CITY OF PORTERVILLE

URBAN WATER MANAGEMENT PLAN
2010 UPDATE
AUGUST 2014

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ABBREVIATIONS – Entities

CDP ..... Census-Designated Place
CDPH ..... California Department of Public Health
DCTRA ..... Deer Creek and Tule River Authority
DWR ..... Department of Water Resources
ID ..... Irrigation District
IRWMP ..... Integrated Regional Water Management Plan
MOU ..... Memorandum of Understanding
PID ..... Porterville Irrigation District
SWRCB ..... State Water Resources Control Board
USBR ..... United States Bureau of Reclamation
UWMP ..... Urban Water Management Plan
UWMPA ..... Urban Water Management Plan Act
UWMPGB ..... UWMP 2010 Guidebook
WCP ..... Water Conservation Plan
WMP ..... Water Master Plan or Water System Master Plan

ABBREVIATIONS – Terminology & Units

AB ..... State Assembly Bill
ac ..... acre
ADD ..... Average Daily Demand
af ..... acre-feet
afy ..... acre-feet per year
bgs ..... below ground surface
cfs ..... cubic feet per second
CWC ..... California Water Code
DMM ..... Demand Management Measures
DU ..... Dwelling Unit
ETo ..... Evapotransporation
ft ..... feet
gpd ..... gallons per day
gpcd ..... gallons per capita per day

MDD ..... Maximum Day Demand
MG ..... Million Gallons
mgd ..... million gallons per day
µg/L ..... micrograms per liter
pCi/L ..... picocuries per liter
PHG ..... Public Health Goal
PKH ..... Peak Hour Demand
psi ..... pounds per square inch
SB ..... State Senate Bill
TCP 1,2,3-Trichloropropane
UDB ..... Urban Development Boundary
ULF ..... Ultra-Low Flush Toilet

1 INTRODUCTION

1.1 Purpose

The Urban Water Management Plan (UWMP) is a requirement of the Urban Water Management Planning Act (UWMPA) (Division 6, Part 2.6 of the California Water Code [CWC] §10610-10656). The UWMPs must be filed every five years and submitted to the Department of Water Resources (DWR). The submittal is required to meet the requirements of the UWMPA, including the most current amendments that have been made. The UWMPA applies to urban water suppliers with 3,000 or more connections being served or supplying more than 3,000 acre-feet (AF) of water annually.

UWMPs are required of the state's urban water suppliers in an effort to assist their resource planning and to ensure adequate water supplies are available for future use. A secondary purpose of the UWMP is to provide for a plan or series of plans during water drought situations. This report was prepared according to the requirements of the CWC, UWMPA and the UWMP Guidebook 2010.

1.2 Background

1.2.1 Urban Water Management Planning Act

In 1983, SB797 altered Division 6 of the CWC by producing the UWMPA. Since 1983, several amendments to the original document have increased the requirements of the UWMPs submitted today. One such amendment required projections for water use to extend 20 years at 5-year intervals. Recently, this has been increased to a 25-year projection providing for a minimum 20-year projection up until the next UWMP is completed.

Various other amendments have increased requirements to include sections on recycled water use, demand management measures (DMMs), and water shortage contingency plans. Recycled water use sections were added to assist in evaluation of alternate water supplies for future use when projects exceed the current water supplies. Demand management measures must be clearly described including which measures are being implemented and which are scheduled for implementation in the future. Water contingency plans are to be prepared and coordinated with other water suppliers in the area for use during times of drought. Pertinent bills that have passed are included in **Table 1-1**.

Table 1-1: Pertinent Bills

Bill	Requirements
SB610 and AB901	Consideration of water availability when reviewing new large developments
SB318	Investigate possibilities of developing desalinated water
AB105	Submit UWMP to State Library
Water Conservation Bill (2009)	Urban water suppliers to reduce the statewide average per capita daily water consumption by 20% by December 31, 2020

1.2.2 Previous Urban Water Management Plan

The City of Porterville (City) previously prepared an UWMP in 2007. This 2010 UWMP serves as an update to the previous UWMP and complies with all new requirements and regulations.

1.3 Resource Maximization/Import Minimization

The City has strived to maximize their existing water resources to minimize the need to import water. This has been done through conservation programs, especially metering, to minimize per capita consumption. The City's per capita demands are lower than most cities in the area. However, an expanding population has required more groundwater pumping. This has stressed the local groundwater supplies and well yields are declining. Consequently, the City has begun to secure surface water contracts.

According to the 2005 UWMP, the City of Porterville and Porterville Irrigation District (PID) had recently completed a Memorandum of Understanding (MOU) regarding cooperative water operations. In the MOU, the two parties agreed to jointly develop and conduct programs to increase surface water imports to the City.

The City has not historically worked much with other agencies in the management of their water resources. However, the City plans to build closer relations with the County of Tulare and nearby irrigation and water districts. The City began to develop those relationships during preparation of the General Plan Update in 2006 and continues to build on those relationships.

The City has not been a participant in an Integrated Regional Water Management Plan (IRWMP), but they are interested in evaluating the benefits of participation. Funding is available from Propositions 50 and 84 for IRWMPs. PID may prepare an IRWMP with the member agencies of the Tule River Improvement Joint Powers Agreement, since it includes most of the important regional water users. The City may also consider preparing an IRWMP with the Tulare County Association of Governments. Historically, this group has coordinated mostly on transportation projects, but they could feasibly collaborate on water projects also.

2 PLAN PREPARATION

2.1 Coordination

Legal Requirements:

§10620(d)(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

§10621(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by §10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

§10635(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

§10642 Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.

§10642 Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.

The efforts to prepare this UWMP were coordinated with appropriate agencies to provide the most accurate and clear representation of the water supply in the City.

Table 2-1: Coordination with Appropriate Agencies

(UWMPGB Table 1)

Coordinating Agencies	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Contacted for Assistance	Sent a Copy of the Draft Plan	Sent a Notice of Intention to Adopt
Porterville Irrigation District					X	X
Terra Bella ID					X	X
Saucelito ID					X	X
Lower Tule River ID					X	X
Vandalia ID					X	X
Tea Pot Dome ID					X	X
Tulare County					X	X
Tule River Association					X	X

2.2 Plan Adoption, Submittal, and Implementation

Legal Requirements:

§10640 – 10621(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3.

§10642 After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

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

§10644(a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

§10645 Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

The City will hold a public hearing and adopt the 2010 UWMP on or about August 19, 2014. A copy of the adopting resolution is included in Appendix A. Prior to the public hearing, a notice will be published notifying the public of the pending hearing.

Once the UWMP has been adopted, a copy of the UWMP and amendments will be submitted to DWR and the State Library. Once submitted to DWR, a copy will be made available for public review for 30 days and submitted to Tulare County within 60 days.

3 SYSTEM DESCRIPTION

3.1 Service Area Physical Description

Legal Requirements:

§10631(a) Describe the service area of the supplier.
§10631(a) (Describe the service area) climate.

3.1.1 Location and History

The city of Porterville is located in the San Joaquin Valley in central California. The city is nestled against the western edge of the Sierra Nevada foothills in the southern portion of Tulare County. Porterville is approximately 24 miles southeast of Visalia, California, and 50 miles north of Bakersfield, California. The Friant-Kern Canal, a major conveyance facility of the Central Valley Project, passes approximately four miles to the west of the center of the city. The city is also situated approximately one mile east of the Porterville Irrigation District (PID). PID encompasses about 17,400 acres in Tulare County.

The city of Porterville covered approximately 13.3 square miles in 2005 and 17.6 square miles in 2010 (2010 Census). This UWMP focuses on the city, but still addresses some areas outside of the City that are within the Planning Area as defined in the General Plan update. As described in the General Plan adopted in 2008, the Planning Area covers about 36,341 acres (56.8 square miles). Approximately 25,100 acres (39.2 square miles) or about 70 percent of the Planning Area lies outside of the existing city limits within unincorporated Tulare County. The Planning Area encompasses land that is of interest for long-term planning, including hillsides and surrounding agricultural land. However, being included within the Planning Area does not necessarily mean that the City is considering annexation.

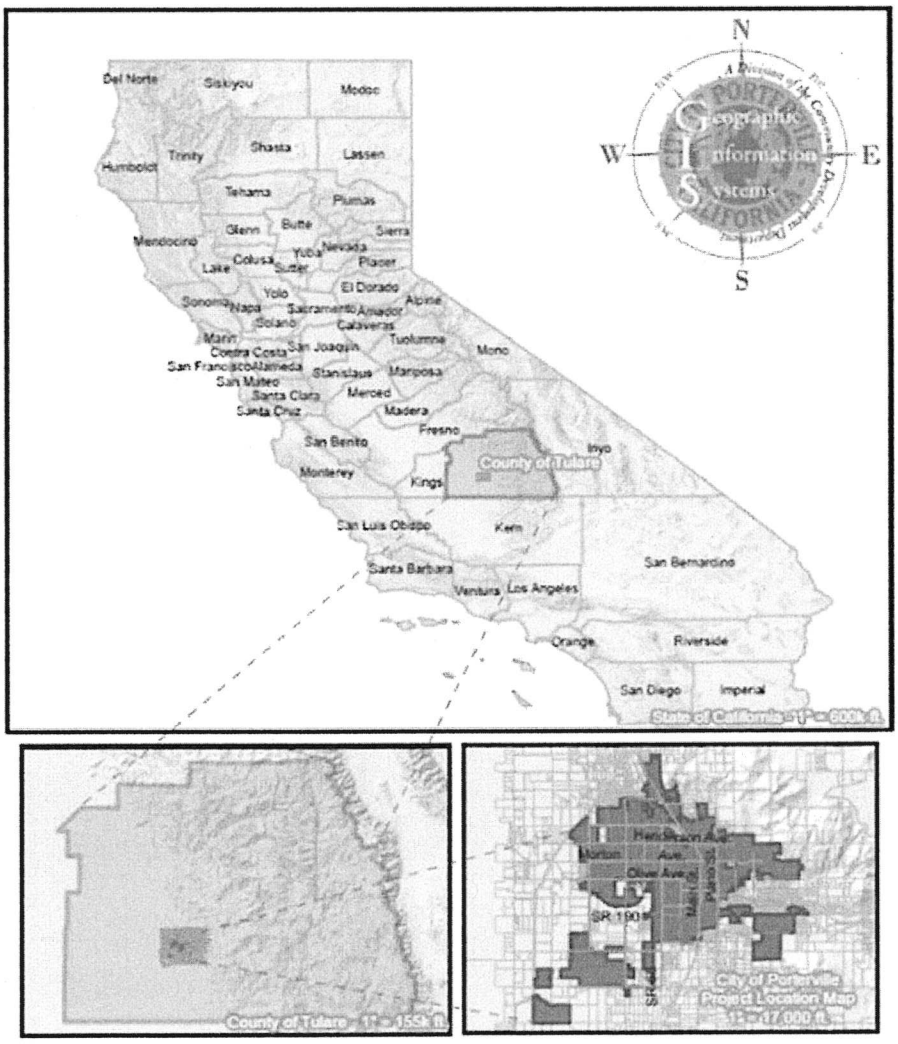
The Tule River, which flows through the southern portion of the city, is one of the principal watercourses in Tulare County. The city is bisected by the Tule River, dividing the northern and southern portions of the city. Under normal conditions, discharge in the Tule River is regulated by Success Dam, located approximately five miles upstream. Tule River flood stages at the city have been reduced significantly by Success Dam, which is operated for flood control by the US Army Corps of Engineers. The 100-year floodplain for the Porterville urban area is delineated by the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps and these floodplains closely correspond to the watercourses that flow through the city. The main channel of the Tule River can pass flows of about 10,000 cubic feet per second (cfs) before extensive damage occurs. Damage to urban property would occur at flows of approximately 16,000 cfs.

Porter Slough is a natural tributary of the Tule River and flows through the center of the urban area (see Figure 3-1: Regional Location Map). It originates from the Tule River approximately 4 miles upstream from the center of the city, and returns to the river

approximately 17 miles below its point of origin. Porter Slough has a designated capacity of 450 cfs and is an officially designated floodway of Tule River, as determined by the Central Valley Flood Protection Board (known as the Reclamation Board prior to 2008). In practice, the policy has been to prevent Tule River flood flows from entering Porter Slough in order to avoid potential flooding problems in central Porterville. However, controlled flows are released into Porter Slough for groundwater recharge.

Private ditches form another major water feature in the area. Seven ditch companies divert water from points within the Planning Area: Pioneer, Campbell-Moreland, Porter Slough, Vandalia, Poplar, Hubbs-Miner, and Woods-Central. In addition to delivering water for irrigation, these ditches also provide extra capacity to carry peak flood flows and urban stormwater runoff. The Friant-Kern Canal defines the western edge of the Planning Area. Water in the Canal is imported from the San Joaquin River northeast of Fresno, and distributed to the western portion of the Planning Area by the Porterville Irrigation District.

Figure 3-1: Regional Location Map



3.1.2 Land Use

According to the 2008 General Plan, Single-Family Residential and Public/Quasi-Public were the most significant existing land uses located within the 2005 city limits, each representing more than 20 percent of the total land use. More than 1,500 acres (17 percent) of the incorporated land was designated as vacant, with no identified land use designation. Within the Planning Area, approximately 21,270 acres (59 percent) of the total land area was being used for agriculture and other rural uses. Thirteen percent of the entire Planning Area was categorized as single family residential and 10 percent was considered vacant.

Other land uses in the Planning Area include commercial, retail, and industrial. Downtown lies near the center of the Planning Area, bordered by Morton Avenue to the north, Olive Avenue to the south, D Street to the west, and Fourth Street to the east. Main Street is the central commercial street. Other large commercial areas are located along State Route 65 (SR 65) and Olive Avenue. The majority of the industrial sites are in proximity to the intersection of SR 190 and Main Street, and in proximity to the Union Pacific Railroad. A few industrial developments are also located near the Porterville Municipal Airport. **Table 3-1** indicates the distribution of land amongst the various land use categories, as discussed in the 2008 General Plan.

