City of Riverbank
2010 Urban Water Management Plan (UWMP)

DRAFT for PUBLIC REVIEW

September 10, 2014

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

SECTION 1 INTRODUCTION

The City of Riverbank prepared this update of its Urban Water Management Plan (UWMP) during the spring of 2013. The updated plan was adopted by the City Council on INSERT DATE, and submitted as adopted to the California Department of Water Resources (DWR) on INSERT DATE. A copy of the signed resolution of plan adoption is included as Appendix A.

This plan includes information necessary to meet the requirements of the California Water Code Division 6, Part 2.6: Urban Water Management Planning, and Division 6, Part 2.55: Water Conservation, with guidance from the CA Department of Water Resources guidance document, Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan.

1.1 CONTACT

The City of Riverbank, the retail water supplier, is a Municipality, and is not a Bureau of Reclamation Contractor or State Water Project Contractor.

The name of the person to contact at the City of Riverbank regarding this 2010 Urban Water Management Plan is:

Michael Riddell, Deputy Development Services Director
6707 Third St. (mailing)
2901 High St.
Riverbank, CA 95367
Phone: (209) 869-7128
After Hours Phone: 1-800-672-9068
Email address: mriddell@riverbank.org
Web page address: http://www.riverbank.org/Depts/PublicWorks/default.aspx

1.2 PURPOSE

The City of Riverbank's Urban Water Management Plan (UWMP) is prepared in accordance with California Water Code Division 6, Part 2.6: Urban Water Management Planning (10610 et. seq.) and Division 6, Part 2.55: Water Conservation (10608 et. seq.). Through this legislation, the State of California is promoting the managed use of water for urban and municipal purposes. The UWMP Act requires municipalities, which supply water to more than 3,000 customers (or supplying more than 3,000 acre-feet annually) to prepare an UWMP. Under the Act, urban water suppliers are required to submit a complete plan to the DWR in years ending in zero (0) and (5). An UWMP is required in order for a water supplier to be eligible for State grants and loans associated with water system planning and capital improvement projects.

In November 2007, The Water Conservation Act of 2009 was signed into law as part a comprehensive water legislation package. The Water Conservation Act sets a goal to achieve a 20% reduction in urban per capita water use in California by December 31, 2020, and directs urban retail water suppliers to set interim (2015) and final (2020) water use targets to achieve this reduction.

The purpose of this plan is to describe and evaluate system water demands; sources of water supply; efficient uses of water; water conservation demand management measures; and implementation, strategy and schedule to meet the requirements of the Urban Water Management Planning and Water Conservation acts.

1.3 PUBLIC PARTICIPATION

The City has actively encouraged community participation in its urban water management planning efforts. The City held a public meeting on INSERT DATE for review and comments on the draft plan prior to adoption by the City Council. In accordance with Section 6066 of the Government Code, notices of a public hearing were placed in the Riverbank News at least two weeks prior to the public hearing and the UWMP was made available to the public for review and comment before the City Council adoption (notice attached in Appendix B). Copies of the draft UWMP were available at City offices and the library. Additionally, community input was sought during the development of the City's Water Ordinances initially adopted in 1967 and subsequently amended.

1.3.1 Agency Coordination

The City of Riverbank is an independent water supplier and does not purchase from, nor wholesale water, to other agencies. The development of this UWMP was coordinated with City Development Services Department staff. Development Services is responsible for maintaining statistical data regarding water consumption and overseeing all development activities in the City. The Finance Department is responsible for utility billing.

Table 1.1 provides a summary of coordination and public involvement actions during the preparation of the 2010 UWMP.

Table 1.1 (SWR Table 1)
Summary of Coordination Efforts to Include
Agencies and Citizens in Planning and Notification

Coordination and Public Involvement Actions						
Entities	Plan Writing	Contacted	Attended Meeting	Given Copy	Comments Received	Noticed of Adoption
Consultant	X	X		X	X	X
City of Riverbank	X	X	X	X	X	X
Development Services	X	X	X	X	X	X
Library		X		X		X

1.4 OTHER NOTIFICATION AND SUBMITTAL REQUIREMENTS

In addition to submittal to the DWR, the City also submitted the UWMP to the California State Library within 30 days of the adoption hearing pursuant to Section 10644(a). The City will also make the plan available for public review during normal business hours within 30 days following filing with the DWR.

SECTION 2 SUPPLIER SERVICE AREAS

2.1 SERVICE AREA

The City of Riverbank is located adjacent and south of the Stanislaus River, approximately 4 miles to the southwest of the City of Oakdale, and just northeast of the City of Modesto as depicted in Figure 2-1. The City, and its General Plan area, is located within the Stanislaus and San Joaquin Basins of the Great Central Valley. The City supplies potable water to all the residential, commercial, and institutional / governmental water users within City limits. The City also supplies water to several residential locations and complexes outside of the city limits, but within the Sphere of Influence. Figure 2-2 portrays the City limits, Sphere of Influence, and General Plan boundary.

2.2 CLIMATE

The Riverbank area is considered semi-arid, characterized by hot, dry summers and mild, wet winters. Average winter temperatures range from the mid-40s to the high-60s and average summer temperatures from the 50s to the 90s. Per information from Western Regional Climate Center and CIMIS station observations the annual rainfall amounts range from 5.7 inches to 27.4 inches per year for the period between 1906 and 2010. In the region, average rainfall is approximately 12.15 inches per year.

2.3 POPULATION GROWTH

The City's annual population growth rate has varied widely during the past decade. From 2000 to 2010, the population increased by approximately 6,375 residents per the State of California, Department of Finance. Growth rates during this period have been as high as 8.4% between 2004-2005 and as low as 0.73% between 2008-2009. For purposes of this plan, the City has a future projected average population growth rate of 3.3% growth rate based on historical average growth data from 2001 through 2010. Table 2-2 summarizes the projected population growth of the City to the year 2030, including the projected build-out population based on the City's General Plan 2005-2025.

Table 2.1 (DWR Table 2)
Population Projections of the City of Riverbank

	2010	2013 (actual)	2015	2020	2025	2030	Build-out (b)
City Population (a)	22,201	23,149	25,860	29,520	33,179	36,839	52,500

(a) Population estimates using a 3.3% growth rate based on historical growth data from 2001 through 2008 from *State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Riverbank, California.*

(b) *City of Riverbank General Plan 2005-2025*

Supplier Service Areas

The City's current actual distribution area substantially overlaps the city limits as shown in Figure 2.2. The City provides water service to the developed areas within the sphere of influence, which consists of single-family and multifamily residential units; commercial establishments; and industrial, private, and governmental institutions. The City's sphere of influence will expand over time to serve the General Plan boundary area as a result of economic and population growth.

Figure 2.1

City of Riverbank
Water Supply Study and
Water Master Plan Update

Vicinity Map

San Joaquin

Stanislaus

Escalon

Oakdale

Ripon

Riverbank

Salida

Modesto

Empire

Waterford

Ceres

Hughson

120

108

99

132

Legend:

- Riverbank City Limits
- Surrounding Cities
- City of Riverbank
- Highways

N

9,000 0 9,000

Scale Feet

Stantec Consulting Inc.
6980 Sierra Center Pkwy. #100
Reno, Nevada 89511
Tel: (775) 850-0777
Fax: (775) 850-0787
stantec.com

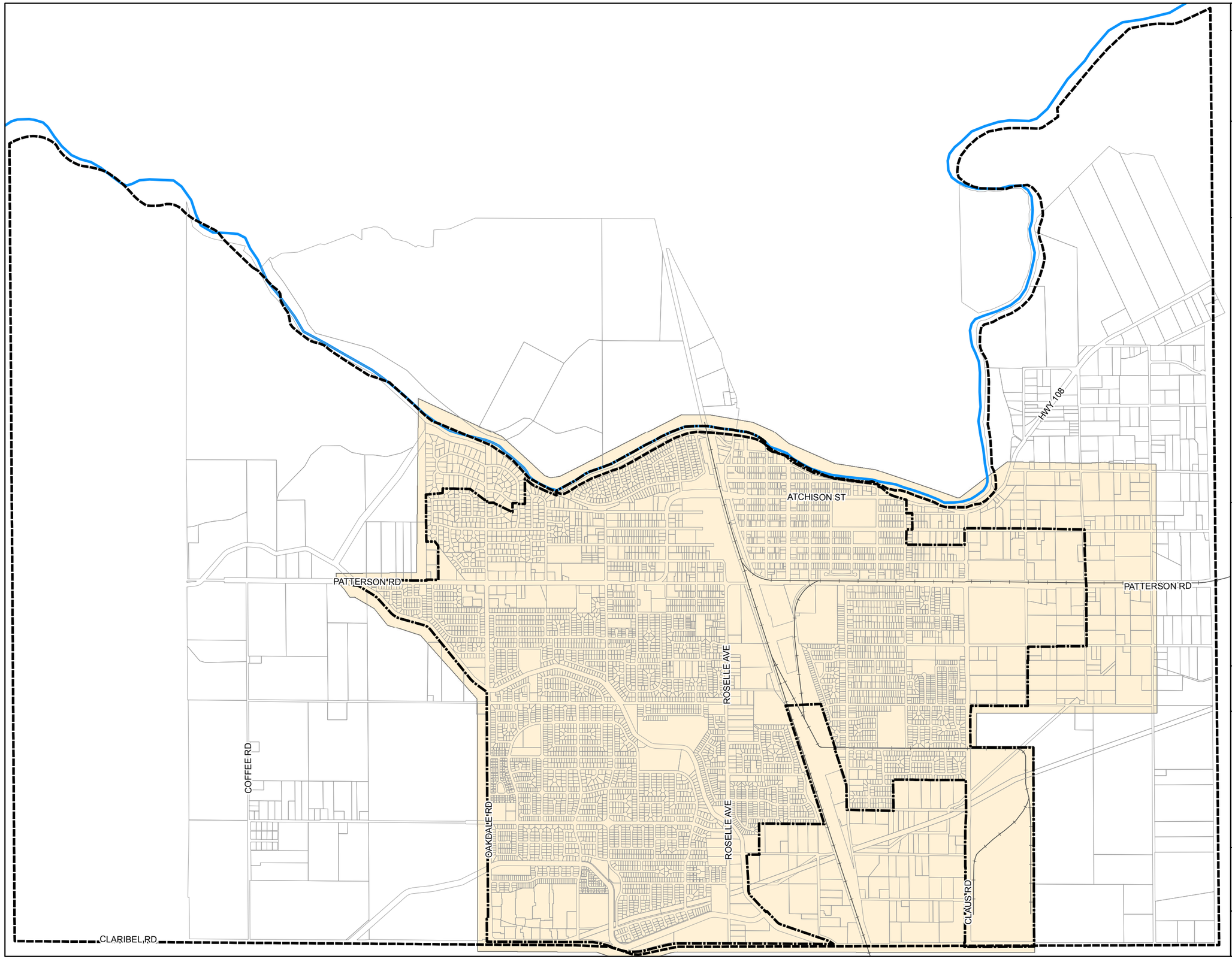

Figure 2.2

City of Riverbank
Water Supply Study and
Water Master Plan Update

Riverbank City Limits, Sphere of Influence, and General Plan Boundaries

Legend:

- Gen. Plan Study Area (2008)
- City Limits
- Sphere of Influence
- Parcels
- Railroad
- Stanislaus River

Notes: Sphere of Influence is assumed to be extent of the parcels.

N

1,000 0 1,000 2,000

Scale Feet

Stantec Consulting Inc.
6980 Sierra Center Pkwy. #100
Reno, Nevada 89511
Tel: (775) 850-0777
Fax: (775) 850-0787
stantec.com

SECTION 3 SYSTEM DEMANDS

This section describes the City's water system demands, including calculating its baseline (base daily per capita daily) water use and interim and urban water use targets. It quantifies the City's current water system demand by category and projects them over the planning horizon of the UWMP. The projections also include system water losses and water use target compliance.

When calculating future water demands, the projected demands were based on the assumed reduction in per capita daily use determined from planning for and implementing actions associated with the Water Conservation Bill of 2009.

This section also includes a description of how the City calculated its baseline and targets, following the technical methods and methodologies described in Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Bill of 2009) (DWR 2010a).

3.1 BASELINES AND TARGETS

Beginning with the 2010 UWMPs, SBX7-7 (CWC §10608 (e)) requires each urban retail water supplier to include the following in its UWMP.

- **Baseline daily per capita water use** — how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.
- **Urban water use target** — how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are, and planned to be, implemented.
- **Interim urban water use target** — the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

In 2015 and 2020, each water supplier will also determine compliance daily per capita water use to assess progress toward meeting interim and 2020 urban water use targets. Determining and tracking use levels and targets will support the goal of reducing the state's per capita urban water consumption by 20 percent.

The steps required to calculate the City's urban water use targets include developing the gross water use, the current and estimated service area population, followed by calculating the baseline daily per capita water use.

3.1.1 Gross Water Use Service Area Population

Gross water use is a measure of water supplied to the distribution system over 12 months and adjusted for changes in distribution system storage and deliveries to other water suppliers that pass through the distribution system. Recycled water deliveries are to be excluded from the calculation of Gross Water Use. Water delivered through the distribution system for agricultural use may be deducted from the calculation of Gross Water Use. Under certain conditions, industrial process water use also may be deducted from Gross Water Use.

Section 10608.12(g) of the Water Code defines "Gross Water Use" as:

The total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier

(2) The net volume of water that the urban retail water supplier places into long-term storage

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24

The historical annual metered groundwater production for the City's water system is presented in DWR Table 18. Per Methodology 1: Gross Water Use in the DWR guidance, the City's gross water use is equivalent to the annual groundwater production as there is no import/export of water and no recycled water use within the system.

Table 3.1 (DWR Table 18)
Groundwater Pumped

Year	Quantity, AFY
1995	2889
1996	3582
1997	3485
1998	2976
1999	3291
2000	3299
2001	3383
2002	3778
2003	3842
2004	4168
2005	4664
2006	6350
2007	5187
2008	5044
2009	4740
2010	4351

System Demands

Year	Quantity, AFY
2011	4220
2012	4220
2013	4094

3.1.2 Service Area Population

Section 10608.20(f) of the Water Code indicates that when calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections. To obtain an accurate estimate of daily per capita water use, water suppliers must estimate population of the areas that they actually serve, which may or may not coincide with either their jurisdictional boundaries or with the boundaries of cities. Customers may be in the distribution area with a wholly private supply during the baseline and compliance years, and new areas may be annexed into a water supplier's distribution system over time. The area used for calculating Service Area Population shall be the same as the distribution system area used in calculating the gross water use.

The City's current and estimated population is presented in DWR Table 2 in Section 2 of this UWMP. The City's actual distribution area substantially overlapped with the City boundaries during the baseline years. As population and economic growth continue in the future, the actual distribution area will geographically expand into the General Plan build-out areas.

3.1.3 Base Daily Per Capita Water Use

Baseline per capita water use must be calculated for a water system to define their 2015 interim and 2020 water use targets. Base Daily Per Capita Water Use is defined as average gross water use, expressed in GPCD, for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use under Section 10608.20 and Section 10608.22:

- The first base period is a 10- to 15-year continuous period, and is used to calculate baseline per capita water use per Section 10608.20.
- The second base period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per Section 10608.22.

Unless the urban retail water supplier's five year Base Daily Per Capita Water Use per Section 10608.12 (b) (3) is 100 GPCD or less, Base Daily Per Capita Water Use must be calculated for both baseline periods.

In calculating Base Daily Per Capita Water Use one of the following base periods must be used:

- If recycled water made up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- If recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

The base period ranges selected for calculating the baseline daily per capita water use are presented in DWR Table 13. DWR Table 14 presents the calculated base daily per capita water use for the 10-year and 5-year ranges. The maximum allowable 2020 per capita water use target is the lower of either 95% of the 5-year baseline daily per capita water use or the target determined by one of the DWR target methods discussed in the following section.

Table 3.2 (DWR Table 13)
Base Period Ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	5,044	*AFY*
	2008 total volume of delivered recycled water	0	*AFY*
	2008 recycled water as a percent of total deliveries	0	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	1996	
	Year ending base period range[2]	2005	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range[3]	2007	

Table 3.3 (DWR Table 14)
Base daily per capita water use — 10- to 15-year range

Base period year		Distribution System Population	Daily system gross water use (gpd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	1996	13,352	3,197,578	239
Year 2	1997	13,987	3,110,988	222
Year 3	1998	14,323	2,657,507	185
Year 4	1999	14,552	3,229,714	222
Year 5	2000	15,826	2,944,950	186
Year 6	2001	16,193	3,022,613	187
Year 7	2002	17,107	3,371,650	197
Year 8	2003	17,388	3,430,567	197
Year 9	2004	18,386	3,715,332	202
Year 10	2005	20,077	4,164,350	207
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
			Base Daily Per Capita Water Use	**207**

Table 3.4 (DWR Table 15)
Base daily per capita water use — 5-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	17,388	3,430,567	197
Year 2	2004	18,386	3,715,332	202
Year 3	2005	20,077	4,164,350	207
Year 4	2006	21,271	4,365,203	205
Year 5	2007	21,575	4,630,328	215
			Base Daily Per Capita Water Use	**207**

3.1.4 Base Daily Per Capita Water Use Targets

The City must set a 2020 water use target and a 2015 interim target using one of four methods. Three of these are defined in Section 10608.20(a)(1), with the fourth developed by DWR by the end of 2010. The 2020 water use target will be calculated using one of the following four methods:

- **Method 1**: 80% of the water supplier's baseline per capita water use
- **Method 2**: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses
- **Method 3**: 95% of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan. The Modesto Groundwater Subbasin is located in the San Joaquin River Hydrologic Region. This region has a year 2015 conservation target of 211 gpcd and a year 2020 target of 174 gpcd. A reduction to 95% for this region makes the urban water target 165 gpcd.
- **Method 4**: This is a provisional method (will be revised and updated in 2014) developed by DWR to account for climate and population density and differences in regions related to levels of per capita water use according to plant water needs and levels of commercial, industrial, and institutional water use. Water savings are calculated using a BMP Calculator tool provided by DWR.

The target may need to be adjusted further to achieve a minimum reduction in water use regardless if the 95% of the 5-year baseline range defined above is greater than the selected urban water use target. The Water Code directs that water suppliers must compare their actual water use in 2020 with their calculated targets to assess compliance. In addition, water suppliers will report interim compliance in 2015 as compared to an interim target (generally halfway between the baseline water use and the 2020 target level). The years 2015 and 2020 are referred to in the methodologies as compliance years. All baseline, target, and compliance-year water use estimates must be calculated and reported in gallons per capita per day (GPCD).

The City of Riverbank has selected Method 3 for establishing their interim 2015 and final 2020 urban water use targets. Based on this, the City's targets are as follows:

- Final 2020 Target = 165 gpcd
- Interim 2015 = 187 gpcd

Current 2013 water use is approximately = 167 gpcd.

3.2 WATER USE

This section quantifies the City's past and current water use, and projected water use, identifying the uses among water use sectors, based on available water supply and metered usage data.

3.2.1 Water Use by Sector

DWR Tables 3 and 4 present the City's past water use (2006) and current water use based on 2010 metered data. The City categorizes metered water use sectors by Single Family Residential, Commercial/Institutional/Governmental, Industrial, and Other. Past water use data for 2006 is presented because itemized volume used per land use classification was not available for years prior to 2006.

Table 3.5 (DWR Table 3)
Water deliveries — actual, 2006

	2006				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume, AFY	# of accounts	Volume, AFY	Volume
Single family	6,168	4,056	6		4,056
Multi-family	N/A	N/A[2]			N/A[2]
Commercial	254	395	17		330
Institutional/governmental					
Industrial	6	65	2		65
Landscape		67			67
Agriculture					0
Other					0
Total	6,428	4,518	25	0	4,518

[1] 2006 data used instead of 2005 because itemized volume used per land use classification not available for years prior to 2006,
[2] Volume included in single family sector value.

Table 3.6 (DWR Table 4)
Water Deliveries — Actual, 2010

	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume, AFY	# of accounts	Volume, AFY	Volume, AFY
Single family	6,846	3,906			3,906
Multi-family	14	N/A[1]			N/A[1]
Commercial	247	270			270
Institutional/governmental					
Industrial	13	117			117
Landscape					0
Agriculture					0
Other	28	77			77
Total	7,148	4,370	0	0	4,370

[1] Multi-family volume included in single family residential sector.

DWR Tables 5 through 7 provide projected water demands for 2015, 2020, 2025, 2030 and 2035. In calculating the estimated number of accounts and water usage by sector (the historical 2000 – 2010 population growth of 3.3%), a straight-line projection was made through 2035. Estimated usage was developed for 5-year time increments based on the projected population, the baseline daily per capita usage of 207 gpcd and 2.97 capita per equivalent residential unit. Based on 2006 and 2010 metered data, residential usage represents approximately 90% of the total usage. The remaining 10% is for commercial/institutional, industrial and other use categories.

