percentages of total metered connections and total volume for each sector (*Table 6*) were used to calculate 2015 and 2020 sector connections and volumes.

Since the City will implement conservation programs for each water use sector to comply with the 2009 Water Conservation act, the above methodology and *Tables 13-15* assume an equal sharing of the 20 x 2020 use reduction across all sectors.

Table 13
Projected 2020 Water Deliveries - AAF

Water Use Sectors	Metered		Not Metered		Total
	# of Accounts	Volume	# Accounts	Volume	Volume
Single-Family residential	23608	19009	0	0	19009
Multi-Family residential	2182	1757	0	0	1757
Commercial/Institutional/ Governmental	2706	2179	0	0	2179
Industrial	396	319	0	0	319
Landscape/Other					
Total	28892	23264			23264

Sources: *Table 11; DWR Public Water System Statistics 2010 Report*

Notes:

- The number of total connections (accounts) is based on population projections (*Table 4*) and an average of 3.2 persons per connection. (Source: 2012 Water Utility Master Plan)
- Volumes and Number of connections for each sector are based on 2015 percentages (*Table 6*).
- Volumes reflect 2020 Urban Water Use Interim target (*Table 12*) minus system losses.

**Table 14
Projected 2025 Water Deliveries – AAF**

Water Use Sectors	Metered		Not Metered		Total
	# of Accounts	Volume	# Accounts	Volume	Volume
Single-Family residential	24029	19348	0	0	19348
Multi-Family residential	2221	1788	0	0	1788
Commercial/Institutional/ Governmental	2754	2218	0	0	2218
Industrial	403	325	0	0	325
Landscape/Other					
Total	29407	23679	0	0	23679

Notes:

1. The number of total connections (accounts) is based on population projections (*Table 4*) and 3.2 persons per connection. (Source: 2012 Water Utility Master Plan)
2. Volumes and numbers of connections for each sector are based on 2010 percentages (*Table 6*).
3. Volumes reflect 2020 Urban Water Use target (*Table 12*) minus system losses.

For projected water deliveries in 2025 and 2030, average daily use was assumed to hold steady at 224 GPCD. Total water deliveries were calculated as the product of 224 GPCD and the projected population (*Table 4*) minus unaccounted for system losses (5.9%, see *Table 18*). Water use reductions are assumed to be shared equally among all sectors.

**Table 15
Projected 2030 & 2035 Water Deliveries – AAF**

Water Use Sectors	2030		2035	
	Metered ⁴		Metered ⁴	
	# Accounts ^{1,2}	Volume ^{2,3}	# Accounts ^{1,2}	Volume ^{2,3}
Single-Family residential	24541	19760	25053	20172
Multi-Family residential	2268	1826	2316	1865
Commercial/Institutional/ Governmental	2813	2265	2871	2312
Industrial	412	332	420	339
Landscape/Other				
Total	30034	24183	30660	24688

Notes:

1. The number of total connections (accounts) is based on population projections (*Table 4*) and 3.2 persons per connection. (Source: 2012 Water Utility Master Plan)
2. Volumes and numbers of connections for each sector are based on 2010 percentages (*Table 6*).
3. Volumes reflect 2020 Urban Water Use target (*Table 12*) minus system losses.
4. All connections within the service area are metered.

4.4 Projected Water Demand from Future Lower-Income Housing Units

The City of Redding Redevelopment Agency supplied data in July 2011 on projects scheduled for completion through July 2013. Using details from this data, including number, type and size of units, 2020 and 2025 total demand for planned future units was calculated with the assumption of meeting the 2020 Compliance Target of 224 GPCD. Additionally, water demand in 2030 and 2035 for currently planned lower income units is assumed to stay relatively constant at the 2020 Water Use Target of 224 GPCD.

In addition to specific planned projects, the City of Redding Redevelopment Agency has an approximate target of 20-25 lower income units per year. Using the upper value of 25 new units per year after July 2013, future demand was calculated by multiplying Interim and 2020 Water Use per capita targets by the projected number of additional lower income housing residents. Total projected lower income demands are the sum of demand from specific, currently planned units and projected demand from target per year increase in lower income units (see *Table 16* below). Though the lower income demands presented in *Table 16* are included in the overall Single-Family/Multi-Family water use projections detailed in *Tables 13-15*, the City is required to illustrate that sufficient water supplies will be available to serve the lower income sector.

Table 16 Lower-income Projected Water Demands - AAF				
Low Income Water Demands*	2020	2025	2030	2035
Demand for planned Lower Income units (86 units built through July, 2013—average 1.7 persons/unit)	36.3	36.3	36.3	36.3
Demand for projected 25 additional lower income units per year after July 2013 at 1.7 persons/unit	77.5	130.4	183.3	236.2
Total Lower Income Single-Family/Multi-Family residential demand	113.8	166.7	219.6	272.5
Lower Income Demand as % of total Single-Family and Multi-Family Demand	0.5%	0.7%	1.0%	1.2%

Source: City of Redding Redevelopment Agency Senior Project Coordinator

Notes:

1. Assumed Interim Target (252 GPCD) will be met in 2015 and the 2020 Target (224 GPCD) will be met for the years 2020-2035.
2. The Water Conservation Act of 2009 defines a lower income household as one earning 80 percent or less of median income, adjusted for family size.
3. For the calculations in this UWMP, demand calculations were limited to lower-income housing units specifically identified by the Redding Redevelopment Agency and not on house-by-house income analysis over the entire city. Therefore, the lower-income demands presented in *Table 16* are likely to be underestimated.

4.5 Sales/Connections to Other Agencies

Though the City of Redding has emergency service inter-ties with Bella Vista Water District, the City of Shasta Lake, the Centerville Community Services District, Shasta Community Services District and Keswick CSA25, the existing inter-ties do not have adequate capacity to provide significant supply on a regular basis. (Source: *City of Redding 2016 Water Utility Master Plan Table 2-7 Inter-Agency Connection Data*)

Table 17 Sales/Connections to Other Agencies - AAF								
	Inter-ties		Water Distributed					
	#	Sizes (in)	2005	2010	2015	2020	2025	2030
Bella Vista Water	3	6, 8, 12	0	0	0	0	0	0
Centerville CSD	3	6,8,12	0	0	0	0	0	0
City of Anderson	1	8	0	0	0	0	0	0
City of Shasta Lake	2	6,6	0	0	0	0	0	0
Shasta CSD	1	8	0	0	2.6	0	0	0
Keswick CSD	1	4	0	0	0.1	0	0	0
Total	11		0	0	0	0	0	0

Source: *City of Redding 2010 Water Master Plan Table 2-7*

4.6 Total Actual and Projected Water Use

Total actual and projected system water demands, including deliveries (*Tables 5-7, 13-15*) and system losses are summarized in *Table 18* below. The City of Redding supports and works with adjacent districts and water purveyors to assist in supplying water during drought and other potential challenges they may be enduring. In 2014 and 2015 the City purchased water from the McConnell Foundation and sold an identical amount to irrigation districts further south in the Sacramento Valley. The City also provided water to Keswick and Shasta CSDs however these occurrences are rare and accomplished under individual, one-time contracts. The City of Redding makes only retail water deliveries and has no current or planned wholesale contracts.

Table 18 Additional Water Uses and Losses - AAF						
Water Use	2005¹	2010¹	2015¹	2020²	2025²	2030²
Unaccounted For System Losses	1,812	1,100	2,269	2,825	2,885	2,945

Source: DWR Water System Statistics reports 2000-2010

Notes:

1. Actual data from DWR statistics and customer billing data.
2. 2001-2015 average unaccounted for system water losses were 5.9%.

**Table 19
Total Water Use - AAF**

Water Use	2005¹	2010¹	2015¹	2020²	2025²	2030²	2035²
M & I Sales	25,070	22,957	19,057	23,264	23,679	24,183	24,688
Unaccounted For System Losses	1,812	1,100	2,269	2,775	2,825	2,885	2,945
Sales to Other Agencies	0	0	0	0	0	0	0
Total	26,894	24,057	21,326	26,039	26,504	27,068	27,633

Notes:

1. Actual data from DWR statistics and billing data.
2. 2001-2010 average unaccounted for system water losses were 5.9%.

4.7 Water Use Reduction Plan

The City has selected Method 1 for establishing its long-term water use targets.

Since 2008, the City’s per capita water consumption has been declining and the 2015 interim target has already been achieved. The City suspects that the economy has played a part in declining consumption and realizes that per capita water use may increase as economic conditions improve. To that end, the City continues to implement its Water Use Efficiency Program designed around the principles of education, outreach, aggressive leak detection and repair, and quality control through timely customer account audits. The City will also continue to implement water-efficiency measures for new customers, including the Water Efficient Landscape Ordinance, **Appendix J**, and the CalGreen Building Code. Future efforts include specific targeting of Commercial/Industrial/Institutional (CII) customers through an audit program and improvements to our single-family residential customer service outreach program. BMP Implementation efforts as referenced in Section 7 will form the foundation for achieving sustainable water savings over time and enable the City to meet the requirements of SBx7-7.

In August 2013 following a Proposition 218 protest vote process the City implemented tiered water rates to encourage conservation. However, in 2014 litigation was successful against a community for tiered rates based on an argument that the higher tiers were paying more for the water than it cost the utility. The City is currently in the process of re-evaluating their utility rate structures which will likely include elimination of the tiered rates.

SECTION 5 – SYSTEM SUPPLIES

5.1 - Water Sources – General

The City of Redding has three primary sources from which to supply its municipal water system:

1. Surface water is drawn from the Sacramento River at Pump Station #1, located upstream of the Diestelhorst Bridge with a pumping capacity of 30.6 million gallons per day (MGD). The river pump station, consisting of 5 large pumps, lifts raw water to the Foothill Water Treatment Plant (WTP), which has a current treatment capacity of 24 MGD and expansion possibilities up

to 42 MGD.

2. Surface water is drawn from Whiskeytown Lake via the Spring Creek Conduit. The water is gravity fed to the Buckeye WTP, where up to 14 MGD of water can be treated and sent into the distribution system.

Together, these surface water sources account for approximately 6 billion gallons of water per year, or about 70% of the City's total annual production.

3. Groundwater is pumped by sixteen wells located over the Redding Groundwater Basin (RGWB)—see map of geographic extent, *Figure 8*. The City's wells are operated during the warmer, drier months of May through October that typically see increased demand. The active wells in the Enterprise (southeast) and Cascade (south-central) areas of the City have capacities of approximately 9.8 MGD and 0.4 MGD, respectively. Together these wells provide the City with about 2.8 billion gallons of water per year, approximately 30% of total annual production.

Figure 2 (Appendix I) shows the location of supply sources for the City of Redding, *Figure 9* illustrates actual monthly water production by source for 2015, and *Table 20* summarizes the current and projected water supplies from the sources described in this section.

Figure 8: Areal Extent of Redding Groundwater Basin 5-6

Source: Redding Basin Water Resources Management Plan Environmental Impact Report (2007)

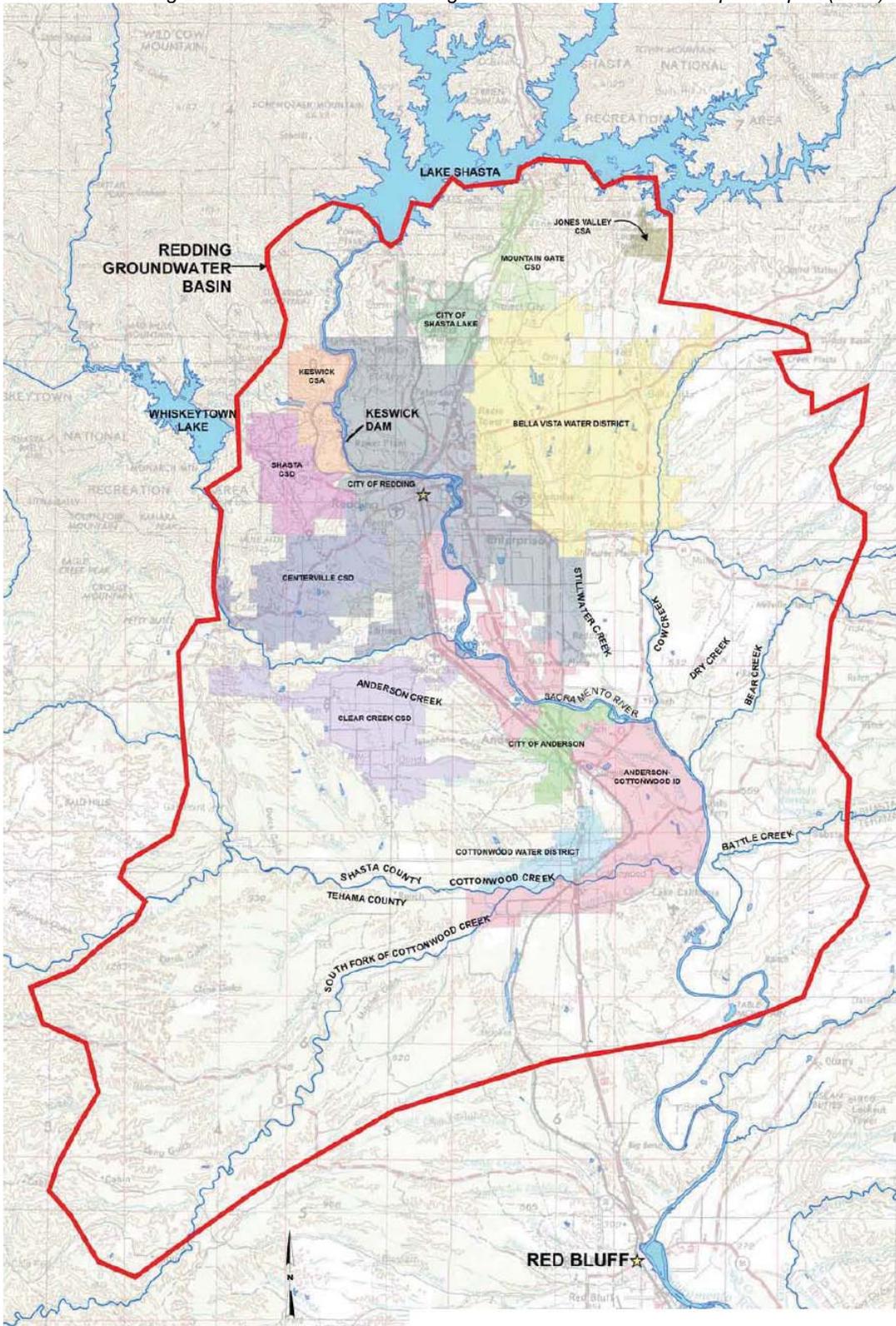
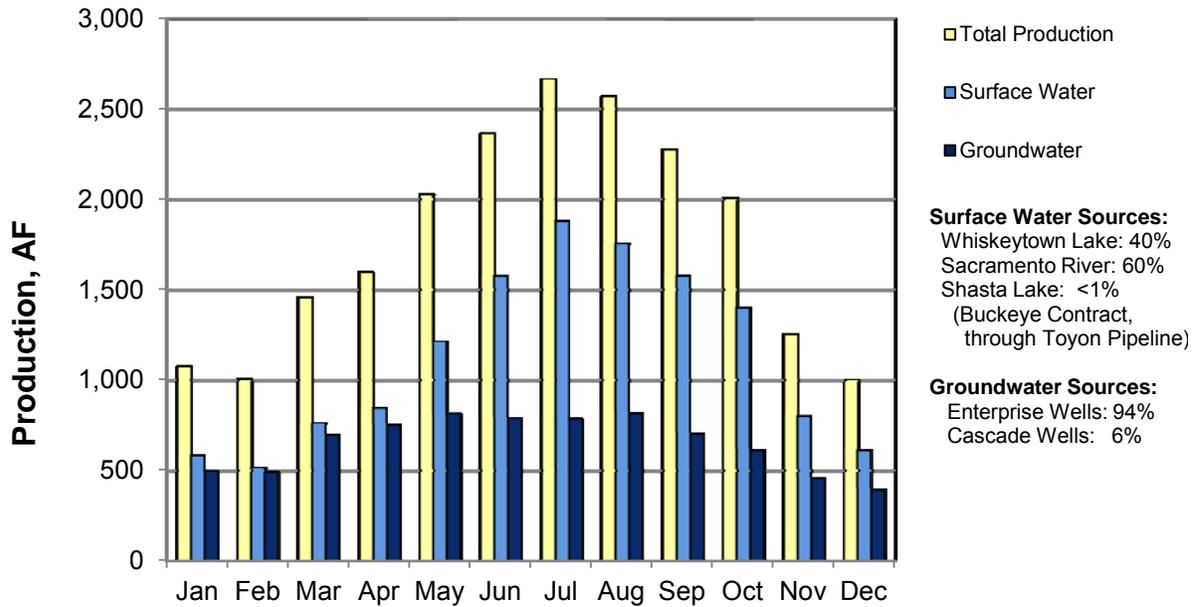


Figure 9: City of Redding Monthly Water Production by Source, 2015



**Table 20
Water Supply Availability, Current & Projected - AAF**

Water Supply Sources	2010	2015	2020	2025	2035
Surface water—Sacramento River ¹	21,000	21,000	21,000	21,000	21,000
Surface water—Whiskeytown Lake ²	6,140	6,140	6,140	6,140	6,140
Redding Groundwater Basin ³	11,005	11,005	11,005	13,405	13,405
Anderson Cottonwood Irrigation District	0	500	4000	4000	4000
Other	0	0	0	0	0
Total	38,145	38,645	42,145	44,545	44,545

Source: Draft City of Redding 2016 Water Utility Master Plan, Tables 5-1 & 5-2

Note:

1. Redding Contract with Bureau of Reclamation for Sacramento River Diversion, #14-06-200-2871A.
2. Redding Contract with Bureau of Reclamation for Spring Creek Conduit Diversion, #14-06-200-5272A.
3. Groundwater production is based 50% of maximum pump capacity which is an estimate of actual average operations.

5.2 Water Sources – Groundwater

The Redding Groundwater Basin (RGWB), identified in DWR Bulletin 118 as a class B, provided the City with approximately 7,500-11,000 acre-feet of water per year or Annual Acre Feet (AAF) through sixteen wells during the years 2006-2010 (see Table 21). The wells range in depth from 170 feet to 600 feet and are run primarily during periods of high water demand, especially the months of June, July and August (see Figure 9). The return flow of groundwater to the river from the City’s wastewater treatment facilities contributes to water supplies for downstream users.

The well water is generally of very high quality with the exception of arsenic concentrations above the Primary Maximum Contaminant Level (MCL) at wells #11 and #13 and manganese levels above the Secondary MCL in all Enterprise wells except #3 and #4. As defined by the United States Environmental Protection Agency (USEPA), a Primary MCL provides a standard to protect public health while a Secondary MCL exists to prevent aesthetic issues such as taste, color and odor. In Enterprise area wells, leaching from natural deposits can result in dissolved manganese concentrations near or above the Secondary MCL and requires treatment in order to avoid the black color that develops as manganese precipitates out of solution. Treatment consists of application of chemical sequestering agents which bind the manganese in solution. None of the Cascade zone wells require sequestration, and iron levels above the Secondary MCL have not been encountered at any of the City's wells.

Due to detection of arsenic concentrations above the USEPA Primary MCL at wells #11 and #13, these two wells have not been operated for water supply since 2008—though they could conceivably be used on a limited basis if the water were to be blended with other well output in order to reduce the overall arsenic level below the Primary MCL limit. Potential sources of arsenic contamination in general include erosion of natural deposits, runoff from orchards, and glass and electronics production wastes. In October 2012 the California Department of Public Health issued the City a permit changing the status of wells #11 and #13 to “Standby,” which would limit pumping to short-term emergencies of five consecutive days or less and for less than fifteen total calendar days per year.

The City is a member of the Redding Area Water Council (RAWC), a consortium of water purveyors that operate in Shasta County. In 1998, the Shasta County Water Agency, on behalf of the RAWC, prepared a comprehensive groundwater management plan for the RGWB (see copy of the *Coordinated AB3030 Groundwater Management Plan* in **Appendix B**). The City is also participating in a consortium of nearby groundwater users to form a Groundwater Sustainability Agency (GSA) pursuant to the requirements of AB 1739, SB 1168, and SB1319 collectively known as the Sustainable Groundwater Management Act.

The RGWB is not an adjudicated basin. As the basin is not in overdraft, no legal pumping limit has been set—therefore, no overdraft mitigation efforts are currently underway. Though no safe yield has been established for the RGWB, groundwater modeling as part of the *Coordinated AB3030 Groundwater Management Plan* indicates that the RGWB is resilient to severe drought conditions and is able to recover with one year of normal rainfall. There were no limitations to pumping groundwater during the period 2006-2010, as groundwater wells supplement the surface water supply and are used primarily to meet increased water demand during the summer. During the spring, fall and winter months only a few wells out of the sixteen are operated, since operating the surface WTPs is less costly and produces higher water quality. Enterprise wells #11 & #13 (for locations, see *Figure 2, Appendix I*) have been placed on standby due to arsenic levels testing close to and above the Maximum Contaminant Level (MCL) of 10 mg/L.

During the 2006-2010 period, groundwater volumes were sufficient as a seasonal supplement to surface water sources, providing approximately 30% of total annual water production. (see *Table 21*). Groundwater wells can supply enough water to supplement existing surface water contracts with the Bureau (see *Figure 9, Section 5.1*) without any noted overdraft conditions in the local groundwater basin (*Bulletin 118 2003 Update* for basin 5-6). *Table 22* indicates that future well pumping under current operations criteria would be enough to continue supplying

between 30 and 40 percent. See *Table 28*, Section 5.6 for description of future groundwater supply projects and *Figure 11*, Section 6.2 for an illustration of groundwater contribution to meeting projected future demands. In years of extreme drought a combination of increased and mandatory conservation measures and increased groundwater usage can result in as much as 60% of demand being supplied from groundwater.

Table 21
Groundwater—Volume Pumped 2006-2010 – AAF

	2006	2007	2008	2009	2010	2015
Redding Groundwater Basin (5-6)	8,837	9,923	8,871	8,901	7,817	7,785
Total Supply	27,760	28,706	30,133	27,869	24,057	21,293
Groundwater as a % of Total Water Supply	32%	35%	29%	32%	32%	37%

Source: DWR Water System Statistics 2006-2015

Table 22
Groundwater—Volume Projected to be Pumped - AAF

Basin Name	2020	2025	2030	2035
Redding Groundwater Basin (5-6)	9,113	9,276	9,473	9,682
% of Total Water Supply	35%	35%	35%	35%

Sources:

1. Groundwater pumping projected from current well operations criteria and capacity.
2. Groundwater as a percent of total water supply derived from *Table 19*—projected total water use.

5.3 Transfer and Exchange Opportunities

The City has inter-ties with three nearby water districts and two neighboring cities (see *Table 17*) and transfers of water can be obtained from these water suppliers to meet a short-term deficiency. In addition, the City has recently negotiated a 40 year contract with Anderson Cottonwood Irrigation District (ACID) for water transfers of up to 4,000 AFY. Under drought conditions, the maximum yearly transfer to the City from ACID would be reduced to 3,000 AFY. The exact amount to be transferred is unpredictable and largely based on climate conditions and curtailments. Additional transfer agreements may happen on a singular basis such as a transfer from McConnell foundation in 2014 and 2015 and a similar transfer to Kanawaha/Glide water district in those same years. However the only ongoing transfer agreement the City maintains is the ACID contract.

Table 23
Transfer and Exchange Opportunities - AAF

Transfer agency	Transfer or Exchange	Proposed Volume
Anderson-Cottonwood Irrigation District	Transfer	up to 4,000
Total:		≤ 4,000

Figure 11, Section 5.2 illustrates the potential ACID transfer volume relative to volumes from other supply sources.

5.4 Desalinated Water Opportunities

The City is located in the Sacramento Valley approximately 150 miles from the Pacific Ocean. In addition, there is no brackish water in the RGWB and both the Sacramento River and Whiskeytown Lake are fresh water sources. Therefore, no opportunity exists for use of desalinated water as a future water supply.

5.5 Recycled Water Opportunities

5.5.1 Wastewater Quantity, Quality, and Current Uses

Collection System

The City’s Wastewater Utility is organized into three divisions: Collection, Treatment and Industrial Waste. The Wastewater Collection division provides sanitary sewer services to City residents and is tasked with the operations and maintenance of a complex system of sewer mains, trunk lines, interceptors and lift stations which collectively transport waste to one of two City Wastewater Treatment Plants.

There are 430 miles of sewer pipeline and 7,800 manholes that provide access to the collection system for maintenance and flow monitoring. Seventeen lift stations located throughout the system utilize pumps to lift the wastewater to a higher elevation where it again enters the gravity-flow collection system.

Of the seventeen facilities, seven are major lift stations with average daily dry weather flows ranging from 0.35 million gallons per day (MGD) to 2.0 MGD. These major facilities have more sophisticated control systems that allow the pumping to automatically increase and decrease according to the flow rates. They include flow monitoring and equipment diagnostic instrumentation as well as emergency generator systems to ensure continuation of operations in the event of electrical power loss. The remaining ten facilities are smaller lift stations with flows ranging from 1,000 to 52,000 gallons per day (GPD).

The Collection division also maintains nine rain gauges throughout the system that monitor rainfall amounts and track the effects of rain on the collection system through infiltration and inflow.

Source: City Wastewater Collection Department Staff

Wastewater Treatment Plants and Processes

The City currently runs two wastewater treatment plants, both of which are considered tertiary treatment facilities: Stillwater Wastewater Treatment Plant (SWWTP) and Clear Creek Wastewater Treatment Plant (CCWWTP).

Wastewater from the Redding area west of the Sacramento River is collected and treated at the CCWWTP, situated along the western shore of the Sacramento River at the southern boundary of the City's service area (see *Figure 2, Appendix I*). In 2015, the treatment facility discharged effluent at an annual average rate of 6.3 MGD and the effluent total suspended solids (TSS) concentration of the wastewater averaged 1.9 mg/L (93 lbs/day). Recycled water used for landscape irrigation and wash down purposes at the treatment site is not measured, while the remainder of the effluent is discharged into the Sacramento River where it is repeatedly diverted and treated for reuse by water agencies further downstream.

Wastewater from the Redding area east of the Sacramento River is collected and treated at the SWWTP, situated at the southern extreme of the City's service area along the Sacramento River's eastern shore (see *Figure 2, Appendix I*). In 2015, the Stillwater treatment facility discharged effluent at an annual average rate of 2.8 MGD with effluent total suspended solids (TSS) averaging 2.03 mg/L (46.5 lbs/day). Recycled water used for landscape irrigation and wash down purposes on-site is not measured. Recycled water used for crop irrigation is permitted under Waste Discharge Requirement #96-0169 and volume delivered fluctuates from 27.0 AF in 2009 to 56.2 AF in 2015 depending on weather conditions and crop cycles. The remainder of effluent is discharged into the Sacramento River where it is repeatedly diverted and treated for reuse by water agencies further downstream.

The wastewater treatment plants service areas include mostly residential and commercial customers with a small number of industrial clients which do not contribute heavy metals or other toxic industrial waste. A source control program monitors industrial and commercial enterprises to ensure that toxic substances and other pollutants to ensure that wastewater discharged to the collection system will neither upset treatment plant processes nor contain contaminant levels that violate regulatory discharge limits.

The City's wastewater treatment plants employ the following processes in order to achieve tertiary treatment:

Clear Creek Wastewater Treatment Plant	Stillwater Wastewater Treatment Plant
1. Primary Sedimentation - Grit Removal	1. Activated Sludge - Conventional
2. Activated Sludge - Complete Mix	2. Filtration
3. Filtration	3. Chlorination/Dechlorination
4. Chlorination/Dechlorination	4. Wastewater Disposal
5. Wastewater Disposal	

Estimated Wastewater Disposal Quantities

Wastewater volumes at SWWTP were estimated using the growth and collection system flow projections for the Stillwater Basin obtained from the 2012 Wastewater Utility Master Plan and the 2016 Draft update to the document. Treated wastewater volumes at CCWWTP were calculated based on the following assumptions:

- The average 2011 through 2015 recorded annual flow.
- Volume of wastewater produced will increase based on the change in population as provided in the 2016 update to the Wastewater Utility Master Plan.

Wastewater flow estimates in *Table 24* & *Table 25* for both wastewater treatment plants are based on the best available planning data and assumptions concerning future development. Therefore, results for 2020-2035 should be understood only as approximate values.

		Table 24 Recycled Water—Wastewater Collection and Treatment - AAF						
Type of Wastewater		2010¹	2015¹	5-yr Avg.	2020²	2025²	2030²	2035²
Wastewater volume collected and treated in service area	Stillwater WWTP	4,518	3,103	3,601	3,658	3,725	3,804	3,889
	Clear Creek WWTP	10,946	7,057	7,697	7,820	7,963	8,131	8,314
	Total	15,464	10,160	11,297	11,478	11,688	11,935	12,203
Volume that meets recycled water standard:		All	All	All	All	All	All	All
<u>Sources:</u> 2010, 2015: WWTP monthly/yearly reports 2015-2035 Stillwater: Projections based on <i>2009 Stillwater WWTP Facilities Plan</i> (see text above) 2015-2035 Clear Creek: Projections based on the 5-year average volumes and population growth estimates from the <i>2016 Draft Wastewater Utility Master Plan Update</i>								

Notes:

1. 2010 and 2015 values are based on actual flow data.
2. Approximate values based on calculations and assumptions described above.
3. Neither calculation method (for SWWTP or CCWWTP) takes into account the expected reduction in usage reflected in the 2015 and 2020 water use targets. Therefore, *Table 24* results are likely to be an overestimate of treated wastewater volumes, adding to the inherent uncertainty in calculations based upon projections of future population growth and development patterns.

**Table 25
Recycled Water—Non-recycled Wastewater Disposal - AAF**

Method of Disposal	Treatment Level	2010	2015	5-yr Avg.	2020 ¹	2025 ¹	2030 ¹	2035 ¹
Sacramento River - SWWTP	Tertiary	4,508	3,047	3,555	3,613	3,680	3,759	3,844
Sacramento River - CCWWTP	Tertiary	10,574	7,057	7,697	7,820	7,963	8,131	8,314
	Total:	15,102	10,104	11,252	11,433	11,643	11,890	12,158

Sources:

2010, 2015: City of Redding Wastewater Utility Staff & Monthly/Yearly Reports

2020-2035: 97.7% of treated wastewater (*Table 24*)—based on 2010 averages from wastewater treatment plant monthly reports.

Note:

1. Projected wastewater disposal quantities in *Table 25* for 2020-2035 are based on multiple planning assumptions (see above narrative) and therefore should be taken as approximate values.

5.5.2 Recycled Water Potential and Projected Use

Although the volume and quality of treated effluent are suitable for reclamation, the idea of reusing the water in the City's service area for irrigation purposes has several drawbacks. First, the contracts between the City and the United States Bureau of Reclamation (Bureau) state that any wastewaters that result from diverted Sacramento River water are the property of the Bureau, which could limit the possibility of the City's selling recycled water to other water agencies or reusing the water itself. In addition, due to the expense of distribution, reuse options are mostly limited to the use of treated effluent for on-site irrigation and agricultural crops within the immediate vicinity of the City's two wastewater treatment plants—the 56.2 AF of recycled water in 2015 was delivered by SWWTP to irrigate 30 acres for one agricultural customer. However, since SWWTP lies outside the City's water service boundary, this delivery did not offset any potable water demand. Actual delivery volumes are at the discretion of the landowner and fluctuate with crop climate variations and crop rotation, increasing from 35.3 AF in 2005 to 58.3 AF in 2010. The average of the last five years delivery of recycled water was 45.2 AF with the last two years between 55 and 57 AF. For the purpose of this UWMP recycled water deliveries (*Table 26*) are estimated to remain constant through 2035 and to come strictly from SWWTP.

Finally, the Anderson-Cottonwood Irrigation District (ACID) currently supplies water for irrigation in the Redding area—diverting from the Sacramento River and delivering flows to agricultural customers without treatment and almost exclusively by gravity. City recycled water would necessarily be more expensive due to the required distribution infrastructure and increased pumping from its treatment plants. As such, the selling of recycled water at this juncture would be neither financially feasible nor energy efficient.

Table 26 Recycled Water—Potential Future Use – AAF						
User Type	Description	Feasibility	2015	2020	2025	2035
Agricultural irrigation	Delivery to single customer from Stillwater WWTP	feasible	58.3	58.3	58.3	58.3
	Total:		58.3	58.3	58.3	58.3

Note: Though clarified filter backwash water is recycled back into the raw water stream at the City’s water treatment plants, this volume does not appear in *Table 26* because it has already been metered and accounted for upon withdrawal from the surface water source (Sacramento River or Whiskeytown Lake).

Table 27 Recycled Water—2005 UWMP Use Projection Compared to 2010 Actual Use - AAF		
User Type	2015 Actual Use	2010 Projection for 2015
Agricultural irrigation	56.2	58.3

Source: SwwTP 2015 monthly/annual reports

5.6 Future Water Projects

In anticipation of projected demands, two new wells on the east side of the City are scheduled for construction by the year 2025 (alternatively, two existing out-of-service wells could be rehabilitated). The City is proceeding with well head treatment on one well which should enable a blending plan to re-activate one of the standby wells. When the project is completed it will represent one of the two scheduled new wells. These wells will provide reliable additional supply in an area of the City that is growing and supplement the Sacramento River and Whiskeytown Lake sources.

Water conservation measures outlined in this plan will reduce future consumption and postpone the need for new supply sources. In 2007, the City completed an expansion of the Buckeye Water Treatment Plant (WTP) from 7 MGD to 14 MGD capacity, facilitating meeting increased summer water demands in the Buckeye area. This expansion, coupled with renegotiated Bureau contracts, gives the City the option of taking the Foothill WTP completely offline for maintenance during low-demand winter months. *Table 28* summarizes planned future water projects. Projected sources and supplies are illustrated in *Figure 10*, Section 6.2.

**Table 28
Future Water Supply Projects - AAF**

				Multiple-Dry years to Agency		
Project Name	Projected Completion Date	Normal Year to Agency	Single Dry Year to Agency	Year 1	Year 2	Year 3
Well #17 or Well #13 Rehab	2025	1,008	1,008	1,008	1,008	1,008
Well #18 or Well #11 Rehab	2030	1,008	1,008	1,008	1,008	1,016
Total		2,016	2,016	2,016	2,016	2,016

Source: *City of Redding 2016 Water Utility Master Plan Update*

SECTION 6: WATER SUPPLY RELIABILITY AND SHORTAGE CONTINGENCY PLANNING

6.1 Water Supply Reliability

Water Supply: Historical Context

The City of Redding is a United States Bureau of Reclamation (Bureau) contractor and receives water from the Central Valley Project (CVP) under two separate agreements.

In 1966, the City entered into a long-term supply contract with the Bureau, with an initial term from April 1964 to March 31, 2004. The Redding Contract, one of a group of Bureau supply contracts generally referred to as "Settlement Contracts," was intended to resolve legal water rights conflicts that arose between senior pre-1914 water rights holders along the Sacramento River and the Bureau following completion of the CVP. In 2005 the Redding Contract was extended for another forty years, until March 31, 2045. The Redding Contract supply is allocated into two classifications—Base supply of 17,850 annual acre-feet (AAF) and Project supply of 3,150 AAF.

In 1971, the City entered into the original Buckeye Contract with the Bureau, which assigned the Buckeye Service Area (Buckeye) to the City and made available CVP supply to the City to serve the Buckeye area. Amendments to the Buckeye Contract were made in 1990 and again in 1994. The 1994 amended Buckeye Contract governs the supply to the City's Buckeye Water Treatment Plant, which came online in 1995. In 2005, the Buckeye Contract was extended another forty years until February 28, 2045. The Buckeye Contract provides the City with 6,140 acre-feet (AF) of Project water.

In addition to the two surface water contracts with the Bureau, the City has two groundwater supply sources, the Enterprise well field and the Cascade well field. Enterprise well field provides most of the City's groundwater, while the Cascade well field provides a relatively minor local supply to the southern end of the Cascade service area only. These well fields are located within the Redding Groundwater Basin (RGWB) which is deemed to be approximately 510 square miles in size and which can provide a considerable augmented supply (see areal map of RGWB in *Figure 8*, Section 5.1)

The Shasta County Water Agency performed groundwater modeling as part of development of the Redding Area Groundwater Management planning process. Modeling conditions of the 1930's California drought coupled with 2025 projected demand, the aquifer was able to recover with just one year of normal rainfall—leading to the conclusion that the Redding Area Groundwater Basin (5-6) is very resilient and able to meet all reasonably expected demand.

Source: Shasta County Water Agency (Shasta County Public Works)

In 2011 the City entered into a 40 year contract with Anderson Cottonwood Irrigation District (ACID) to purchase water starting with 500 acre feet per year for the first five years and up to 4,000 acre feet per year thereafter. Water purchased from ACID would be curtailed in proportion to any curtailment to ACID's supplies.

Water Supply Reliability and Future City Growth

The *Public Facilities Element* of the General Plan Policy Document establishes goals with regard to the development of infrastructure within the City's planning area. These goals are

intended to ensure that water supply and supply capacity are able to meet the demands for future growth. See **Appendix C**, *City of Redding General Plan: Public Facilities Element*.

Natural resources contribute to the City's economy and are important elements of Redding's quality of life. Both responsible management and protection of these resources are needed. The General Plan seeks to balance the need to accommodate growth with the need for the conservation, protection, and enhancement of the area's natural resources. The *Natural Resource Element* establishes goals and policies with regard to surface and groundwater resources. These goals are intended to insure that the City can maintain excellent water quality and an adequate water supply to meet future growth demands. See **Appendix D**, *City of Redding General Plan: Natural Resource Element*.

6.2 Historic and Current Supply During Drought Conditions

The Bureau defines a critical water year as one in which projected in-flows to Shasta Reservoir equal less than 3.2 million AF. When a critical-year condition is declared for Shasta Reservoir, the Bureau can reduce the Redding Contract supply by up to 25% of the average April-October volumes withdrawn under that contract during the previous three non-critical water years. From initiation of the City's Bureau contracts to present, the Sacramento River (Redding Contract) supply has been reduced in this manner in 1977, 1991, 1992, and 1994.

During a critical or constrained water year (less severe than a critical water year), the Buckeye Contract supply can be reduced to 75% of the average yearly use during the previous three non-constrained water years. The City's Buckeye Contract supply is Project (CVP) water and is therefore more susceptible to Bureau restrictions. Buckeye Contract supplies have been reduced in such fashion nine times since 1971: 1990-1994, 1999, 2001, 2008 and 2009. Only once since 1971 did the Bureau reduce the Buckeye allotment further, to 65% of total contract allotment in 1977. Though a future 35% reduction is unlikely, this takes a conservative approach in calculating drought period supply in this UWMP by assuming a reduction to 65% of historical use in the third consecutive constrained water year (*Table 32 & Table 35*).

In summary, Bureau dry year policies stipulate a reduction of the Redding Contract by subtracting up to 25% of April-October historical use (previous three non-impacted years) from the contractual amount of 17, 850 AFY and Buckeye Contract supply can be limited to 75% of total average use for the previous three non-constrained water years.

In 2015 the California Governor declared a drought emergency which triggered a clause in the Bureau contracts that allows curtailments to exceed the standard reductions. In that year the Redding contract was reduced to 75% and the Buckeye contract to 25%.

Bureau historical statistics for total calculated annual inflows into Shasta Lake were used in order to determine the City's single dry year, median runoff year, and multiple dry year periods. Shasta Lake inflow data was complete for Bureau water years (October-September) 1971-2015, and multiple year moving averages were calculated for 3, 4, 5, and 6-year periods. The lowest multi-year average for at least three years occurred from 1990-1992, as summarized in *Table 29*. *Table 30* compares available water supplies during the driest single year and driest three-year period since 1971. The "Percentage of Normal Year" supply calculation in *Table 30* for the year 1977 is artificially low due to two primary factors: an increase in the supply allotments from the Bureau between 1977 and 2005, as outlined in the City's Buckeye and Redding contracts (**Appendix L**), and growth in groundwater pumping capacity during this time period due to

construction of additional wells. Finally, *Table 31* qualitatively summarizes factors with potential to limit the City’s water supply.

In addition to curtailment of Bureau deliveries during critical or constrained years both Bureau contracts have language enabling further reductions. The Sacramento River contract contains language granting authority to the California State Water Resources Control Board or a court of competent jurisdiction the ability to issue a final decision or order modifying the terms and conditions of the water rights of either party in order to impose Bay-Delta water quality obligations. This particular clause requires some negotiation and potentially mediation. The Buckeye contract

**Table 29
Basis of Water Year Data**

Water Year Type	Base Year(s)	Historical Sequence
Average Water Year ^{1,2}	2005	1971-2015
Single Dry Water Year ³	1977	1971-2015
Multiple Dry Water Year ⁴	1990-92	1971-2015

Source: United States Bureau of Reclamation, Central Valley Operations office—Shasta Lake Inflow statistics. Data is for Bureau water years, defined as October of previous year through September of reference year.

Notes:

1. *Average Year* — a year or an averaged range of years in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the year the previous 30 years or more (in this case, 1971-2015) which saw the median runoff value.
2. *Single dry year* —the lowest annual runoff for a watershed within the previous 30 years or more.
3. *Multiple-dry year period* — multi-year period during the previous 30 years or more in which the lowest average runoff occurred.

Table 30
Supply Reliability—Historic Conditions - AAF

	Average/Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
	2005	1977 ¹	1990 ³	1991 ^{2,3}	1992 ^{2,3}
Buckeye Contract	5,280	917	1,582	1,582	1,582
Redding Contract	21,000	8,250	16,300	16,600	16,900
Groundwater Wells ⁴	9,500	4,429	6,112	7,328	7,328
Total	35,780	13,595	23,994	25,510	25,810
Percent of Average/Normal Year (2005):		38% ⁴	67%	71%	72%

Notes:

1. Calculated using well-capacity data from the 1982 Water Master Plan (assumes wells are operating at 50% of yearly capacity). The City's Redding and Buckeye Contracts were cut to 75% and 65% of 1977 contract allotments, respectively. (see [Appendix L](#))
2. The Buckeye Contract was cut to 75% of 3-year historical use in 1990-92.
3. An additional groundwater well came online in 1991.
4. All wells assumed to operate under historic operation criteria.
5. Besides reductions described in #1, the low % for 1977 is due in part to increased Bureau contract allotments (see [Appendix L](#)) and groundwater well capacity in 2005 compared to 1977.

Table 31
Factors Resulting in Inconsistency of Supply

Name of Supply	Legal/ Contractual	Environmental	Water Quality	Climatic
Sacramento River	X	X		X
Whiskeytown Lake	X	X		X
Redding Groundwater Basin			X	

Source: City of Redding Water Utility Staff

Unlike the City of Redding's water contracts with the Bureau which are subject to the contractual constraints described at the start of Section 6.2, the Redding Groundwater Basin (RGWB) has proven to be an extremely reliable source of water and supplies the City with additional supply during periods of high water usage. The two primary groundwater quality concerns include the high arsenic levels in wells #11 and #13 and elevated manganese concentrations in Enterprise zone wells—see the more detailed discussion in Section 5.2.

Supply reliability during drought periods, subject to Bureau contract restraints as discussed above, is summarized in *Table 32*. *Table 33* and *Figure 10* present a supply and demand comparison for a normal water year, and *Tables 34*, *Table 35* and *Figure 11* compare projected supplies and demands during drought periods.

Table 32
Supply Reliability—Current Water Source Availability - AAF

Water Source	Average/Normal Water Year	Multiple Dry Years Water Supply		
		2016 ¹	2017	2018
Sacramento River (Bureau Redding Contract) ²	21,000	18,465	18,465	18,465
Whiskeytown Lake (Bureau Buckeye Contract) ³	6,140	4,123	4,123	3,573
Redding Groundwater Basin ⁴	7,900	7,900	7,900	7,900
ACID	4,000	4,000	4,000	4,000
Total	39,040	34,488	34,488	34,488

Notes:

1. 2016 data illustrates supply totals for a single dry year.
2. Redding Contract 2016 hypothetical reduction = $0.25 \times (2011-2013 \text{ average April-Oct Sacramento River withdrawals}) = 2,535 \text{ AF}$
3. Buckeye Contract hypothetical 2011 single dry year supply equals 75% of average contract use during the last three non-constrained Project water years = $0.75 \times (\text{Average } 2011-2013 \text{ Project water use}) = 4,123 \text{ AAF}$;
Third year drought supply could be reduced to 65%, at Bureau's direction (assumed for 2013 values).
4. Source: Historic operation of the wells during drought years (Average of 2013 through 2015).

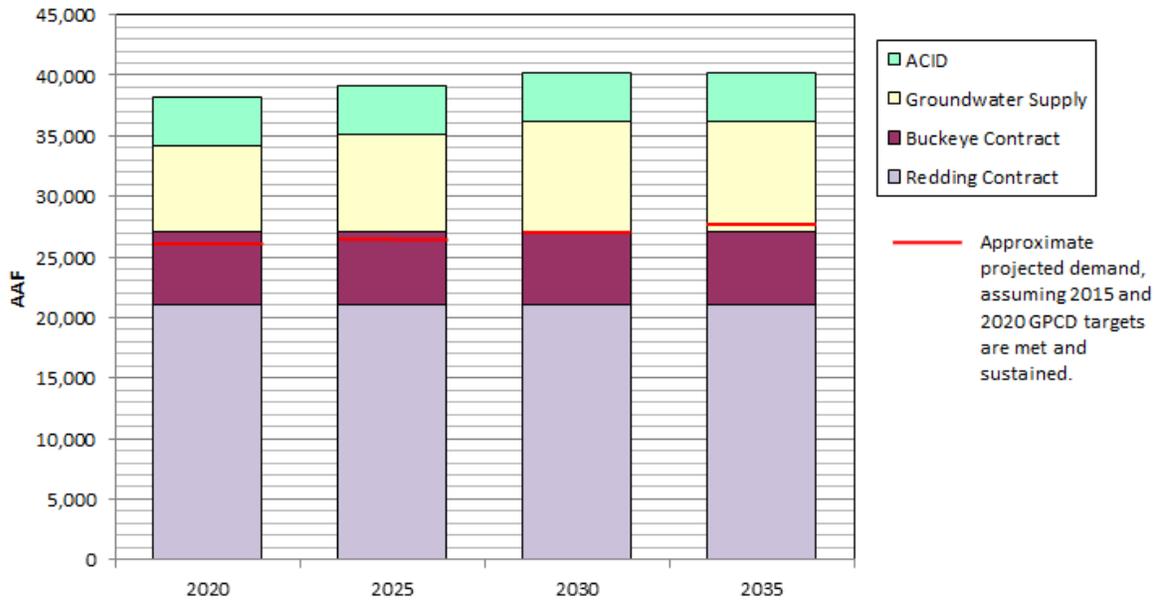
Table 33
Supply and Demand Comparison—Normal Year - AAF

	2015 ⁵	2020	2025	2030 ¹	2035
Redding Contract Supply	15,750	21,000	21,000	21,000	21,000
Buckeye Contract Supply	1,535	6,140	6,140	6,140	6,140
Groundwater Well Supply	7,785	7,000	8,000	9,000	9,000
ACID Supply	500	4,000	4,000	4,000	4,000
Supply Totals ³	25,570	38,140	39,140	40,140	40,140
Demand Totals ^{2,4}	19,001	26,039	26,504	27,068	27,633
Difference	6,569	12,101	12,636	13,072	12,407
Difference as % of Supply	26%	32%	32%	33%	31%
Difference as % of Demand	34%	46%	48%	48%	45%

Notes:

1. Two additional groundwater wells are assumed to come online by 2030 (see *Table 28, Section 5.6*).
2. Water demands in this table reflect the assumption that the City will meet interim and 2020 targets and that the 2020 GPCD target will be maintained through 2035.
3. From *Table 20*.
4. From *Table 19*.
5. 2015 data is actual and reflects Bureau curtailments

Figure 10: City of Redding Projected Demand and Source Supplies, Normal Water Year



**Table 34
Supply and Demand Comparison—Single Dry Year¹ - AAF**

	2020 ³	2025 ³	2030 ^{2,3}	2035 ³
Supply Totals ⁴ (from <i>Table 32</i>)	34,448	35,448	36,448	36,448
Demand Totals (from <i>Table 19</i>)	26,039	26,504	27,068	27,633
Difference	8,409	8,944	9,380	8,815
Difference as % of Supply	24	25	25	24
Difference as % of Demand	32	34	35	32

Notes:

1. For explanation concerning the determination of single dry year water supply volumes, see *Table 29* and the introduction to Section 6.2.
2. Two new (or rehabilitated) groundwater wells are assumed to come online by 2030 (see *Table 28*).
3. Water demands in this table reflect the assumption that the City will meet interim (2015) and 2020 targets and that the 2020 GPCD target will be maintained through 2035.
4. Increases in future Redding Contract dry year reductions due to increased April-October usage (by a larger population) after 2011 are assumed negligible relative to total supply.

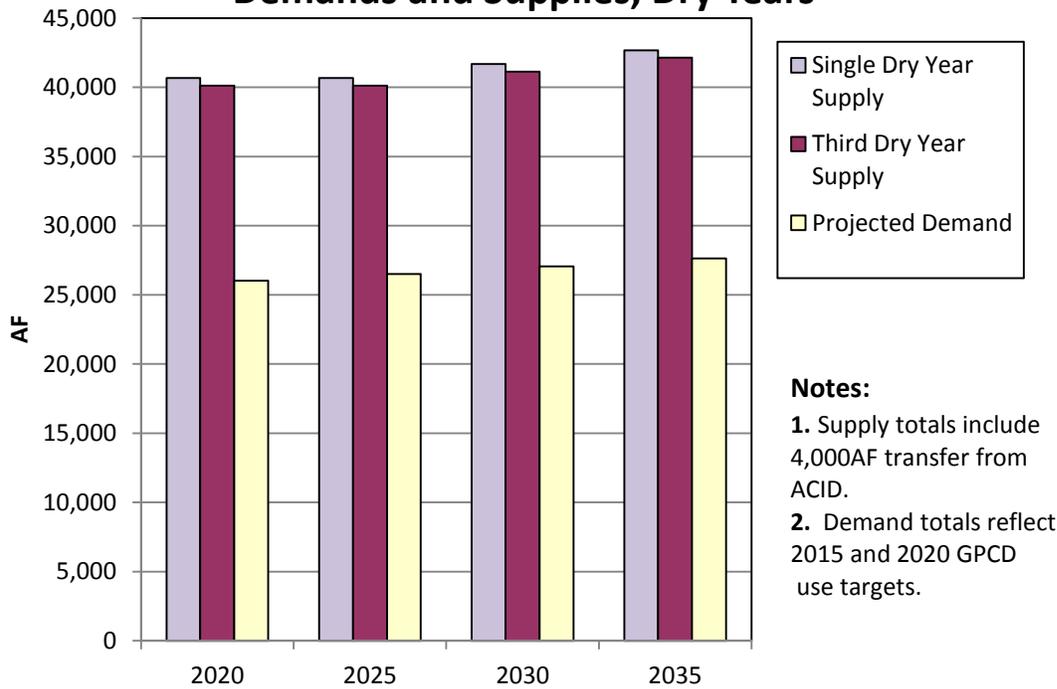
**Table 35
Supply and Demand Comparison—Multiple Dry Year Events⁴ - AAF**

		2020	2025⁵	2030	2035
Multiple dry year first year supply	Supply totals ^{1, 2}	34,448	35,448	36,448	36,448
	Demand totals ³	26,039	26,504	27,063	27,663
	Difference	8,409	8,944	9,380	8,815
	Difference as % of Supply	24	25	25	24
	Difference as % of Demand	32	34	35	32
Multiple dry year second year supply	Supply totals ^{1,2}	34,448	35,448	36,448	36,448
	Demand totals ³	26,039	26,504	27,063	27,663
	Difference	8,409	8,944	9,380	8,815
	Difference as % of Supply	24	25	25	24
	Difference as % of Demand	32	34	35	32
Multiple dry year third year supply	Supply totals ^{1,2}	34,448	35,448	36,448	36,448
	Demand totals ³	26,039	26,504	27,063	27,663
	Difference	8,409	8,944	9,380	8,815
	Difference as % of Supply	24	25	25	24
	Difference as % of Demand	32	34	35	32

Notes on Table 35:

1. Water supply sources are the same as in *Table 32*.
2. For explanation of determining single dry year and multiple dry year water supply volumes, see the introduction to Section 6.2 and *Table 29*.
3. Water demands in this table reflect the assumption that the City will meet interim and 2020 urban water use targets and that the 2020 GPCD target will be maintained through 2030 (see *Table 19*).
4. *Table 35* data is also presented in *Figure 11*.
5. Two new (or rehabilitated) groundwater wells are assumed to come online by 2030 (see *Table 28*).

Figure 11: City of Redding Projected Water Demands and Supplies, Dry Years



6.3 Water Quality

As required by the *Federal Safe Drinking Water Act*, City water supplies must meet stringent water quality standards set by the California Water Resources Control Board - Division of Drinking Water, the United States Environmental Protection Agency (USEPA), and the Food and Drug Administration (FDA). An annual *Water Quality Report* is published and distributed to all water customers. The City consistently meets or falls below Maximum Contaminant Levels set by Federal and State Agencies thereby ensuring that Water Quality Standards are met throughout the year. **Appendix H** contains water quality information in the City Water Utility’s *2014 Consumer Confidence Report*.