Table 3-1: Land Use Categories (source: *Porterville General Plan* (2008))

	Incorporated		*Unincorporated*		*Total Planning Area*	
Land Use	Area (acres)	Percent of Total (%)	Area (acres)	Percent of Total (%)	Area (acres)	Percent of Total (%)
Agricultural/Rural/Conservation	820	9%	20,390	75%	21,210	58%
Single-Family Residential	2,230	24%	2,525	9%	4,760	13%
Multi-Family Residential	170	2%	65	0%	240	1%
Retail Shopping	80	1%	0	0%	80	0%
Commercial	480	5%	277	1%	760	2%
Industrial	320	3%	31	0%	350	1%
Public/Quasi-Public	2,020	22%	614	2%	2,630	7%
Vacant	1,580	17%	2,009	7%	3,590	10%
Unclassified (roads, water, etc.)	1,461	16%	1,220	4%	2,680	7%
Total	9,161	100%	27,131	100%	36,300	100%

3.1.3 Climate

Porterville has an inland Mediterranean climate that is characterized by warm, dry summers and cooler winters. Summer high temperatures often exceed 100 degrees Fahrenheit (°F), averaging in the mid-90s. The daily summer temperature variation can be as high as 30°F. Winters are for the most part mild and humid. Average high temperatures during the winter are in the high 50s to low 60s, while the average daily low temperature is in the 40s. The average annual precipitation in the Porterville area is approximately 11 inches. Approximately 85 percent of the annual precipitation occurs between November and April.

Table 3-2 summarizes the climate data for the city.

Table 3-2: Climate Characteristics

Month	Average Eto	Maximum Temperature	Minimum Temperature	Average Temperature	Average Rainfall
January	1.04	58.5	38.6	48.5	2.10
February	1.88	64.9	42.0	53.5	1.94
March	3.65	71.1	45.7	58.4	2.00
April	5.53	77.2	49.2	63.2	1.05
May	7.20	85.9	55.5	70.7	0.41
June	8.00	93.3	61.8	77.6	0.10
July	8.40	98.8	67.6	83.2	0.02
August	7.46	97.7	65.8	81.8	0.02
September	5.56	92.6	61.0	76.8	0.16
October	3.89	82.3	52.4	67.4	0.56
November	1.89	68.4	43.3	55.8	1.15
December	1.05	58.6	38.0	48.3	1.71
Annual	55.55	79.2	51.8	65.5	11.22

Notes:

1) Rainfall and temperature data from Western Regional Climate Center, Porterville Station, based on data from 1981-2010.
2) Evapotranspiration data from California Irrigation Management Information System Porterville (#169) Station, based on data from 2000-2012.

3.2 Service Area Population

Legal Requirements:

§10631(a) (Describe the service area) current and projected population...The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier...

§10631(a) ... (population projections) shall be in five-year increments to 20 years or as far as data is available.

§10631(a) Describe...other demographic factors affecting the supplier's water management planning.

Over the past 30 years, the city of Porterville's population has grown at an average annual rate of 3.7 percent. However, the City's population growth has slowed to an average annual rate of 2.8 percent over the past 15 years. According to the 2010 Census, the city currently has a population of 54,165. Water service is provided to an additional population outside of the city limits of about 4,067 in 2010, for a total 2010 population of 58,232. Buildout according to the 2008 General Plan would accommodate a population of 107,300 residents in the Planning Area through year 2030. However, based on the 2010 population of 54,165, and maintaining the projected annual population growth rate of 3.7 percent, as contemplated in the General Plan, the projected 2030 population is 120,431.

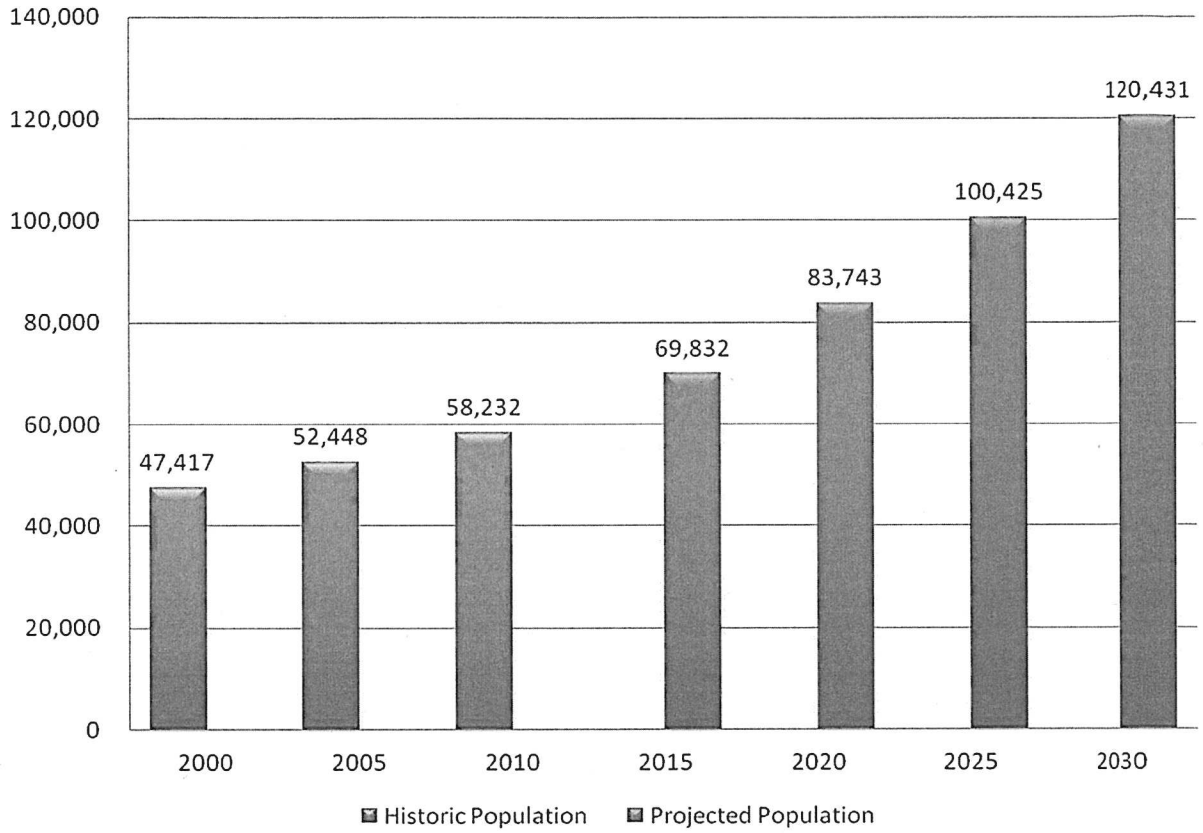
Table 3-3: Service Population – Current and Projected

(UWMPGB Table 2)

	2010	2015	2020	2025	2030
Service area population[1]	58,232[2]	69,832[3]	83,743[3]	100,425[3]	120,431[3]

[1] Service area population is defined as the population served by the distribution system.
[2] Source: Census (2010) plus population outside of city limits.
[3] Population projections based on 3.7% annual increase (City of Porterville General Plan).

Figure 3-2: Population – Historical and Projected



The current 2010 City of Porterville population is 54,165 persons in a gross area of 11,270 acres. That equates to an average density of 4.8 persons per gross acre, within the City limits. The current 2010 population between the City limits and the proposed Urban Development Boundary (UDB) is 4,067 persons within 4,900 acres. The service area population includes the City population and the remaining population within the UDB but outside of the City limits, for a total 2010 population within the UDB of 58,232.

4 SYSTEM DEMANDS

4.1 Historical Water Use

Water demands within the City's service area are largely residential, with commercial, industrial, institutional, and City-related consumption accounting for approximately 25% of the total water demand (Water Master Plan 2001). As of 2010, the City has 14,746 metered services, which is 97% of the total service connections.

In 2010, the City produced 12,380 AF (4,034,035,380 gallons) of water from groundwater supplies to serve a population of about 58,232. **Table 4-1** details the actual water deliveries for 2005 in terms of metered versus unmetered services.

The City's water use increased in a fairly linear fashion through 2007. Beginning in 2008, water use began to decline due to economic conditions and water conservation measures. It is anticipated that overall use will continue to increase, but at a slower pace due to growth policies and conservation measures being implemented.

Table 4-1: Water Deliveries – 2005

(UWMPGB Table 3)

	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume[3]	Volume
Single family	11,907	6,903	449	413	7,316
Multi-family	800	1,296	6	14	1,310
Commercial/Institutional	1,086	2,119	4	12	2,132
Industrial	22	177			177
Landscape Irrigation	2	48			48
Other	156	599			599
Agricultural Irrigation					0
System Losses[1,2]				610	610
Total	13,953	11,142	459	1,049	12,191

Units: acre-feet per year

1. Unaccounted for system losses are estimated to be five percent of total production.
2. System losses may include leaks, flushing, fires, flow testing, backflushing, etc.
3. Volumes for unmetered connections are estimated based on the total volume less the metered volume and system losses, and the number of unmetered connections for each water use sector.

Approximately 97 percent of the city of Porterville and surrounding communities served by the City water supply system are metered. All new construction will be metered, and meters may be installed on existing unmetered service connections at the request of the customer. There is no proactive system in place to retrofit the remaining unmetered services with meters at this time.

4.2 Baselines and Targets

Legal Requirements:

> *§10608.20(e) An urban retail water supplier shall include in its urban water management plan...due in 2010 the baseline daily per capita water use, 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.*

Determining the City's baseline per capita use is the first step of calculating the required targets for the 20-year planning period, which will allow DWR to determine the City's compliance with required reduction described in the Water Conservation Bill of 2009.

4.2.1 Baseline

The first step in developing a baseline water usage rate for the City is determining the applicable range of years for which the baseline average will be calculated. It was determined that the City will use the 10-year approach since the City had no recycled water deliveries in 2008. A 5-year baseline is also calculated to assist in establishing the reduction targets. A summary of the 2008 total and recycled water deliveries, 10-year baseline range, and 5-year baseline range is included in **Table 4-2**.

Table 4-2: Base Period Ranges

(UWMPGB Table 13)

Base	Parameter	Value
10-year base period	2008 total water deliveries	13,615
	2008 total volume of delivered recycled water	0
	2008 recycled water as a percent of total deliveries	0
	Number of years in base period[1]	10
	Year beginning base period range	2000
	Year ending base period range[2]	2009
5-year base period	Number of years in base period	5
	Year beginning base period range	2003
	Year ending base period range[3]	2007

Units : acre-feet per year

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

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

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

The data used to calculate the baseline is summarized in the following table. The UWMPA requirements state a continuous range must be used with the range ending between the end of 2004 and 2010.

Table 4-3: Base Daily Per Capita Water Use – 10 Year Range

(UWMPGB Table 14)

Base period year		Distribution system population[1]	Daily system gross water use (AF/yr)	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year				
Year 1	2000	47,417	10,577	9.4	199
Year 2	2001	48,638	11,174	10.0	205
Year 3	2002	50,092	12,497	11.2	223
Year 4	2003	50,134	12,340	11.0	220
Year 5	2004	51,401	12,796	11.4	222
Year 6	2005	52,448	12,191	10.9	208
Year 7	2006	50,740	12,767	11.4	225
Year 8	2007	56,698	13,775	12.3	217
Year 9	2008	56,911	13,615	12.2	214
Year 10	2009	57,318	13,156	11.7	205
				Base Daily Per Capita Water Use	**214**

1. Population based on DOF Table E-4 (city of Porterville), 2001-2010 with 2000 and 2010 Census Counts, plus number of connections outside of the city limits at an average occupancy of 3.2 persons per unit.

The following table summarizes the data used to calculate the 5-year baseline, which has a UWMPA requirement to be a continuous range, ending between the end of 2007 and 2010.

Table 4-4: Base Daily Per Capita Water Use – 5 Year Range

(UWMPGB Table 15)

Base period year		Distribution system population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	50,134	11.0	220
Year 2	2004	51,401	11.4	222
Year 3	2005	52,448	10.9	208
Year 4	2006	50,740	11.4	225
Year 5	2007	56,698	12.3	217
			Base Daily Per Capita Water Use	**218**

4.2.2 Targets

Four methods have been developed to determine water use targets for the City. The UWMPA requires a target be established for 2020 and an interim target for 2015. Each method and its calculated water use are described below.

4.2.2.1 Method 1 – 80 Percent

Method 1 is based upon the determined base daily per capita use as determined by the water supplier. The base daily per capita use is 214 gallons per capita per day (gpcd). Method 1 requires that this usage be reduced to by 20%, yielding a target use of 171 gpcd.

4.2.2.2 Method 2 – Performance Standards

Method 2 uses commercial, industrial, institutional, indoor residential, and landscape water usage quantities to calculate a water use target. The City's data is deficient of landscape water usage, therefore making this method impractical for use in calculating a target water use.

4.2.2.3 Method 3 – 95 Percent Hydrologic Region Target

Method 3 is based upon the hydrologic region target, which is reduced by 5% to obtain the 95% target. According to the 20x2020 Water Conservation Plan, the region-specific conservation goal is 188 gpcd for the Tulare Lake region. With this information, Method 3 yields are a target use of 179 gpcd.

4.2.2.4 Method 4 – Provisional

Development of Method 4 by DWR began in February 2010. The draft method was released on January 24, 2011. The draft method had to be presented to several agencies including the California Water Commission before being adopted in mid-February 2011 and being released along with DWR's final 2010 guidebook. DWR has stated that this is a provisional method, subject to later revisions during the 2015 UWMP cycle. The methodology for the provisional draft method relies on the base daily per capita use in 2000 and reduction in the three urban use sectors:

- Residential indoor;
- Commercial, industrial, and institutional (CII); and
- Landscape use and water loss.

A discussion of each of these components, and the calculated savings in each of these sectors is included below.

4.2.2.4.1 Residential Indoor Savings

Since indoor and outdoor water use is delivered through a single meter, an assumption of 70 gpcd has been provided by DWR for standard residential indoor water use. To determine indoor residential savings, the draft provisional method outlines two methodologies. First, a best management practices (BMP) calculator has been developed to sum the savings for three conservation elements including single and multi-family residential housing toilets, residential washers, and showerheads. Due to insufficient data on the implementation of these water-saving measures, it will not be discussed further or used to assess indoor residential savings for the city. Therefore,

the City will use what has been termed the "default option" to determine these savings. Based on the draft provisional method, this default value is 15 gpcd.