The following formula was used to project the number of equivalent residential units (ERU):

$$\text{ERUs} = \frac{\text{Water use (GPD)} \times 90\%}{207\ (\text{GPD/capita}) \times 2.97\ (\text{capita/ERU})}$$

2.97 capita / ERU represents the weighted average of the capita/RU for each residential land use classification, i.e. MDR, LDR, HDR, etc. (Per capita info from General Plan). Weighting is proportional to the total projected average day demand at build-out for each residential land use type for the General Plan area plus the unbuilt MDR within the existing City limits. See Table 4-3 and 4-4 from 2007 UWMP.

To project future water use, a 10% and 20% conservation factor was applied to the 2015 and 2020-2035 population based demand projections.

Table 3.7 (DWR Table 5)
Water Deliveries — Projected, 2015

	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume, AFY	# of accounts	Volume, AFY	Volume, AFY
Single family	7,824	4,588			4,588
Multi-family	14	N/A[1]			N/A[1]
Commercial	270	296			296
Institutional/governmental					0
Industrial	14	127			127
Landscape					0
Agriculture					0
Other	32	87			87
Total	8,154	5,098	0	0	5,098

[1] Multi-family volume included in single family residential sector.

Table 3.8 (DWR Table 6)
Water Deliveries — Projected, 2020

	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume, AFY	# of accounts	Volume	Volume, AFY
Single family	8,948	4,930			4,930
Multi-family	N/A[1]	N/A[1]			N/A[1]
Commercial	291	318			318
Institutional/governmental					0
Industrial	15	137			137
Landscape					0
Agriculture					0
Other	34	93			93
Total	9,288	5,478	0	0	5,478

[1] Multi-family accounts and volume included in single family residential sector.

Table 3.9 (DWR Table 7)
Water Deliveries — Projected 2025, 2030, and 2035

	2025		2030		2035 - optional	
	metered		metered		metered	
Water use sectors	# of accounts	Volume, AFY	# of accounts	Volume, AFY	# of accounts	Volume, AFY
Single family	10,058	5,541	11,168	6,153	12,278	6,765
Multi-family	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Commercial	327	357	363	397	399	436
Institutional/governmental						
Industrial	17	154	19	171	21	188
Landscape						
Agriculture						
Other	38	105	42	116	46	128
Total	10,440	6,157	11,592	6,837	12,744	7,517

[1] Multi-family accounts and volume included in single family residential sector.

3.2.2 Low Income Projected Water Demands

The current UWMP requirement includes projections of lower income household water use projections. DWR Table 8 provides these projections. These demands are included as part of DWR tables 5-8. The City of Riverbank's low income households make up 12.3% of the population based on economic and housing data for the City. This percentage of low income population was then applied to the residential water demand projections to estimate "low income water demand".

Table 3.10 (DWR Table 8)
Low-Income Projected Water Demands, AFY

Low Income Water Demands	2015	2020	2025	2030	2035 - opt
Single-family residential	564	606	681	757	832
Total	564	606	681	757	832

3.2.3 Sales to Other Water Agencies

The City does not currently sell water to any neighboring agencies and has no plans to do so in the future.

3.2.4 Additional Water Uses and Losses

Additional water use and losses are defined in DWR Table 10. System losses could include system leaks, meter inaccuracies, construction water, distribution system flushing, and unauthorized connections. For the purpose of this UWMP, the City has estimated a 5% system loss based on an analysis of previous metered supply and delivery data.

Table 3.11 (DWR Table 10)
Additional Water Uses and Losses, AFY

Water use[1]	2006	2010	2015	2020	2025	2030	2035 -opt
Saline barriers							
Groundwater recharge							
Conjunctive use							
Raw water							
Recycled water							
System losses[1]	372	107	255	274	308	342	376
Other (define)							
Total	372	107	255	274	308	342	376
[1] System Losses for 2006 and 2010 based on metered supply and delivery data. System losses for 2015 based on a 5% system loss estimate.							

3.2.5 Total Water Use

The total past, current and projected water use for the City is presented in DWR Table 11 and is based on total water deliveries from DWR Tables 3-7 and the estimated water system losses from DWR Table 10.

Table 3.12 (DWR Table 11)
Total Water Use, AFA

Water Use	2006	2010	2015	2020	2025	2030	2035 - opt
Total water deliveries (from DWR Tables 3 to 7)	4518	4370	5098	5478	6157	6837	7517
Sales to other water agencies (from DWR Table 9)	0	0	0	0	0	0	0
Additional water uses and losses (from DWR Table 10)	372	107	255	274	308	342	376
Total	4,890	4,477	5,353	5,752	6,465	7,179	7,893

3.3 WATER USE REDUCTION PLAN

Part 10608.36 of the Water Code requires the City to provide an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions. As a retail water supplier, the City is required to develop an implementation plan for compliance with the Water Conservation Bill of 2009. The plan provides a general description of how the City intends to reduce per capita water use to meet its urban water use target. In developing the plan, the City also needs to consider any potential economic impacts that may result from the water use reduction program. The implementation plan must also be discussed at the urban water management plan public hearing.

The City's plan to help achieve water use reductions include:

- Continued implementation of all cost effective DMMs
- Implementation of DMMs not currently being implemented or scheduled for implementation
- Develop DMM implementation tracking program to better be able to assess effectiveness of DMMs
- Describe steps necessary to properly implement the DMMs:
  - Marketing strategy for customer enrollment
  - Tracking of participation and results of participation
  - Schedule strategy
- Discuss potential revenue impacts associated with reduced system water use including potential impact to water rates ability to cover fixed costs:
  - Future rate analysis will include revenue and cost projections with projected reduced use and propose a rate/financing structure to ensure operational costs are adequately funded under such circumstances.
- Assess in the 2015 UWMP the effectiveness of the steps being taken to meet the urban water use target and make adjustments to the City's program as necessary to meet the 20% by 2020 reduction goal
- Use of recycled water and rain water harvesting
- Turf limitation and removal ordinances
- Model home ordinance
- Amend subdivision ordinance to mandate new homes not exceed per capita water use targets
- Enforce Green Building Code requirements including implementation of SB 407/Civil Code Sections 1101.1 - 1101.8 fixture retrofit requirements.

SECTION 4 SYSTEM SUPPLIES

This section describes the City's sources of water. It includes a description of City's groundwater source(s), source limitations (physical or political), water quality, and water exchange opportunities. Also included is a short discussion regarding planned future water supply projects to meet future water system demands. A detailed analysis of the City's groundwater supply and supply reliability issues are discussed in Section 5 of this UWMP.

4.1 DESCRIPTION OF EXISTING FACILITIES

The City relies exclusively on groundwater as a potable water supply. Surface water applications are limited to natural recharge to the groundwater supply. An urban recycled wastewater program is not planned at this time.

The City supplies potable water through a pressurized distribution system. The City water supply and distribution system is comprised of ten wells with pumps, two 1 million gallon (MG) storage tanks with booster pumping stations, and over 44 miles of pipeline 8 inches to 12 inches in diameter. There are also several miles of 4-inch and 6-inch diameter pipelines.

The inventory of ten wells includes new Well No. 9 (Prospector), constructed by the Crossroads residential development; Well No. 10, located on City property north of the Crossroads commercial development near Oakdale Road, south of the MID Lateral #6 Canal; and Well #12 located on the east side of Riverbank, south of Patterson Road and adjacent to Chief Tucker Avenue . Well No. 10 began operating in May 2008 and has a pumping capacity of approximately 1,500 gpm (depending on groundwater levels). Well #12 was completed in 2009 and has a pumping capacity of 1,500 gpm. An eleventh well, Well No. 11 has been designed and is planned for the south side of Santa Fe Street, east of Central Avenue in rural northeastern Riverbank. The locations of existing and planned water supply wells are shown in Figures 4-1 and 4-2. A summary of the production capacity of the existing groundwater wells is presented in Table 4.1. A summary of the amount of groundwater pumped in the previous years is provided in Table 3.1 (DWR Table 18) in Section 3 of this UWMP.

Table 4.1
Existing Groundwater Wells

Well Number	Location	Pump Capacity, gpm
1	2nd Street	Abandoned
2	8th Street	660
3	Jackson	625
4	Pioneer	900
5	River Heights	900
6	Whorton	1,000
7	Crossroads	1,200
8	Novi	1,200
9	Prospector	1,300
10	Oakdale Road	1,500
12	Chief Tucker Ave.	1,500
	Total Pumping Capacity	**10,785**

Figure 4.1

City of Riverbank
Water Supply Study and
Water Master Plan Update

Existing Water Supply Facilities

CITY WELL #4
ATCHISON ST
HWY 108
CITY WELL #5
WATER TANK #1 & BOOSTER PUMP STATION
CITY WELL #2
PATTERSON RD
PATTERSON RD
CITY WELL #3
CITY WELL #7
ROSELLE AVE
CITY WELL #6
WATER TANK #2 & BOOSTER PUMP STATION
CITY WELL #8
COFFEE RD
OAKDALE RD
ROSELLE AVE
CITY WELL #10
CITY WELL #9
CLAUS RD
CLARIBEL RD

Legend:

- Gen. Plan Study Area (2008)
- City Limits
- Existing Water Storage Tank
- Existing Well
- Parcels
- Railroad
- Stanislaus River

Notes: Sphere of Influence is assumed to be extent of the parcels.

N

1,000 0 1,000 2,000

Scale Feet

Stantec Consulting Inc.
6980 Sierra Center Pkwy. #100
Reno, Nevada 89511
Tel: (775) 850-0777
Fax: (775) 850-0787
stantec.com

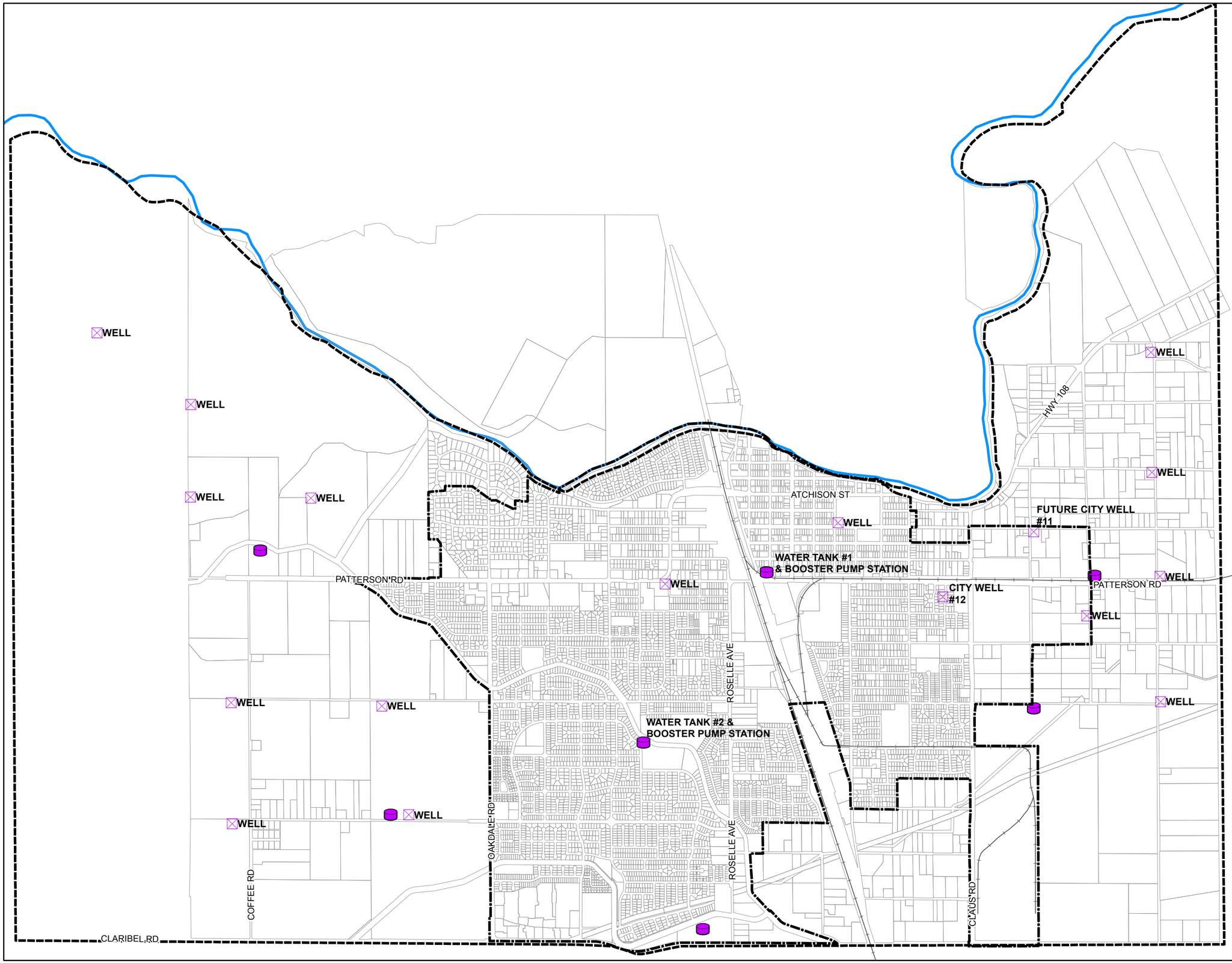

Figure 1

City of Riverbank
Water Supply Study and
Water Master Plan Update

Planned Water Supply Facilities

Legend:

- Gen. Plan Study Area (2008)
- City Limits
- Potential Storage Tank
- Potential Well
- Parcels
- Railroad
- Stanislaus River

Notes: Sphere of Influence is assumed to be extent of the parcels.

N

1,000 0 1,000 2,000

Scale Feet

Stantec Consulting Inc.
6980 Sierra Center Pkwy. #100
Reno, Nevada 89511
Tel: (775) 850-0777
Fax: (775) 850-0787
stantec.com

4.2 TRANSFER AND EXCHANGE OPPORTUNITIES

Proposed water supply strategies for the City do not consider the use of surface water from the Stanislaus River. At present, conjunctive (surface water) uses are limited to natural groundwater recharge from surface water. Should Oakdale Irrigation District embark on a program of supplying treated surface water for municipal uses, opportunities to purchase water may become available.

4.3 WATER QUALITY

Regional water quality is generally very good, with total dissolved solids, nitrate, and DBCP (a soil fumigant) being the only potential concerns. There are a number of possible contaminating activities within the Riverbank General Plan area, including the Thunderbolt Wood Processing facility and the Riverbank Army Ammunitions Plant. Neither of these, or any other potential contaminating activities, has shown a water quality impact to the City's production wells. Historically, water quality at the City's wells has been excellent, with no safe Drinking Water Act violations to date. There are no projected water supply changes due to water quality for the duration of the current UWMP planning horizon.

4.4 CURRENT AND PROJECTED NORMAL WATER SUPPLIES

The City's current (2010) and projected water supplies are provided in Table 4.2. As mentioned previously, the City relies exclusively on groundwater for their water supply. The City does not anticipate using a wholesale supply source to meet future needs. The projected water supplies are based on the total water use defined in Section 3 of this UWMP.

Table 4.2 (DWR Table 16 and 19)
Water Supplies — Current and Projected, AFY

Water Supply Sources		2010	2013	2015	2020	2025	2030	2035 - opt
Water purchased from:	**Wholesaler supplied volume (yes/no)**							
Wholesaler 1								
Wholesaler 2								
Wholesaler 3								
Supplier-produced groundwater		4,351	4.095	5,353	5,752	6,465	7,179	7,893
Supplier-produced surface water								
Transfers in								
Exchanges In								
Recycled Water								
Desalinated Water								
Other								
Other								
Total		**4,351**	**4,095**	**5,353**	**5,752**	**6,465**	**7,179**	**7,893**

4.5 FUTURE WATER SUPPLY PROJECTS

The City prepared their Water Supply Study and Water Master Plan in 2007 to ensure the required infrastructure will be in place to provide a reliable water source for existing and future City residents. The following summary includes a description of the build-out facilities. Development within the General Plan study area is anticipated to occur over an extended period of time (in excess of 20-30 years). Figure 4.2 highlights the proposed water supply wells and tanks as shown in the master plan.

The City has no future water supply projects planned at this time. Existing water supplies are more than adequate to satisfy existing system demands and future water supplies will be brought on as necessary to satisfy specific development needs as discussed below.

4.5.1 Future Groundwater Extractions

The ten existing City wells (Well No. 2-10, 12) have an approximate total capacity of 10,785 gpm as summarized previously in Table 4.1. In order to meet future water demands, the City's master plan suggested the addition of sixteen new groundwater wells (including Well No. 11 and Well No. 12), each at a capacity of 1,500 gpm, to meet 20% reserve capacity provisions and maximum day demands, as well as emergency storage requirements at build-out conditions. Besides Wells No. 11 and 12, which will be located within the City's current sphere of influence, most of these new water supply wells will be located outside of the City's current sphere of influence and within the General Plan areas east and west of the current City limits. A summary of the anticipated wells by area is presented in Table 4.3.

Table 4.3
Future Water Supply Needs

Buildout Area[1]	Existing Wells	New Wells Needed	New Wells Needed
West Riverbank	0	8	8
Central Riverbank	9	11	2
East Riverbank	0	6	6
Total	9	25	16

1. Central Riverbank includes the City's current sphere of influence. East and West Riverbank include the General Plan build-out areas.

4.5.2 Future Groundwater Extractions – Implementation Strategies

As noted, sixteen new municipal wells are proposed to meet build-out water demands. Planning, design, construction, and startup of these wells will require a collaborative effort between City staff and development interests. Timing of well construction is critical to ensure that water supply facilities are on-line well in advance of increased demands. For this to occur, the City has initiated the following implementation strategy:

1. A water supply master plan has been prepared including a recommended phasing plan for capital facilities. The phasing plan establishes priorities based on likely development scenarios and provides a framework for City-developer financing of proposed wells through impact fees.

2. Siting and design criteria have been established for new municipal wells. The criteria allows for early-on identification of superior well sites, particularly in areas proposed for development. The City expectation is that property developers will reserve well sites based on the approved criteria as part of the entitlement process.

3. Triggers for new well construction will be established based on an annual review of well production versus water demands. Master plan recommendations will be updated on a bi-annual basis to reflect current demand trends and development plans. Where a specific development triggers the need for additional wells, the development agreement between the property owner and the City will include provisions for financing and construction of required wells. Development will not be allowed to proceed without consideration of water supply facilities.

4.6 CITY OF RIVERBANK GROUNDWATER SYSTEM (MODESTO GROUNDWATER BASIN)

This section describes the Modesto groundwater subbasin from which the City's groundwater sources are located. Based on the Integrated Regional Groundwater Management Plan for the Modesto Subbasin, 2005 (CD copy attached as Appendix D) and various groundwater investigations performed on groundwater availability in the subbasin, this section provides the supporting information in determining the reliability of the City's groundwater sources during normal, single dry, and multiple dry year events.

4.6.1 City of Riverbank Well System

The City of Riverbank is located within the San Joaquin Valley and the Modesto Ground Water Subbasin (see Figure 4.3). The subbasin lies between the Stanislaus River to the north and the Tuolumne River to the south, and between the San Joaquin River on the west and crystalline basement rock of the Sierra Nevada foothills on the east (source: California Bulletin 118, updated 2/27/04).

The City's water supply is provided by ten production wells. As shown in Table 4.4, the wells range in depth from 240 feet to 830 feet and average 440 feet deep. Yields from the wells range from 625 gallons per minute (gpm) at Well No. 3, to 1,500 gpm at Well No. 10 and Well No. 12. The average yield per well is about 1,000 gpm, while the total available yield from all wells is 10,785 gpm. The minimum specific capacity of the wells ranges from a low of about 25 gallons per minute per foot of drawdown (gpm/ft) at Well No. 3, to more than 120 gpm/ft at Well No. 6. The average of the minimum specific capacities for all wells is about 60 gpm/ft.

4.6.2 Hydrogeologic Setting

Groundwater in the Modesto subbasin is produced from several sedimentary units that are Pleistocene to Miocene in age. The younger formations, known as the Turlock Lake, Riverbank, Modesto and Laguna Formations, are typically unconsolidated deposits of poorly-sorted gravel, sand, silt and clay. The units host predominantly unconfined to semi-confined aquifers that support high yielding wells. Transmissivities range from 60,000 to 280,000 gpd/ft, while storage coefficients range from 7 to 17 percent (source: California Bulletin 118, updated 2/27/04).

Underlying these formations is the older Mehrten Formation, which is comprised of semi-consolidated claystone, siltstone, sandstone, and agglomerate. The Mehrten is also an important aquifer and supports high-yielding wells. The Mehrten Formation surfaces in the eastern part of the Basin and dips to the southwest at a slope of about 0.006 (Burow, 2004). Transmissivities for the Mehrten Formation range between 28,000 and 250,000 gpd/ft while storage coefficients range from 1x10-4 to 1x10-6. The Mehrten Formation is underlain by the Valley Springs and Ione Formations. Because these deep formations may contain saline water, they are typically not a source of groundwater.

Most of the City of Riverbank wells are completed in the upper unconsolidated aquifers, although the deepest wells penetrate the Mehrten Formation.

4.6.2.1 Pumping Test Data

Dunn Environmental (2007) completed pumping tests on two City of Riverbank wells, No. 7 and No. 9. The testing included both step tests and 10-hour constant discharge tests, and utilized other nearby wells as monitoring wells. Dunn Environmental also completed a pumping test on Well No. 12 in 2009 which included a 24-hour constant discharge test.