Source Water Assessment and Sanitary Survey

The City of Redding conducted drinking water source assessments of its surface water sources in the *City of Redding Surface Water Source Assessment* (SWSA) in June 2001 and as part of the *Redding Area 2016 Watershed Sanitary Survey* (Sanitary Survey). Additionally, the City performed a Groundwater Source Assessment (GWSA) in May 2002. According to source assessments, the City’s surface sources are at highest risk of contamination from sewage spills, railway and major roadway accidents, illegal dumping, historic mining activities and recreational use.

According to the GWSA of May 2002, wells in more industrial areas, including Cascade Well 5 and Enterprise Wells 8, 9, 12, and 13, are most vulnerable to:

- 1) Airports—Maintenance/fueling areas
- 2) Septic systems and sewer collection system overflows/leaks

- 3) Wastewater Treatment Plant
- 4) Lumber processing and manufacturing
- 5) Biosolids land application
- 6) Natural gas pipelines
- 7) Roads and streets

All other wells are located in residential areas and are considered most vulnerable to the following contamination sources:

- 1) High density housing
- 2) High density of septic systems
- 3) Sewer collection system overflows or leaks
- 4) Roads and streets
- 5) Grazing
- 6) Chemical/Natural gas pipelines

Water quality related excerpts from the executive summary of the 2016 Sanitary Survey include the following:

- The overall quality of water from the four watersheds is quite good due in part to:
 - 1) The large volumes of water captured by the watersheds, which dilute contaminants;
 - 2) The presence of five lakes, which allow contaminants to settle out of the water;
 - 3) Land management regulations of local, state, and federal agencies.
- The greatest likely threats to water quality are potential high turbidity from landslides and erosion, particularly in the Trinity and Whiskeytown Watersheds, and possible contamination due to accidental spills resulting from highway and railroad accidents—particularly for the Sacramento River and Shasta Lake.
- Forty-nine months of raw water sampling by the City of Redding, Bella Vista Water District, and Clear Creek CSD for *Cryptosporidium* in the Spring Creek conduit and Sacramento River, as required under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), indicate that no addition of *Cryptosporidium* removal or inactivation technology will be required. The very chlorine-resistant *Cryptosporidium* has been the culprit in several noteworthy outbreaks of gastroenteritis attributed to contamination of U.S. surface water supplies.
- Although disinfection byproducts are a concern for some treatment plants within the Redding Area Watershed, City of Redding water treatment staff analysis confirms that neither the Buckeye nor the Foothill Water Treatment Plants have an issue with excessive formation of disinfection byproducts within the treatment plants or distribution system.

Proactive prevention of invasive species, such as quagga mussels (*Dreissena rostriformis bugensis*), will also be important for preserving source water quality and protecting water system infrastructure. Quagga mussels can rapidly colonize hard surfaces and clog water intake structures such as pipes and screens, thereby reducing supply water pumping capabilities. In addition, quagga mussels can disrupt the food web by rapid filtration of phytoplankton and suspended particulate matter from the water, leading to increased water clarity, decreases in chlorophyll concentrations, and accumulations of pseudofeces. The clearer water allows more light penetration, causing aquatic plants to proliferate, and decomposition of pseudofeces can deplete dissolved oxygen content. Finally, the highly concentrated levels of

waterborne pollutants in pseudofeces move up the food chain, increasing toxicity exposure to fish and other aquatic life. (Source: *Dreissena Species FAQs, a Closer Look*—U.S. Geological Survey).

Water quality factors identified in the 2011 Sanitary Survey, the 2002 GWSA, and the 2001 SWSA are summarized in *Table 36*.

Table 36
Water Quality—Current and Potential Water Supply Impacts

Water Source	Description of Condition	2015	2020	2025	2030	2035
Sacramento River	High turbidity from landslides and erosion	X	X	X	X	X
	Accidental spills from highway and railroad accidents	X	X	X	X	X
Whiskeytown Lake	High turbidity from landslides and erosion	X	X	X	X	X
	Invasive mussel species	X	X	X	X	X
Redding Groundwater Basin	Wells #11 and #13 not currently operating due to arsenic levels near the MCL ¹	X	X	X		
	Need for dilution of water from wells #11 & #12 to dilute manganese levels below the secondary standard	X	X	X	X	X

Sources: *Redding Area 2011 Watershed Sanitary Survey*; *City of Redding Groundwater Source Assessment (2002)* and *Surface Water Source Assessment (2001)*; *2010 Consumer Confidence Report (Appendix H)*

Note:

1. Installation of treatment capabilities at wells 11 and 13 are being considered (tentatively by the year 2030).

6.4 Water Shortage Contingency Plans

(Water Code Section 10632)

A water emergency plan, as distinguished from a water conservation plan, describes strict measures that would be carried out only during times of severe water shortage. Since the City has extensive surface water rights and groundwater to draw from, severe water shortages have rarely occurred. The diversification of the City's supply system to include both ground and surface water sources helps the City from being dependent on one type of supply. If a water shortage were to occur, it is not likely that both supplies would become unreliable. The City does require both voluntary and mandatory actions in the event of a water shortage.

The City maintains inter-ties with three nearby water districts and two neighboring cities and transfers of water can be obtained from these water suppliers to meet a short-term deficiency (see *Table 17*).

Disaster Response and Water Shortage Contingency Plan

In April, 2015 the City adopted Ordinance Number 2523, Section 2 – *Water Shortage Contingency Plan* replacing the prior section titled Drought Management Plan. The City of Redding *Water Utility Disaster Response Plan (Appendix F)* calls into effect the *Water*

Shortage Contingency Plan (Appendix G) if contamination or disruption of the City’s water supply, from any of the sources, is determined to be a long-term event. The City’s *Water Utility Disaster Response Plan* outlines procedures to notify the media and public in addition to City/County personnel and local hospitals and medical clinics. Notification of the majority of the public could be accomplished within two or three hours. Also, *Tables 37-39* summarize stages, reductions, and penalties that are part of the City’s *Water Shortage Contingency Plan*, which would take effect during a more prolonged water supply shortage.

The plan consists of four stages. The first stage is voluntary, year round common sense management practices independent of calculations or supply thresholds. Stages two through four are based on running average of the seven-day water demand expressed as a percentage of the water system safe operating capacity (SOC).

5.5 Analysis of Revenue Impacts of Reduced Sales during Shortages

City Council Policy 412 dictates that the Water Utility maintain a minimum 5% cash reserve balance. Revenue in excess of expenditures is added to that reserve. Should the Utility experience revenue shortfall as a result of a water shortage, reserves can be used for operating expenses or to fund conservation activities and capital expenditures. In addition, a cost of service study to assess the Water Utility’s financial stability is currently underway. The future needs of the Utility will be evaluated, alternative pricing structures will be addressed, and a recommendation will be made to City Council to protect the long-term viability of the Utility.

Table 37 Water Supply Shortage Stages and Conditions		
Stage Number	Water Supply Conditions	Demand as % SOC
Stage 1 - Voluntary Reduction	Drought or Emergency	
Stage 2 - Mandatory Reduction	Drought or Emergency	80%
Stage 3 - Mandatory Reduction	Drought or Emergency	85%
Stage 4 - Mandatory Reduction	Drought or Emergency	90%

Source: *City of Redding Water Shortage Contingency Plan, Redding Municipal Code Chapter 14.09*

Table 38 Water Shortage Contingency—Penalties and Charges	
Penalty or Charge	Stage When Penalty takes Effect
\$50 per day or occurrence	Stage 2
\$250 per day or occurrence	Stage 3
\$500 per day or occurrence	Stage 4

Source: *City of Redding Water Shortage Contingency Plan, Redding Municipal Code Chapter 14.09*

**Table 39
Consumption Reduction Methods**

Consumption Reduction Method	Projected Reduction (%)
STAGE 1 – Voluntary	
Landscape watering with hose end sprinklers or automated irrigation discouraged	15-25%
Irrigation allowed on alternating days and restricted time of day	
Prevent potable water irrigation from flow onto adjacent areas	
Wash vehicles only with hoses fit with automatic shutoff nozzle	
Restrict hard surface washing to actions that protect health and safety	
Restrict use of potable water in decorative features to those with recirculating pumps	
Refrain from irrigating for 48-hours after measurable rainfall	
Serving of drinking water in public eating establishments limited to those that request water	
Encourage hotels to provide option for customers to avoid laundering linens daily	
Public irrigation encouraged to follow above irrigation practices	
Encourage construction contractors to implement common sense conservation practices	
STAGE 2 - Mandatory	
All Stage 1 reduction methods become mandatory	15-35%
Water service for construction projects will be granted on a case by case basis	
Penalties are implemented	
STAGE 3 - Mandatory	
All Stage 2 requirements with enhanced penalties	15-40%
STAGE 4 - Mandatory	
All Stage 1 voluntary practices become mandatory	15-50%
Outdoor landscape watering, including handheld irrigation with potable water prohibited at all times	
Operation of any ornamental fountain, pond or other ornamental water feature for aesthetic purposes prohibited except to support aquatic life	
Use of water for dust control prohibited	
Washing down buildings or structures prohibited	
Use of potable water for construction purposes prohibited	
Use of potable water for motor vehicle washing prohibited	
Commercial car wash facilities restricted to hours between 7am and 7pm	
Filling or refilling outdoor pools prohibited	
Temporary fire hydrant use permits suspended	
New or expanded water service permits prohibited	
Increased penalties	

SECTION 7 – DEMAND MANAGEMENT MEASURES

(Water Code Section 10631.5)

As a United States Bureau of Reclamation (Bureau) contractor, the City of Redding is required by the Central Valley Project Improvement Act (CVPIA) of 1992, Public law 102-575, Section 3045(e) to develop and implement a Federal Water Management Plan (FWMP) that includes Best Management Practices (BMPs) developed by the California Urban Water Conservation Council (CUWCC). The current required update of the City's progress toward full implementation is being prepared concurrently with this Urban Water Management Plan (UWMP).

The FWMP is an essential element of the City's contractual CUWCC obligations with the Bureau and the City is required to complete the CUWCC annual report, which includes BMP reporting. This report, completed annually by signatories to the CUWCC Memorandum of Understanding (MOU) and by Bureau contractors, defines implementation requirements for Municipal and Industrial BMPs or Demand Management Measures (DMMs). A 2010 MOU amendment reorganized the original BMPs into 5 new categories and allowed water purveyors to choose a Flex Track menu for implementing BMPs. The City has chosen the Flex Track option; implementation is discussed below in *Table 40*. For the purpose of responding to Urban Water Management Planning Act and as allowed by law, the City will also submit the relevant BMP activity reports excerpted from the City's 2010 FWMP update. See **Appendix E** for the City of Redding's 2015 Annual CUWCC Report.

**Table 40
Best Management Practices**

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
FOUNDATIONAL			
Utility Operations			
Conservation Coordinator	The City has funded a full-time water conservation specialist since 2008	Ongoing	Time and resources spent on various aspects of the Water Use Efficiency Program is tracked through the use of Job Order Numbers.
Water Waste Prevention	The City has two ordinances which prohibit Water Waste year-round	Ongoing	Water Waste calls are a defined issue for work order program and enforcement takes place during normal business hours. The Utility is implementing a new Asset Management System that will allow easier querying and reporting of water waste calls and accompanying data.
Water Loss Control	The City performs a yearly water loss analysis and results are reported in annual accounting to the Department of Water Resources	Ongoing	Public Works and Utility personnel respond promptly to reports of leaks and perform distribution system leak detection when warranted; Utility personnel repair leaks as necessary.
Metering with Commodity Rates	The City is 100% metered and bills its customers monthly based on actual water usage (meter reads)	Ongoing	Each monthly bill includes the prior year's meter read to assist customers in managing their water consumption. Customer Service Representatives can also provide consumption data upon request. Three year's use/billing data is available for customers to access online with account # and last four digits of SS#.
Conservation Pricing	The City bills water consumption by volume at a uniform rate for all customer classes	Ongoing	The Water Utility is currently conducting a cost of service study. Pricing structures related to equity and feasibility across customer classes will be studied. It is likely that tiered price structure will be replaced with a drought penalty price structure.

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
FOUNDATIONAL			
Education Programs			
Public Information Programs	<p>The City has a well-established and comprehensive Public Education Program and is always looking for new ways to engage the public in water education. Public Outreach is carried out by utility personnel and includes topics such as water conservation, storm water pollution prevention, water quality, water supply and treatment, watershed protection, wastewater collection and treatment and industrial waste processes. Outreach activities are targeted to the following:</p> <ul style="list-style-type: none"> • General Public • Community Groups • Business Leaders • Building and Landscape Professionals • Government Organizations • City Departments 	Ongoing	<p>Utility staff engage or participate in the following:</p> <ul style="list-style-type: none"> • Annual City Services & Energy Fair, Whole Earth and Watershed Festival and other community events where we provide information to the public in the form of displays and interactive activities • Docent training at local natural resources museum • Public Event days at the local museum • Collaboration with local environmental interests to provide workshops • Development of multi-media advertising, including radio, TV and print ads • Website development and maintenance • Interagency partnerships <p>In addition, the Utility offers:</p> <ul style="list-style-type: none"> • Tours of Water & Wastewater Treatment Facilities • Guest speaker/lecturer for community groups • Funding to support natural resource exhibits at local museum • A WaterWise Gardening CD for residential customers • Low-flow showerheads and conservation kits upon request • Materials that encourage water conservation, including notices that can be hung on customers' doors that encourage inspection of landscape irrigation systems for possible water waste <p>Future endeavors include:</p> <ul style="list-style-type: none"> • Establishing a single website for water, wastewater and storm water pollution prevention information • Developing a more comprehensive message that encompasses water, wastewater and storm water pollution prevention • Exploring additional partnership opportunities with area other agencies and non-profits • Exploring the possibility of offering residential water-efficient landscaping workshops • Possible conversion of Waterwise Landscaping CD to Web viewing

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
School Education Programs	The City has implemented a school education program that includes providing instructional assistance to K – 14 classes and materials that both meet California state framework requirements and are age-level appropriate.	Ongoing	<p>The Utility has purchased instructional materials for loan to area schools and has prepared a summary of available materials in a Water Education Lending Library (WELL) catalog available to educators through a link on website</p> <p>Utility staff also engage or participate in the following:</p> <ul style="list-style-type: none"> • Continuing education in the form of workshops, webinars, conferences • Host Project WET and Project Learning Tree Workshops • Environmental Education Initiative training <p>In addition, the Utility offers:</p> <ul style="list-style-type: none"> • Tours of Water & Wastewater Treatment Facilities to school groups • Guest speaker/lecturer for K-8, high school and local college classes • Groundwater Model demonstrations
PROGRAMMATIC			
Residential			
Assistance Program	The City provides onsite leak detection assistance for customers	Ongoing assistance provided during normal business hours	Work Orders are generated when a customer calls requesting assistance. A Utility Customer Service Worker visits the site and tries to isolate the leak if possible. If appropriate, repairs to public system are made and recommendations given regarding private plumbing and irrigation systems. Customers are shown how to read their water meter and how to check for leaks.
High-Efficiency Clothes Washers (HECWs)	The City has suspended its High-Efficiency Clothes Washers Rebate Program	N/A	Over 2,000 rebates were processed during the fiscal years 2006-2007 through 2010-2011 while this BMP was being implemented.
High Bill Contact with Single-Family and Multi-Family Customers	The City provides Customer Service assistance to customers with concerns	Ongoing during normal business hours	Customer Service Representatives review meter reads and bills with customers and can provide consumption data for 3 years upon request. Work orders are generated if on-site assistance is requested.
Educate Residential Customers about Behavioral Aspects of Water Conservation	The City provides Customer Service assistance to customers with concerns	Ongoing during normal business hours	Customer Service Representatives and Field personnel are educated in conservation practices and provide information to customers.

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
Notify Residential Customers of Leaks on the Customer's side of Meter	Meter Readers and/or Customer Service Representatives notify customer when meter reads are out of the ordinary	Ongoing during normal business hours	Meter Readers leave door hangers for customers and log information that appears on an internal report. Service Orders are generated and remain on an Open Service Order report until such time as the issue is resolved. Customer Service Representatives follow-up with customers and any additional conversations or measures implemented are documented in the customer service database.
Implement an Automatic Meter Reading Program for Residential Customers	The City will research alternatives to determine feasibility of implementing an AMI/AMR program	In Process	The Utility has had several meetings with a company that can deploy AMI infrastructure. Financing remains an impediment at this time but will be discussed during the next budget cycle. Public reluctance may be an issue and steps will be taken to address customer concerns should the program move forward.
PROGRAMMATIC			
Commercial, Institutional and Industrial (CII)			
Gray Water	Gray Water Systems fall under the jurisdiction of Shasta County Environmental Health	N/A	
Pond and Water Feature Recirculation	In November 2015, the City updated Ordinance 16.70 <i>Water Efficient Landscape</i> which requires that recirculated water be used for all new decorative water features and irrigation systems unless an exemption is granted for public health reasons.	Ongoing	Compliance is ensured through the permit process.
Submetering	The City offers Commercial/Industrial/ Institutional (CII) customers the option of installing landscape submeters in lieu of paying a full connection fee for a separate water meter.	Ongoing	The City bills Commercial/Industrial/ Institutional (CII) customers for sewer based on water volume and strength of discharged flow. During the sewer audit process, existing customers are made aware of and encouraged to install submeters as a means to isolate water used for irrigation versus water used for other purposes. In the process, customers are educated about indoor and outdoor water consumption as well as ways to reduce that consumption by ensuring leaks are found and repaired.

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
PROGRAMMATIC			
Landscape			
Monitor and Report on Landscape Water Use	The City will research alternatives to determine the best method of monitoring Landscape Water Use	Planned for fiscal year 2017-2018	The majority of existing meters are mixed-use meters and the Utility's current billing program cannot distinguish between landscape water use and water use for domestic purposes. In order to develop a meaningful monitoring program, many departments will have to be consulted and involved in the decision-making process to either modify or replace the current program. That could delay or hinder implementation of a comprehensive program. The City does have some irrigation-only meters and has recently allowed the installation of submeters for the purpose of measuring landscape water use. The use of submeters allows the City to comply with AB1881 while saving customers the full cost of a separate connection fee. While it will be easier to track water use using separate meters, modifications to the billing system and a coordinated effort to implement will be necessary.
Provide Technical Landscape Resources and Training	The City will explore the possibility of offering residential water-efficient landscape workshops	Planned for fiscal year 2017-2018	The Utility has designed a water-efficient landscape class outline and will contact some or all of the following to discuss partnerships in offering training: <ul style="list-style-type: none"> • Turtle Bay Exploration Park & Botanical Gardens • Shasta College Master Gardener Program • Native Plant Society • Local nurseries • Landscaping professionals • Other interested professionals
Develop Holistic Approach to Landscape Water Use Efficiency	The City is committed to overall landscape water-use efficiency through both current and planned activities	Ongoing	Ensuring compliance with landscape ordinances coupled with current education and outreach efforts such as distribution of Water-Wise Landscaping CD form the basis of a broad-based approach to landscape water-use efficiency. Future efforts should allow for tracking and monitoring water use reduction.

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
ADDITIONAL PROGRAMMATIC MEASURES FOR IMPLEMENTATION			
Participate in Local and Regional Planning and Regulatory Activities	The City participates in meetings of local water resource managers, maintains membership in organizations that track, monitor, and support conservation legislation, and participates in integrated regional water planning efforts. The water and electric utilities collaborate to disseminate important information regarding regulatory activities	Ongoing	Utility staff attend meetings, contribute information and plan activities through participation in the following: <ul style="list-style-type: none"> • Water Resource Managers of Shasta County • Redding Area Water Council • Northern Sacramento Valley Integrated Regional Water Management Planning group • Shasta County Environmental Education Working Group Memberships the Utility maintains include: <ul style="list-style-type: none"> • American WaterWorks Association – National and Cal-Nevada Section • Northern California Water Association • Association of California Water Agencies • Central Valley Project Water Association • California Municipal Utilities Association • Sacramento River Settlement Contractors
Offer Water Saving Devices	The City provides water-saving devices to its customers on upon request	Ongoing during normal business hours	The Utility offers the following to its customers upon request: <ul style="list-style-type: none"> • Low-flow showerheads • Faucet aerators • Toilet dye tabs • Water conserving garden hose nozzles
Commercial/ Industrial/ Institutional (CII) Water Audits	The City will conduct research to determine the feasibility of offering CII water audits upon request	Planned for fiscal year 2012-2013	The Utility does not have the staff or expertise to conduct Commercial/Industrial/ Institutional (CII) audits at this time. To provide assistance to CII customers, the Utility proposes the following: <ul style="list-style-type: none"> • Investigate the types and costs of CII Audits being offered by other agencies • Determine typical water savings that might be achieved through a CII audit • Define likely parameters to be addressed in a CII audit • Research the availability of individuals or firms that possess the necessary expertise to conduct CII audits • Explore partnership opportunities in offering CII audits to lower the overall cost • Develop a draft Request for Proposal to initiate a pilot program • If the outcome proposal for a pilot program is favorable, move forward with using a consultant/contractor to perform CII audits

BMP	Current or Proposed Action	Status	Scheduling/Tracking/Monitoring
Sewer Bill Inquiry	The City provides Customer Service assistance to customers with concerns about their high sewer bills, which are based in part on water consumption	Ongoing during normal business hours	<p>Sewer bill inquiries are generated by a call from a CII customer or a referral from the Industrial Waste Division. Because the City determines sewer charges by water volume as well as strength of flow, a water use evaluation of the business is integral to the inquiry. That evaluation may include but not be limited to:</p> <ul style="list-style-type: none"> • A review of water use history • An assessment of irrigation use on the property • An assessment of non-discharge industrial processes • For food service customers, an assessment of technology in place and calculation of the average water use per customer served • A study to validate the end use of water <p>Depending on the results of the evaluation, the following suggestions to reduce water consumption may be made:</p> <ul style="list-style-type: none"> • Replacement of Pre-rinse Spray Valves • Installation of water efficient dishwashers, flow restricting devices, high-efficiency washing machines, low-flow toilets and showerheads, faucet aerators, and auto shut-off nozzles • Seek assistance from a plumber to locate and get leaks repaired • Turn off automatic irrigation systems during winter months
Sewer Audits	The City conducts approximately 2,600 sewer audits per year as a result of new water use billing data generated for the winter months December through February. An evaluation of water consumption, including leaks and irrigation water use is part of this audit.	Ongoing during normal business hours from March through May	<p>Each year, monthly sewer fees are re-calculated for all CII customers. Preliminary billing data is received by Customer Service Representatives who then review the account data for errors or significant year-to-year changes. The goal of the audit process is to:</p> <ul style="list-style-type: none"> • Identify customers with possible leaks after historical comparisons of water use data • Discuss water consumption with customer and advise that plumber or leak detection personnel may be necessary • Advise customer that once leak is repaired and City receives copy, adjustments can be made to sewer billing calculations • Recalculate sewer fees and document water leak repair

SECTION 8 – MISCELLANEOUS PROVISIONS

(Water Code Section 10650-10657)

Agencies subject to the Urban Water Management Planning Act must have adopted a complete UWMP that meets the requirements of the law and submitted it to DWR to be eligible for drought assistance from the State and funds administered by DWR.

APPENDIX A

Public Notice and Involvement Documents

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APPENDIX A**Contact Information for Agencies listed in Table 1**

Agency	Department	Name	Address	Phone	e-mail Address
Anderson Cottonwood Irrigation District		Stan Wangberg General Manager	2810 Silver Street Anderson, CA 96007	530-365-7329	acidstan@sbcglobal.net
Bella Vista Water District		David Coxey Manager	11368 East Stillwater Way Redding, CA 96003	530-241-1085	dcoxey@bvwd.org
Centerville CSD		Chris Muelbacher Manager	P.O. Box 990431 Redding, Ca 96099-0431	530-246-0680	cmuelbacher@centervillecsd.com
CH2M Hill		Doug Harris CH2M Hill Redding Office Manager	2525 Airport Dr. Redding, CA 96001	530-243-5831	Doug.harris@CH2M.com
City of Anderson		Jeff Kiser Public Works Director	1887 Howard St. Anderson, CA 96007	530-378-6636	jkiser@ci.anderson.ca.us
City of Redding	City Manager	Barry Tippin Assistant City Manager	777 Cypress Ave. Redding, CA 96001	530-225-4067	btippin@ci.redding.ca.us
City of Redding	Community Services	Kim Niemer Director	777 Cypress Ave. Redding, CA 96001	530-225-4085	kniemer@ci.redding.ca.us
City of Redding	Development Services	Larry Vaupel Director	777 Cypress Ave. Redding, CA 96001		lvaupel@ci.redding.ca.us
City of Redding	Housing	Steve Bade Housing Manager	777 Cypress Ave. Redding, CA 96001		sbade@ci.redding.ca.us
City of Redding	Industrial Waste	Tracy Wyhlidko Supervisor	777 Cypress Ave. Redding, CA 96001		twyhlidko@ci.redding.ca.us
City of Redding	Planning	Paul Hellman Planning Manager	777 Cypress Ave. Redding, CA 96001	530-646-3746	phellman@cityofredding.org

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

Agency	Department	Name	Address	Phone	e-mail Address
City of Redding	Public Works	Brian Crane Public Works Director	777 Cypress Ave. Redding, CA 96001	530-245- 7155	bcrane@ci.redding.ca.us
		Jon McClain Assistant Director Utilities		530-224- 6029	jmccclain@ci.redding.ca.us
		Chuck Aukland Assistant Director Engineering		530-245- 7156	caukland@ci.redding.ca.us
City of Redding	Redding Electric Utility	Barry Tippin Director	777 Cypress Ave. Redding, CA 96001	530-339- 7350	btippin@ci.redding.ca.us
City of Redding	Storm Drain Utility	Marty Wayne Project Coordinator	777 Cypress Ave. Redding, CA 96001	530-224- 4457	mwayne@ci.redding.ca.us
		Matt Cervenka P/W Supervisor		530-224- 2435	mcervenka@ci.redding.ca.us
City of Redding	Wastewater Utility	Josh Vandiver Collection Supervisor	777 Cypress Ave. Redding, CA 96001	530-224- 6069	jvandiver@ci.redding.ca.us
		Dave Johnston Stillwater Supervisor		530-378- 6702	jszychulda@ci.redding.ca.us
		Troy Mitchell, Clear Creek Supervisor		530-225- 4157	tmitchell@ci.redding.ca.us
		Josh Keener Compliance Coordinator		530-224- 4122	jkeener@ci.redding.ca.us

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

Agency	Department	Name	Address	Phone	e-mail Address
City of Redding	Water Utility	Mike Robertson Water Utility Manager emeritus	777 Cypress Ave. Redding, CA 96001	530-224- 6040	mrobertson@ci.redding.ca.us
		David Guadagni Distribution Supervisor		530-224- 6033	dguadagnit@ci.redding.ca.us
		Conrad Tona Treatment Supervisor		530-225- 4475	ctona@ci.redding.ca.us
		Pam Clackler Water Conservation Specialist		530-224- 6032	pclackler@ci.redding.ca.us
City of Shasta Lake		Jeff Tedder City Engineer	4332 Vallecito St. Shasta Lake, CA 96019	530-275- 7423	jtedder@cityofshastalake.org
		William Bishop Treatment Superintendent	1650 Stanton Dr. Shasta Lake, 96019	530-275- 7450	wbishop@cityofshastalake.org
Clear Creek CSD		Kurt Born General Manager	5880 Oak Street Anderson, CA 96007	530-357- 2121	cccsd@shasta.com
California Water Resources Control Board	Division of Drinking Water	Steve Watson Associate Engineer	415 Knollcrest Drive Suite 110 Redding, CA 96002	530-225- 4828	steve.watson@cdph.ca.gov
Department of Water Resources		Mary Randall	2440 Main St. Red Bluff, CA 96080	530-529- 7300	mrandall@water.ca.gov
Greater Redding Chamber of Commerce	Jake Mangas	President/CEO	747 Auditorium Drive Redding, CA 96001	530-225- 4433 ext. 104	jake@reddingchamber.com
McConnell Foundation		Brian Sindt Program Officer Sustainable/ Livable Communities	800 Shasta View Drive Redding, CA 96003	530-226- 6200	info@mcconnellfoundation.org
Mountain Gate CSD		Jeff Cole Manager	14508 Wonderland Blvd. Redding, CA 96003	530-275- 3002	mgcsd@shasta.com
Pace Engineering		Tom Warnock Civil Engineer	1730 South Street, Redding CA 96001	530-244- 0202	twarnock@pacecivil.com

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

Agency	Department	Name	Address	Phone	e-mail Address
Redding Rancheria		Tracy Edwards CEO	2000 Redding Rancheria Road, Redding, CA 96001	530-224-8979	execsec@redding-rancheria.com
		Rob Krikorian Public Works			robk@redding-rancheria.com
Sharrah Dunlap Sawyer, Inc. (SDS)		Greg Dunbar C.E.O.	6590 Lockheed Dr. Redding, CA 96002	530-221-1792	gdunbar@sdsengineering.com
Shasta Builders Exchange		Katherine Reid Office Manager	2990 Innsbruck Drive Redding, CA 96003	530-221-5556	info@shastabe.com
Shasta County Public Works		Patrick Minturn Public Works Director	1855 Placer St. Redding, CA 96001	530-225-5661	pminturn@co.shasta.ca.us
		Eric Wedemeyer SCWA Supervising Engineer			ewedemeyer@co.shasta.ca.us
Shasta CSD		Chris Koeper , Manager	10711 French Ave Shasta, CA 96087	530-241-6264	scsd@snowcrest.net
Shasta EDC		Tony Giovaniello President	410 Hemsted Drive, Suite 100 Redding, CA 96002	530-224-4920	tony@shastaedc.org
Sierra Pacific Industries		Mark Pawlicki Director of Corporate Affairs and Sustainability	P.O. Box 496028 Redding, CA 96049-6028	530-378-8000	sierra@spi-ind.com
Turtle Bay Exploration Park		Beverly Stupek Development Officer	1335 Arboretum Drive, Suite A Redding, CA 96003	530-243-8850	bstupek@turtlebay.org
United States Bureau of Reclamation	Mid-Pacific Region	Federico Barajas, Area Manager	16349 Shasta Dam Blvd Shasta Lake, CA 96019	530-275-1554	fbarajas@mp.usbr.gov
Water Works Engineers		Sami Kader P.E.	1405 Victor Ave, Suite A Redding, CA 96003	530-243-2113 X111	samik@wwengineers.com

Agency	Department	Name	Address	Phone	e-mail Address
Western Shasta Resource Conservation District		Chester Anderson District Manager	6270 Parallel Rd. Anderson, CA 96007	530-365-7332	chester@westernshastarc.org
Wheelabrator Shasta Energy Company		Mike Burt	20811 Industry Road; P.O. Box 7000 Anderson, CA 96007	530-365-9173	mburt@wtienergy.com

- Notices of Public Hearing – Redding Record Searchlight: *Pending*
- Screen Capture – Draft Plan availability on City Website: *Pending*
- Notification to Shasta County of Pre-submittal Urban Water Management Plan *Pending*
- Documentation of Submittal of Reviewed Plan to Shasta County and California State Library: *Pending*
- Notice that Approved Plan is Available for Public Review: *Pending*

Dear Colleagues,

The City of Redding is in the process of revision of its Urban Water Management Plan (UWMP) and has reached the point where we are requesting input on the Draft UWMP. The UWMP, prepared for the State of California Department of Water Resources, will establish the City's compliance with the California Water Code. Division 6, Part 2.6, Urban Water Management Planning. Urban water suppliers who provide municipal water to more than 3,000 customers or supply its customers with more than 3,000 acre-feet of water are required to assess the reliability of water sources over a 20-year planning horizon considering normal, dry and multiple dry years, and develop the framework necessary to satisfy the Urban Water Management Plan Act requirements to reduce the amount of water each person uses per day by the year 2020. This assessment is prepared every 5 years and submitted to the Department of Water Resources. Its purpose is to consolidate regional information regarding water supply and demand, provide public information, and improve statewide water planning. A public hearing is being planned for June 21 to accept written and oral comment. A separate official notice will follow with details of that hearing.

The Draft UWMP may be reviewed at the following locations:

City of Redding Public Works Department, City Hall

777 Cypress Avenue, Redding, California

City of Redding Corporation Yard

20055 Viking Way Building #3, Redding, California

On the City of Redding Water Utility web site:

<http://www.cityofredding.org/departments/public-works/public-works-utilities/water-utility>

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CITY OF REDDING PUBLIC WORKS

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NEWS

City of Redding sets example in water conservation. While El Nino-driven rains may have put California's drought out of mind for now, the City of Redding continues to significantly reduce water use in its parks, ballfields and public-grounds landscaping. 3/22/2016 10:18:00 AM [More »](#)



Departments » Public Works » Public Works Utilities

Water Utility

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The Redding Water Utility is responsible to provide our customers with a reliable supply of high quality drinking water now and in the future. The Water Utility serves approximately 80,000 people within a service area of approximately 60 square miles. Our water quality not only meets Federal and State Standards each and every day of the year, but in most cases, contaminant levels fall far below published Primary and Secondary Standards. This means you, as the consumer, are assured of the safest water we can deliver to your tap.

Vacant
Water Utility Manager
(530) 224-6068

CONTACT INFORMATION

Main Office:
ph: (530) 224-6068

Office Hours
Monday-Friday
8:00 am-3:30 pm

Location
20055 Viking Way, Bldg #3
Redding, CA, 96003

Mailing Address
City of Redding Water Utility
PO Box 496071
Redding, CA 96001

The Water Utility consists of the following:

- [Water Distribution](#)
- [Foothill Water Treatment Plant](#)
- [Buckeys Water Treatment Plant](#)

Water Distribution System Flushing Program

The City of Redding Water Utility will be flushing water mains serving the Enterprise and Cascade areas beginning in the months of February through April. Visit our [Water Distribution System Flushing Program](#) page for more information.

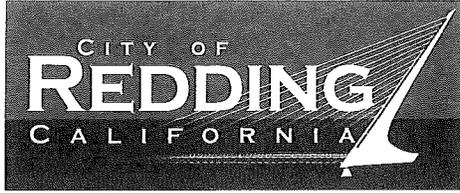
Additional Resources:

- [Learn about mandatory water-use restrictions](#)
- [Water saving tips](#)
- [Redding Water Smart Gardening](#)
- [City of Redding Municipal Code \(water\)](#)
- [Learn about the Redding water supply](#)
- [Water rates and connection rates fee schedule 2014-2015](#)
- [Draft 2015 Urban Water Management Plan](#)
- [Report water waste here](#)

Written or e-mail comments for receipt prior to the meeting may be submitted to:

City of Redding
 David Braithwaite, P.E.
 Project Coordinator
 P.O. Box 496071
 Redding, CA 96049-6071
 530-225-4473
dbraithwaite@ci.redding.ca.us

Mailing 5-23-16



CITY OF REDDING
777 CYPRESS AVENUE, REDDING, CA 96001
P.O. Box 496071, REDDING, CA 96049-6071

**PUBLIC WORKS DEPARTMENT
FIELD OPERATIONS**

MAILING: PO Box 496071, REDDING, CA 96049-6071
SHIPPING: 20055 VIKING WAY, BLDG. #3, REDDING, CA 96003
530.224.6068
530.224.6071 FAX

May 18, 2016
W-030-075

Mr. Patrick J. Minturn, Director
Shasta County Public Works
1855 Placer Street
Redding, CA 96001

Dear Mr. Minturn:

Subject: City of Redding's Urban Water Management Plan

The City of Redding's Water Utility wishes to inform you that we are in the process of reviewing and revising our Urban Water Management Plan. This letter confirms, in writing, our initial announcement that took place via email on April 28, 2016.

We are informing you of this revision because we serve water within Shasta County boundaries and wanted to give you the opportunity to provide input through the process. The revised Urban Water Management Plan will be submitted to the Department of Water Resources after the final review and adoption by the City Council.

The City will be holding a public hearing targeting the June 21, 2016, City Council meeting prior to adoption.

Please contact David Braithwaite, Project Coordinator, at 530-225-4473, or email dbraithwaite@cityofredding.org if you would like to participate in the City's urban water management planning process or if there is another individual within your jurisdiction who should be our primary point of contact.

Sincerely,

A handwritten signature in black ink, appearing to read "Jon McClain".

Jon McClain, P.E.
Assistant Director of Public Works

JM/rb



RESOLUTION NO. 2016-___

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF REDDING TO AMMEND THE URBAN WATER MANAGEMENT PLAN AS REQUIRED BY THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES PURSUANT TO ASSEMBLY BILL 797, THE "URBAN WATER MANAGEMENT PLANNING ACT," AMENDING DIVISION 6, PART 2.6, OF THE CALIFORNIA WATER CODE

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually, prepare an Urban Water Management plan, the primary objective of which is to plan for the conservation and efficient use of water, and;

WHEREAS, the City of Redding is an urban water supplier providing water to a population of approximately 91,000 people; and,

WHEREAS, the City of Redding has therefore prepared an Urban Water Management Plan which incorporates Best Management Practices and will submit its Plan to the California Department of Water Resources; and,

WHEREAS, The City of Redding, in accordance with the State of California guidelines and current criteria, will re-evaluate and resubmit its plan at least once every five years or as conditions warrant;

NOW, THEREFORE, BE IT RESOLVED that the 2015 Urban Water Management Plan update be adopted and submitted to the California Department of Water Resources.

I HEREBY CERTIFY that the foregoing resolution was introduced, read, and adopted at a regular meeting of the City Council on the 21st day of June 2016, by the following vote:

AYES:	COUNCIL MEMBERS:
NOES:	COUNCIL MEMBERS:
ABSENT:	COUNCIL MEMBERS:
ABSTAIN:	COUNCIL MEMBERS:

MISSY MCARTHUR, Mayor

ATTEST:

FORM APPROVED:

PAMELA MIZE, City Clerk

BARRY E. DeWALT, City Attorney

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that at a regular meeting of the Redding City Council on Tuesday, June 21, 2016, at 6:00 p.m., in the City Council Chambers, located at 777 Cypress Avenue, Redding, California, the City Council of the City of Redding will hold a public hearing for the purpose of adopting its 2015 Urban Water Management Plan (UWMP).

The City of Redding is in the process of revising its UWMP for submittal to the State of California Department of Water Resources. The UWMP establishes the City's compliance with the California Water Code, Division 6, Part 2.6, Urban Water Management Planning. Urban water suppliers who provide municipal water to more than 3,000 customers or supply its customers with more than 3,000 acre-feet of water are required to assess the reliability of water sources over a 20-year planning horizon. The assessment is prepared every five years and takes into consideration normal, dry and multiple dry years and developing the framework necessary to satisfy the UWMP Act requirements to reduce the amount of water each person uses per day by the year 2020. It further provides for the consolidation of regional information regarding water supply and demand; public information; and improved statewide water planning.

The 2015 UWMP is available for review at the following:

City of Redding Public Works Department
777 Cypress Avenue, Redding, CA 96001

City of Redding City Clerk's Office
777 Cypress Avenue, Redding, CA 96001

City of Redding Corporation Yard, Building #3
20055 Viking Way, Redding, CA 96001

City of Redding Water Utility web site:

<http://www.cityofredding.org/departments/public-works/public-works-utilities/water-utility>

Questions regarding the 2015 UWMP may be directed to Project Coordinator David Braithwaite at (530) 225-4473 or dbraithwaite@cityofredding.org. Written or e-mail comments regarding the UWMP may be submitted prior to the meeting to City of Redding City Clerk's office, 777 Cypress Avenue, Redding, CA 96001 or cityclerk@cityofredding.org.

At said time and place, persons interested in the 2015 UWMP may appear before the City Council and be heard thereon.

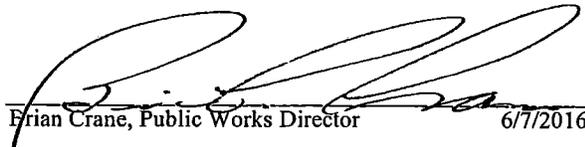
PAMELA MIZE
City Clerk, City of Redding

DATED: June 7, 2016
June 14, 2016



CITY OF REDDING REPORT TO REDDING CITY COUNCIL

APPROVED

MEETING DATE: June 21, 2016 ITEM NO. 6.1 [W-030/S-050-430]	FROM: Brian Crane, Public Works Director
SUBJECT: 6.1--Adopt Resolution to Amend the City of Redding Urban Water Management Plan	
APPROVED BY	
 Brian Crane, Public Works Director 6/7/2016	 Kurt Starman, City Manager 6/13/2016

Recommendation

Adopt Resolution amending the Urban Water Management Plan as required by the State of California Department of Water Resources pursuant to Assembly Bill 797, the "Urban Water Management Planning Act," amending Division 6, Part 2.6, of the California Water Code.

Background

To further water conservation in the State of California, Assembly Bill (AB) 797, the Urban Water Management Planning Act, was approved in September 1983 and has been amended numerous times in subsequent years. AB 797 initiated a statewide effort to conserve water by requiring urban water suppliers that provide municipal water to more than 3,000 customers or supply its customers with more than 3,000 acre-feet of municipal water annually prepare, in accordance with the prescribed requirements, an Urban Water Management Plan (Plan). The City of Redding developed its Plan in 1985 and has amended the Plan every five years as required by law.

The City's Plan supports long-term resource planning by assessing the reliability of water sources over a 20-year planning horizon considering normal, dry, and multiple dry years and by analyzing water demand. The current Plan also incorporates the framework necessary to increase water efficiency in order to help the state achieve an overall reduction of per capita water use. Senate Bill x7-7, the Water Conservation Act of 2009, requires that each urban-water retail agency develop water-use targets and an interim water-use target, unique to each agency, and identify strategies that will result in a decrease in Per Capita Daily Consumption, measured in gallons per capita per day, by 20 percent in the year 2020. These strategies are identified in the Plan as Best Management Practices.

Staff has developed the Plan in accordance with state requirements and guidelines and hereby submits this Plan for Council's consideration.

Issue

Does the City Council wish to approve the attached resolution amending the Urban Water Management Plan and remain eligible for grant and loan funding from the State of California?

Alternatives; Implication of Alternatives

The City Council has the option of selecting one of the following alternatives:

1. Approve the attached resolution amending the City's Urban Water Management Plan. Adoption of the amended Plan would allow the City to remain eligible for grants and loans that may become available through the State of California.
2. Do not approve the attached resolution amending the Urban Water Management Plan. Doing so would mean that the City would be out of compliance with state requirements and ineligible for loans or grant funding until the Plan was brought into compliance.

Fiscal Impact

The Water Utility anticipated the ongoing and proposed implementation of the Best Management Practices detailed in the Plan and has budgeted accordingly. No additional costs will be incurred through the next budget cycle.

Conclusion

The Water Utility has complied with the provisions of Section 6, Part 2.6, of the California Water Code by preparing and updating its Urban Water Management Plan. A draft Plan was available on the Water Utility's website and notification sent to numerous agencies, districts, private entities, and public entities in accordance with requirements mandated by the Department of Water Resources. The amended Plan addresses conservation requirements and will enable the City to remain eligible for state grants and loans.

c: David Braithwaite, Public Works-Field Operations

Attachments:

Resolution
Draft Urban Water Management Plan (available online)

RESOLUTION NO. 2016-___

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF REDDING TO AMEND THE URBAN WATER MANAGEMENT PLAN AS REQUIRED BY THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES PURSUANT TO ASSEMBLY BILL 797, THE "URBAN WATER MANAGEMENT PLANNING ACT," AMENDING DIVISION 6, PART 2.6, OF THE CALIFORNIA WATER CODE

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually, prepare an Urban Water Management plan, the primary objective of which is to plan for the conservation and efficient use of water, and;

WHEREAS, the City of Redding is an urban water supplier providing water to a population of approximately 91,000 people; and,

WHEREAS, the City of Redding has therefore prepared an Urban Water Management Plan which incorporates Best Management Practices and will submit its Plan to the California Department of Water Resources; and,

WHEREAS, The City of Redding, in accordance with the State of California guidelines and current criteria, will re-evaluate and resubmit its plan at least once every five years or as conditions warrant;

NOW, THEREFORE, BE IT RESOLVED that the 2015 Urban Water Management Plan update be adopted and submitted to the California Department of Water Resources.

I HEREBY CERTIFY that the foregoing resolution was introduced, read, and adopted at a regular meeting of the City Council on the 21st day of June 2016, by the following vote:

AYES:	COUNCIL MEMBERS:
NOES:	COUNCIL MEMBERS:
ABSENT:	COUNCIL MEMBERS:
ABSTAIN:	COUNCIL MEMBERS:

MISSY MCARTHUR, Mayor

ATTEST:

FORM APPROVED:

PAMELA MIZE, City Clerk

City Attorney

The City of Redding Urban Water Management Plan can be found online at the following web address:

<http://www.cityofredding.org/departments/public-works/public-works-utilities/water-utility>

APPENDIX B

Coordinated AB 3030 Groundwater Management Plan

for the

Redding Groundwater Basin

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**Coordinated AB 3030
Groundwater Management Plan
for the
Redding Groundwater Basin**

**Prepared for the
Redding Area Water Council**

**Prepared by
Shasta County Water Agency**

November 1998

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Appendix "A"

Chapter 1 - Introduction

Background and Authority of AB 3030

Section 1.01. On January 1, 1993, California Assembly Bill 3030, the Groundwater Management Act, was codified into California law. California Water Code Sections 10750 et seq., allow local water agencies to adopt local groundwater management plans. Local public and private entities are encouraged by Water Code Section 10755.2 to adopt and implement a coordinated AB 3030 Plan, such as this plan for the Redding Groundwater Basin.

Section 1.02. Development of an AB 3030 Plan under Water Code Sections 10750, et seq., allows local entities to efficiently manage groundwater supplies, assure long-term water supplies, and distribute costs, benefits, and water sharing in a locally determined equitable manner.

Section 1.03. The Department of Water Resources ("DWR") defines a "Groundwater Management Plan" as "planned use of the groundwater basin yield, storage space, transmission capability, and water in storage."

Section 1.04. Water Code Section 10750 et seq., defines "Groundwater Management Program" as "a coordinated and ongoing activity undertaken for the benefit of a groundwater basin pursuant to a Groundwater Management Plan as specified in AB 3030."

Section 1.05. The Redding Area Water Council ("Water Council") is an association of numerous public and private entities within the Redding Groundwater Basin area who have determined by Memorandum of Understanding (MOU) dated August, 1998 to jointly prepare, adopt and implement an AB3030 Plan for the Redding Basin.

The Shasta County Water Agency (SCWA), an authorized groundwater management agency as defined in Water Code Section 10753, was authorized by the Water Council MOU to serve as the lead agency in preparing, adopting, and implementing this AB 3030 Groundwater Management Plan. The MOU also designated the Water Council to serve in a policy making oversight capacity for this planning effort. Accordingly, this plan has been undertaken by agreement of the public and private entities comprising the Water Council, as permitted by Water Code Sections 10750.7, 10753 and 10755.2. (See Table 1 for a list of Water Council members.)

Section 1.06. By executing the MOU, each of the participating entities has found and declared that management of the groundwater within their combined jurisdictions, by joint preparation, adoption and implementation of this AB3030 Plan, is in the public interest and will be of common benefit to water users within the Plan Area described in Chapter 2 of this Plan.

Section 1.07. The Water Council has determined that the adoption of this plan will provide immediate and long-term benefits for all beneficial uses of water.

Purpose of the Plan

Section 1.08. The purposes of this Groundwater Management Plan can be summarized as follows:

- A. To avoid or minimize conditions that would adversely affect groundwater availability and quality within the Plan area.
- B. To develop a groundwater management program which addresses data collection and which protects and enables reasonable use of the groundwater resources of the Redding Basin.
- C. To implement the elements of the Groundwater Management Plan by achieving Basin-wide consensus, wherever possible.

Section 1.09. The Plan will not intrude upon, diminish, or negate in any manner, the existing authority of each affected agency, except as may be expressly provided. This Plan is intended to supplement and strengthen individual agency authority, while building on coordination efforts through the public/private entity partnership established by the above-referenced MOU.

Coordinated Implementation

Section 1.10. The Water Council shall implement this AB 3030 Plan, with SCWA serving as the lead agency, consistent with the MOU establishing the Water Council. Accordingly, SCWA, working with and at the direction of the Water Council Steering Committee, will coordinate with all affected water purveyors and other interested parties to implement this Plan within the defined Plan Area.

Section 1.11. This Plan will be effective within the entire jurisdictional boundary of each participating public entity, however, the Plan will not be effective within those portions of Shasta County lying outside of the jurisdictional boundaries of the other participating public agencies and also lying outside of the Redding Groundwater Basin (shown schematically on Figure 1, upon its adoption by majority vote of the Water Council, and upon meeting all regulatory prerequisites.

TABLE 1
Redding Area Water Council

Member Agencies

City of Anderson
City of Redding
City of Shasta Lake
Shasta County Water Agency
Anderson-Cottonwood Irrigation District
Bella Vista Water District
Clear Creek Community Services District
Centerville Community Services District
Cottonwood Water District
Shasta Community Services District
Mountain Gate Community Services District
Simpson Paper Company
McConnell Foundation

Chapter 2 - Plan Area

Location

Section 2.01. The AB 3030 Plan Area encompasses the cities of Shasta Lake, Redding, and Anderson, and the lands served by the numerous other water districts, agencies and purveyors in Shasta County and northern Tehama County comprising the Water Council. The Plan Area is the Redding Groundwater Water Basin (shown on Figure 1), including the service areas of the public water purveyors (shown on Figure 2).

Physiography and Geology

Section 2.02. The Redding Basin is bounded on the east by the dissected alluvial terraces which form the foothills of the Cascade Range. The low hills and dissected uplands of the Coast Range stretch for the length of the western Shasta and Tehama County borders. The interior of the Redding Basin is characterized by stream channels, floodplain, and natural levees of the Sacramento River and its tributaries. Alluvial fans are also present near the confluence of tributaries with the Sacramento River.

Section 2.03. The geology of the Redding Basin is complex. The Basin is a structural trough formed from downwarped marine sedimentary deposits of the Chico Formation. Overlying the Chico Formation is a thick section of interfingering sedimentary deposits that have been transported from highlands surrounding the east, north, and west sides of the Redding Basin. These sedimentary materials form the principal aquifers of the Redding Basin. They range in thickness from a feather edge at the margins of the Redding Basin to over 3,000 feet near the confluence of the Sacramento River and Cottonwood Creek. The sedimentary deposits that came from the east are predominantly of volcanic origin and are referred to as the "Tuscan Formation."

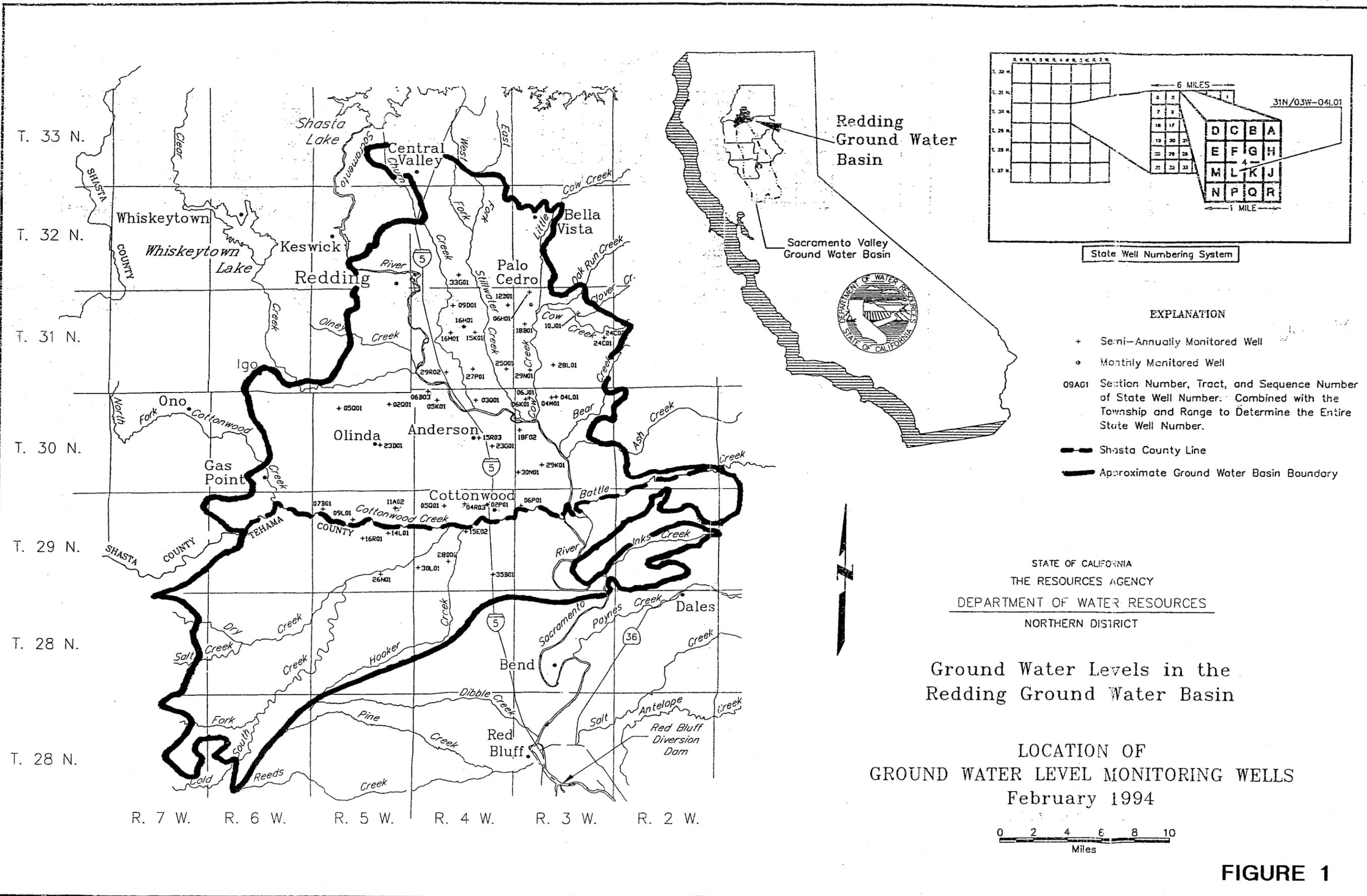
On the highlands east of the Redding Basin, the Tuscan Formation is dominated by volcanic mudflows. The mudflow deposits are generally of low permeability and are characterized by a bouldery surface appearance. However, in the Redding Basin itself, the volcanic mudflows were eroded, sorted, and redeposited shortly after eruption. These reworked deposits are composed of thick, highly permeable sand and gravel strata. These units of the Tuscan Formation are the most prolific aquifers of the Redding Basin. Materials that were derived from the finer-grained sediments of the Coast Ranges are termed the Tehama Formation. The Tehama Formation deposits are considerably less permeable than the Tuscan Formation, but still accommodate a good aquifer. (See Figure 3 for an illustrative depiction of a typical geologic cross-section view looking from west to east across the Redding Basin.)