4.2.2.4.2 Commercial, Industrial and Institutional Savings

Baseline CII water can be easily established for the City since more than 99 percent of the commercial, industrial, and institutional connections were metered in 2000, 2005 and 2010. The calculated baseline for CII use (over the same 2000 through 2009 period) was 42.8 gpcd. The draft provisional method estimates a default value for CII savings of 10 percent. The CII water savings are therefore 4.3 gpcd.

4.2.2.4.3 Landscape and Water Loss Savings

The landscape and water loss water use is determined by subtracting the default indoor water use of 70 gpcd and CII water use of 43 gpcd from the calculated base line per capita use of 214. Based on calculated baseline per capita water use, the landscape and water loss use is 101 gpcd. The draft provisional method estimates a default value for landscape and water loss savings of 21.6 percent. The landscape and water loss savings are therefore 21.9 gpcd.

4.2.2.4.4 Metered Savings

Metered savings are considered in addition to the savings attributed to the three sectors previously discussed. Based on the provisional method, a meter savings of 20 percent is applied to the average delivery per unmetered connection in the midpoint of the baseline period. Using the assumed savings outlined in the provisional method of 20 percent, savings from metering is calculated as 3.6 gpcd.

4.2.2.4.5 Summary

Based on the steps above, the total water savings is estimated at 44.7 gpcd. When compared with the baseline demand of 214 gpcd, this would result in a water conservation target of 169 gpcd.

Table 4-5: Method 4 Summary

	Baseline Water Use (gpcd)	Water Savings (gpcd)
Residential Indoor	70[1]	-15[2]
CII	43[1]	-4.3[3]
Landscape/Water Loss	101	-22[4]
Metered	N/A	-3.6[5]
Totals	214	-44.7
Net Usage	**169**	

[1] Assumed value based on UWMPGB Draft Provisional Method 4
[2] Residential indoor water savings based on UWMPGB Draft Provisional Method 4
[3] CII water savings of 10% based on UWMPGB Draft Provisional Method 4
[4] Landscape and Water Loss savings of 21.6% based on UWMPGB Draft Provisional Method 4
[5] Metered savings of 20% based on UWMPGB Draft Provisional Method 4

4.2.2.5 Minimum Water Use Reduction Requirement

The final step in determining the applicability of the water use target for the City is to confirm the water use targets discussed above meet the minimum reduction requirements as defined by DWR. The minimum reduction required by DWR must be below 95 percent of the 5-year baseline, which is 218 gpcd, as defined in **Table 4-4**.

4.2.3 Summary of Baseline and Targets

Based on the water use targets, the City's water use target for 2020 is 179 gpcd, while the interim 2015 target is 197 gpcd (based on 50% of the target conservation below the 10-year baseline). The 2020 target was determined using Method 3, 95% of the regional water conservation goal. According to DWR guidelines, this target is valid because it is less than the target confirmation. A summary of the baselines and targets is presented in the following table.

Table 4-6: Baseline and Targets Summary

Baselines (gpcd)	
10-Year	214
5-Year	218
Target Determinations (gpcd)	
Method 1	171
Method 2	N/A
Method 3	179
Method 4	169
Target Confirmation (gpcd)	207
Target Selected (gpcd)	179
Interim Target (gpcd)	197

Notes:
Method 1: 80% of 10-Year Baseline
Method 3: 95% of Hydrologic Region Target (Tulare – 179 gpcd)
Target Confirmation: 95% of 5-Year Baseline
Interim Target: Target Selected plus 10-year Baseline, divided by 2

4.3 Water Demands

Legal Requirements:

§10631(e)(1) Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) Agricultural.

§10631(e)(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

§10631.1(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

Since 2005, new connections to the water system have been added at an average annual rate of 1.1% with an overall water demand increase of 0.3% per year. Approximately 97% of the system is metered, which intrinsically commands a water use efficiency characteristic within the community, promoting conservation. This has contributed to an overall decrease in per capita water consumption over the past five years.

Table 4-9 illustrates current and projected water demand from 2010 to 2030 in acre-feet per year and the number of metered/non-metered service connections for the same

time period. The data for the year 2010 is actual data. For future years the data is projected based on general plan land uses, projected growth rates, and historic demands.

Table 4-7: Water Deliveries 2010 – 2030

(UWMPGB Tables 4, 5, 6 & 7)

	2010				
	Metered		Not Metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	12,578	6,401	361	650	7,051
Multi-family	747	1,224	105	564	1,788
Commercial/Institutional	1,071	1,989	3	19	2,007
Industrial	18	78			78
Landscape Irrigation	161	410			410
Other	171	411	2	16	427
Agricultural Irrigation					0
System Losses[1,2]				619	619
Total	**14,746**	**10,513**	**471**	**1,867**	**12,380**
	2015				
	Metered		Not Metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	15,228	7,919	289	607	8,525
Multi-family	938	1,520	84	487	2,007
Commercial/Institutional	1,286	2,508	2	12	2,520
Industrial	22	110			110
Landscape Irrigation	193	802			802
Other	206	659	2	16	675
Agricultural Irrigation					0
System Losses[1,2]				770	770
Total	**17,873**	**13,517**	**377**	**1,815**	**15,410**
	2020				
	Metered		Not Metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	18,435	9,053	208	191	9,245
Multi-family	1,175	1,880	60	144	2,024
Commercial/Institutional	1,543	2,932	1	3	2,935
Industrial	26	120			120
Landscape Irrigation	231	878			878
Other	248	744	1	6	750
Agricultural Irrigation					0
System Losses[1,2]				840	840
Total	**21,658**	**15,607**	**270**	**1,184**	**16,791**

	2025		2030	
	Metered		Metered	
Water use sectors	# of accounts	Volume	# of accounts	Volume
Single family	22,357	11,179	26,811	13,406
Multi-family	1,481	2,370	1,776	2,842
Commercial/Institutional	1,852	3,519	2,221	4,220
Industrial	31	140	37	170
Landscape Irrigation	277	1,025	332	1,262
Other	299	897	359	1,077
Agricultural Irrigation				
System Losses[1,2]		1,007		1,207
Total	**26,297**	**20,136**	**31,536**	**24,183**

Units: acre-feet per year
1. Unaccounted for system losses are estimated to be five percent of total production.
2. System losses may include leaks, flushing, fires, flow testing, etc.

4.3.1 Residential Customer Class

Rural Residential This designation is intended to allow opportunities for rural living on lots ranging in size from 2.5 to 10 acres or more. This land use is around the periphery of the community because it helps serve as a transition between agriculture/open space and more intensive urban uses. This type of development helps define the limits of urban development. Clustered development is encouraged, and smaller lots may be allowed, provided that the overall density does not exceed 0.2 units per acre, with lower limits applying in the Hillside Development Zone.

Resort Residential This designation is intended to allow residential development along the Lake Success shore and surrounding hillsides. There is an emphasis on creating a resort community with supporting commercial and recreation uses. Pedestrian-oriented design standards, including clustered development patterns, will promote sustainable development. The maximum overall density is 5.0 units per acre, with lower limits applying in the Hillside Development Zone.

Very Low Density Residential This designation is typical of large lot or executive home single-family subdivisions. The maximum residential density is 2.5 units per gross acre.

Low Density Residential This density represents typical single-family subdivisions. The maximum residential density is 6.0 units per gross acre.

Low-Medium Density Residential This density is also for typical single-family subdivisions, but allows for smaller lots. The maximum residential density is 9.0 units per gross acre.

Medium Density Residential This density range would accommodate a variety of housing types, such as small-lot single-family homes, detached zero lot line developments, duplexes, townhouses, and garden apartments. Pedestrian-oriented design and clustered development can support higher levels of density. The maximum residential density is 12.0 units per gross acre.

High Density Residential This classification is intended to accommodate attached homes, two- to four-plexes, and apartment buildings. The maximum residential density is 24.0 units per gross acre.

4.3.2 Mixed-Use Customer Class

Downtown Mixed-Use Downtown Mixed-Use development allows for a mostly vertical mix of commercial, service, office, and residential uses. The vertical nature of this type of use may allow for a reduction in the minimum parking requirements. This designation allows a maximum FAR of 3.0. The maximum residential density is 30.0 units per gross acre.

Commercial Mixed-Use This designation allows for either horizontal or vertical mixed-use development. Commercial, service, office, and residential uses are allowed. Buildings more than one story are strongly encouraged. The designation allows a maximum FAR of 2.0. The maximum residential density is 24.0 units per gross acre.

4.3.3 Commercial/Office/Industrial Customer Class

Downtown Retail Pedestrian-oriented and "Main Street" design standards, a vertical mix of uses, and the retention of a unique retail environment is the focus in the Downtown area. This designation allows for a maximum FAR of 3.0.

Retail Centers Design and use standards will be established for regional shopping centers located at major circulation intersections. Large format or "big box" retail and auto sales as well as travel related services, such as hotels and gas stations are allowed. This designation allows for a maximum FAR of 0.35.

General and Service Commercial This designation is intended for retail and services uses that meet local and regional demand. Examples of allowable uses include: equipment rental and repair, commercial print shops, auto sales, storage facilities, and wholesale businesses, and specialized retail not normally found in shopping centers. Accessory office uses related to the primary commercial use are also allowed. This designation allows for a maximum FAR of 0.40.

Neighborhood Commercial This designation is intended for small-scale commercial development that primarily provides office space and convenience retail for local neighborhoods. This designation allows for a maximum FAR of 0.30.

Professional Office This designation is intended for office complex development, including professional and medical offices, as well as research and development activities. Small restaurants, support services, convenience retail and limited medium and high density residential are also allowed. This designation allows for a maximum FAR of 0.50.

Industrial Park This designation comprises a mix of light industrial, secondary office, bulk retail, and service uses. Typical uses include warehouse, mini-storage, research and development, wholesale, bulk retail, and office space with limited customer access. Other uses may be allowed, such as commercial recreation, distribution centers, or other uses that require large, warehouse-style buildings. Small-scale retail and service

uses serving local employees and visitors are permitted as secondary uses. This designation allows for a maximum FAR of 0.40.

Industrial This designation allows primary manufacturing, refining, and similar activities including those with outdoor facilities. It also accommodates warehousing, distribution, with support commercial services and ancillary office space. No retail uses are allowed. This designation allows for a maximum FAR of 0.60.

4.3.4 Agricultural/Rural/Conservation

This designation preserves agricultural and resource conservation areas. Incidental residential uses with septic systems are allowed, subject to health and environmental standards. Clustered housing is strongly encouraged because it makes the provision of other infrastructure, such as roads and electricity, more cost-effective and limits the impact on natural resources. Industrial gravel and aggregate mining is allowed in areas designated as Mineral Resource Zones.

4.3.5 Public Uses and Open Space

Public/Institutional This designation is intended for lands owned by public entities, including the Municipal Airport, City Hall, County buildings, and the hospital. At the Municipal Airport, industrial park uses will be allowed. It will provide for needed public facilities, including, but not limited to, recycling centers, sewage treatment ponds, and police and fire stations. This designation allows for a maximum FAR of 0.25.

Education This designation is intended for lands owned by public or private entities for educational purposes, including schools, colleges, vocational training facilities, and administrative offices.

Commercial Recreation This designation is intended for campgrounds, off-road vehicle complexes, and other recreation areas where patrons usually pay to participate. The maximum FAR is 0.10.

Park This designation applies to both public and private recreation sites and facilities. It allows for a maximum FAR of 0.10.

4.4 Water Demand Projections

Legal Requirements:

> *§10631(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).*

The population growth data summarized in **Table 3-3** was used to estimate the future water use within the city. The population in 2010 was 58,232 and is projected to reach 120,431 in 2030.

The City of Porterville does not currently sell water to any other agencies, and has no plans to sell water to other agencies in the future.

Table 4-8: Sales to Other Water Agencies

(UWMPGB Table 9)

Water distributed	2005	2010	2015	2020	2025	2030
N/A	0	0	0	0	0	0
Total	0	0	0	0	0	0
Units :acre-feet per year						

The City has projected future additional water uses and losses including use of water for groundwater recharge. These values are presented in **Table 4-9**, but they do not represent additional water sources or demands. All water that is recharged will later be pumped and consumed; hence, it is incorporated into the numbers in **Table 4-7**. Recycled water is used for groundwater recharge and crop irrigation, however it is not used to directly meet the demands of the city customers, and is therefore not considered in this section. System losses have already been accounted for in **Table 4-7**, and are not reproduced in **Table 4-9**.

Table 4-9: Additional Water Uses and Losses

(UWMPGB Table 10)

Water use	2005	2010	2015	2020	2025	2030
Groundwater Recharge[1]	0	0	0-1,800	0-1,800	0-1,800	0-1,800
Untreated Surface Water[2]	0	0	0	0	0	0
Recycled water[3]	0	0	0	0	0	0
System losses[4]	0	0	0	0	0	0
Total	0	0	0-1,800	0-1,800	0-1,800	0-1,800
Units :acre-feet per year						

Source:
[1] Only a range of values for groundwater recharge can be provided at this time. Recharge is assumed to range from 0% to about 200% of annual average surface water deliveries (2005 UWMP).
[2] No untreated surface water considered.
[3] No recycled water considered.
[4] System losses are assumed to be 5% of total water delivered into the system; these losses have already been accounted for in Table 4-1and Table 4-7.

Table 4-10: Total Water Use

(UWMPGB Table 11)

Water Use	2005	2010	2015	2020	2025	2030
Total water deliveries[1]	12,191	12,380	15,410	16,791	20,136	24,183
Sales to other water agencies[2]	0	0	0	0	0	0
Additional water uses and losses[3]	0	0	0-1,800	0-1,800	0-1,800	0-1,800
Total	12,191	12,380	15,410	16,791	20,136	24,183

Units :acre-feet per year

[1] Table 4-1 and Table 4-7
[2] Table 4-8
[3] Table 4-9

As shown above, the total water use for the City service area will continue to increase due to population growth.

4.5 Planned Development

§10910(a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

§10912 For the purpose of this part, the following terms have the following meanings:

§10912(a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Legal Requirements:

Within the next five years the City has a few large scale projects planned that may fall within the statutory definition under *§10912(a).* They include the River Walk Commercial Center located on S. Jaye Street at the intersection with Hwy. 190, and the South County Detention Facility located on Scranton Ave at the intersection with Newcomb Street.