At Well No. 7, the step tests were completed at rates of 240 gpm, 650 gpm and 1,300 gpm. The specific capacity at each rate was 74 gpm/ft. At Well No. 9, the step tests were completed at rates of 1,000 gpm, 1,750 gpm and 2,400 gpm. The well was slightly less efficient and the specific capacity ranged from 50 to 47 gpm/ft of drawdown. At Well No. 12, the step tests were completed at rates of 1,000 gpm, 1,700 gpm, and 2,700 gpm with a specific capacity at each rate of approximately 43 gpm/ft. These values are similar to the average specific capacity value of 56 gpm/ft reported by Burow (2004) for wells in the unconfined aquifer above and east of the Corcoran Clay (p. 31). All Riverbank wells are located east of the Corcoran Clay.

For the constant-discharge tests, Well No. 7 was pumped at 1,500 gpm, well No. 9 was pumped at 2,400 gpm, and Well No. 12 was pumped at 2,500 gpm. For Well No. 7, Dunn Environmental calculated the transmissivity at 530,000 to 588,000 gpd/ft, while for Well No. 9, it ranged between 290,000 gpd/ft and 313,000 (using recovery data). Well No. 12 transmissivity ranged from 93,000 to 123,000 gpd/ft. Storage coefficients for the wells were calculated to be in the range of 1x10-3 and 7x10-4, indicating semi-confined conditions.

System Supplies

These specific capacity values, and others previously reported for the remaining City of Riverbank wells are provided in Table 4.4, and can be used to estimate the maximum pumping rate that can be attained without dewatering the aquifer to the top of the well screen or the depth of the pump bowls. In the case of Well No. 7, the well drillers report indicated that a seal was set at 216 feet bgs, and that most groundwater was produced from sand, gravel and cobbles located between that depth and 314 feet bgs. At the above specific capacity, and with a maximum drought-year depth to static water level of about 66 feet bgs, the well should be able to produce significantly more than its rated capacity of 1,200 gpm (potentially up to 150 ft times 74 gpm/ft) without drawing water levels below the depth of the well seal. Other infrastructure likely constrains the output.

In the case of Well No. 9, the well drillers report indicated that a seal was set to 148 feet bgs, and that most groundwater was produced from coarse sand located between 152 and 174 feet, 293 and 307 feet, and 382 and 392 feet bgs. At the above specific capacity of 47 gpm/ft, and with a maximum drought-year depth to static water level of about 66 feet bgs, this well should also be able to produce significantly more than its rated capacity of 1,300 gpm (potentially up to 82 ft times 47 gpm/ft) without drawing water levels below the depth of the well seal.

Calculations for the other city wells are provided in Table 4.4. As shown, using the maximum dry year depth to water, all of the City wells should be easily able to provide water at their maximum pumping rates without drawing water levels below the reported depth of the pump bowls or the top of the well screen (base of the seal) with the exception of Well No. 2 which has a shallow seal and is open hole below 25 feet bgs.

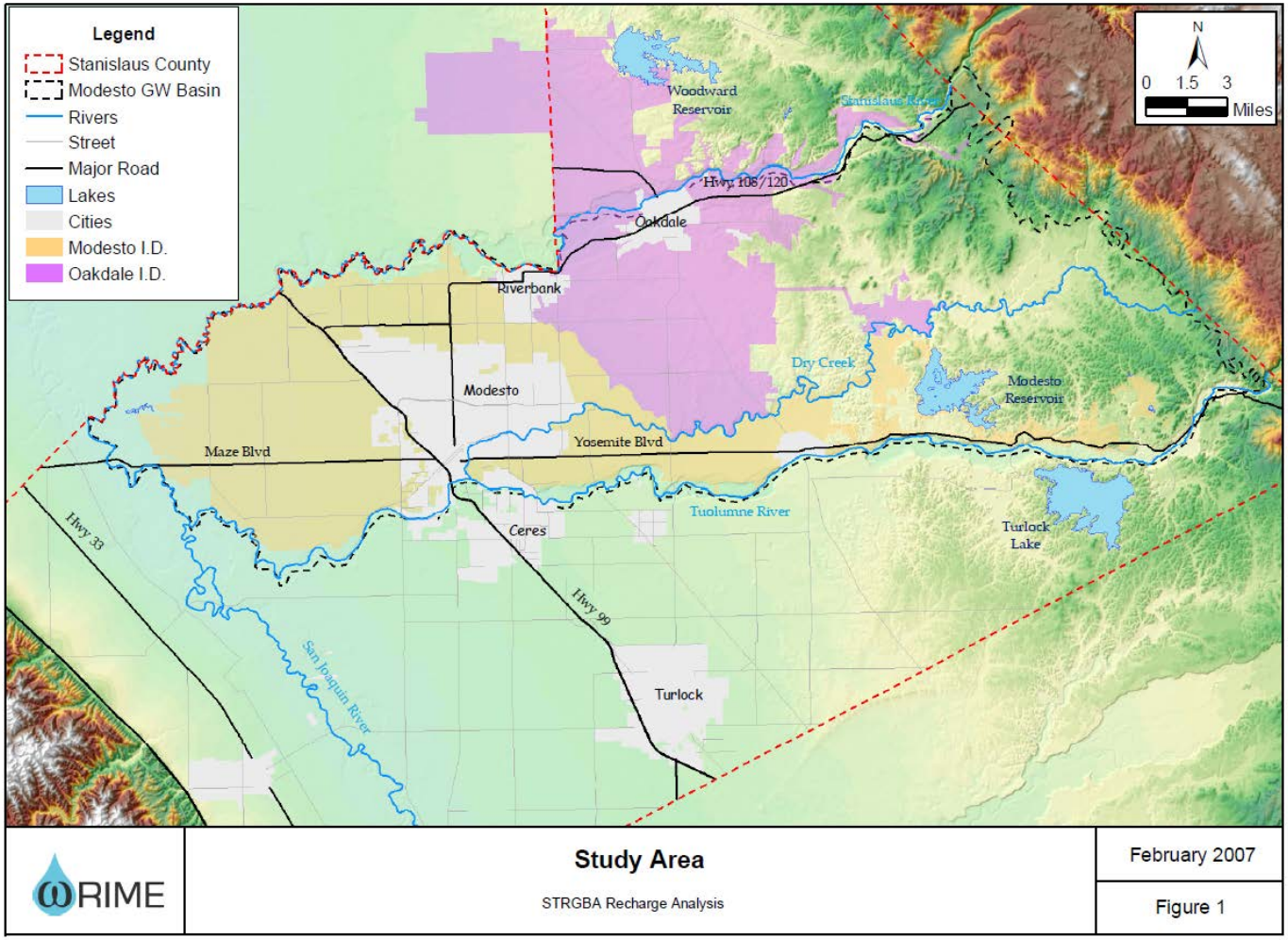

Figure 4.3 Location Map showing City of Riverbank and the Modesto Groundwater Subbasin Source: Water Resources & Information Management Engineering, Inc. Memo entitled: Recharge Characterization for Stanislaus and Tuolumne Rivers Groundwater Basin Association. Available online at: http://gis.stancounty.com/wateratlas/pdf/Stanislaus%20and%20Tuolumne%20River%20Groundwater%20Basin%20Assoc%20Recharge%20Anaylsis.pdf

Table 4.4 City of Riverbank Well Construction Data (1)

Well No.	8th St (Well No. 2)		Jackson (Well No. 3)		Pioneer (Well No. 4)		River Hghts (Well No. 5)		Whorton (Well No. 6)		Crossroads (Well No. 7)		Novi (Well No. 8)		Prospector (Well No. 9)		Oakdale Rd (Well No. 10)		Chief Tucker Ave (Well No. 12)	
Date Constructed	1956		1965		1972		1978		1981		1990		2001		2004		2007		2010	
Boring Depth	375		420		436		503		608		537		265		600		845		560	
Completed Depth	240		420		436		385		560		NA		260		392		830		602	
	From	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**	**From**	**To**
Well Seal	0	25	NA		0	92	0	50	0	65	0	216	0	200	0	148	0	145	0	180
Gravel pack		None		None	0	92	0	220	0	560		None	200	265	148	392	145	360	180	350
					92	436											520	845		
Open hole		135		0		None		165		None		None		None		None		None		None
Approx. Sand and Gravel thickness in open hole		NA		0		0		15		0		0		0		0				0
Well Screen		NA		NA	132	160	130	220	225	315	209	341	210	250	152	174	164	184	239	259
					175	250		225	315	345					293	307	210	230	299	319
					275	431			345	495					382	392	255	265	339	389
									495	555							300	330	409	419
																	595	605	489	499
																	740	760	529	549
																	810	820		
Total screen length		NA		NA		259		315		270		132		40		46		120		130
Approx. gravel and sand thickness @ screened intervals (feet)		NA		NA		201		31		76		66		40		56				315
Well Capacity (GPM)		660		625		900		900		1000		1200		1200		1300		1500		1500
Depth to bowls		unk		unk		145		unk		unk		150		178		130				130
Well Specific Capacity Range (GPM/ft drawdown)	45	47	24	35		74	56	81		122		75		unk		50				43

System Supplies

Well No.	8th St (Well No. 2)		Jackson (Well No. 3)		Pioneer (Well No. 4)		River Hghts (Well No. 5)		Whorton (Well No. 6)		Crossroads (Well No. 7)		Novi (Well No. 8)		Prospector (Well No. 9)		Oakdale Rd (Well No. 10)		Chief Tucker Ave (Well No. 12)	
Minimum Specific Capacity (GPM/ft Drawdown)		45		24		74		56		122		75		24		50				43
Historic Max Static DTW (Date/DTW)	1956	70	1994	64	1996	63	1978/ 2005	74	1994	68	1994	66	2005	66	2004	63		unk	2009	85
Historic Min Static DTW (Date/DTW)	1968	52	1972	50	1998	60	1995	61	1981/ 2005	57	1998	57.6	2006	66	2006	61		unk		unk
Estimated Drawdown (feet) at Max Production = (Capacity / Minimum Specific Capacity)		15		26		12		16		8		16		50		26				35
Estimated Pumping Level (feet bgs) at Max Production and Max Static DTW		85		90		75		90		76		82		116		89				120
Height of Max pumping level above pump bowls or the top of well screen (for wells without reported pump depth).		-60		35		57		40		149		68		62		41				10

[1] Source: Dunn Environmental, 2007 and 2009; and Nolte Associates, Inc., 2008. NA = Not available. Unk = unknown.

4.6.3 City of Riverbank Groundwater System and Usage

As shown in Table 4.5, for the year 2010, the City produced about 4,351 acre-feet (AF) of groundwater from the nine active wells (Well No. 1 has been removed from service). Table 4.6 shows the annual production for each well. Table 4.6 also shows how production has steadily increased over the past twenty years through 2007, which was the maximum groundwater pumped by the City at 5,187 ac-ft. From 2007 through 2013, the City has seen a noticeable decrease in annual pumping, even though there has been a steady population increase within the City's sphere of influence.

City staff believes the reduction in annual pumping is due to conservation efforts and the effect of the economic downturn.

The maximum daily use typically occurs in July or August. The largest monthly volume pumped was in July 2007, when 720 ac-ft of ground water was produced. This is equal to about 23 ac-ft /day or 5,260 gpm (7.6 million gallons per day).

It is estimated that at full build-out, for the entire plan area (i.e. future demand within the City limits and General Plan areas), the projected water demand will be 14,610 AFY, or 3.4 times the 2010 production. Suggested facilities in the area Master Plan include the addition of sixteen new groundwater wells (including Well No. 11), each at a capacity of 1,500 gpm, to meet 20% reserve capacity provisions and maximum daily demands, as well as emergency storage requirements at buildout conditions (Nolte Engineering, 2008).

Table 4.5 - City of Riverbank Well Production Well Data by Month

CITY OF RIVERBANK HISTORICAL GROUNDWATER PUMPING BY MONTH													
	Groundwater Pumping, ac-ft/month												
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Totals, ac-ft/yr**
1980	60	61	68	91	119	146	165	158	136	118	78	55	1,254
1984	67	66	88	131	178	215	222	219	193	99	66	67	1,611
1985	68	71	77	120	181	215	218	199	150	110	61	58	1,528
1986	64	61	71	107	178	230	242	212	160	86	86	71	1,568
1988	60	78	141	100	159	210	201	219	183	152	83	64	1,650
1989	70	70	96	130	198	219	215	220	98	120	95	70	1,601
1991	132	104	92	160	218	242	298	264	258	218	138	138	2,262
1992	126	126	126	196	282	285	298	328	295	255	169	117	2,602
1993	114	135	160	187	255	261	322	316	307	224	172	138	2,590
1995	124	133	153	161	247	350	375	382	334	287	194	149	2,889
1996	166	197	230	232	319	385	434	507	502	290	184	137	3,582
1997	122	129	241	299	378	393	442	415	380	318	210	158	3,485
1998	156	146	192	217	250	350	443	385	300	212	126	199	2,976
1999	156	146	170	234	353	432	488	460	377	344	249	208	3,618
2002	179	162	190	320	386	443	546	449	392	325	195	191	3,777
2003	164	157	227	236	357	463	572	437	468	372	188	201	3,842
2004	182	172	269	335	494	504	551	506	396	324	232	199	4,166
2005	206	177	214	289	461	510	643	718	483	419	312	232	4,664
2006	228	223	231	220	528	626	716	663	516	395	302	240	4,890
2007	240	215	311	438	536	618	720	640	479	382	349	270	5,187
2008	217	230	331	460	491	589	635	611	525	429	308	209	5,044

System Supplies

CITY OF RIVERBANK HISTORICAL GROUNDWATER PUMPING BY MONTH

Groundwater Pumping, ac-ft/month

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Totals, ac-ft/yr
2009	198	201	264	303	541	560	681	529	537	370	344	212	4,740
2010	229	191	298	312	385	362	481	556	563	549	258	167	4,351
2011	234	226	244	324	525	484	523	611	466	30	285	268	4,220
2012	241	254	257	291	453	425	650	561	419	381	191	207	4,220
2013	113	211	314	398	381	517	542	371	490	376	231	150	4,094

Source: Nolte Associates, Inc., 2008, City staff

Table 4.6 - City of Riverbank Production Data by Well

CITY OF RIVERBANK HISTORICAL GROUNDWATER PUMPING BY WELL Annual Groundwater Pumping, ac-ft/yr												
Years	8th Street (Well 2)	Jackson (Well 3)	Pioneer (Well 4)	River Heights (Well 5)	Whorton (Well 6)	Crossroads (Well 7)	Novi (Well 8)	Prospector (Well 9)	Heartland (Well 10)	Chief Tucker (Well 12)	Totals, AFY	Ave. GPM
2002	444	50	508	171	1,393	305	906	-			3,777	2,341
2003	230	258	527	532	1,178	357	760	-			3,842	2,382
2004	438	161	1,184	103	1,169	366	744	-			4,166	2,583
2005	430	104	824	394	735	140	826	1,210			4,664	2,892
2006	505	97	895	352	321	184	622	1,914			4,890	3,032
2007	302	156	972	499	887	372	855	1,155			5,187	3,222
2008	498	110	718	626	959	409	337	832	533		5,044	3,127
2009	284	130	678	437	816	886	174	684	689		4,740	2,938
2010	157	233	302	338	479	247	926	117	1000	554	4,351	2,697
2011	271	46	831	128	262	763	924	182	449	1008	4,864	3,016
2012	433	310	32	85	358	170	35	506	717	157	2,803	1,738
2013	226	196	442	616	495	238	83	374	368	1054	4,092	2,537

4.6.4 Modesto Subbasin Groundwater Storage and Budget

According to California's Groundwater Bulletin 118, updated 2/27/04, the estimated specific yield for the Modesto Subbasin is 8.8 percent. The estimated storage capacity to a depth of 300 feet is approximately 6,500,000 acre-feet. The annual water demand for the basin was estimated at 590,000 AF in 2000. Groundwater accounted for 206,500 AF of the total supply (Nolte Engineers, 2008). Total annual recharge to the basin was estimated at 310,000 acre-feet, the largest component of which is from irrigation followed by precipitation.

Assuming no recharge, the current City of Riverbank groundwater usage of 4,351 AFY is less than 1% of the total annual subbasin withdrawals, and less than 1/10th of 1% of the total estimated storage capacity of the basin.

As discussed previously, at full build-out, it is anticipated that the City of Riverbank annual groundwater requirements will be 3.4 times the current volume. It is uncertain when the full build-out scenario would occur, but the anticipated groundwater requirements would amount to less than 0.2% of the total amount of subbasin groundwater storage and less than 5% of the total annual basin recharge.

4.6.5 Groundwater Level Trends

4.6.5.1 Subbasin Trends

According to California's Groundwater Bulletin 118, updated 2/27/04, groundwater levels in the subbasin "declined nearly 15 feet from 1970 through 2000. The period 1970 through 1978 showed steep declines totaling about 12 feet. The six-year period from 1978 through 1984 saw stabilization and rebound of about 7 feet. 1984 through 1995 again showed steep declines, bottoming out in 1995 at nearly 20 feet below the 1970 level. Water levels then rose about 5 feet from 1996 to 2000. Water level declines have been more severe in the eastern portion of the subbasin, but have risen faster in the eastern subbasin between 1996 and 2000 than in any other portion of the subbasin".

Recovery of the aquifer was enhanced by the opening of the Modesto Irrigation District's surface water treatment plant in 1994, as use of surface water from the Tuolumne River has allowed the City of Modesto to reduce pumping from its water supply wells.

As shown in Figure 4.4, in addition to water level declines from increasing pumping, there is also a positive correlation between water levels and annual precipitation in Modesto Irrigation District wells. A known drought occurred between the years 1987 and 1992, and water levels dropped significantly during that period. Above average precipitation and groundwater recharge then occurred in 1993, 1996 and 1998, and groundwater levels rebounded almost to the pre-drought elevations, although there is somewhat of a lag period in the response of the aquifer to precipitation. Precipitation was also less than normal in 2002 and 2003, and regional ground water levels again declined, although not as severely as during the earlier drought period. The smaller decline is likely the result of the use of surface water as discussed above.

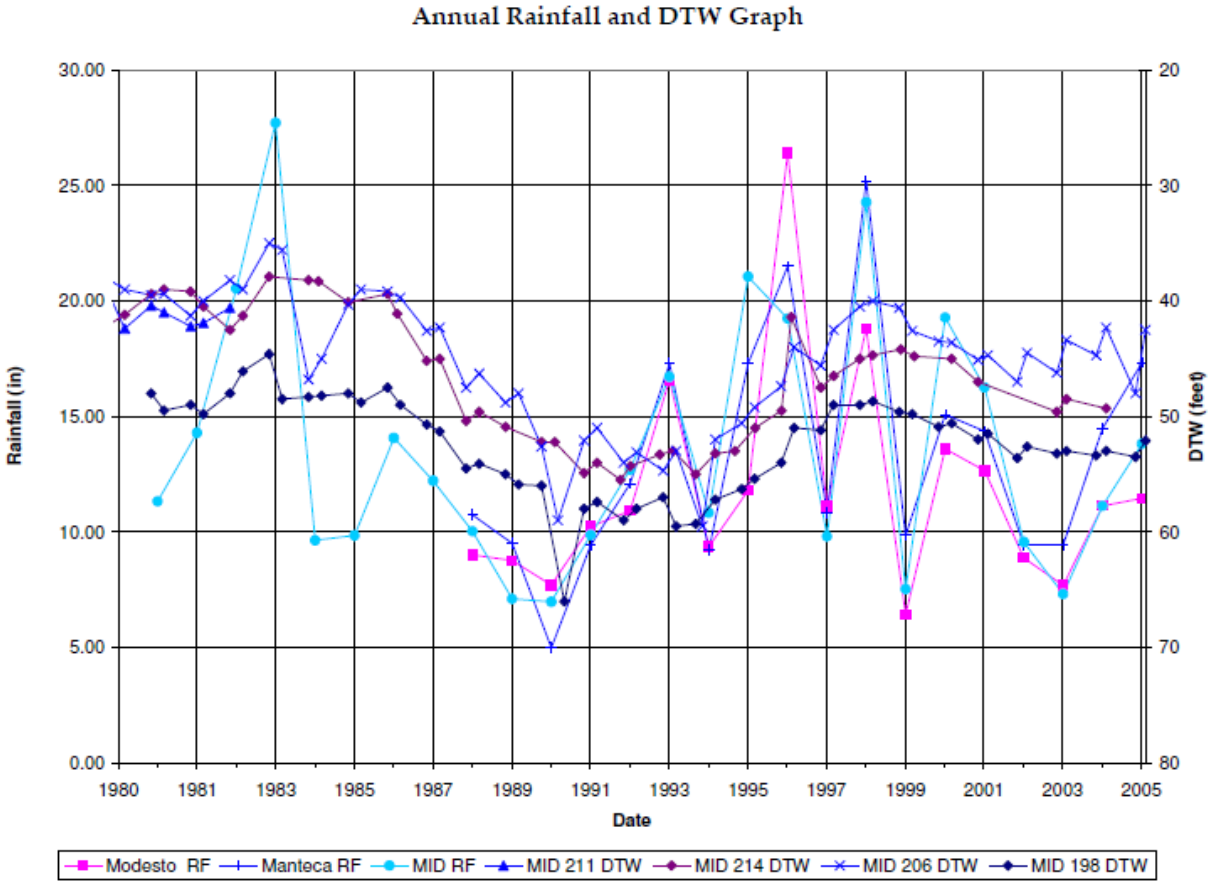

Figure 4.4 - Comparison of average rainfall (RF) and depth to groundwater in Modesto Irrigation District monitoring wells (MID).
Source: Dunn Environmental, 2007.