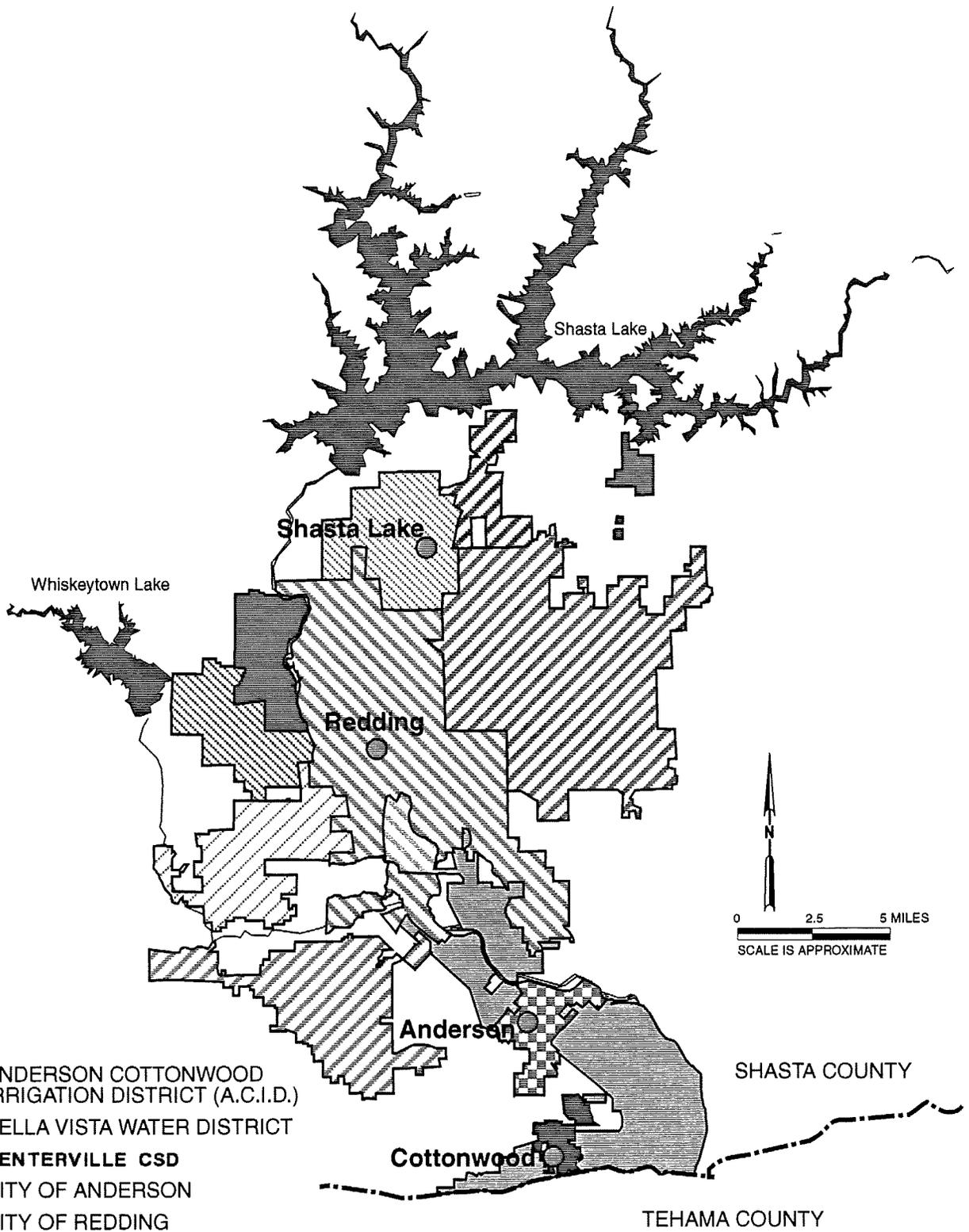
Section 2.04. The oldest rock unit exposed in the area is the Upper Cretaceous Chico Formation. This unit consists of sandstone, conglomerates, and shale which are of marine origin. In most areas of the Redding Basin, the Chico Formation contains salt water under artesian pressure.

Section 2.05. In the eastern portion of the Redding Basin, the Chico Formation is overlain by the Pliocene Tuscan Formation. The Tuscan Formation's pyroclastic and sedimentary rocks consist of reworked volcanic mudflows. Along the eastern margin of the Sacramento Valley, the Tuscan Formation is the major water-bearing unit.

Section 2.06. The Tehama Formation overlies the Chico Formation in the western portion of the Redding Basin. These sediments consist of sand, gravel, and clay which were deposited by the ancestral Sacramento River and its west slope tributary streams. While parts of the Tehama Formation appear to be younger than the Tuscan Formation, fingers of the two formations are inter-layered beneath the central valley floor, which indicates that portions of the two formations are equivalent in age.

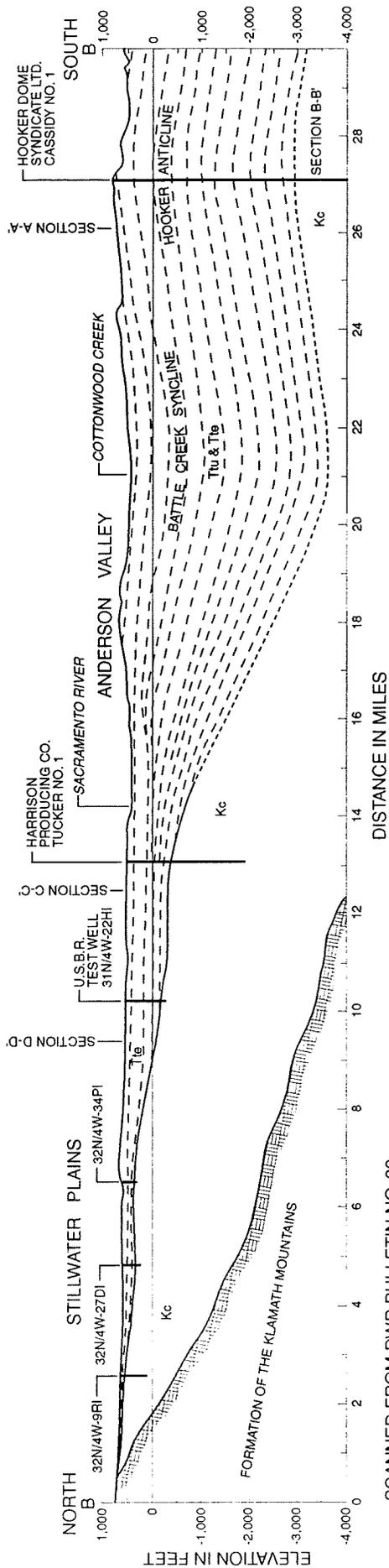
Section 2.07. The Red Bluff Formation rests primarily on the Tehama Formation to the west of the Sacramento River and is approximately the same age as the conglomerates. This formation consists of coarse gravel, commonly with large boulders in a red sandy clay matrix of low permeability. These materials may have been originally deposited by the debris-laden, turbid streams draining glacial areas. (Bulletin 118-6, DWR, 1978)





-  ANDERSON COTTONWOOD IRRIGATION DISTRICT (A.C.I.D.)
-  BELLA VISTA WATER DISTRICT
-  CENTERVILLE CSD
-  CITY OF ANDERSON
-  CITY OF REDDING
-  CITY OF SHASTA LAKE
-  CLEAR CREEK CSD
-  COTTONWOOD WATER DISTRICT
-  JONES VALLEY CSA
-  KESWICK CSA
-  MOUNTAIN GATE CSD
-  SHASTA CSD

FIGURE 2
WATER PURVEYOR BOUNDARIES
 REDDING GROUNDWATER BASIN, SHASTA COUNTY



SCANNED FROM DWR BULLETIN NO. 22

FIGURE 3
GENERALIZED CROSS SECTION
ACROSS THE SACRAMENTO VALLEY
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

Section 2.08. Alluvial deposits of varying age underlie the floodplain along the Sacramento River and its tributaries. These flood-deposited materials generally appear as thin layers of gravel, sand, silt, and clay which occur in thicker beds along the channel of the Sacramento River.

Climate

Section 2.09. Shasta County exhibits a wide range of precipitation and temperature due to the relatively large elevation difference between the valley floor and the highlands in the extreme eastern and western portions of the County adjacent to the Redding Basin. Precipitation and temperature data from Redding, representing typical valley floor climate parameters in the Redding Basin, demonstrate that the valley lands encompassing the Redding Basin experience hot dry summers and mild winters.

Section 2.10. Typical temperatures in the Redding area are summarized in Table 2. Mean annual precipitation in Shasta County (from the Shasta County Hydrology Manual) is shown on Figure 4.

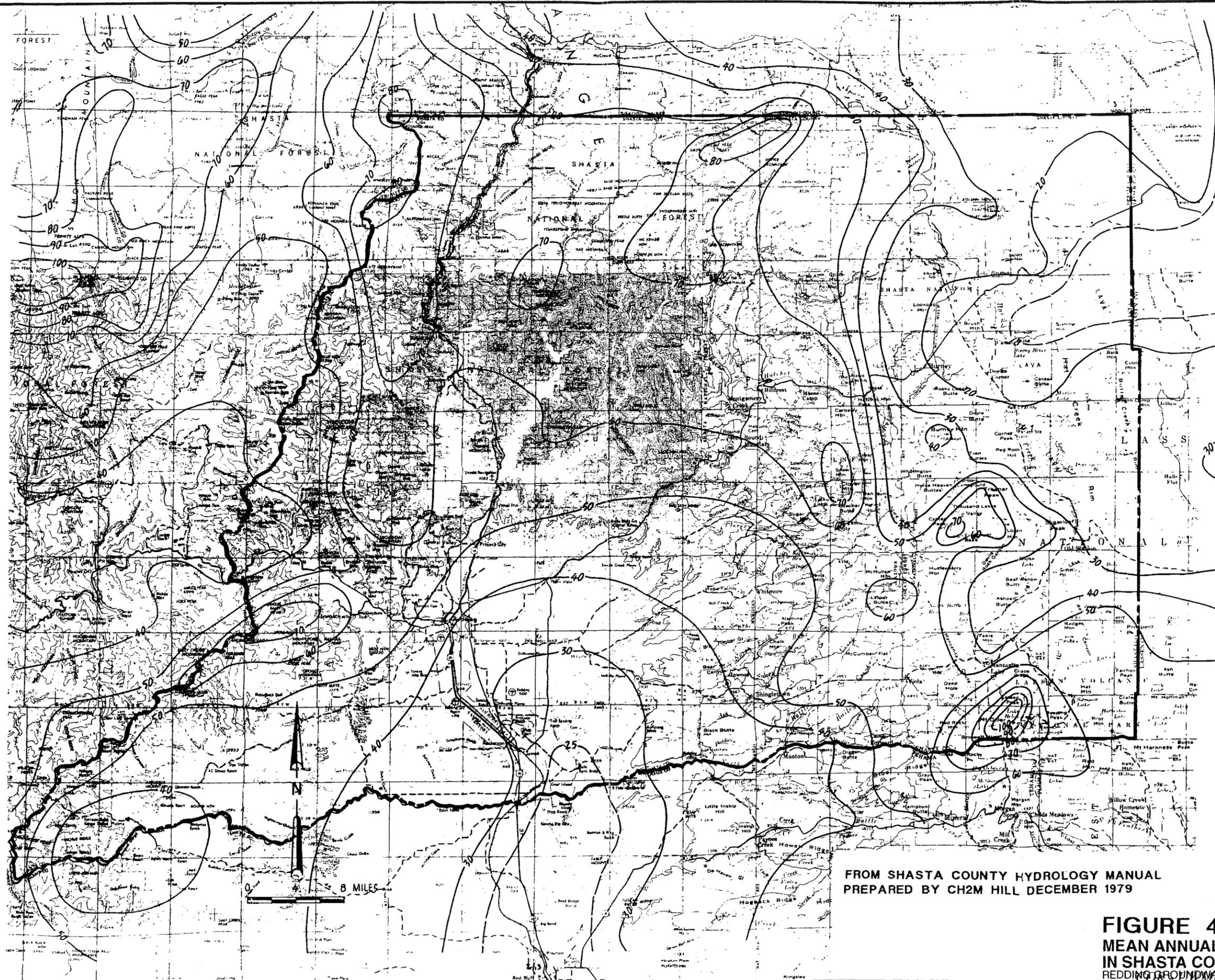
Section 2.11. The major portion of annual precipitation generally occurs from November through April; very little rainfall typically occurs between May and October. Average annual rainfall in the Redding Basin varies from approximately 25 to 50 inches.

TABLE 2
Historic Climatic Data for Redding, California

Month	¹ Normal Mean Temperature (°F)	² Highest Temperature of Record (°F)	² Lowest Temperature of Record (°F)	² Average Sunshine
Jan	45.5	77	19	73%
Feb	50.7	83	21	83%
Mar	52.2	85	28	84%
Apr	58	94	33	90%
May	66.4	104	36	91%
Jun	76.1	111	42	94%
Jul	81.5	118	54	97%
Aug	79.5	115	51	97%
Sep	74.1	116	40	94%
Oct	63.5	105	33	92%
Nov	51.8	88	23	84%
Dec	45	74	17	73%
Annual Average	62	118	17	88%

¹Period of record: 1961 through 1990

²Data through 1995



FROM SHASTA COUNTY HYDROLOGY MANUAL
 PREPARED BY CH2M HILL DECEMBER 1979

FIGURE 4
MEAN ANNUAL PRECIPITATION
IN SHASTA COUNTY
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

Section 2.12. The population within the Redding Basin is growing at a much higher rate than in the surrounding areas, in part because of the availability of public services, including public water supplies. The development of public water systems has resulted in a variety of high intensity land uses, including urban, residential, agriculture, riparian and native vegetation, and recreation. The three incorporated cities in the Redding Basin—Redding, Shasta Lake, and Anderson—currently account for about sixty-six percent (66%) of the total population within the Redding Basin. (See Shasta County Water Resources Master Plan—Phase 1 Report, SCWA (1997), Appendix C). Long term population growth rates in the Redding Basin have been relatively uniform since World War II.

Economy

Section 2.13. The economy of Shasta County and the Redding Basin is directly tied to water supply. Lack of reliability in the water supplies has resulted in severe impacts within the service areas of purveyors who rely on federal water contracts for all or a major portion of their water supplies. Since 1991, there have been cutbacks of as much as 75 percent of agricultural allocations and 25 percent of municipal and industrial allocations. These cutbacks have resulted in substantial uncertainty and related constraints on the short-term and long-term planning needed for the orderly development of the Redding Basin.

Local Interest

Section 2.14. In late 1996, the SCWA, acting as a lead agency in this coordinated planning process, hired CH2M HILL, a water resources consulting firm, and retained legal counsel specializing in water, environmental, and regulatory law to assist with development and implementation of the Groundwater Management Plan. Working together, the Water Council members prepared the "Shasta County Water Resources Master Plan Phase 1 Report" (October 1997), which addresses current and future water needs in Shasta County and the Redding Basin. The Water Council members, by terms of the June 1998 MOU, have agreed to continue with this joint planning effort, including the preparation of an integrated surface and groundwater management plan for the Redding Groundwater Basin.

List of Participants

Section 2.15. The Water Council includes the major public and private water users in the Redding Basin. Water use for 1995 by type of use and purveyor or major user in the Redding Basin is shown in Table 3.

Section 2.16. In addition to the above referenced public and private stakeholders, key interest groups will be encouraged to participate in Plan implementation, including public education.

Section 2.17. The success of this Groundwater Management Plan, as prepared pursuant to Water Code Section 10750 et seq., will largely be dependent on the extent of coordination between all affected public entities and other interested parties. As required under Water Code Section 10750 et seq., a notice of public hearing will be published to consider whether to implement a Groundwater Management Plan.

Legal, Financial and Political Considerations

Section 2.18. In Shasta County, as in other parts of California, water resources management is governed by a complex system of local, state, and federal laws. Water use, development, and allocation are controlled by legal contracts and agreements, common law principles, statutes, constitutional provisions, and court decisions. These legal considerations, in combination with the jurisdictional powers of the various local governing agencies and the private property rights of groundwater users, form the framework which governs water resources management in Shasta County and the Redding Basin. A more thorough overview of the institutional framework for water resource management in California is provided in Chapter 2 of *The California Water Plan Update* (DWR Bulletin 160-98) reviewed.

TABLE 3
Current Annual Water Needs Summary
Redding Basin
 (acre-feet x 1,000, except as noted)

	Major Public Purveyors					Small	Private Users			Totals
	ACID Gravity	BVWD Pressure	Clear Creek CSD Pressure	Anderson City Pressure	Redding City Pressure	Shasta Lake City Pressure	Others ^a Pressure	HWUI ^b Pressure	Irrigators 50% Gravity, 50% Pressure	
Water- Using Lands										
Irrigated Agriculture										
Permanent Crops	5.40	0.24	3.10	0.00	0.14	0.00	0.00	0.00	0.04	8.92
Grain and Field Crops	1.04	0.63	0.09	0.00	0.45	0.00	0.00	0.21	1.31	3.73
Pasture	45.93	10.35	3.57	0.00	0.04	0.04	0.10	1.38	13.82	75.19
Truck	0.14	0.02	0.04	0.00	0.04	0.00	0.00	0.00	0.30	0.54
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural Urban (1 to 5 acres)	8.48	4.18	0.00	0.00	0.00	0.00	0.08	0.00	0.00	12.74
Total	60.99	15.42	6.80	0.00	0.63	0.04	0.18	1.59	15.47	101.12
Urban										
Urban	0.00	2.07	0.56	1.34	15.66	2.06	0.93	0.00	2.44	25.06
Rural Urban Domestic (1 to 5 acres)	0.00	0.98	0.95	0.09	1.51	0.02	1.44	0.00	1.63	6.62
Total	0.00	3.05	1.51	1.43	17.17	2.08	2.37	0.00	4.07	31.68
Commercial And Industrial										
Commercial	0.00	0.25	0.07	0.16	1.16	0.02	0.04	0.00	0.11	1.81
Industrial	0.00	1.70	0.14	0.07	0.60	0.00	0.12	14.67	0.71	18.01
Total	0.00	1.95	0.21	0.23	1.76	0.02	0.16	14.67	0.82	19.82
Recreation And Environmental										
Water Bodies	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Parks and Golf Courses	0.00	0.68	0.00	0.16	0.87	0.08	0.02	0.00	0.24	2.05
Riparian Vegetation	4.67	0.30	0.03	0.00	3.53	0.00	0.00	0.00	3.14	11.67
Total	4.67	0.98	0.03	0.16	4.40	0.08	0.02	0.00	3.38	13.72
Diversions to Other Counties										
	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
Total	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
Total Water Delivery Demands, acre-feet per year^c	95.66	21.40	8.55	1.82	23.96	2.23	2.73	16.26	23.74	196.34
Conveyance Losses (acre-feet per year)	79.34	1.06	0.43	0.09	1.02	0.11	0.14	0.81	1.16	84.16
Current Diversion Requirements (acre-feet per year) ^c	175.00	22.46	8.98	1.91	24.98	2.34	2.87	17.07	24.90	280.46

a Centerville CSD, Shasta County CSD, Keswick CSA , Mountain Gate CSD, Cottonwood Water District and Jones Valley CSA.

b Heavy Water Usage Industrial (Simpson Paper Company, Sierra Pacific Industries, and Wheelabrator).

c Includes 20,000 acre-feet per year delivered to Tehama County and 10,000 acre-feet delivered to downstream users.

Section 2.19. The Water Council will adopt rules and regulations to implement provisions of this AB 3030 Plan. All such rules and regulations shall be adopted pursuant to Water Code Section 10753.8.

Section 2.20. Though permitted pursuant to Water Code Section 10754 et seq., no fees or assessments to finance AB 3030 Plan expenses, such as administrative and operating costs, will be considered by the Water Council unless a future need is demonstrated.

Condition of the Groundwater Basin

Redding Groundwater Basin and Sub-Basins

Section 2.21. The boundaries of the Redding Basin roughly approximate the eastern and western edges of the Sacramento Valley floor. (See Figure 1, showing the Basin and Plan Area.) The foothill areas which constitute the eastern and western portions of Shasta and Tehama Counties adjacent to the Redding Basin are designated as "highland" areas, and are noted for their relative scarcity of groundwater resources. Sub-basins and areas within the Redding Basin with unique characteristics will be identified and evaluated in AB 3030 Plan implementation.

Existing Monitoring

Section 2.22. Since the late 1920s, the State Department of Water Resources (DWR) and the United States Bureau of Reclamation have measured groundwater levels for 48 wells in the Redding Basin. Currently, 35 wells are monitored semi-annually and 5 wells are measured on a quarterly basis.

Section 2.23. The DWR issues periodic reports which relate to the monitoring program in the Redding Basin. These reports include groundwater hydrographs for the monitored wells. The most recent report, entitled *Ground Water Levels in the Sacramento Valley Groundwater Basin, Shasta County*, was released by DWR in November 1996. Figures 4 through 10 show examples of hydrographs throughout the Redding Basin.

Section 2.24. Most wells in the monitoring program are measured by DWR semi-annually, usually in March and October. These monitoring periods provide an indication of groundwater levels before and after the typical agricultural irrigation season.

Section 2.25. In addition to recording water levels, the DWR reports also include, for each well, information on the producing aquifer(s), degree of certainty associated with the groundwater body classification, the hydrogeologic unit, and the applied use of the extracted groundwater.

Section 2.26. The data from these historic and ongoing monitoring wells will be considered and reflected in the development of a Redding Basin computer model, expected to be completed during further Water Council groundwater study efforts.

Historic Variations in Groundwater Levels

Section 2.27. Groundwater levels fluctuate on an annual basis in response to extraction; infiltration and downward percolation from precipitation, surface-water sources, and irrigation; and subsurface inflows and outflows. In parts of the Redding Basin, groundwater levels vary seasonally due to higher recharge during winter months and pumpage during summer months.

Section 2.28. Monthly measurements of groundwater show that water levels start dropping in early spring (usually April) and continue to decline through the summer until early September. Maximum levels are usually reached by February.

Section 2.29. Over the long term, groundwater levels in the Redding Basin have remained steady. There are seasonal fluctuations (summer to winter), and there are some fluctuations caused by wet or dry years, but overall, groundwater levels have not changed significantly throughout the period of record.

Historic Groundwater Pumpage

Section 2.30. In the earlier parts of this century, little groundwater was used in Shasta County and the Redding Basin. The Sacramento River and its primary tributaries provided the source for most irrigation. A notable exception is along Cottonwood Creek, where substantial extractions were made over several decades, largely ending in the 1980s.

Section 2.31. In the early 1970s, approximately 5 percent of all irrigation water came from groundwater, and approximately 95 percent came from surface-water sources. In 1995, approximately 12.5 percent of all water used in the Redding Basin was derived from groundwater. The vast majority of groundwater extracted is put to municipal and industrial uses.

Groundwater Quality

Section 2.32. For the most part, groundwater in the Redding Basin is of excellent quality. However, certain areas have experienced water quality problems, especially at the northern and northwestern perimeters of the Redding Basin where wells penetrate the Chico Formation.

Section 2.33. Additional review of existing and potential groundwater quality problems in the Redding Basin is needed. This will occur in AB 3030 Plan implementation.

Need for Groundwater Management Plan

Section 2.34. There is a substantial, but undefined, supply of groundwater in the Redding Basin. The Redding Basin does not appear to be in a state of groundwater overdraft; however, at this time there is no certainty as to how close the Redding Basin is to overdraft, what constitutes a "safe annual yield," and when and how frequently well interference problems may arise in the future.

Section 2.35. The need for an AB 3030 Plan is documented in the Shasta County Water Resources Master Plan Phase 1 Report (October 1997) "Phase 1 Report," which was prepared for the Water Council. As indicated in that report, additional study of the Redding Basin's characteristics is needed to better understand and evaluate the occurrence, movement, origin, and destination of groundwater in the Redding Basin, and what constitutes reasonable use thereof.

Section 2.36. This plan is intended to provide a mechanism for both the public and private stakeholders in the Redding Basin to evaluate, manage, protect, and preserve this valuable local groundwater resource.

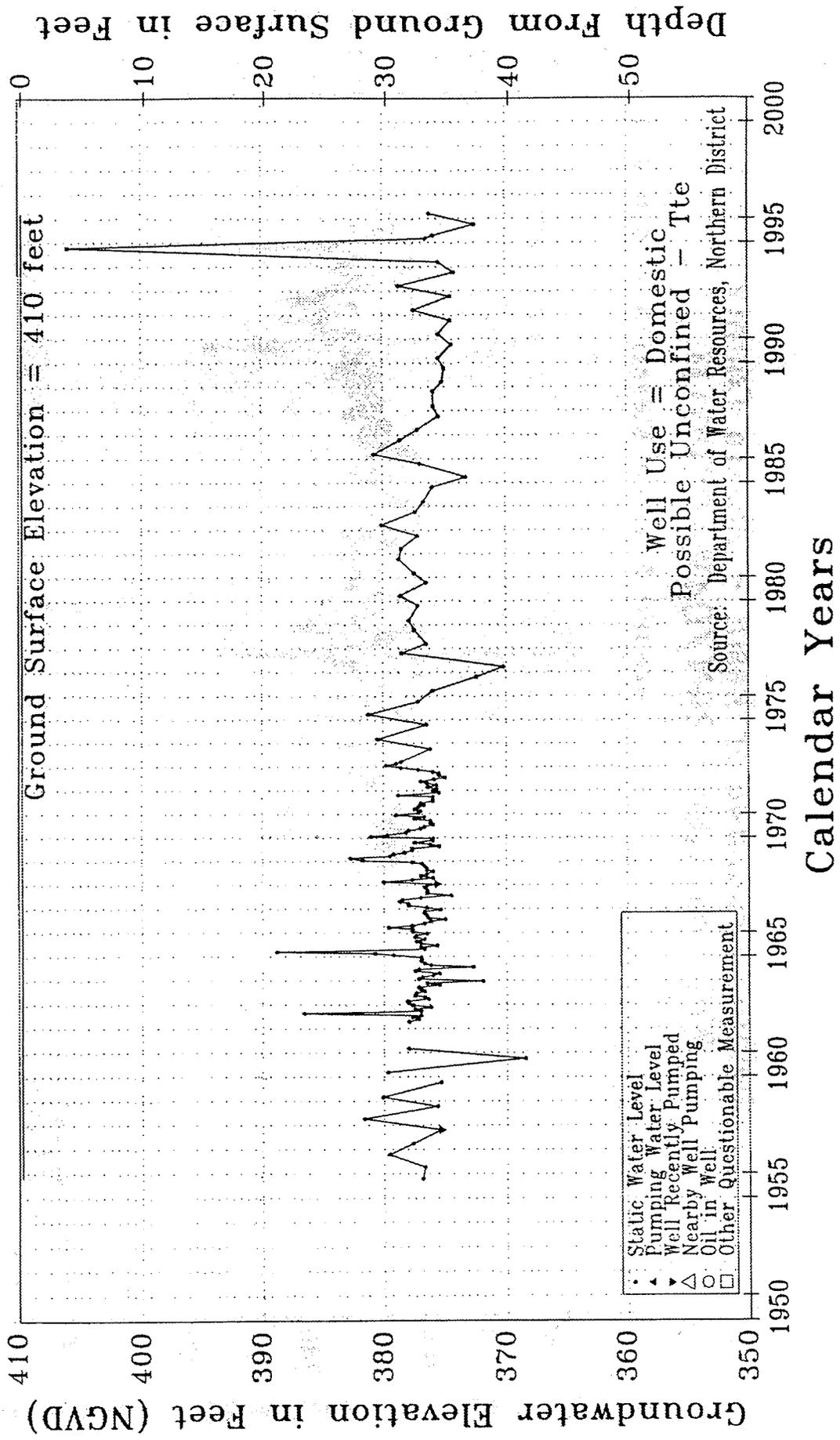


FIGURE 5
WELL NUMBER 29N/03W-06P01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

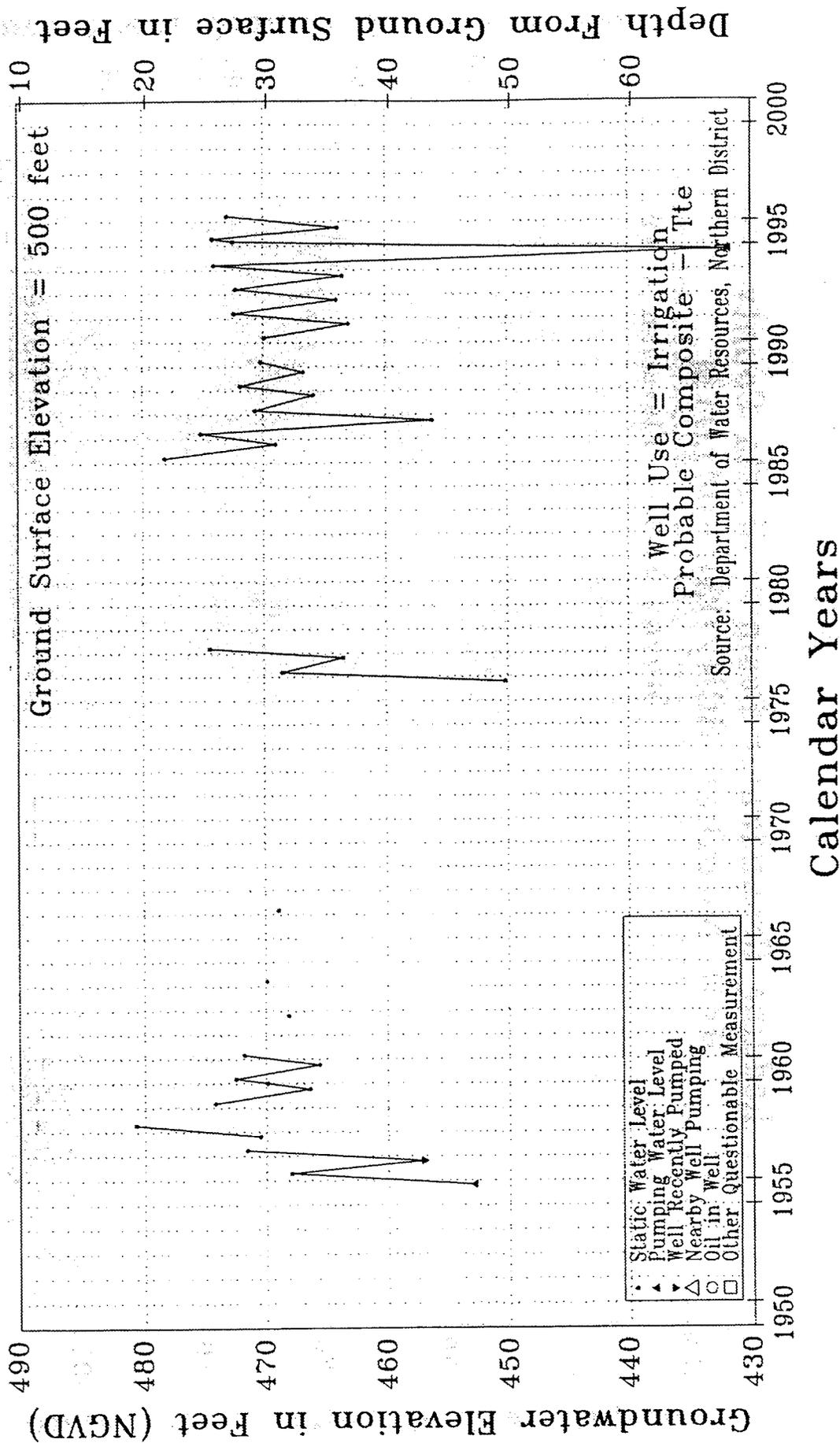


FIGURE 6
WELL NUMBER 29N/05W-26N01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

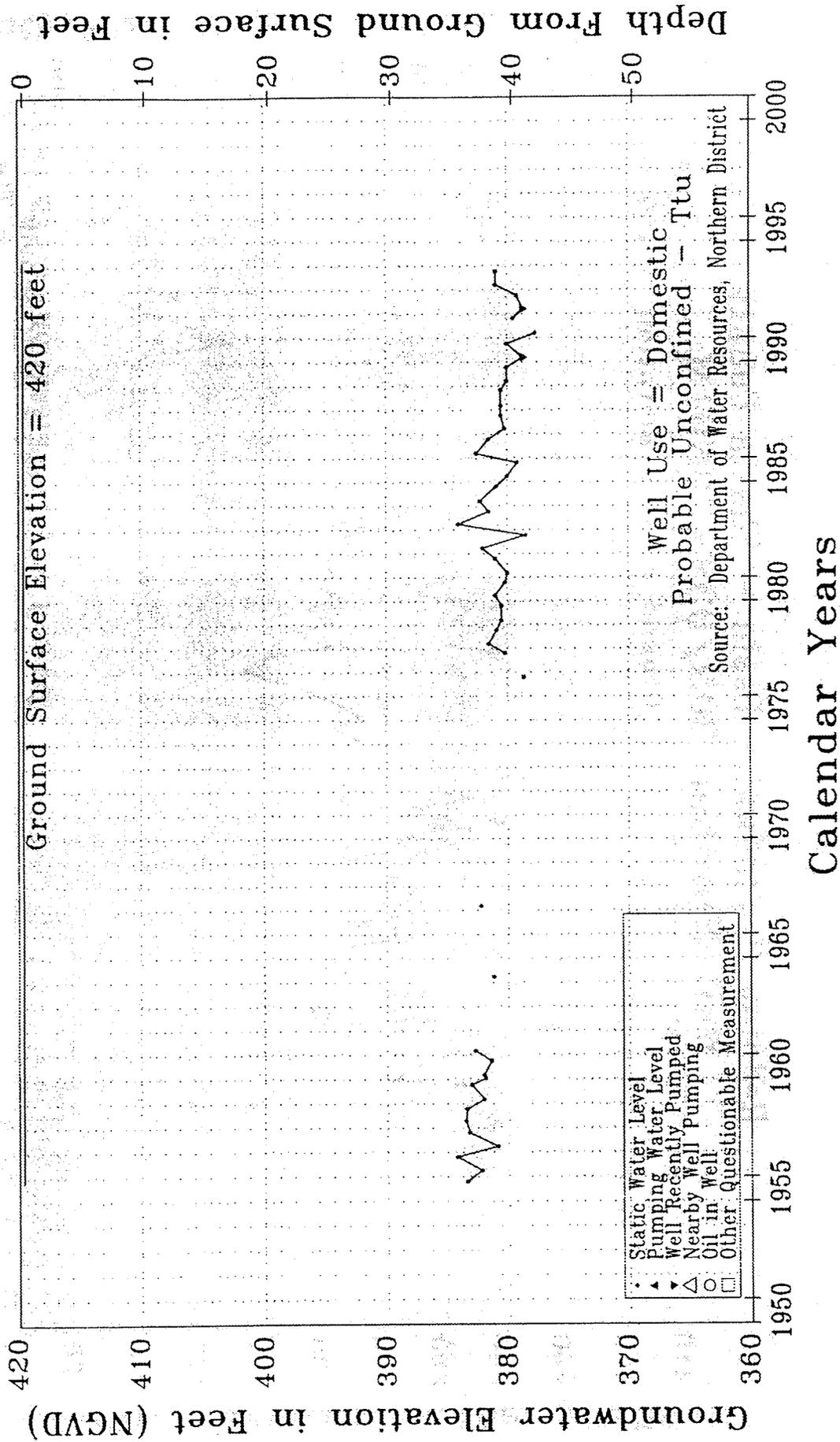


FIGURE 7
WELL NUMBER 30N/03W-29K01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

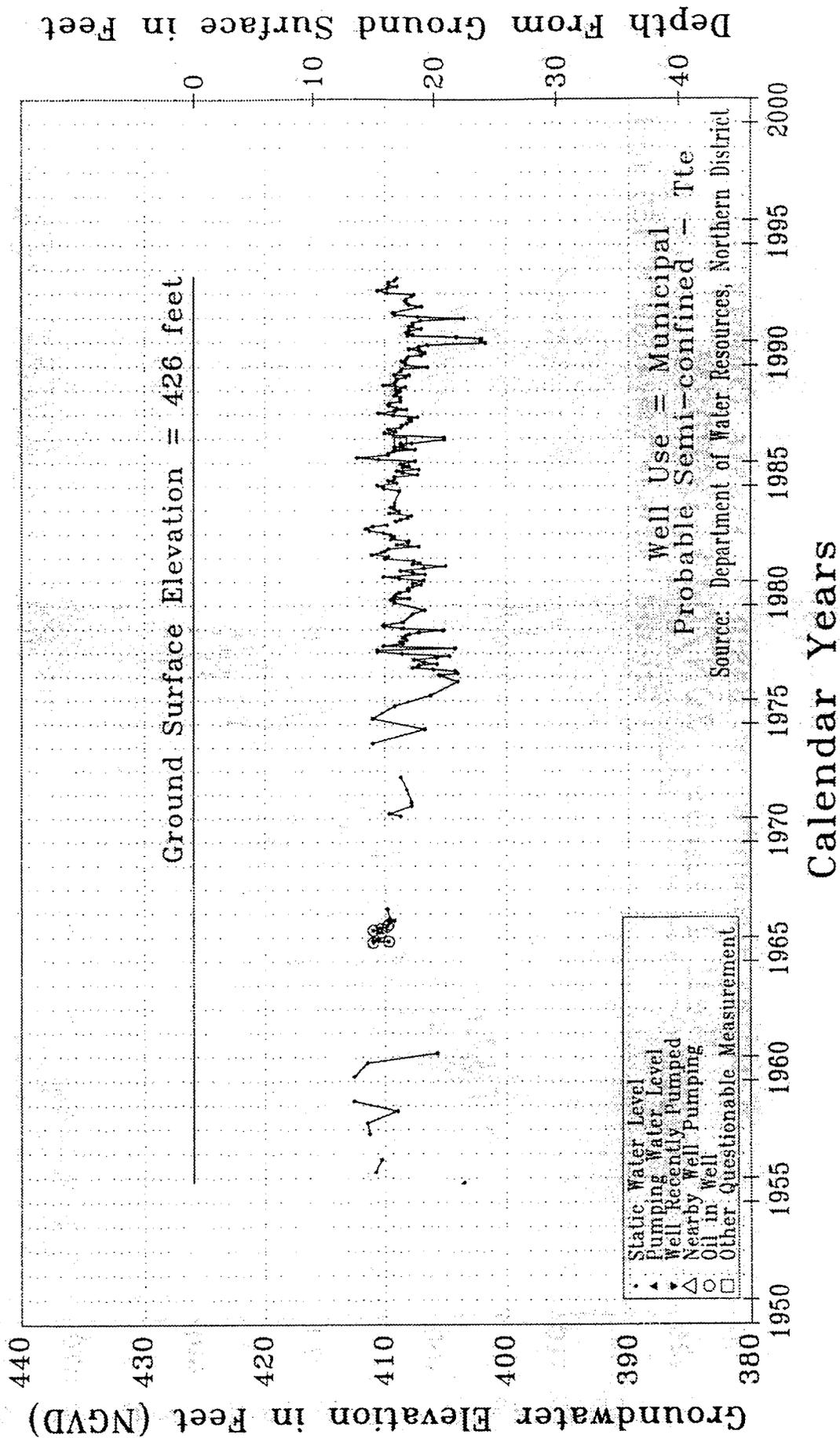


FIGURE 8
WELL NUMBER 30N/04W-15R03M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

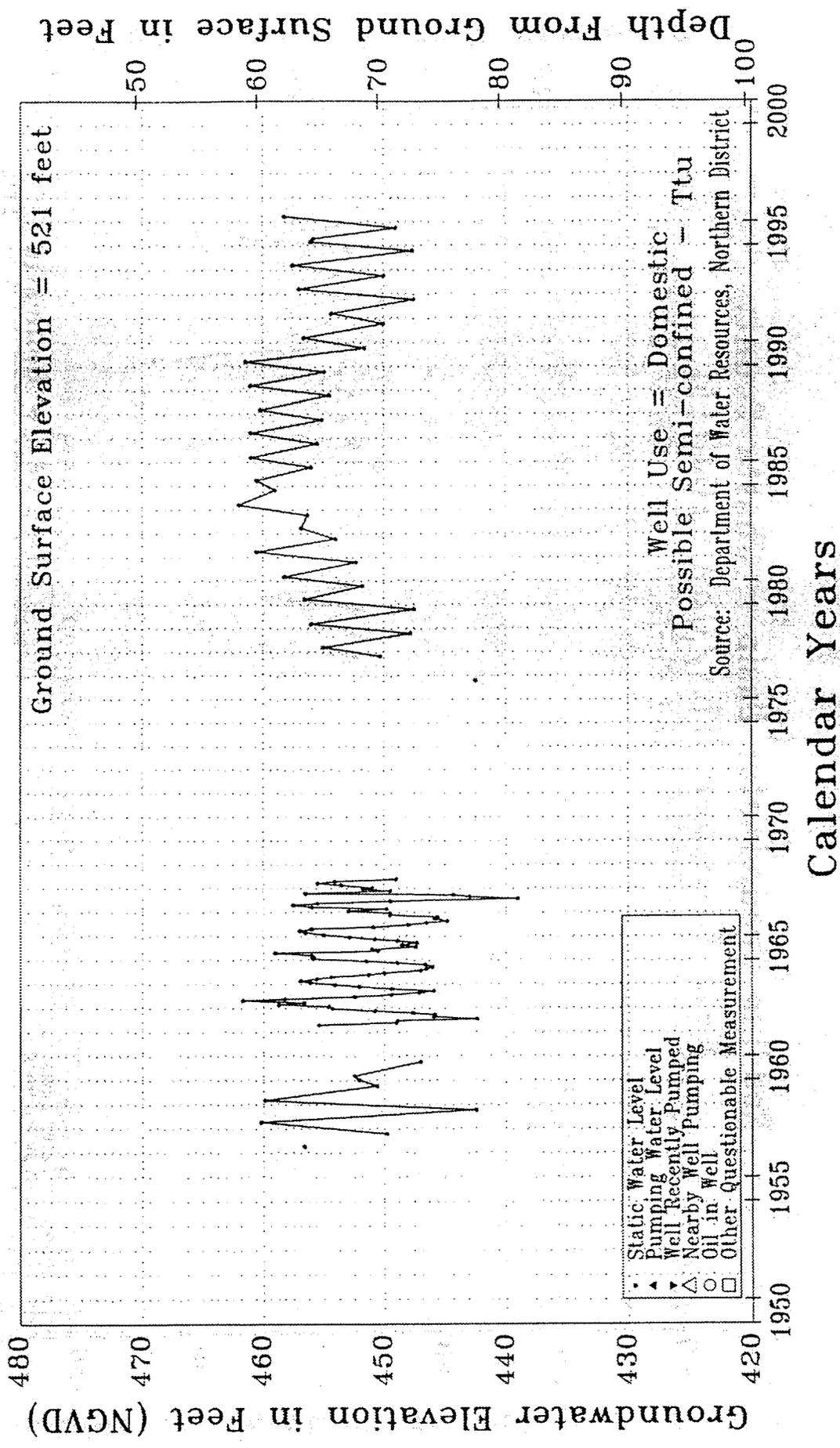


FIGURE 9
WELL NUMBER 31N/03W-06H01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

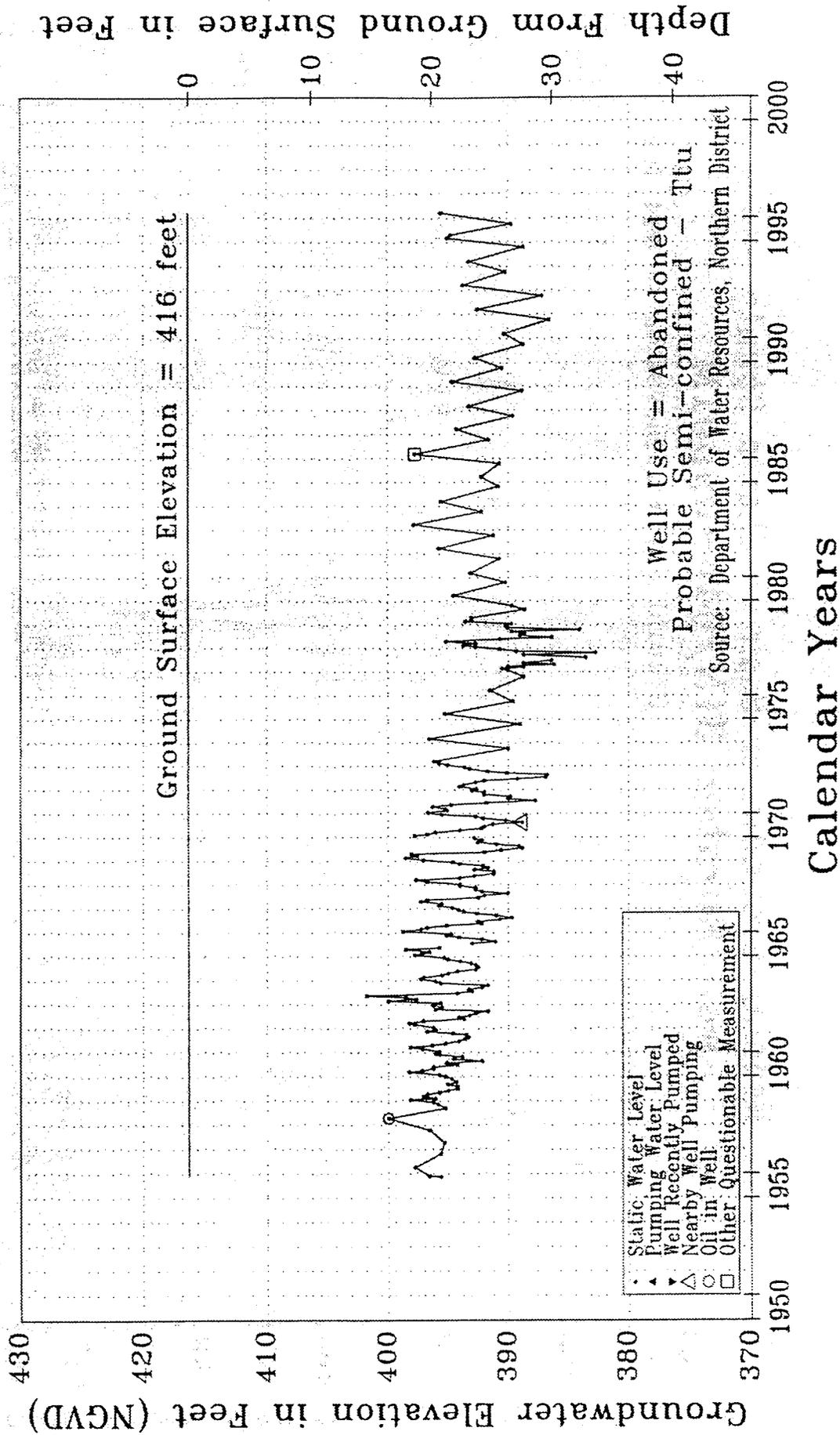


FIGURE 10
WELL NUMBER 31N/03W-29N01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

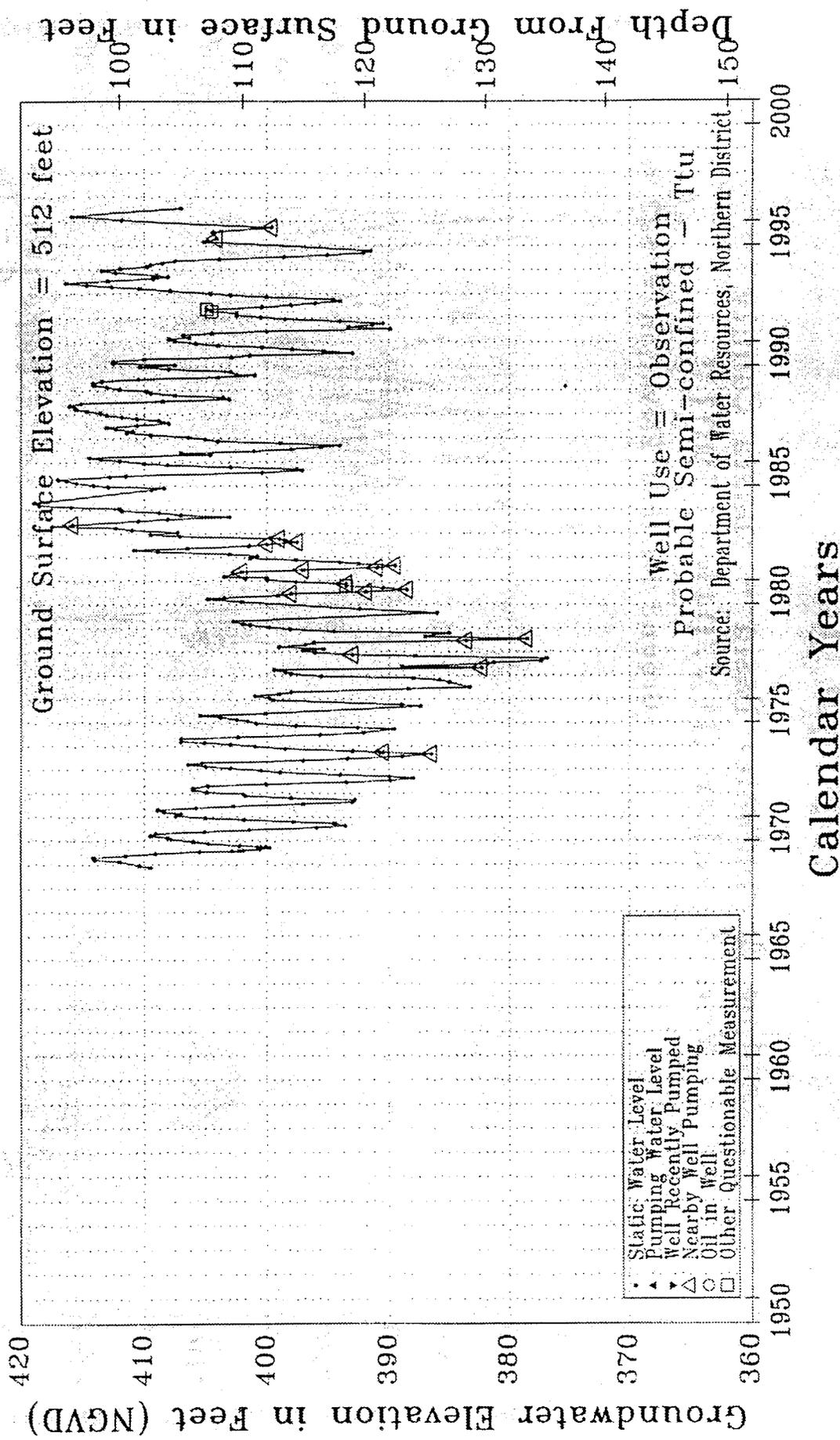


FIGURE 11
WELL NUMBER 31N/04W-16H01M
 REDDING GROUNDWATER BASIN, SHASTA COUNTY

Chapter 3 - Elements of the AB 3030 Plan

AB 3030 Plan Elements

Section 3.01. The approach to groundwater management reflected in this AB 3030 Plan will generally be based on voluntary cooperation between water agencies, purveyors, and interested private parties in the Redding Basin, with an information-gathering and monitoring emphasis. This plan includes the following elements: (1) Data Development/Groundwater Monitoring; (2) Public Entity Coordination and Reporting; (3) Public Information and Education; (4) Export Limitations; (5) Water Quality; (6) Wellhead Protection; (7) Land Use; (8) Conjunctive Use Operations; (9) Groundwater Management Facilities; and (10) Groundwater Overdraft and Well Interference. These elements are further described below.