4.5.1 Low Income Projected Water Demands

The City of Porterville General Plan references the Housing Element, which is included in a separate volume and was adopted in March 2004. The Housing Element has since been updated, and a Final Draft Housing Element was updated on May 18, 2010. The Housing Element contains the Regional Housing Needs Allocation (RHNA) and the assumptions used to develop the allocations. The RHNA identified the need to construct 1,224 very low-and 862 low-income housing units by 2014. Since the RHNA used January 1, 2007, as the baseline for growth projections for the Housing Element planning period of 2009-2014, any new units built or issued certificates of occupancy since 2007 may be counted. Based on the 2010 Housing Element, 213 very low and low income housing units have been developed, approved, or are under construction since January 2007. With these credits, the City has remaining RHNA including 1,173 very low income units and 700 low income units.

To calculate the low income water demands, the 2010 Census shows 3.27 persons per occupied household and the interim demand target of 197 gpcd will be used for 2015, and the 2020 target of 179 gpcd will be used for the years 2020 through 2030.

For the year 2015:

1,873 x 3.27 persons per unit x 197 gpcd x 365 days ÷ 325,851.4 gallons per AF= 1,352 AF per year demand.

For the years after 2015, the low income demand will be reduced to 1,228 AF per year based on the 2020 target of 179 gpcd.

Table 4-11: Low Income Projected Water Demands

(UWMPGB Table 8)

Low Income Water Demands	2015	2020	2025	2030
Residential	1,352	1,228	1,228	1,228
Total	1,352	1,228	1,228	1,228
Units : afy				

4.6 Water Use Reduction Plan

Legal Requirements:

> *CWC§10608.26 Urban wholesale water suppliers shall include in the urban water management plans . . . an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part (10608.36). Urban retail water suppliers are to prepare a plan for implementing the Water Conservation Bill of 2009 requirements and conduct a public meeting which includes consideration of economic impacts.*

The previously discussed water use targets will result in a large amount of water conserved but will take a significant effort to attain. The following demand projections are not inclusive of the demand management measures, as those are difficult to quantify and will be better understood with actual data as the measures are implemented.

Table 4-12: Total Water Use Projections

Demand Projection	2015	2020	2025	2030
Population	69,832	83,743	100,425	120,431
Demand Projection w/o Water Conservation	16,712	20,041	24,033	28,821
Demand Projection w/ Water Conservation	15,410	16,791	20,136	24,147
Difference	1,330	3,283	3,937	4,721
Units : af/yr				

Figure 4-1: Projected Water Demands with and without Conservation

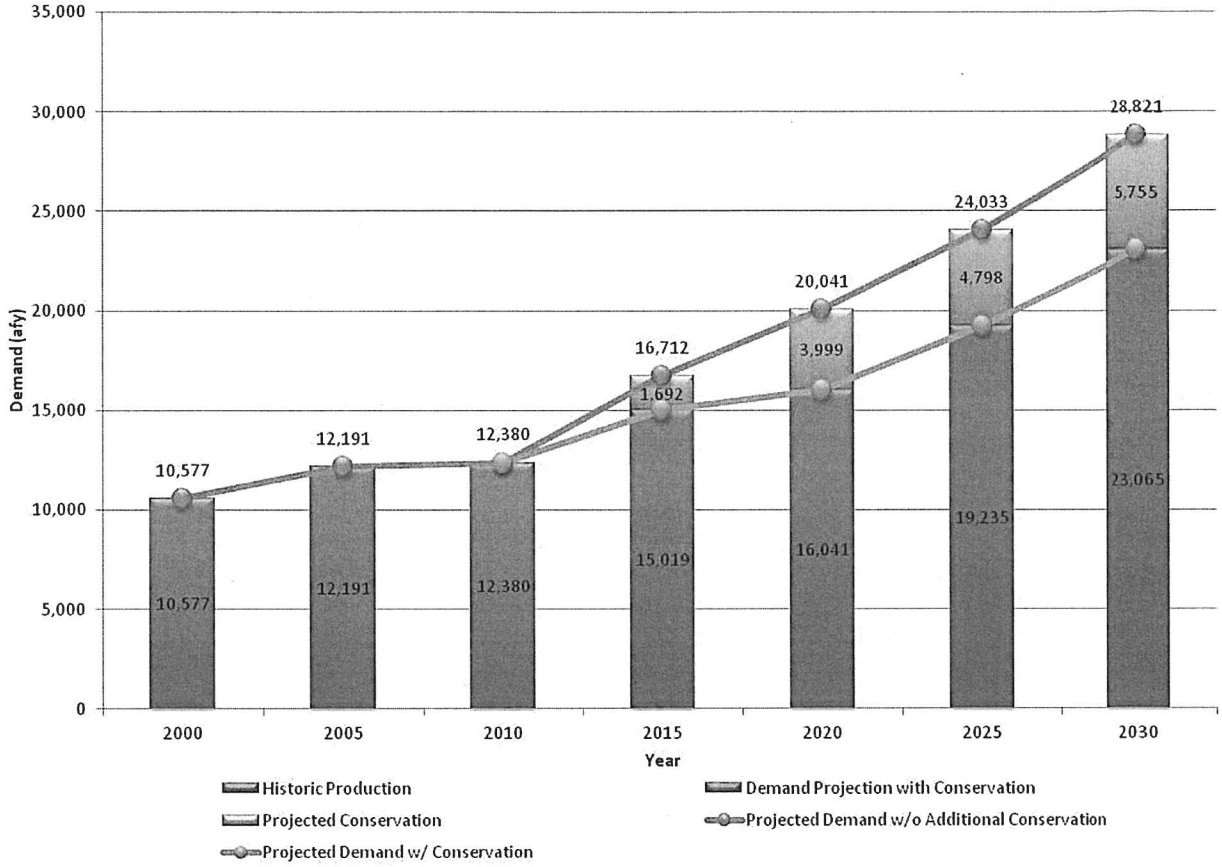


Figure 4-1 shows the difference in water use projections with and without conservation practices in place. The City will have to achieve a water savings of 5,753 afy by 2030. To achieve these savings, the City will make efforts toward implementing the DMMs described in Section 6. Of primary importance are the residential DMMs, as the customer base is largely residential.

5 SYSTEM SUPPLIES

5.1 Water Sources

Legal Requirements:

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

UWMPA requirements state the water supplier must describe their existing and planned water supply sources for the next 20 years. The following description includes information such as water rights, an overdraft summary, any adjudication decrees and other pertinent information.

5.1.1 Water Supply and Storage Facilities

The City of Porterville has historically relied on groundwater to supply municipal water to its residents. In addition to groundwater, the City has purchase rights for about 900 AF annually from the Pioneer Ditch Company and Porter Slough Ditch Company (General Plan 2008). Some of this surface water is used for a small pond at Murry Park in Porterville, but historically most of this water has not been used by the City. However the City has recently begun a ground water recharge program with this surface water.

Water production and distribution in the city are provided by two separate water systems maintained and operated by the Public Works Department. Each system is completely independent of each other. The systems include the Central City System and the Rowland Water System.

According to the General Plan, the City has 34 active wells serving the Planning Area, which includes both water systems. Water is distributed from the wells through approximately 200 miles of pipeline operated and maintained by the Public Works Department. The City has approximately 14,746 metered connections, of which approximately 13,325 are residential meters.

The City's municipal wells are generally scattered west of Plano Avenue and south of Westfield Avenue. The area east of Plano Avenue is considered water deficient. The City currently operates and maintains five hillside reservoirs, including three 3.0 million gallon reservoirs, one 550,000 gallon reservoir, and one 300,000 gallon reservoir.

Current and future supply projections through 2030 are shown in **Table 5-1**. The City of Porterville expects to update their Water System Master Plan in 2015-2016. This will include a water balance study as well as analysis of the distribution facilities needed to accommodate population growth, potential need for a surface water treatment plant, and the facilities needed to accept and recharge surface water. After completion of the Master Plan, several new projects will likely be identified to improve the distribution system and provide greater assurance that the City can meet peak water demands.

The City has established a goal of gradually reducing groundwater pumping to match the aquifer safe yield by 2020 (UWMP 2007). The City anticipates purchasing surface water and implementing water conservation programs to meet the remaining demands. Purchase of surface water will be either recharged or treated and delivered directly to users. In order to safely deliver surface water to customers, the City would need to build a surface water treatment plant.

Table 5-1: Water Supplies

(UWMPGB Table 16)

Water Supply Sources	2010	2015	2020	2025	2030
Porterville Produced Groundwater[1]	12,380	15,410	16,791	20,136	24,183
Surface Water Diversions[2]	0	900	900	900	900
Surface Water Purchases[3]	0	1,500	3,520	4,300	5,440
Total	12,380	17,810	21,211	25,336	30,523

Units : acre-feet per year

Sources:
[1] The aquifer safe yield is assumed to be 1.0 AF/acre. This value is approximate and needs to be verified with a detailed water balance study.
[2] Includes water rights on the Tule River with the Pioneer Ditch Company and Porter Slough Ditch Company.
[3] Surface water sellers are likely to include Porterville Irrigation District and other local irrigation and water districts.

Table 5-2: Wholesale Supplies

(UWMPGB Table 17)

Wholesale Sources	Contracted	2015	2020	2025	2030
N/A	0	0	0	0	0

The City does not use wholesale water for its supply source.

5.2 Groundwater

Legal Requirements:

§10631(b) (Is) groundwater...identified as an existing or planned source of water available to the supplier...

§10631(b)(1) (Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

§10631(b)(2) (Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.

§10631(b)(2) For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board.

§10631(b)(2) (Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

§10631(b)(2) For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

§10631(b)(3) (Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

§10631(b)(4) (Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

5.2.1 Groundwater Description and Management Plan

The city is located within the Tule Sub-basin of the San Joaquin Valley Groundwater Basin. The Tule Sub-basin is not presently adjudicated but is considered to be in a state of overdraft. The area is underlain by an unconfined aquifer which receives groundwater recharge from the Sierra Nevada Mountains and seepage from the Tule River and irrigation ditches. The alluvial fans of the Tule River provide highly permeable area in which groundwater is readily replenished. Annual rainfall in Porterville usually ranges from eight to 12 inches; however, there is no estimate of what percentage of rainfall reaches the groundwater supply.

Groundwater quality in the Porterville area is generally good. Groundwater quality and quantity is generally better on the western edge of town, which is why most of the production wells are located in that area. A few wells have been shut down due to water quality problems. Wells adjacent to Porter Slough have been closed due to percloroethylene (PCE) contamination, and a few wells in the downtown area and eastern portion of town have nitrate problems (originating from citrus orchards). All active wells produce water that meets State and Federal drinking water quality standards. The City does not currently treat any groundwater supply well.

More detailed information on the groundwater conditions within the city of Porterville area is provided in an October 2009 report prepared by Kenneth Schmidt and Associates, entitled *Groundwater Conditions within the City of Porterville Urban Area Boundary*.

The City does not currently have a Groundwater Management Plan (GMP). The Deer Creek and Tule River Authority (DCTRA) is a joint powers authority comprised of five local irrigation districts in the vicinity of Porterville. The DCTRA adopted a new Groundwater Management Plan (GMP) in the summer of 2006. The City may consider becoming a partial or full member of the DCTRA and signatory to the GMP, or the City may develop their own GMP.

5.2.2 Groundwater Levels and Historical Trends

Groundwater levels have declined an average of 0.75 feet per year on well hydrographs completed by the Department of Water Resources. In addition, well yields have decreased substantially in the past 10 years. Some City wells have had capacity reductions from 1,500 gallons per minute (gpm) to 500 or 600 gpm. New wells typically have capacities of 500 gpm or less (General Plan).

According to a 2009 Ken Schmidt report regarding groundwater conditions within the city of Porterville,

> *"The decreases in specific capacities and pumping rates for a number of City wells are not indicative of an overall long-term overdraft, or that the City may 'run out of water' within a few years. Rather, they are indicative of short-term decreases in saturated thickness during droughts, and for some flo-path wells, of well plugging."*

5.2.3 Sources of Recharge

The City has not recharged groundwater in the past, however they are interested in developing a recharge program, particularly in the Porter Slough. The City currently owns approximately 25 stormwater detention basins, which allow for incidental groundwater recharge. The City will consider additional water detention basins, which could serve as both stormwater detention and groundwater recharge. Some of the best topsoils for groundwater recharge are located along the present or ancestral channels of the Tule River (General Plan).

5.2.4 Existing and Projected Groundwater Pumping

The City has historically relied on groundwater pumping for most of its water supply. The following tables show the quantities of groundwater the City has pumped in the past five years and anticipates what will be pumped through 2030.

Table 5-3: Groundwater – Volume Pumped

(UWMPGB Table 18)

Basin name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
Tule Sub-basin	Metered	11,259	12,381	12,075	11,295	10,513
Tule Sub-basin	Unmetered	1,508	1,394	1,540	1,861	1,867
Total groundwater pumped		12,767	13,775	13,615	13,156	12,380
Groundwater as a percent of total water supply		100.0%	100.0%	100.0%	100.0%	100.0%
Units: acre-feet per year						

Table 5-4: Groundwater – Volume Projected to be Pumped

(UWMPGB Table 19)

Basin Name(s)	2015	2020	2025	2030
Tule Sub-basin	15,410	16,791	20,136	24,183
Total groundwater pumped	15,410	16,791	20,136	24,183
Percent of total water supply	100%	86%	79%	79%
Units: acre-feet per year				

As shown in **Table 5-3**, the amount of groundwater being pumped has seen a decline from 2007 to 2010 due to decrease in demands. The projection from 2010 to 2030 anticipates that the amount of groundwater being pumped will increase due to population increases, while the percent of the total water supply that groundwater represents will decrease with the introduction of surface water supplies. The City is considering surface water treatment as a long term water supply option to relieve their reliance on groundwater.

5.3 Transfer Opportunities

Legal Requirements:

§10631(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

The City of Porterville presently has limited water supplies that could be transferred or exchanged. Groundwater constitutes the majority of the City's water supply and cannot be transferred or exchanged. The City has rights to 900 AF of Tule River water with the Pioneer Ditch Company and Porter Slough Ditch Company. The City will not likely transfer or exchange these supplies, but plans to use them directly for groundwater recharge, landscape irrigation, or as treated surface water.

The City is interested in purchasing (transferring in) surface water from other agencies. The City has determined that surface water is needed to supplement groundwater due to rapidly declining well yields. Surface water purchases will improve the reliability of the City's water supply.