4.6.5.2 Riverbank Wells

Hydrographs for Riverbank area monitoring wells, obtained online from the California Division of Water Resources, Water Data Library, are provided in Figures 4.4 and 4.5. Most hydrographs show a relatively small, but steady decline in water levels beginning in the 1950's, which accelerated somewhat through the mid-1980s. Similar to the MID wells in Figure 4.4, the most severe period of aquifer drawdown occurred during the drought years of 1987 to 1992. During this period, more than 20 feet of additional drawdown occurred in many area wells and a portion of the ground water storage within the basin was depleted. Although the data sets are incomplete, a strong rebound in water levels is again associated with years of increased precipitation. In general, Dunn Environmental (2007) believed that wells further from the Stanislaus River experienced larger drawdown than wells closer to the river, as a result of aquifer recharge to shallow aquifers from river infiltration, as the river near Riverbank is a losing stream. However, the amount of drawdown in a given monitoring location is likely related to the depth of the well, the aquifer from which it produces, and the proximity of the well to other large municipal or irrigation wells.

System Supplies

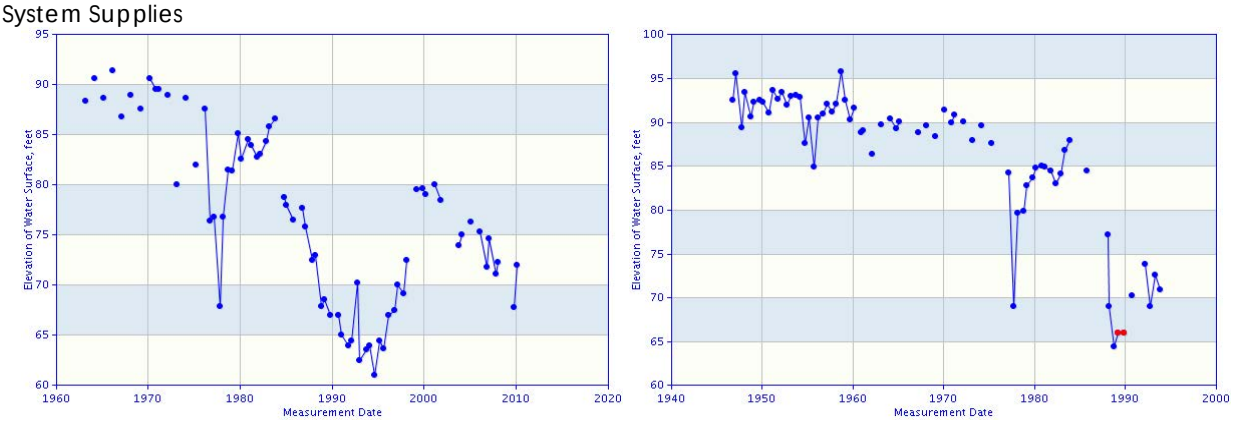

Figure 4.5
Well Hydrographs

Left - Hydrograph of a well located in Township 02 South, Range 09 East, Section 36. This well is located about 1.5 miles south of downtown Riverbank just east of City Well No. 9. Ground surface elevation 125 ft amsl. Right - Hydrograph of a well located in Township 02 South, Range 9 East, Section 25. This well is located about 0.5 miles southeast of downtown Riverbank, southeast of City Well No. 2. Ground surface elevation 142 ft amsl.

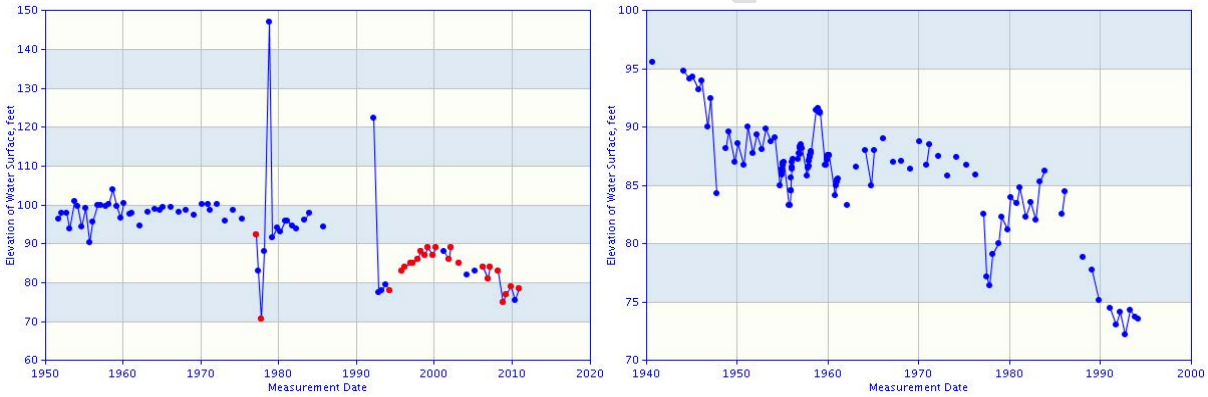

Figure 4.6 Well Hydrographs

Left - Hydrograph of a well located in Township 02 South, Range 10 East, Section 29. This well is located about 1.5 miles east of downtown Riverbank. Right - Hydrograph of a well located in Township 02 South, Range 10 East, Section 30. This well is located about 0.5 miles east of downtown Riverbank, east of City Well No. 2. Ground surface elevation 143 ft amsl.

System Supplies

Dunn Environmental (2007) prepared a chart of available water level data for City of Riverbank production wells during the period from 1989 to 1998 (see Figure 4.7). This data set only includes the latter part of the five-year drought that occurred between 1987 and 1992. In general, water levels in the City of Riverbank wells range from 60 to 65 feet bgs, which is similar to, or a few feet higher than, the depths to water for nearby monitoring wells indicated in Figures 4.5 and 4.6.

During the drought years of 1989 to 1992, most wells show relatively small water level declines of a few feet in that period, similar to the declines shown in Figure 4.4 for the MID wells. Water levels reached their lowest point in 1994 and then began to rebound during the following years of above average precipitation. This rebound occurred despite an increase in groundwater pumping during the period shown in Table 4.5. As previously described, a portion of the recovery is also likely due to the opening of the Modesto Irrigation District's surface water treatment plant in 1994 and their subsequent decrease in groundwater usage.

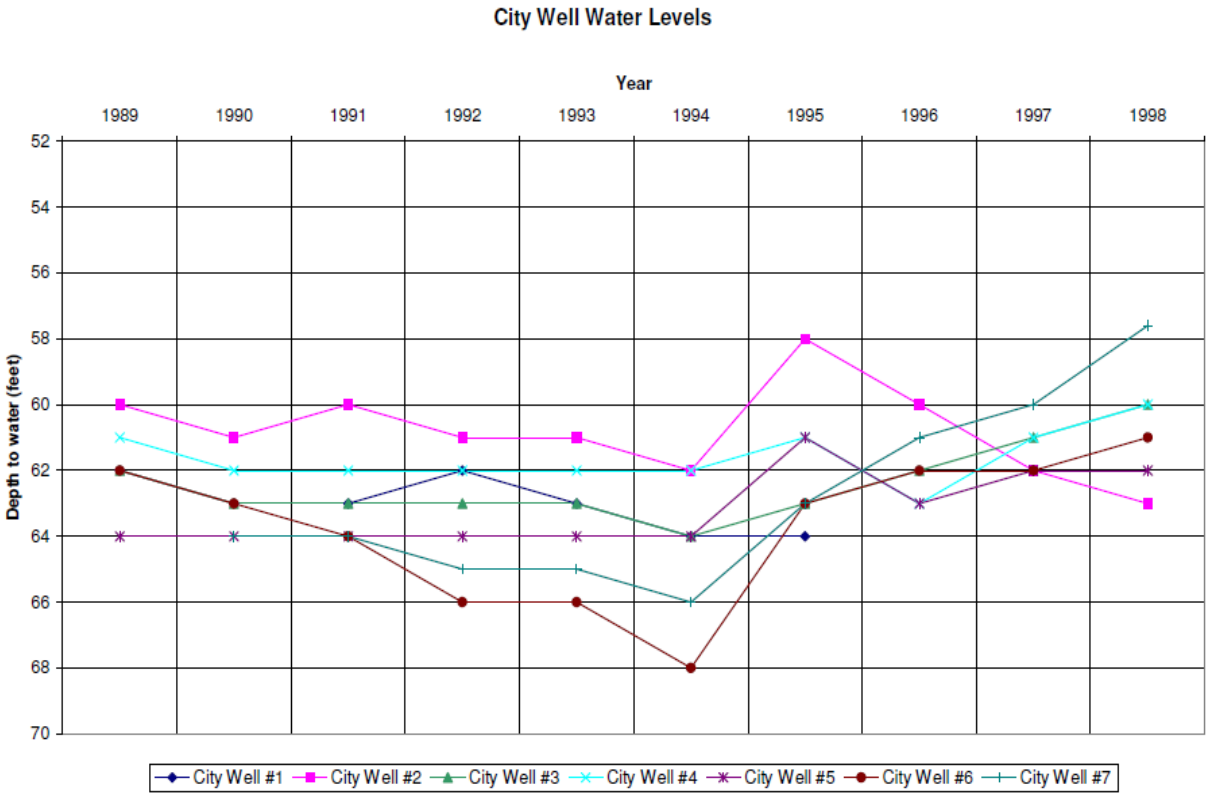

Figure 4.7
Annual Depth to Water Measurements for City of Riverbank Wells

Source: Dunn Environmental, 2007.

System Supplies

The data in the chart from 1989 to 1994 represent the lowest known water levels for City wells after both the five year drought period and prior to use of surface water by the City of Modesto. As previously discussed in Section 4.6.2.1, the pumping test data from the wells and the specific capacity calculations, coupled with the well construction information, indicates that all of the City wells should easily be able to provide water at their maximum pumping rates without drawing water levels below the reported depth of the pump bowls or the top of the well screen (base of the seal) with the exception of Well No. 2 which has a shallow seal and is open hole below 25 feet bgs.

4.6.6 Conclusions

Long-term pumping has impacted the aquifer in the Modesto subbasin and in the vicinity of the City of Riverbank. During the extended drought years from 1987 to 1992, water levels dropped up to 30 feet, when compared to water levels that existed in the 1950's. However, increases in annual precipitation, coupled with reduction of groundwater pumping by the City of Modesto, has allowed water levels to recover somewhat up into 2013.

Even at the water levels that existed at the end of the drought period and prior to implementation of Modesto's surface water facility, the City of Riverbank wells and the aquifer had the capacity to supply additional production. Only a small percentage of the storage capacity in the upper 300 feet of the aquifer is tapped and it appears that properly spaced wells will be able to provide the required capacity at full build out.

SECTION 5 WATER RECYCLING

This chapter provides a description of the wastewater collection and treatment system for the City as well as information on recycled wastewater.

5.1 WASTEWATER COLLECTION AND TREATMENT

The City owns and operates a wastewater treatment plant (WWTP) on the north bank of the Stanislaus River. The WWTP consists of a headworks facility equipped with a mechanical screen, a screenings compactor, a flow metering device, a parallel channel for overflow protection and a future additional screen, four mechanically aerated treatment ponds, and seven evaporation/percolation ponds. The City WWTP receives wastewater from residential, commercial, and industrial sources.

Influent flows to the WWTP were analyzed and summarized in the 2006 Annual Report for the City of Riverbank. The 2006 monthly average was 1.82 mgd.

The City WWTP is subject to Waste Discharge Requirements Order No. 94-100 (WDR) adopted by the Regional Board in April 1994. The WDR permitted the WWTP for flows up to 7.9 mgd.

In April 2001, the, Regional Board issued Cleanup and Abatement Order No. 5-01-703 (C&A) for the City WWTP. The City has subsequently implemented all operational and facility improvements ordered in the C&A, including completion of the pond expansion project, berm remediation work, and other physical improvements.

Following a Regional Board staff inspection of the facility, the City was determined to be in violation of its WDR and was subsequently issued a Notice of Violation (NOV) in March 2003. As part of its commitment to address sludge management at the WWTP and satisfy requirements of the NOV, the City has constructed lined treatment ponds and essentially reconfigured the plant layout. The plan, which was approved by the Regional Board, significantly upgraded the plant and provided increased treatment capabilities and environmental protection. Phase 1 of the project converted Ponds P-1 and P-2 to treatment ponds through deepening and installing a dual liner system of 1-ft compacted clay and a 60 mil HDPE geomembrane liner system, which is protected by a 2-ft layer of soil on the pond bottoms. The project was constructed according to a Construction Quality Assurance Plan as required by the Regional Board and with geotechnical reports confirming the construction details of the liner.

Phase 1 also included new piping, control gates, inlet and outlet structures, and a new pipeline from the existing headworks structure to the new treatment ponds; relocation of six 75 hp aerators to each pond; and construction of a new parallel headwords structure to increase the inflow capacity and prevent potential spillage during peak flows coupled with rain events. The new ponds operate in series and the treated wastewater flows through Pond T-4 to the percolation ponds. This provides more thorough treatment and control of the sludge generated in the lined ponds. Phase 2 included sludge removal from Pond P-2. Phase 2 was completed in the Summer of 2008. As required by the Regional Board, two new monitoring wells have been constructed near the new lined treatment ponds.
The City continues to expend considerable time and resources in its on-going efforts to operate and maintain the WWTP in compliance with the current WDR.

Estimates of wastewater flow within the City for the present and future conditions are shown in Table 5.1.

Figure 5.1 (DWR Table 21)
Recycled Water — Wastewater Collection and Treatment (AF/Y)

Type of Wastewater	2006	2010	Buildout (a)
Wastewater collected & treated in service area	2,040	1,938	7,400(b)
Volume that meets recycled water standard	0	0	0

(a) *City of Riverbank General Plan 2005-2025*

(b) *City of Riverbank 2007 Sewer Collection System Master Plan*

Total Wastewater flow (Million gallons)			
	2011	**2012**	**2013**
Total Year	**619.43**	**604.29**	**592.68**
Avg. Monthly	**51.62**	**50.36**	**49.39**
Avg. Daily	**1.70**	**1.66**	**1.62**

No new permit developments (as of February 2014).

5.2 WATER REUSE

In an effort to implement the City's General Plan policy on recycled water, the City of Riverbank General Plan 2005-2025, Conservation element, Policy CONS-6.6 directs that "The City will encourage the use of recycled water for appropriate use, including but not limited to outdoor irrigation, toilet flushing, fire hydrants, and commercial and industrial processes."

The City WWTP incorporates secondary treatment through a pond system. Effluent disposal occurs through a series of percolation ponds. The plant is not currently configured for the production of recycled wastewater. An urban recycled wastewater program is not planned at this time. No salinity management plans, as would be required for large water reuse implementation, have been performed.

5.3 GRAY WATER AND RAINWATER HARVESTING

The City may consider gray and rainwater collection and reuse in larger, new development areas in the future.

SECTION 6 WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This section describes the City's water supply reliability and water shortage contingency planning efforts and includes:

- Comparison of projected water supplies and demands
- Assessment of the overall reliability of future supplies regardless of drought or emergency conditions
- Discussion of how an urban water suppliers water sources can vary as a result of emergency or other external influences such as system or other limitations, as well as the water supplier's planned response
- Description of the drought contingency plan—the water supplier's response and planning for changes or shortages in water supplies

6.1 WATER MANAGEMENT TOOLS – MAXIMIZE RESOURCES AND MINIMIZE IMPORT

The City uses its own local groundwater supply and does not rely on imported water use to satisfy system demands. The City completed their most recent update to the Water Supply Study and Water Master Plan in 2007. This plan outlines the projected water demands within the existing City sphere of influence as well as the City's 2005-2025 General Plan area. The plan evaluates the current and future water demands for the City based on projected growth within the existing service area and future General Plan build-out area. The plan was prepared by the City to identify; needed water system improvements to the existing infrastructure, expansion necessary to accommodate anticipated growth and methods to maximize available resources and minimize the need to import water.

The City has also prepared a number of reports addressing the reliability of the City's groundwater supply, including a Source Sufficiency Report for the City of Riverbank General Plan Update, 2007.

In a continuing effort to provide a safe and reliable supply of water to the City now and into the future, the water master plan will be updated in 2016.

6.2 WATER SUPPLY RELIABILITY

Table 6.1 provides the basis of water year data for defining average, single dry and multiple dry water years to develop water supply reliability.

Table 6.1 (DWR Table 27)
Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	2008
Single-Dry Water Year	1976/1977
Multiple-Dry Water Years	1989-1992

Table 6.2 and 6.3 show the historic and current water supply reliability conditions for the City groundwater supply. The average/normal water year groundwater supply is based on the reliable expected water supply from the City's existing 10 wells, which provide a reliable pumping capacity of 10,785 gpm, or approximately 17,400 AFA. Based on the groundwater basin discussion presented in Section 5 of this UWMP, it was concluded that the City's water supply is firm and would not see a reduction in available pumping capacity during single and multiple dry year conditions. Also, the City currently sees no impacts on the current and projected water supply based on legal, environmental, water quality or climatic factors.

Table 6.2 (DWR Table 28)
Supply Reliability — Historic Conditions, AFA

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
17,400	17,400	17,400	17,400	17,400	17,400
Percent of Average/Normal Year:	100%	100%	100%	100%	100%

Table 6.3 (DWR Table 31)
Supply Reliability — Current Water Sources

Water supply sources	Average / Normal Water Year Supply	Multiple Dry Water Year Supply		
		Year 1	Year 2	Year 3
City produced groundwater	17,400	17,400	17,400	17,400
Percent of normal year:	100%	100%	100%	100%

6.3 WATER SUPPLY VERSUS DEMAND COMPARISONS

This section provides an assessment of the reliability of the City's water service to its customers during normal, dry, and multiple dry water years. The supply totals are based on Table 6.2 above and the groundwater supply discussion in Section 5 of this UWMP. Demand totals are detailed in Section 3 of this UWMP. In projecting future water use for the City, interim and final urban water use targets were applied. Table 6.4 (DWR Table 32), 6.5 (DWR Table 33) and 6.6 (DWR Table 34) provide the City's water supply and demand comparisons for normal, single dry, and multiple dry year scenarios.

Table 6.4 (DWR Table 32)
Supply and Demand Comparison — Normal Year

	2015	2020	2025	2030	2035 - opt
Supply totals	17,400	17,400	17,400	17,400	17,400
Demand totals	5,353	5,752	6,465	7,179	7,893
Difference	12,047	11,648	10,935	10,221	9,507
Difference as % of Supply	69.2%	66.9%	62.8%	58.7%	54.6%
Difference as % of Demand	225%	202%	169%	142%	120%

Table 6.5 (DWR Table 33)
Supply and Demand Comparison — Single Dry Year

	2015	2020	2025	2030	2035 - opt
Supply totals	17,400	17,400	17,400	17,400	17,400
Demand totals	5,353	5,752	6,465	7,179	7,893
Difference	12,047	11,648	10,935	10,221	9,507
Difference as % of Supply	69.2%	66.9%	62.8%	58.7%	54.6%
Difference as % of Demand	225%	202%	169%	142%	120%

Table 6.6 (DWR Table 34)
Supply and Demand Comparison — Multiple Dry-Year Events

		2015	2020	2025	2030	2035 - opt
Multiple-dry year - first year supply	**Supply totals**	17,400	17,400	17,400	17,400	17,400
	Demand totals	5,353	5,752	6,465	7,179	7,893
	Difference	12,047	11,648	10,935	10,221	9,507
	Difference as % of Supply	69.2%	66.9%	62.8%	58.7%	54.6%
	Difference as % of Demand	225%	202%	169%	142%	120%
Multiple-dry year - second year supply	**Supply totals**	17,400	17,400	17,400	17,400	17,400
	Demand totals	5,353	5,752	6,465	7,179	7,893
	Difference	12,047	11,648	10,935	10,221	9,507
	Difference as % of Supply	69.2%	66.9%	62.8%	58.7%	54.6%
	Difference as % of Demand	225%	202%	169%	142%	120%
Multiple-dry year - third year supply	**Supply totals**	17,400	17,400	17,400	17,400	17,400
	Demand totals	5,353	5,752	6,465	7,179	7,893
	Difference	12,047	11,648	10,935	10,221	9,507
	Difference as % of Supply	69.2%	66.9%	62.8%	58.7%	54.6%
	Difference as % of Demand	225%	202%	169%	142%	120%

6.4 WATER SHORTAGE CONTINGENCY PLANNING

6.4.1 Water Shortage Contingency Plan

In accordance with the City of Riverbank's emergency response procedures, the City has developed a comprehensive water shortage contingency plan. The plan is consistent with the provisions of the City's emergency response procedures to implement during an interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

6.4.1.1 Water Shortage Emergency Response

The City of Riverbank has two water storage tanks totaling 2 million gallons of system storage. Each of the storage tanks is equipped with a booster pumping station with backup power. These tanks will supply water for essential needs in the case of emergencies. The City has chlorination pumps at each well site that may be put into operation when needed. Seven of the City's wells have diesel engine electric generators with enough fuel to run 12 to 24 hours without refueling.