Data Development/Groundwater Monitoring

Section 3.02. To ensure that its actions are taken in accordance with the public interest, and to further prevent the use of unnecessary and potentially burdensome management techniques, SCWA will work with Water Council participants to collect data and will conduct or receive necessary and relevant studies, for the purpose of further documenting the existing quality and quantity of groundwater within the Redding Basin. This SCWA activity will be undertaken in a scope and manner consistent with the Water Council MOU, including the preparation and maintenance of a linked surface water and groundwater computer-based model.

Section 3.03. SCWA will serve as the Water Council's information and data collection coordinator, and will collect and conduct, or have conducted, technical investigations to carry out this plan, including computer model development. All data collection and technical investigations authorized under this plan shall be carried out by SCWA in consultation with the Water Council Steering Committee.

Section 3.04. One of the goals in the data collection and evaluation process will be to determine the Redding Basin's long-term safe annual yield. For the purpose of this plan, "long-term safe annual yield" shall be as defined in Appendix A, which defines this and other key AB 3030 Plan and implementing regulation terms. The determination shall estimate the safe annual yield of the total Redding Basin under various hydrologic conditions and the probable boundaries of the sub-basin hydrologic units.

Section 3.05. The Water Council shall prepare a report on the status of the Redding Basin no less than bi-annually. The report shall include an estimate of annual recharge, pumping, and groundwater discharge to surface streams. The report shall include any other information which the Water Council deems relevant and necessary to the effective management of groundwater within the Plan Area, including estimated changes in water levels and the amount of water in storage.

- A. Collection and Analysis of Data/Preparation of Reports on Hydrologic Conditions. Data related to the hydrologic inventory of the Redding Basin will be collected and reviewed as a component of the periodic report to be prepared by the Water Council. Principal factors to be considered will include surface water imported to and exported from the Redding Basin, evapotranspiration, the estimated groundwater recharge, discharge, and extractions from the Redding Basin, and subterranean outflow.
- B. Preference for Use of Existing Databases. To avoid incurring unnecessary costs, the Water Council shall utilize Phase 1 Report data and further determine the status of additional studies and monitoring programs carried out within the Redding Basin by federal, state, and local agencies. Where possible, information from pre-existing data collection programs, and new data derived from the computer model to be developed for the Water Council and other sources, will be incorporated into the report.
- C. Expansion of Data Collection Efforts. Where significant and important data are missing or incomplete, the Water Council will determine methods to acquire a more complete database.

Section 3.06. The Water Council, using its Technical Advisory Committee as it determines appropriate, may prepare or receive reports on groundwater and supplemental water supplies, groundwater quality, and other conditions within the Plan Area. The Water Council may identify information useful to a water replenishment or conjunctive use project and prepare reports on the utility of these types of projects within the Plan Area.

Section 3.07. To protect and/or enhance the quality and quantity of water within the Redding Basin, the Water Council shall develop and implement a Redding Basin monitoring program. The monitoring program may consist of the measures identified in these sections and will be implemented by the adoption of rules and regulations, as determined appropriate by the Water Council Steering Committee.

- A. **Monitoring Redding Basin Conditions.** The previous and ongoing collection and analysis of basic hydrologic data are important elements of the Management Plan. Monitoring is essential to characterize Redding Basin conditions and to provide the technical information needed to make decisions regarding the optimal use and management of the Redding Basin. Monitoring of the Redding Basin will allow the Water Council to: (1) identify reliable sources of information; (2) identify changing conditions; (3) develop and implement specific groundwater management programs as may be determined necessary in the future; and (4) document the accomplishments of the management program.
- B. **Use of Existing Monitoring Data.** The Water Council shall coordinate with the DWR, Northern District Office, to use and supplement their existing semi-annual well water level measurement program. Monitoring of water levels will allow the Water Council to gauge the status of the groundwater resource in response to changing hydrologic conditions and water use practices. The number and location of these wells will be determined by the Water Council Steering Committee.
- C. **Monitoring Groundwater Quality Conditions.** The Water Council shall include one or more monitoring wells within the Redding Basin, and in each sub-basin where feasible, for the purpose of measuring water quality conditions within the Redding Basin. The number and location of these wells will be determined by the Water Council Steering Committee. Efforts will be made to use existing wells that are subject to water quality testing to minimize costs associated with the water quality monitoring program.

Section 3.08. The Water Council shall prepare an annual estimate of the amount of water extracted within the Plan Area and of the total cumulative groundwater extractions within the Redding Basin.

Public Entity Coordination and Reporting

Section 3.09. The Water Council shall strive at all times to coordinate with all agencies having jurisdiction over water-related matters in and adjacent to the Redding Basin.

Section 3.10. The Water Council will coordinate with the Regional Water Quality Control Board, U.S. Environmental Protection Agency, the State Office of Drinking Water, and other state and local regulatory agencies to monitor and develop information concerning groundwater quality compliance with applicable standards, and to otherwise manage and ensure reasonable use of Plan Area groundwater.

Public Information and Education

Section 3.11. It is essential to involve the public, agricultural, industrial, and business communities early in the development of the Groundwater Management Plan. Throughout the implementation of this plan, public education and community relations will be integral to successful groundwater management in the Redding Basin.

Section 3.12. The Water Council shall provide public outreach through public presentations, published information items, and references to groundwater data available through other public agencies, as determined by the Steering Committee.

Export Limitations

Section 3.13. In order to preserve and protect Redding Groundwater Basin resources, and to ensure their reasonable and beneficial use in a way that is not detrimental to the Basin and its local users, County of Shasta Ordinance No. SCC 98-1, as adopted by the Shasta County Board of Supervisors on January 27, 1998, is fully incorporated into this AB 3030 Plan by reference, and shall apply throughout the AB 3030 Plan area except: (1) as otherwise provided by this Plan; or (2) as it may be superceded by adoption of one or more local ordinances within individual public agency boundaries. That groundwater extraction and export ordinance, which is codified as Chapter 18.08 of the Shasta County Code, is attached to this Plan as Appendix A.

The term "Shasta County" as used in Exhibit "A" for the purpose of requiring a permit for the export of ground water outside of the County, shall mean the AB 3030 Plan area.

The term "Commission" as used in Exhibit "A" shall be the Water Council Technical Advisory Committee, as established by MOU, unless otherwise designated and appointed by the Water Council.

The terms "Clerk of the Board" and "Board" as used in Exhibit "A" for the purpose of appeals from Commission actions on permit applications, shall mean the "Director" as therein defined and the full Water council, Respectively.

Water Quality

Section 3.14. The Water Council, working with members and non-member entities shall develop a program to assess, monitor, and protect the quality of groundwater in the Redding Basin to ensure the quality is acceptable for all beneficial uses.

Wellhead Protection

Section 3.15. Abandoned wells provide the potential for pollutants or contaminants to enter and/or spread into the Redding Basin groundwater. As such, well abandonment represents a key concern in groundwater management. The Water Council shall coordinate with the County Division of Environmental Health to obtain written notice concerning well abandonment projects.

Section 3.16. Improperly constructed and abandoned wells can impair yields and increase the potential for groundwater contamination. The Water Council supports the California Model Well Code standards, and the Shasta County well construction and destruction ordinance and regulations, and will work with the County Division of Environmental Health to provide information to well owners throughout the Basin regarding proper well construction and abandonment procedures.

Land Use

Section 3.17. The Water Council members with local land-use jurisdiction will strive to coordinate their respective land use and water supply management decisions in the Plan Area. The Water Council will also strive to develop and maintain ongoing working relationships with all water purveyors in and around Redding Basin relative to land use and water supply decisions.

Section 3.18. Moved to 4.06

Conjunctive Use Operations

Section 3.19. The Water Council shall evaluate options and develop a program for conjunctive use of Redding Basin water sources in an effort to increase or maintain Redding Basin water supplies.

Groundwater Management Facilities

Section 3.20. The Water Council will assess the need for short- and long-term facilities, such as conjunctive use facilities, and develop a proposed facilities plan as may be determined appropriate.

Groundwater Overdraft and Well Interference

Section 3.21. A mitigation and prevention program will be developed to address potential overdraft, well interference, and similar problems that would adversely affect the groundwater resources in the Plan area. This program will identify strategies and actions that will promote reasonable groundwater usage in the Redding Basin.

Section 3.22. The Water Council Steering Committee shall review this AB 3030 Plan and its implementation on a bi-annual basis and shall report its findings to all MOU participants.

Chapter 4 - Implementation

Procedure

Section 4.01. A Groundwater Management Plan developed pursuant to Water Code Section 10750 et seq., must be conducted according to the procedure show in Table 4.

TABLE 4
Procedure to Implement
Groundwater Management Plan

1. Publish notice of public hearing to consider whether to adopt resolution of intent.
 2. Conduct a hearing on whether to adopt a resolution of intent to adopt a Groundwater Management Plan.
 3. Adopt a resolution of intention to adopt a Groundwater Management Plan.
 4. Publication of notice.
 5. Prepare a Groundwater Management Plan within 2 years.
 6. Hold a second hearing after plan preparation is complete.
 7. Consider protests at conclusion of second hearing.
 8. If protests are received from landowners representing more than 50% of assessed value of property in the County occurs, the Plan shall not be adopted.
 9. If protests are received from landowners representing less than 50% of assessed value of property in the Redding Basin Plan area occurs, the AB 3030 Plan may be adopted within 35 days after Step 6.
-

Plan Administration

Section 4.02. The Water Council will administer the AB 3030 Plan throughout the Plan Area in accordance with the adopted Water Council MOU. As reflected in that MOU, successful implementation of the AB 3030 Plan must involve the ongoing participation of, and coordination between, all Redding Basin agencies which are empowered with groundwater-related duties and other interested local entities.

Section 4.03. Consistent with Water Council objectives in preparing this AB 3030 Plan, it is intended that this Plan will apply to the service areas of all local water purveyors within its stated boundaries. However, any local agency, investor-owned utility, or mutual water company which may decline to have the plan made applicable within its service area will be exempt from this plan within its jurisdiction, as stated in the MOU or applicable law.

Section 4.04. Any local water agencies within the boundaries of the AB 3030 plan area that decline to participate in cooperative management of the Redding Basin within its agency boundary shall be encouraged to adopt their own groundwater management plans and coordinate with the Water Council to the extent possible.

Section 4.05. This AB3030 Plan shall be funded, with respect to implementation and maintenance, as provided in the Water Council MOU as may be amended.

Section 4.06. In accordance with the California Groundwater Management Act, the Water Council will develop rules and regulations from time to time, to implement provisions of this plan, as it may be amended consistent with the Water Council MOU. These rules and regulations shall be adopted by the Water Council by resolution.

Chapter 5 - Plan Amendments

Section 5.01. This AB3030 Plan shall be periodically updated, based on changed circumstances within the Redding Basin, as determined by the Water Council.

Section 5.02. Plan Amendments shall occur in the manner established in the Water council MOU, as may be amended.

Section 5.03. The Water Council shall endeavor to publicly distribute, and educate the public concerning, any AB3030 Plan amendments adopted resulting in more than mere technical changes.

APPENDIX "A"

ORDINANCE NO. SCC 98-1

**AN ORDINANCE OF THE COUNTY OF SHASTA
REPEALING ORDINANCE NO. SCC 97-6 AND ADOPTING
CHAPTER 18.08 "GROUNDWATER MANAGEMENT"
REGARDING THE EXTRACTION AND EXPORTATION OF
GROUNDWATER FROM SHASTA COUNTY**

The Board of Supervisors of the County of Shasta does ordain as follows:

SECTION 1. GROUNDWATER MANAGEMENT. Chapter 18.08, entitled "Groundwater Management" is hereby added to Title 18 of the Shasta County Code to read as follows:

Chapter 18.08. Groundwater Management.

Section 18.08.010. Declaration of Findings and Purpose.

The Board hereby finds and declares:

(A) The groundwater underlying Shasta County has historically provided the people and lands of Shasta County with water for agricultural, domestic, municipal/industrial and other purposes;

(B) The Board recognizes that the principle of California law that water may be appropriated from a groundwater basin if the groundwater basin is in a surplus condition and such appropriation would not impair the reasonable and beneficial needs of overlying users;

(C) It is essential for the protection of the health, welfare, and safety of the residents of the County, that the groundwater resources of Shasta County be protected from harm resulting from the extraction of groundwater for use on lands outside of the County, until such time as needed additional surface water supplies are obtained for use on lands of the County, or as further and more accurate quantification of groundwater resources within the County is developed and groundwater management plans for affected basins have been adopted;

(D) Much of the economic production of the County depends upon the use of groundwater;

(E) The groundwater of Shasta County provides a significant amount of water for domestic uses throughout the County;

(F) The groundwater of Shasta County has been and will continue to be a vital part of the economic well-being and stability of the County;

(G) Because of the need for increased water supply to meet future needs within the county, and because surface water supplies obtained in the future may need to be used conjunctively with available local groundwater for reasonable and beneficial local uses, it is vital that the County's ground water supply and quality be preserved;

(H) Although the County intends to jointly undertake with affected local agencies to develop an integrated water resources management plan for each of the various regions of Shasta County to further plan and implement prudent water management practices, interim measures addressing the extraction of groundwater for export are needed to protect the existing groundwater basins;

(I) It is essential for information gathering and monitoring purposes, and for the protection of the County's groundwater resources, that the County adopt a permit process addressing the extraction of groundwater for use outside of the County; and

(J) In adopting and codifying this groundwater management ordinance the County does not intend to limit other authorized means of managing Shasta County groundwater, and intends to work cooperatively with interested local agencies to further develop and implement joint groundwater management practices.

Section 18.08.020. Definitions.

(A) "Annual yield" means the maximum quantity of water which can be withdrawn annually from a groundwater supply without causing a significant adverse impact on the affected basin or adverse water quality conditions, including the amount of water which can be extracted without:

(1) Exceeding in any calendar year the long-term mean annual water supply of the basin (considering all sources of recharge and withdrawal);

(2) Lowering water levels so as to make further drilling of water wells uneconomical;

(3) Causing water pumped from the basin to deteriorate below established drinking water quality standards;

(4) Violating water rights or restrictions in pumpage in the groundwater basin as established by court adjudication or application of state or federal law.

(B) "Aquifer" means a geologic formation that stores, transmits and yields significant quantities of water to wells and springs.

(C) "Board" means the Board of Supervisors of Shasta County.

(D) "Commission" means a nine (9) person decision-making body which shall be appointed, with membership serving at the pleasure of the appointing authority, as follows: one (1) representing the County of Shasta; three (3) representing the cities of Redding, Anderson and Shasta Lake, to be appointed by the City Selection Committee established pursuant to state law; three (3) representing independent water districts, including one such district located in Eastern Shasta County, to be appointed by the Special District Selection Committee established pursuant

to state law; one (1) representing agricultural users, to be nominated by the Shasta County Farm Bureau and appointed by the Board of Supervisors; and one (1) representing industrial users, to be appointed by the Board of Supervisors.

(E) "County" means the County of Shasta.

(F) "Director" means the Chief Engineer of the Shasta County Water Agency, or his designee.

(G) "Export" means the transportation of water from within Shasta County to any location outside of the County *by pipe, canal, stream, river or similar conveyance method. The transportation of bottled water outside of the County by vehicle shall not constitute an "export" as that term is used in this chapter.*

(H) "Groundwater management plan" means a plan prepared pursuant to the California Groundwater Management Act (commencing with Water Code Section 10750 et seq.) or California Water Code Section 1220, and adopted by the Board.

(I) "Groundwater" means all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels.

(J) "Historical practice" means the consistent or predominant practice of an applicant within seven (7) years preceding the operative date of this chapter.

(K) "Hydraulic gradient" means the slope of the water table.

(L) "Hydrology" means the origin, distribution, and circulation of water through precipitation, stream flow, infiltration, groundwater storage, and evaporation.

(M) “Integrated water resources management plan” means a comprehensive surface and groundwater planning and management program involving affected local agencies.

(N) “Interested party” means any local agency or any property owner overlying an aquifer from which groundwater is proposed to be, or has been pumped, which is subject to the permit requirements of this chapter.

(O) “Local Agency” means a city located within Shasta County, or an independent special district wholly or in part located within the boundaries of the County, which is a purveyor of waters for agricultural, domestic, or municipal use.

(P) “Overdraft” means the condition of a groundwater supply in which the amount of water extracted by pumping exceeds the amount of water replenishing the supply, and the point at which extractions from the supply exceed its annual yield.

(Q) “Percolation” means the movement of water through the soil to the groundwater table.

(R) “Permeability” means the capability of the soil or another geologic formation to transmit water.

(S) “Piezometric surface” means the surface to which the water in a confined aquifer will rise.

(T) “Porosity” means void or open spaces in alluvium and rocks that can be filled with water.

(U) “Recharge” means flow to groundwater storage from precipitation, irrigation, infiltration from streams, spreading basins and other sources of water.

(V) "Specific capacity" means the volume of water pumped from a well in gallons per minute per foot of draw down.

(W) "Spreading water" means discharging native or imported water to a permeable area for the purpose of allowing it to percolate to the zone of saturation including well injection and other forms of artificial recharge and replenishment.

(X) "Transmissivity" means the rate of flow of water through an aquifer.

(Y) "Usable storage capacity" means the quantity of groundwater of acceptable quality that can be economically extracted from storage.

(Z) "Water table" means the surface or level where groundwater is encountered in a well in an unconfined aquifer.

(AA) "Water agency" means the Shasta County Water Agency.

(BB) "Water year" means the year beginning October 1 and ending the last day of the following September.

(CC) "Zone of saturation" means the area below the water table in which the soil is saturated with groundwater.

Section 18.08.030. Permit Required for Export for Use Outside County.

It shall be unlawful to extract groundwater underlying lands in Shasta County for export of that groundwater, either directly or indirectly, without first obtaining a permit as provided in this chapter. For purposes of this section, the extraction of ground water to replace a surface water supply which has been, is being, or will be exported for commercial purposes shall be considered an extraction of groundwater that is subject to this ordinance.

Section 18.08.040. Exclusions From Permit Requirements.

This chapter shall not apply to the extraction of groundwater in the following circumstances:

- (A) To prevent the flood of lands; or
- (B) To prevent the saturation of the root zone of agricultural land; or
- (C) For use within the boundaries of a local agency which is located in part within County and located in part in another County where such extraction quantities and use are consistent the with historical practice of the local agency; or
- (D) For extractions to boost heads for portions of local agency facilities, consistent with the historical practice of the local agency; or
- (E) To enable water export that is expressly permitted by terms of an adopted groundwater management plan; or
- (F) Where the person or entity demonstrates to the satisfaction of the Director that its water management practices will result in an average annual groundwater basin recharge which is equal to or in excess of its extraction of groundwater for export uses.

The person or entity asserting that one or more of the exclusions of this section applies shall have the burden of supporting its assertion that no permit is required.

Section 18.08.050. Application for a use Permit.

An application for a permit shall be filed with the Water Agency on a form specified by the Director, which shall include all information specifically requested thereon and other information requested by the Director to address specific aspects of the proposed groundwater export. Concurrently, the applicant shall consent to the commencement and financing of

appropriate environmental review as may be required by the California Environmental Quality Act ("CEQA"; Public Resources Code §21000 et seq.) and applicable guidelines. The application for a permit and required environmental review shall be accompanied by the deposit of fees for these purposes, as shall be established by Board resolution.

Section 18.08.060. Procedures for Processing.

(A) Within ten (10) calendar days of filing of a complete permit application, which shall include all of that information and the deposit of fees required by section 18.08.050, the Director shall post a notice on the County Public Works Department public bulletin board that an application has been filed, and shall send a copy of the notice to all local agencies within the County which have jurisdiction over lands overlying or adjacent to the location of the proposed extraction, and to any interested party who has made a written request to the Director for such notice within the last twelve (12) calendar months, seeking written comments. Upon posting and otherwise providing notice of the application, the Director shall review the application to determine whether it is complete for purposes of proceeding pursuant to CEQA requirements and shall thereafter commence environmental review as may be appropriate.

(B) The Director may review the matter of the application with affected County departments, staff of the State Department of Water Resources, staff of the Regional Water Quality Board - Central Valley Region, and any interested local water agency within whose boundary the proposed activity is proposed to occur. If the applicant is proposing to extract groundwater from within or adjacent to an area within the County for which a groundwater management plan has been adopted, but which plan does not expressly permit the export of water, the Director shall consider the contents of any such plan and other relevant information provided

by each affected local agency. Any interested person or agency may provide written comments relevant to the matter of the proposed extraction of groundwater, which shall be submitted within thirty (30) days of the date of posting and mailing the notice of filing the permit application.

(C) The environmental review shall be undertaken in accordance with CEQA and implementing guidelines. All costs of the environmental review determined appropriate by the Water Agency shall be the responsibility of the applicant.

(D) Upon completion of the required environmental review the Director shall forward the application, together with any written comments received, environmental documentation and the Director's recommendations, to the Commission. Upon receipt of the Director's recommendations, the Commission shall immediately schedule a public meeting to consider the permit application, which shall be noticed pursuant to Government Code Section 6061.

Section 18.08.070. Public Review Concerning Issuance of Permit.

(A) Formal rules of evidence shall not apply in the Commission's public review proceeding for the application, but the Commission may establish such rules as will enable the expeditious presentation of the matter and receipt of relevant information thereto. At the Commission's public review, which may be continued from time to time as determined appropriate by the Commission, the applicant shall be entitled to present any oral or documentary evidence relevant to the application, and the applicant shall have the burden of proof of establishing the facts necessary for the Commission to make the required findings. The Commission shall also hear relevant evidence presented by other interested persons and entities, the Director, other County staff, and the public.

(B) The Commission, in considering each permit application, shall consider all potential impacts the proposed export would have on the affected aquifer, including but not limited to potential hydraulic gradient, hydrology, percolation, permeability, piezometric surface, porosity, recharge, annual yield, specific capacity, spreading waters, transmissivity, usable storage capacity, water table and zone of saturation impacts.

(C) The Commission may request any additional information it deems necessary for its decision. The cost of such additional information shall be borne by the applicant.

Section 18.08.080. Findings Required for Granting of Permit Approval or Denial.

The permit may only be granted if there is a majority of the total membership of the Commission present at the required public meeting and a majority of the total membership of the Commission finds that the proposed groundwater extraction will not have significant detrimental impacts on the affected groundwater basin by determining that:

(A) The proposed extraction will not cause or increase an overdraft of the groundwater underlying the County;

(B) The proposed extraction will not adversely affect the long term ability for storage or transmission of groundwater within the aquifer;

(C) The proposed extraction will not exceed the annual yield of the groundwater underlying the County and will not otherwise operate to the injury of the reasonable and beneficial uses of overlying groundwater users;

(D) The proposed extraction will not result in an injury to a water replenishment, storage, or restoration project operating in accordance with statutory authorization;

(E) The proposed extraction is in compliance with Water Code Section 1220; and

(F) The proposed extraction will not be otherwise detrimental to the health, safety and welfare of property owners overlying or in the vicinity of the proposed extraction site(s).

If the Commission determines that one or more of the findings required by this section cannot be made, upon considering the proposed export together with potential conditions of permit issuance, it shall deny the permit application. The basis for any such denial shall be reflected in the Commission's official record of proceedings.

The applicant shall be notified in writing of the Commission's decision on the application, including the basis for denial where applicable, within fifteen (15) days of the final Commission action on the application.

Section 18.08.090. Conditions of Permit Approval.

If the permit is to be approved, the Commission shall impose appropriate conditions of permit issuance so as to prohibit overdraft or other adverse conditions, and may impose other conditions that it deems necessary to promote or maintain the health, safety, and welfare of Shasta County residents. Such other conditions of permit issuance may include, but shall not be limited to, requirements for observation and/or monitoring wells. Notwithstanding the foregoing, the Commission may issue the permit if the Commission finds that the applicant will provide adequate mitigation to offset all adverse effects that would otherwise result from the proposed extraction.

Section 18.08.100. Reapplication After Commission Denial.

Reapplication for a permit which has been denied by the Commission may not be filed with the Water Agency until the water year following the denial. For any such reapplication to be accepted as complete, and for it to be further reviewed in accordance with the procedures set forth in sections 18.08.060 through 18.08.090, it must be accompanied by information that

demonstrates a significant change in those circumstances which represented the factual basis for the previous permit application denial.

Section 18.08.110. Appeal of Commission Action on Application.

(A) The applicant and any interested party may appeal a decision of the Commission by filing a written request with the Clerk of the Board within (15) days of issuance of the decision to be appealed from. Any such appeal shall specifically set forth the procedural and substantive reasons for the appeal or be deemed incomplete and ineffectual. The Clerk shall set a Board hearing time within ten (10) days of receipt of a complete request for appeal which shall be heard within twenty (20) days of notice thereof. Written notice of the appeal shall be given to the Commission, the permit applicant, the appellant, and all other interested parties, and the appeal hearing shall be published pursuant to Government Code Section 6061.

(B) The Board shall hear the appeal as to those disputed matters which were heard by the Commission and are specifically set out in the appeal request, but may continue such hearing from time to time as determined appropriate by the Board. The appeal before the Board shall not be conducted with formal rules of evidence, but rather shall be conducted under such rules as set by the Board for the expeditious presentation of the matter and relevant information pertaining thereto by the appellant and by other parties interested in the Commission decision appealed from. An appeal decision by the affirmative vote of a majority of Board members shall be the final administrative decision in the matter.

(C) In any appeal taken under this section the permit applicant who is proposing to extract groundwater for exportation outside of the County shall have the burden of proving to the satisfaction of the Board, that such extraction is either exempt from permit requirements pursuant

to Section 18.08.040 or will not have significant detrimental impacts based on the criteria set forth in Section 18.08.080.

Section 18.08.120. Challenge to Approved Permit.

(A) Any interested party may challenge the ongoing extraction of groundwater pursuant to an approved permit during the term of the permit based on allegations that one or more of the following circumstances exists:

(1) there has been or is an ongoing violation of one or more conditions of an approved permit; or

(2) the extraction of groundwater pursuant to this chapter has caused or increased an overdraft in the basin; has adversely affected the long term ability for storage or transmission of groundwater in the affected aquifer; exceeds the annual yield of the affected groundwater basin; operates to the injury of the reasonable and beneficial uses of overlying groundwater users; is in violation of Water Code Section 1220; or results in an injury to a water replenishment, storage, or restoration project operating in accordance with statutory authorization; or

(3) the continued extraction of groundwater pursuant to a previously approved permit will be detrimental to the health, safety and welfare of one or more affected local agencies or other interested parties.

(B) A challenge pursuant to this section shall be commenced by filing a written request with the Director on a form prescribed by the Director. Such a challenge shall allege one or more of the circumstances specified by this section and shall generally describes facts in support of those alleged circumstances. In such event the Director shall, within ten (10) days of receipt of such challenge in a completed form, give notice of the challenge to the Commission, the

permittee, the appellant, all affected local agencies, and to any other interested party which has requested such notice. A Commission review shall be held on the matter following the procedures set out in Section 18.08.070. The Commission's decision may be to deny the challenge and leave the previously issued permit unchanged, to grant the challenge and terminate the permit, or to impose modified conditions to the permit, which the permittee shall be obligated to adhere to if continued extraction for export purposes is to occur, based on findings addressing the criteria specified in Section 18.08.080.

(C) The standard for review in any such challenge proceeding shall be substantial evidence. The burden of proof shall be upon the person or entity extracting the groundwater that is the subject of the challenge.

(D) Appeals from Commission decisions on challenges may be made to the Board in accordance with the procedures in Section 18.08.110.

Section 18.08.130. Permit Term.

Except as may be modified pursuant to Section 18.08.110, all approved permits shall be valid for a term not to exceed three (3) water years from the date of the issuance of the permit, as determined by the approving body; however, if the permit is for extraction as part of a conjunctive use program that has been approved by the Board the permit shall not exceed the length of the term of that program. For the purpose of calculation, the water year in which the permit is granted shall not be counted in determining the three year time period if less than four (4) months remain in the water year at the time of final permit approval.

Section 18.08.140. Limitation of Permit.

(A) Nothing contained in this chapter nor in the conditions an issued permit shall be construed as giving the permittee an exclusive right to groundwater extraction, nor as establishing a compensable right in the event the permit is subsequently terminated or modified following a challenge to the permit.

(B) The issuance of a permit pursuant to this chapter shall evidence that the health, welfare, and safety of County residents will not be harmed by the extraction and exportation of local groundwater outside the County boundaries.

(C) Any issued permit shall not exempt, supersede, or replace any requirements of federal, state, and local laws and regulations, including but not limited to California Water Code section 1220, the Groundwater Management Act, and any other statutes governing California groundwater law, well drilling and maintenance or building permit requirements, and is to be construed and applied in harmony with applicable existing law.

(D) Upon the adoption of a groundwater management plan or similar plan affecting a particular groundwater basin or aquifer within Shasta County, as approved the Board of Supervisors in concert with other local agencies having jurisdiction, any provisions of such plan or permits issued thereunder shall supersede the provisions of this chapter and permits approved hereunder, in the event of any inconsistency.

Section 18.08.150. Inspection.

The Director, with good cause, may at any and all reasonable times enter any and all places, property, enclosures and structures, for the purpose of making examinations and investigations to determine whether any provision of this chapter has been violated.

Section 18.08.160. Civil Penalty.

Upon determining that a violation of this chapter has occurred or is ongoing, the County may elect to proceed with a civil action against a violator, including, but not limited to, injunctive relief. Any person or entity who violates this chapter shall also be subject to fines of up to five thousand dollars (\$5,000) per separate violation. A person shall be deemed to have committed separate violations for each and every day or portion thereof during which any such violation is committed, continued, or permitted, as well as for each and every separate groundwater well within which any such violation is committed, continued or permitted.

SECTION 2. If any section, subsection, sentence, clause or phrase of this chapter is for any reason held illegal, invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions hereof.

SECTION 3. This ordinance shall take effect and be in full force and effect thirty (30) days after its passage, and prior to the expiration of fifteen (15) days from the passage thereof shall be published once in one or more newspapers of general circulation, printed and published in the County of Shasta.

DULY PASSED AND ADOPTED this 27th day of January, 1998, by the Board of Supervisors of the County of Shasta by the following vote:

AYES: Supervisors Clarke, Dickerson, Fust, Hawes, and Wilson

NOES: None

ABSENT: None

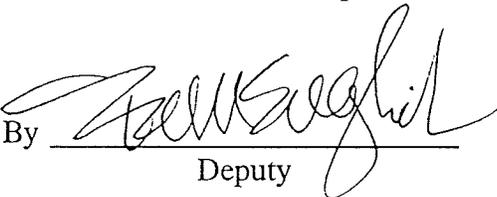
ABSTAIN:



PATRICIA A. CLARKE, Chairman
Board of Supervisors
County of Shasta
State of California

ATTEST:

CAROLYN TAYLOR
Clerk of the Board of Supervisors

By 
Deputy

APPENDIX C

Redding General Plan Public Facilities Element *(excerpt)*

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APPENDIX C

Redding General Plan Public Facilities Element (*excerpt*)

The *Public Facilities Element* of the General Plan Policy Document establishes goals with regard to the development of infrastructure within the City's planning area. These goals are intended to insure that water supply and supply capacity are able to meet the demands for future growth.

Public Facilities Goal #1:

Ensure that adequate public services and facilities are available to support development in an efficient and orderly manner. Policies to achieve this goal are:

- 1A. Require that all new development, including major modifications to existing development, construct necessary on-site infrastructure to serve the project in accordance with City standards.
- 1B. Require that all new development, including major modifications to existing development, construct or provide a fair share contribution toward the construction of any off-site improvements necessary to offset project impacts and/or support the project.
- 1C. When reviewing applications for land use designation changes (i.e. zone change, General Plan Amendment, Specific Plan), conduct a thorough analysis of the impacts of the proposed changes on all aspects of the City's infrastructure system, and require mitigation as appropriate.
- 1D. Require that the provision of streets, sewer, electric, water, drainage, and other needed infrastructure be coordinated in a logical manner between adjacent developments so as to reduce design, construction and maintenance costs.
- 1E. Require that infrastructure be designed and constructed to meet ultimate capacity needs, pursuant to a master plan, so as to avoid the need for costly retrofitting.
- 1F. Utilize reimbursement agreements, where appropriate, when an individual developer installs upgraded or oversized facilities and the cost of the facilities exceeds the development's proportional share of responsibility.
- 1G. Direct growth toward areas that already have infrastructure capacity available by providing incentives for quality infill development.
- 1H. Encourage clustering of development to maximize the use and efficiency of infrastructure facilities.
- 1I. Regularly update and adopt the City's Capital Improvement Program (CIP) to prioritize funding for public works projects in accordance with the General Plan.
- 1J. Recognize the considerable public investment made in existing utility and street infrastructure by ensuring that funding for maintaining its integrity, reliability, and service

levels is on par with investment in new facilities.

Public Facilities Goal #5:

Ensure that adequate public services and facilities are available to support development in an efficient and orderly manner. Policies to achieve this goal are:

- 5A. Establish the following thresholds for water services and facilities:
 - Program planned expansion activities, when demand at an existing treatment plant reaches within 10 percent plant capacity.
 - Reservoir capacity should be maintained at 20 percent of maximum day demand.
 - Develop additional water supplies from wells at least two years prior to a projected water deficit.

- 5B. Develop and maintain a regular program for systematically replacing deteriorated or deficient water pipes.

- 5C. Require water distribution systems to be interconnected ("looped") wherever feasible to facilitate the reliable delivery of water anywhere in the City.

- 5D. Immediately begin the process to acquire additional allocations from the U.S. Bureau of Reclamation.

- 5E. Be actively involved in surface water adjudication, which could have a negative impact on the City's water rights and/or allocation.

- 5F. Periodically update the City's Master Water Plan to reflect changes to the General Plan General Plan Diagram, water use pattern changes, regulatory changes, or other circumstances.

APPENDIX D

Redding General Plan Natural Resource Element *(excerpt)*

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APPENDIX D

Redding General Plan Natural Resource Element (*excerpt*)

Natural Resource Goal #2:

Develop and maintain adequate water supplies for domestic and fire suppression purposes. Policies to achieve this goal are to:

- 2A. Continue to evaluate options for increasing the City's and other water providers' water supplies, including, but not limited to, acquiring additional allocations from the Sacramento River, development of additional wells, and enhancement of water-storage and treatment facilities.
- 2B. Encourage water-conservation practices including, but not limited to, use of:
 - A tiered pricing system for water, which is tied to, the amount consumed by a household or business.
 - Native plants or other plants with low water requirements in public and private development projects.
 - Drip irrigation systems.
 - "Gray water" for landscape irrigation if approved by Shasta County.
- 2C. Utilize water reclamation projects in landscape and agricultural uses if approved by the California Regional Water Quality Control Board and State Department of Health Services.
- 2D. Support efforts to limit exportation of surface water to other areas of the State and to protect local water rights.

Natural Resource Goal #3:

Preserve and protect the quantity and quality of groundwater resources within the planning area. Policies to achieve this goal are to:

- 3A. Provide maximum groundwater-recharge opportunities by maintaining the natural condition of waterways and floodplains to the extent feasible given flood-control requirements. City development regulations generally prohibit floodplain development, as these protected areas represent significant opportunities for stormwater management and groundwater recharge.
- 3B. Comply with the Regional Water Quality Control Board's regulations and standards to maintain and improve groundwater quality in the Planning Area.
- 3C. Support the preparation of a groundwater management plan for the Redding Groundwater Basin that will address long-term sustainability of the resource.

3D. Support efforts to prevent exportation of groundwater to other areas of the State and to retain local control over the resource.

3E. Work with appropriate State, Federal, and local agencies to protect, improve, and enhance groundwater quality in the region.

Natural Resource Goal #4:

Prevent and remedy surface water, groundwater and soil contamination. Policies to achieve this goal are to:

4A. Discourage the establishment of any new septic systems, except in areas where residential densities are low (1–5 units per acre and larger) and soils are suitable for septic system use.

4B. Continue to accept, recycle, and/or properly dispose of household hazardous wastes through ongoing operation of the City's Household Hazardous Waste Collection Program.

4C. Work with appropriate local, State, and Federal agencies to ensure that those responsible for soil, surface-water, and/or groundwater contamination are required to initiate, monitor, and complete full remediation activities.

4D. Work with Shasta County and other appropriate agencies to educate the public and business owners regarding the proper handling and disposal of hazardous materials and household hazardous waste.

4E. Establish and enforce penalties for illegal dumping of both hazardous and non-hazardous materials.

APPENDIX E

California Urban Water Conservation Council Reports: 2013 & 2014

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CUWCC BMP Retail Coverage Report 2013

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

5993 City of Redding

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:

Title:

Email:

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.		https://www.municode.com/library/ca/redding/codes/code_of_ordinances?nodeId=16572	Municipal Code 14.08.230: Customer Responsibility for Maintenance; Municipal Code 16.70.160 Water Waste Prevention; Municipal Code 14.09 Water Shortage Contingency Plan.
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			City of Redding Municipal Code 16.70: Water Efficient Landscape Ordinance.
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			

At Least As effective As

Exemption



CUWCC BMP Retail Coverage Report 2013
Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

**ON TRACK
Exempt**

5993 City of Redding

Completed Standard Water Audit Using AWWA Software? Yes

AWWA File provided to CUWCC? No

AWWA Water Audit Validity Score?

Complete Training in AWWA Audit Method No

Complete Training in Component Analysis Process? No

Component Analysis? No

Repaired all leaks and breaks to the extent cost effective? Yes

Locate and Repair unreported leaks to the extent cost effective? No

Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. No

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
424				False		

At Least As effective As

Exemption

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

**ON TRACK
Exempt**

5993 City of Redding

Numbered Unmetered Accounts No

Metered Accounts billed by volume of use Yes

Number of CII Accounts with Mixed Use Meters

Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? No

Feasibility Study provided to CUWCC? No

Date: 1/1/0001

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters No

At Least As effective As

Exemption

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

Not On Track

5993 City of Redding

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Commodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Increasing Block	Yes	6568604.00	6512410.00
Multi-Family	Uniform	Yes	1133800.00	1124100.00
Commercial	Uniform	Yes	2486869.00	2465595.00
Industrial	Uniform	Yes	87169.00	86423.00
Other	Uniform	Yes	46992300	465901.10
			10746365.00	10654429.10

Calculate: V / (V + M) 50 %

Implementation Option: Use Annual Revenue As Reported

Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: Yes

Customer Class	Rate Type	Conserving Rate?
Single-Family	Uniform	Yes
Multi-Family	Uniform	Yes
Commercial	Other	No

At Least As effective As

Exemption

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

5993

City of Redding

Retail

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year? Yes

Public Outreach Program List	Number
General water conservation information	36
Website	24
Total	60

Did at least one contact take place during each quarter of the reporting year? Yes

Number Media Contacts	Number
Television contacts	8
Radio contacts	4
Newspaper contacts	8
Total	20

Did at least one website update take place during each quarter of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Outreach	30000
Total Amount:	30000

Description of all other Public Outreach programs

Comments:

The Water Utility, in conjunction with other local water purveyors and the ACWA, sponsored a 2 part water-education event called California Water Series.

At Least As effective As

Exemption



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

5993 City of Redding

Retail

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Materials meet state education framework requirements? Yes

The Water Utility has developed an Educational Resources catalog that describes all the curriculum materials available for loan to teachers. In addition, it describes resources available to educators and community groups.

Materials distributed to K-6? Yes

Educational resources catalog details materials available for distribution

Materials distributed to 7-12 students? Yes (Info Only)

Educational resources catalog details materials available for distribution

Annual budget for school education program: 6000.00

Description of all other water supplier education programs

Materials meet state Educational Framework requirements and are available upon request

Comments:

At Least As effective As No

Exemption No 0



CUWCC BMP Retail Coverage Report 2014

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

5993 City of Redding

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:

Title:

Email:

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.	Copy_of_RMC_Water_Waste_References.docx	https://www.municode.com/library/ca/redding/codes/code_of_ordinances?nodeId=16572	Municipal Code 14.08.230: Customer Responsibility for Maintenance; Municipal Code 16.70.160 Water Waste Prevention; Municipal Code 14.09 Water Shortage Contingency Plan.
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			

At Least As effective As

Exemption



CUWCC BMP Retail Coverage Report 2014
Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

Comments:



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

**ON TRACK
Exempt**

5993 City of Redding

Completed Standard Water Audit Using AWWA Software? Yes

AWWA File provided to CUWCC? No

AWWA Water Audit Validity Score?

Complete Training in AWWA Audit Method Yes

Complete Training in Component Analysis Process? Yes

Component Analysis? No

Repaired all leaks and breaks to the extent cost effective? Yes

Locate and Repair unreported leaks to the extent cost effective? Yes

Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. No

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
942				False		

At Least As effective As

We currently use Cartograph as a Work Order database and are redesigning input fields to capture missing data. However, this will take time to implement as we have to budget resources and time to ugrades software.

Exemption

Comments:



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

**ON TRACK
Exempt**

5993 City of Redding

Numbered Unmetered Accounts No

Metered Accounts billed by volume of use Yes

Number of CII Accounts with Mixed Use Meters

Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? No

Feasibility Study provided to CUWCC? No

Date: 1/1/0001

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters Yes

At Least As effective As

With the City's upgrade to the Customer Service Billing Software, we will be able to identify all CII accounts from which to conduct a feasibility study. We have no funding this budget cycle to perform the analysis, but will budget accordingly.

Exemption

Comments:



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

Not On Track

5993 City of Redding

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Commodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Increasing Block	Yes	11209341	
Multi-Family	Uniform	Yes		
Commercial	Uniform	Yes	5191112	
Industrial	Uniform	Yes		
Institutional	Uniform	Yes		
			16400453	

Calculate: V / (V + M) 100 %

Implementation Option: Use Annual Revenue As Reported

Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: Yes

Customer Class	Rate Type	Conserving Rate?
Single-Family	Uniform	Yes
Multi-Family	Uniform	Yes
Commercial	Other	No

At Least As effective As

Exemption

Comments:

Residential Revenue includes SF and MF and is the sum of both fixed and commodity revenue. Commercial Revenue includes all CII customers and is the sum of both fixed and commodity Revenue. SF Sewer Revenue includes all revenue from all sources.



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

5993

City of Redding

Retail

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year? Yes

Public Outreach Program List	Number
General water conservation information	6
Landscape water conservation media campaigns	1
Website	5
Total	12

Did at least one contact take place during each quarter of the reporting year? Yes

Number Media Contacts	Number
Television contacts	6
Radio contacts	2
Newspaper contacts	2
Total	10

Did at least one website update take place during each quarter of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Outreach	30000
Total Amount:	30000

Public Outreach Additional Programs

Fix A Leak Workshop

City Service & Energy Fair

Description of all other Public Outreach programs

Comments:

The Water Utility, in conjunction with other local water purveyors and the ACWA, sponsored a 2 part water-education event called California Water Series.

At Least As effective As

No



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Exemption

No

0



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

5993 City of Redding

Retail

Does your agency implement School Education programs? No

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Materials meet state education framework requirements? Yes

The Water Utility has developed an Educational Resources catalog that describes all the curriculum materials available for loan to teachers. In addition, it describes resources available to educators and community groups.

Materials distributed to K-6? Yes

Educational resources catalog details materials available for distribution

Materials distributed to 7-12 students? Yes (Info Only)

Educational resources catalog details materials available for distribution

Annual budget for school education program: 5000.00

Description of all other water supplier education programs

Materials meet state Educational Framework requirements and are available upon request

Comments:

At Least As effective As No

Exemption No 0



CUWCC BMP Coverage Report 2014

5993 City of Redding

Baseline GPCD: 272.45

GPCD in 2014 240.22

GPCD Target for 2018: 223.40

Biennial GPCD Compliance Table

ON TRACK

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	262.60	100%	272.40
2012	2	92.8%	252.80	96.4%	262.60
2014	3	89.2%	243.00	92.8%	252.80
2016	4	85.6%	233.20	89.2%	243.00
2018	5	82.0%	223.40	82.0%	223.40

APPENDIX F

City of Redding Water Utility Emergency Response Plan Section 2:

Water Utility Disaster Response Plan

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CITY OF REDDING

WATER UTILITY

DISASTER RESPONSE PLAN

FOR

FOOTHILL WATER TREATMENT PLANT
3100 FOOTHILL BLVD, REDDING, CA

BUCKEYE WATER TREATMENT PLANT
11501 BENSON ROAD, SHASTA, CA

CASCADE & ENTERPRISE
GROUNDWATER WELLS



Revised: October 2015

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DISASTER RESPONSE PLAN

GENERAL

The City of Redding Water Utility is committed to providing a safe, pure and wholesome potable water supply to all of its water customers.

The following regulations associated with the legal requirements of preparing a Disaster Response Plan (Emergency Response Plan) are:

1. California Government Code Section 8607.2 - Public Water System Plans
2. United States Public Law 107-188 Public Health Security and Bioterrorism Preparedness and Response Act of 2002.
3. California Health and Safety Code, Sections 116460, 116555 and 116750.

Disasters/emergencies that are likely to occur in the water system's service area that are addressed are: earthquake, major fire emergencies, water outages due to loss of power, localized flooding, water contamination, and acts of sabotage.

To continue minimum service levels and mitigate the public health risks from drinking water contamination that may occur during a disaster or other emergency events. In order to provide reliable water service and minimize public health risks from unsafe drinking water during those events, the City of Redding Water Utility water system proposes the following plan that defines how it will respond to emergencies and/or disasters that are likely to affect its operation.

THE PLAN

If the Water Utility experiences contamination or disruption of any of its water sources, through one of the above unforeseen circumstance, which includes the Sacramento River raw water supply to the Foothill Water Treatment Plant, the Spring Creek Conduit raw water supply from Whiskeytown Lake which supplies water through the Spring Creek Conduit to the Buckeye Water Treatment Plant or the sixteen groundwater wells, this disaster response plan contains the following information concerning:

- **Disaster Planning**
- **Background Information**
- **Notification Plan**
- **Sampling Plan**
- **Enforcement**
- **Water Sources**
- **Distribution System Operations Changes**
- **Chlorine Emergency Procedures**
- **Hazardous Materials Incident Plan**
- **Employee Emergency Call Out Lists**
- **Shasta County & Cal Trans Emergency Call Out Lists**
- **Miscellaneous Emergency Telephone Numbers**
- **Contractor Listings for Emergency Situations**
- **Suppliers for Emergency Situations**

DISASTER PLANNING

It is important to note all actions under this plan must also be coordinated with the City of Redding Fire Department's Emergency Operation Center (EOC) located in Building #4 at 20055 Viking Way, Redding, and all other City of Redding Departments if applicable.

The City of Redding has an **Emergency Operations Center** and **Department of Public Works Emergency Guidelines Plan** to help coordinate the City's efforts to handle a myriad of potential emergencies. The City's Water Utility Disaster Response Plan is part of the Redding Department of Public Works Emergency Guidelines Plan. All Department of Public Works Managers maintain an up-to-date copy of the City's Emergency Operations Plan and Department of Public Works Emergency Guidelines Plan which is the basis for the coordination of operations and the management of critical resources during natural or manmade emergencies.

BACKGROUND INFORMATION

The City of Redding's water supply comes from three sources, the Sacramento River, Whiskeytown Lake (via the Spring Creek Conduit) and groundwater wells from the Redding Groundwater Basin. The Sacramento River raw water is pumped from Pump Station No.1 at 2300 Riverside Drive to the Foothill Water Treatment Plant (FWTP) located at 3100 Foothill Blvd. The Whiskeytown Lake raw water is conveyed through the Spring Creek Conduit (between Whiskeytown Lake and Keswick Lake) to the Buckeye Water Treatment Plant (BWTP) located at 11501 Benson Road in Shasta, CA, as shown on the Redding Water System Map 2011, Exhibit "A".

Sixteen groundwater wells are located in the Cascade and Enterprise areas of the City. Four wells and one standby well located in the Cascade area, on the south side of the City limits and ten wells and two standby wells are located in the Enterprise area, on the east side of the City limits. All the groundwater wells are also shown on the Redding Water System Map 2011, Exhibit "A."

The entire Redding Water System, with its seven pressure zones are all inter-tied with booster pump stations, pressure regulating stations, supervisory vaults and closed valves between the a joining pressure zones (depicted in Exhibit "A," with detailed drawings depicted in the Water System Atlas located in Redding Public Works Field Operations, 20055 Viking Way and carried in all Water Utility vehicles). The internet's City of Redding Online Portal\City Departments\Support Services\GisMap\Go to Interactive Map\Interactive Map\Water also displays the City's water infrastructure.

In the event of a Sacramento River contamination or disruption of pumping that eliminates the ability to use Pump Station No.1 as a water source for the FWTP, the use of other sources would be implemented. The City has 32.7 million gallons of reservoir storage capacity, the BWTP can produce 14 Million Gallons per Day (MGD) and 13 MGD can be produced from the groundwater well system. The combination of the BWTP and groundwater wells could provide approximately 27 MGD of capacity. Depending on what time of year the incident occurred would dictate the level of conservation and public cooperation required. During the winter months very little impact would be felt. The average demand for the four winter months is 14 MGD. However, during the summer months customers would be required to eliminate all outside irrigation and the use of construction water during the emergency situation. Use of water would be limited to activities necessary to maintain the health, safety, and welfare of the customers of the City of Redding Water Utility.

In the event of Whiskeytown Lake contamination or disruption of the Spring Creek Conduit which eliminates the ability to use it as a water source for the BWTP, the use of other sources would be implemented. During the winter months very little impact would be felt. The City's Foothill Water Treatment Plant rated at 26 MGD would be able to provide the necessary water demand through Pump Houses No. 3 & No. 4. The groundwater well system could also supplement the Foothill Pressure Zone if additional water is required. However, during the summer months customers would be required to eliminate all outside irrigation and the use of construction water during the emergency situation. Use of water would be limited to activities necessary to maintain the health, safety, and welfare of the customers of the City of Redding Water Utility.

It is very unlikely that the Water Utility would lose all of its sixteen groundwater wells in the Cascade and Enterprise areas of the city at the same time. But, if a major disaster did occur, or there was contamination of the Redding Groundwater Basin, which is the supply source for all the utilities groundwater wells, or if the groundwater basin were to drop to an all time low due to a drought situation, the following mitigation measures would take effect. The Water Utility has 32.7 million gallons of reservoir storage capacity, the BWTP can produce 14 MGD and the FWTP can produce 26 MGD. The combination of the BWTP and FWTP could provide approximately 40 MGD of capacity. Both of these sources can supply water into the Enterprise and Cascade Pressure Zones that is supplied by the groundwater wells. However, during the summer months customers would be required to eliminate all outside irrigation and the use of construction water during the emergency situation. Use of water would be limited to activities necessary to maintain the health, safety, and welfare of the customers of the City of Redding Water Utility.

If the contamination or disruption of the City's water supply, from any of the sources, was determined to be a long-term event, the Water Utility would implement its **Drought Management Plan** to conserve water.

DROUGHT MANAGEMENT PLAN

Redding Municipal Code - Utilities - 14.09 - DROUGHT MANAGEMENT PLAN – WATER SHORTAGE CONTINGENCY PLAN

14.09.010 Purpose:

The purpose of this chapter is to establish a drought management plan to equitably distribute the available water to the city's customers and to ensure an adequate supply for human consumption, sanitation, and fire protection. The Water Shortage Contingency Plan will implement updated 2015 state-mandated conservation measures as well as provide provisions to better respond to future water shortage conditions. (Ord. 2523, § 2, 4-72015)

WATER QUALITY NOTIFICATION PLAN

All public notifications (Boil Water Order (BWO), Unsafe Water Alert (UWA) or Do Not Drink Notices) should be coordinated with the State Water Resources Control Board - Division of Drinking Water (SWRCB-DDW) District Engineer, County Environmental Health Department and the County Health Officer prior to issuing a public notice. However, any one of the three agencies can act in an emergency to immediately issue a BWO or UWA, if delays would jeopardize public health and safety. The SWRCB-DDW District Engineer or the water system must notify the County Health Department and the County Health Officer prior to or immediately after issuing a public notice. “Notice must be given directly to a person,” any message left on voice mail or answering machine is not sufficient to meet this requirement. Details of the person responsible for completing this notification and the method that will be utilized are contained in the Disaster Response Plan.