The City has established a goal of gradually increasing surface water purchases between 2010 and 2020 so that groundwater pumping is equal to the safe yield in 2020. Surface water will be either recharged or treated and delivered directly to users. When possible, the City will take advantage of more affordable floodwaters and recharge more water in wet years. As a result, surface water purchases will vary annually, but, on a long-term average, will meet their purchase goals.

5.3.1 Existing Surface Water Rights

The City has limited surface water rights in the Pioneer Ditch Company and Porter Slough Ditch Company. These water rights can provide up to 900 AF of water per year from the Tule River. Some of this water is used for a small pond at a municipal park in the City, but historically, most of this water has not been used by the City. By virtue of holding stock in the two ditch companies, the City is allowed to divert Tule River floodwater in some years for free. Flood releases, under direction of the Corps of Engineers, are charged against the Success Reservoir storage accounts with the highest percentage of their allowable storage space filled. The units, whose stored water is released for flood control, has first call on the flood released water for their irrigation and spreading demands, after which the flood released water is available to others. When feasible, the City will divert these flood waters for groundwater recharge.

5.3.2 Other Surface Water Sources

Other surface water sources potentially available to the City include Central Valley Project Friant water and other Tule River waters. Central Valley Project Friant water originates in Lake Millerton and is conveyed through the Friant-Kern Canal. This water is not fully reliable since the Friant-Kern Canal is taken out of service for a 10-week period every three years. However, this impact would be minor since the outage period is relatively short, the City has a groundwater supply, and there would be low demand for water when the Canal is taken out of service (winter months). In addition, Porterville could use existing storage facilities to store surface water prior to a canal outage. Tule River water is stored in Lake Success, which is located a few miles east of the city.

5.3.3 Surface Water Purchases

The Porterville Irrigation District, located west of the City, has appropriative water rights on Tule River, ditch company water rights on the Tule River, and Central Valley Project Friant Division water rights. Due to the seasonal nature of water supplies and demands, the Porterville Irrigation District sometimes has more water available to its landowners than they can reasonably use at the time. It is during these periods that PID would be able to sell some of their water to the City. PID has been able to find willing buyers for the water, but they would prefer to sell it to a local agency, such as the City of Porterville, since that would benefit PID's groundwater levels and the local community. The City and PID have held several meetings to discuss surface water purchases and both sides are committed to holding further discussions and hope to ultimately negotiate a surface water purchase agreement.

In December 2006 the City approved $34,000 per year for three years to purchase surface water for groundwater recharge. This was the first major commitment by the City to import surface water and address the problem of declining well yields. If local irrigation districts sell surplus CVP water to the City with no markup, then the water would cost about $50/AF. This represents the lower end of possible water costs and at this price the $34,000 could purchase 680 AF/year or about 6% of the 2005 City water demands. It should be recognized, however, that surface water could cost up to $100/AF or more.

5.3.4 Surface Water Treatment

The City will need to construct a surface water treatment plant if surface water supplies are delivered directly to customers. Boyle Engineering Corporation has prepared a report outlining the steps needed to develop a plant. The City has determined that a surface water treatment plant will need a fairly firm water supply and operate the majority of the time to be economical. The City has held discussions with Porterville Irrigation District about partnering on the construction and operation of a treatment plant. The results of the discussions were favorable and both sides are interested in further negotiations. Construction of a surface water treatment plant will be dependent on the City receiving approval for a $5 million infrastructure loan.

Table 5-5: Transfer and Exchange Opportunities

(UWMPGB Table 20)

Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume
Pioneer Ditch Company and Porter Slough Ditch Company	Transfer	Long Term[1]	900
Porterville Irrigation District	Transfer	Long Term[1]	5,000
Total			5,900

Units : acre-feet per year
[1] Volume to be provided to the City as raw water to be recharged or treated by the City.

5.4 Desalinated Water Opportunities

Legal Requirements:

§10631(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

There are no opportunities to develop desalination of ocean water or brackish ocean water since the city of Porterville is located in the Central San Joaquin Valley. In addition, the groundwater is of adequate quality and desalination is not necessary.

Table 5-6: Desalination Opportunities

Water Source	Proposed Volume to be Desalinated
Seawater	0
Brackish Seawater	0
Brackish Groundwater	0
Total	0
Units : acre-feet per year	

5.5 Recycled Water Opportunities

Legal Requirements:

§10633 Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.

§10633(a) (Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

§10633(b) (Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

§10633(c) (Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

§10633(d) (Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

§10633(e) (Describe) the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

§10633(f) (Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

§10633(g) (Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

The City owns and operates a wastewater treatment plant that provides secondary level treatment of all of the city's wastewater. In 2005, the city generated approximately 5 million gallons (MG) of wastewater each day. Recently, wastewater generation has averaged about 47% of total water used. The difference between the water demand and effluent is considered the outside water use. Accordingly, the wastewater generation will increase to an estimated 10 MG/day (annual average) by 2030.

The City presently uses wastewater effluent (recycled water) for groundwater recharge and crop irrigation. Six ponds are used to percolate wastewater effluent. In the spring and summer the ponds are dry because the effluent is used to irrigate crops. Crops are irrigated with recycled water on agricultural land located about five to six miles from the city's center. The City has annexed this land so they can keep it under agricultural production and ensure that there is always a demand for the effluent.

5.6 Coordination

The City has not actively involved other agencies in determining the best uses for recycled water, partly because all of the water is already being used for beneficial purposes. The City has been encouraged by several parties to consider other uses for the water, such as landscape irrigation, dual distribution systems, and industrial water supply, but tertiary level treatment would need to be added to their wastewater treatment plant. If opportunities arise to use recycled water for other uses, then a public hearing will be used to solicit comments from the public and other agencies.

5.7 Wastewater Quantity, Quality and Current Uses

Table 5-7 summarizes the past and projected volumes of wastewater generated and treated in Porterville. A breakdown of recycled water use for crop irrigation and groundwater recharge is not available. More detailed data on recycled water use will be maintained in the future. Estimating future recycled water uses would be highly speculative and therefore is not included here. However, the City plans to recycle 100% of its effluent (i.e. none will be sent to evaporation ponds). It is also likely that some recycled water will be used for groundwater recharge and crop irrigation through 2030. It is possible that some will be used for landscape irrigation in the future.

The use of recycled water for residential non-potable use would only be possible if a dual distribution system is constructed and the water receives tertiary-level treatment. The construction of a dual distribution system would only be practical in new developments. The City plans to investigate the use of dual distribution systems in the near future.

Table 5-7: Recycled Water – Wastewater

(UWMPGB Table 21)

Type of Wastewater	2005	2010	2015	2020	2025	2030
Wastewater collected & treated in service area[1]	5,693	5,782	7,160	7,841	9,417	11,294
Volume that meets recycled water standard (Secondary Level)	5,693	5,782	7,160	7,841	9,417	11,294

Units : acre-feet per year

1. *Wastewater assumed to be approximately 46.7% of total water delivered into system.*

In 2008, the City pumped about 13,300 acre-feet of water for public supply. The amount of wastewater effluent generated at the City WWTF was about 5,100 acre-feet for the same year. The residual, or approximately 8,200 acre-feet, is considered the outside water use within the water supply area. Of this, an estimated 70 percent (5,700 acre-feet) was consumed by evapotranspiration (Schmidt 2009).

Of the 5,100 acre-feet of effluent that was generated, 3,100 acre-feet of effluent was applied for irrigation of 425 acres of crops in the airport area in 2008. An estimated

1,500 acre-feet was applied within the proposed UDB. In 2008, 2,000 acre-feet of effluent was delivered to percolation basins in the Old Deer Creek channel. Of this amount, an estimated 50 acre-feet was lost to evaporation, and the remaining 1,950 acre-feet percolated to the groundwater (Schmidt 2009).

During the winter, most of the City effluent has been percolated in basins in the Old Deer Creek channel, located immediately south of the UAB. In 2008, about 1,950 acre-feet of this effluent percolated to the groundwater (Schmidt 2009).

Table 5-8: Recycled Water – Wastewater Disposal

(UWMPGB Table 22)

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Percolation Ponds	Secondary	1,999	2,005	2,011	2,017	2,023	2,029
Recycled Water Use	Secondary	3,024	3,033	3,042	3,051	3,060	3,069
Groundwater Recharge	Secondary						
	Total	5,024	5,038	5,053	5,068	5,083	5,098

Units : acre-feet per year

Table 5-9: Recycled Water – Projection Compared to Actual

(UWMPGB Table 24)

Use Type	2010 Actual Use	2005 Projection for 2010[1]
Agricultural irrigation/incidental recharge	3,025	4,269
Landscape irrigation[2]	0	0
Industrial reuse	0	0
Groundwater recharge	1,999	750
Water feature	0	0
Total	5,024	5,019

Units : afy

[1]From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing categories or modified to the new categories, at the discretion of the water supplier.

[2]Includes parks, schools, cemeteries, churches, residential, or other public facilities)

Table 5-10: Recycled Water – Potential Future Users

(UWMPGB Table 23)

User Type	Description	Feasibility	2015	2020	2025	2030	2035
Agricultural irrigation	Tertiary Treated	Yes	3,033	3,042	3,051	3,060	3,069
Landscape irrigation	Tertiary Treated	Yes	0	0	0	0	0
Industrial reuse	Tertiary Treated	No	0	0	0	0	0
Groundwater recharge	Tertiary Treated	Yes	2,005	2,011	2,017	2,023	2,029
Water feature	Tertiary Treated	Yes	0	0	0	0	0

Units : afy

Note: Each line item is a possible use; not all would be utilized concurrently.

It will be much easier to encourage the use of recycled water in areas that are not yet developed. The City is considering requiring that new development within areas to receive recycled water install recycled water mains (purple pipe) to supply recycled water to landscape areas. The City would be able to guarantee availability to customers even during water shortages that are not disaster related.

Customers will be educated about the uses of recycled water and the need for its reuse. Potential customers will be educated about the merits of using recycled water for recirculation uses. During the development process, the City will promote, encourage, and in some cases, require potential developments to include ways to use recycled water. The following table summarizes potential methods the City may use to encourage recycled water use.

Table 5-11: Methods to Encourage Recycled Water Use

(UWMPGB Table 25)

Actions	Projected Volume			
	2015	2020	2025	2030
Lower Cost of Water				
Dual Distribution System				
Customer Education				
Promotion of Recirculating Uses				
Development Review Committee				
Total				

Units : acre-feet per year ***(No Data to submit at this time.)***

5.8 Future Water Projects

Legal Requirements:

§10631(h) (Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

This section provides a description of planned water supply projects that could directly increase water supplies. Although the City is planning to complete the projects described below, their success will be dependent on staff and funding availability, and in some cases cooperation from other agencies. Planned water supply projects include the following:

Construct Surface Water Treatment Plant. The City plans to design and construct a surface water treatment plant. The plant will allow the City to directly deliver surface water to customers. The size of the plant is currently unknown and will depend on several factors including available funding and the volume of surface water the City can secure through long-term purchase agreements.

Water Distribution System Improvements. Porterville expects to update their Water System Master Plan in 2014-2015. This will include an analysis of the distribution facilities needed to accommodate population growth, a surface water treatment plant, and the facilities needed to accept and recharge surface water. After completion of the Master Plan a number of new projects will likely be identified. These projects will improve the distribution system and provide greater assurance that the City can meet peak water demands.

New Well Constructions. In the past the City has typically installed one new wells each year with capacities ranging from 500 to 1,500 gpm. The City will continue to install new wells at a rate necessary to keep up with demands. Due to the unreliable nature of surface water, well capacities will need to have sufficient capacity to meet almost 100% of City demands. Planned groundwater recharge will help to ensure that the wells can provide the same yield in normal, single dry, and multiple dry years.

Water Conservation. The City has established a goal of reducing per capita water demands as discussed in Section 4.2. This will be accomplished through a variety of demand management measures as described in Section 7 of this UWMP. The water savings are essentially equivalent to securing a water source of the same volume.

Table 5-12: Future Water Supply Projects

(UWMPGB Table 26)

Project name			
Projected start date			
Projected completion date			
Potential project constraints			
Normal year supply			
Single dry year supply			
Multiple Dry Years	Year 1		
	Year 2		
	Year 3		
Units : afy (No Projects at this Time)			

6 WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLAN

6.1 Water Supply Reliability

Legal Requirements:

§10620(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

§10631(c)(1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years.

§10631(c)(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

6.1.1 Frequency and Magnitude of Supply Deficiencies

This section discusses the reliability of water supplies and their vulnerability to seasonal and climatic shortages. Seasonal shortages are based on precipitation patterns of individual watersheds. The City considers estimated impacts due to climate change or climate fluctuations to be highly speculative and has chosen not to rely on them. The City does recognize that they exist and will reassess their water supply adequacy regularly to address climate changes. The City will also design their system with some redundancy so that some adverse impacts from climate change can be accommodated.

The City has historically used groundwater to meet all of their water demands. Groundwater supplies have not significantly been impacted, and, as a result, there is no history of any water supply deficiencies for the City water system. However, groundwater levels have declined about 0.5 to 1.0 feet/year over the last 20 years based on Department of Water Resources' well hydrographs. This decline in groundwater levels, however, is not consistent with the decline in well yields, which has been more serious. Some City wells have seen capacity reductions from 1,500 gallons per minute (gpm) to 500 or 600 gpm (although well rehabilitation may be able to restore these wells to their previous performance levels). In addition, some new wells have capacities of 500 gpm or less, although this might be improved by drilling wells in different locations.

Surface water is less reliable than groundwater since its availability depends on precipitation. The reliability of surface water sources for the City cannot be determined until specific water sources and water sellers are identified. The reliability will also depend on details in any surface water purchase agreements. The City may acquire some firm water that would be guaranteed or almost guaranteed each year. This water would possibly be treated at a new surface water treatment plant. The City could also buy surplus or floodwaters that are only available during wet years. This water would be available in varying quantities and would most likely be recharged and later pumped for use in normal and dry years. The City has established goals for surface water

purchases and the City could begin purchasing and banking water in advance to meet these demands in case droughts occur in the near future. The City Council has approved the purchase of surface water to be used for groundwater recharge. Existing retention facilities and the Porter Slough are available for groundwater recharge.