The City can contact bottled water companies in cases of emergencies. Canals containing non-portable water traverse the community. Local trucking firms can transport water along with the City's fire tanker trucks. Residents would need to boil or disinfect non-potable water.

The City recognizes the importance of water demand management measures in reducing water demand and will continue to implement these measures. Also, the City would increase media attention to the water supply situation during a shortage and would step up public water education programs.

When a water shortage appears imminent, a City water shortage response team would be activated by the City Council, City Manager, and Director of Development Services. The team includes the City Manger's Office, Development Services Department, Public Safety Department (Emergency Services and Sheriff), and Finance Department.

6.4.1.2 Preparation Actions for a Catastrophe

Below is an example of actions the City would undertake if a catastrophe were imminent or declared.

1. Determine extent of water shortage
2. Activate the water shortage response team
3. Monitor existing storage
4. Obtain additional water supplies
5. Develop alternative water supplies
6. Determine where immediate funding will come from
7. Contact and coordinate with other agencies
8. Put employees and contractors on-call
9. Communicate with the public

6.4.1.3 Supplemental Water Supplies

To offset future potential water shortages due to a drought or disaster, the City will keep communication open with adjacent communities, MID, and OID to deliver additional water, if needed.

6.4.1.4 Long Term Additional Water Supply Options

To meet future long-term water demand beyond 2020, the City will continue working on the possibility of bringing in surface water to supplement groundwater. Recycled water opportunities will also be studied further.

6.5 WATER SUPPLY RELIABILITY/DROUGHT CONTINGENCY ORDINANCE/RESOLUTION

The Water Code requires a water supplier to develop a water supply reliability/drought contingency plan to identify the thresholds for implementation of various actions to support conservation during water supply shortages. The City adopted a no waste ordinance in 1991, which is currently being revised to meet new guidelines. Along with the Water Shortage Contingency Plan, a draft resolution to declare a Water Shortage Emergency will be presented to council for adoption.

6.5.1 Rationing Stages and Reduction Goals

The City has developed a four-stage action plan (Table 6.7) to invoke during a declared water shortage. The plan includes voluntary and mandatory rationing; depending on the causes, severity, and anticipated duration of water supply shortages, if known. Action stages may be triggered by a shortage at any time of the year. If it appears that it may be a dry year, mainly due to insufficient precipitation and further dropping of the groundwater table, the City can take action in advance of a crisis. Any combination of at least three of the criteria will institute the Stage actions.

Table 6.7 (DWR Table 35)
Water Shortage Contingency — Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage	Program Type
Stage 1 – Minimal	• Below average rainfall in the previous 12-24 months • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in static ground water levels* • Irrigation allotments by local irrigation districts reduced by 15% • Extended warm weather patterns typical of summer	15	Voluntary / Mandatory
Stage 2 - Moderate	• Below average rainfall in the previous 24-36 months • Prolonged periods of low water pressure • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in groundwater • Irrigation allotments by local irrigation districts reduced by 25% • Extended warm weather patterns typical of summer	25	Voluntary / Mandatory
Stage 3 – Severe	• Below average rainfall in the previous 36-48 months • Prolonged periods of low water pressure. • 10% or more of City wells out of service due to noncompliance or drop in groundwater levels • Irrigation allotments by local irrigation reduced by 35% • Extended warm weather patterns typical of summer	35	Voluntary / Mandatory
Stage 4 - Critical	• Below average rainfall in the previous 48-60 months. • Prolonged periods of low water pressure • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in groundwater levels • Irrigation allotments by local irrigation districts reduced by 50% • Extended warm weather patterns typical of summer	50	Voluntary / Mandatory

6.5.2 Priority by Use

Priorities for use of available water during shortages are listed below according to ranking.

1. Minimum health and safety allocations - for interior residential needs (includes single family, multifamily, mobile homes and convalescent facilities); and firefighting and public safety needs;
2. Commercial, industrial, institutional/governmental operations - for maintaining economic base of community;
3. Existing landscaping - trees and shrubs;
4. New demand - proposed construction projects.

6.5.3 Health and Safety Requirements

Based on information provided by the California Department of Water Resources, commonly accepted estimates of interior residential water use in the United States are presented in Table 6.8. These water use estimates indicate per capita health and safety water requirements for various appliances and fixtures. A health and safety allotment of 68 gallons per capita per day (gpcd) is essential for basic interior water use with no habit or plumbing fixture change. However, if there is prolonged water shortage or a disaster, then customers would be required to make changes in their interior water use habits (for instance, not flushing toilets unless necessary or taking less frequent showers). These reductions will be reinforced through a public awareness campaign during periods of threatened water supply.

Table 6.8
Estimated Per Capita Health and Safety Water Consumption

	Non-Conserving Fixtures			Habit Changes			Conserving Fixtures[2]		
Unit	Daily Use	Unit Use	gal/day	Daily Use	Unit Use	gal/day	Daily Use	Unit Use	gal/day
Toilets	5 flushes	5.5 gpf	27.5	3 flushes	5.5 gpcd	16.5	5 flushes	1.5 gpf	7.5
Shower	5 min	4.0 gpm	20.0	4 min	3.0 gpm	12.0	5 min	2.0 gpm	10.0
Washer[1]	12.5 gpcd		12.5	11.5 gpcd		11.5	11.5 gpcd		11.5
Kitchen	4 gpcd		4.0	4 gpcd		4.0	4 gpcd		4.0
Other	4 gpcd		4.0	4 gpcd		4.0	4 gpcd		4.0
Total (gpcd)			68.0			48.0			37.0
					Reduction (%)	*29.4*			*22.9*

1 Reduced washer use results from larger loads.
2 Fixtures include ULF 1.6 gpf toilets, 2.0 gpm showerheads, and efficient clothes washers.

6.6 MANDATORY PROHIBITIONS ON WATER WASTING

As previously mentioned, a no waste ordinance has been in effect. The City Water Shortage Contingency Plan will prohibit various wasteful water uses identified in Table 6.9 below. Warnings and penalties are levied for infractions to the ordinance.

Table 6.9 (DWR Table 36)
Water Shortage Contingency — Mandatory Prohibitions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Using potable water for street washing	Stage 4
Washing Cars	Stage 2
Outdoor water use restrictions	Stage 4
Sidewalk/street cleaning	Stage 2
Plumbing leaks	Stage 1
No new service connections	Stage 4

6.7 CONSUMPTION REDUCTION METHODS

Examples of consumption reduction methods that could be instituted during a drought period include: use prohibitions (especially for landscape irrigation); additional water conservation enforcement; voluntary rationing, mandatory rationing; reduction of water pressure in water lines where feasible; flow restrictions; expansion of leak detections and repair programs; installation of water kits, plumbing fixture replacements; restriction on building permits; and installation of pool covers. Water shortage pricing is not considered feasible due to Proposition 218 requirements.

6.8 EXCESSIVE USE PENALTIES

Any customer violating the regulations and restrictions on water use set forth in the City's no waste ordinance shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive another warning. A third violation within a twelve-month period triggers the levy of a $20 fine. A fourth violation triggers a $50 fine; a fifth violation triggers a $100 fine; and a sixth violation triggers a $200 fine. At this point, the City may install a water meter at the customer's expense (if a meter is not present). Subsequent fines are levied at $200 each.

6.9 REVENUE AND EXPENDITURE IMPACTS AND MEASURES TO OVERCOME IMPACTS

Water rates need to be set up to enable water suppliers to cover the costs in pumping, storing, treating, and delivering water. Revenues need to be collected to build reserves for future water system repairs, maintenance, and replacement. Water shortages increase costs to the water supplier by increasing expenses for public educational campaigns, stricter conservation efforts, and facility development. Likewise, water shortages impact the operations cash flow as water use falls. Other costs for repairs, maintenance, and replacement are fixed.

6.10 MECHANISMS TO DETERMINE REDUCTIONS IN WATER USE

With normal water supply conditions, water production is recorded daily at each wellhead. Totals are reported weekly to the Water Services Supervisor, and monthly to the Director of Municipal Utilities.

Reporting escalates with advanced stages of water shortages. During water emergency shortages, production figures would be reported to the Domestic Water Supervisor hourly, and to the Development Services Director and City Manager daily. Reports would also be provided to the City Council and the Public Safety Department. If reduction goals are not met, the City Council would be notified so that additional action may be taken (water shortage emergency).

SECTION 7 WATER DEMAND MANAGEMENT MEASURES

7.1 INTRODUCTION

The City of Riverbank is committed to the implementation of the most feasible water conservation measures appropriate for the City to produce the greatest reduction in water use practicable. The City of Riverbank is not signatory to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and is therefore not a member of the California Urban Water Conservation Council (CUWCC).

Water Code Section 10631(f) requires the City to implement to the extent practicable 14 enumerated Demand Management Measures (DMMs) intended to lessen demands on the State's water resources through increased conservation and efficient water use. This section presents the City's program to implement and monitor the practicable DMMs; as well as the required cost benefit analyses (CBAs) for those that are not currently feasible to be implemented, or scheduled to be implemented.

A summary of the 14 existing demand management measures is presented in Table 7-1.

Table 7.1
Summary of Demand Management Measures

DMM	Description	Riverbank Implementation Status
A	Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Not currently feasible
B	Residential Plumbing Retrofit	Not currently feasible
C	System Water Audits, Leak Detection, and Repair	Implemented
D	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Implemented
E	Large Landscape Conservation Programs and Incentives	Not currently feasible
F	High Efficiency Washing Machine Rebate Program	Not currently feasible
G	Public Information Programs	Implemented
H	School Education Programs	Not currently feasible
I	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Not currently feasible
J	Wholesale Agency Programs	N/A
K	Conservation Pricing	Implemented
L	Water Conservation Coordinator	Not currently feasible
M	Water Waste Prohibition	Implemented
N	High Efficient Toilet Replacement	Not currently feasible

7.2 DEMAND MANAGEMENT MEASURES

The City is committed to providing safe and reliable water to its customers in the most efficient and cost-effective manner; therefore, in response to the Water Code, the City will address the 14 DMMs to the extent feasible.

In general, feasibility is based primarily on a cost benefit analysis comparing the value of the water saved versus the costs to implement the DMM. Certain costs have been determined which applies to multiple DMM cost benefit analyses (CBA) which are summarized as follows:

Cost of incremental water supplied: This is the electrical cost for pumping and chemical costs per AF of water delivered. It does not include fixed operational costs. Data (rounded) from a 1.5 year period are utilized as follows:

Beginning of period	8/16/2012
End of period	2/6/2014
Total Energy Costs	$551,000
Total Chemical Costs	$4,000
Total Water delivered	5,600 AF
Incremental Cost per AF	$100
Incremental cost per million gallons	$325

Cost of City Staff: This is the approximate cost per hour for City staff to administer and/or conduct field audits or outreach programs. For the CBA it is assumed the costs would be limited to staff that would cost $50/hour, including benefits.

Cost of Vehicle Use: For the CBA it is assumed the costs would be at least $0.60/mile, including depreciation, registration, insurance, maintenance, and fuel.

Number of Residences built before 1993: Greater water savings can be attained in older houses that were completed before 1993 when water conserving fixtures were mandated in the building code. It is presumed of the 6,614 residences currently served less than 3,000 are older than 1993.

Water Use Per household: Current population is reported to be 23,149, which averages to 3.5 persons per household. Although recent water use averages about 160 gpcd, for water savings CBA, a value of 200 gpcd (closer to historic average), or 700 gallons per household per day is utilized as a conservative estimate.

For each DMM, an overall outline of the City's schedule for DMM implementation is provided with a means of tracking and evaluating DMM implementation and effectiveness. Specific tasks will be summarized and reported in UWMP updates for each DMM; therefore, a reporting period is defined as the five-year period between UWMP updates.

7.2.1 DMM A – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Many residential customers unknowingly use water inefficiently and take for granted this limited resource. Additionally, many customers do not understand the amount of water wasted by overwatering their landscape. A water survey program is intended to educate City customers on efficient landscape water use, test fixtures for leaks, provide information on other services available to them (other DMMs) such as rebates and free water efficient fixtures and as such requires City staff and transportation costs as well as costs for rebates or water saving fixtures if offered.

DMM Description

The Water Survey Program for Single-Family Residential and Multi-Family Residential Customers consists of the following actions:

- Define the funding source and allocate appropriate funds for this DMM
- Assign Water Conservation staff
- Target high use customers and market water use surveys to single-family residential and multi-family residential customers through the following actions.
    - On an annual basis, compile single-family and multi-family residential user account information and water use data. This information will be analyzed to prioritize the marketing efforts described below. High volume water use customers as identified as being the top five percent (5%) highest water consumers will be the focus for initial marketing efforts followed by the remaining 15 percent (15%) as determined by water use ranking priority to make up the target 20 percent (20%) marketing effort as outlined in this measure.
- Develop or identify marketing material to be used for initial contact, during surveys and follow-up to surveys.
    - Compile DMM specific materials/equipment such as educational materials, tools for minor irrigation system repair, flow and measurement equipment, replacement sprinkler equipment and other applicable materials and equipment.
- Directly contact via letter or telephone, not less than 1% of single-family residential customers and 1% of multi-family residential customers each year with an offer to conduct a water survey.
    - Priority in contact shall be given to those high volume use customers identified above.
    - Telephone followed by letter contact shall be conducted for users identified above as high volume use customers.

- Letter correspondence and telephone contact shall include information on other DMM services available to the customer such as high efficient toilets, high efficient washing machines, and free water conserving retrofit devices.

- Conduct surveys of all positive respondents to survey offer and other interested customers becoming aware of the survey through DMM 7. Surveys shall include indoor and outdoor components, and at minimum shall have the following elements:

Indoor

- Check for leaks, including toilets, faucets, and water meter;
- Check showerhead flow rates, aerator flow rates, and offer to replace (see DMM B) or recommend replacement, as necessary;
- Check toilet flushing rating and recommend installation of displacement device or direct customer to HET rebate program, as necessary; replace leaking toilet flapper, as necessary;
- Check and document any other water use appliances that may exist in the residence such as dishwasher, evaporative cooler, spa and so on.

Outdoor

- Check irrigation system for leaks, use of irrigation timers, and proper irrigation times;
- Review or develop customer irrigation schedule.

- Provide customer with evaluation results and water saving recommendations; leave information packet with customer.
- For those customers who are reluctant to having staff conduct an onsite survey, offer a self survey kit. The self survey kit will include the City forms and a description to walk the customer through the water audit process. The form enclosed in the kit will allow the customer to record their fixture flow rates for comparison to currently available low water use fixtures and allow the customer to return the completed form for a free water conservation kit distributed under DMM B. The self survey kit will include the following:
  - Toilet tabs to detect toilet leaks,
  - Shower flow rate detector bag,
  - Self Water Audit instructions and forms,
  - Educational material such as water savings tips, the significance of the EPA Water Sense certification, and
  - Promotional material for incentives and rebates the City provides.

- Maintain survey information and track monthly customer use and information to ensure accuracy and for use in evaluating DMM effectiveness.

Schedule and Steps for Implementation

The City currently does offer educational materials to households as part of its education and outreach program but has no plans to implement a formal water survey program at this time as the costs would be a burden on current City finances and the costs far exceed the benefits expected. The required CBA summary table follows, with calculation details provided in Appendix G:

CBA Table DMM A – W.C. 10631(g)(2)	
Cost Effectiveness Summary	
Total Annual Costs	$ 64,400
Total Annual Benefits	$ 2,600
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ /AF)	100
Water Savings (AF/Y)	26.0

A summary of the non-economic factors affecting the Water Survey Program and taken into consideration in this Cost-Benefit analysis is provided in the following paragraphs.

Environmental

The environmental effects of implementing a Water Survey Program in the City would be minimal. As stated previously, the City uses groundwater wells as its potable water source. Surface waters would not be measurably affected by implementing or not implementing the program.

There would be an environmental benefit to implementing the program in the form of reduced electrical power consumption for the production, treatment and distribution of water.

Social

There is a societal benefit in implementing the Water Survey Program. A reduction in the amount of water produced and distributed means a reduction in the amount of money spent on its production. The publicly owned system would see a reduction in power required to pump, treat, and distribute the water.

Implementing the program would also convey to the water users the message that the City is working to conserve water. The extent to which the program would be socially beneficial is not quantifiable, however.

Health

There are no measurable health benefits to either implementing or not implementing the Water Survey Program.

Customer Impact

Water customers that participate in the Water Survey Program would be educated on sources of potential leaks in their system and will know how to prevent them or fix them. They may also be better informed of irrigation practices and landscaping options to reduce their water consumption. Participants may also talk with friends and neighbors about what they have learned, which may have an effect on how they manage water at their own homes.

Technological Factors

There are several technological advances in residential irrigation practices that are available to the average homeowner to reduce the amount of water used. Automatic sprinkling and drip irrigation systems can be equipped with timers. Soil moisture probes and rain sensors can be used to adjust irrigation schedules. Internet websites are devoted to appropriate landscaping plant choices given sun exposure, soil types, and climate. All of this information can be provided as part of a Water Survey Program. It is also available to anyone with internet access that is interested in conserving water, even without the Program.

Conclusion

While there are some non-economic benefits to implementing a Water Survey Program, the costs of the Program are too excessive to justify it at this time. At a minimum a City employee (assumed ½ time) and vehicle would have to be dedicated to properly running the program. There would also be advertising and material costs associated with the Program. The sum of these costs makes implementing the Program prohibitive given current City budget constraints.

7.2.2 DMM B – Residential Plumbing Retrofit

This DMM replaces high water use fixtures with low-volume retrofit plumbing devices. These devices range from toilet water displacement bags to faucet aerators. The devices are typically installed during a water survey; however, are available to the public upon request.

The City adopted the 2013 California Green Building Standards Code, and the 2013 California Plumbing Code, which will conform to the legal requirements for maximum water usage for fixture retrofits and replacements for residential uses, including 1.28 gallon water closets and 0.5 gallon urinals. In addition the City will conform to the requirements SB 407/Civil Code Sections 1101.1 - 1101.8 which require the eventual retrofit of residential (and commercial) non-compliant fixtures by 2019.

However the City has no plans to implement a fixture retrofit incentive program (i.e.; offer rebates) to residences constructed before 1994, as the costs to fund and administer such a program is not cost effective for much the same reasons as a high efficiency toilet replacement program is not cost effective (Reference DMM N). A general fixture retrofit program may provide somewhat more water savings than toilet replacements alone (i.e.; 15%, Reference American Water Works Association Research Foundation, Residential End Uses of Water, 1999,

Table 5.4); however, even without associated additional rebate costs, the costs far exceed the value of water savings reasonably attainable.

The below table uses the same participation assumptions as stated in DMM N and assumes an additional 15% savings in water as a general fixture rebate program would include faucet and showerhead replacements in addition to low flow toilet rebates and incentives.

CBA Table DMM B– W.C. 10631(g)(2)	
Cost Effectiveness Summary	
Total yearly Costs	$ 12,500
Total yearly Benefits	$ 1,060
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ per AF)	100
Water Savings (AFY)	10.6

7.2.3 DMM C – System Water Audits, Leak Detection, and Repair

The goals of modern water loss control methods include both an increase in water use efficiency in the utility operations and proper economic valuation of water losses to support water loss control activities. In May 2009 the American Water Works Association (AWWA) published the 3rd Edition M36 Manual Water Audits and Loss Control Programs. BMP 1.2 will incorporate these new water loss management procedures and apply them in California. Agencies are expected to use the AWWA Free Water Audit Software ("AWWA Software") to complete their standard water audit and water balance.

The City currently evaluates consumption reports for extreme variations. If a variation is noted, the City checks the meter for leaks. If a leak is detected, the City notifies the consumer and the leak is repaired. The City will maintain water audit books on an annual basis to help estimate system losses.

DMM Description

The System Water Audit, Leak Detection, and Repair DMM will consist of the following with implementation as described below:

- System tracking of water production and use, and an assessment of water losses as a percentage of production

Schedule and Steps for Implementation

If the annual prescreening audit indicates that unaccounted water is greater than 10 percent, the City will complete a water audit of its distribution system using methodology consistent with that described in *Water Audit and Leak Detection Guidebook* by the AWWA.
Implementation shall consist of at least the following actions:

1. Annually (April) complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit shall be calculated as follows:
   - Determine total metered sales for previous year;
   - Determine other verifiable water uses from previous year, e.g., construction water, hydrant flushing, fire suppression uses, etc.;
   - Determine total annual production into the distribution system;
   - Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full scale system audit is indicated.
2. When indicated by the above analysis, the City will perform a complete water audit of the distribution system using methodology consistent with that described in AWWA M36: Water Audit and Leak Detection.
3. Advise customers whenever it appears possible that leaks exist on the customer's side of the meter.