For any contamination or disruption of the Sacramento River or Whiskeytown Lake water source the Water Utility would enact the "Water Quality Notification Plan" as outlined:

(All telephone numbers in "Red Font" are considered **CONFIDENTIAL HOME TELEPHONE NUMBERS**)

WATER QUALITY NOTIFICATION PLAN				
Name	Title	Phone: Office Cell	Evening Phone	Fax
Brian Crane	Public Works Director	245-7155 638-5098	XXXXXXXX	225-7024
Jon McClain	Asst. Public Works Director	224-6029 227-6082	XXXXXXXX	225-6071
Vacant	Water Utility Manager			225-6071
Conrad Tona	Supervisor - Water Treatment	225-4475 227-4124	XXXXXXXX	225-4552
Dave Guadagni	Supervisor - Water Distribution	224-6033 604-5138	XXXXXXXX	225-6071
CALIFORNIA DEPARTMENT OF PUBLIC HEALTH PERSONNEL				
Office	Department of Public Health	224-4800	----	224-4844
Steve Watson	Water Resource Engineer	224-4828	XXXXXXXX	"
Mike McNamara	Associate Engineer	224-4873	XXXXXXXX	"
Michael T. Burgess	Senior Engineer	224-6506	XXXXXXXX	"
Katie Connaughton	Water Resource Engineer	224-4870	XXXXXXXX	"
Stephen Rooklidge	Drinking Water Engineer	224-2413	XXXXXXXX	"
If the above personnel cannot be reached, contact:				
Office of Emergency Service Warning Center (24 hrs): 800-852-7550 or 916-845-8911 When reporting a water quality emergency to the Warning Center, please ask for the State Water Resources Control Board - Division of Drinking Water Duty Officer				
SHASTA COUNTY HEALTH DEPARTMENT				
Carla Serio	County Health Department	225-5787	SHASCOM to notify	225-5413

SHASCOM, RADIO, TELEVISION STATIONS, NEWSPAPER

PHYSICIANS ANSWERING SERVICE, HOSPITALS & CLINICS

SHASCOM - REVERSE 9-1-1 NOTIFICATION SYSTEM			
Emergency Agency	Address	Telephone	Fax
Shasta Area Safety Communications Agency	3101 South St.	911 or 225-4200	N/A

RADIO, TELEVISION STATIONS & NEWSPAPER CONTACTS			
Station	Address	Telephone	Fax
KJPR radio	1721 Market St.	243-8000	898-4348
KLXR & 1230 AM Radio	1236 Market St.	244-5082	244-5698
KESR/KEWB/KKXS/KNCQ/KHRD Radio	1588 Charles Dr.	244-9700	244-9707
KFPR/HCHO Radio	603 N. Market	898-3930	898-4348
KQMS/KSHA Radio	3360 Alta Mesa Dr.	226-9500	221-4940
KVIP Radio	1139 Hartnell Ave.	222-4455	222-4484
KRCR 7R TV	755 Auditorium Dr.	243-7777	243-9382
KHSL 12 TV / KNVN 24 TV - Chico	3460 Silverbell Rd.	343-1212	342-7405
KIXE PBS 9 TV	630 N. Market St.	243-5493	243-7443
KGEC 26 TV	215 Lake Blvd.	242-6158	222-2340
RECORD SEARCHLIGHT	1101 Twin View Blvd.	225-8233	225-8236

PHYSICIANS ANSWERING SERVICES			
REDDING ANSWERING SERVICE	1410 Elmwood Dr.	245-1111	245-1101

HOSPITALS AND CLINICS			
MERCY MEDICAL CENTER	2175 Rosaline	225-6000	225-6233
SHASTA REGIONAL MEDICAL CENTER	100 Butte St.	244-5400	244-5331
PATIENTS HOSPITAL	2900 Eureka Way	225-8700	225-8721
EVERYDAY HEALTH CARE	3270 Churn Creek	638-7258	222-4480
ROCCUPATIONAL MEDICAL CENTER	1710 Churn Creek Rd.	646-4242	223-1847
HILLTOP MEDICAL CLINIC	1093 Hilltop Dr.	221-1565	221-3912
HILLTOP MEDICAL CLINIC (West)	2123 Eureka Way	246-4629	246-4621
REDDING HEALTH CARE	191 Hartnell Ave.	222-2113	222-1729
DIALYSIS NORTH	2500 Wyndham Ln.	229-1906	229-1906
DIALYSIS CLINIC	180 Northpoint Dr.	246-1140	246-1128
REDDING DIALYSIS	1876 Park Marina Dr.	246-7474	246-0179

All Telephone Numbers Listed Are Area Code "530"

- A. All the above named City, State and County personnel would be notified immediately by the City answering service during non-office hours or by Redding Department of Public Works secretaries during office hours by telephone or facsimile (Time required: 15 minutes two personnel).
- B. City of Redding answering service would be notified and given instructions on how to answer inquires. They would be told to call water utility personnel required to implement a working plan of action (Time required: 15 minutes, two personnel).
- C. SHASCOM would be notified by the City of Redding Water Utility to proceed with the Reverse 9-1-1 Notification System defining the Emergency. This system can quickly target a precise geographic, area such as a pressure zone, and saturate it with thousands of calls per hour. The public notification would include:
 - 1. Who - City of Redding Water Utility
 - 2. What drinking water regulation has been exceeded.
 - 3. When it occurred.
 - 4. Area of the City involved.
 - 5. Health significance involved.
 - 6. Action being taken.
 - 7. What customers should do.
- D. Radio Stations and Television Stations would also be notified by telephone or facsimile to broadcast the Emergency. The public notification would include:
 - 1. Who - City of Redding Water Utility.
 - 2. What drinking water regulations have been exceeded.
 - 3. When it occurred.
 - 4. Area of the City involved.
 - 5. Health significance involved.
 - 6. Action being taken.
 - 7. What customers should do during the emergency.

NOTE: *This information would have State Water Resources Control Board – Division of Drinking Water approval (Time required: ½ hour by telephone or facsimile, two personnel). Written notices would be hand delivered to above radio and television stations as soon as possible (Time required: one hour, two personnel using two vehicles). Estimated area coverage: one-half the population of the City.*

- E. All hospitals, medical facilities, and doctors would be notified, if necessary.

Notification would be by telephone or facsimile followed by hand delivered notice (Time required: ½ hour by telephone, two personnel). Hand-delivered notices to follow (Time required: One hour, four personnel).

- F. The Record Searchlight would be contacted with a written notification or facsimile which would include the items listed for radio and television stations in Section C (Time required: one hour, one personnel). Estimated coverage: thirty-five percent of the City population.
- G. If an outlying area is affected, water service crews and meter readers would be used with the aid of meter route maps, water utility water atlas maps, and street atlas maps to give notification door-to-door. This method could also be used for businesses, such as restaurants, RV parks, hotels, motels, and convalescent hospitals (Time required: one to two hours, 10 to 20 personnel).
- H. A long-term problem would be handled by all-of-the above, plus notification on our monthly billing of all City electric and water utility customers.
- I. The majority of water customers could be contacted within two to three hours utilizing a minimum of 15 personnel to a maximum of 30 personnel depending on the type of emergency and size of the area involved.
- J. Whenever a school or school system, the owner or operator of residential rental property, or the owner or operator of a business property receives, a notification from a person operating a public water system under any provision of this section, the school or school system shall notify school employees, students, and parents if the students are minors. The owner or operator of the business property shall notify employees of businesses located on the property.
 - 1. The operator shall provide the customer with sample notification from which may be used by the customer in complying with the requirements of this subdivision and which shall indicate the nature of the problem with the water supply and the most appropriate methods of notification which may include, but is not limited to, the sending of a letter to each water user and the posting of a notice at each site where drinking water is dispensed.
 - 2. The notice required by this subdivision will be given within ten days receipt of notification from the person operating the public water system.
 - 3. Any person failing to give notice as required by this subdivision will be civilly liable in an amount not to exceed One Thousand Dollars (\$1,000) for each day of failure to give notice.
 - 4. If any operator has evidence of a noncompliance with the requirements of this subdivision, the operator will report this information to the County Health Department at 225-5787 and the State Water Resources Control Board - Division of Drinking Water at 224-4800.
- K. The City of Redding would update the Water Utility website within 24 hours:

<http://www.ci.redding.ca.us/water/index.html>

BOIL WATER ORDER

In the event of a water quality emergency where minimum **Bacteriological Water Quality Standards** cannot be reasonably assured, the State Water Resources Control Board - Division of Drinking Water will prescribe a "Boil Water Order" (BWO) to the City of Redding Water Utility.

The Boil Water Order can be issued by either one, or combination of the following agencies:

1. State Water Resources Control Board - Division of Drinking Water
2. Shasta County Department of Health
3. City of Redding Water Utility
4. City of Redding Emergency Operations Plan
5. City of Redding Emergency Operations Center (EOC)

Designated personnel to authorize issuance of Boil Water Order:

1. State Water Resources Control Board - Division of Drinking Water
 - a. Regional Chief
 - b. District Engineer(s)
2. Shasta County Department of Health:
 - a. Director of Environmental Health
3. City of Redding Water Utility:
 - a. City Manager
 - b. Director or Assistant Director of Public Works
 - c. Water Utility Manager
 - d. Supervisor - Water Distribution
 - e. Supervisor - Water Treatment
4. City of Redding Emergency Operations Center (EOC):
 - a. Emergency Operations Incident Commander
 - b. City of Redding Police Chief
 - c. City of Redding Fire Chief

Methods of Boil Water Order Issuance:

The Boil Water Order will be issued through the means of the **Water Quality Notification Plan**.

The conditions in which the Boil Water Order shall be issued:

1. Biological contamination of water supply system including but not limited to:

- a. Prolonged water outages in areas with ruptured sewer and/or water mains.
 - b. Ruptured water treatment, storage, and/or distribution facilities in areas of known sewage spills or other biological contamination.
 - c. Illness attributed to water supply.
2. Unusual system characteristics including but not limited to:
 - a. Prolonged loss of pressure in distribution system.
 - b. Sudden loss of chlorine residual.
 - c. Severe discoloration and odor.
 - d. Inability to implement emergency chlorination.

A Sample "Boil Water Order" is Attached - Exhibit "B"

The conditions in which a Boil Water Order shall be canceled:

1. Biological contamination and the health hazard in the water system have been effectively abated and safe water quality has been reliably confirmed by water quality monitoring throughout the water system.
2. The above-mentioned agency that has the authority to issue the Boil Water Order.

A Sample "Cancellation of Boil Water Order" is attached - Exhibit "C"

UNSAFE WATER ALERT

In the event of a water quality emergency due to **Known or Suspected Chemical (non-bacteriological) Contamination**, the State Water Resources Control Board - Division of Drinking Water will prescribe an "Unsafe Water Alert" to the City of Redding Water Utility.

The Unsafe Water Alert can be issued by either one, or combination of the following agencies:

1. State Water Resources Control Board - Division of Drinking Water
2. Shasta County Department of Health
3. City of Redding Water Utility
4. City of Redding Emergency Operations Center (EOC)

Designated personnel to authorize issuance of Unsafe Water Alert:

1. State Water Resources Control Board -Division of Drinking Water:
 - a. Regional Chief
 - b. District Engineer(s)
2. Shasta County Department of Health:

- a. Director of Environmental Health
- 3. City of Redding Water Utility:
 - a. City Manager
 - b. Director of Public Works
 - c. Water Utility Manager
 - d. Supervisor - Water Distribution
 - e. Supervisor - Water treatment
- 4. City of Redding Emergency Operations Center (EOC):
 - a. Emergency Operations Incident Commander
 - b. City of Redding Police Chief
 - c. City of Redding Fire Chief

Methods of Unsafe Water Alert Issuance:

The Unsafe Water Alert will be issued through the means of the **Water Quality Notification Plan**.

The conditions in which the Unsafe Water Alert shall be issued:

- 1. Know or suspected widespread chemical or hazardous contamination in the water supply distribution system.
 - a. Ruptured water distribution system in area of known chemical spills coupled with loss of pressure, severe odor and discoloration, loss of chlorine residual; inability of existing water treatment process to neutralize chemical contaminants prior to entering the water system.
- 2. Threatened or suspected acts of sabotage confirmed by analytical results.
 - a. Suspected contamination triggered by acts of sabotage or threats by vandals is confirmed by analytical testing, and there is reason to believe that the contamination has affected the water system.
- 3. Implemented by the City Water Utility due to water treatment inadequacies.

A Sample "Unsafe Water Alert" is attached - Exhibit "D"

The conditions in which an Unsafe Water Alert can be canceled:

- 1. Hazardous contamination in the water system has been effectively abated and safe water quality has been reliably confirmed by water quality monitoring throughout the water system.
- 2. The above-mentioned agency's who have the authority to issue the Unsafe Water Alert.

A Sample "Cancellation of Unsafe Water Alert" is attached - Exhibit "E"

SAMPLING PLAN

The City of Redding Water Utility has a **Routine Sample Siting Plan** which can be used for bacteriological and water quality monitoring throughout the water distribution system.

The Routine Sample Siting Plan is located at:

1. Foothill Water Treatment Plant office and laboratory, 3100 Foothill Blvd.
2. Water Utility office, Public Works Corp Yard, 20055 Viking Way.
3. State Water Resources Control Board - Division of Drinking Water, 364 Knollcrest Drive, Suite #101, Redding, CA.

The Water Utility can use the following local laboratory's to do analytical testing to confirm chemical or bacteriological contamination:

1. City of Redding Wastewater Treatment Plants:

Clear Creek Wastewater Treatment Plant, 2220 Metz Rd., Redding CA 96001.
Phone 225-4158
Fax 245-7208

Stillwater Wastewater Treatment Plant, 9001, Airport Rd., Anderson CA 96007
Phone 378-6701
Fax 378-6709

Note: First contact State Water Resources Control Board – Division of Drinking Water, local office, for approval to use the Wastewater Treatment Plant laboratories

2. Basic Laboratory 2218 Railroad Ave., Redding, CA 96001, ph. 243-7234 ext. 217.
If no answer at the above number; please call the contact numbers in the order listed below:

Selina Oilar 213-949-7451
Jennifer McCurdy 530-604-7231
Nathan Hawley 530-941-4055
Ricky Jensen 530-945-5298
If none of the numbers can be reached, please call:
Emergency Mailbox 530-243-7234 ext. 250

3. Shasta County Environmental Health Laboratory (bacteriological only).
2650 Breslauer Way, Redding, CA 96001.

Phone 225-5072
Fax 225-5061

- 4. State Water Resources Control Board –Division of Drinking Water
364 Knollcrest Drive, Suite #101, Redding, CA
Phone 224-4800
To obtain approval to use the State Water Resources Control Board laboratory in Richmond Ca.

ENFORCEMENT

As part of the notification plan the customers would be directed to conserve water and to eliminate any unnecessary water use and contractors would be directed not to use construction water. Depending on the time of year and normal demands out side water use for irrigation and construction use might not be prohibited. The irrigation and construction water use prohibition would be enforced by the Redding Police Department and Water Utility personnel citing Redding Municipal Code 14.08.260 that would be in effect for emergencies:

Redding Municipal Code - Utilities - 14.08.260 - Shutting Off Water During Emergency

All faucets, sprinklers, hose nozzles or other continuous streams must be shut off promptly upon the alarm of fire or other emergency or major disaster; the water not to be turned on again until the fire is known to be extinguished. (Prior code § 29-27)

WATER SOURCES AVAILABLE

The City of Redding has several sources of water available in case of an emergency, disruption of water source and Sacramento River or Whiskeytown Lake water contamination that is not treatable, then the City would rely on groundwater wells and inter-ties with neighboring cities and water districts.

GROUNDWATER WELLS

The City has sixteen groundwater wells with a combined capacity of 13 million gallons per day (MGD) . The wells are located in the Cascade and Enterprise areas of the City. The Cascade area has four wells, located in the Southwest part of the City. The Enterprise area has twelve wells located in the Southeastern part of the City. Groundwater water contamination that is not treatable, then the City would rely on the Sacramento River or Whiskeytown Lake water sources and inter-ties with neighboring cities and water districts if needed.

INTER-TIES WITH NEIGHBORING CITIES AND WATER DISTRICTS

The City has existing inter-ties with two neighboring cities and four neighboring water districts and the potential for an emergency inter-tie with another water district south of the city limits. The Standard Operating Procedures (SOP's) for operation of Intertie meters with the cities and water

districts are electronically located on the S:\Water Treatment Plant Files\S.O.P.'s\20 All Safety and Emergency\Emergency Interties.

City of Anderson has an inter-tie with the City located at 3607 Meadow View Drive which could provide water to the Wooded Acres North Subdivision and the P.G. & E. Service Center. That area was previously served by the City of Anderson prior to annexation to the City of Redding. The City of Anderson water source is groundwater.

Bella Vista Water District (BVWD) is located to the northeast of Redding and has three inter-ties. One located near Canby Rd. and Churn Creek Rd. at the BVWD Water Treatment Plant site, one located at 1431 Edgewood Drive near Tiburon Drive, and one at Old Alturas Road at Abernathy Lane. The combined capacity of these three (3) inter-ties is approximately 1200 gallons per minute (gpm). These capacities are estimates since the City has transferred water to BVWD but has not had the occasion to receive water from BVWD. BVWD also obtains the majority of its water from the Sacramento River, these sources of inter-tie water may not be available if the Sacramento River was considered contaminated.

Centerville Community Services District (CCSD) which is located west of Redding and has two inter-ties with the City. One in the Mary Lake Subdivision, Hill 900 Pressure Zone, and the other one at 16755 Clear Creek Road, just west of the City's Electric Utility's Redding Power Plant in the Cascade Pressure Zone. That Mary Lake inter-tie has a capacity of 400 gpm and has been used previously, and the Clear Creek Road inter-tie has a capacity of 1300 gpm. CCSD receives their water from the Clear Creek Community Service District Filtration Plant via the Muletown conduit out of Whiskeytown Lake. Whereas CCSD receives all of its water from Whiskeytown Lake; this source of inter-tie water may not be available if Whiskeytown Lake was considered contaminated.

City of Shasta Lake has inter-ties located north of the City in the Buckeye Pressure Zone which is located in Shasta County. The City of Shasta Lake currently supplies water to 18 customers in the Summit City Zone. Depending on the conditions of the Shasta Lake system, water could continue to be supplied to the City of Redding. Whereas the City of Shasta Lake receives all of its water from Shasta Lake this source of inter-tie water may not be available if Shasta Lake was considered contaminated.

Shasta County Public Works – CSA No. 25 – Keswick has an inter-tie with the City on the Buckeye Water Treatment Plant 30-inch transmission main to the Buckeye Pressure Zone. The inter-tie is located at the intersection of Rock Creek Rd. and West St., in Keswick. The amount of water available in gpm to the City will be determined after the completion of CSA No. 25's filter and reservoir expansion project. CSA No. 25 Keswick draws its water source from the Spring Creek Conduit, same as the City's BWTP, and may not be available if Whiskeytown Lake was considered contaminated

Shasta Community Services District (SCSD) has an inter-tie with the City on the Buckeye Water Treatment Plant 30-inch transmission main to the Buckeye Pressure Zone. The inter-tie is located at 11324 Bandana Trail inside SCSD Pump Station. The amount of water available is approximately 600 gpm. SCSD draws its water source from the Spring Creek Conduit, at the same turnout as the City's BWTP, and may not be available if Whiskeytown Lake was considered contaminated.

INTER-TIE NOTIFICATION CONTACTS & TELEPHONE NUMBERS			
City or District	Day Phone	Answering Service	Fax
City of Anderson	378-6636	378-6638	378-6666
Bella Vista WD	241-1085	241-1085	241-8534
Centerville CSD	246-0680	246-0680	246-2254
City of Shasta Lake	275-7450	275-7400	275-7414
Shasta County CSA No. 25	225-5661	225-5661	225-5667
Shasta CSD	246-0680	245-1138	246-2254

An emergency inter-tie with the Clear Creek Community Services District (CCCSD) could be constructed at the southern end of the City. This inter-tie could provide approximately 400 gpm and would require the construction of 4000 feet of pipeline from district piping to Redding Ranchettes Reservoir. Clear Creek Community Service District is supplied water from the Muletown Conduit out of Whiskeytown Lake. Whereas CCCSD receives the majority of its water from Whiskeytown Lake this source of inter-tie water may not be available if Whiskeytown Lake was considered contaminated.

The City of Redding Water Utility is also a member of the Northern California Water Agency Response Network (WARN) which helps supply mutual aid during a major disaster. The California Office of Emergency Services would also be requested to assist the City in any major disaster.

INTER-TIE LOCATIONS

Attached are the site plan maps indicating the location of the available inter-ties with the two cities and four water districts depicted as Exhibits "F" through "N."

DISTRIBUTION SYSTEM OPERATION CHANGES:

FOOTHILL WATER TREATMENT PLANT

To implement this contingency plan following the shut down of the Foothill water plant or Pump Station No.1, some distribution system operations changes would be required. The Standard Operating Procedures (SOP's) for operation of Intertie meters with other water districts are electronically located on the S:\Water Treatment Plant Files\S.O.P.'s\20 All Safety and Emergency\Emergency Interties. The locations on the Water Utility water atlas sheets (Water System Atlas located in Redding Public Works Field Operations, 20055 Viking Way and carried in all Water Utility vehicles) and changes would be as follows:

Water Atlas Page - G 7

Open the eight-inch pressure relief valve (PRV) located behind Pump House No. 3 at 299 Sulphur Creek Road to supply Buckeye Water Treatment Plant water to the Foothill Pressure Zone.

Water Atlas Page - M 8

Install a booster pump on the Crosstown main at the Cypress Avenue Supervisory Vault located at 760 Parkview Avenue. This pump would allow Enterprise Pressure Zone groundwater to be transferred to the upper Foothill Zone storage reservoir. From the Foothill Zone the Cascade and Hill 900 Pressure Zones could be supplied. The Cascade Zone could also be supplied through the South Bonnyview Supervisory Vault from the Enterprise Pressure Zone.

Water Atlas Page - SC 14

Isolate the Wooded Acres North Subdivision and P.G.& E. Service Center and supply by the City of Anderson well.

Water Atlas Page – M 2 – M 2A and N 2 – N 2A

Make contact with CCSD and determine if water is available, then meet a representative from CCSD. Open the check valve from the Mary Lake Pressure Zone to the Hill 900 Pressure Zone before proceeding to open the inter-tie with the Centerville Community Service District at Inter-tie No. 1, located at Record Lane and O'Connor Avenue, to help supply the Hill 900 Pressure Zone.

Water Atlas Page - H 10B, H 11, J 13

Make contact with BVWD and determine if water is available, then meet a representative from BVWD to open inter-ties No.1, No. 2, & No. 3.

Water Atlas Page - SB 6

Request assistance from the WARN Agency and California Office of Emergency Services to construct the inter-tie between the City of Redding Ranchettes Reservoir and the Clear Creek Community Services District water main located at the end of Windsor Lane.

BUCKEYE WATER TREATMENT PLANT

To implement this contingency plan following the shut down of the Buckeye Water Plant or the Spring Creek Conduit some distribution operation changes would be required. The changes would be as follows:

Water Atlas Page - G 5, G 7

Place into operation the City's Pump Houses No. 3 & No. 4, controlled through the FWTP. This would supply water to all parts of the Buckeye Pressure Zone and Hilltop/Dana Pressure Zone.

Water Atlas Page - -D 2

Make contact with CSA No. 25 – Keswick and determine if water is available, then meet a representative from Shasta County Water Agency to open intertie.

Water Atlas Page - -D 4

Make contact with SCSD and determine if water is available, then meet a representative from SCSD to open intertie.

Water Atlas Page - NV 5

Open closed valve V 7 from the Summit City Zone from the City of Shasta Lake, to supply water to the northern end of the Buckeye Pressure Zone.

CHLORINE EMERGENCY PROCEDURES

Refer to the Risk Management Plan (RMP) for Hazardous Materials response; Foothill Water Treatment Plant, Buckeye Water Treatment Plant, and Enterprise Wells.

HAZARDOUS MATERIALS INCIDENT PLAN

Information and notification of the hazardous materials incident plan can be located in the Department of Public Works Emergency Guideline Plan.

EMPLOYEE EMERGENCY CALL OUT LISTS

Employee call out list can be located in the Department of Public Works Emergency Guideline Plan.

SHASTA COUNTY & CAL TRANS EMERGENCY CALL OUT LISTS

Employee call out list can be located in the Department of Public Works Emergency Guideline Plan and the City of Redding Emergency Operation Center (EOC) Guidebook.

MISCELLANEOUS EMERGENCY TELEPHONE NUMBERS

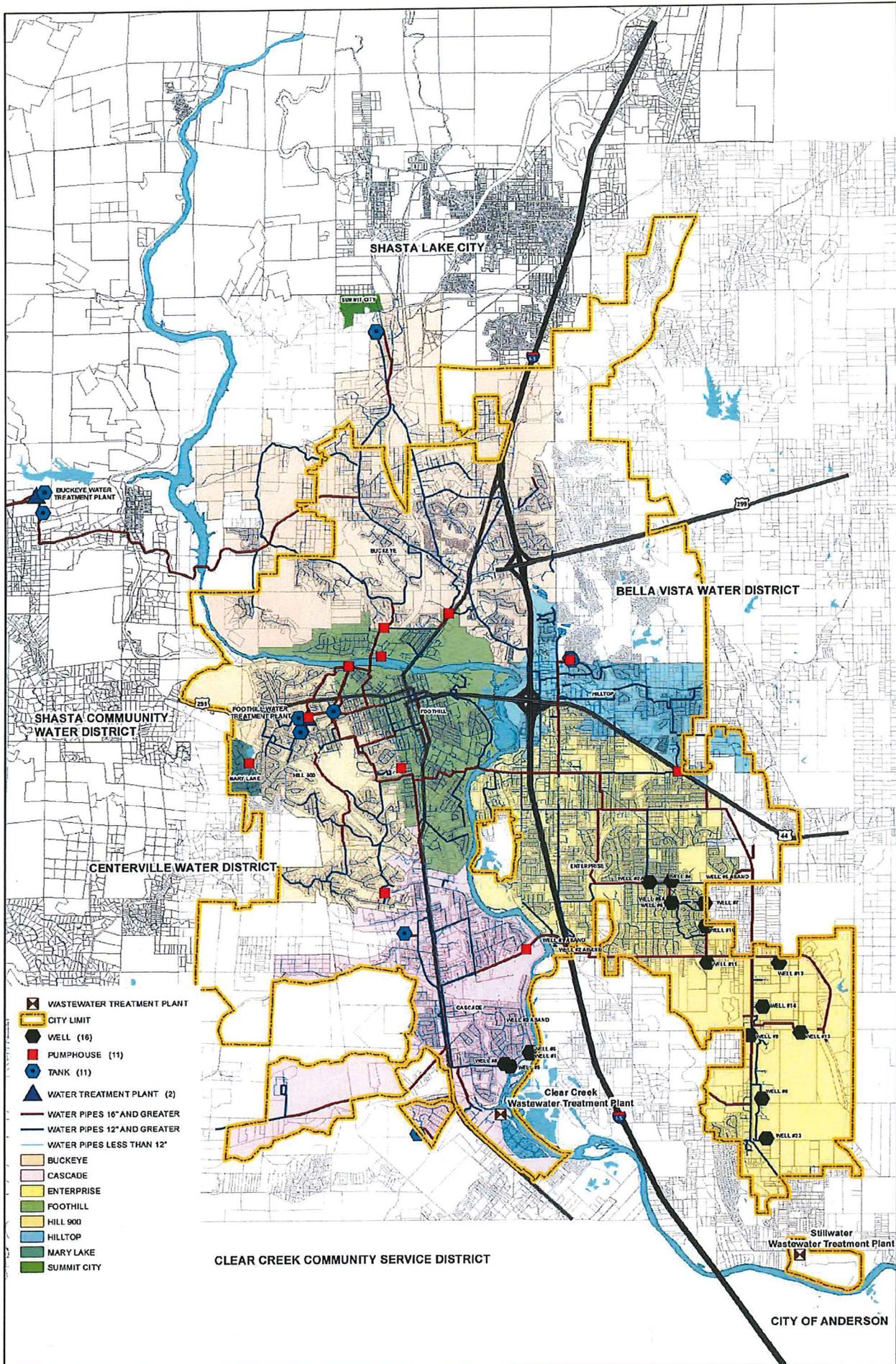
Miscellaneous emergency call out list can be located in the Department of Public Works Emergency Guideline Plan and the City of Redding Emergency Operation Center (EOC) Guidebook.

CONTRACTOR LISTINGS FOR EMERGENCY SITUATIONS

Contractor listings and emergency telephone numbers for emergency situations can be located in the Department of Public Works Emergency Guideline Plan City of Redding Emergency Operation Center (EOC) Guidebook.

SUPPLIERS FOR EMERGENCY SITUATIONS

Suppliers for emergency situations can be located in the Department of Public Works Emergency Guidelines Plan City of Redding Emergency Operation Center (EOC) Guidebook.





P.O. BOX 496071
REDDING, CA 96049-6071
*Conserving resources today...
For Redding's tomorrow*

EXHIBIT B

DATE: _____

BOIL WATER ORDER

FAILURE TO FOLLOW THIS ADVISORY COULD RESULT IN ILLNESS

Due to the recent _____, the City of Redding Water Utility in conjunction with the State Water Resources Control Board - Division of Drinking Water, and/or Shasta County Health Department are advising residents of Redding to use boiled tap water or bottled water for drinking and cooking purposes as a safety precaution.

All tap water used for drinking or cooking should be boiled rapidly for at least five minutes. This is the preferred method to assure that the water is safe to drink.

An alternative method of purification for residents that do not have gas or electricity available is to use fresh liquid household bleach (Chlorox, Purex, etc.) To do so, add 8 drops (or 1/4 teaspoon) of bleach per gallon of clear water or 16 drops (or 1/2 teaspoon) per gallon of cloudy water, mix thoroughly, and allow to stand for 30 minutes before using. A chlorine-like taste and odor will result from this purification and is an indication that adequate disinfection has taken place.

Water purification tablets may also be used by following the manufacturers' instructions.

Optional: Potable water is available at the following locations:

Please bring clean water container (five gallons maximum capacity).

Emergency water treatment and water quality testing are being conducted by the City's Water Utility to resolve this water quality emergency problem. The City's Water Utility will notify residents as soon as the water is safe to drink through public notification.

For more information, please call:

City of Redding Water Utility	224-6068
Foothill Water Treatment Plant	225-4192
Supervisor--Water Treatment	225-4475
Water Utility Manager	224-6040
State Water Resources Control Board - Division of Drinking Water	224-4800
Shasta County Environmental Health Department	225-5787

Issued by: _____ (signature)

Title: _____ Print Name: _____



P.O. BOX 49607
REDDING, CA 96049-6071
*Conserving resources today...
For Redding's tomorrow*

EXHIBIT C

DATE

CANCELLATION OF BOIL WATER ORDER

On _____ (date) you were notified of the need to boil or disinfect all tap water in your home for drinking or cooking purposes. The City of Redding Water Utility in conjunction with the State Water Resources Control Board - Division of Drinking Water, and/or Shasta County Health Department has determined that, through abatement of the health hazard followed by comprehensive testing of the water, your water is safe to drink. It is no longer necessary to boil your tap water or for you to consume bottled water.

For more information, please call:

City of Redding Water Utility	224-6068
Foothill Water Treatment Plant	225-4192
Supervisor--Water Treatment	225-4475
Water Utility Manager	224-6040
State Water Resources Control Board - Division of Drinking Water	224-4800
Shasta County Environmental Health Department	225-5787

Issued by: _____
(signature)

Title: _____ Print Name: _____



P.O. BOX 496071
REDDING, CA 96049-6071
*Conserving resources today...
For Redding's tomorrow*

EXHIBIT D

DATE:

UNSAFE WATER ALERT

DO NOT DRINK YOUR TAP WATER!

Due to the recent _____ emergency situation, the City of Redding Water Utility in conjunction with the State Water Resources Control Board, and/or Shasta County Health Department are advising residents of Redding to **NOT USE TAP WATER FOR DRINKING UNTIL FURTHER NOTICE** but to use bottled water for drinking and cooking purposes as safety precaution. Boiling the water will not make the water safe.

FAILURE TO FOLLOW THIS ADVISORY COULD RESULT IN ILLNESS.

Emergency water treatment and quality testing are being conducted by the City's Water Utility to resolve this water quality emergency problem. The City's Water Utility will notify residents as soon as the water is safe to drink through public notification.

For more information, please call:

City of Redding Water Utility	224-6068
Foothill Water Treatment Plant	225-4192
Supervisor--Water Treatment	225-4475
Water Utility Manager	224-6040
State Water Resources Control Board - Division of Drinking Water	224-4800
Shasta County Environmental Health Department	225-5787

Issued by: _____ Title: _____
(Signature)

Print Name: _____



P.O. BOX 496071
REDDING, CA 96049-6071
*Conserving resources today...
For Redding's tomorrow*

EXHIBIT E

DATE

CANCELLATION OF UNSAFE WATER ALERT

On _____ (date) you were notified of the need to not use the water supply served to your home for drinking or cooking purposes. The City of Redding Water Utility in conjunction with the State Water Resources Control Board, and/or Shasta County Health Department has determined that, through abatement of the health hazard followed by comprehensive testing of the water, **YOUR TAP WATER IS SAFE TO DRINK.**

IT IS NO LONGER NECESSARY TO CONSUME BOTTLED WATER.

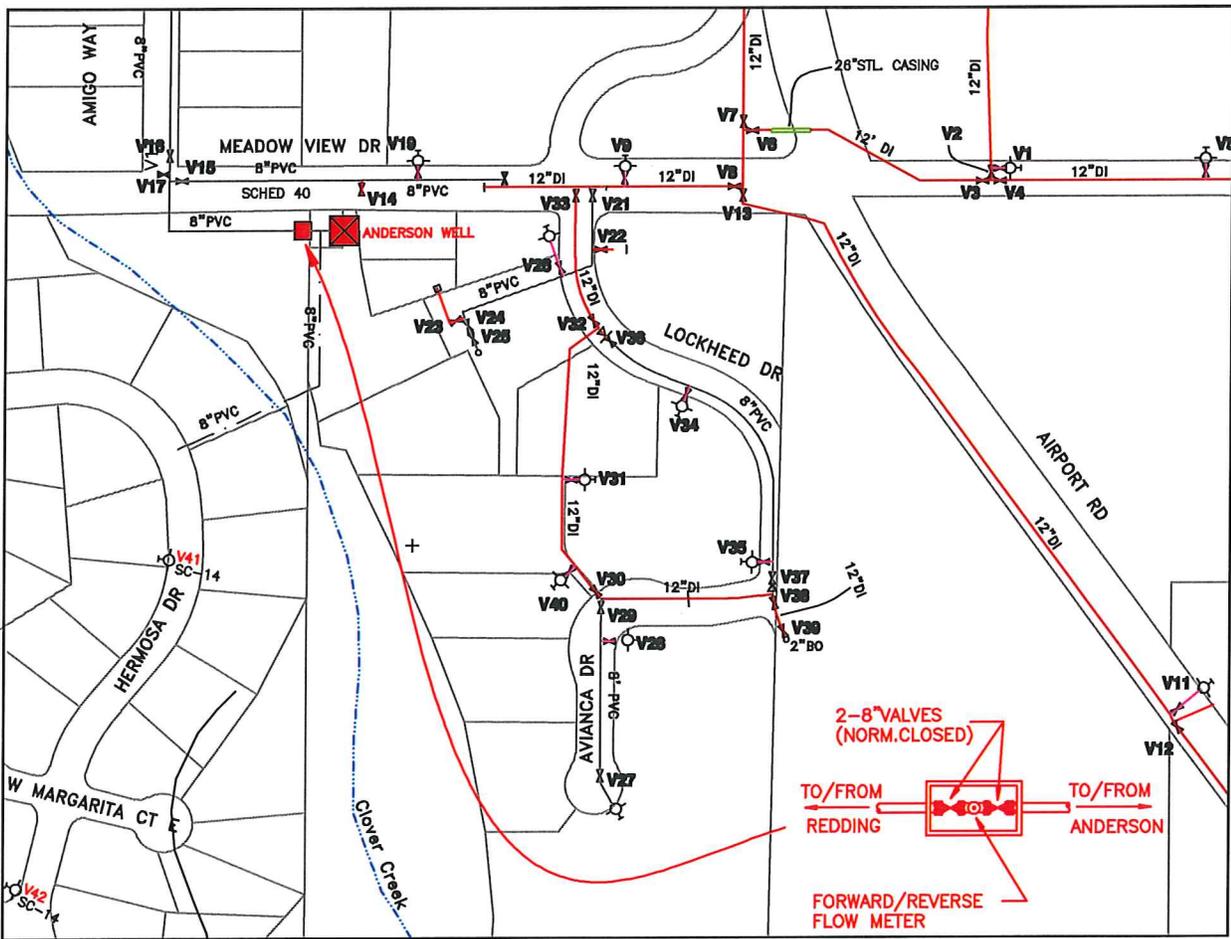
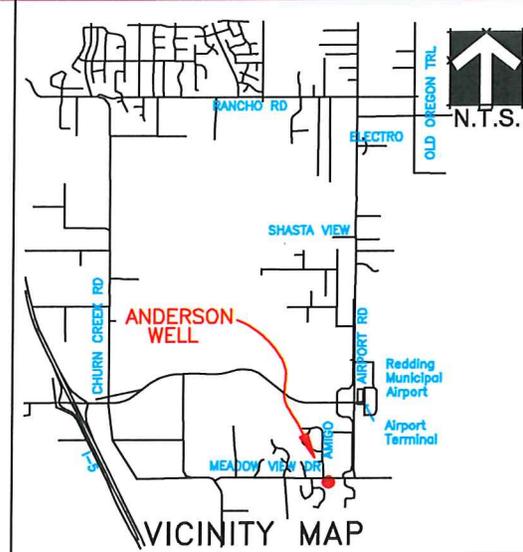
For more information, please call:

City of Redding Water Utility	224-6068
Foothill Water Treatment Plant	225-4192
Supervisor--Water Treatment	225-4475
Water Utility Manager	224-6040
State Water Resources Control Board - Division of Drinking Water	224-4800
Shasta County Environmental Health Department	225-5787

Issued by: _____ Title: _____
(Signature)

Print Name: _____

EXHIBIT F



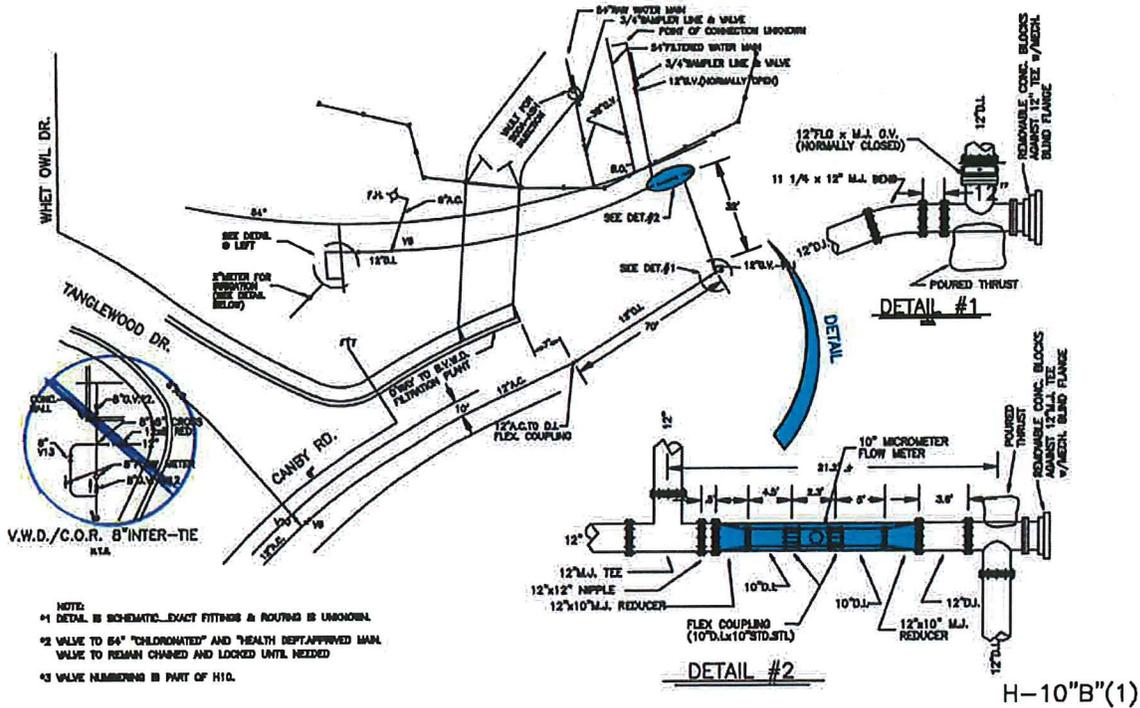
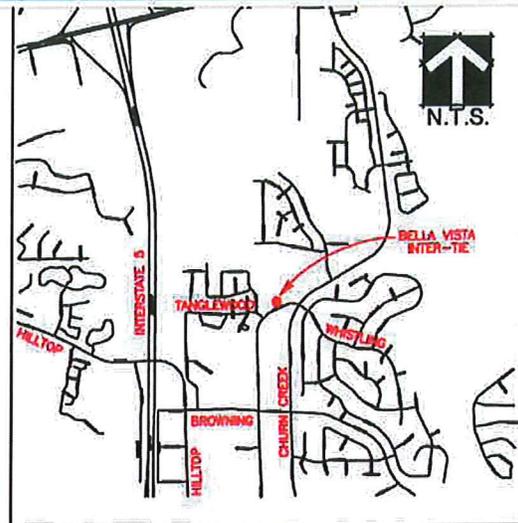
SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO: .

REDDING MUNICIPAL UTILITIES
 CITY OF ANDERSON
 WATER SYSTEM INTER-TIE



EXHIBIT G



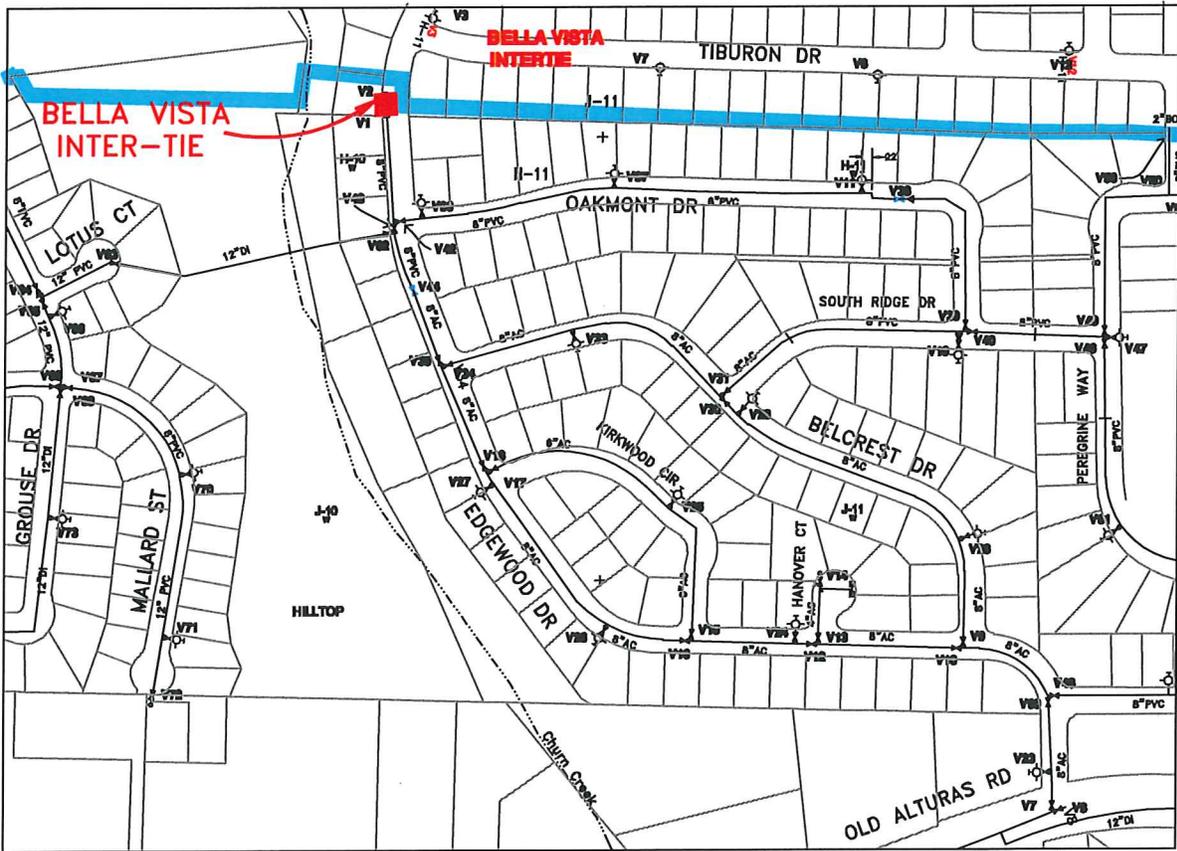
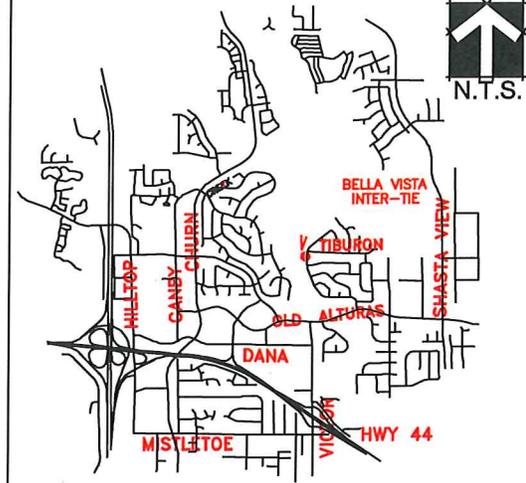
SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO. :

REDDING MUNICIPAL UTILITIES
BELLA VISTA
 WATER SYSTEM INTER-TIE No.1



EXHIBIT H



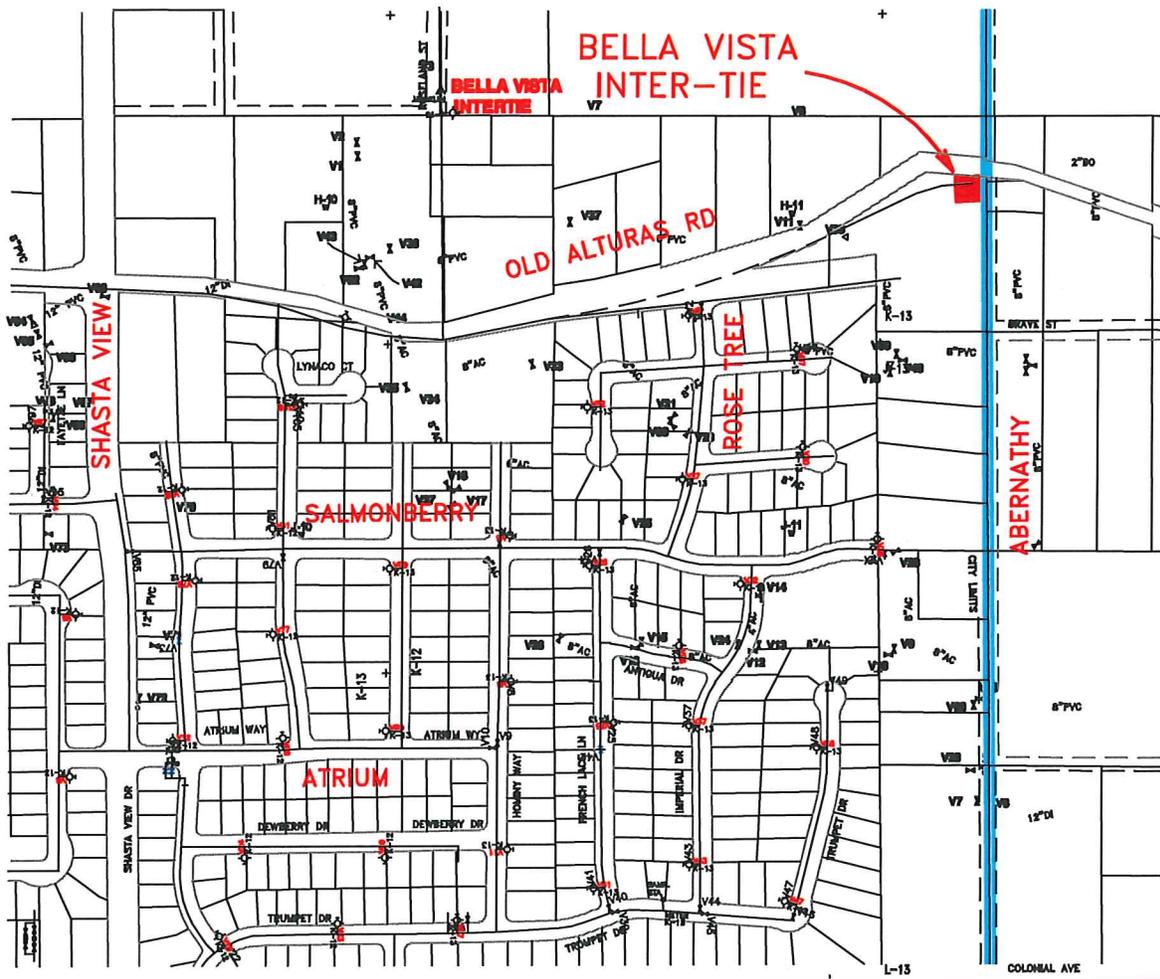
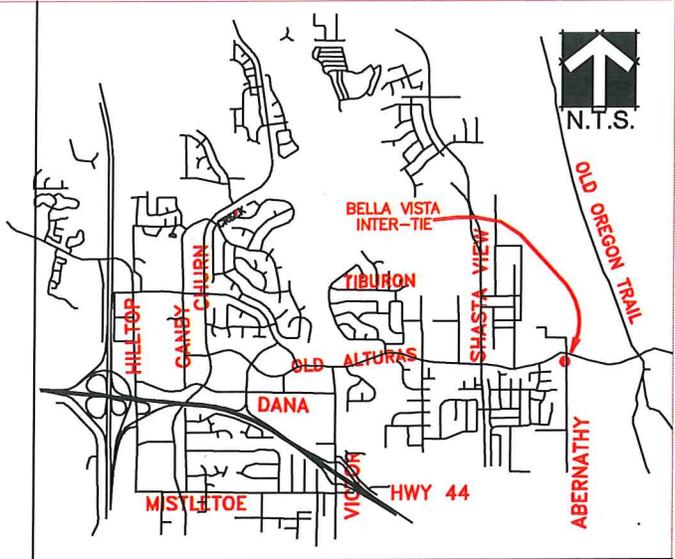
SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO. :

REDDING MUNICIPAL UTILITIES
BELLA VISTA
WATER SYSTEM INTER-TIE No.2



EXHIBIT I



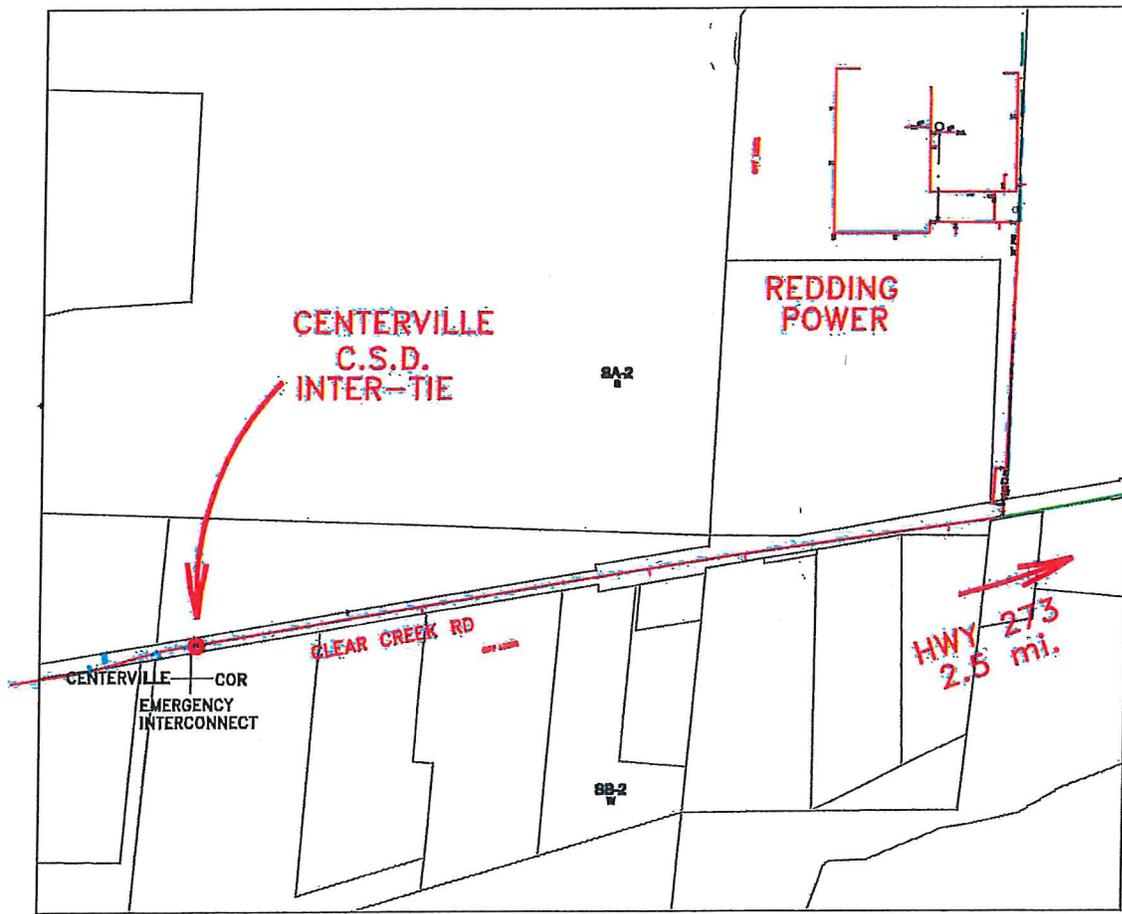
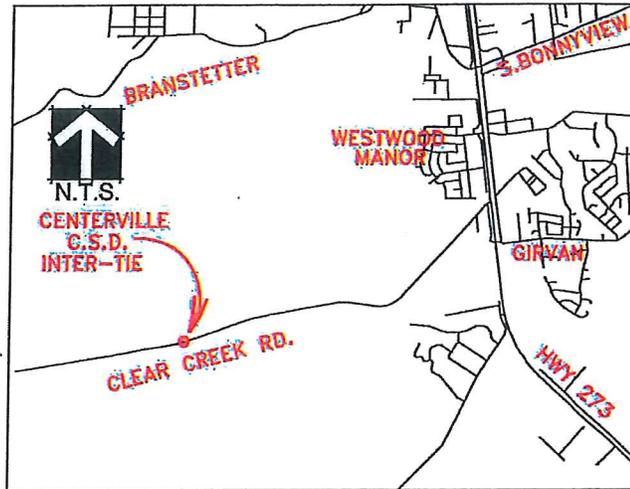
SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO: .