Surface water could potentially be utilized from the Pioneer Water Company (PWC, of which the City currently owns 466 shares, approximately 12.94%) and would like to increase the City's holdings and water rights. City Council has subsequently authorized the Public Works Director, at his discretion, to purchase surface water for groundwater recharge and purchase or bid on PWC shares. As of July 2014, the City Water Fund had $100,000 available for water purchases of this nature.

Another potential surface water partner is Porterville Irrigation District (PID). PID has several surface water supplies including appropriative water rights on the Tule River, ditch company water rights on the Tule River, and Central Valley Project Friant Division water. PID has stated that due to the seasonal nature of water there are points in time when more water is available than their landowners can reasonably use. It is during these times that PID would be able to sell water to the City.

It should also be noted that other surface water supplies could be available to the City, if needed. With access to the Friant-Kern Canal, the City can potentially buy water from anywhere in the State through an exchange. In addition, the City could feasibly purchase canal company stock from the various stockholders. This would be a relatively simple way to transfer water supplies. These water sources will be pursued in the future if necessary, but it is believed that groundwater pumping, surface water purchases from PWC, and water conservation efforts will allow the City to meet their water demands through 2030.

Although the City's aquifer is in a state of overdraft they could still meet their water demands for several more years solely with groundwater. While the City recognizes the need to address their water problems as soon as possible, they are not in an immediate need to secure surface water sources, and could secure them incrementally as demands increase. **Table 5-5** lists potential surface water purchases.

6.1.2 Basis of Water Year Data

Historical rainfall data available for the city of Porterville from the Western Regional Climate Center (WRCC)[1] were examined to establish a basis of water year for average, single dry, and multiple dry years. As shown in Table

Table 6-1, for the purposes of this report, the year 2001 is classified as an "average" year, the year 1989 is classified as a "single dry" year, and the years 1988 to 1990 are classified as "multiple dry" years.

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[1] Source http://www.wrcc.dri.edu/. Data was examined for the Porterville Station (period of record: 1948-2006).

Table 6-1: Basis of Water Year Data

(UWMPGB Table 27)

Water Year Type	Base Year(s)
Average Water Year	2001
Single-Dry Water Year	1989
Multiple-Dry Water Years	1988-1990

6.1.3 Supply Reliability

During drought years, water use patterns typically change. Outdoor water use will typically increase as irrigation is used to replace the decrease in precipitation. However, the increase in outdoor use can be offset, in part, by increasing mandatory conservation measures.

In order to assess the impact of drought years on the City's annual demands, the City's historical per capita water usage was calculated. By dividing the City's service area population into the total water consumed on an annual basis, consumption in gallons per capita per day (gpcd) was determined. This method of annual consumption, based on current population, eliminates the impact of growth changes. The historical per capita consumption from 2000 to 2010 is shown in **Figure 6-1**.

The historic per capita demand has been variable over the past 10 years, with an overall increase from 2000 through 2004, a dip in 2005, and a recent downward trend since 2006. As shown, the per capita consumption in 2006 was about 5 percent above the 10-year average of 214 gpcd calculated in Section 4, **Table 4-6**. The 10-year Historic Per Capita Demand is considered to be indicative of the maximum potential variation in water demands on an annual basis. As shown in **Figure 6-1**, the year 2006 represents the largest increase in water demand above the Historic Per Capita Trend. For purposes of calculating the impact of dry years, water demands will be increased by five percent for single dry and multiple dry hydrologic years.

Figure 6-1: Historic Per Capita Demand

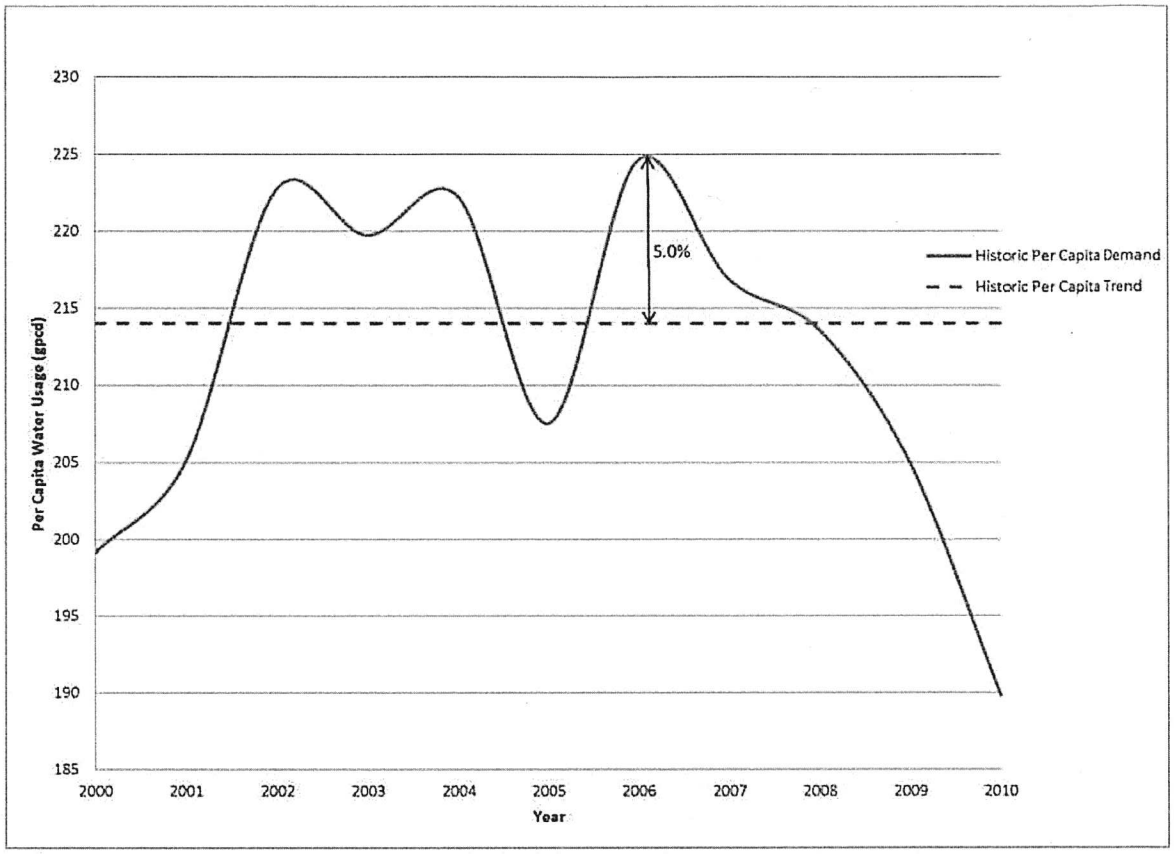

Table 6-2 presents calculations showing the percentage of supply available for the hydrologic years shown in **Table**

Table 6-1. The percentages of normal year shown in **Table 6-2** were calculated by comparing the actual per capita demand for that year to the per capita demand trend of 214 gpcd. Since the City relies solely on groundwater to meet its demands, the available "supply" drawn from the groundwater aquifer in any year is essentially equal to the system water demand for that year. As such, the variation in per capita water use from the historic trend does not necessarily coincide with "dry" or "wet" years. These percentages are not used in this report for projecting future increases in water demands, as per capita demands have been highly variable. The calculation of the percent of water supply consumed relative to the Normal Year Water supply (Percent of Average/Normal Year) is shown in **Table 6-2**. This difference identifies two characteristics: the City of Porterville in an Average Water Year (2001), used less water than the 10 year Historic Per Capita Trend, and in dry and multiple dry water years used more water than the 10 year Historic Trend, ranging from 11 percent to 17 percent. Factors such as conservation efforts and economic considerations have contributed to an overall reduction in per capita demands in more recent years.

Table 6-2: Supply Reliability – Historic Conditions

(UWMPGB Table 28)

Supply Source	Average Water Year (2001)	Single Dry Water Year (1989)	Multiple Dry Water Years		
			Year 1 (1988)	Year 2 (1989)	Year 3 (1990)
Ground Water	11,174[1]	8,865[2]	8,046[3]	8,865[2]	9,481[4]
Surface Water	0	0	0	0	0
Total	11,174	8,865	8,046	8,865	9,481
Percent of Average/ Normal Year	96%[5]	117%	117%	117%	111%

[1] 2001 Actual water consumption Table 4-3
[2,3,4] Actual water consumption Department of Water Resources Public Water Utility Statistics
[5] Percent of Average/Normal Year = Average Water Year (11,174 acre-ft) / Normal Water Year based on Historic Trend (Historic Per Capita Demand (214 gpcd) * 2001 Population Table 4-3 (48,638)*365 days/year / 325,851)

Based on conservative planning assumptions, the City's current supply reliability is summarized in **Table 6-3**. The "Normal Year" water use was calculated by multiplying the City service area's 2010 population by the baseline per capita water usage of 214 gpcd. This equates to an annual volume of 13,959 acre-feet per year for a "normal" condition; however, the City's actual 2010 water use was 12,380 acre-feet. This variation is because the Normal Water Year demand estimate is based on a 10 year Historic Per Capita Trend, see **Figure 6-1**. The single and multiple dry year consumptions are assumed to be five percent more than the normal water use, based on **Figure 6-1**.

Table 6-3: Supply Reliability – Current Water Sources

(UWMPGB Table 31)

Water Supply Sources	Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
Porterville Produced Groundwater	13,959[1]	14,657[2]	14,657	14,657	14,657
Surface Water Diversions	0	0	0	0	0
Surface Water Purchases	0	0	0	0	0
Percent of Normal Year:	100%	105%	105%	105%	105%

Units : acre-feet per year
[1] Normal Water Year 2010 = Historic Per Capita Demand (214 gpcd) * 2010 Population Table 3-3 (58,232)*365 days/year / 325,851
[2] Normal Water Year 2010 = 13,959 acre-ft * 105% = 14,657 acre-ft

6.1.4 Projected Normal Water Year Demands

The Water Supply Totals for the years 2015 through 2030, shown in **Table 6-4**, originate from **Table 5-1**, and include both groundwater and surface water supplies.

Table 6-4: Supply and Demand Comparison – Normal Year

(UWMPGB Table 32)

Water Use	Water Use (AFY)			
	2015	2020	2025	2030
Supply Totals[1]	17,810	21,211	25,336	30,523
Demand Totals[2]	15,410	16,791	20,136	24,183
Difference	2,400	4,420	5,200	6,340
Difference as % of Supply	13%	21%	21%	21%
Difference as % of Demand	16%	26%	26%	26%

Units : AFY
[1] Table 5-1 Water Supply Sources
[2] Table 5-4 Groundwater – Volume Projected to be Pumped

As shown, both supply and demand are expected to increase from 2015 to 2030. The supply totals reflect using groundwater only to the extent required to meet potable demands. Excess supply is a reflection of other supplies such as surface water or recycled water. The supplies utilized will be provided by the sources discussed previously.

6.1.5 Projected Single Dry Water Year

The projected single dry year water demands through 2030 are estimated based on the normal dry year demands, with an anticipated demand and supply increase of five percent. As shown in **Table 6-5**, the projected supplies and demands are equal, because the City's supply source is groundwater.

Table 6-5: Supply and Demand Comparison – Single Dry Year

(UWMPGB Table 33)

Water Use	Water Use (AFY)			
	2015	2020	2025	2030
Supply totals[1]	16,180	17,630	21,143	25,392
Demand totals[2]	16,180	17,630	21,143	25,392
Difference	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%

Units : AFY
[1] Supply total includes only groundwater supply from Table 5-1 (UWMPGB Table 16), plus 5%.
[2] Demand total includes normal year demand projection from Table 4-10 (UWMPGB Table 11), plus 5%.

6.1.6 Projected Multiple Dry Water Years

During a multiple year drought the City will probably have to rely almost exclusively on groundwater. The projected multiple dry year water demands through 2030 are estimated based on the normal year demands and the anticipated demand and supply increase of 5%. The projected multiple dry water year supplies and demands are presented in **Table 6-6**.

Table 6-6: Supply & Demand Comparison – Multiple Dry Years

(UWMPGB Table 34)

Water Use		Water Use (AFY)			
		2015	2020	2025	2030
Year 1	Supply totals[1]	16,180	17,630	21,143	25,392
	Demand totals[2]	16,180	17,630	21,143	25,392
	Difference	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%
Year 2	Supply totals[1]	16,180	17,630	21,143	25,392
	Demand totals[2]	16,180	17,630	21,143	25,392
	Difference	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%
Year 3	Supply totals[1]	16,180	17,630	21,143	25,392
	Demand totals[2]	16,180	17,630	21,143	25,392
	Difference	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%

Units : AFY
[1] Supply total includes only groundwater supply from Table 5-1 (UWMPGB Table 16), plus 5%.
[2] Demand total includes normal year demand projection from Table 4-10 (UWMPGB Table 11), plus 5%.

6.1.7 Factors Affecting Supply Reliability

The factors that can affect water supply reliability are varied. **Table 6-8** lists the factors that are anticipated to potentially affect the City's water supply.

Table 6-7: Factors Resulting in Inconsistency of Supply

(UWMPGB Table 29)

Water supply sources	Limitation quantification	Legal	Environmental	Water quality	Climatic
Porterville-produced groundwater	X			X	
Surface Water Diversions				X	X
Surface Water Purchases				X	X

Units : acre-feet per year

6.1.7.1 Legal

The supplies the City relies upon are neither in the process of adjudication nor the subject of any new legislation limiting them. However, that could change in the future; in which case those supplies could be diminished from their current volume.

6.1.7.2 Environmental

The status of environmental regulation in California is routinely changing due to new legislation, endangered species statuses, et cetera. Should new environmental legislation come into existence it could potentially cause a lack of supply. The recent water supply reductions in the Delta are an example of environmental water needs versus community water supplies. It is anticipated that alterations to the water supply could be made to accommodate these changes, should they occur.

6.1.7.3 Water Quality

Water quality standards are fairly stable but can still experience periods of modification as new constituents are deemed to be 'of concern' and MCLs are created or made more stringent.

6.1.7.4 Climatic

As climate change becomes more quantifiable and potentially affects the local water conditions, alterations in the water supply planning area will likely be required. Climate change elements, such as drought or severe flooding, could strongly affect supply reliability, therefore requiring the City to make modifications to their water supplies.