Tracking and Documentation

To assess the progress of the DMM the following information should be gathered. This information will be summarized in the UWMP updates.

1. The completed AWWA Standard Water Audit and Water Balance worksheets.
2. City shall maintain in-house records of audit results, methodologies, and worksheets for each completed audit period.
3. City keeps records of each component analysis performed, and incorporates results into future annual standard water balances.
4. City, for the purpose of setting the Benchmark:
   a) Keeps records of intervention(s) performed, including standardized reports on leak repairs, pressure reduction undertaken for loss reduction, infrastructure rehabilitation and renewal, volumes of water saved, and costs of intervention(s); and
   b) Prepares a yearly summary of this information for use in tracking DMM effectiveness.

Method to Evaluate Effectiveness

The City will collect the following information to track the effectiveness of this DMM:

1. Prescreening audit results and supporting documentation
2. Maintain in-house records of audit results or the completed American Water Works Association (AWWA) Audit Worksheets for each completed audit period

Effectiveness of this DMM is verified by maintaining unaccounted water losses to less than 10% as indicated by the prescreened water audits.

Estimate of Current Conservation Savings

Estimate of water conservation savings will be calculated based on the reduction of unaccounted for water losses as data becomes available.

7.2.4 DMM D – Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All new and existing water service connections are metered and billed by volume of use in the City. The City completed a meter replacement program and increased the water accountability to 92% in 2006. Therefore, the City does not need to retrofit any existing connections. The use of water meters allows for better tracking and monitoring of water conservation data. A summary of the number of meter connections per account classification for the year 2010 is provided in Table 7.2.

Table 7.2
City of Riverbank Water Connections Meter Information

Account Classifications	Number of Potable Connections Metered
Residential	6,860
Commercial/Institutional/Government	247
Industrial	13
Other	28
Total Connections	**7,148**

The 2013 billing rate for domestic water use is presented in Table 7.3.

Table 7.3
2014 Domestic Water Billing Rates

Quantity of Water/Type of User/Size of Meter	Rate
Minimum Charge for First 1000 cu ft (bimonthly)	$29.29
Residential	
Apartments, Commercial, and Industrial	
1-1/2-inch meter	$29.29
2-inch meter	$36.70
3-inch meter	$55.16
4-inch meter	$76.23
8-inch meter	$144.87
Outside City Limits	
1-inch meter	$33.91
2-inch meter	$49.81
Rates for Water Exceeding First 1,000 cu ft	
Next 4,000 cu ft	$0.34 per 100 cu ft
Next 34,000 cu ft	$0.33 per 100 cu ft
Next 40,000 cu ft	$0.30 per 100 cu ft

DMM Description

For consistency with California Water Code (Section 525b), this DMM refers to potable water systems. A water meter is defined as a device that measures the actual volume of water delivered to an account in conformance with the guidelines of the American Water Works Association.

Schedule and Steps for Implementation

The City will continue to install and read meters on all new services, and will continue to conduct its meter calibration and replacement program.

Implementation shall consist of at least the following actions:

1. Require meters for all new service connections.
2. Establish a program for retrofitting existing unmetered service connections when identified.
3. Read meters and bill customers by volume of use.
    a) Establish and maintain billing intervals that are no greater than bi-monthly (every two months) for all customers.
    b) For each metered connection, perform at least five actual meter readings (including remotely sensed) per twelve month period.
4. Prepare a written plan, policy or program that includes:
    a) A census of all meters, by size, type, year installed, customer class served and manufacturer's warranty accuracy when new;
    b) A currently approved schedule of meter testing and repair, by size, type and customer class;
    c) A currently approved schedule of meter replacement, by size, type, and customer class; and
5. Identifying intra- and inter-agency disincentives or barriers to retrofitting mixed use commercial accounts with dedicated landscape meters, and conducting a feasibility study(s) to assess the merits of a program to provide incentives to switch mixed use accounts to dedicated landscape meters.

Tracking and Documentation

This DMM allows the City to track use on a per account basis, and analyze savings for each sector and the City as a whole. Additionally this data will allow the City to perform full-scale water audits. This section outlines the recommended minimum use data necessary for tracking sector, seasonal and annual water use and describes how each relates to the proposed DMMs.

1. Confirmation that all new service connections are metered and are being billed by volume of use and provide:
    a) Number of metered accounts;
    b) Number of metered accounts read;
    c) Number of metered accounts billed by volume of use;
    d) Frequency of billing (i.e. six or twelve times per year) by type of metered customer (e.g. single family residential, multiple family residential, commercial, industrial, and landscape irrigation); and
    e) Number of estimated bills per year by type of metered customer (e.g. single family residential, multiple family residential, commercial, industrial, and landscape irrigation) vs. actual meter readings.
2. Estimated number of CII accounts with mixed-use meters

3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period

Estimate of Current Conservation Savings

As the City of Riverbank is 100% metered and bills all customers by volume of use, no further reduction of demand is expected. Further reductions may be seen in conjunction with water audits performed under DMM C.

7.2.5 DMM E – Large Landscape Conservation Programs and Incentives

The City does not currently perform large landscape water use surveys or assign evapotranspiration water use budgets and a formal program and incentives are not feasible at this time. However, as the City grows and more parks are developed, the City will consider certifying staff to perform large landscape audits.

As required by the Water Conservation in Landscaping Act of 2006, the City has adopted DWR's model ordinance, Model Water Efficient Landscape Ordinance. Use of this model ordinance will help the City meet their urban water management goals by limiting the water use per acre for large landscape accounts.

Irrigation accounts for a large portion of urban water use in California. Irrigation water use varies dramatically depending on water pricing and availability, plant choice, geographic locations, seasonal conditions, and the level of commitment to sound water efficiency practices. The goal of this DMM is that irrigators, with assistance from the City, will achieve a higher level of water use efficiency consistent with the actual irrigation needs of the plant materials. Reaching this goal would reduce overall demands for water, reduce demands during the peak summer months, and still result in a healthy and vibrant landscape for the City.

DMM Description

This DMM consists of developing, tracking, and accounting for irrigation water use at these large landscape accounts through on site surveys with follow-up visits. Water conservation is achieved through this DMM by increasing irrigation efficiency at large landscape accounts and reducing water waste.

Schedule and Steps for Implementation

Implementation of large landscape conservation program shall consist of at least the following actions:

1. Promoting the use of the Model Water Efficient Landscape Ordinance
2. Maintain and distribute the list of suggested plants and efficient irrigation systems
3. Maintain and distribute City Standard Plans for landscape irrigation plans
4. Continue to work with large landscape irrigation users on water conservation measures

Tracking and Documentation

To assess the progress of the DMM the following information should be gathered. This information will be summarized in the UWMP updates.

1. Number of dedicated irrigation meter accounts.
2. Number of surveys offered.
3. Number of surveys accepted.
4. Estimated annual water savings by customers receiving surveys and implementing recommendations.

Evaluation of Effectiveness of DMM

As a means of evaluating the effectiveness of this measure, large landscape meter records will be reviewed on an annual basis for the peak irrigation month water use. A database will be developed showing peak month landscape irrigation water use for the major landscape irrigation connections and will indicate which have existing budgets and will indicate the last survey date.

Water Savings Assumptions

Assuming fully implementing large landscape BMPs will result in a 15%-20% reduction in demand for landscape irrigation by affected accounts. In 2010 the total water consumed by all non-residential accounts was approximately 400 AF/year. Assuming 50% of that water involves landscape irrigation the total water that may be saved by fully implementing this program with current users totals less than 40 AF/yr. Most of those savings will occur just by implementing the water efficient ordinance. Additional savings by site surveys and incentives are likely to be less than 25% of the total possible savings or 10 AF/yr, over a five year time horizon.

Cost Benefit Analysis

Costs to fully implement the program for City staff time, transportation, and incentive costs are estimated to be require about 10% of those incurred to implement DMM A (assumes 1/20 of a full time employee) and would be approximately $6,400/year with a potential benefit of approximately $200/yr as summarized in the table below:

Table DMM E – W.C. 10631(g)(2)	
Cost Effectiveness Summary	
Total Annual Costs	$ 6,400
Total Annual Benefits	$ 200
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ /AF)	100
Water Savings (AF/Y)	2.0

7.2.6 DMM F – High-efficiency Washing Machine Rebate Program

Washing machines make up 21.7% of the total indoor residential water use (Mayer et al, 1999). Replacing conventional top load high volume washing machines with horizontal axis front loading washing machines have been found to conserve water by as much as 38% per load (Vickers, 2001). Although high efficiency washing machines save the consumer more money over the life of the appliance when compared to conventional washing machines, initial sticker price and unfamiliarity tend to be main barriers withholding consumer from purchasing High Efficiency Washing Machines (HEWMs). Because of the sticker price rebates must be substantial (i.e.; $100) to be effective. Due to the high costs this program is not currently feasible at this time.

DMM Description

This DMM is based on providing a financial incentive for customers in the City's utility service area to switch to HEWMs. The incentive would allow customers to upgrade existing conventional washing machines to high efficient washing machines to benefit both the customer and utility through reduced water use.

Schedule and Steps for Implementation

PG&E currently offers rebates on energy efficient appliances to their customers. The City does not currently provide additional rebates for HEWMs but supports the use of high-efficiency washing machines and will support local, state, and federal legislation to improve efficiency standards for washing machines. The City will also advertise the PG&E rebate program to its customers through its website. The City will re-evaluate implementation of this program in the 2015 UWMP.

Tracking and Documentation

The City will track the installation of HEWMs to customers within their service territory through the PG&E rebate program.

Estimate of Current Conservation Savings

The City will develop a database to track the installation of high-efficiency washing machines based on the PG&E rebate program. With this information, the City will have the ability to track if there is a measurable decrease in metered water usage.

Cost Benefit Analysis

The CBA for this DMM is detailed in Appendix G and costs are limited to rebate costs only, administrative costs would be in addition to those presented.

Table DMM F - 10631(g)(2)	
Cost Effectiveness Summary	
Total Annual Costs	$ 26,500
Total Annual Benefits	$ 688
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ per AF)	100
Water Savings (AFY)	6.9

7.2.7 DMM G – Public Information Programs

A public information program is a powerful channel of communication between the public and the message the City delivers. The key goal to a public information program is to educate the public: on the necessity of conservation; the benefits of conservation; and actions needed to achieve water conservation goals. Secondary benefit is the ability to convey specific DMM information and if possible conduct business through certain channels such as a processing a rebate application on the City website. There is a variety of medium available to choose from to keep the public informed; however, at a minimum, a conservation webpage should be made available to promote conservation and support DMM activities.

DMM Description

An informed public tends to be more responsive to City services and more understanding to the needs of rate adjustments when warranted. This DMM includes communication with the public through various means as described below to promote water conservation, involvement in the UWMP update process, and general awareness of water use and conservation. This program includes development of outreach materials for each targeted DMM effort, providing educational sessions for interested parties, and providing conservation displays and information via community events, bill stuffers and other forms of communication.

Schedule and Steps for Implementation

The City currently implements the following public information programs:

1. Bi-monthly City newsletters are provided with customers' bills
2. The City maintains an internet website that posts public information to promote water conservation practices
3. Annual consumer confidence reports are distributed to the City's water customers and contain water conservation information
4. The City Water Conservation Coordinator, or other assigned City staff attends public events, such as Beyond Earth Day

The City will continue to implement similar programs over the next five years. One area that may be considered is information regarding water softeners that during regeneration, discharge solids back into the sewer system. This practice can contribute to increases in total dissolved solids (salt) concentrations in wastewater which in turn may be regulated in the future by the Regional Water Quality Control Board (Regional Board).

Implementation shall consist of at least the following actions:

Tracking and Documentation

The City will set up a database to include the following:

1. Number of public speaking and media events relating to conservation during reporting period.
2. Number of paid or public service announcements relating to conservation produced or sponsored during reporting period.
3. Types of information relating to conservation provided to customers.
4. Annual budget for public information programs directly related to conservation. Currently the City spends approximately $1,000 per year on coloring books, brochures, and water conservation information for distribution at this event and other venues, such as the Farmers' Market.

Beyond Earth Day Outreach Event

Evaluation of Effectiveness of DMM

As a customer calls, e-mails, or comes in to the City offices and inquiries about a water conservation program, the person receiving the inquiry should ask how the customer heard about the program. This information should be noted for use in evaluating the communication effectiveness of this DMM. This will allow the City the ability to evaluate which forms of communication are most prevalent.

Estimate of Current Conservation Savings

No specific method of evaluating the effectiveness of this DMM has been identified by the City.

7.2.8 DMM H – School Education Programs

Education programs inform younger generations on the life cycle of water and benefits of conservation. Implementing an ongoing education campaign on the K-12 grade level using educational materials (which meet education standards) allows children to learn methods of conservation to apply at home and to reinforce behavioral changes within the household. Additionally, learning about conservation leaves a long lasting impression on the students with the potential of improving their conservation awareness as an adult.

DMM Description

The School Education Programs DMM consists of developing and presenting water conservation materials to K-12 grade classes in the City. This DMM would be coordinated with other related DMMs and would be implemented according to the steps described below.

Schedule and Steps for Implementation

The City has implemented school education programs in the past, providing educational videos and associated curriculum to local schools to teach children about the importance of water and water conservation practices, but due to budgetary considerations it intends to focus on broader public education initiatives (DMM G) and does not intend to implement this DMM.

Programs would include working with school districts and private schools in the water suppliers' service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Educational materials shall meet the state education framework requirements and grade-appropriate materials shall be distributed.

Tracking and Documentation

At minimum, the City would report on the following:

1. Curriculum materials developed and/or provided by agency (including confirmation that materials meet state education framework requirements and are grade-level appropriate)
2. Number and type of materials developed and/or provided by the City
3. Number of students reached
4. Annual budget for school education program
5. Description of all other water supplier education programs

Evaluation of Effectiveness of DMM

There are no methods of measuring effectiveness for this DMM.

Estimate of Current Conservation Savings

No specific method of evaluating the effectiveness of this DMM has been identified by the City.

Cost Benefit Analysis

Details of the CBA are included in Appendix G and summarized as follows:

Table DMM H - 10631(g)(2)	
Cost Effectiveness Summary	
Total Annual Costs	$ 7,900
Total Benefits	Not Available
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ per AF)	100
Water Savings (AFY)	N/A

7.2.9 DMM I – Conservation Programs for Commercial, Industrial, and Institutional Accounts

This DMM establishes conservation programs implemented on the Commercial, Industrial, and Institutional (CII) sectors.

DMM Description

Conservation programs should be established for CII accounts and will parallel residential measures in such that surveys (indoor/outdoor), and incentive programs may be made available for the CII sector and will be the focus of this measure. Some CII customers may maintain landscaped areas, which require a more exhaustive outdoor survey therefore; in those instances, the survey effort will be coordinated with DMM E Large Landscape Conservation Programs.

Schedule and Steps for Implementation

However, for the same rationale as presented in DMM A, the City does not intend to implement a staffed conservation program for commercial and industrial users for the foreseeable future because the cost of such a program cannot be justified by the potential water savings. Commercial and Industrial accounts account for approximately 6% of the total City water use and with about the 3 % of connections. This indicates there is no significant difference in the CBA from that presented in DMM A except for a proportionate reduction in cost of 3% and benefit of 6%, with the following adjustments: The cost of the program is approximately 5% of that presented in DMM A (which is probably low given the generally higher costs of commercial fixtures), and the potential water savings for those that participate is twice as great as assumed for DMM A (26% instead of 13%). The result summarized in the table below show that the program would not be cost effective.

Table DMM I - 10631(g)(2)		
Cost Effectiveness Summary		
Total Costs	$	3,220
Total Benefits	$	200
Discount Rate	N/A	
Time Horizon	5 years	
Cost of Water ($ per AF)	100	
Water Savings (AF/Y)	2.0	

7.2.10 DMM J – Wholesale Agency Programs

The City of Riverbank is not a wholesale agency. Therefore, this DMM does not apply.

7.2.11 DMM K – Conservation Pricing

DMM Description

This DMM promotes water conserving retail water rate structures. When creating a rate case, professional judgments are made to determine whether costs are accounted to a variable or fixed cost center by the staff of the agency. The final water rate case is an accumulation of all the decisions and judgments made by staff and supplemented by the financial projections leading an agency to establish its final water rate recommendation.

In a water, sewer or refuse collection rate increase case, the final rates as recommended by staff must go through ballot approval at a Proposition 218 hearing. Proposition 218 contains requirements for the imposition of a fee or charge for property related services. Procedures for fees and charges are contained in Section 6 of Article XIII D and must be implemented during a rate increase. Paragraph (b) describes the requirements for new, existing, or increased fees and charges, as:

1. Revenues from fees or charges shall not exceed the funds required to provide the service.
2. Revenues from fees or charges shall not be used for any other purpose.
3. The amount of the fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel.
4. No fee or charge may be imposed unless the service is actually used by or immediately available to the owner of the property in question.
5. No fee or charge shall be imposed for general governmental services, i.e., police, ambulance, library, where the service is available to the public at large in substantially the same manner as it is to the property owners.

This DMM is not intended to supplant this rate setting process, but rather to reinforce the need to establish a strong nexus between volume-related system costs and volumetric commodity rates. Conservation pricing requires volumetric rate(s). The goal of this DMM is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs (which may include utility long-run marginal costs), financial stability, revenue sufficiency, and customer equity.

The City's water customers are billed based on their metered water use. Water fees and charges are established by Section 52.61 of the City of Riverbank Code of Ordinances. A summary of the rates is provided in Table 7.4.

Schedule and Steps for Implementation

The City will adjust rates periodically as deemed necessary.

7.2.12 DMM L – Water Conservation Coordinator

DMM Description

To actively manage the DMM measures outlined in this Section, a water conservation coordinator (WCC) and supporting staff must be identified. The WCC will be charged with overseeing and developing the strategies and procedures of all steps and procedures listed in each DMM. This person must be personable and maintain a friendly and professional image as a representative of the City as the WCC will be in direct contact with the public. Additionally, the WCC must be able to communicate effectively by relaying complex concepts to upper management and City Council as the administrator of the Water Conservation Program.

Schedule and Steps for Implementation

DMM implementation activities are to be distributed among a variety of City employees.

The currently designated water conservation coordinator is:

Kathleen Cleek, Senior Administrative Analyst
6707 Third Street
Riverbank, CA 95367
(209) 863-7120.

Implementation shall consist of at least the following actions:

1. Designation of a water conservation coordinator and support staff (if necessary), whose duties shall include the following:
   - Coordination and oversight of conservation programs and DMM implementation;
   - Compilation of data necessary for preparation of the DMM Implementation Status Report to be included in UWMP updates;
   - Communication and promotion of water conservation issues to agency senior management; coordination of agency conservation programs with operations and planning staff; preparation of annual conservation budget; and preparation of the conservation elements of the agency's Urban Water Management Plan.

Evaluation of Effectiveness of DMM

Evaluation of effectiveness will consider the goals met under each DMM implementation and schedule and ultimately the overall volume of water savings produced by the active management of the program by the coordinator.

The duties of water conservation coordinator require approximately 80 hours per year. Other staff time to implement water conservation programs require approximately 100 hours per year.

Estimate of Current Conservation Savings

The City has no method to determine conservation savings associated with this DMM.

7.2.13 DMM M– Water Waste Prohibition

The most visual forms of wasteful practices occur during residential irrigation and outdoor water use. To combat wasteful use, water waste prohibition in the form of an ordinance informs the customer that water waste is prohibited.

DMM Description

Section 52.34 of the City of Riverbank Code of Ordinances outlines restricted water use during peak periods. The Code of Ordinances states, "These provisions shall apply to all persons using water in the City regardless of whether any person using water shall have a contract for water service with the City. Failure to comply with any provision, requirement, rules or regulation under this chapter shall be unlawful and punishable as an infraction".

Schedule and Steps for Implementation

The City has permanently incorporated implementation of this DMM into their ordinances.

The prohibitions under the ordinance are follows:

1. Washing cars, without the use of a quick-acting positive shut-off nozzle on the hose. Furthermore, there shall be no washing of building exteriors, mobile home exteriors, recreational vehicle exteriors, sidewalks, patios, driveways, gutters or other exterior surfaces, unless permitted by the Public Works Director and done with the use of a quick-acting positive shut-off nozzle on the hose.
2. Outdoor water use in violation of the following schedule:
    a. No outdoor water use will be allowed between 12:00 p.m. and 7:00 p.m.
    b. Dwellings or establishments with odd-numbered street addresses shall water only on Mondays, Wednesdays and Fridays subject to the time restrictions set forth above.
    c. Dwellings or establishments with even-numbered street addresses shall water only on Tuesdays, Thursdays and Saturdays subject to the time restrictions set forth above.
    d. Anyone may water on Sundays subject to the time restrictions set forth above.
    e. For new construction, developer shall set timers for landscape irrigation as detailed above, prior to home sale.
    f. Rain sensors and automatic shut-offs shall be included in all new construction.