REDDING MUNICIPAL UTILITIES
BELLA VISTA
 WATER SYSTEM INTER-TIE No.3



EXHIBIT K



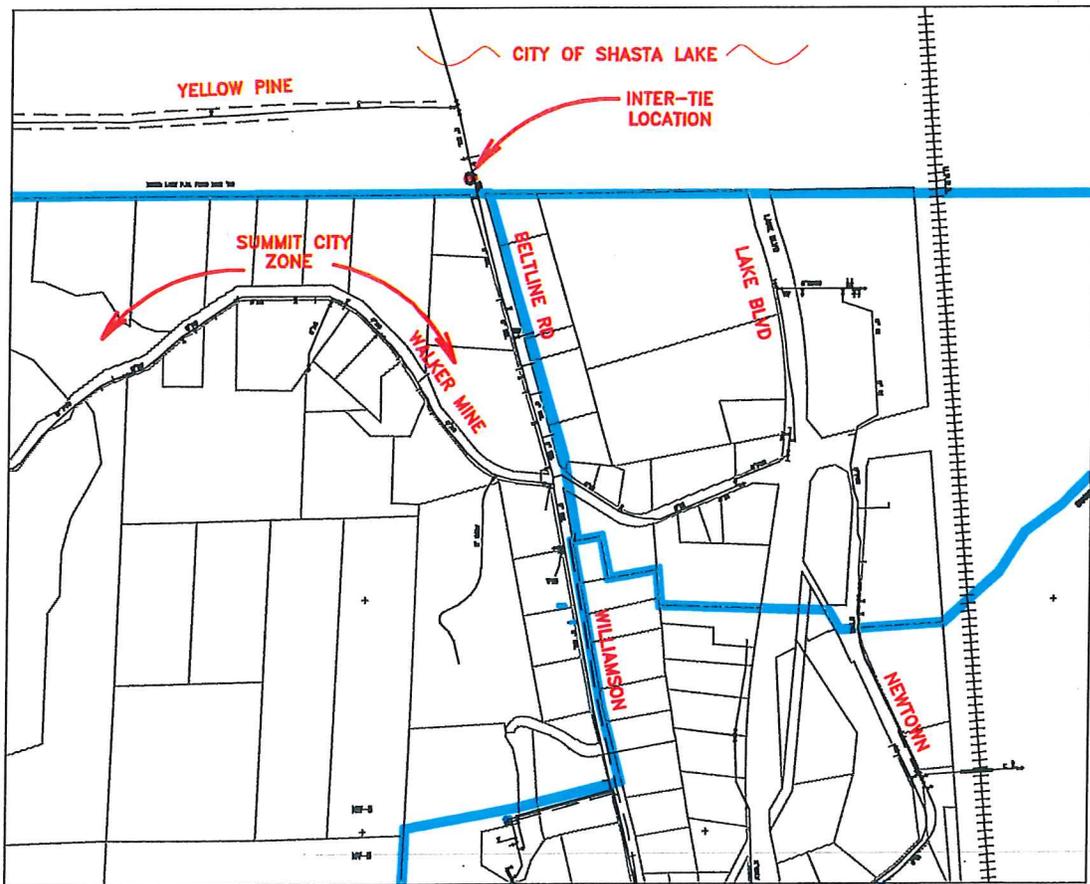
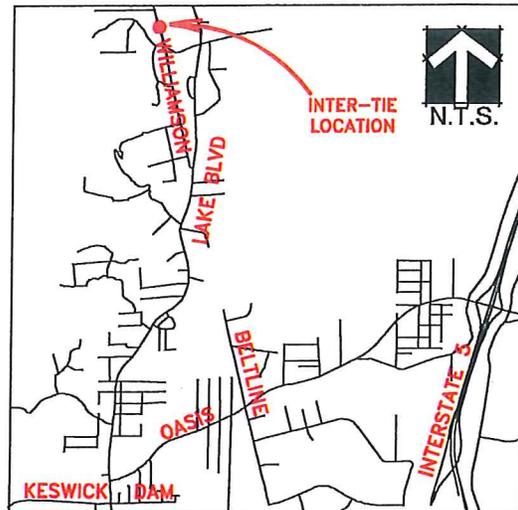
SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO: .

REDDING MUNICIPAL UTILITIES
CENTERVILLE COMMUNITY SERVICES DISTRICT
WATER SYSTEM INTER-TIE No. 2



EXHIBIT L



SITE PLAN

DWG. BY: RALPH BENTRIM
 DATE: NOV. 2008
 SCALE: NONE
 MAP NO. :

REDDING MUNICIPAL UTILITIES
 CITY OF SHASTA LAKE
 WATER SYSTEM INTER-TIE



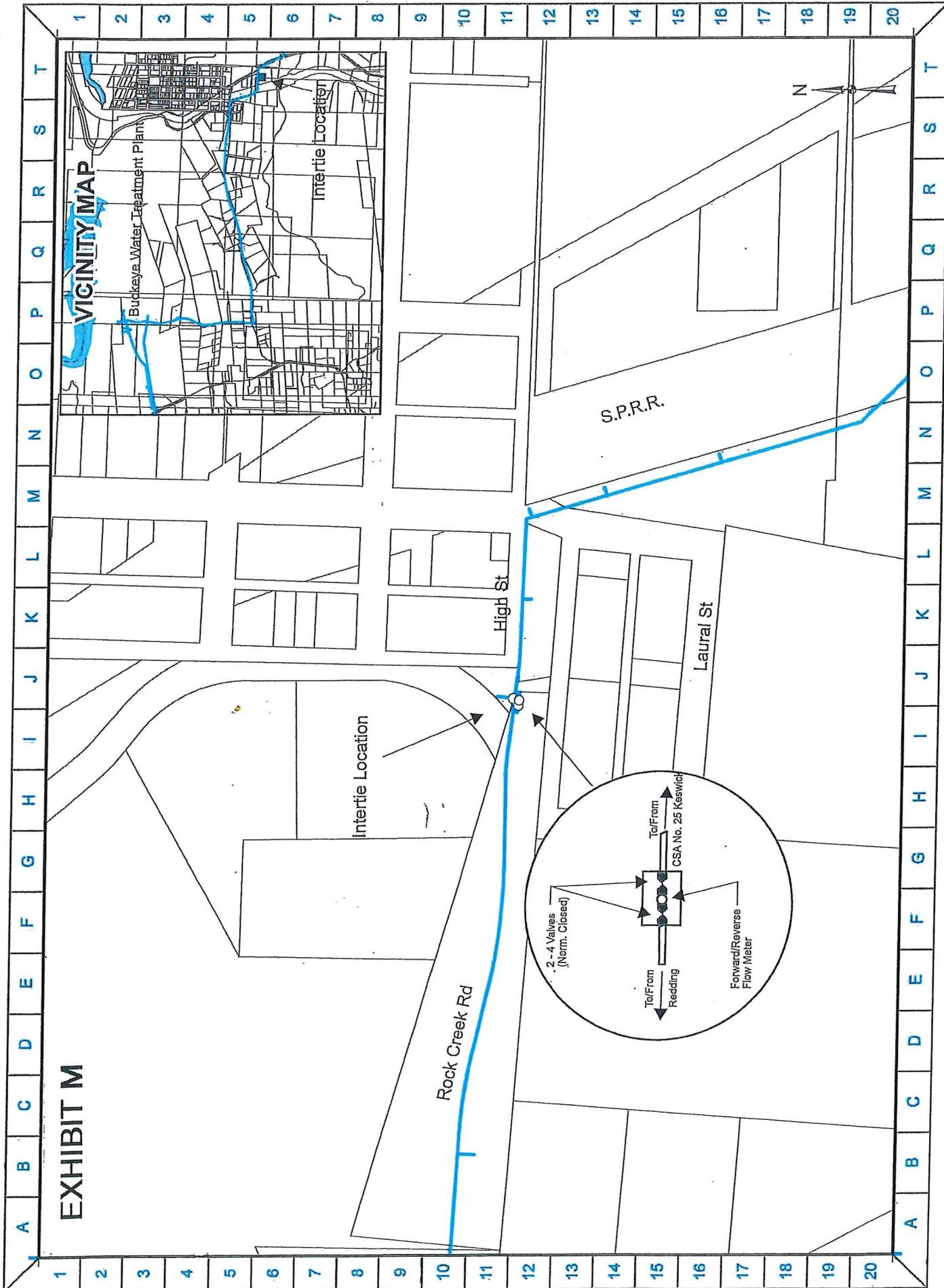
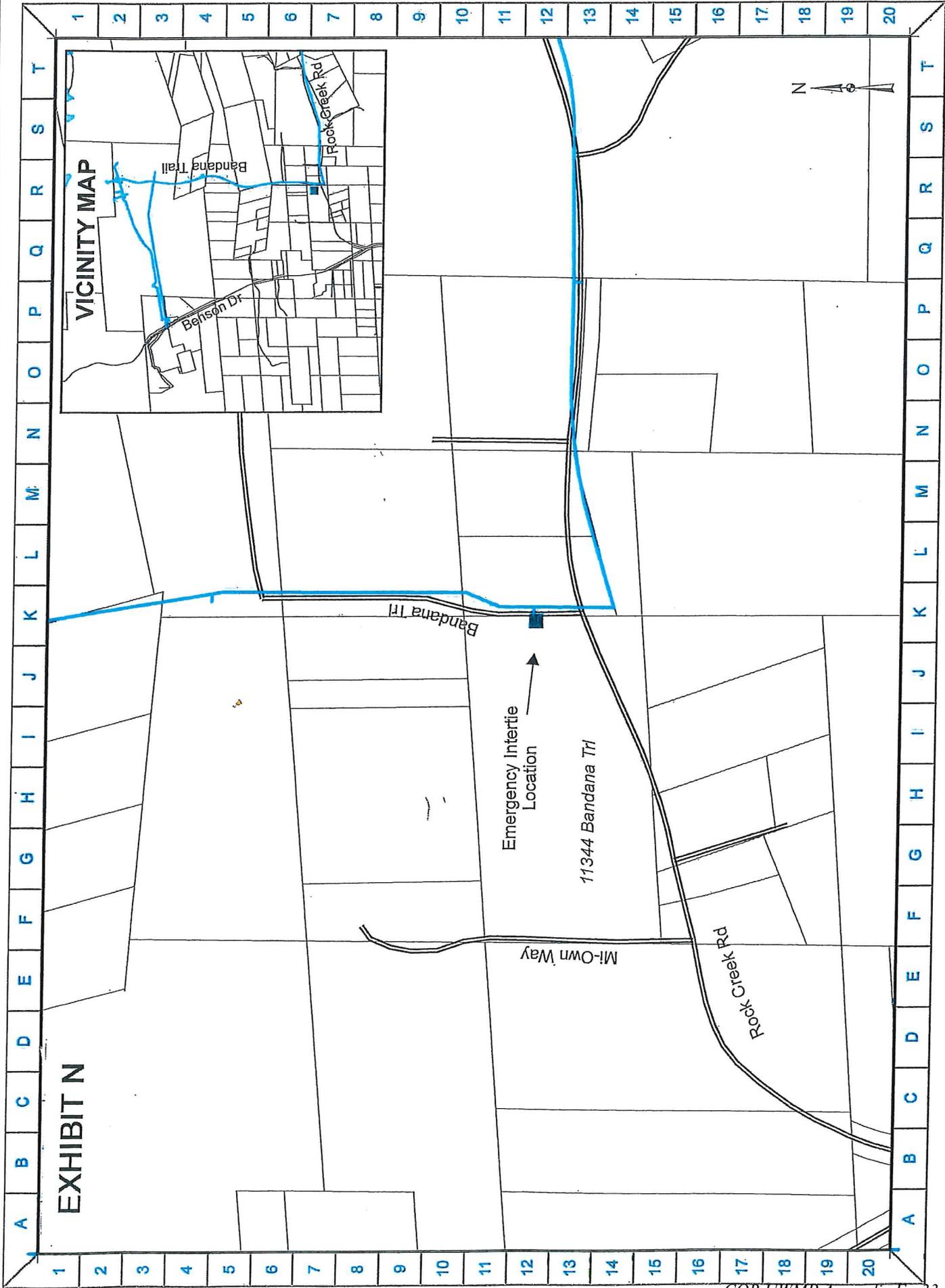


EXHIBIT M

SITE PLAN

CSA No. 25 KESWICK & COR INTERTIE
11344 ROCK CREEK RD

P:\Water\ESRI\SitePlan_KeswickCSD\Intertie.mxd Sept 23, 2015



CITY OF REDDING AND SHASTA COMMUNITY SERVICE DISTRICT
EMERGENCY INTERTIE LOCATION

APPENDIX G

Water Shortage Contingency Plan

The following is the actual Ordinance that appears in the City of Redding Municipal Code and would become effective should a water shortage condition be declared.

Chapter 14.09 - WATER SHORTAGE CONTINGENCY PLAN^[1]

Sections:

Footnotes:

--- (1) ---

Editor's note—Ord. No. 2523, § 2, adopted Apr. 7, 2015, repealed the former Ch. 14.09, §§ 14.09.010—14.09.070, and enacted a new Ch. 14.09 as set out herein. The former Ch. 14.09 pertained to drought management plan and derived from Ord. 1957, § 1, adopted 1991; Ord. 2374, § 14, adopted 2006; and Ord. No. 2510, §§ 2, 3, adopted Aug. 5, 2014.

14.09.010 - Declaration of policy, purpose, and intent.

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the City of Redding hereby adopts the following regulations and restrictions on the delivery and consumption of water.

Water uses regulated or prohibited under this water shortage contingency plan (the plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as set forth in this chapter.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.020 - Application.

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided within the City of Redding's water service area. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.030 - Definitions.

For the purposes of this plan, the following definitions shall apply:

"Automatic irrigation system:" means any system of one or more devices controlled by any means other than a manually operated, momentary action, valve or switch, which emits water into the air more than one inch from the discharge port of the device(s). For the purposes of this article, momentary action shall mean a device that permits the flow of water only so long as a person manually holds the valve or switch in the open or on position.

"City manager:" means the head of the administrative branch of the city government with all the duties and responsibilities set forth in Chapter 2.08 of this Code. As it applies to this chapter, city manager may designate the authorities provided.

"Conservation:" those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

"Customer:" any person, company, or organization using water supplied by the City of Redding.

"Domestic water use:" water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

"Drip irrigation system:" means a permanently installed automatic watering system which applies water directly to or under the surface of the soil or, porous (soaker) hoses fitted with both a pressure reducing device set at ten psi maximum and an accurate pressure monitoring gauge. In no case shall any such system emit water more than one inch into the air from any discharge port or orifice.

"Landscape irrigation use:" water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

"Non-essential water use:" water uses that are not essential, nor required for the protection of public, health, safety, and welfare, including:

- (a) Irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this plan;
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
- (c) Use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
- (d) Use of water to wash down buildings or structures for purposes other than immediate fire protection;
- (e) Flushing gutters or permitting water to run or accumulate in any gutter or street;
- (f) Use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools;
- (g) Use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
- (h) Failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
- (i) Use of water from hydrants for construction purposes or any other purposes other than fire fighting.

"Safe operating capacity:" means the maximum amount of potable water which, expressed in millions of gallons per day (mgd), the city is safely capable of delivering to the city's water distribution system at any given time from:

- (1) The total available from the city's water treatment plants;
- (2) The total available from the city's groundwater wells; and
- (3) Total available from other potable water sources that may be added in the future or, due to regulatory changes that increase or decrease water availability, from existing facilities/sources.

"Seven-day running average water demand:" means the daily average of the amount of water pumped to the city's water distribution system from all available sources for the period beginning at 12:00 a.m. on the seventh calendar day prior to the date the calculation is made and ending at 12:00 a.m. on the date the calculation is made.

"State Water Resources Control Board:" is the agency designated by the Legislature of the State of California to regulate and manage surface water diversions and water rights within the state. The State

Water Resources Control Board may have the authority to reduce or suspend water diversion rights under certain conditions.

"Vehicle wash facility:" means a business that washes vehicles with water or a water-based product, including self-service car washes, full-service car washes, roll-over/in-bay style car washes, and fleet maintenance wash facilities.

"Waste:" means causing or permitting a flow of water from a city water main or service line, to run into any river, creek or other natural watercourse or drain, superficial or underground channel, or into any sanitary or storm sewer, any street, road or highway, or upon the lands of another person or upon public lands except as necessary for the proper operation of any public water supply system.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.040 - Stage 1 established and criteria for initiation and termination of conservation/water shortage emergency response Stages 2 through 4

The city manager shall monitor water supply and/or demand conditions on a continuous basis and shall determine when conditions warrant initiation or termination of Stages 2 through 4 of the plan. Public notification of the initiation or termination of conservation response Stages 2 through 4 shall be by means of publication in a newspaper of general circulation, radio and television announcements, web site announcements, and signs posted in public places, along with warnings of violations posted on private property.

The Stages 2 through 4 criteria described below are based on running average of the seven-day water demand expressed as a percentage of the water system safe operating capacity. Stage 1 conservation measures are in effect regardless of any calculation of supply or demand.

A. Stage 1—Year Round Water Conservation Measures (Voluntary Water Conservation Practices and Best Management Practices)

Established—Stage 1 year-round water conservation measures are those common sense practices designed to prevent waste of the finite water resources available to the City of Redding water service area. Such measures, as provided in Section 14.09.050A of this plan are in effect year-round and are independent of any calculation of the system's safe operating capacity, shortage, or abundance of supply. The voluntary elimination of water wasteful acts is considered to be the most basic, common sense approach to reducing waste of water resources. Residents of the City of Redding are asked to always be mindful of the value of all natural resources.

B. Stage 2—Moderate Water Shortage Conditions

Requirements for initiation—The city manager shall initiate Stage 2 and customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section 14.09.050B of this plan when the seven-day running average water demand exceeds eighty percent of the safe operating capacity for a period of seven consecutive days.

Requirements for termination—Stage 2 shall terminate at 12:01 a.m. on the day following the notice of the declaration by the city manager that the conditions triggering Stage 2 have ceased to exist for a period of fourteen consecutive days. Such declaration may be made prior to the expiration of the fourteen-day period if, in the discretion of the city manager extraordinary circumstances exist, such as the occurrence of significant and/or a prolonged period of precipitation. Upon the termination of Stage 2, Stage 1 shall go into effect.

C. Stage 3—Severe Water Shortage Conditions

Requirements for initiation—The city manager shall initiate Stage 3 and customers shall be required to comply with the requirements and restrictions on certain non-essential water uses

provided in Section 14.09.050C of this plan when the seven-day running average daily water demand exceeds eighty-five percent of the safe operating capacity for a period of seven consecutive days.

Requirements for termination—Stage 3 shall terminate at 12:01 a.m. on the day following the notice of the declaration by the city manager that the conditions triggering Stage 3 have ceased to exist for a period of fourteen consecutive days. Such declaration may be made prior to the expiration of the fourteen-day period if, in the discretion of the city manager, extraordinary circumstances exist, such as the occurrence of significant and/or a prolonged period of precipitation. Upon the termination of Stage 3, the city manager, based upon the existing conditions, has the discretion to determine which appropriate stage to initiate and the water conservation measures set forth in that stage, shall become effective.

D. Stage 4—Emergency Water Shortage Conditions

Requirements for initiation—The city manager shall initiate Stage 4, and customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section 14.09.050D of this plan when the city manager determines that the seven-day running average water demand exceeds ninety percent of the safe operating capacity or where a water supply emergency is declared and the city manager determines that this stage is appropriate to address the emergency. The city manager can declare a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unexpected loss of capability to provide water service; or
2. Surface water supply curtailments imposed by the regulatory authority; or
3. Natural or man-made contamination of the water supply source(s); or
4. Consumer demand for water reaches ninety percent of the system's safe operating capacity.

Requirements for termination—Stage 4 shall terminate at 12:01 a.m. on the day following the notice of the declaration by the city manager that the conditions triggering Stage 4 have ceased to exist for a period of three consecutive days. Such declaration may be made prior to the expiration of the three-day period if, in the discretion of the city manager, extraordinary circumstances exist, such as the occurrence of significant and/or a prolonged period of precipitation. Upon the termination of Stage 4, the city manager, based upon the existing conditions, has the discretion to determine which appropriate stage to initiate and the water conservation measures set forth in that stage shall become effective.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.050 - Water conservation/water shortage emergency response stages.

The city manager shall monitor Stage 1 conservation and water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section 14.09.040 of the plan, shall determine that a moderate, severe or emergency condition exists and shall implement the following actions upon publication of notice in a newspaper of general circulation:

A. Stage 1—Year-round Water Conservation Measures (Voluntary Conservation Practices and Best Practices)

Goal: To eliminate wasteful practices in order to help preserve and protect our finite water resources. Widespread adherence to common sense voluntary conservation practices will eliminate or delay the requirement to initiate mandatory restrictions required under Stages 2—4 of this plan.

1. Voluntary Landscape Watering Conservation Practices:

- A. Landscape watering with hose-end sprinklers or automatic irrigation systems is strongly discouraged at all times except on the following days between the hours of midnight and 7:00 a.m. and again on the same day between the hours of the hours of 9:00 p.m. until midnight.
 - a. Customers whose street addresses end with an odd number should water only on Wednesday, Friday, and Sunday and only within the designated time period.
 - b. Customers whose street addresses end with an even number should water only on Tuesday, Thursday, and Saturday and only within the designated time period.
2. Best Management Practices: Customers within the water service area should engage in the following best management practices:
 - a. Potable water should be applied to outdoor landscapes in a manner that does not cause runoff such that water flows onto adjacent property, non-irrigated areas, private and public sidewalks, roadways, parking lots or structures.
 - b. Customer should not use 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.
 - c. Potable water should not be applied to driveways and sidewalks for routine cleaning or debris removal. The use of a pressure washer to clean hard surfaces including driveway, sidewalks, and outdoor dining areas is permissible when such action is necessary to protect the public health and safety.
 - d. Potable water should not be used in a fountain or other decorative water feature, except where the water is part of a recirculating system.
 - e. Customers should not apply potable water to outdoor landscapes during and up to forty-eight hours after measurable rainfall.
 - f. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served is prohibited.
 - g. To promote water conservation, operators of hotels and motels should provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel should prominently display notice of this option in each bathroom using clear and easily understood language.
3. Public Facilities: Water service to landscape maintenance districts, parks, cemeteries, and other public facilities are encouraged to comply with the restrictions set forth in the Section.
4. Construction Projects: Water service for construction projects are encouraged to implement common sense water conservation practices.

B. Stage 2—Moderate Water Shortage Conditions

Goal: To achieve a reduction in total daily water demand such that the seven-day running average water demand is less than eighty percent of the safe operating capacity of the water system facilities or in response to the imposition of mandatory outdoor watering restrictions imposed by the State of California. All Stage 1 voluntary best management practices set forth in Section 14.09.050A.2 are mandatory in Stage 2, plus the following;

1. Landscape watering by any means including automatic irrigation systems, hose-end sprinklers, drip irrigation, hand-held hose, or bucket is prohibited except on the following days between the hours of midnight and 7:00 a.m. and again on the same day between the hours of the hours of 9:00 p.m. until midnight.
 - a. Customers whose street addresses end with an odd number may water only on Wednesday, Friday, and Sunday and only within the permitted time period.

- b. Customers whose street addresses end with an even number may water only on Tuesday, Thursday, and Saturday and only within the permitted time period.
- 2. Public Facilities: Water service to landscape maintenance districts, parks, cemeteries, and other public facilities shall comply with the restrictions set forth in the section.
- 3. Construction Projects: Water service for construction projects shall be addressed on a case-by-case basis.
- 4. Penalty: Any customer in violation of Stage 2 requirements shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not timely corrected, any continued violation of mandatory Stage 2 requirements after notice and warning is provided shall be punishable by an administrative fine of fifty dollars per day or per occurrence.

C. Stage 3—Severe Water Shortage Conditions

Goal: To achieve a reduction in total daily water demand such that the seven-day running average water demand is less than eighty-five of the safe operating capacity of the water system facilities or in response to the imposition of mandatory outdoor watering restrictions imposed by the State of California.

All Stage 2 requirements apply, with the exception of an enhanced penalty, as follows:

Penalty: Any customer in violation of Stage 3 requirements shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not timely corrected, any continued violation of mandatory Stage 3 requirements after notice and warning is provided shall be punishable by an administrative fine of two hundred dollars per day or per occurrence.

D. Stage 4—Emergency Water Shortage Conditions

Goal: Achieve a reduction in total daily water demand such that demand is less than ninety percent of the safe operating capacity of the water system facilities or in response to the imposition of critical surface water diversion curtailments by the regulatory authority.

All Stage 1 voluntary best management practices are prohibited in Stage 4 plus the following:

- (1) Outdoor landscape watering, including handheld irrigation, with potable water is prohibited at all times;
- (2) The following uses of water are prohibited:
 - a. Operation of any ornamental fountain, pond or other ornamental water feature for aesthetic purposes except where necessary to support aquatic life.
 - b. Use of water for dust control.
 - c. Washing down buildings or structures for purposes other than immediate fire protection.
 - d. Use of bulk potable water obtained from the city for construction purposes.
 - e. Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle other than by a person washing any public safety vehicle on public property.
 - f. Filling, refilling, or adding water to swimming pools, wading pools, and jacuzzi-type pools, which are located outside.
 - g. Using a fire hydrant pursuant to a temporary fire hydrant permit.
- (3) Vehicle washing at a vehicle wash facility is prohibited at all times except between the hours of 7:00 a.m. and 7:00 p.m. A person owning or operating a vehicle wash facility shall take affirmative action to prevent use of the vehicle wash facility during the prohibited

hours specified herein. Such actions shall include posting a sign indicating that the vehicle wash facility is closed and preventing vehicular access onto the property or into the washing bays. In addition, the owner/operator may also choose to disable the washing mechanisms so as to prevent operation.

- (4) No permits for new, additional, or expanded water service connections, meters, or service lines shall be granted. An exception applies where the city has already issued either a final plan for a residential lot or a commercial building permit for the site or the construction project that requires the water service.
- (5) Penalty: Any customer in violation of Stage 4 requirements shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not timely corrected, any continued violation of mandatory Stage 4 requirements after notice and warning is provided shall be punishable by an administrative fine of five hundred dollars per day or per occurrence.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.060 - Enforcement.

Any violation of this chapter shall be enforced utilizing administrative processes and remedies set forth in Chapter 1.13, Chapter 1.14, or Chapter 1.15 of this Code.

(Ord. No. 2523, § 2, 4-7-2015)

14.09.070 - Exceptions, variances and appeals.

The city manager may, in writing, grant temporary variance for existing water uses otherwise prohibited under this plan.

- A. A person requesting a variance from the provisions of this article must file an application with the city manager on forms promulgated by the city. Each application shall include the following information:
 - (1) Name and address of the applicant(s);
 - (2) A full description of the proposed water use, including, but not limited to:
 - a. The daily amount of the proposed use;
 - b. The hours of the proposed use;
 - (3) A reference to the specific provision(s) of this article from which the applicant is requesting relief;
 - (4) A detailed statement as to how the specific provision of the article adversely affects the applicant and/or what damage or harm will occur to the applicant or others if applicant complies with this article;
 - (5) A description of the relief requested;
 - (6) The period of time for which the variance is sought;
 - (7) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this article and the compliance date; and
 - (8) Any additional information that the city manager deems relevant and necessary in making a determination regarding the request.
- B. The city manager shall grant or deny the application for variance not later than 5:00 p.m. on the third city business day following delivery of the application to the city manager.

A variance granted by the city manager shall contain the following provisions:

- (1) A description of the allowable water uses granted by the variance;
- (2) A description of any conditions imposed which must be satisfied in order to maintain the variance in effect;
- (3) A timetable for compliance with any conditions set forth in the variance; and
- (4) Such other provisions as the city manager determines to be reasonable and necessary.

Variances granted shall expire upon the earlier of:

- (1) The date the water conservation measure from which the variance was granted is no longer in effect;
- (2) The date the city manager determines that the applicant has failed to comply with any deadline imposed with respect to compliance with the conditions set forth in the variance; or
- (3) The date the city manager specifically sets forth for termination of the variance.

Variance not a defense. The granting of a variance shall not be a defense to a violation of the provisions of this article which occurs prior to the effective date of the variance. No variance shall be retroactive or otherwise justify any violation of this plan occurring prior to the issuance of the variance.

(Ord. No. 2523, § 2, 4-7-2015)

APPENDIX H

2015 City of Redding Customer Confidence Report (Water Quality Report)

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Water Quality Report

2015

PWS ID# 4510006

THE CITY OF REDDING PROVIDES exceptional water to you!

The City of Redding's Public Works Department is pleased to present to you the 2015 Consumer Confidence Report (CCR). The report is designed to provide our water customers with summary information on the water quality of the City's water supply sources, the levels of any detected contaminants, and compliance with drinking water regulations. The CCR is prepared and distributed to the City's water customers each year, in accordance with State and Federal regulations for electronic delivery. The information contained in this report was taken from water analysis performed through December 2015. We test the drinking water quality for many constituents as required by State and Federal Regulations to ensure that the water supplied to our customers consistently meets both Federal and State Water Quality Standards. Last year your tap water met all U.S. Environmental Protection Agency (USEPA) and State drinking water health standards. However, five of the ten Enterprise groundwater wells, which are operated approximately six months out of the year, did exceed the maximum contaminant level for manganese, which is a secondary drinking water standard. Secondary standards are established for contaminants that do not cause adverse health effects, but do diminish the esthetic quality of the water.

We would like all our customers to have current and factual information about our drinking water. To that end, water customers who receive this report are asked to share this information with any tenant or water user on the premise. The CCR can be accessed from the Water Utility web page at <http://www.reddingutilities.com/water.html>, or if you wish to have a copy mailed to you please contact the City Public Works Water Utility at (530) 224-6068.

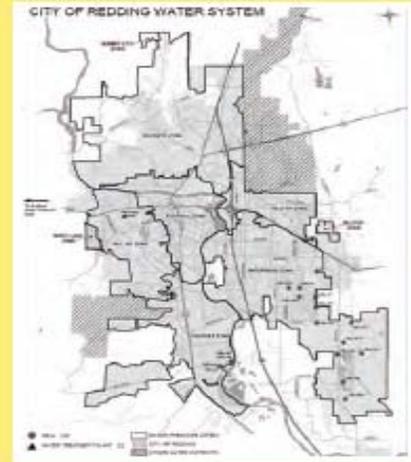
We welcome public participation in water quality issues. Information that deals with decisions about our water system is addressed during Redding City Council meetings. These meetings are held the first and third Tuesday of each month at 6:00 p.m. in the City Council Chambers at City Hall. The address is 777 Cypress Avenue, Redding. Council information can be accessed on web page at <http://www.cityofredding.org/city-council/city-council-information>.

We are available to answer questions and provide information if needed. Please see the contact information below.



**THE CITY HAS INITIATED
STAGE 1 OF ITS WATER
SHORTAGE PLAN**

**WHICH CALLS FOR VOLUNTARY
CONSERVATION. CONSERVATION
INCLUDES IRRIGATING BETWEEN
THE HOURS OF 9 PM AND 7 AM AND
ON THE SPECIFIC DAYS DEPENDING
ON THE ADDRESS.**



HOW TO CONTACT US:

Utility Customer Service & Billing:
(530) 339-7200

Leak Reports:
(530) 224-6068

Water Conservation Materials:
(530) 224-6032

Water Quality Concerns:
(530) 224-6068

General Information:
(530) 224-6068

Water Quality Information:
(530) 225-4475

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo entienda bien

A Message from the Assistant Director of Public Works

Your health and the health of the Redding community is important to us. We are proud of the fact that your water utility not only meets stringent Federal and State Water Quality standards each and every day of the year, but in most cases, contaminant levels fall far below published Primary and Secondary Standards. This means that you, the consumer, are assured of the safest water we can deliver to your home or business.

Through careful management of our resources and prudent business decisions, we will continue to investigate and develop additional water sources and bring you the highest quality water at the lowest possible cost, now and in the future.

As a division of the City of Redding's Public Works Department, the Water Utility's mission is to provide our customers with a reliable supply of high-quality drinking water. The

Water Utility workforce is made up of highly trained, well-equipped, certified operators that are dedicated to achieving their primary mission. Operations staff members monitor the system 365 days a year and stand ready to respond to both routine and emergency conditions. Undersized and aging pipelines are being replaced systematically in the order of priority within the basic framework of the Water Utility Master Plan. Continued investment in capital facilities such as distribution pipelines, reservoirs, pump stations, water treatment plants and groundwater wells are necessary to maintain the current level of service to our customers.

Towards that end, 25 full time employees maintain approximately 558 miles of water mains, 29,282 metered service connections, one 24 MGD surface water treatment plant, one 14 MGD surface water



treatment plant, 16 groundwater wells, 1 raw water pump station, 9 booster pump stations, 11 reservoirs totaling 32.7 million gallons of storage, four supervisory valve stations, 13 pressure reducing stations, seven pressure zones and serve approximately 85,000 people within a service area of approximately 60 square miles.

If you have any questions or need additional information on the City of Redding Water System please contact us at (530) 224-6068.

Source Water Assessment

The City of Redding conducted source water assessments for its surface water in July 2001 and groundwater sources in May 2002. The source water assessment identifies possible activities in the vicinity of each source that could affect the water quality of that source. The sanitary survey for our surface water sources was updated in June 2015. For more information on the source water assessment or sanitary survey, please contact the City Public Works Water Utility at (530) 224-6068 or SWRCB Division of Drinking Water, Field Operations Branch at (530) 224-4800.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from wastewater treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally-occurring or be the result of oil and gas production and mining activities.
- **Arsenic**: While your drinking water meets the federal and state standard for arsenic, it does contain low levels of arsenic. The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The USEPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.
- **Nitrate** in drinking water at levels above 45 mg/L is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 45 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies. If you are caring for an infant, or you are pregnant, you should ask advice from your health care provider. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Water Quality Standards and Testing Results

In order to ensure that tap water is safe to drink, the USEPA and the SWRCB prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. SWRCB regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

The City's water supplies must meet stringent water quality standards that are set forth by the USEPA and the SWRCB. The tables on the following pages list all of the drinking water contaminants that were detected during sampling over the past several years. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. SWRCB allows monitoring for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, are more than one year old.

Additional General Information on Drinking Water

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791) or on their website at <http://www.epa.gov/safewater>.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the USEPA website.

Infants, young children, and pregnant women are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of the materials used in your home's plumbing. If your water faucet has not been used for several hours, you can minimize the potential for lead exposure by flushing the faucet for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. Additional information is available from the USEPA Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

As part of the USEPA Unregulated Contaminant Monitoring Rule (UCMR 3) program, the City is collecting and analyzing two sets of samples for the 2nd and 3rd quarters, between March to July 2014 and January to July 2015. Samples are collected from finished water from both of our surface water treatment plants and groundwater well system sites representing the entire water system. Perfluorinated compounds, synthetic organic compounds, volatile organic compounds, six metals and one oxyhalide anion were analyzed in the UCMR 3 monitoring. The USEPA has not established maximum contaminant levels (MCL) for these unregulated contaminants, and the human health effects of these contaminants at the levels they were found is unclear. In the absence of MCLs and health standards, published guidance or health reference levels are available from the USEPA's Safe Drinking Water Hotline (1-800-426-4791) or on their website at <http://www.epa.gov/safewater>. This data will serve as a primary source of occurrence and exposure information that the agency uses to develop regulatory decisions.

Water Supply Sources

Water sources include surface water from the Sacramento River and Whiskeytown Reservoir which made up 55% of the treated water supply, or approximately 4.6 billion gallons. The groundwater from the Redding Groundwater Basin made up 45% of the treated water supply, or approximately 2.5 billion gallons. The two surface water treatment plants and 16 groundwater wells supply water to the City of Redding service area. The water system is divided into seven pressure zones: Enterprise (east), Cascade (south), Foothill (central), Hilltop-Dana (northeast), Hill 900 (west), Summit City, and Buckeye (north). The Hill 900 and Foothill zones are supplied with surface water from the Sacramento River via the Foothill Water Treatment Plant (PWTP). The Enterprise and Cascade zones are supplied by a blend of well water and water from the Foothill zone. The Buckeye zone is supplied with surface water from Whiskeytown Reservoir via the Buckeye Water Treatment Plant (BWTP) and water from the Foothill Zone. The Hilltop-Dana zone is supplied with water from both the Enterprise and Buckeye zones. These pressure zones are shown on the City of Redding Water System diagram to the right. City water is considered soft, with low to moderate alkalinity, and comparatively trace levels of disinfection byproducts.

Groundwater Quality

Five of the wells in the Enterprise zone have elevated iron and manganese levels that can form black mineral deposits in the distribution system. A sequestrant/corrosion inhibitor (blend of orthophosphate and polyphosphate) is added at these wells to keep the minerals dissolved and minimize deposits in the piping. Areas supplied by well water are flushed through a Unidirectional Flushing Program to remove accumulated deposits that can cause "discolored water". A comprehensive blending and sampling plan has been developed with State Water Resources Control Board (SWRCB), Division of Drinking Water to ensure drinking water standards are met. While Arsenic has been detected in some of our groundwater sources, we are in compliance with the Division of Drinking Water's MCL. Compliance with this MCL for arsenic is determined based on a running quarterly average of the testing results. The arsenic MCL was reduced from 50 ppb to 10 ppb on January 23, 2006 by the USEPA.

2015 SAMPLING RESULTS

Sampling results showing TREATMENT OF SURFACE WATER SOURCES

Treatment Technique (Type of approved filtration technology used):	Conventional treatment (coagulation, sedimentation, and filtration) and direct filtration (coagulation and filtration) in combination with chlorination
Turbidity Performance Standards (that must be met through the water treatment process)	Turbidity of the filtered water must: 1 – Be less than or equal to 0.3 NTU in 95% of measurements in a month 2 – Not exceed 1.0 NTU for more than eight consecutive hours 3 – Not exceed 5.0 NTU at any time
Lowest monthly percentage of four-hour samples that met Turbidity Performance Standard No. 1.	Foothill WTP: 99.9% were less than or equal to 0.3 NTU Buckeye WTP: 99.9% were less than or equal to 0.3 NTU
Highest single instantaneous turbidity measurement during the year.	1.92 NTU (0.02 to 5.0 NTU range) for Foothill Water Treatment Plant 0.25 NTU (0.02 to 5.0 NTU range) for Buckeye Water Treatment Plant
Number of violations of any surface water treatment requirements.	None

Note: Turbidity (measured in NTU) is a measurement of the cloudiness of water. Monitoring turbidity is a good indicator of water quality and to verify compliance and effectiveness of our water filtration systems and disinfectants.

Sampling results showing the detection of coliform bacteria 2015

Microbiological Contaminants	Highest No. of Detections	No. of Months in Violation	MCL	MCLG	Typical Source of Bacteria
Total Coliform Bacteria (Total Coliform Rule)	0 (In a month)	0	Greater than 5% of monthly samples positive.	0	Naturally present in the environment
Fecal Coliform or E. coli (Total Coliform Rule)	0 (In the year)	0	A routine sample and a repeat sample detect total coliform and either sample also detects fecal coliform or E. coli	0	Human and animal fecal waste
Fecal Indicators (E. coli, enterococci or coliphage) (Federal Groundwater Rule)	0 (In a month)	0	Treatment Technique (TT) for untreated groundwater	N/A	Human and animal fecal waste

Note: The City of Redding analyzes a minimum of 23 water samples per week throughout the year in the water distribution system for coliform bacteria. A total of 1,244 coliform bacteria monitoring samples were taken during calendar year 2015.

Sampling results showing the detection of Lead and copper (next sampling date Summer 2016)

Lead and Copper	No. of Samples Collected	90th Percentile Level Detected	No. Sites Exceeding AL	AL	PHG	Typical Source of Contaminant
Lead (ppb) [July 2013]	30	ND	0	15	< 2	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Copper (ppm) [July 2013]	30	0.28	0	1.3	< 0.17	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

Sampling results for sodium, hardness, and General Chemistry / 2015

Contaminant (CCR reporting units)	Sample Dates	Average Level Detected	Range of Detections	MCL	PHG (MCLG)	Typical Source of Contaminant
Sodium (ppm)	8-15	13	13	N/A	N/A	Generally found in ground & surface water
Hardness (ppm as CaCO ₃)	1-15 - 12-15	68.3	32 - 123	N/A	N/A	Generally found in ground & surface water
Calcium (ppm)	1-15 - 12-15	13.1	5 - 22	N/A	N/A	Naturally occurring dissolved mineral
Magnesium (ppm)	1-15 - 12-15	8.6	5 - 19	N/A	N/A	Naturally occurring dissolved mineral
pH	1-15 - 12-15	7.8	7.42 - 8.13	N/A	N/A	pH 6.5 to 8.5 is typical for drinking water
Alkalinity (ppm as CaCO ₃)	1-15 - 12-15	54.6	39 - 130	N/A	N/A	Measures the buffering capacity of the water

TERMS USED IN THIS REPORT

To help you better understand these terms, the following definitions are provided:

Microbial Contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;

Inorganic Contaminants, such as salts and metals, that can be naturally occurring or can result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and which can also come from gas stations, urban stormwater runoff, agricultural applications, and septic systems;

Radioactive Contaminants, that can be naturally occurring or can be the result of oil and gas production and mining activities.

More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

AL (Regulatory Action Level):

The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL (Maximum Contaminant Level):

The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

Secondary MCLs (SMCLs) are set to protect the odor, taste and appearance of drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. EPA.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NS: No standard

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L (picocuries per liter): A measure of radioactivity.

PDWS (Primary Drinking Water Standard): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG (Public Health Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California EPA.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

ppt (parts per trillion): One part substance per trillion parts water (or nanograms per liter).

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water

Detection of contaminants with a Primary Drinking Water Standard

Contaminant (CCR reporting units)	Sample Date	Average Level Detected	Range of Detections	MCL (MRDL)	PHG (MCLG) (MRDLG)	Typical Source of Contaminant
Chlorine (Distribution system)	1-15 - 12-15	0.78	0.03 - 1.41	4.0	4.0	Disinfectant required by regulation to be added to drinking water.
Aluminum (MCL @ 1ppb)	1/12 - 12/12	61.7	52.4 - 71	100	0.6	Erosion of natural deposits; residual from some water treatment process
Arsenic (ppb) (Wells) ¹	1-15 - 10-15	9.3	8 - 11	10	0.004	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes.
Nitrate (ppm as NO3) (Wells and Surface Water)	Quarterly 2015 Samples taken April, May, July, Aug & Oct.	3.9	0 - 11	45	45	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits. Infants below the age of six months who drink water containing nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant's blood to carry oxygen. Symptoms include shortness of breath and blueness of the skin. High nitrate levels may affect the oxygen-carrying ability of the blood of pregnant women.
Nitrites (ppm)	8-15 - 10-15	0.125	0-1	1 (as N)	1 (as N)	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits.
Total Trihalomethanes (Distribution system) (ppb)	Quarterly 2015	30.1	0 - 61.3	80	N/A	By-product of drinking water disinfection.
Total of Five Haloacetic Acids – HAA5 (Distribution system) (ppb)	Quarterly 2015	28.4	0 - 56	60	N/A	By-product of drinking water disinfection.
Total Organic Carbon (TOC) ²	Quarterly 2015	1.015	0.6 - 1.5	N/A	N/A	Various natural and man made sources.
Gross Alpha (pCi/L)	7-15 - 9-15	0	0 - 0	15	(0)	Erosion of natural deposits.
Radium 228 (pCi/L)	3-15 - 9-15	1.26	0 - 2.59	5	0.05	Erosion of natural deposits.
Asbestos (MFL) (Distribution system)	6/08	0.27	0.27	7	7	Internal corrosion of asbestos cement water mains; erosion of natural deposits.
Fluoride	2013	0.1	0.1 to 0.2	2.0	1	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories.

¹ Only Enterprise Well No.12 and No.14 have had detections above the arsenic standard. These wells are in the Enterprise pressure zone and are operated on a limited basis during the summer to meet peak water demand and the well water is blended with water from other Enterprise wells to reduce the arsenic below the required MCL. The arsenic MCL was reduced from 50 ppb to 10 ppb on January 23, 2006 by the USEPA.

² Total Organic Carbon is a precursor for disinfection byproduct formation. The Treatment Technique requirement applies to water filtered from the Buckeye Water Treatment Plant and Foothill Water Treatment Plant.

Detection of contaminants with a Secondary Drinking Water Standard

Contaminant (CCR reporting units)	Sample Date	Average Level Detected	Range of Detections	SMCL	PHG (MCLG)	Typical Source of Contaminant
Aluminum (ppb)	1/12 – 12/12	61.7	52.4 to 71	200	600	Erosion of natural deposits; residual from some water treatment process
Manganese (ppb) ³	1-15 - 12-15	42.1	0 - 90	50	N/A	Leaching from natural deposits
Sulfate (ppm)	8-15	7.68	7.29 - 8.07	500	N/A	Runoff/leaching from natural deposits; industrial waste
Chloride (ppm)	7-15 - 8-15	9.5	5.2 - 15.4	500	N/A	Runoff/leaching from natural deposits; seawater influence
Total Dissolved Solids (ppm)	1-15 - 12-15	109.3	81 - 214	1000	N/A	Runoff/leaching from natural deposits
Specific Conductance	1-15 - 12-15	182.2	85-358	1600	1600	Substances that form ions when in water; seawater influence
Iron (ppb) ³	1-15 - 12-15	3.56	0 - 114	300	N/A	Leaching from natural deposits; industrial wastes

Several wells in the Enterprise pressure zone have elevated levels of manganese and iron. Polyphosphate is added to sequester these minerals and the water is blended with water from other Enterprise wells to reduce the iron and manganese below the required MCL, and minimize brown water complaints. Water distribution crews have started unidirectional flushing in the Enterprise pressure zone to help minimize these complaints also.

Sampling results for US EPA UNREGULATED MONITORING RULE (UCMR 3)

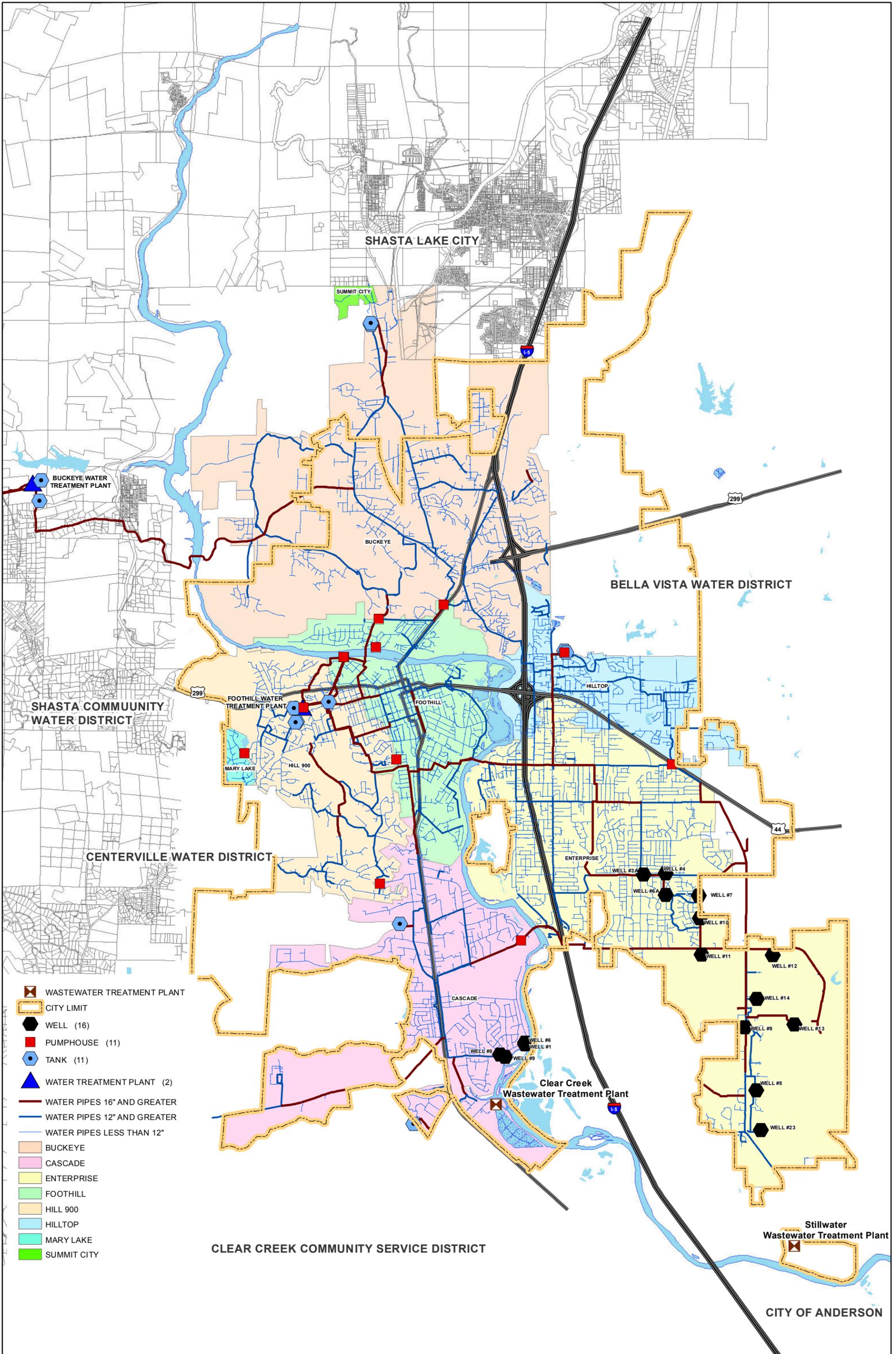
All Public Water Systems (PWS's) serving 10,000 or more service connections, as the City of Redding, are required by the USEPA to participate in this program. This data serves as a primary source of occurrence and exposure information that the USEPA uses to develop regulatory decisions. Large PWS's pay for their own testing costs. (Twenty-one unregulated contaminants were analyzed during the 2nd quarter of 2014 and 2015; The last 3 of the five contaminants below were above the MRL)

Contaminant (CCR reporting units)	Sample Dates	Average Level Detected	Range of Detections	MRL	MCL	PHG (MCLG)	Typical Source of Contaminant
Chromium (ppb)	1-5 - 7-15	0	0 - 0	0.2	50	0.04	Discharge from steel and pulp mills and chrome plating plants; erosion of natural deposits
Chromium-VI (ppb)	1-15 - 8-15	0	0 - 0	0.02	10	0.02	Discharge from electroplating factories, leather tanneries, wood preservation, chemical synthesis, refractory production, textile manufacturing facilities; erosion of natural deposits
Molybdenum (ppb)	3, 6/14	1.0	<1.0 to 1.4	1.0	N/A	N/A	Does not occur naturally as a free metal , but rather in various oxidation states in minerals
Strontium (ppb)	3, 6/14	126.4	0.37 to 310	0.3	N/A	N/A	Occurs naturally in the minerals celestine and strontianite
Vanadium (ppb)	3, 6/14	2.3	0.4 to 3.9	0.2	N/A	N/A	Occurs naturally in about 65 different minerals and in fossil fuel deposits

APPENDIX I

FIGURE 2: City of Redding Existing Water System Map

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- ☒ WASTEWATER TREATMENT PLANT
- ▭ CITY LIMIT
- WELL (16)
- PUMPHOUSE (11)
- ⬡ TANK (11)
- ▲ WATER TREATMENT PLANT (2)
- WATER PIPES 16" AND GREATER
- WATER PIPES 12" AND GREATER
- WATER PIPES LESS THAN 12"
- BUCKEYE
- CASCADE
- ENTERPRISE
- FOOTHILL
- HILL 900
- HILLTOP
- MARY LAKE
- SUMMIT CITY

FIGURE 2: CITY OF REDDING EXISTING WATER SYSTEM



APPENDIX J

City of Redding Water Efficient Landscape Ordinance

Municipal Code 16.70

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CITY OF REDDING REPORT TO REDDING CITY COUNCIL

MEETING DATE: November 17, 2015 ITEM NO. 9.4(b) [C-110-100/W-030]	FROM: Larry Vaupel, Development Services Director
SUBJECT: 9.4(b)--Ordinance Amending RMC Title 16 (Buildings and Construction), Chapter 16.70 (Water Efficient Landscape)	
APPROVED BY	
 Larry Vaupel, Development Services Director 11/5/2015	 Kurt Starman, City Manager 11/9/2015

Recommendation

Offer Ordinance amending RMC Title 16 (Buildings and Construction), Chapter 16.70 (Water Efficient Landscape) for first reading by title only and waive the first reading, and direct the City Clerk to publish a summary of the ordinance.

Background

The Governor’s April 1, 2015, Executive Order declaring a drought-related State of Emergency directed the Department of Water Resources (DWR) to update its water efficient landscape requirements. That direction was carried out and resulted in putting in place a new Model Water Efficient Landscape Ordinance (MWELO) which will be applied on a statewide basis beginning on December 1, 2015.