6.2 Water Shortage Contingency Planning

Legal Requirements:

§10632(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

§10632(b) 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.

§10632(c) 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(d) 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(e) 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(f) Penalties or charges for excessive use, where applicable.

§10632(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures or the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

§10632(h) A draft water shortage contingency resolution or ordinance.

§10632(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

§10635(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

6.2.1 Water Shortage Stages and Reduction Objectives

The City has an existing Water Conservation Plan (WCP) that outlines policies and procedures to help reduce water demands during droughts. The WCP addresses the following stages of action.

Stages of Action

The Water Conservation Plan includes four phases of implementation. Actions in each phase would be undertaken by the City or the general public. When staff determines that water supply conditions warrant a phase change they present the request to the City Council for their approval. The production capacity will be monitored to determine recommendations for moving from one phase to the next. Any decision to change phases will be based on a combination of surface water supplies, weather conditions, trends in water usage, groundwater levels, and well yields.

Conservation measures gradually increase with each phase. The public are given opportunities to voluntarily reduce consumption in Phase I. If these efforts are not sufficient, then Phase II is implemented, which includes mandatory measures with a

target reduction of 10%. If these are not sufficient then Phase III is implemented, which includes more stringent mandatory regulations with a target reduction of 10-25%. If these are not sufficient then Phase IV is implemented, which includes more increasingly stringent, mandatory regulations with a target reduction of 25-50%.

Estimate of Minimum Supply

Historically, the City has pumped groundwater to meet all water supply demands. While there may be less water infiltrating from rainfall, snowfall, runoff and irrigation during dry years, it does not adversely impact groundwater supplies in the short term. As a result, the City has had fairly consistent water supplies during different hydrologic years. Although well yields are gradually declining each year, it is expected that there would be no water shortages.

Table 6-8: Water Shortage Stages and Reduction Objectives

(UWMPGB Table 35)

Phase	Conditions	Percentage Shortage
Water Conservation Phase I Minor (Voluntary)	Supplies available to meet demands (Normal Water Supply)	0%
Drought Response Phase II Moderate (Mandatory)	Groundwater in overdraft or available production within 10% of peak hour demands (Water Supply Shortage)	10%
Drought Response Phase III Significant (Mandatory)	Significant water shortage, available water production is up to 25% less than peak hour demands (Significant Water Supply Shortage)	10-25%
Emergency Response Phase IV Critical (Mandatory)	Severe water shortage, available water production is up to 50% less than peak hour demands (Critical Water Supply Shortage)	25%-50%

6.2.2 Prohibitions, Consumption Reduction Methods, and Penalties

Descriptions of the prohibitions, penalties and consumption reduction methods in each phase of the Water Conservation Plan are provided below:

Phase I

Phase I applies during periods when a normal water supply is available. Water conservation efforts include a myriad of programs and policies that are described in Section 7.

Phase II

Phase II applies during periods when there is a water supply shortage. All of the conservation measures in Phase I will continue to be implemented along with the following as mandatory regulations.

Actions by the City:

1. Continuation of all Conservation Programs and Regulations Established in Phases I.
2. The City of Porterville will enforce a mandatory odd/even watering schedule for all residents. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. Excessive run-off is prohibited.
3. Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense.
4. Public Information Program. The City will pursue a more aggressive distribution of information than its efforts initiated in Phase I to promote public awareness of the need to conserve water with a stronger emphasis on the water shortage condition.
5. Water System Pressure Reduction. The City's water system may experience reduced water pressures during high usage periods. This may deter water use for nonessential activities and encourage scheduling of landscape watering to late nights or early mornings.
6. City Landscapes and Watering Schedules. All City parks, median islands and public facility landscapes will be watered during the late night or early morning hours to reduce impact on the water system during peak usage hours.
7. Leak Detection - Water Waste. The City will continue in its proactive plan to audit water supply usage. All City staff will be reminded of the necessity of reporting any evidence of leaks or water waste for immediate action. There will be an emphasis on coordinated community efforts to reduce water waste.
8. Waste of Water Notices. City staff will be equipped to issue "Waste of Water" notices to consumers identified as misusing water.

Actions by the General Public:

1. Watering Schedule. Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday, Thursday and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday, Friday and Sunday. There is no watering on Monday.
2. Lawn and Landscaping Watering. All residential, commercial and industrial landscape watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days.
3. Conservation Efforts. The general public will be strongly encouraged to utilize those water conservation measures contained within the City's public information program.
4. Restaurants. Notices will be sent to all restaurants within the city limits requesting support of water conservation efforts by serving water to customers upon request only.

5. Vehicle Washing and Sidewalk Hosing. The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. The washing of automobiles, trucks, trailers, boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses.

Phase III

Phase III applies during periods when there is a significant water shortage and the following mandatory regulations will apply:

Actions by the City:

1. Continuation of all Conservation Programs and Regulations Established in Phases I and II.
2. The City of Porterville will enforce a two day a week odd/even watering schedule for all residents. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. Excessive run-off is prohibited.
3. Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense.
4. Public Information Program. The utility billing system will begin to notify customers of restrictions on water use. The program to promote public awareness will be intensified with emphasis placed on communicating the mandatory water conservation requirements to the public.
5. City Landscapes and Watering Schedules. All City parks, median islands and public facility landscapes will adopt a two-day watering schedule. If it becomes necessary, watering of City parks and median islands will be suspended and evaluated each day.

Actions by the General Public:

1. Watering Schedule. Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday and Sunday. There is no watering on Monday, Thursday, or Friday.
2. Landscape Watering. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days.
3. Vehicle Washing and Sidewalk Hosing. The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. The washing of automobiles, trucks, trailers,

boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses.

Phase IV

Phase IV applies during periods when there is a severe water shortage and the following mandatory regulations will apply:

Actions by the City:

1. Continuation of all Conservation Programs and Regulations Established in Phases I, II, and III.
2. Rate Structure Enhancement. A 20% rate increase on all residential and landscape water accounts will go into effect. This rate increase will encourage water conservation and will also serve as a provision to recover the lost revenues from water conservation.
3. Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense.
4. City Landscapes and Watering Schedules. Watering of City parks and median islands will be suspended and evaluated each day.

Actions by the General Public:

1. Landscape Watering. Lawn and landscaping watering is prohibited.
2. Vehicle Washing and Sidewalk Hosing. The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. The washing of automobiles, trucks, trailers, boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses.

Table 6-9: Water Shortage Contingency – Mandatory Prohibitions

(UWMPGB Table 36)

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Outdoor water use on non-watering day	Phase II
Using a hose without a nozzle	Phase II
Broken sprinklers or other leaks	Phase II
Excessive runoff from property	Phase II
Outside washing	Phase II
Outside watering	Phase IV

Table 6-10: Water Shortage Contingency – Consumption Reduction Methods

(UWMPGB Table 37)

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Main flushing only on complaint basis	Phase II	10%
Irrigation reduced to 1 or 2 days per week	Phase III	18% to 35%
20% water rate increase	Phase IV	20%
No outdoor watering	Phase IV	50%
Customer allotments/rate changes	Phase IV	25% to 40%

6.2.3 Revenue and Expenditure Impacts/Measures to Overcome Impacts

The City bills most of its customers on a volumetric basis. As a result, conservation measures, which aim to reduce water consumption, can also reduce revenue for the City. Significant water conservation during droughts can have a major impact on City revenues. Although the City would have lower water purchase and pumping costs with lower water deliveries, they also have considerable fixed and overhead costs that are the same for any volume of water delivered. As a result, conservation measures need to be coupled with rate adjustments to ensure that the water system is financially sustainable.

The City has developed a Water Conservation Plan that raises water rates by 20% during droughts. The higher unit rate is intended to discourage use, but it will also help to offset the revenue lost from selling a lower volume of water. The suitability of this 20% increase is not yet known and it needs to be tested during a single-year and multi-year drought. If, in the future, the 20% price increase is found to be inadequate the City will again reevaluate the WCP and modify it accordingly.

Implementation of the WCP will not have a large impact on expenditures or revenues. No additional costs are expected for billing or operations. Existing City staff will provide the personnel needed to implement the plan and enforce water conservation measures.

It is likely that higher expenditures will be needed for public information programs, but these will probably be small compared to the total City water budget. Fines for water waste are a source of revenue and they typically increase during droughts. However, the revenues from fines are also small compared to the overall City water budget.

Table 6-11: Water Shortage Contingency – Penalties and Charges

(UWMPGB Table 38)

Penalties or Charges	Stage When Penalty Takes Effect
Increase in water rates of 20%	Phase IV
Fines for waste	Phase II

6.2.4 Actions During a Catastrophic Interruption

The City does not have a formal written plan to address a catastrophic non-drought related interruption in water supply (i.e. power outage, system failure, natural disaster, etc.). However, the WCP could be used to reduce consumption after a catastrophic supply interruption. The City also has back-up generators in the event of a power outage. Lastly, the City recognizes the need for more contingency plans to address non-drought related events and plans to investigate other alternatives.

Table 6-12: Actions During a Catastrophic Event

Event	Action
Regional Power Outage	Utilize emergency backup power at selected facilities and provide public notice through broadcasts of emergency and ask customers to reduce consumption to essential uses.
Terrorism Event	Make use of alternate production facilities as available.
Natural Disaster	Utilize emergency backup power if utility provided power is interrupted. Utilize intertie connection if available. Immediately implement Phase III demand reduction program.

6.2.5 Reduction Measuring Mechanism

Water meters are read monthly, but during a drought the water consumption must be tracked more frequently. Reading customer meters more frequently would be costly and impractical, however, the City will be able to closely track groundwater pumping and surface water deliveries on a daily basis. This data will be evaluated weekly to determine if the WCP is effective in reducing water consumption.

6.3 Water Quality

Legal Requirements:

> *§10634 The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.*

Presently, water quality problems do not pose a threat to water reliability, but the City recognizes the need to protect water quality and prevent future degradation. A discussion on surface water quality and groundwater quality follows.

Surface Water

Future surface water sources would likely be purchased from local irrigation and water districts. These districts have water rights on the San Joaquin River and Tule River. Both of these water sources originate primarily from precipitation in the Sierra Nevada Mountains and as a result have good to excellent water quality. These water supplies have no restrictions on use for municipal water, but they will require standard water treatment.

Tule River water is delivered from Lake Success. According to a report entitled *Surface Water Treatment Guideline* prepared by Boyle Engineering in February 2005: "*The reservoir (Lake Success) periodically experiences turnover episodes which have caused hydrogen sulfide problems. These turnovers take place in the spring and fall. In the summer/fall, the lake experiences algae growth problems.*" A turnover episode takes place when convection circulation occurs in a lake causing the lower waters to rise and the upper waters to sink. Hydrogen sulfide must be present in the lake bottom sediments and is brought to the surface during a turnover episode.

Additional development in watershed areas may cause some water quality degradation in the San Joaquin and Tule Rivers. However, improved watershed management may prevent further degradation or even improve the water quality. As a result, it is assumed that the quality of these surface water sources will remain good to excellent through the next 20 years.

Groundwater

Groundwater quality in the City is generally good, however a few wells have been shut down due to water quality problems. Some wells have been closed due to percloroethylene (PCE) contamination, and a few wells have experienced nitrate problems. All active wells produce water that meets State and Federal drinking water quality standards.

The City does not presently provide treatment of any well water. Blending could feasibly be used at wells that experience water quality problems. However, the City does not have infrastructure in place to blend good and poor quality groundwater, and does not have plans to construct blending facilities in the immediate future. The City does not perform any groundwater remediation, but there are possibly some other agencies conducting groundwater remediation projects within the city limits.

Groundwater quality is generally better on the western edge of town, and hence most of the production wells are placed in this area. At each new well site, a test hole is drilled to characterize the groundwater quality before a decision is made to install a new well.

The impacts of groundwater quality on future supplies are unknown. However, water supply is considered a greater threat to water reliability. As a result, the City is actively seeking a surface water supply. The City has constructed an inter-tie between the city-wide water distribution system and the airport distribution system. This has allowed groundwater from the Deer Creek Watershed to be delivered to most of the city. This could result in a significant increase in the water supplies available to the City, since the Deer Creek Watershed is benefitting from percolation of treated effluent.

Table 6-13: Water Quality – Current and Projected Water Supply Impacts

(UWMPGB Table 30)

Water source	Description of condition	2010	2015	2020	2025	2030
Surface Water	Acceptable	0	0	0	0	0
Groundwater	Acceptable	0	0	0	0	0

It is not anticipated that water quality will adversely affect water supply in the near future. In the instance that a well or surface water has water quality issues, treatment or blending can be provided.

7 DEMAND MANAGEMENT MEASURES (DMM)

7.1 DMMs

Legal Requirements:

§10631(f)(1) and (2) (Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) water survey programs for single-family residential and multifamily residential customers; (B) residential plumbing retrofit; (C) system water audits, leak detection, and repair; (D) metering with commodity rates for all new connections and retrofit of existing connections; (E) large landscape conservation programs and incentives; (F) high-efficiency washing machine rebate programs; (G) public information programs; (H) school education programs; (I) conservation programs for commercial, industrial, and institutional accounts; (J) wholesale agency programs; (K) conservation pricing;(L) water conservation coordinator; (M) water waste prohibition; (N) residential ultra-low flush toilets.

§10631(f)(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

§10631(f)(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

§10631(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

The City has implemented many demand management measures (DMM) to reduce per capita water consumption. Metering has probably had the greatest impact on conserving water. In 2010 about 97% of the City's deliveries were metered. All metered customers are billed on a volumetric basis and therefore have incentives to conserve water. The City has also established a goal to increase water conservation efforts with education being the cornerstone of the City's water conservation program. The City also recognizes that a diversified water conservation portfolio is necessary since different programs have varying impacts on different groups. As a result, the City's water conservation efforts include a variety of programs and measures.

Table 7-1: Demand Management Measures

Demand Management Measure	Implemented	Planned for Implementation	Cost Benefit Analysis Completed	Not Applicable
DMM1 – Water Survey Programs	X			
DMM 2 – Residential Plumbing Retrofit	X			
DMM3 – Water System Audits	X			
DMM4 – Metering and Commodity Rates	X			
DMM5 – Landscape Irrigation Programs	X			
DMM6 – Washing Machine Rebate Program			X	
DMM7 – Public Information Program	X			
DMM8 – School Education Program	X			
DMM9 – Commercial, Industrial and Institutional Conservation Programs	X			
DMM10 – Wholesale Agency Programs				X
DMM11 – Conservation Pricing	X			
DMM12 – Water Conservation Coordinator	X			
DMM13 – Water Waste Prohibition	X			
DMM14 – Ultra Low Flush Toilet Replacement			X	

7.1.1 Water Survey Programs

Water surveys involve an on-site assessment of water uses on a customer's property to identify area of high water usage or water waste.