3. Violations. All fines are payable with the next water bill.
    a. First violation - Warning
    b. Second violation - $20 fine
    c. Third violation - $50 fine
    d. Fourth violation - $100 fine
    e. Fifth violation and each violation thereafter - $200 fine
    f. The City shall set and enforce a fine for the developer if irrigation timers are not set and operating properly prior to the sale of the house

Evaluation of Effectiveness of DMM

The City will collect the following information to determine the effectiveness of this DMM:

1. Number of customers contacted about water waste violations
2. Number of customers cited for repeat water waste violations

Estimate of Current Conservation Savings

The City has no method to determine conservation savings associated with this DMM.

However the City has Tracking Information (number of warnings and citation issued):

Year	Warnings	Citations
2011	19	0
2012	37	1
2013	27	0

7.2.14 DMM N – High Efficient Toilet Replacement

All new toilets sold in California after January 1, 1994 must be ultra low-flush toilets, which use a maximum of 1.6 gallons per flush (gpf). These ultra low-flush toilets (ULFT) save approximately 60% to 75% of water when compared to their high water use counterparts at 3.5 and 5.0 gpf. In this measure, older 3.5 and 5.0 (gpf) toilet fixtures in residences are replaced with 1.6 gpf fixtures. Implementation of this DMM is intended to accelerate the replacement of non-conserving toilets at a faster pace than “natural replacement”.

DMM Description

This DMM is based on implementing a financial incentive program for customers in the City's utility service area for replacement of higher water use toilets with ULFTs. The incentive will allow customers to upgrade existing high water use toilets to high efficient toilets to benefit both the customer and utility through reduced water use.

Schedule and Steps for Implementation

Due to the City's current budget constraints, a financial incentive for toilet replacement is not offered. The City will continue to consider offering a rebate for installation of ULFTs as budget allows. The City will, through its public education program, continue to encourage the installation of ULFTs.

Cost benefit Analysis

The details of the CBA are presented in Appendix G and presume this program will focus on the pre-1993 households and includes rebate costs of $100 per household. Administrative costs are not included. The CBA is summarized in the following table:

Table - DMM N 10631(g)(2)	
Cost Effectiveness Summary	
Total Annual Costs	$ 12,500
Total Annual Benefits	$ 917
Discount Rate	N/A
Time Horizon	5 years
Cost of Water ($ per AF)	100
Water Savings (AFY)	9.2

SECTION 8 REFERENCES

Stanislaus and Tuolumne Rivers Groundwater Basin Association, 2005. Integrated Regional Groundwater Management Plan for the Modesto Subbasin

Burow, K. R., Shelton, J. L., Hevesi, J. A., and Weissmann G. S., 2004: Hydrologic Characterization of the Modesto Area, San Joaquin Valley, California. USGS Scientific Investigations Report, 2004-5232. 54 pages.

California's Groundwater – Bulletin 118, San Joaquin River Hydrologic Region, San Joaquin Valley Groundwater Basin, Last Update 2/27/04. California Department of Water Resources, http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/5-22.02.pdf

California Department of Water Resources, Water Data Library. http://www.water.ca.gov/waterdatalibrary/ or http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/index.cfm

Dunn Environmental, Inc., 2007: Source Sufficiency Report for the City of Riverbank General Plan Update. Unpublished report prepared for the City of Riverbank, dated June 2007. 63 pages.

Garcia-Davis Ringler Engineering, 2001: Draft City of Riverbank Water System Study and Master Plan. Unpublished report prepared for the City of Riverbank Staff dated September 2001.

Nolte Associates, Inc., 2007: City of Riverbank, SB 610 Water Supply Assessment Report for 2007 General Plan September 2007 Update. Unpublished report prepared for the City of Riverbank, dated November 2007.

Nolte Associates, Inc., 2008: City Of Riverbank 2007 Urban Water Management Plan. Unpublished report prepared for the City of Riverbank, dated October 2008.

Appendix A

RESOLUTION TO ADOPT THE URBAN WATER MANAGEMENT PLAN – TO BE PROVIDED BY CITY

Appendix B

NOTICE OF PUBLIC HEARING – TO BE PROVIDED BY CITY

Appendix C

URBAN WATER MANAGEMENT PLAN CHECKLIST

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

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix A
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)	Water supplier is in the City in which it serves	
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Section 1 Appendix B
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1 Appendix B
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix A
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Inclusive throughout UWMP

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 2.2
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.3
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 3.1
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 3.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	N/A
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 3.2
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 4.4
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 4.6
16	Describe the groundwater basin.	10631(b)(2)		Section 4.6
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		N/A

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		N/A
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 4.6
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 4.6
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 4.4
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 4.2
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 4.5
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		N/A
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 5
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 5.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 5
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 5
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 5
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 5
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 5
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Section 5
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 6.1
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 6.2
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		N/A
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 6.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 6.2
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Section 6.4
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 6.6
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 6.7
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 6.8
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 6.9
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Appendix F
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 6.10
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 4.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 6.2
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 7.2
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 7.2
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 7.2
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Section 7.2, Appendix I
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Section 7.2

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

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

Appendix D

INTEGRATED REGIONAL GROUNDWATER MANAGEMENT PLAN (CD COPY) – TO BE PROVIDED BY CITY

Appendix E

CITY OF RIVERBANK WATER ORDINANCES

CHAPTER 52: WATER

Section

Cross-reference:

Systems Development Fees, see § 150.30 through 150.36

GENERAL PROVISIONS

§ 52.01 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply:

APPLICANT. An individual or agency applying for utility service.

COMMERCIAL SERVICE. Provision of water to premises where the customer is engaged in trade.

CROSS-CONNECTION. When used herein, all applicable sections of the City Code shall apply.

CUSTOMER, CONSUMER. An individual or agency of record receiving utility service from the utility.

DEVELOPER. A person or corporation requesting water service from the city regardless of the number of services.

DEVELOPMENT. The improving of developed and/or undeveloped land to more fully use the available land and/or structures. A development may be a subdivision.

DOMESTIC SERVICE. Provisions of water for household residential purposes, including water for sprinkling lawns, gardens and shrubbery, watering livestock, washing vehicles and other similar and customary purposes.

EMPLOYEE. Any person designated by the City Manager or the Director of Public Works to perform work and labor for the utility department, excluding contractors and their employees.

FIRE PROTECTION SERVICE. Provision of water to premises for automatic fire protection.

FLAT RATE. A fixed periodic charge for an unmetered service.

FLAT RATE SERVICE. Provision of water in unmeasured quantities.

IDLER. That piece of pipe used to conduct water in place of a meter in flat rate service.

INDUSTRIAL SERVICE. Provision of water to a customer for use in manufacturing, processing activities, or other uses as described in the Zoning Ordinance.

IRRIGATION SERVICE. Provision of water for commercial, agricultural, floricultural or horticultural use.

MAINS. Distribution pipelines located in streets, highways, public ways, or public utility easements which are used to serve the general public.

METER. The device used to measure water consumption, such as, water meter.

METER RATE SERVICE. Provision of water in measured quantities.

MUNICIPAL or ***PUBLIC USE.*** Provision of water to a municipality or other public body.

PRE-METERED WATER USAGE. Use of city water prior to city water meters being installed by the property owner.

RENTABLE UNIT. A rentable unit is any building or portion thereof that can be used as a completely independent unit.

SERVICE CONNECTIONS. The pipe, valves, and other facilities by which means the utility conducts water from its distribution mains to and through the meter; or, to the curb-stop or shut-off valve on an unmetered service connection.

SENIOR CITIZEN. All persons who have reached the age of 65 years and classed as “head of household” and who earn not over $7,000 annually.

SUBDIVIDER. A person, firm, corporation, partnership, or association who proposes to divide, divides, or causes to be divided real property into a subdivision for himself or for others, except that employees and consultants of such persons or entities acting in such capacity are not “subdividers”.

SUBDIVISION. The division, by any subdivider, of any unit or units of improved or unimproved land, or any portion thereof, shown on the latest equalized county assessment roll as a parcel or as contiguous parcels.

TEMPORARY SERVICE. A service for circuses, bazaars, fairs, construction work, irrigation of vacant property, and similar uses, that because of their nature will not be used steadily or permanently.

UTILITY. The public utility or publicly owned utility named herein.

UTILITY SERVICE. Includes water and/or sewer and/or refuse service.

WATER WASTING. The use of water in such a manner that excess water is used and not effectively

utilized for the lawfully intended purpose. Water wasting includes, but is not limited to the following:

(1) Watering lawns or gardens such that excess water leaves property or area being watered.

(2) Washing vehicles, equipment or boats in driveways or streets using open hose.

(3) Having leaky faucets or plumbing fixtures on premises.

(`67 Code, § 4-6-1) (Am. Ord. 2000-09, passed 12-11-00)

§ 52.02 CITY TO OWN AND OPERATE WATER SYSTEM.

The city shall own and operate a water system serving designated areas within and without the corporate limits of the city and may purchase existing systems or construct new works as may be necessary to supply to the people within the areas an adequate and safe domestic water supply. The City Council shall designate the area within and without the corporate limits of the city which shall receive water service from the city water system. The city shall endeavor to supply safe, potable, continuous and sufficient water at proper pressure to all consumers at all times.

(`67 Code, § 4-6-2)

§ 52.03 INSTALLATION AT OWNER'S EXPENSE.

All on-site and off-site water lines, connections, valves, plumbing and accessory water facilities shall be constructed and installed at the owner's expense, and shall be to city standards and approved by the city prior to water service turn-on.

(`67 Code, § 4-6-6)

§ 52.04 APPLICATION FOR SERVICE.

(A) All applications for water service shall be made on the forms furnished by the city. Every customer obtaining water service shall sign an application. In addition to any other information required, such application shall show a true and accurate description of the area served, purpose for which water shall be used, and the applicant's interest in the property served.

(B) Owners of property will be held responsible for water used on their premises, although payments will be accepted from tenants. In case tenants do not pay, the service may be disconnected and shall not be restored until the delinquent water charges, including the cost of water delivered as well as the cost of reconnection services, have been paid.

(`67 Code, § 4-6-7)

§ 52.05 WHEN CITY WILL OR WILL NOT FURNISH WATER.

(A) When laterals are in place or within a reasonable distance from a particular parcel, the city will furnish water service from such line to the back of the curbline if the pipeline is located in the street or to the back of the sidewalk if a sidewalk is in place (except when there is a parkway between the curb and sidewalk) or to the property line if the pipeline is located in an easement, or alley.

(`67 Code, § 4-6-8)

(B) Water will not be furnished where there are defective or leaking faucets, closets, or other fixtures, or where there are water closets or urinals without self-closing valves, or tanks without self-acting float valves, and when such may be discovered the supply may be shut off.

(`67 Code, § 4-6-9)

§ 52.06 EQUIPMENT PROPERTY OF CITY; MAINTENANCE OF LINES.

(A) All pipelines and appurtenant facilities constructed in or under city streets, easements, or alleys shall become the property of the city upon completion of the installation, and upon final inspection and acceptance of the lines by the Director of Public Works.

(`67 Code, § 4-6-16)

(B) The city will maintain all mains, laterals, and appurtenances within the city right-of-way, on city property or easements. It shall be the responsibility of all water users to maintain the water service line from, but not including the water meter, to the outlets of the line, inclusive of city easements.

(`67 Code, § 4-6-18)

§ 52.07 EASEMENTS ON PRIVATE PROPERTY.

When a line is to be constructed across private property to serve one or more parcels of land, a utility easement shall be granted to the city and the easement line, size and installation approved by the Director of Public Works.

(`67 Code, § 4-6-17)

§ 52.08 UNAUTHORIZED TURN-ON.

No person or water user shall turn on or reconnect a water meter or water connection that has been turned

off or disconnected by the city.
(`67 Code, § 4-6-20) Penalty, see § 10.99

§ 52.09 DAMAGE TO SYSTEM.

Any person, including a public utility, who damages any city water line or fire hydrant, shall immediately report the location and extent of damage to the city. The city shall thereupon repair the damage and charge the cost of such repair to the person or utility who caused the damage.
(`67 Code, § 4-6-22)

§ 52.10 TAMPERING WITH FIRE HYDRANTS.

It is unlawful for any person to operate, alter, change, remove, disconnect, connect with, or interfere in any manner with any fire hydrant owned or used by the city without first obtaining written permission from the Chief of the Fire Department or his designated officer in charge.
(`67 Code, § 4-6-29) Penalty, see § 10.99

§ 52.11 MULTIPLE USERS.

If more than one consumer is served from one service connection, the owner of the property or his agent shall be required to sign for and guarantee payment for water service thereat, and the owner shall be liable for all water served through such connection.
(`67 Code, § 4-6-23)

§ 52.12 MAINTENANCE OF FIXTURES AND BOILERS; NEW PLUMBING.

(A) The city shall not be liable for any damage to the property of the consumer or others caused by broken, damaged, or leaky fixtures upon the premises of the consumer. The city may charge for all water supplied the consumer through a meter, even though the water is wasted because of broken, damaged, leaky or open fixtures. The city shall in no case be liable for damages occasioned by water running from open fixtures in or on premises to which it has turned on the water. All consumers having an arrangement for hot water shall have a tank from which to feed the boiler. The city shall not be responsible for the safety of boilers on the premises of any consumer.
(`67 Code, § 4-6-24)

(B) When old plumbing is being repaired or remodeled, or new plumbing is being installed, the owner shall install a stopcock or valve on the pipe between the property line and the first fixture on his premises. Unless such stopcock or valve is installed, the city shall not be required to turn on the water or to install a service connection.
(`67 Code, § 4-6-25)

(C) No plumber or other person will be allowed to make any alteration to any conduit, pipe, or other fixture connecting with the city mains, or to connect pipes when they have been disconnected, or to turn water off or on at the premises without the permission from the city.
(`67 Code, § 4-6-26)

§ 52.13 STANDBY FIRE PROTECTION SERVICE.

Whenever fire protection water service on a standby basis is furnished to a customer, a charge of $2 per month per each inch of standby service shall be made and billed bi-monthly while such service is being furnished. Check valves are required and shall be tested and certified for correct operation annually at owner's expense.
(`67 Code, § 4-6-32)

§ 52.14 WELLS.

(A) No person may drill, dig, install or operate a water well within the city for any purpose without the consent of the City Council.
(`67 Code, § 4-6-34) (Ord. 83-1, passed 3-28-83)

(B) No person owning or operating an existing well within the city may furnish water for sale or gift.

(C) If a request is received to connect the city water system from an owner having a well on his property, that well shall be properly abandoned in accordance with city standards, or an approved backflow prevention device shall be installed before the connection can be made.
(`67 Code, § 4-6-35) (Ord. 83-1, passed 3-28-83) Penalty, see § 10.99

§ 52.15 NEW SUBDIVISIONS.

Any new subdivision or development which will receive water service from the city water system shall, at the subdivider's expense, install and construct the necessary main lines, laterals, meter boxes, service connections, and fire hydrants in accordance with city specifications. The subdivider or developer shall

convey ownership thereof to the city and pay to the city connection fees for each lot or parcel to be served in the subdivision or development. The mains shall extend to the farthest limits of the subdivision or development as approved by the City Engineer. Water mains shall be looped unless otherwise approved by the City Engineer.
(`67 Code, § 4-6-37) (Ord. 83-1, passed 3-28-83)

§ 52.16 FALSIFYING INFORMATION.

No person shall knowingly make any false statement, representation, record, report, plan or other document filed with, or to be filed with or taken by, the city.
(`67 Code, § 4-6-44) Penalty, see § 10.99

§ 52.17 PRE-METERED WATER USAGE.

(A) Any land owner using pre-metered water as defined in § 52.01 shall be required to pay a fee equal to the minimum monthly rate for metered water as established from time to time by the City Council. The pre-metered water usage fee shall be paid at the time of the issuance of a building permit. The minimum fee collected shall be a two month billing cycle of the established minimum metered rate. The pre-metered rate shall continue until the land owner installs an approved water meter. Failure to cause the installation of a water meter may result in disconnection of water service.

(B) The City Council finds that this section is enacted in order to off-set the loss of water revenue and to establish city criteria in the regulation of pre-metered water usage.
(Ord. 2000-09, passed 12-11-00)

WATER USE REGULATIONS

§ 52.30 RESPONSIBILITY OF USERS.

It shall be the responsibility of all water users to prevent contamination of or damage to water meters or water systems by reason of their operation of the water outlets and water equipment, and if required by the city, the water users shall install, at their expense, check valves, surge tanks, backflow prevention devices, or other devices as prescribed by the Director of Public works in order to avoid damage to or contamination of the meters or systems. Check valves and back flow prevention devices must be tested when installed and annually thereafter at customer's expense.
(`67 Code, § 4-6-5)

§ 52.31 USE OF WATER BY OTHER THAN SUPPLIED PERSON.

No water user using water supplied by the city, shall supply any other person with such water or allow any other person the use of such water from the water user's water connection or permit a further connection to be made to the water user's connection on his or any other premises unless authorized by the city.
(`67 Code, § 4-6-21) Penalty, see § 10.99

§ 52.32 IRRIGATING.

No water shall be used for irrigation purposes by means of an open hose without a sprinkler, and no water shall be wasted or used except for some useful and necessary purpose.
(`67 Code, § 4-6-27)

§ 52.33 PROHIBITED ACTS.

(A) No person shall make connection with the system without first obtaining a permit from the city.

(B) No unauthorized person shall turn on or off or otherwise interfere with any water line or appurtenant facility.

(C) No person shall waste water.

(D) No person shall install or maintain any pipe, faucet, hose bib, fixture or appliance connected to the water system in such condition or state of disrepair that water may be or is lost or wasted.

(E) No person shall supply city water to anyone without city authorization. The city shall have the right, upon five days' written notice to cease, to disconnect the water service for the person supplying the water.

(F) No person shall construct a bypass around any meter or service.
(`67 Code, § 4-6-36) (Ord. 83-1, passed 3-28-83) Penalty, see § 10.99

§ 52.34 RESTRICTED WATER USE DURING PEAK PERIODS.

In addition to all other provisions and requirements of this chapter, the following additional rules and regulations for the use of water are hereby established. These provisions shall apply to all persons using water in the city regardless of whether any person using water shall have a contract for water service with the city. Failure to comply with any provision, requirement, rules or regulation under this chapter shall be unlawful and punishable as an infraction.

(A) Washing cars, without the use of a quick-acting positive shut-off nozzle on the hose. Furthermore, there shall be no washing of building exteriors, mobile home exteriors, recreational vehicle exteriors, sidewalks, patios, driveways, gutters or other exterior surfaces, unless permitted by the Public Works Director and done with the use of a quick-acting positive shut-off nozzle on the hose.

(B) Outdoor water use in violation of the following schedule:

(1) No outdoor water use will be allowed between 12:00 p.m. and 7:00 p.m.

(2) Dwellings or establishments with odd-numbered street addresses shall water only on Mondays, Wednesdays and Fridays subject to the time restrictions set forth above.

(3) Dwellings or establishments with even-numbered street addresses shall water only on Tuesdays, Thursdays and Saturdays subject to the time restrictions set forth above.

(4) Anyone may water on Sundays subject to the time restrictions set forth above.

(C) Violations. All fines are payable with the next water bill.

(1) First violation - Warning.

(2) Second violation - $20 fine.

(3) Third violation - $50 fine.

(4) Fourth violation - $100 fine.

(5) Fifth violation and each violation thereafter - $200 fine.

(`67 Code, § 4-6-48) (Ord. 91-03, passed 3-11-91)

§ 52.35 BACKFLOW AND CROSS-CONNECTION CONTROL.

(A) *Public water supply protection required.* In accordance with the requirements of 17 Cal. Code of Regs. §§ 7583 through 7622 and Cal. Health & Safety Code §§ 116800 *et seq.*, no water service connection to any premises shall be installed or maintained by the city unless the public water supply is protected as required by state regulations and the requirements stated below. This section supplements and does not supersede local plumbing regulations, codes or ordinances or state Department of Public Health Regulations relating to water supply.

(B) *Where protection is required*. In general, backflow prevention devices shall be installed on the service connection to any premises having:

(1) Any service connection having an auxiliary water supply, or internal systems containing water of deteriorating quality.

(2) Any service connection to any sewage treatment plant, sewage pumping station, or any premises which handle or transport sewage;

(3) Any service connection where any substance is handled under pressure in such fashion as to permit entry into the water system;

(4) Any service connection where material dangerous to health or toxic substance that might possibly be introduced into the water system;

(5) Any premises which is served by more than one meter connection.

(6) Any service where lawn or garden sprinkling systems are present shall have a backflow prevention device installed on the lawn or garden sprinkler supply line.

(7) The type of protection required for each type of premises shall be as stipulated in the city standards.

(C) *Private wells prohibited.* No person may drill, dig, install or operate a water well within the city for any purpose without the consent of the city.

(D) *Existing wells.* No person owning or operating an existing well within the city may furnish water for sale or gift to any other premises. If request is received to connect to the city water system, from an owner having a well on his property, that well shall be properly abandoned in accordance with state and city standards, or an approved reduced pressure principle backflow prevention device shall be installed before the connection can be made.

(E) *Responsibility for installation, inspection and maintenance.* Backflow prevention devices required herein shall be installed in accordance with city standards at the expense of the customer.