The City adopted its own water efficient landscape ordinance in 2010 which mirrored the State’s requirements of the original State MWELO. The new MWELO includes a substantial number of requirements for new residential, commercial, industrial, and institutional landscaping in those instances where a building permit will be issued. It also includes certain requirements for larger landscape areas that are proposed to be refurbished. The Council received a memo from staff detailing the new MWELO requirements in September 2015.

In summary, the main changes, in addition to significant documentation obligations on the part of the private developers and the City, include:

- Lowering the threshold of affected developments with landscape from the previous range of 2,500 to 5,000 square feet to 500 square feet. In particular, the requirements apply to: (1) new construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building permit; and (2) rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building permit.
- Establishing irrigation windows (between 8:00 p.m. and 10:00 a.m.).

- Requiring automatic “smart controllers” that respond to soil moisture.
- Requiring water “submeters” for landscapes meeting certain thresholds.
- Requiring compost to be applied to non-turf area to a depth of six inches.
- Establishing “water budgets” that are significantly lower than the previous MWELO, having an impact on the type of plants and irrigation that can be utilized.
- Establishing yearly reporting requirements for the City.

The overriding purpose of the state mandate is to promote landscape designs that generate less water demand and to require the use of water efficient irrigation systems to avoid unnecessary use of water resources. The regulations require the City to develop and administer programs to ensure post-installation compliance with maximum water allowances; to evaluate and provide recommendations for efficient use of water for certain existing landscapes; and to provide public education regarding the principles of water efficient landscapes.

In an effort to inform affected businesses of the mandates before the effective date, staff has sent information regarding the new MWELO requirements to local landscape architects, landscape designers, landscape contractors, irrigation specialists, land developers, and nurseries. Staff will continue working over the next month to put necessary processes in place to meet the City’s obligations.

Unless the City adopts an ordinance that is at least as restrictive as the state MWELO, that MWELO automatically takes effect on December 1, 2015. The City’s current ordinance clearly does not meet this requirement and will need to be substantially modified to include the new provisions and/or to incorporate the new MWELO. As indicated in the above referenced correspondence to the Council on this matter, staff recommends that the City not replicate the entire state MWELO into the RMC as was done in 2010. However, staff does see value in including certain basic provisions of the new MWELO in the RMC to provide easily accessible guidance to City staff and our customers. The RMC would refer to the MWELO for the technical requirements that are more likely to be changed by the state over time, negating the need to amend our local ordinance if and when that occurs. As such, the proposed ordinance before the Council for consideration includes several elements of the MWELO as listed below (all other provisions are incorporated by reference):

- Applicability.
- Landscape Package Submittal Requirements.
- Certificate of Completion Process and Requirements.
- Water Waste Prevention/Penalties.
- Public Education.
- Reporting.

In addition to the proposed ordinance, the entire MWELO is attached to this report.

Issue

Does the Council feel that the manner in which the provisions of the MWELO would be incorporated into the RMC is acceptable and, if so, wish to adopt the ordinance repealing Chapter 16.70, Water Efficient Landscape, and replace it with a new Chapter 16.70?

Alternatives; Implication of Alternatives

1. Adopt the ordinance repealing Chapter 16.70, Water Efficient Landscape, and replace it with a new Chapter 16.70 that addresses current law in the manner described above. (Staff Recommendation)
2. Direct staff to prepare an ordinance repealing existing Chapter 16.70 and replacing it with a new Chapter that simply references/incorporates the state MWELO.

Environmental Findings

Adoption of the ordinance is not a “project” as defined by the California Environmental Quality Act.

Fiscal Impact

The requirements will add yet another burden on staff to ensure compliance with a much more complicated program and for yearly reporting. At this juncture, staff cannot provide an estimate of additional staff costs.

Conclusion

The significant changes that the new MWELO establishes means many more projects will fall under the requirements and those requirements will become more onerous. Staff sees no reason to go further in regulating landscape and its irrigation than will be required by the state.

Given that the MWELO will become effective on December 1, 2015; those provisions will be in effect before any local ordinance could be included in the RMC. Regardless, staff sees a benefit in adopting certain provisions in the RMC as noted above. It will not affect requirements, but will provide a more user-friendly structure. Staff will continue to make efforts to provide information regarding the new MWELO requirements to local contractors, landscape professional, and developers. Note that until such time as the ordinance becomes effective, the state MWELO will govern exclusively.

Attachments:

Draft New Ordinance
2015 Model Water Efficient Landscape Ordinance (available online)

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF REDDING REPEALING CHAPTER 16.70 (WATER EFFICIENT LANDSCAPE) OF TITLE 16 (BUILDINGS AND CONSTRUCTION) OF THE REDDING MUNICIPAL CODE AND RESTATING CHAPTER 16.70 (WATER EFFICIENT LANDSCAPE) OF THE REDDING MUNICIPAL CODE, ALL RELATING TO WATER EFFICIENT LANDSCAPE

THE CITY COUNCIL OF THE CITY OF REDDING DOES ORDAIN AS FOLLOWS:

Section 1. Title 16 (Buildings and Construction), Chapter 16.70 (Water Efficient Landscape), Sections 16.70.010 through 16.70.180 are hereby repealed.

Section 2. Title 16 Buildings and Construction), Chapter 16.70 (Water Efficient Landscape), Sections 16.70.010 through 16.70.080 are added to read as follows:

Chapter 16.70 - WATER EFFICIENT LANDSCAPE

16.70.010 - Purpose.

This chapter is intended to comply with and implement the provisions of the California Model Water Efficient Landscape Ordinance, hereinafter referred to as MWEL0, as may be amended from time to time. The specific purposes of the MWEL0 and these regulations are to:

- A. Promote the values and benefits of landscaping practices that integrate and go beyond the conservation and efficient use of water;
- B. Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by encouraging the use of a watershed approach that requires cross-sector collaboration of industry, government and property owners to achieve the many benefits possible;
- C. Establish provisions for water management practices and water waste prevention for existing landscapes;
- D. Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;
- E. Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;

- F. Encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and
- G. Encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance.

16.70.020 – MWELO Provisions Adopted.

In addition to the requirements of this Chapter, the following Sections of the state MWELO (California Code of Regulations, Title 23, Division 2.7) are hereby adopted and incorporated by reference, a copy of which is on file and open for inspection in the City of Redding permit center.

- §491. Definitions.
- §492. Provisions for New Construction or Rehabilitated Landscapes.
- §492.4. Water Efficient Landscape Worksheet.
- §492.5. Soil Management Report.
- §492.6. Landscape Design Plan.
- §492.7. Irrigation Design Plan.
- §492.8. Grading Design Plan.
- §492.10. Irrigation Design Plan.
- §492.11. Landscape and Irrigation Maintenance Schedule.
- §492.13. Irrigation Efficiency.
- §492.14. Recycled Water.
- §492.15. Graywater Systems.
- §492.16. Stormwater Management and Rainwater Retention
- §492.18. Environmental Review.
- §494. Effective Precipitation.
- §495. Reporting.
- Appendix A – Reference Evapotranspiration (ETO) Table.
- Appendix B – Sample Water Efficient Landscape Worksheet.
- Appendix C – Sample Certificate of Completion.
- Appendix D – Prescriptive Compliance Option.

16.70.030 - Applicability.

After December 1, 2015, and consistent with Executive Order No. B-29-15, this ordinance shall apply to all of the following landscape projects:

- A. New construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check or design review;
- B. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

- C. Existing landscapes limited to Section 16.70.060.b ; and
- D. Cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 492.4, and 492.11 of the MWELO and 16.70.060.a of this Chapter; and existing cemeteries are limited to Sections 16.70.060.b and 16.70.070 of this Chapter.
- E. Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of this ordinance or conform to the prescriptive measures contained in Appendix D of the MWELO.
- F. For projects using treated or untreated graywater or rainwater captured on site, any lot or parcel within the project that has less than 2500 sq. ft. of landscape and meets the lot or parcel's landscape water requirement (Estimated Total Water Use) entirely with treated or untreated graywater or through stored rainwater captured on site is subject only to Appendix D Section (5) of the MWELO.
- G. This ordinance does not apply to:
 - 1. Registered local, state or federal historical sites;
 - 2. Ecological restoration projects that do not require a permanent irrigation system;
 - 3. Mined-land reclamation projects that do not require a permanent irrigation system; or
 - 4. Existing plant collections, as part of botanical gardens and arboretums open to the public.

16.70.040 - Landscape Documentation Package Review and Approval Required.

- A. A complete Landscape Documentation Package must be submitted and found to satisfy the requirements of this chapter prior to authorization for water service and the installation of a new water meter or a change in water service. The application shall include an application fee as may be required by resolution of the City Council.

The Landscape Documentation Package shall include the following six (6) elements:

- 1. Project information;
 - a) Date.
 - b) Project applicant.
 - c) Project address (if available, parcel and/or lot number(s)).
 - d) Total landscape area (square feet).
 - e) Project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed).
 - f) Water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well.
 - g) Checklist of all documents in Landscape Documentation Package.
 - h) Project contacts to include contact information for the project applicant and property owner.

- i) Applicant signature and date with statement, “I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package.”
 - 2. Water Efficient Landscape Worksheet;
 - a) Hydrozone information table.
 - b) Water budget calculations;
 - 1) Maximum Applied Water Allowance (MAWA).
 - 2) Estimated Total Water Use (ETWU).
 - 3. Soil Management Report;
 - 4. Landscape Design Plan;
 - 5. Irrigation Design Plan; and
 - 6. Grading Design Plan.
- B. Upon approval of the landscape documentation package, the project applicant shall:
 - 1. Receive a building permit and record the date of the permit on the certificate of completion.
 - 2. Provide a copy of the approved landscape documentation package to the property owner or site manager.
 - 3. Submit a copy of the water efficient landscape worksheet to the City.
- C. In the event that a water-supply emergency is declared by a water purveyor, these landscape requirements shall be deferred for those projects served within the impacted area until such time as the water-supply emergency has been lifted.

16.70.050 - Certificate of Completion.

- A. Upon completion of the installation of landscape and irrigation systems in compliance with the approved landscape design plan, a certificate of completion shall be submitted to the city for review and to the owner of record. The city shall review the certificate of completion and shall approve or deny the certificate. If the certificate of completion is denied, the city shall provide information to the project applicant regarding reapplication, appeal, or other assistance. The Certificate of Completion shall include the following six (6) elements:
 - 1. Project information sheet that contains:
 - a) Date;
 - b) Project name;
 - c) Project applicant name, telephone, and mailing address;

- d) Project address and location; and
 - e) Property owner name, telephone, and mailing address;
2. Certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package;
 - a) Where there have been significant changes made in the field during construction, these “as-built” or record drawings shall be included with the certification;
 - b) A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes.
 3. Irrigation scheduling parameters used to set the controller (see Section 492.10 of the MWELO);
 4. Landscape and irrigation maintenance schedule (see Section 492.11 of the MWELO);
 5. Irrigation audit report (see Section 492.12 of the MWELO); and
 6. Soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 492.5 of the MWELO).
- B. The project applicant shall:
1. Submit the signed Certificate of Completion to the City for review;
 2. Ensure that copies of the approved Certificate of Completion are submitted to the local water agency and property owner or his or her designee.
- C. The City of Redding will approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the City will provide information to the project applicant regarding reapplication, appeal, or other assistance.

16.70.060 - Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis..

All landscape irrigation audits required by the MWELO shall be conducted by a third party certified landscape irrigation auditor and shall not be conducted by the person who designed or installed the landscape. In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of 1 in 7 lots or approximately 15% will satisfy the auditing requirement.

- A. For new construction and rehabilitated landscape projects installed after December 1, 2015, the project applicant shall submit an irrigation audit report with the Certificate of Completion to the City that may include, but is not limited to: inspection, system tune-up,

system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming.

The City or appropriate water district will administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

- B. The following shall apply to all existing landscapes that were installed before December 1, 2015, and are over one acre in size.
 - 1. For landscapes that have a water meter, the City or appropriate water district will administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: $MAWA = (0.8) (ET_o) (LA) (0.62)$.
 - 2. For landscapes that do not have a meter, the City or appropriate water district will administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

16.70.070 – Water Waste Prevention/Penalties.

- A. The City will prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff from leaving the target landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures. The City may establish and administer penalties to the project applicant for non-compliance with the ordinance to the extent permitted by law.
- B. Restrictions regarding overspray and runoff may be modified if:
 - 1. The landscape area is adjacent to permeable surfacing and no runoff occurs; or
 - 2. The adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.

16.70.080 – Public Education.

The City will provide information to owners of permitted renovations and new, single-family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes based on a water budget.

- A. Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance. The signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, and rainwater catchment systems. Information shall also be provided about designing, installing, managing, and maintaining water efficient landscapes.

Section 3. The passage of this ordinance is not a “project” according to the definition in the California Environmental Quality Act, and therefore is not subject to the provisions requiring environmental review.

Section 4. Severability. If any provision of this ordinance or the application thereof to any person or circumstance is held invalid, the remainder of the ordinance and the application of such provision will remain in effect to the extent permitted by law.

Section 5. This ordinance shall take effect thirty (30) days after the date of its adoption, and the City Clerk shall certify to the adoption thereof and cause its publication according to law.

I HEREBY CERTIFY that the foregoing ordinance was introduced and read by the City Council at a regular meeting on the 17th day of November, 2015; and was duly read and adopted at a regular meeting on the ____ day of _____, 2015, by the following vote:

AYES: COUNCIL MEMBERS:
NOES: COUNCIL MEMBERS:
ABSENT: COUNCIL MEMBERS:
ABSTAIN: COUNCIL MEMBERS:

FRANCIE SULLIVAN, Mayor

ATTEST:

APPROVED AS TO FORM:

PAMELA MIZE, City Clerk

BARRY E. DeWALT, City Attorney

2015 Model Water Efficient Landscape Ordinance (MWELO)

Chapter 2.7. Model Water Efficient Landscape Ordinance

§ 490. Purpose.

- (a) The State Legislature has found:
- (1) that the waters of the state are of limited supply and are subject to ever increasing demands;
 - (2) that the continuation of California's economic prosperity is dependent on the availability of adequate supplies of water for future uses;
 - (3) that it is the policy of the State to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;
 - (4) that landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development;
 - (5) that landscape design, installation, maintenance and management can and should be water efficient;
 - (6) that Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use.
- (b) Consistent with the legislative findings, the purpose of this model ordinance is to:
- (1) promote the values and benefits of landscaping practices that integrate and go beyond the conservation and efficient use of water;
 - (2) establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by encouraging the use of a watershed approach that requires cross-sector collaboration of industry, government and property owners to achieve the many benefits possible;
 - (3) establish provisions for water management practices and water waste prevention for existing landscapes;
 - (4) use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;
 - (5) promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;
 - (6) encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and
 - (7) encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance.
- (c) Landscapes that are planned, designed, installed, managed and maintained with the watershed based approach can improve California's environmental conditions and provide benefits and realize sustainability goals. Such landscapes will make the urban environment resilient in the face of climatic extremes. Consistent with the legislative findings and purpose of the Ordinance, conditions in the urban setting will be improved by:
- (1) Creating the conditions to support life in the soil by reducing compaction, incorporating organic matter that increases water retention, and promoting productive plant growth that leads to more carbon storage, oxygen production, shade, habitat and esthetic benefits.
 - (2) Minimizing energy use by reducing irrigation water requirements, reducing reliance on petroleum based fertilizers and pesticides, and planting climate appropriate shade trees in urban areas.
 - (3) Conserving water by capturing and reusing rainwater and graywater wherever possible and selecting climate appropriate plants that need minimal supplemental water after establishment.
 - (4) Protecting air and water quality by reducing power equipment use and landfill disposal trips, selecting recycled and locally sourced materi-

als, and using compost, mulch and efficient irrigation equipment to prevent erosion.

(5) Protecting existing habitat and creating new habitat by choosing local native plants, climate adapted non-natives and avoiding invasive plants. Utilizing integrated pest management with least toxic methods as the first course of action.

NOTE: Authority cited: Section 65593, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 65591, 65593 and 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New chapter 2.7 (sections 490-495) filed 7-31-92; operative 7-31-92 (Register 92, No. 32).
2. Amendment of section and NOTE filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of subsections (a)(4) and (b)(1)-(2), new subsections (e)-(f)(5) and amendment of NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 490.1. Applicability.

(a) After December 1, 2015, and consistent with Executive Order No. B-29-15, this ordinance shall apply to all of the following landscape projects:

(1) new construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check or design review;

(2) rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

(3) existing landscapes limited to Sections 493, 493.1 and 493.2; and

(4) cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 492.4, 492.11, and 492.12; and existing cemeteries are limited to Sections 493, 493.1, and 493.2.

(b) For local land use agencies working together to develop a regional water efficient landscape ordinance, the reporting requirements of this ordinance shall become effective December 1, 2015 and the remainder of this ordinance shall be effective no later than February 1, 2016.

(c) Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of this ordinance or conform to the prescriptive measures contained in Appendix D.

(d) For projects using treated or untreated graywater or rainwater captured on site, any lot or parcel within the project that has less than 2500 sq. ft. of landscape and meets the lot or parcel's landscape water requirement (Estimated Total Water Use) entirely with treated or untreated graywater or through stored rainwater captured on site is subject only to Appendix D section (5).

(e) This ordinance does not apply to:

(1) registered local, state or federal historical sites;

(2) ecological restoration projects that do not require a permanent irrigation system;

(3) mined-land reclamation projects that do not require a permanent irrigation system; or

(4) existing plant collections, as part of botanical gardens and arboreturns open to the public.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 491. Definitions.

The terms used in this ordinance have the meaning set forth below:

(a) "applied water" means the portion of water supplied by the irrigation system to the landscape.

(b) "automatic irrigation controller" means a timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers are able to self-adjust and schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(d) "Certificate of Completion" means the document required under Section 492.9.

(e) "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.

(f) "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

(g) "check valve" or "anti-drain valve" means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

(h) "common interest developments" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.

(i) "compost" means the safe and stable product of controlled biologic decomposition of organic materials that is beneficial to plant growth.

(j) "conversion factor (0.62)" means the number that converts acres-inches per acre per year to gallons per square foot per year.

(k) "distribution uniformity" means the measure of the uniformity of irrigation water over a defined area.

(l) "drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(m) "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(n) "effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.

(o) "emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.

(p) "established landscape" means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

(q) "establishment period of the plants" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three to five years for establishment.

(r) "Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 492.4.

(s) "ET adjustment factor" (ETAF) means a factor of 0.55 for residential areas and 0.45 for non-residential areas, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. The ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0. The ETAF for existing non-rehabilitated landscapes is 0.8.

(i) "evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(u) "flow rate" means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

(v) "flow sensor" means an inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow sensors must be connected to an automatic irrigation controller, or flow monitor capable of receiving flow signals and operating master valves. This combination flow sensor/controller may also function as a landscape water meter or submeter.

(w) "friable" means a soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

(x) "Fuel Modification Plan Guideline" means guidelines from a local fire authority to assist residents and businesses that are developing land or building structures in a fire hazard severity zone.

(y) "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. Health and Safety Code Section 17922.12.

(z) "hardscapes" means any durable material (pervious and non-pervious).

(aa) "hydrozone" means a portion of the landscaped area having plants with similar water needs and rooting depth. A hydrozone may be irrigated or non-irrigated.

(bb) "infiltration rate" means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

(cc) "invasive plant species" means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

(dd) "irrigation audit" means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule. The audit must be conducted in a manner consistent with the Irrigation Association's Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency "Watersense" labeled auditing program.

(ee) "irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The irrigation efficiency for purposes of this ordinance are 0.75 for overhead spray devices and 0.81 for drip systems.

(ff) "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

(gg) "irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

(hh) "landscape architect" means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

(ii) "landscape area" means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Wa-

ter Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

(jj) "landscape contractor" means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

(kk) "Landscape Documentation Package" means the documents required under Section 492.3.

(ll) "landscape project" means total area of landscape in a project as defined in "landscape area" for the purposes of this ordinance, meeting requirements under Section 490.1.

(mm) "landscape water meter" means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

(nn) "lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

(oo) "local agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project.

(pp) "local water purveyor" means any entity, including a public agency, city, county, or private water company that provides retail water service.

(qq) "low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(rr) "main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

(ss) "master shut-off valve" is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

(tt) "Maximum Applied Water Allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 492.4. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0. $MAWA = (ET_0) (0.62) [(ETAF \times LA) + ((1-ETAF) \times SLA)]$

(uu) "median" is an area between opposing lanes of traffic that may be unplanted or planted with trees, shrubs, perennials, and ornamental grasses.

(vv) "microclimate" means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

(ww) "mined-land reclamation projects" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

(xx) "mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(yy) "new construction" means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.

(zz) "non-residential landscape" means landscapes in commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

(aaa) "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

(bbb) "overhead sprinkler irrigation systems" or "overhead spray irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

(ccc) "overspray" means the irrigation water which is delivered beyond the target area.

(ddd) "parkway" means the area between a sidewalk and the curb or traffic lane. It may be planted or unplanted, and with or without pedestrian egress.

(eee) "permit" means an authorizing document issued by local agencies for new construction or rehabilitated landscapes.

(fff) "pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

(ggg) "plant factor" or "plant water use factor" is a factor, when multiplied by ETo, estimates the amount of water needed by plants. For purposes of this ordinance, the plant factor range for very low water use plants is 0 to 0.1, the plant factor range for low water use plants is 0.1 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the publication "Water Use Classification of Landscape Species". Plant factors may also be obtained from horticultural researchers from academic institutions or professional associations as approved by the California Department of Water Resources (DWR).

(hhh) "project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section 492.3, to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or his or her designee.

(iii) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

(jii) "record drawing" or "as-builts" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

(kkk) "recreational area" means areas, excluding private single family residential areas, designated for active play, recreation or public assembly in parks, sports fields, picnic grounds, amphitheaters or golf course tees, fairways, roughs, surrounds and greens.

(lll) "recycled water," "reclaimed water," or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation and water features. This water is not intended for human consumption.

(mmm) "reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Appendix A, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.

(nnn) "Regional Water Efficient Landscape Ordinance" means a local Ordinance adopted by two or more local agencies, water suppliers and other stakeholders for implementing a consistent set of landscape provisions throughout a geographical region. Regional ordinances are strongly encouraged to provide a consistent framework for the landscape industry and applicants to adhere to.

(ooo) "rehabilitated landscape" means any relandscaping project that requires a permit, plan check, or design review, meets the requirements of Section 490.1, and the modified landscape area is equal to or greater than 2,500 square feet.

(ppp) "residential landscape" means landscapes surrounding single or multifamily homes.

(qqq) "run off" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

(rrr) "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(sss) "soil texture" means the classification of soil based on its percentage of sand, silt, and clay.

(ttt) "Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

(uuu) "sprinkler head" or "spray head" means a device which delivers water through a nozzle.

(vvv) "static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.

(www) "station" means an area served by one valve or by a set of valves that operate simultaneously.

(xxx) "swing joint" means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

(yyy) "submeter" means a metering device to measure water applied to the landscape that is installed after the primary utility water meter.

(zzz) "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

(aaaa) "valve" means a device used to control the flow of water in the irrigation system.

(bbbb) "water conserving plant species" means a plant species identified as having a very low or low plant factor.

(cccc) "water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.

(dddd) "watering window" means the time of day irrigation is allowed.

(eeec) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension and the Department of Water Resources 2014.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 65592 and 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 7-31-92; operative 7-31-92 (Register 92, No. 32).
2. Amendment of section and NOTE filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492. Provisions for New Construction or Rehabilitated Landscapes.

(a) A local agency may designate by mutual agreement, another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596,

Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 7-31-92; operative 7-31-92 (Register 92, No. 32).
2. Amendment of section heading, repealer and new section and amendment of NOTE filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.1. Compliance with Landscape Documentation Package.

- (a) Prior to construction, the local agency shall:
- (1) provide the project applicant with the ordinance and procedures for permits, plan checks or design reviews;
 - (2) review the Landscape Documentation Package submitted by the project applicant;
 - (3) approve or deny the Landscape Documentation Package;
 - (4) issue a permit or approve the plan check or design review for the project applicant; and
 - (5) upon approval of the Landscape Documentation Package, submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.
- (b) Prior to construction, the project applicant shall:
- (1) submit a Landscape Documentation Package to the local agency.
- (c) Upon approval of the Landscape Documentation Package by the local agency, the project applicant shall:
- (1) receive a permit or approval of the plan check or design review and record the date of the permit in the Certificate of Completion;
 - (2) submit a copy of the approved Landscape Documentation Package along with the record drawings, and any other information to the property owner or his/her designee; and
 - (3) submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.2. Penalties.

(a) A local agency may establish and administer penalties to the project applicant for non-compliance with the ordinance to the extent permitted by law.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.3. Elements of the Landscape Documentation Package.

(a) The Landscape Documentation Package shall include the following six (6) elements:

- (1) project information;
 - (A) date
 - (B) project applicant
 - (C) project address (if available, parcel and/or lot number(s))
 - (D) total landscape area (square feet)
 - (E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
 - (F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
 - (G) checklist of all documents in Landscape Documentation Package
 - (H) project contacts to include contact information for the project applicant and property owner
 - (I) applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package".

(2) Water Efficient Landscape Worksheet;

(A) hydrozone information table

(B) water budget calculations

1. Maximum Applied Water Allowance (MAWA)

2. Estimated Total Water Use (ETWU)

(3) soil management report;

(4) landscape design plan;

(5) irrigation design plan; and

(6) grading design plan.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.4. Water Efficient Landscape Worksheet.

(a) A project applicant shall complete the Water Efficient Landscape Worksheet in Appendix B which contains information on the plant factor, irrigation method, irrigation efficiency, and area associated with each hydrozone. Calculations are then made to show that the evapotranspiration adjustment factor (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non-residential areas, exclusive of Special Landscape Areas. The ETAF for a landscape project is based on the plant factors and irrigation methods selected. The Maximum Applied Water Allowance is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non-residential areas) and expressed as annual gallons required. The Estimated Total Water Use (ETWU) is calculated based on the plants used and irrigation method selected for the landscape design. ETWU must be below the MAWA.

(1) In calculating the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A. For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999.

(b) Water budget calculations shall adhere to the following requirements:

(1) The plant factor used shall be from WUCOLS or from horticultural researchers with academic institutions or professional associations as approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

(3) All Special Landscape Areas shall be identified and their water use calculated as shown in Appendix B.

(4) ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.5. Soil Management Report.

(a) In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant, or his/her designee, as follows:

- (1) Submit soil samples to a laboratory for analysis and recommendations.

(A) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

(B) The soil analysis shall include:

1. soil texture;
2. infiltration rate determined by laboratory test or soil texture infiltration rate table;
3. pH;
4. total soluble salts;
5. sodium;
6. percent organic matter; and
7. recommendations.

(C) In projects with multiple landscape installations (i.e., production home developments) a soil sampling rate of 1 in 7 lots or approximately 15% will satisfy this requirement. Large landscape projects shall sample at a rate equivalent to 1 in 7 lots.

(2) The project applicant, or his/her designee, shall comply with one of the following:

(A) If significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or

(B) If significant mass grading is planned, the soil analysis report shall be submitted to the local agency as part of the Certificate of Completion.

(3) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.

(4) The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of subsection (a)(1)(B), new subsection (a)(1)(C) and amendment of NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.6. Landscape Design Plan.

(a) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) Plant Material

(A) Any plant may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance. Methods to achieve water efficiency shall include one or more of the following:

1. protection and preservation of native species and natural vegetation;
2. selection of water-conserving plant, tree and turf species, especially local native plants;
3. selection of plants based on local climate suitability, disease and pest resistance;
4. selection of trees based on applicable local tree ordinances or tree shading guidelines, and size at maturity as appropriate for the planting area; and
5. selection of plants from local and regional landscape program plant lists.
6. selection of plants from local Fuel Modification Plan Guidelines.

(B) Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 492.7(a)(2)(D).

(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the

project site. Methods to achieve water efficiency shall include one or more of the following:

1. use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;

2. recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure [e.g., buildings, sidewalks, power lines]; allow for adequate soil volume for healthy root growth; and

3. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(D) Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).

(E) High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians.

(F) A landscape design plan for projects in fire-prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required per Public Resources Code Section 4291(a) and (b). Avoid fire-prone plant materials and highly flammable mulches. Refer to the local Fuel Modification Plan guidelines.

(G) The use of invasive plant species, such as those listed by the California Invasive Plant Council, is strongly discouraged.

(H) The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

(2) Water Features

(A) Recirculating water systems shall be used for water features.

(B) Where available, recycled water shall be used as a source for decorative water features.

(C) Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation.

(D) Pool and spa covers are highly recommended.

(3) Soil Preparation, Mulch and Amendments

(A) Prior to the planting of any materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.

(B) Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 492.5).

(C) For landscape installations, compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall be incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.

(D) A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5 % of the landscape area may be left without mulch. Designated insect habitat must be included in the landscape design plan as such.

(E) Stabilizing mulching products shall be used on slopes that meet current engineering standards.

(F) The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.

(G) Organic mulch materials made from recycled or post-consumer shall take precedence over inorganic materials or virgin forest products unless the recycled post-consumer organic products are not locally available. Organic mulches are not required where prohibited by local Fuel Modification Plan Guidelines or other applicable local ordinances.

(b) The landscape design plan, at a minimum, shall:

(1) delineate and label each hydrozone by number, letter, or other method;

(2) identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation;

(3) identify recreational areas;

(4) identify areas permanently and solely dedicated to edible plants;

(5) identify areas irrigated with recycled water;

(6) identify type of mulch and application depth;

(7) identify soil amendments, type, and quantity;

(8) identify type and surface area of water features;

(9) identify hardscapes (pervious and non-pervious);

(10) identify location, installation details, and 24-hour retention or infiltration capacity of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Project applicants shall refer to the local agency or regional Water Quality Control Board for information on any applicable stormwater technical requirements. Stormwater best management practices are encouraged in the landscape design plan and examples are provided in Section 492.16.

(11) identify any applicable rain harvesting or catchment technologies as discussed in Section 492.16 and their 24-hour retention or infiltration capacity;

(12) identify any applicable graywater discharge piping, system components and area(s) of distribution;

(13) contain the following statement: "I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan"; and

(14) bear the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.)

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; Section 1351, Civil Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.7. Irrigation Design Plan.

(a) This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) System

(A) Landscape water meters, defined as either a dedicated water service meter or private submeter, shall be installed for all non-residential irrigated landscapes of 1,000 sq. ft. but not more than 5,000 sq. ft. (the level at which Water Code 535 applies) and residential irrigated landscapes of 5,000 sq. ft. or greater. A landscape water meter may be either:

1. a customer service meter dedicated to landscape use provided by the local water purveyor; or

2. a privately owned meter or submeter.

(B) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data utilizing non-volatile memory shall be required for irrigation scheduling in all irrigation systems.

(C) If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regu-

lating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system.

2. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

(D) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.

(E) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(F) Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the applicable local agency code (i.e., public health) for additional backflow prevention requirements.

(G) Flow sensors that detect high flow conditions created by system damage or malfunction are required for all on non-residential landscapes and residential landscapes of 5000 sq. ft. or larger.

(H) Master shut-off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

(I) The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

(J) Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

(K) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(L) The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in Section 492.4 regarding the Maximum Applied Water Allowance.

(M) All irrigation emission devices must meet the requirements set in the American National Standards Institute (ANSI) standard, American Society of Agricultural and Biological Engineers/International Code Council's (ASABE/ICC) 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard. All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.

(N) It is highly recommended that the project applicant or local agency inquire with the local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

(O) In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

(P) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

(Q) Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

(R) Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turfgrass.

(S) Check valves or anti-drain valves are required on all sprinkler heads where low point drainage could occur.

(T) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(U) Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:

1. the landscape area is adjacent to permeable surfacing and no runoff occurs; or
2. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or
3. the irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria in Section 492.7 (a)(1)(I). Prevention of overspray and runoff must be confirmed during the irrigation audit.

(V) Slopes greater than 25% shall not be irrigated with an irrigation system with a application rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.

(2) Hydrozone

(A) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(B) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

(C) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.

(D) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

1. plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
2. the plant factor of the higher water using plant is used for calculations.

(E) Individual hydrozones that mix high and low water use plants shall not be permitted.

(F) On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Hydrozone Information Table (see Appendix B Section A). This table can also assist with the irrigation audit and programming the controller.

(b) The irrigation design plan, at a minimum, shall contain:

- (1) location and size of separate water meters for landscape;
- (2) location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;
- (3) static water pressure at the point of connection to the public water supply;
- (4) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;
- (5) recycled water irrigation systems as specified in Section 492.14;
- (6) the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and
- (7) the signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized

to design an irrigation system. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.8. Grading Design Plan.

(a) For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for other local agency permits satisfies this requirement.

(1) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including:

- (A) height of graded slopes;
- (B) drainage patterns;
- (C) pad elevations;
- (D) finish grade; and
- (E) stormwater retention improvements, if applicable.

(2) To prevent excessive erosion and runoff, it is highly recommended that project applicants:

- (A) grade so that all irrigation and normal rainfall remains within property lines and does not drain on to non-permeable hardscapes;
- (B) avoid disruption of natural drainage patterns and undisturbed soil; and
- (C) avoid soil compaction in landscape areas.

(3) The grading design plan shall contain the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan" and shall bear the signature of a licensed professional as authorized by law.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.9. Certificate of Completion.

(a) The Certificate of Completion (see Appendix C for a sample certificate) shall include the following six (6) elements:

- (1) project information sheet that contains:
 - (A) date;
 - (B) project name;
 - (C) project applicant name, telephone, and mailing address;
 - (D) project address and location; and
 - (E) property owner name, telephone, and mailing address;
- (2) certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package;
 - (A) where there have been significant changes made in the field during construction, these "as-built" or record drawings shall be included with the certification;
 - (B) A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes.
- (3) irrigation scheduling parameters used to set the controller (see Section 492.10);
- (4) landscape and irrigation maintenance schedule (see Section 492.11);
- (5) irrigation audit report (see Section 492.12); and

(6) soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 492.5).

(b) The project applicant shall:

(1) submit the signed Certificate of Completion to the local agency for review;

(2) ensure that copies of the approved Certificate of Completion are submitted to the local water purveyor and property owner or his or her designee.

(c) The local agency shall:

(1) receive the signed Certificate of Completion from the project applicant;

(2) approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the local agency shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. New subsection (a)(2)(B) and amendment of NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.10. Irrigation Scheduling.

(a) For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the local water purveyor, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(3) For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.

(4) Parameters used to set the automatic controller shall be developed and submitted for each of the following:

(A) the plant establishment period;

(B) the established landscape; and

(C) temporarily irrigated areas.

(5) Each irrigation schedule shall consider for each station all of the following that apply:

(A) irrigation interval (days between irrigation);

(B) irrigation run times (hours or minutes per irrigation event to avoid runoff);

(C) number of cycle starts required for each irrigation event to avoid runoff;

(D) amount of applied water scheduled to be applied on a monthly basis;

(E) application rate setting;

(F) root depth setting;

(G) plant type setting;

(H) soil type;

(I) slope factor setting;

(J) shade factor setting; and

(K) irrigation uniformity or efficiency setting.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.11. Landscape and Irrigation Maintenance Schedule.

(a) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.

(d) A project applicant is encouraged to implement established landscape industry sustainable Best Practices for all landscape maintenance activities.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.12. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.

(b) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of 1 in 7 lots or approximately 15% will satisfy this requirement.

(c) For new construction and rehabilitated landscape projects installed after December 1, 2015, as described in Section 490.1:

(1) the project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;

(2) the local agency shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.13. Irrigation Efficiency.

(a) For the purpose of determining Estimated Total Water Use, average irrigation efficiency is assumed to be 0.75 for overhead spray devices and 0.81 for drip system devices.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596,

Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.14. Recycled Water.

(a) The installation of recycled water irrigation systems shall allow for the current and future use of recycled water.

(b) All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and State laws.

(c) Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.15. Graywater Systems.

(a) Graywater systems promote the efficient use of water and are encouraged to assist in on-site landscape irrigation. All graywater systems shall conform to the California Plumbing Code (Title 24, Part 5, Chapter 16) and any applicable local ordinance standards. Refer to § 490.1 (d) for the applicability of this ordinance to landscape areas less than 2,500 square feet with the Estimated Total Water Use met entirely by graywater.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.15 to 492.16, new section 492.15 and amendment of NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.16. Stormwater Management and Rainwater Retention.

(a) Stormwater management practices minimize runoff and increase infiltration which recharges groundwater and improves water quality. Implementing stormwater best management practices into the landscape and grading design plans to minimize runoff and to increase on-site rainwater retention and infiltration are encouraged.

(b) Project applicants shall refer to the local agency or Regional Water Quality Control Board for information on any applicable stormwater technical requirements.

(c) All planted landscape areas are required to have friable soil to maximize water retention and infiltration. Refer to § 492.6(a)(3).

(d) It is strongly recommended that landscape areas be designed for capture and infiltration capacity that is sufficient to prevent runoff from impervious surfaces (i.e. roof and paved areas) from either: the one inch, 24-hour rain event or (2) the 85th percentile, 24-hour rain event, and/or additional capacity as required by any applicable local, regional, state or federal regulation.

(e) It is recommended that storm water projects incorporate any of the following elements to improve on-site storm water and dry weather runoff capture and use:

- Grade impervious surfaces, such as driveways, during construction to drain to vegetated areas.

- Minimize the area of impervious surfaces such as paved areas, roof and concrete driveways.
- Incorporate pervious or porous surfaces (e.g., gravel, permeable pavers or blocks, pervious or porous concrete) that minimize runoff.
- Direct runoff from paved surfaces and roof areas into planting beds or landscaped areas to maximize site water capture and reuse.
- Incorporate rain gardens, cisterns, and other rain harvesting or catchment systems.
- Incorporate infiltration beds, swales, basins and drywells to capture storm water and dry weather runoff and increase percolation into the soil.
- Consider constructed wetlands and ponds that retain water, equalize excess flow, and filter pollutants.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.16 to section 492.17 and renumbering of former section 492.15 to new section 492.16, including amendment of section heading, section and NOTE, filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.17. Public Education.

(a) Publications. Education is a critical component to promote the efficient use of water in landscapes. The use of appropriate principles of design, installation, management and maintenance that save water is encouraged in the community.

(1) A local agency or water supplier/purveyor shall provide information to owners of permitted renovations and new, single-family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes based on a water budget.

(b) Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance.

(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, and rainwater catchment systems.

(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.17 to new section 492.18 and renumbering of former section 492.16 to new section 492.17, including amendment of section and NOTE, filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 492.18. Environmental Review.

(a) The local agency must comply with the California Environmental Quality Act (CEQA), as appropriate.

NOTE: Authority cited: Section 21082, Public Resources Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 21080 and 21082, Public Resources Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. Renumbering of former section 492.17 to new section 492.18, including amendment of NOTE, filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 493. Provisions for Existing Landscapes.

(a) A local agency may by mutual agreement, designate another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 7-31-92; operative 7-31-92 (Register 92, No. 32).
2. Repealer and new section and amendment of NOTE filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 493.1. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) This section, 493.1, shall apply to all existing landscapes that were installed before December 1, 2015 and are over one acre in size.

(1) For all landscapes in 493.1 (a) that have a water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: $MAWA = (0.8) (ET_o) (LA) (0.62)$.

(2) For all landscapes in 493.1(a), that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

(b) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of subsection (a) and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 493.2. Water Waste Prevention.

(a) Local agencies shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff from leaving the target landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures. Penalties for violation of these prohibitions shall be established locally.

(b) Restrictions regarding overspray and runoff may be modified if:

(1) the landscape area is adjacent to permeable surfacing and no runoff occurs; or

(2) the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.

NOTE: Authority cited: Section 65594, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 494. Effective Precipitation.

(a) A local agency may consider Effective Precipitation (25% of annual precipitation) in tracking water use and may use the following equation to calculate Maximum Applied Water Allowance:

$MAWA = (ET_o - Bppl) (0.62) [(0.55 \times LA) + (0.45 \times SLA)]$ for residential areas.

$MAWA = (ET_o - EPPT) (0.62) [(0.45 \times LA) + (0.55 \times SLA)]$ for non-residential areas.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. Repealer and new section; new NOTE and new Appendices A-C filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

§ 495. Reporting.

(a) Local agencies shall report on implementation and enforcement by December 31, 2015. Local agencies responsible for administering individual ordinances shall report on their updated ordinance, while those agencies developing a regional ordinance shall report on their existing ordinance. Those agencies crafting a regional ordinance shall also report on their new ordinance by March 1, 2016. Subsequently, reporting for all agencies will be due by January 31st of each year. Reports shall be submitted to the Department of Water Resources.

(b) Local agencies are to address the following:

(1) State whether you are adopting a single agency ordinance or a regional agency alliance ordinance, and the date of adoption or anticipated date of adoption.

(2) Define the reporting period. The reporting period shall commence on December 1, 2015 and the end on December 28, 2015. For local agencies crafting regional ordinances with other agencies, there shall be an additional reporting period commencing on February 1, 2016 and ending on February 28, 2016. In subsequent years, all local agency reporting will be for the calendar year.

(3) State if using a locally modified Water Efficient Landscape Ordinance (WELO) or the MWELO. If using a locally modified WELO, how is it different than MWELO, is it at least as efficient as MWELO, and are there any exemptions specified?

(4) State the entity responsible for implementing the ordinance.

(5) State number and types of projects subject to the ordinance during the specified reporting period.

(6) State the total area (in square feet or acres) subject to the ordinance over the reporting period, if available.

(7) Provide the number of new housing starts, new commercial projects, and landscape retrofits during the reporting period.

(8) Describe the procedure for review of projects subject to the ordinance.

(9) Describe actions taken to verify compliance. Is a plan check performed; if so, by what entity? Is a site inspection performed; if so, by what entity? Is a post-installation audit required; if so, by whom?

(10) Describe enforcement measures.

(11) Explain challenges to implementing and enforcing the ordinance.

(12) Describe educational and other needs to properly apply the ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015).

HISTORY

1. New section filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38). For prior history, see Register 2009, No. 37.

Appendix A. Reference Evapotranspiration (ET_o) Table

Appendix A - Reference Evapotranspiration (ET _o) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ET _o
ALAMEDA													
Fremont	1.5	1.9	3.4	4.7	5.4	6.3	6.7	6.0	4.5	3.4	1.8	1.5	47.0
Livermore	1.2	1.5	2.9	4.4	5.9	6.6	7.4	6.4	5.3	3.2	1.5	0.9	47.2
Oakland	1.5	1.5	2.8	3.9	5.1	5.3	6.0	5.5	4.8	3.1	1.4	0.9	41.8
Oakland Foothills	1.1	1.4	2.7	3.7	5.1	6.4	5.8	4.9	3.6	2.6	1.4	1.0	39.6
Pleasanton	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
Union City	1.4	1.8	3.1	4.2	5.4	5.9	6.4	5.7	4.4	3.1	1.5	1.2	44.2
ALPINE													
Markleeville	0.7	0.9	2.0	3.5	5.0	6.1	7.3	6.4	4.4	2.6	1.2	0.5	40.6
AMADOR													
Jackson	1.2	1.5	2.8	4.4	6.0	7.2	7.9	7.2	5.3	3.2	1.4	0.9	48.9
Shanandoah Valley	1.0	1.7	2.9	4.4	5.6	6.8	7.9	7.1	5.2	3.6	1.7	1.0	48.8
BUTTE													
Chico	1.2	1.8	2.9	4.7	6.1	7.4	8.5	7.3	5.4	3.7	1.7	1.0	51.7
Durham	1.1	1.8	3.2	5.0	6.5	7.4	7.8	6.9	5.3	3.6	1.7	1.0	51.1
Gridley	1.2	1.8	3.0	4.7	6.1	7.7	8.5	7.1	5.4	3.7	1.7	1.0	51.9
Oroville	1.2	1.7	2.8	4.7	6.1	7.6	8.5	7.3	5.3	3.7	1.7	1.0	51.5
CALAVERAS													
San Andreas	1.2	1.5	2.8	4.4	6.0	7.3	7.9	7.0	5.3	3.2	1.4	0.7	48.8
COLUSA													
Colusa	1.0	1.7	3.4	5.0	6.4	7.6	8.3	7.2	5.4	3.8	1.8	1.1	52.8
Williams	1.2	1.7	2.9	4.5	6.1	7.2	8.5	7.3	5.3	3.4	1.6	1.0	50.8
CONTRA COSTA													
Brentwood	1.0	1.5	2.9	4.5	6.1	7.1	7.9	6.7	5.2	3.2	1.4	0.7	48.3
Concord	1.1	1.4	2.4	4.0	5.5	5.9	7.0	6.0	4.8	3.2	1.3	0.7	43.4
Courtland	0.9	1.5	2.9	4.4	6.1	6.9	7.9	6.7	5.3	3.2	1.4	0.7	48.0
Martinez	1.2	1.4	2.4	3.9	5.3	5.6	6.7	5.6	4.7	3.1	1.2	0.7	41.8
Moraga	1.2	1.5	3.4	4.2	5.5	6.1	6.7	5.9	4.6	3.2	1.6	1.0	44.9
Pittsburg	1.0	1.5	2.8	4.1	5.6	6.4	7.4	6.4	5.0	3.2	1.3	0.7	45.4
Walnut Creek	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
DEL NORTE													
Crescent City	0.5	0.9	2.0	3.0	3.7	3.5	4.3	3.7	3.0	2.0	0.9	0.5	27.7
EL DORADO													
Camino	0.9	1.7	2.5	3.9	5.9	7.2	7.8	6.8	5.1	3.1	1.5	0.9	47.3
FRESNO													
Clovis	1.0	1.5	3.2	4.8	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Coalinga	1.2	1.7	3.1	4.6	6.2	7.2	8.5	7.3	5.3	3.4	1.6	0.7	50.9
Firebaugh	1.0	1.8	3.7	5.7	7.3	8.1	8.2	7.2	5.5	3.9	2.0	1.1	55.4
FivePoints	1.3	2.0	4.0	6.1	7.7	8.5	8.7	8.0	6.2	4.5	2.4	1.2	60.4
Fresno	0.9	1.7	3.3	4.8	6.7	7.8	8.4	7.1	5.2	3.2	1.4	0.6	51.1
Fresno State	0.9	1.6	3.2	5.2	7.0	8.0	8.7	7.6	5.4	3.6	1.7	0.9	53.7
Friant	1.2	1.5	3.1	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Kerman	0.9	1.5	3.2	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.2
Kingsburg	1.0	1.5	3.4	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.6
Mendota	1.5	2.5	4.6	6.2	7.9	8.6	8.8	7.5	5.9	4.5	2.4	1.5	61.7
Orange Cove	1.2	1.9	3.5	4.7	7.4	8.5	8.9	7.9	5.9	3.7	1.8	1.2	56.7
Panoche	1.1	2.0	4.0	5.6	7.8	8.5	8.3	7.3	5.6	3.9	1.8	1.2	57.2
Parlier	1.0	1.9	3.6	5.2	6.8	7.6	8.1	7.0	5.1	3.4	1.7	0.9	52.0

Attachment: 2015 Model Water Efficient Landscape Ordinance (available online) (2316 : 9.4(b)--Water Efficient Landscape Ordinance)

Appendix A - Reference Evapotranspiration (ETo) Table*

County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
FRESNO													
Reedley	1.1	1.5	3.2	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Westlands	0.9	1.7	3.8	6.3	8.0	8.6	8.6	7.8	5.9	4.3	2.1	1.1	58.8
GLENN													
Orland	1.1	1.8	3.4	5.0	6.4	7.5	7.9	6.7	5.3	3.9	1.8	1.4	52.1
Willows	1.2	1.7	2.9	4.7	6.1	7.2	8.5	7.3	5.3	3.6	1.7	1.0	51.3
HUMBOLDT													
Eureka	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Ferndale	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Garberville	0.6	1.2	2.2	3.1	4.5	5.0	5.5	4.9	3.8	2.4	1.0	0.7	34.9
Hoopla	0.5	1.1	2.1	3.0	4.4	5.4	6.1	5.1	3.8	2.4	0.9	0.7	35.6
IMPERIAL													
Brawley	2.8	3.8	5.9	8.0	10.4	11.5	11.7	10.0	8.4	6.2	3.5	2.1	84.2
Calipatria/Mulberry	2.4	3.2	5.1	6.8	8.6	9.2	9.2	8.6	7.0	5.2	3.1	2.3	70.7
El Centro	2.7	3.5	5.6	7.9	10.1	11.1	11.6	9.5	8.3	6.1	3.3	2.0	81.7
Holtville	2.8	3.8	5.9	7.9	10.4	11.6	12.0	10.0	8.6	6.2	3.5	2.1	84.7
Meloland	2.5	3.2	5.5	7.5	8.9	9.2	9.0	8.5	6.8	5.3	3.1	2.2	71.6
Palo Verde II	2.5	3.3	5.7	6.9	8.5	8.9	8.6	7.9	6.2	4.5	2.9	2.3	68.2
Seeley	2.7	3.5	5.9	7.7	9.7	10.1	9.3	8.3	6.9	5.5	3.4	2.2	75.4
Westmoreland	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Yuma	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
INYO													
Bishop	1.7	2.7	4.8	6.7	8.2	10.9	7.4	9.6	7.4	4.8	2.5	1.6	68.3
Death Valley Jct	2.2	3.3	5.4	7.7	9.8	11.1	11.4	10.1	8.3	5.4	2.9	1.7	79.1
Independence	1.7	2.7	3.4	6.6	8.5	9.5	9.8	8.5	7.1	3.9	2.0	1.5	65.2
Lower Haiwee Res.	1.8	2.7	4.4	7.1	8.5	9.5	9.8	8.5	7.1	4.2	2.6	1.5	67.6
Oasis	2.7	2.8	5.9	8.0	10.4	11.7	11.6	10.0	8.4	6.2	3.4	2.1	83.1
KERN													
Arvin	1.2	1.8	3.5	4.7	6.6	7.4	8.1	7.3	5.3	3.4	1.7	1.0	51.9
Bakersfield	1.0	1.8	3.5	4.7	6.6	7.7	8.5	7.3	5.3	3.5	1.6	0.9	52.4
Bakersfield/Bonanza	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
Bakersfield/Greenlee	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
Belridge	1.4	2.2	4.1	5.5	7.7	8.5	8.6	7.8	6.0	3.8	2.0	1.5	59.2
Blackwells Corner	1.4	2.1	3.8	5.4	7.0	7.8	8.5	7.7	5.8	3.9	1.9	1.2	56.6
Buttonwillow	1.0	1.8	3.2	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.5	0.9	52.0
China Lake	2.1	3.2	5.3	7.7	9.2	10.0	11.0	9.8	7.3	4.9	2.7	1.7	74.8
Delano	0.9	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.4	0.7	52.0
Famoso	1.3	1.9	3.5	4.8	6.7	7.6	8.0	7.3	5.5	3.5	1.7	1.3	53.1
Grapevine	1.3	1.8	3.1	4.4	5.6	6.8	7.6	6.8	5.9	3.4	1.9	1.0	49.5
Inyokern	2.0	3.1	4.9	7.3	8.5	9.7	11.0	9.4	7.1	5.1	2.6	1.7	72.4
Isabella Dam	1.2	1.4	2.8	4.4	5.8	7.3	7.9	7.0	5.0	3.2	1.7	0.9	48.4
Lamont	1.3	2.4	4.4	4.6	6.5	7.0	8.8	7.6	5.7	3.7	1.6	0.8	54.4
Lost Hills	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
McFarland/Kern	1.2	2.1	3.7	5.6	7.3	8.0	8.3	7.4	5.6	4.1	2.0	1.2	56.5
Shafter	1.0	1.7	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.5	0.9	52.1
Taft	1.3	1.8	3.1	4.3	6.2	7.3	8.5	7.3	5.4	3.4	1.7	1.0	51.2
Tehachapi	1.4	1.8	3.2	5.0	6.1	7.7	7.9	7.3	5.9	3.4	2.1	1.2	52.9
KINGS													
Caruthers	1.6	2.5	4.0	5.7	7.8	8.7	9.3	8.4	6.3	4.4	2.4	1.6	62.7

Attachment: 2015 Model Water Efficient Landscape Ordinance (available online) (2316 : 9.4(b))--Water Efficient Landscape Ordinance