(1) All backflow preventers shall be inspected, tested, and maintained by a certified backflow prevention device tester, on a regular basis and a report of such activity shall be submitted to the city on forms provided by the city.

(2) In general, the backflow prevention device shall be inspected and tested at time of installation and thereafter according to the following schedule:

Type of	***Frequency of***

Device	*Test*
Air Gap	Annually
Reduced Pressure Principle	Annually
Double Check Valve	Annually

(3) All inspections, testing, maintenance and reporting shall be done at the expense of the customer.

(F) *Discontinuance of service.* The city may shut off service to any premises and may physically disconnect the customer's piping from the city's water distribution system if a backflow prevention device required by this section is not installed, tested, and maintained as required, or if any defect is found in an installed backflow prevention device, or if it is found that a backflow prevention device has been removed or bypassed, or if unprotected cross-connection exist on the premises; and service will not be restored until such conditions or defects are corrected.

(`67 Code, § 4-6-47) (Ord. 85-03, passed 6-24-85)

METERS

§ 52.45 USE OF METERS REQUIRED.

The quantity of water furnished by the city to all water users shall be determined and ascertained by a meter.

(`67 Code, § 4-6-10)

§ 52.46 INSTALLATION OF METERS.

All water meters shall be installed adjacent to and on the property owner's side of the curbline if installed along a street, and on the property line if installed in an alley.

(`67 Code, § 4-6-11)

§ 52.47 DAMAGING OR INTERFERING WITH METERS.

(A) Water meters and meter boxes are the property of the city and it shall be unlawful to damage or interfere with them or to place dirt, trash, or other obstructions on or over the meter boxes.

(`67 Code, § 4-6-12)

(B) If a meter or appurtenances are damaged by the carelessness or negligence of the owner or occupant of the premises, the Public Works Department will repair the meter and the cost of such repairs shall be charged against the owner of the property, and if not paid within 30 days, shall become a lien against said property.

(`67 Code, § 4-6-15)

§ 52.48 METER FAILURES; TESTING.

(A) In the event any meter fails to operate properly or to correctly register the water used, the charge for the period during which the meter fails to operate properly or fails to register water, shall be based upon the average daily consumption for the same period of the prior year by the same user. If such a reading is not available, the city shall estimate the amount of such consumption from all information available and the consumer shall be charged on the basis of such estimate for water consumed.

(`67 Code, § 4-6-13)

(B) When any water consumer makes a complaint that the bill for any particular period is excessive, the Public Works Department will, upon request, have such meter re-read and the service inspected for leaks. Should such consumer then desire that the meter be tested, he will be required to make a deposit of $10 to cover the cost of making such test. The meter will then be changed or tested. Should the meter be found to register over 3% more water than actually passes through it, another meter will be substituted therefor, and the fee of $10 shall be refunded to the person making the request. If the meter is found to register not over 3% the $10 deposit shall be forfeited to the city and the water bill paid as rendered.

(`67 Code, § 4-6-14)

§ 52.49 CHANGE OF METER LOCATION OR METER SIZE.

Any person desiring to change the location or size of a service that has already been installed shall make an application to the city, and, upon payment in advance of the cost as determined by the city, the city may cause said change to be made. No such change will be made unless such change is determined to be feasible

and can be done at a reasonable cost.
(`67 Code, § 4-6-19)

RATES AND CHARGES

§ 52.60 WATER FUND.

(A) The Director of Finance shall collect all monies that shall become due to the city for water services, connection fees, payments for extensions, and all other costs, charges, penalties, and fees as provided herein and shall pay them into the city treasury and account for them in the same manner as the Director of Finance pays into the city treasury and accounts for all other sums received in his official capacity.

(B) All monies so collected shall be placed in a special fund to be known as the Water Fund and such money shall thereafter be expended for the administration, engineering, operation, maintenance and expansion, including the purchase of land and/or easements, of the city water system.
(`67 Code, § 4-6-4)

§ 52.61 FEES AND CHARGES ESTABLISHED BY ORDINANCE.

The amounts of all charges provided for herein, including but not limited to, water rates, connection fees, deposits, turn-on charges, penalties, and reconnection fees, shall be established from time to time by ordinance of the City Council. The failure to pay any fee or charge established by ordinance adopted pursuant to this chapter shall constitute a violation of this code and shall be subject to fines and penalties set forth in the city code.
(`67 Code, § 4-6-38)

(A) *Water service charges.* Minimum charge for 1,000 cubic feet for two months (bimonthly) is established as follows:

(1) Residential:

Meter Size	***Rate***
5/8" meter	$ 29.29
3/4" meter	29.29
1" meter	29.29

(2) Apartments, commercial, and industrial users with meters 1-1/2" or larger:

Meter Size	***Rate***
1-1/2" meter	$ 29.29
2" meter	36.70
3" meter	55.16
4" meter	76.23
8" meter	144.87

(3) Outside city limits:

Meter Size	***Rate***
1" meter	$ 33.91
2" meter	49.81

(4) Quantity rates for water exceeding the 1,000 cubic foot minimum charge for the particular meter size shall be:

Rate

Next 4,000 cubic feet	$ 0.34 per 100 cubic feet
Next 34,000 cubic feet	0.33 per 100 cubic feet
Next 40,000 cubic feet	0.30 per 100 cubic feet

(5) The minimum charge will entitle the customer to the quantity of water that the minimum charge will purchase at the quantity rates.

(6) Quantity rates for public schools for irrigation shall be $ 0.30 per 100 cubic feet.

(7) The water rates will increase annually at 75% of the Consumer Price Index for the West B/C region as of April 30 of each calendar year.

(B) *Connection fees.* Connection fees for water service for properties in the city shall be as follows:

(1) Connection fee in a subdivision shall be determined at the time of recording the final map.

(2) Connection fee not in a subdivision (infill) shall be as follows:

Rate

Residential – with no existing stubout	$ 1,700.00
Residential – with existing stubout	800.00
Commercial/Industrial – with no existing stubout	1,700.00
Commercial/Industrial – with existing stubout	800.00

(C) *Inspection fee.* A $75 water meter inspection fee will be required per inspection.

(D) *Well destruction permit.* Any property owner seeking to abandon their well must first obtain a well destruction permit from the City of Riverbank Public Works Department. The fee for the permit shall be $75.

(Ord. 83-1, passed 3-28-83; Am. Ord. 2005-005, passed 4-25-05; Am. Ord. 2005-008, passed 5-9-05; Am. Ord. 2005-012, passed 7-11-05; Am. Ord. 2006-010, passed 7-10-06; Am. Ord. 2007-003, passed 7-9-07; Am. Ord. 2008-007, passed 7-14-08; Am. Ord. 2010-001, passed 6-28-10)

§ 52.62 WHEN CHARGES DUE.

All water charges, fees and deposits shall be paid at the time service is requested. No building, plumbing or electrical permit shall be issued until said water charges, fees and deposits are paid.

(`67 Code, § 4-6-39) (Ord. 83-1, passed 3-28-83)

§ 52.63 WATER CHARGES AS A LIEN.

Each charge levied by or pursuant to this chapter or any resolution adopted pursuant to this chapter, is hereby made a lien upon the property which received the benefit of the service or facility for which the charge was made, and any steps authorized by law may be taken by the city to enforce payment of such lien.

(`67 Code, § 4-6-40) (Ord. 83-1, passed 3-28-83)

§ 52.64 PAYMENT OF BILLS.

(A) Water bills shall be rendered on a bimonthly basis and are due and payable on the first day of the month following the billing period, and shall be delinquent on the last day of the month if not paid by that date.

(B) Any bill which is not paid on or before the delinquent date shall be subject to a 10% penalty. If the bill is not paid within ten days after it becomes delinquent, the water service may be discontinued and an additional charge for the subsequent turn-on shall be paid by the consumer.

(C) When a service is discontinued due to nonpayment of bills, service shall not be resumed until all charges and penalties are paid pursuant to the procedures set forth in § 52.66 herein. All charges and penalties which are not paid shall become a lien on the property. Termination of service shall not be effective to a residential dwelling for nonpayment while an investigation of a customer dispute or complaint is pending or in progress by the city. Termination of water service shall not be effected on any Saturday, Sunday, legal holiday, or at any time during which the business offices of the city are not open to the public.

(`67 Code, § 4-6-41) (Ord. 83-1, passed 3-28-83; Am. Ord. 93-06, passed 11-22-93; Am. Ord. 2005-012, passed 7-11-05)

§ 52.65 DEPOSITS.

(A) A deposit of $60 will be required for all new consumers as a guarantee for the payment of future bills.

(B) If a consumer who has made a cash deposit fails to pay a bill for metered service, the Water Department may apply the deposit insofar as necessary to liquidate the bill and may require that the deposit be restored to its original amount before the next bill is due.

(C) After a cash deposit to guarantee payment for metered or measured service has stood unimpaired for 12 months, such deposit shall be applied to the depositor's current account balance. Upon closing any account, the balance of any deposit remaining, after the closing bill for service has been paid, shall be returned promptly to the depositor.

(`67 Code, § 4-6-42) (Ord. 83-1, passed 3-28-83; Am. Ord. 2000-04, passed 4-10-00; Am. Ord. 2005-005, passed 4-25-05)

§ 52.66 DISCONNECTION FOR LATE PAYMENT.

(A) It is the policy of the city to discontinue utility service to customers by reason of nonpayment of bills only after notice and a meaningful opportunity to be heard on disputed bills. The city's form for application for utility service and all bills shall contain, in addition to the title, address, room number, and telephone number of the official in charge of billing, clearly visible and easily readable provisions to the effect:

(1) That all bills are due and payable on or before the date set forth on the bill; and

(2) That if any bill is not paid by or before that date, a second bill will be mailed containing a cutoff notice that if the bill is not paid within ten days of the mailing of the second bill, service will be discontinued for nonpayment; and

(3) That any customer disputing the correctness of his bill shall have a right to a hearing at which time he may be represented in person and by counsel or any other person of his choosing and may present orally or in writing his complaint and contentions to the city official in charge of utility billing. This official shall be authorized to order that the customer's service not be discontinued and shall have the authority to make a final determination of the customer's complaint.

(B) Requests for delays or waiver of payment will not be entertained; only questions of proper and correct billing will be considered. In the absence of payment of the bill rendered or resort to the hearing procedure provided herein, service will be discontinued at the time specified, but in no event until the charges have been due and unpaid for at least 30 days.

(C) When it becomes necessary for the city to discontinue utility service to a customer for nonpayment of bills, service will be reinstated only after all bills for service then due have been paid, along with a turn-on charge, the amount of which shall be set by ordinance of the City Council.

ADMINISTRATION

§ 52.75 MANAGEMENT OF SYSTEM.

The management, control and care of the city water system shall be vested in the City Manager under the direction of the City Council.

(`67 Code, § 4-6-3)

§ 52.76 ACCESS TO BE PROVIDED TO CITY.

Access to service connections, turn-off valves and meters must be provided for the city at all times.

(`67 Code, § 4-6-28)

§ 52.77 RIGHT OF ENTRY.

Any authorized agent of the city shall have the right at all times during reasonable hours to enter any premises being supplied with water for the purpose of examining the condition of water pipes, water closets, and other plumbing, and in case a leak is found, to shut off the water until the leak is repaired by the consumer.

(`67 Code, § 4-6-30)

§ 52.78 RIGHT TO SHUT OFF WATER MAINS.

The city shall have the right at any time to shut off, ration, or apportion water by reason of an emergency, shortage or water supply, or for making repairs, modifications, changes or other work in city water service facilities.

(`67 Code, § 4-6-31)

§ 52.79 TERMINATION OF SERVICE.

Whenever the Water Department receives a written request from any property owner to terminate or

discontinue water service to any property for the reason that the property is unoccupied and does not require such service, the Water Department shall terminate water and sewer services as of the date such notice is received, and shall make no further charges for water or sewer services until the owner requests resumption of service. Until such request is received, all such charges as provided shall be due and payable.
(`67 Code, § 4-6-33)

§ 52.80 CORRECTION OF VIOLATION.

In order to enforce the provisions of this chapter, the city may correct any violation of this chapter. The cost of such correction, including attorney's fees, may be added to any water service charge payable by the person occupying the property upon which the violation occurred, and the city shall have such remedies for the collection of such costs as it has for the collection of water service charges.
(`67 Code, § 4-6-43)

§ 52.81 VIOLATION AN INFRACTION.

Any person violating the provisions of this chapter is guilty of an infraction.
(`67 Code, § 4-6-46) (Ord. 83-1, passed 3-28-83)

Appendix F

SAMPLE RESOLUTION TO DECLARE A WATER SHORTAGE EMERGENCY

RESOLUTION NO. _

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RIVERBANK DECLARING AN EMERGENCY AND AN IMMEDIATE NEED TO CURTAIL ALL NON-ESSENTIAL WATER USE

WHEREAS, on [DATE/TIME], there was an event [to be specified] resulting sudden and unexpected impact to the community water system that has [or will] limit the ability of the City to obtain and distribute the customary amount of water to [all/some] of our citizens; and

WHEREAS, City staff's attempts to mitigate the effect of [specified event] have been unsuccessful, and City staff advises that there is an immediate need to limit all non-essential water use to mitigate the loss or impairment of public health, safety, property, and essential public services.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Riverbank finds:

1. The above-referenced recitals are true and correct and incorporated herein by reference.

2. That the public interest and necessity demand the immediate curtailment of non-essential water usage including but not limited to: [specify, ie street washing, landscape/yard irrigation, fountain or water feature use, vehicle washing, pool use…]

3. That the City Manager or his designee is authorized to expend an amount not to exceed $ to facilitate notification of the affected citizens and enforcement and monitoring compliance with this resolution.

4. Violation of this ordinance is considered a waste of water as specified by City Code 52.33.

5. That the City Council shall review the emergency action at its next regular meeting scheduled for _ to determine whether the emergency situation has been eliminated and whether there is a need to take further action as a result of the emergency.

PASSED AND ADOPTED on this _ day of _ , 20_ by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

_____
Mayor

Attest:

_____

City Clerk

Appendix G DMM COST BENEFIT ANALYSIS DATA

City of Riverbank
2010 Urban Water Management Plan

Demand Management Measure Cost-Benefit Analysis

DMM A - Water Survey Programs for Single-Family and Multi-Family Residential Customers

Unit Cost of Water	325	$/MG[a]
	100	$/AF

Cost

Employee	$	50.00	per hour[b]
(Salary and Benefits)	$	52,000	per year (half time)
Vehicle Cost	$	6,000	per year[c]
(capital depreciation, insurance, fuel, etc.)			
Materials	$	6,000	per year[d]
(faucets aerators, shower heads, etc.)			
Advertisement	$	400	per year
(flyers, web page development, etc.)			
Sub-Total of Annual Cost of Program	**$**	**64,400**	

Benefit

Single-Family Residence

Number of Single Family Residences	6,614	Units[e]
Number of Persons/Residence	3.5	Persons[f]
Per Capita Daily Water Consumption	200	gallons[g]
Estimated Water Savings per Residence	13	%[h]
Estimated Water Savings per Residence	33,200	gallons

	Predicted Participation		Water Savings	
year 1[i]	8	%	17,567,000	gallons
year 2	7	%	15,371,000	gallons
year 3	3	%	6,588,000	gallons
year 4	1	%	2,196,000	gallons
year 5	1	%	2,196,000	gallons

Sub-Total of Predicted Water Savings	43,918,000	gallons
(Water Savings expected over the 5-year horizon window)	130	acre*feet

Sub-Total of Cost Savings (5-year Horizon)	$	13,000
Average Annual Cost Savings	$	2,600

Total Predicted (5 year) Water Savings	130	acre*feet

Total of Cost Savings (5-year Horizon)	$	13,000
Average Annual Cost Savings	**$**	**2,600**

Annual Program Budget (Deficit)	**$**	**(61,800)**

Footnotes to DMM A Calculations Worksheet

a. Unit Cost of Water: $325/Million Gallons

b. City Employee Compensation: $50/hour
Based on an estimated $37/hour + 33% of hourly wage for fringe benefits

c. Annual Vehicle Cost: $ 6,000 per year
Presumes 10,000 miles per year

d. Materials Cost: $ 6,000 per year
Annual budget set aside for purchasing and providing faucet aerators and low-flow shower heads to program participants.

Cost of facet aerator:	$ 10	
Cost of shower head:	$ 15	
No. of participating houses:	1200	(total no. of houses over time horizon)
Time horizon	5	years
Annual materials cost:	$ 6,000	

e. Single-family Residences: 6614

f. Number of Persons per residence: 3.5

g. Water Consumtion: 200 gallons per capita per day

h. Estimated Water Savings: 13% per residence
Assumed typical value based off data provided in City of San Diego's Residential Water Survey Program. Water savings for single-family residences are expected to be larger than multi-family residences due to the large portion of water use dedicated to exterior irrigation.

i. Program Time Horizon: 5 years
A 5-year time horizon is considered in this study, which coincides with the period between UWMP updates. It is assumed that the maximum program participation during this 5-year period is 20%. All calculations of program costs and water savings are based on a 20% participation rate.

Demand Management Measure Cost-Benefit Analysis

DMM F - High Efficiency Washing Machine Rebate Program

Unit Cost of Water 325 $/MG[(a)]
100 $/AF

Washing machine cash rebate: $ 100

Number of residences	6400	
Number of persons per residence	3.5	
Average water use in washer	15	gallons per day per capita[(b)]
High-efficiency machine water use	6.75	gallons per day per capita[(c)]
Water savings	8.25	gallons per capita per day

Program participation

Time horizon **5 years**

Predicted Participation		Water Use (Normal)	Water Use (High Efficency)	Water Saved
Year 1	260 res.	13650 gpd	7508 gpd	6143 gpd
Year 2	260 res.	13650 gpd	7508 gpd	6143 gpd
Year 3	260 res.	13650 gpd	7508 gpd	6143 gpd
Year 4	260 res.	13650 gpd	7508 gpd	6143 gpd
Year 5	260 res.	13650 gpd	7508 gpd	6143 gpd

Total water saved: 6143 gpd
2,242,000 gallons per year
6.9 AF per year

Annual cost savings: **$ 688**

Cost

Time horizon **5 years**

	Predicted Participation	Rebate (Individual)	Rebate (Annual)	Other Costs (Disposal fees, advertisement, administrative, etc.)
Year 1	260 res.	$ 100	$ 26,000	$ 500
Year 2	260 res.	$ 100	$ 26,000	$ 500
Year 3	260 res.	$ 100	$ 26,000	$ 500
Year 4	260 res.	$ 100	$ 26,000	$ 500
Year 5	260 res.	$ 100	$ 26,000	$ 500

Expected annual cost: **$ 26,500**

Footnotes

a. Unit Cost of Water

b. Average Water Use — Amercian Water Works Association Research Foundation, *Residential End Uses of Water* , 1999, pp 104 -7

c. High-efficiency machine use — Based on an average per load reduction in water use of 40%

Demand Management Measure Cost-Benefit Analysis

DMM H - School Education Programs

Unit Cost of Water	325	$/MG[(a)]
	100	$/AF

Program Participation

School	**Enrollment**
Elementary	1618
Middle	556
High	537
Total	2711

Cost

Brochure creation	$	2,500	
Reproduction/distribution	$	2	per pamphlet
	$	5,400	total distribution
Total Annual Cost	**$**	**7,900**	

Benefit

There is no quantifiable benefit to the program

Footnotes

a. Unit Cost of Water

Demand Management Measure Cost-Benefit Analysis

DMM N - Residential Ultra-Low-Flush Toilet Replacement Program

Unit Cost of Water 325 $/MG[a]
100 $/AF

Ultra-Low-Flush Toilet Rebate $ 100

Number of eligible residences	3000	
Number of persons per residence	3.5	
Average number of flushes per person	5	per day[b]
Volumer per flush, standard toilet	5.5	gallons
Volumer per flush, ULF toilet	1.6	gallons
Water savings	3.9	gallons per flush

Program participation

Time horizon **5 years**

Predicted Participation		Water Use (Normal)	Water Use (High Efficency)	Water Saved
Year 1	120 res.	11550 gpd	3360 gpd	8190 gpd
Year 2	120 res.	11550 gpd	3360 gpd	8190 gpd
Year 3	120 res.	11550 gpd	3360 gpd	8190 gpd
Year 4	120 res.	11550 gpd	3360 gpd	8190 gpd
Year 5	120 res.	11550 gpd	3360 gpd	8190 gpd

Total water saved: 8190 gpd
2,989,000 gallons per year
9.2 AF per year

Annual cost savings: **$ 917**

Cost

Time horizon **5 years**

	Predicted Participation		Rebate (Individual)		Rebate (Annual)		Other Costs (Disposal fees, advertisement, administrative, etc.)
Year 1	120 res.	$	100	$	12,000	$	500
Year 2	120 res.	$	100	$	12,000	$	500
Year 3	120 res.	$	100	$	12,000	$	500
Year 4	120 res.	$	100	$	12,000	$	500
Year 5	120 res.	$	100	$	12,000	$	500

Expected annual cost: **$ 12,500**

Footnotes

a. Unit Cost of Water

b. Average Water Use — Amercian Water Works Association Research Foundation, *Residential End Uses of Water* , 1999, pp 96 -7