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
KINGS													
Corcoran	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Hanford	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.2	5.4	3.4	1.4	0.7	51.5
Kettleman	1.1	2.0	4.0	6.0	7.5	8.5	9.1	8.2	6.1	4.5	2.2	1.1	60.2
Lemoore	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.4	0.7	51.7
Stratford	0.9	1.9	3.9	6.1	7.8	8.6	8.8	7.7	5.9	4.1	2.1	1.0	58.7
LAKE													
Lakeport	1.1	1.3	2.6	3.5	5.1	6.0	7.3	6.1	4.7	2.9	1.2	0.9	42.8
Lower Lake	1.2	1.4	2.7	4.5	5.3	6.3	7.4	6.4	5.0	3.1	1.3	0.9	45.4
LASSEN													
Buntingville	1.0	1.7	3.5	4.9	6.2	7.3	8.4	7.5	5.4	3.4	1.5	0.9	51.8
Ravendale	0.6	1.1	2.3	4.1	5.6	6.7	7.9	7.3	4.7	2.8	1.2	0.5	44.9
Susanville	0.7	1.0	2.2	4.1	5.6	6.5	7.8	7.0	4.6	2.8	1.2	0.5	44.0
LOS ANGELES													
Burbank	2.1	2.8	3.7	4.7	5.1	6.0	6.6	6.7	5.4	4.0	2.6	2.0	51.7
Claremont	2.0	2.3	3.4	4.6	5.0	6.0	7.0	7.0	5.3	4.0	2.7	2.1	51.3
El Dorado	1.7	2.2	3.6	4.8	5.1	5.7	5.9	5.9	4.4	3.2	2.2	1.7	46.3
Glendale	2.0	2.2	3.3	3.8	4.7	4.8	5.7	5.6	4.3	3.3	2.2	1.8	43.7
Glendora	2.0	2.5	3.6	4.9	5.4	6.1	7.3	6.8	5.7	4.2	2.6	2.0	53.1
Gorman	1.6	2.2	3.4	4.6	5.5	7.4	7.7	7.1	5.9	3.6	2.4	1.1	52.4
Hollywood Hills	2.1	2.2	3.8	5.4	6.0	6.5	6.7	6.4	5.2	3.7	2.8	2.1	52.8
Lancaster	2.1	3.0	4.6	5.9	8.5	9.7	11.0	9.8	7.3	4.6	2.8	1.7	71.1
Long Beach	1.8	2.1	3.3	3.9	4.5	4.3	5.3	4.7	3.7	2.8	1.8	1.5	39.7
Los Angeles	2.2	2.7	3.7	4.7	5.5	5.8	6.2	5.9	5.0	3.9	2.6	1.9	50.1
Monrovia	2.2	2.3	3.8	4.3	5.5	5.9	6.9	6.4	5.1	3.2	2.5	2.0	50.2
Palmdale	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
Pasadena	2.1	2.7	3.7	4.7	5.1	6.0	7.1	6.7	5.6	4.2	2.6	2.0	52.3
Pearblossom	1.7	2.4	3.7	4.7	7.3	7.7	9.9	7.9	6.4	4.0	2.6	1.6	59.9
Pomona	1.7	2.0	3.4	4.5	5.0	5.8	6.5	6.4	4.7	3.5	2.3	1.7	47.5
Redondo Beach	2.2	2.4	3.3	3.8	4.5	4.7	5.4	4.8	4.4	2.8	2.4	2.0	42.6
San Fernando	2.0	2.7	3.5	4.6	5.5	5.9	7.3	6.7	5.3	3.9	2.6	2.0	52.0
Santa Clarita	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Santa Monica	1.8	2.1	3.3	4.5	4.7	5.0	5.4	5.4	3.9	3.4	2.4	2.2	44.2
MADERA													
Chowchilla	1.0	1.4	3.2	4.7	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Madera	0.9	1.4	3.2	4.8	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.5
Raymond	1.2	1.5	3.0	4.6	6.1	7.6	8.4	7.3	5.2	3.4	1.4	0.7	50.5
MARIN													
Black Point	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
Novato	1.3	1.5	2.4	3.5	4.4	6.0	5.9	5.4	4.4	2.8	1.4	0.7	39.8
Point San Pedro	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
San Rafael	1.2	1.3	2.4	3.3	4.0	4.8	4.8	4.9	4.3	2.7	1.3	0.7	35.8
MARIPOSA													
Coulterville	1.1	1.5	2.8	4.4	5.9	7.3	8.1	7.0	5.3	3.4	1.4	0.7	48.8
Mariposa	1.1	1.5	2.8	4.4	5.9	7.4	8.2	7.1	5.0	3.4	1.4	0.7	49.0
Yosemite Village	0.7	1.0	2.3	3.7	5.1	6.5	7.1	6.1	4.4	2.9	1.1	0.6	41.4
MENDOCINO													
Fort Bragg	0.9	1.3	2.2	3.0	3.7	3.5	3.7	3.7	3.0	2.3	1.2	0.7	29.0
Hopland	1.1	1.3	2.6	3.4	5.0	5.9	6.5	5.7	4.5	2.8	1.3	0.7	40.9

Attachment: 2015 Model Water Efficient Landscape Ordinance (available online) (2316 : 9.4(b)--Water Efficient Landscape Ordinance)

Appendix A - Reference Evapotranspiration (ET _o) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ET _o
MENDOCINO													
Point Arena	1.0	1.3	2.3	3.0	3.7	3.9	3.7	3.7	3.0	2.3	1.2	0.7	29.6
Sanel Valley	1.0	1.6	3.0	4.6	6.0	7.0	8.0	7.0	5.2	3.4	1.4	0.9	49.1
Ukiah	1.0	1.3	2.6	3.3	5.0	5.8	6.7	5.9	4.5	2.8	1.3	0.7	40.9
MERCED													
Kesterson	0.9	1.7	3.4	5.5	7.3	8.2	8.6	7.4	5.5	3.8	1.8	0.9	55.1
Los Banos	1.0	1.5	3.2	4.7	6.1	7.4	8.2	7.0	5.3	3.4	1.4	0.7	50.0
Merced	1.0	1.5	3.2	4.7	6.6	7.9	8.5	7.2	5.3	3.4	1.4	0.7	51.5
MODOC													
Modoc/Alturas	0.9	1.4	2.8	3.7	5.1	6.2	7.5	6.6	4.6	2.8	1.2	0.7	43.2
MONO													
Bridgeport	0.7	0.9	2.2	3.8	5.5	6.6	7.4	6.7	4.7	2.7	1.2	0.5	43.0
MONTEREY													
Arroyo Seco	1.5	2.0	3.7	5.4	6.3	7.3	7.2	6.7	5.0	3.9	2.0	1.6	52.6
Castroville	1.4	1.7	3.0	4.2	4.6	4.8	4.0	3.8	3.0	2.6	1.6	1.4	36.2
Gonzales	1.3	1.7	3.4	4.7	5.4	6.3	6.3	5.9	4.4	3.4	1.9	1.3	45.7
Greenfield	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
King City	1.7	2.0	3.4	4.4	4.4	5.6	6.1	6.7	6.5	5.2	2.2	1.3	49.6
King City-Oasis Rd.	1.4	1.9	3.6	5.3	6.5	7.3	7.4	6.8	5.1	4.0	2.0	1.5	52.7
Long Valley	1.5	1.9	3.2	4.1	5.8	6.5	7.3	6.7	5.3	3.6	2.0	1.2	49.1
Monterey	1.7	1.8	2.7	3.5	4.0	4.1	4.3	4.2	3.5	2.8	1.9	1.5	36.0
Pajaro	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.1
Salinas	1.6	1.9	2.7	3.8	4.8	4.7	5.0	4.5	4.0	2.9	1.9	1.3	39.1
Salinas North	1.2	1.5	2.9	4.1	4.6	5.2	4.5	4.3	3.2	2.8	1.5	1.2	36.9
San Ardo	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
San Juan	1.8	2.1	3.4	4.6	5.3	5.7	5.5	4.9	3.8	3.2	2.2	1.9	44.2
Soledad	1.7	2.0	3.4	4.4	5.5	5.4	6.5	6.2	5.2	3.7	2.2	1.5	47.7
NAPA													
Angwin	1.8	1.9	3.2	4.7	5.8	7.3	8.1	7.1	5.5	4.5	2.9	2.1	54.9
Careros	0.8	1.5	3.1	4.6	5.5	6.6	6.9	6.2	4.7	3.5	1.4	1.0	45.8
Oakville	1.0	1.5	2.9	4.7	5.8	6.9	7.2	6.4	4.9	3.5	1.6	1.2	47.7
St Helena	1.2	1.5	2.8	3.9	5.1	6.1	7.0	6.2	4.8	3.1	1.4	0.9	44.1
Yountville	1.3	1.7	2.8	3.9	5.1	6.0	7.1	6.1	4.8	3.1	1.5	0.9	44.3
NEVADA													
Grass Valley	1.1	1.5	2.6	4.0	5.7	7.1	7.9	7.1	5.3	3.2	1.5	0.9	48.0
Nevada City	1.1	1.5	2.6	3.9	5.8	6.9	7.9	7.0	5.3	3.2	1.4	0.9	47.4
ORANGE													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
PLACER													
Auburn	1.2	1.7	2.8	4.4	6.1	7.4	8.3	7.3	5.4	3.4	1.6	1.0	50.6
Blue Canyon	0.7	1.1	2.1	3.4	4.8	6.0	7.2	6.1	4.6	2.9	0.9	0.6	40.5
Colfax	1.1	1.5	2.6	4.0	5.8	7.1	7.9	7.0	5.3	3.2	1.4	0.9	47.9
Roseville	1.1	1.7	3.1	4.7	6.2	7.7	8.5	7.3	5.6	3.7	1.7	1.0	52.2
Soda Springs	0.7	0.7	1.8	3.0	4.3	5.3	6.2	5.5	4.1	2.5	0.7	0.7	35.4
Tahoe City	0.7	0.7	1.7	3.0	4.3	5.4	6.1	5.6	4.1	2.4	0.8	0.6	35.5
Truckee	0.7	0.7	1.7	3.2	4.4	5.4	6.4	5.7	4.1	2.4	0.8	0.6	36.2

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Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
PLUMAS													
Portola	0.7	0.9	1.9	3.5	4.9	5.9	7.3	5.9	4.3	2.7	0.9	0.5	39.4
Quincy	0.7	0.9	2.2	3.5	4.9	5.9	7.3	5.9	4.4	2.8	1.2	0.5	40.2
RIVERSIDE													
Beaumont	2.0	2.3	3.4	4.4	6.1	7.1	7.6	7.9	6.0	3.9	2.6	1.7	55.0
Blythe	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Cathedral City	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Coachella	2.9	4.4	6.2	8.4	10.5	11.9	12.3	10.1	8.9	6.2	3.8	2.4	88.1
Desert Center	2.9	4.1	6.4	8.5	11.0	12.1	12.2	11.1	9.0	6.4	3.9	2.6	90.0
Elsinore	2.1	2.8	3.9	4.4	5.9	7.1	7.6	7.0	5.8	3.9	2.6	1.9	55.0
Indio	3.1	3.6	6.5	8.3	10.5	11.0	10.8	9.7	8.3	5.9	3.7	2.7	83.9
La Quinta	2.4	2.8	5.2	6.5	8.3	8.7	8.5	7.9	6.5	4.5	2.7	2.2	66.2
Mecca	2.6	3.3	5.7	7.2	8.6	9.0	8.8	8.2	6.8	5.0	3.2	2.4	70.8
Oasis	2.9	3.3	5.3	6.1	8.5	8.9	8.7	7.9	6.9	4.8	2.9	2.3	68.4
Palm Desert	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
Palm Springs	2.0	2.9	4.9	7.2	8.3	8.5	11.6	8.3	7.2	5.9	2.7	1.7	71.1
Rancho California	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
Rancho Mirage	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Ripley	2.7	3.3	5.6	7.2	8.7	8.7	8.4	7.6	6.2	4.6	2.8	2.2	67.8
Salton Sea North	2.5	3.3	5.5	7.2	8.8	9.3	9.2	8.5	6.8	5.2	3.1	2.3	71.7
Temecula East II	2.3	2.4	4.1	4.9	6.4	7.0	7.8	7.4	5.7	4.1	2.6	2.2	56.7
Thermal	2.4	3.3	5.5	7.6	9.1	9.6	9.3	8.6	7.1	5.2	3.1	2.1	72.8
Riverside UC	2.5	2.9	4.2	5.3	5.9	6.6	7.2	6.9	5.4	4.1	2.9	2.6	56.4
Winchester	2.3	2.4	4.1	4.9	6.4	6.9	7.7	7.5	6.0	3.9	2.6	2.1	56.8
SACRAMENTO													
Fair Oaks	1.0	1.6	3.4	4.1	6.5	7.5	8.1	7.1	5.2	3.4	1.5	1.0	50.5
Sacramento	1.0	1.8	3.2	4.7	6.4	7.7	8.4	7.2	5.4	3.7	1.7	0.9	51.9
Twitchell Island	1.2	1.8	3.9	5.3	7.4	8.8	9.1	7.8	5.9	3.8	1.7	1.2	57.9
SAN BENITO													
Hollister	1.5	1.8	3.1	4.3	5.5	5.7	6.4	5.9	5.0	3.5	1.7	1.1	45.1
San Benito	1.2	1.6	3.1	4.6	5.6	6.4	6.9	6.5	4.8	3.7	1.7	1.2	47.2
San Juan Valley	1.4	1.8	3.4	4.5	6.0	6.7	7.1	6.4	5.0	3.5	1.8	1.4	49.1
SAN BERNARDINO													
Baker	2.7	3.9	6.1	8.3	10.4	11.8	12.2	11.0	8.9	6.1	3.3	2.1	86.6
Barstow NE	2.2	2.9	5.3	6.9	9.0	10.1	9.9	8.9	6.8	4.8	2.7	2.1	71.7
Big Bear Lake	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Chino	2.1	2.9	3.9	4.5	5.7	6.5	7.3	7.1	5.9	4.2	2.6	2.0	54.6
Crestline	1.5	1.9	3.3	4.4	5.5	6.6	7.8	7.1	5.4	3.5	2.2	1.6	50.8
Lake Arrowhead	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Lucerne Valley	2.2	2.9	5.1	6.5	9.1	11.0	11.4	9.9	7.4	5.0	3.0	1.8	75.3
Needles	3.2	4.2	6.6	8.9	11.0	12.4	12.8	11.0	8.9	6.6	4.0	2.7	92.1
Newberry Springs	2.1	2.9	5.3	8.4	9.8	10.9	11.1	9.9	7.6	5.2	3.1	2.0	78.2
San Bernardino	2.0	2.7	3.8	4.6	5.7	6.9	7.9	7.4	5.9	4.2	2.6	2.0	55.6
Twentynine Palms	2.6	3.6	5.9	7.9	10.1	11.2	11.2	10.3	8.6	5.9	3.4	2.2	82.9
Victorville	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
SAN DIEGO													
Chula Vista	2.2	2.7	3.4	3.8	4.9	4.7	5.5	4.9	4.5	3.4	2.4	2.0	44.2
Escondido SPV	2.4	2.6	3.9	4.7	5.9	6.5	7.1	6.7	5.3	3.9	2.8	2.3	54.2
Miramar	2.3	2.5	3.7	4.1	5.1	5.4	6.1	5.8	4.5	3.3	2.4	2.1	47.1

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Appendix A - Reference Evapotranspiration (ET _o) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ET _o
SAN DIEGO													
Oceanside	2.2	2.7	3.4	3.7	4.9	4.6	4.6	5.1	4.1	3.3	2.4	2.0	42.9
Otay Lake	2.3	2.7	3.9	4.6	5.6	5.9	6.2	6.1	4.8	3.7	2.6	2.2	50.4
Pine Valley	1.5	2.4	3.8	5.1	6.0	7.0	7.8	7.3	6.0	4.0	2.2	1.7	54.8
Ramona	2.1	2.1	3.4	4.6	5.2	6.3	6.7	6.8	5.3	4.1	2.8	2.1	51.6
San Diego	2.1	2.4	3.4	4.6	5.1	5.3	5.7	5.6	4.3	3.6	2.4	2.0	46.5
Santee	2.1	2.7	3.7	4.5	5.5	6.1	6.6	6.2	5.4	3.8	2.6	2.0	51.1
Torrey Pines	2.2	2.3	3.4	3.9	4.0	4.1	4.6	4.7	3.8	2.8	2.0	2.0	39.8
Warner Springs	1.6	2.7	3.7	4.7	5.7	7.6	8.3	7.7	6.3	4.0	2.5	1.3	56.0
SAN FRANCISCO													
San Francisco	1.5	1.3	2.4	3.0	3.7	4.6	4.9	4.8	4.1	2.8	1.3	0.7	35.1
SAN JOAQUIN													
Farmington	1.5	1.5	2.9	4.7	6.2	7.6	8.1	6.8	5.3	3.3	1.4	0.7	50.0
Lodi West	1.0	1.6	3.3	4.3	6.3	6.9	7.3	6.4	4.5	3.0	1.4	0.8	46.7
Manteca	0.9	1.7	3.4	5.0	6.5	7.5	8.0	7.1	5.2	3.3	1.6	0.9	51.2
Stockton	0.8	1.5	2.9	4.7	6.2	7.4	8.1	6.8	5.3	3.2	1.4	0.6	49.1
Tracy	1.0	1.5	2.9	4.5	6.1	7.3	7.9	6.7	5.3	3.2	1.3	0.7	48.5
SAN LUIS OBISPO													
Arroyo Grande	2.0	2.2	3.2	3.8	4.3	4.7	4.3	4.6	3.8	3.2	2.4	1.7	40.0
Atascadero	1.2	1.5	2.8	3.9	4.5	6.0	6.7	6.2	5.0	3.2	1.7	1.0	43.7
Morro Bay	2.0	2.2	3.1	3.5	4.3	4.5	4.6	4.6	3.8	3.5	2.1	1.7	39.9
Nipomo	2.2	2.5	3.8	5.1	5.7	6.2	6.4	6.1	4.9	4.1	2.9	2.3	52.1
Paso Robles	1.6	2.0	3.2	4.3	5.5	6.3	7.3	6.7	5.1	3.7	2.1	1.4	49.0
San Luis Obispo	2.0	2.2	3.2	4.1	4.9	5.3	4.6	5.5	4.4	3.5	2.4	1.7	43.8
San Miguel	1.6	2.0	3.2	4.3	5.0	6.4	7.4	6.8	5.1	3.7	2.1	1.4	49.0
San Simeon	2.0	2.0	2.9	3.5	4.2	4.4	4.6	4.3	3.5	3.1	2.0	1.7	38.1
SAN MATEO													
Hal Moon Bay	1.5	1.7	2.4	3.0	3.9	4.3	4.3	4.2	3.5	2.8	1.3	1.0	33.7
Redwood City	1.5	1.8	2.9	3.8	5.2	5.3	6.2	5.6	4.8	3.1	1.7	1.0	42.8
Woodside	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
SANTA BARBARA													
Betteravia	2.1	2.6	4.0	5.2	6.0	5.9	5.8	5.4	4.1	3.3	2.7	2.1	49.1
Carpenteria	2.0	2.4	3.2	3.9	4.8	5.2	5.5	5.7	4.5	3.4	2.4	2.0	44.9
Cuyama	2.1	2.4	3.8	5.4	6.9	7.9	8.5	7.7	5.9	4.5	2.6	2.0	59.7
Goleta	2.1	2.5	3.9	5.1	5.7	5.7	5.4	5.4	4.2	3.2	2.8	2.2	48.1
Goleta Foothills	2.3	2.6	3.7	5.4	5.3	5.6	5.5	5.7	4.5	3.9	2.8	2.3	49.6
Guadalupe	2.0	2.2	3.2	3.7	4.9	4.6	4.5	4.6	4.1	3.3	2.4	1.7	41.1
Lompoc	2.0	2.2	3.2	3.7	4.8	4.6	4.9	4.8	3.9	3.2	2.4	1.7	41.1
Los Alamos	1.8	2.0	3.2	4.1	4.9	5.3	5.7	5.5	4.4	3.7	2.4	1.6	44.6
Santa Barbara	2.0	2.5	3.2	3.8	4.6	5.1	5.5	4.5	3.4	2.4	1.8	1.8	40.6
Santa Maria	1.8	2.3	3.7	5.1	5.7	5.8	5.6	5.3	4.2	3.5	2.4	1.9	47.4
Santa Ynez	1.7	2.2	3.5	5.0	5.8	6.2	6.4	6.0	4.5	3.6	2.2	1.7	48.7
Sisquoc	2.1	2.5	3.8	4.1	6.1	6.3	6.4	5.8	4.7	3.4	2.3	1.8	49.2
Solvang	2.0	2.0	3.3	4.3	5.0	5.6	6.1	5.6	4.4	3.7	2.2	1.6	45.6
SANTA CLARA													
Gilroy	1.3	1.8	3.1	4.1	5.3	5.6	6.1	5.5	4.7	3.4	1.7	1.1	43.6
Los Gatos	1.5	1.8	2.8	3.9	5.0	5.6	6.2	5.5	4.7	3.2	1.7	1.1	42.9
Morgan Hill	1.5	1.8	3.4	4.2	6.3	7.0	7.1	6.0	5.1	3.7	1.9	1.4	49.5
Palo Alto	1.5	1.8	2.8	3.8	5.2	5.3	6.2	5.6	5.0	3.2	1.7	1.0	43.0

Attachment: 2015 Model Water Efficient Landscape Ordinance (available online) (2316 : 9.4(b)--Water Efficient Landscape Ordinance)

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
SANTA CLARA													
San Jose	1.5	1.8	3.1	4.1	5.5	5.8	6.5	5.9	5.2	3.3	1.8	1.0	45.3
SANTA CRUZ													
De Laveaga	1.4	1.9	3.3	4.7	4.9	5.3	5.0	4.8	3.6	3.0	1.6	1.3	40.8
Green Valley Rd	1.2	1.8	3.2	4.5	4.6	5.4	5.2	5.0	3.7	3.1	1.6	1.3	40.6
Santa Cruz	1.5	1.8	2.6	3.5	4.3	4.4	4.8	4.4	3.8	2.8	1.7	1.2	36.6
Watsonville	1.5	1.8	2.7	3.7	4.6	4.5	4.9	4.2	4.0	2.9	1.8	1.2	37.7
Webb	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.2
SHASTA													
Burney	0.7	1.0	2.1	3.5	4.9	5.9	7.4	6.4	4.4	2.9	0.9	0.6	40.9
Fall River Mills	0.6	1.0	2.1	3.7	5.0	6.1	7.8	6.7	4.6	2.8	0.9	0.5	41.8
Glenburn	0.6	1.0	2.1	3.7	5.0	6.3	7.8	6.7	4.7	2.8	0.9	0.6	42.1
McArthur	0.7	1.4	2.9	4.2	5.6	6.9	8.2	7.2	5.0	3.0	1.1	0.6	46.8
Redding	1.2	1.4	2.6	4.1	5.6	7.1	8.5	7.3	5.3	3.2	1.4	0.9	48.8
SIERRA													
Downieville	0.7	1.0	2.3	3.5	5.0	6.0	7.4	6.2	4.7	2.8	0.9	0.6	41.3
Sierraville	0.7	1.1	2.2	3.2	4.5	5.9	7.3	6.4	4.3	2.6	0.9	0.5	39.6
SISKIYOU													
Happy Camp	0.5	0.9	2.0	3.0	4.3	5.2	6.1	5.3	4.1	2.4	0.9	0.5	35.1
MacDoel	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
Mt Shasta	0.5	0.9	2.0	3.0	4.5	5.3	6.7	5.7	4.0	2.2	0.7	0.5	36.0
Tule lake FS	0.7	1.3	2.7	4.0	5.4	6.3	7.1	6.4	4.7	2.8	1.0	0.6	42.9
Weed	0.5	0.9	2.0	2.5	4.5	5.3	6.7	5.5	3.7	2.0	0.9	0.5	34.9
Yreka	0.6	0.9	2.1	3.0	4.9	5.8	7.3	6.5	4.3	2.5	0.9	0.5	39.2
SOLANO													
Benicia	1.3	1.4	2.7	3.8	4.9	5.0	6.4	5.5	4.4	2.9	1.2	0.7	40.3
Dixon	0.7	1.4	3.2	5.2	6.3	7.6	8.2	7.2	5.5	4.3	1.6	1.1	52.1
Fairfield	1.1	1.7	2.8	4.0	5.5	6.1	7.8	6.0	4.8	3.1	1.4	0.9	45.2
Hastings Tract	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Putah Creek	1.0	1.6	3.2	4.9	6.1	7.3	7.9	7.0	5.3	3.8	1.8	1.2	51.0
Rio Vista	0.9	1.7	2.8	4.4	5.9	6.7	7.9	6.5	5.1	3.2	1.3	0.7	47.0
Suisun Valley	0.6	1.3	3.0	4.7	5.8	7.0	7.7	6.8	5.3	3.8	1.4	0.9	48.3
Winters	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
SONOMA													
Bennett Valley	1.1	1.7	3.2	4.1	5.5	6.5	6.6	5.7	4.5	3.1	1.5	0.9	44.4
Cloverdale	1.1	1.4	2.6	3.4	5.0	5.9	6.2	5.6	4.5	2.8	1.4	0.7	40.7
Fort Ross	1.2	1.4	2.2	3.0	3.7	4.5	4.2	4.3	3.4	2.4	1.2	0.5	31.9
Healdsburg	1.2	1.5	2.4	3.5	5.0	5.9	6.1	5.6	4.5	2.8	1.4	0.7	40.8
Lincoln	1.2	1.7	2.8	4.7	6.1	7.4	8.4	7.3	5.4	3.7	1.9	1.2	51.9
Petaluma	1.2	1.5	2.8	3.7	4.6	5.6	4.6	5.7	4.5	2.9	1.4	0.9	39.6
Santa Rosa	1.2	1.7	2.8	3.7	5.0	6.0	6.1	5.9	4.5	2.9	1.5	0.7	42.0
Valley of the Moon	1.0	1.6	3.0	4.5	5.6	6.6	7.1	6.3	4.7	3.3	1.5	1.0	46.1
Windsor	0.9	1.6	3.0	4.5	5.5	6.5	6.5	5.9	4.4	3.2	1.4	1.0	44.2
STANISLAUS													
Denair	1.0	1.9	3.6	4.7	7.0	7.9	8.0	6.1	5.3	3.4	1.5	1.0	51.4
La Grange	1.2	1.5	3.1	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Modesto	0.9	1.4	3.2	4.7	6.4	7.7	8.1	6.8	5.0	3.4	1.4	0.7	49.7
Newman	1.0	1.5	3.2	4.6	6.2	7.4	8.1	6.7	5.0	3.4	1.4	0.7	49.3
Oakdale	1.2	1.5	3.2	4.7	6.2	7.7	8.1	7.1	5.1	3.4	1.4	0.7	50.3

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
STANISLAUS													
Patterson	1.3	2.1	4.2	5.4	7.9	8.6	8.2	6.6	5.8	4.0	1.9	1.3	57.3
Turlock	0.9	1.5	3.2	4.7	6.5	7.7	8.2	7.0	5.1	3.4	1.4	0.7	50.2
SUTTER													
Nicolaus	0.9	1.6	3.2	4.9	6.3	7.5	8.0	6.9	5.2	3.4	1.5	0.9	50.2
Yuba City	1.3	2.1	2.8	4.4	5.7	7.2	7.1	6.1	4.7	3.2	1.2	0.9	46.7
TEHAMA													
Coming	1.2	1.8	2.9	4.5	6.1	7.3	8.1	7.2	5.3	3.7	1.7	1.1	50.7
Gerber	1.0	1.8	3.5	5.0	6.6	7.9	8.7	7.4	5.8	4.1	1.8	1.1	54.7
Gerber Dryland	0.9	1.6	3.2	4.7	6.7	8.4	9.0	7.9	6.0	4.2	2.0	1.0	55.5
Red Bluff	1.2	1.8	2.9	4.4	5.9	7.4	8.5	7.3	5.4	3.5	1.7	1.0	51.1
TRINITY													
Hay Fork	0.5	1.1	2.3	3.5	4.9	5.9	7.0	6.0	4.5	2.8	0.9	0.7	40.1
Weaverville	0.6	1.1	2.2	3.3	4.9	5.9	7.3	6.0	4.4	2.7	0.9	0.7	40.0
TULARE													
Alpaugh	0.9	1.7	3.4	4.8	6.6	7.7	8.2	7.3	5.4	3.4	1.4	0.7	51.6
Badger	1.0	1.3	2.7	4.1	6.0	7.3	7.7	7.0	4.8	3.3	1.4	0.7	47.3
Delano	1.1	1.9	4.0	4.9	7.2	7.9	8.1	7.3	5.4	3.2	1.5	1.2	53.6
Dinuba	1.1	1.5	3.2	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Lindcove	0.9	1.6	3.0	4.8	6.5	7.6	8.1	7.2	5.2	3.4	1.6	0.9	50.6
Porterville	1.2	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.3	3.4	1.4	0.7	52.1
Visalia	0.9	1.7	3.3	5.1	6.8	7.7	7.9	6.9	4.9	3.2	1.5	0.8	50.7
TUOLUMNE													
Groveland	1.1	1.5	2.8	4.1	5.7	7.2	7.9	6.6	5.1	3.3	1.4	0.7	47.5
Sonora	1.1	1.5	2.8	4.1	5.8	7.2	7.9	6.7	5.1	3.2	1.4	0.7	47.6
VENTURA													
Camarillo	2.2	2.5	3.7	4.3	5.0	5.2	5.9	5.4	4.2	3.0	2.5	2.1	46.1
Oxnard	2.2	2.5	3.2	3.7	4.4	4.6	5.4	4.8	4.0	3.3	2.4	2.0	42.3
Piru	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Port Hueneme	2.0	2.3	3.3	4.6	4.9	4.9	4.9	5.0	3.7	3.2	2.5	2.2	43.5
Thousand Oaks	2.2	2.6	3.4	4.5	5.4	5.9	6.7	6.4	5.4	3.9	2.6	2.0	51.0
Ventura	2.2	2.6	3.2	3.8	4.6	4.7	5.5	4.9	4.1	3.4	2.5	2.0	43.5
YOLO													
Bryte	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
Davis	1.0	1.9	3.3	5.0	6.4	7.6	8.2	7.1	5.4	4.0	1.8	1.0	52.5
Esparto	1.0	1.7	3.4	5.5	6.9	8.1	8.5	7.5	5.8	4.2	2.0	1.2	55.8
Winters	1.7	1.7	2.9	4.4	5.8	7.1	7.9	6.7	5.3	3.3	1.6	1.0	49.4
Woodland	1.0	1.8	3.2	4.7	6.1	7.7	8.2	7.2	5.4	3.7	1.7	1.0	51.6
Zamora	1.1	1.9	3.5	5.2	6.4	7.4	7.8	7.0	5.5	4.0	1.9	1.2	52.8
YUBA													
Browns Valley	1.0	1.7	3.1	4.7	6.1	7.5	8.5	7.6	5.7	4.1	2.0	1.1	52.9
Brownsville	1.1	1.4	2.6	4.0	5.7	6.8	7.9	6.8	5.3	3.4	1.5	0.9	47.4

* The values in this table were derived from:

- 1) California Irrigation Management Information System (CIMIS);
- 2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999; and
- 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922;
- 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426

HISTORY

1. New Appendix A filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Repealer and new Appendix A filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

Appendix B — Sample Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

Reference Evapotranspiration (ET_o) _____

Hydrozone # /Planting Description ^a	Plant Factor (PF)	Irrigation Method ^b	Irrigation Efficiency (IE) ^c	ETAF (PF/IE)	Landscape Area (sq. ft.)	ETAF x Area	Estimated Total Water Use (ETWU) ^d
Regular Landscape Areas							
				Totals	(A)	(B)	
Special Landscape Areas							
				1			
				1			
				1			
				Totals	(C)	(D)	
				ETWU Total			
				Maximum Allowed Water Allowance (MAWA)^e			

^aHydrozone #/Planting Description
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

^bIrrigation Method
overhead spray
or drip

^cIrrigation Efficiency
0.75 for spray head
0.81 for drip

^dETWU (Annual Gallons Required) =
E_{to} x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

^eMAWA (Annual Gallons Allowed) = (E_{to}) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations

Regular Landscape Areas

Total ETAF x Area	(B)
Total Area	(A)
Average ETAF	B ÷ A

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

All Landscape Areas

Total ETAF x Area	(B+D)
Total Area	(A+C)
Sitewide ETAF	(B+D) ÷ (A+C)

HISTORY

1. New Appendix B filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Repealer and new Appendix B filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

Appendix C — Sample Certificate of Completion.

CERTIFICATE OF COMPLETION

This certificate is filled out by the project applicant upon completion of the landscape project.

PART 1. PROJECT INFORMATION SHEET

Date			
Project Name			
Name of Project Applicant		Telephone No.	
		Fax No.	
Title		Email Address	
Company		Street Address	
City	State	Zip Code	

Project Address and Location:

Street Address		Parcel, tract or lot number, if available.	
City		Latitude/Longitude (optional)	
State	Zip Code		

Property Owner or his/her designee:

Name		Telephone No.	
		Fax No.	
Title		Email Address	
Company		Street Address	
City	State	Zip Code	

Property Owner

"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

 Property Owner Signature Date

Please answer the questions below:

1. Date the Landscape Documentation Package was submitted to the local agency _____
2. Date the Landscape Documentation Package was approved by the local agency _____
3. Date that a copy of the Water Efficient Landscape Worksheet (including the Water Budget Calculation) was submitted to the local water purveyor _____

PART 2. CERTIFICATION OF INSTALLATION ACCORDING TO THE LANDSCAPE DOCUMENTATION PACKAGE

"I/we certify that based upon periodic site observations, the work has been completed in accordance with the ordinance and that the landscape planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package."

Signature*	Date	
Name (print)	Telephone No.	
	Fax No.	
Title	Email Address	
License No. or Certification No.		
Company	Street Address	
City	State	Zip Code

*Signer of the landscape design plan, signer of the irrigation plan, or a licensed landscape contractor.

PART 3. IRRIGATION SCHEDULING

Attach parameters for setting the irrigation schedule on controller per ordinance Section 492.10.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE

Attach schedule of Landscape and Irrigation Maintenance per ordinance Section 492.11.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT

Attach Landscape Irrigation Audit Report per ordinance Section 492.12.

PART 6. SOIL MANAGEMENT REPORT

Attach soil analysis report, if not previously submitted with the Landscape Documentation Package per ordinance Section 492.6.

Attach documentation verifying implementation of recommendations from soil analysis report per ordinance Section 492.6.

HISTORY

1. New Appendix C filed 9-10-2009; operative 9-10-2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

2. Repealer and new Appendix C filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

Appendix D — Prescriptive Compliance Option.

(a) This appendix contains prescriptive requirements which may be used as a compliance option to the Model Water Efficient Landscape Ordinance.

(b) Compliance with the following items is mandatory and must be documented on a landscape plan in order to use the prescriptive compliance option:

(1) Submit a Landscape Documentation Package which includes the following elements:

- (A) date
- (B) project applicant
- (C) project address (if available, parcel and/or lot number(s))
- (D) total landscape area (square feet), including a breakdown of turf and plant material
- (E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
- (F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
- (G) contact information for the project applicant and property owner
- (H) applicant signature and date with statement, "I agree to comply with the requirements of the prescriptive compliance option to the MWELO".

(2) Incorporate compost at a rate of at least four cubic yards per 1,000 square feet to a depth of six inches into landscape area (unless contra-indicated by a soil test);

(3) Plant material shall comply with all of the following;

(A) For residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 75% of the plant area excluding edibles and areas using recycled water; For non-residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 100% of the plant area excluding edibles and areas using recycled water;

(B) A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated.

(4) Turf shall comply with all of the following:

(A) Turf shall not exceed 25% of the landscape area in residential areas, and there shall be no turf in non-residential areas;

(B) Turf shall not be planted on sloped areas which exceed a slope of 1 foot vertical elevation change for every 4 feet of horizontal length;

(C) Turf is prohibited in parkways less than 10 feet wide, unless the parkway is adjacent to a parking strip and used to enter and exit vehicles. Any turf in parkways must be irrigated by sub-surface irrigation or by other technology that creates no overspray or runoff.

(5) Irrigation systems shall comply with the following:

(A) Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor.

(B) Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.

(C) Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers recommended pressure range.

(D) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point of connection of the water supply.

(E) All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802-2014. "Landscape Irrigation Sprinkler and Emitter Standard," All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.

(F) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(6) For non-residential projects with landscape areas of 1,000 sq. ft. or more, a private submeter(s) to measure landscape water use shall be installed.

(c) At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

HISTORY

1. New Appendix D filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (4-1-2015) (Register 2015, No. 38).

Chapter 2.7.1. Flood Protection Corridor Program of the Costa-Machado Water Act of 2000

§ 497.1. Scope.

(a) These regulations implement Sections 79035 through 79044, and 79044.9 in Article 2.5 of Chapter 5 of Division 26 of the Water Code, which Division is the Costa-Machado Water Act of 2000. They establish a process for funding acquisition of property rights and related activities for flood protection corridor projects undertaken by the Department of Water Resources directly or through grants to local public agencies or nonprofit organizations.

(b) The Flood Protection Corridor Program is statewide in scope. Within the geographic scope of the CALFED Bay-Delta Program, funds in the subaccount for this program shall be used for projects that, to the greatest extent possible, are consistent with the CALFED long-term plan identified in the Programmatic Record of Decision of August 28, 2000. NOTE: Authority cited: Sections 8300, 12580 and 79044.9, Water Code; 2000 Cal. Stat. Ch. 52, Item No. 3860-101-6005; 2001 Cal. Stat. Ch. 106, Item No. 3860-001-0001, Provision 3; and 2002 Cal. Stat. Ch. 379, Item No. 3860-101-6005. Reference: Sections 79037, 79043, 79044 and 79044.9, Water Code

HISTORY

1. New chapter 2.7.1 (sections 497.1-497.12) and section filed 8-19-2003; operative 8-19-2003 pursuant to Government Code section 11343.4 (Register 2003, No. 34).

§ 497.2. Definitions.

The words used in this chapter have meanings set forth as follows:

(a) "A List" means the preferred priority list of projects described in Section 497.6.

(b) "Applicant" means an entity that is acting as the principal party making an application for funding under the provisions of the Costa-Machado Water Act of 2000.

(c) "B List" means the reserve priority list of projects described in Section 497.6.

(d) "CEQA" means the California Environmental Quality Act, Public Resources Code Sections 21000 *et seq.*

(e) "Department" means the California Department of Water Resources.

(f) "Director" means the Director of the Department of Water Resources.

(g) "FEMA" means the Federal Emergency Management Agency.

(h) "Fully funded" with respect to a grant project means funded to the full amount of the requested funds or to the funding limit, whichever is less.

(i) "Grant application form" means the Department's form entitled "Flood Protection Corridor Program Project Evaluation Criteria and Competitive Grant Application Form" dated April 9, 2003 and incorporated herein by this reference.

(j) "Local public agency" means any political subdivision of the State of California, including but not limited to any county, city, city and county, district, joint powers agency, or council of governments.

(k) "Milestone" means a time when a significant portion of a project is completed, as defined in the contract as a time for disbursement of grant funds.

(l) "Nonprofit organization" means an organization that does not operate for profit and has no official governmental status, including but not limited to clubs, societies, neighborhood organizations, advisory councils, conservation organizations and privately run local community conservation corps.

(m) "Program" means the Flood Protection Corridor Program established by Water Code Division 26, Chapter 5, Article 2.5.

(n) "Property interest" means any right in real property, including easement, fee title, and any other kind of right acquired by legally binding means.

(o) "Project" means all planning, engineering, acquisition of real property interests, construction and related activities undertaken to implement a discrete action undertaken under the program pursuant to Water Code Section 79037.

(p) "Sponsor" means an applicant who has received grant funding through the application process described in these regulations.

(q) "Subaccount" means the Flood Protection Corridor Subaccount created by Water Code Section 79035(a).

NOTE: Authority cited: Sections 8300, 12580 and 79044.9, Water Code. Reference: Sections 79035, 70937, 79038(a) and 79043, Water Code; and Sections 21000 *et seq.*, Public Resources Code.

HISTORY

1. New section filed 8-19-2003; operative 8-19-2003 pursuant to Government Code section 11343.4 (Register 2003, No. 34).

§ 497.3. Program Management Process.

The Department selects, approves, funds, and monitors projects funded by grants under the program. The process of managing the program includes these steps:

(a) The Department shall appoint and maintain a Project Evaluation Team composed of Department staff and other consulting governmental agencies. The Department may request consultation with any appropriate government agency, including but not limited to the Department of Conservation, the Department of Fish and Game, the Department of Food and Agriculture, the Office of Emergency Services, and the CALFED Bay-Delta Program.

(b) Local public agencies or nonprofit organizations qualified under Section 497.4 may apply for program grants for projects at such times as

the Department may designate. Applications for proposed projects shall be submitted in response to a solicitation issued by the Department. As long as uncommitted funds remain available to fund new projects, the Department shall solicit proposals at least once per calendar year. The time period for submitting applications shall be 90 days from the date notice is given by the Department that project proposals are being solicited. Notices shall be provided to cities, counties, flood control districts, reclamation districts, and other local government entities that manage flood plains and flood control projects. The Department will also provide notice to nonprofit organizations with interest in flood management issues, and shall send notice to all individuals and organizations that have requested notice of the opportunity to submit applications. Notices may be given by mail, electronic mail, website posting, or any other method that provides easy access and prompt availability. Projects shall meet the requirements of Section 497.5. Applications shall meet the requirements of Section 497.7.

(c) The Project Evaluation Team shall review each application and evaluate the subject project within 60 days of the close of the specified submittal period, or within 60 days of receipt of requested additional information, whichever is later.

(d) The Project Evaluation Team shall notify the Department to request the applicant to provide additional information within 30 days of the Department's request if:

(1) The project appears potentially eligible but is missing information needed to evaluate the merits of the project, or

(2) Additional information is needed to evaluate the merits of the project in comparison to others received.

(e) If the requested additional information cannot be provided in 30 days, the applicant may refile its application with the additional information at the Department's next solicitation of proposals.

(f) When a proposal that meets minimum qualifications is complete and all requested additional information has been supplied, the Project Evaluation Team shall complete the evaluation of the project including recommending its place on a priority list as described in Section 497.6.

(g) After each solicitation of proposals, Department staff, using the evaluations and recommended priorities of the Project Evaluation Team, shall recommend projects, priority, and amounts per project to be funded and submit the recommendations to the Director for approval of the priority lists. Department staff may recommend:

[The next page is 38.15.]

APPENDIX L

**United States Bureau of Reclamation
Redding and Buckeye Contract Supplies by Year
&
Redding Contract Supply by Month**

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BUREAU OF RECLAMATION
Redding Contract
No. 14-06-200-2871A
Schedule of Water Requirements In Acre Feet

Year	Base Supply	Project Water Supply	Total Supply
1964	3,825	675	4,500
1965	4,250	750	5,000
1966	4,675	825	5,500
1967	5,100	900	6,000
1968	5,525	975	6,500
1969	5,950	1,050	7,000
1970	6,375	1,125	7,500
1971	6,800	1,200	8,000
1972	7,225	1,275	8,500
1973	7,650	1,350	9,000
1974	8,075	1,425	9,500
1975	8,500	1,500	10,000
1976	8,925	1,575	10,500
1977	9,350	1,650	11,000
1978	9,775	1,725	11,500
1979	10,200	1,800	12,000
1980	10,625	1,875	12,500
1981	11,050	1,950	13,000
1982	11,390	2,010	13,400
1983	11,730	2,070	13,800
1984	12,070	2,130	14,200
1985	12,410	2,190	14,600
1986	12,750	2,250	15,000
1987	13,090	2,310	15,400
1988	13,345	2,355	15,700
1989	13,600	2,400	16,000
1990	13,855	2,445	16,300
1991	14,110	2,490	16,600
1992	14,365	2,535	16,900
1993	14,620	2,580	17,200
1994	14,875	2,625	17,500
1995	15,130	2,670	17,800
1996	15,385	2,715	18,100
1997	15,640	2,760	18,400
1998	15,895	2,805	18,700
1999	16,150	2,850	19,000
2000	16,405	2,895	19,300
2001	16,660	2,940	19,600
2002	16,830	2,970	19,800
2003	17,850	3,150	21,000

Point of Diversion (River Mile): 246.7R and 246.25L

No contract fee charged on Base Supply.

\$9.00 per acre foot fee charged on Project Water Supply annually.

If Project Water Supply is diverted there is also a \$13.76 per acre foot fee charged for the CVPIA (Central Valley Project Improvement Act - Restoration Fund).

Exhibit A

CITY OF REDDING
Sacramento River

SCHEDULE OF WATER REQUIREMENTS

	<u>Base Supply</u> (acre-feet)	<u>Project Water</u> (acre-feet)	<u>Contract Total</u> (acre-feet)
March	<u>1,100</u>	<u>0</u>	<u>1,100</u>
April	<u>1,400</u>	<u>0</u>	<u>1,400</u>
May	<u>1,925</u>	<u>0</u>	<u>1,925</u>
June	<u>2,675</u>	<u>25</u>	<u>2,700</u>
July	<u>2,150</u>	<u>850</u>	<u>3,000</u>
August	<u>750</u>	<u>2,250</u>	<u>3,000</u>
September	<u>2,150</u>	<u>25</u>	<u>2,175</u>
October	<u>1,800</u>	<u>0</u>	<u>1,800</u>
November	<u>1,150</u>	<u>0</u>	<u>1,150</u>
December	<u>1,050</u>	<u>0</u>	<u>1,050</u>
January	<u>900</u>	<u>0</u>	<u>900</u>
February	<u>800</u>	<u>0</u>	<u>800</u>
Total	<u>17,850</u>	<u>3,150</u>	<u>21,000</u>

Points of Diversion: 246.7R, 246.25L

Dated: 01-31-2005

WATER UTILITY

Buckeye Contract

No. 14-06-200-5272A

Schedule of Water Requirements In Acre Feet

Year	Cumulative Minimum
1970	375
1971	840
1972	930
1973	1,025
1974	1,170
1975	1,215
1976	1,310
1977	1,410
1978	1,510
1979	1,610
1980	1,710
1981	1,810
1982	1,920
1983	2,030
1984	2,140
1985	2,250
1986	2,360
1987	2,470
1988	2,590
1989	2,710
1990	2,830
1991	2,960
1992	3,090
1993	3,240
1994	3,390
1995	3,540
1996	3,700
1997	3,860
1998	4,030
1999	4,200
2000	4,370
2001	4,540
2002	4,720
2003	4,900
2004	5,090
2005	5,280
2006	5,480
2007	5,690
2008	5,910
2009	6,140

All Totals Reported In Acre Feet.

Buckeye Contract Water Fees Per Acre Foot:

Sacramento River (through Pump House #3 & #4)	= \$21.48
Spring Creek Conduit (Buckeye W.T.P.)	= \$19.85
Toyon Pipeline (Summit City Pressure Zone)	= \$15.00
CVPIA Restoration Fund (fee for all Buckeye water)	= \$13.96



United States Department of the Interior

BUREAU OF RECLAMATION

Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, California 96109-8400

APR 04 2016
FIELD OPERATIONS
PUBLIC WORKS

IN REPLY REFER TO:

NC-440
WTR-4.00

APR 01 2016

Mr. Jon McClain
Redding, City of
P.O. Box 496071
Redding, California 96049-6071

Subject: Initial Declaration of Water Made Available for 2016 - Contract No. 14-06-200-5272A-LTR1 (Contract) - Central Valley Project (CVP), California

Dear Mr. McClain:

The purpose of this letter is to inform you that pursuant to Article 4(a) of the Contract, the initial declaration of Water Made Available for 2016 is 100% of the Contract Total. Despite improved hydrologic conditions for the 2016 water year, California is still in a condition of drought, as the Governor's Emergency Drought Proclamations, issued January 17, 2014 and April 25, 2014, remain in effect.

Pursuant to Article 4(b) of the Contract, please submit a written schedule to this office on or before April 8, 2016, showing the monthly quantities of CVP water to be delivered based on the above declaration of Water Made Available.

Reclamation will update the declaration each month and more frequently if necessary based on then-current operational and hydrologic conditions. If you have questions, please contact Mr. Jacob Berens, Water Conservation Specialist, at 530-934-1359 or jberens@usbr.gov or Ms. Natalie Wolder, Repayment Specialist, at 530-934-1356 or nwolder@usbr.gov.

Sincerely,

FOR

Federico Barajas
Area Manager

APPENDIX M

Urban Water Management Plan Checklist

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Completed Urban Water Management Plan Checklist

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	Appendix A
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	Appendix A Section 2.3
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 2.4 Appendix A
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 2.4 Appendix A
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.1
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 3.3 Table 4
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.4
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 3.1 Section 3.3 Table 4
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 4.1, Table 5 - 7 Section 4.3 Tables 13-15 Section 4.6 Table 19
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month	System Water Use	Section 4.3	Appendix N

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

	period available.			
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 4.4 Table 16
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	Section 4.2
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	Section 4.2 Tables 8-12 Figure 6
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 if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 4.2 Figure 6
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Figure 6
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 4.2 Tables 8-10
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	Not Applicable COR is not a wholesale supplier
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	Section 4.2, 4.7, Figure 6, Appendix K
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 5.1, 5.2, Table 22 & 33, Figure 10
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 5.2, Table 22 & 33, Figure 10
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	System Supplies	Section 6.2.2	Section 5.2, Figure 8, Appendix B

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

	copy of the plan or authorization.			
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 5.2, Appendix B
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 5.2
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 5.2
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 5.1, Figure 9, Table 21, Appendix I
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 5.1 Figure 9 Section 5.2 Table 22 Appendix I
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 5.3
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 5.6 Section 6.2
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 5.4
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	Not Applicable Retail supplier only
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	Not Applicable Retail supplier only
10633	For wastewater and recycled water, coordinate with local water, wastewater,	System Supplies (Recycled	Section 6.5.1	Section 5.5

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

	groundwater, and planning agencies that operate within the supplier's service area.	Water)		Tables 24-26
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 5.5 Table 24
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 5.5 Table 25
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 5.5 Table 27
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 5.5
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 5.5
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 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 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
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 6.2 Tables 29-35 Figures 10 & 11
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 6.2
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 6.2 Section 6.4 Appendix G

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

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 6.3 Table 36
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 6.2 Table 35 Figure 11
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	Section 6.4 Appendix G
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 6.2 Table 32
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	Appendix F
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Appendix G
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Appendix G
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 6.4 Appendix G
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 5.2
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Adopted Appendix G
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	Appendix G
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.	Demand Management Measures	Sections 9.2 and 9.3	CUWCC Member

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

	The description will address specific measures listed in code.			
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	CUWCC Member
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	Appendix E
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 2.4 Appendix A
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	Not a supplier
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	Appendix A
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	Adopted Section 6.4 Appendix G
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	Appendix A
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	Not a supplier
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Appendix A
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Appendix A

CITY OF REDDING 2015 URBAN WATER MANAGEMENT PLAN

	Library.			
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	Not a supplier
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	Appendix A
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	Appendix A

APPENDIX N

AWWA Water Loss Audit Results

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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: **City of Redding Water Utility**
 Reporting Year: **2015** **1/2015 - 12/2015**

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	6,938.050	MG/Yr
Water imported:	+	?		0.000	MG/Yr
Water exported:	+	?	7	24.500	MG/Yr

Master Meter and Supply Error Adjustments

Pcnt:	+	?	7	5.00%	<input checked="" type="radio"/>	<input type="radio"/>		MG/Yr
Value:	+	?			<input checked="" type="radio"/>	<input type="radio"/>		MG/Yr
	+	?	7		<input checked="" type="radio"/>	<input type="radio"/>		MG/Yr

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

WATER SUPPLIED: 6,583.167 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	+	?	7	6,197.590	MG/Yr
Billed unmetered:	+	?			MG/Yr
Unbilled metered:	+	?			MG/Yr
Unbilled unmetered:	+	?		82.290	MG/Yr

Enter a positive value, otherwise a default percentage of 1.25% (of billed metered) is applied and a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 6,279.880 MG/Yr

Click here: ?
for help using option buttons below

Pcnt:	<input type="radio"/>	<input checked="" type="radio"/>	Value:		MG/Yr
-------	-----------------------	----------------------------------	--------	--	-------

Use buttons to select percentage of water supplied
 OR
 value

WATER LOSSES (Water Supplied - Authorized Consumption)

303.287 MG/Yr

Apparent Losses

Unauthorized consumption:	+	?		16.458	MG/Yr
---------------------------	---	---	--	--------	-------

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

Customer metering inaccuracies:	+	?	7	15.533	MG/Yr
Systematic data handling errors:	+	?		15.494	MG/Yr

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

Apparent Losses: 47.485 MG/Yr

Pcnt:	0.25%	<input checked="" type="radio"/>	<input type="radio"/>	Value:		MG/Yr
	0.25%	<input type="radio"/>	<input checked="" type="radio"/>			MG/Yr
	0.25%	<input checked="" type="radio"/>	<input type="radio"/>			MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 255.802 MG/Yr

WATER LOSSES: 303.287 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 385.577 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	9	550.0	miles
Number of <u>active AND inactive</u> service connections:	+	?	10	29,175	
Service connection density:	?			53	conn./mile main

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

Average length of customer service line: + ? (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:	+	?	9	80.0	psi
-----------------------------	---	---	---	------	-----

COST DATA

Total annual cost of operating water system:	+	?	10	\$13,475,000	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	10	\$1.20	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	10	\$0.31	\$/Million gallons

Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 77 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: Unauthorized consumption



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: City of Redding Water Utility
 Reporting Year: 2015 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 77 out of 100 ***

System Attributes:

	Apparent Losses:	47.485	MG/Yr
+	Real Losses:	255.802	MG/Yr
=	Water Losses:	303.287	MG/Yr

? Unavoidable Annual Real Losses (UARL): 214.67 MG/Yr

Annual cost of Apparent Losses: \$76,173

Annual cost of Real Losses: \$410,350 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:	5.9%	
		Non-revenue water as percent by cost of operating system:	4.6%	Real Losses valued at Customer Retail Unit Cost

Operational Efficiency:	{	Apparent Losses per service connection per day:	4.46	gallons/connection/day
		Real Losses per service connection per day:	24.02	gallons/connection/day
		Real Losses per length of main per day*:	N/A	
		Real Losses per service connection per day per psi pressure:	0.30	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL): 255.80 million gallons/year

? Infrastructure Leakage Index (ILI) [CARL/UARL]: 1.19

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