The City has not developed or implemented a targeting/marketing strategy for single-family or multi-family home water surveys. However, the City does perform water surveys at the request of water users. Typically the City is asked to perform a water survey if a customer feels that their water bill is too high. Often the customer asks to have their meter tested or recalibrated. In most cases the meters are functioning properly and City staff then perform a water survey to determine where the customer has high water usage. The water survey includes the following:

1. Check indoor and outdoor plumbing for leaks
2. Check irrigation system timers

3. Evaluate irrigation watering schedule
4. Recommend various water conservation measures to the customer, such as modifications to their irrigation schedule and retrofitting with water efficient fixtures and appliances

Outdoor water consumption accounts for a large proportion of total water sold and offers the biggest target for water savings, so the surveys tend to focus on improving landscape irrigation efficiencies.

The City of Albuquerque developed a Water Use Audit Program (Western Resource Advocates). The program sponsored 125 water audits with water savings averaging 8 percent and estimated potential savings at 30 percent. Based on residential water use records, it is assumed that 185 gpcpd is used in Porterville for residential use, then an 8% reduction would equate to 8% x 185 gallons/capita/day x 3.3 persons/household x 365 days/year = 17,800 gallons/year/household = 0.05 AF/year/household. The effectiveness of the water surveys on conservation will be based on this value.

Porterville performs about five water surveys per year and only at the request of customers. Studies have shown that water surveys are not effective unless they are specifically requested by a customer. When a customer is forced to participate they often have no desire to conserve water and hence will not follow recommendations or suggestions. Studies also show that water surveys have very high costs per volume of water saved. Val Little (2006) evaluated the unit costs to implement various water conservation programs. Little reports that the long-term cost for water savings from water surveys is $1,284/AF. This is presently about four times the cost of delivered water in Porterville. Considering this high cost, the City does not plan to actively market or promote its water survey program, but will continue to perform water surveys when they are requested. It is assumed that future demand for water surveys will remain unchanged.

Table 7-2 and Table 7-3 provide details on past and projected future water surveys in Porterville.

Table 7-2: Past Residential Water Surveys

Description	2001	2002	2003	2004	2005
No. of Residential	5	5	5	5	5
Actual Expenditures - $	NA	NA	NA	NA	NA
Actual Water Savings –	0.25	0.25	0.25	0.25	0.25

Table 7-3: Future Residential Water Surveys

Description	2007	2008	2009	2010	2011
No. of Residential Surveys	5 (est)	5 (est)	5 (est)	5 (est)	5 (est)
Projected Expenditures - $	NA	NA	NA	NA	NA
Projected Water Savings –	0.25	0.25	0.25	0.25	0.25

Implementation Schedule: Ongoing

7.1.2 Residential Plumbing Retrofit

Residential plumbing retrofits can include fixtures such as low flow showerheads, showerhead flow restrictors, toilet flappers and faucet aerators. Estimated savings for some of these fixtures include 2.8 gpcpd for low flow showerheads and 2.8 gpcpd for low flow faucets, and 22 gallons per day for a family of three that uses a complete plumbing retrofit kit (Western Resource Advocates, 2003).

Plumbing retrofits are a fairly expensive means to conserve water. Little (2006) determined that the average lifetime cost per acre-foot saved for device giveaways is $457. This is more expensive than the current $314/AF charged to customers for delivered water. As a result, the City only has a limited plumbing retrofit program, which involves the distribution of showerhead flow restrictors at the annual Porterville Fair. It is believed that distribution of the showerhead flow restrictors also helps to promote a culture of water conservation. A large cross section of the community can be reached at the Porterville Fair and therefore the City plans to continue these efforts.

There is no enforceable ordinance in effect in the City requiring replacement of high-flow showerheads and other water use fixtures with their low flow counterparts. In addition, no data is available on the number of houses with water efficient plumbing fixtures. However, all new buildings in the city are constructed according to State plumbing codes and Title 24 Building Standards. These require that new plumbing fixtures installed since 1992 be water efficient. In addition, many of the fixtures provided by the City have likely been installed and some owners have probably purchased and installed fixtures themselves.

The City tracks the number of showerhead flow restrictors that are handed out and their cost. The effectiveness of the flow restrictor distribution on water conservation is based on the number that are given out. First, it is assumed that 50% of the flow restrictors that are distributed are eventually installed. Each flow restrictor is assumed to reduce water consumption by 2.8 gpcpd (same as low flow showerheads) and each restrictor is assumed to be used by two people. This equates to annual water savings of 0.6 AF/year for each 100 flow restrictors that are distributed. **Table 7.4** includes data on past and anticipated future plumbing retrofits in Porterville.

Table 7-4: Residential Plumbing Retrofit Implementation

	Actual					
	2001-2005	2006	2007	2008	2009	2010
# of showerheads distributed	250	125	125	130	130	140
#of faucet aerators distributed	0	0	0	0	0	0
Actual/projected expenditures ($)	$450	$0	$0	$500	$0	$0
Actual/Projected water saving (afy)	0.8	0.8	0.8	0.8	0.8	0.8

	Projected				
	2011	2012	2013	2014	2015
# of showerheads distributed	150	150	150	150	150
#of faucet aerators distributed	0	0	0	0	0
Actual/projected expenditures ($)	$0	$0	$500	$0	$0
Actual/Projected water saving (afy)	0.8	0.8	0.8	0.8	0.8

Implementation Schedule: Ongoing

7.1.3 Water System Audits

Water system audits include an evaluation of the City's distribution system for leaks and other losses. The system losses (water input minus water metered) are a good indication of the system integrity. In 2006, Johnson Controls performed a water system audit and was able to account for 95% of the City's water. This result was better than expected considering the age of the system and meters. In addition, the Porterville Finance Department prepares annual reports showing water production versus water sales. These reports show that system losses ranged between 4% and 10% between 2001 and 2005. Losses are actually lower because the records do not account for fire hydrant flushing or the water delivered to unmetered accounts, which is estimated at 2% of total water usage. In addition, water that is lost through pipeline leakage usually seeps to the groundwater table where it is available to the City through well pumping, so it is not considered a true loss.

The City's distribution system is operated under pressure, and, as a result, leaks are usually apparent. Only a small number of leaks are repaired each year. A physical system audit is not performed every year, mainly because the system appears to be in good condition and the current losses are considered reasonable. However, all new

water lines are pressure tested to verify that leakage is minimal. Data is not readily available on the miles of pipeline repaired or replaced annually, or the expenditures for this work. These records will be tracked more closely in future years.

The effectiveness of the water system audits will be measured by the losses calculated annually. Increasing losses would indicate the leaks have increased and/or flowmeters are not accurate.

Implementation Schedule: Ongoing

7.1.4 Metering and Commodity Rates

Currently, about 98% of the water used in the city is metered. In addition, all new connections in the city are required to be metered and billed by volume used.

Meter Retrofits and Replacements

The City has no current plans to install meters on unmetered properties due to the high cost. In addition, no meter replacement programs are currently planned because a recent audit and some meter testing has found most meters to be accurate (see Section 7.1.3). Nevertheless, as the meters become older, the City will consider replacement or recalibration.

Water Bills

City water bills show the amount of water used each billing period, and compares that value to water used during the same billing period in the previous year. This information allows water users to evaluate the effectiveness of their own conservation programs.

Effectiveness of Meters

Metering certainly creates an incentive to reduce consumption since customers are billed on a volumetric basis. As shown in the 2005 UWMP, cities that are metered use, on average, 61 gpcpd less than cities that are unmetered (279 gpcpd vs. 218 gpcpd). This equates to 6.83 AF/year for each 100 people. Due to a lack of any other data, this value will be used to estimate the water saved by metering customers in the City. Statistics on past and projected future metering are provided in **Table 7-5**.

Table 7-5: Metering and Commodity Rates Implementation

	Actual				
	2006	2007	2008	2009	2010
# of unmetered accounts*	468	468	480	480	480
# of retrofit meters installed	0	0	0	0	0
# of accounts without commodity rates	0	0	0	0	0
Actual Expenditures ($)	$0	$0	$0	$0	$0
Actual water savings (afy)	0	0	0	0	0

**Does not include non-revenue generating accounts or short-term construction water accounts.*

	Projected				
	2011	2012	2013	2014	2015
# of unmetered accounts*	480	480	480	480	380
# of retrofit meters installed	0	0	0	0	100
# of accounts without commodity rates	0	0	0	0	0
Projected Expenditures ($)	$0	$0	$0	$0	$25,500
Projected water savings (afy)	0	0	0	0	10.85
Does not include non-revenue generating accounts or short-term construction water accounts.					

Implementation Schedule: The City will continue to install and read meters on all new services. The City will continue to retrofit existing services as requested by residents.

7.1.5 Landscape and Irrigation Programs

Large landscape customers include golf courses, cemeteries, and other customers with large turf or garden areas (>10,000 square feet). In 2005, the City had only 48 AF of water used for large landscape irrigation customer types. However, this number is misleading since other customer types (Institutional and Other) also have large landscape irrigation. Large landscaping probably uses about 10 percent of total City water demands.

Existing Programs

Existing large landscape conservation programs are described below:

1) Conservation During Droughts. Large (and small) landscape water conservation is especially promoted during designated droughts (see Section 6) through water timing restrictions and enforcement of water waste policies.
2) Artificial Turf. The City has placed artificial turf on a traffic median as a demonstration project. The City will consider adding a sign to advertise the site.
3) Education Programs. Landscape water conservation is a critical part of the City's Public Information Program (see Section 6.2).
4) Water Surveys. The City does not have a specific program for auditing large landscape accounts. However, the City will perform a water survey (see Section 7.1.1) for a customer that has large landscape water demands.

The City does not presently perform water budgets or offer rebates for landscape conversions.

Possible Future Programs

Several new ideas for large landscape conservation were identified. The City does not plan to implement these in the near future but has established a goal of evaluating their merits over the next five years. These ideas include:

1. Require large properties to have an irrigation audit;

2. Coordinate with local nurseries to compile a list of low-water using trees and plants;
3. Provide rebates for irrigation control systems;
4. Require some degree of xeriscape on new properties;
5. Limit amount/percentage of high water use vegetation on new properties;
6. Provide xeriscape garden tours and xeriscape classes;
7. Develop and implement water efficient parkway and landscape design guidelines for all new residential, commercial, industrial and governmental developments.

Measuring Effectiveness of Program

The effectiveness of the large landscape conservation programs will be measured with the following:

1. Comparison of customers water usage before and after water surveys;
2. Comparison of customers water usage during normal climatic conditions and during droughts;
3. Comments on and demand for landscape water conservation education.

Table 7-6: Landscape and Irrigation Program Implementation

	Actual				
	2006	2007	2008	2009	2010
# of large landscape sites converted to central irrigation systems	0	0	0	0	0
# of budgets developed	0	0	0	0	0
# of surveys completed	0	0	0	0	0
# of follow-up visits	0	0	0	0	0
Actual Expenditures ($)	$0	$0	$0	$0	$0

	Projected				
	2011	2012	2013	2014	2015
# of large landscape sites converted to central irrigation systems	0	0	0	0	1
# of budgets to be developed	0	0	0	0	1
#of surveys to be completed	0	0	0	0	1
# of follow-up visits	0	0	0	0	0
Projected Expenditures ($)	$0	$0	$0	$0	$4,000

Implementation Schedule: Surveys will continue to be offered to customers.

7.1.6 Washing Machine Rebate Program

Due to the potentially high cost per volume of water saved, the City has chosen not to provide rebates for high efficiency washing machines, and will achieve water conservation goals through other programs. See section 7.1.15 for more details on economics of washing machine rebates.

7.1.7 Public Information Program

Education programs are the most common form of conservation measures in most cities. Likewise, the City would like to make public education the centerpiece of their conservation efforts.

Current

Current public information programs on water conservation include the following:

1. City participation in Water Awareness Month (May);
2. Bill stuffers on water conservation;
3. News programs;
4. Radio commercials in English and Spanish;
5. Booth at the Porterville City Fair;
6. Water bills that compare current water usage to the previous year's usage.

These efforts are typically implemented during the high water use period of April to September. These efforts are also intensified during droughts.

Planned

If funding and staff time permit, the City will add the following to their public information program during the next five years:

1. Booths at public events such as neighborhood association meetings and garden clubs.
2. Facility tours (such as the wastewater treatment plant) to civic groups and students.
3. City Council Meetings may be broadcast on television in the future. This would provide the public more opportunities to listen to discussions on water issues.

Evaluations

Evaluating the effectiveness of public education programs is difficult. The impacts from water conservation education are long term and benefits may not be immediately realized. Logically, water conservation education should reduce per capita consumption over time. However, per capita consumption can also vary with many other factors such as weather, development trends, and other demand management measures. Nevertheless, the effectiveness of the pubic education programs will be measured by trends in per capita water consumption. In addition, public comments on and demand for the information programs will also be considered.

Past expenditures and projected future expenditures on public educations programs are summarized in **Table 7.7**.

Table 7-7: Public Information Program Implementation

	Actual				
	2006	2007	2008	2009	2010
Bill inserts/newsletters sent	14,562	14,882	15,014	15,161	15,217
Porterville Recorder / Newspapers sent	29,124	29,764	30,000	30,000	30,000
Bills showing water usage comparison	Yes	Yes	Yes	Yes	Yes
Media Buy	$5,000	$5,000	$5,000	$5,000	$5,000
Special Events	5	5	5	5	5
Website Information	Yes	Yes	Yes	Yes	Yes
Actual Expenditures ($)	$10,000	$10,000	$10,875	$11,00	$13,200

	Projected				
	2011	2012	2013	2014	2015
Bill inserts/newsletters sent	15,250	15,250	15,300	30,600	30,00
Porterville Recorder / Newspapers sent	40,000	40,000	40,000	60,000	60,000
Bills showing water usage comparison	Yes	Yes	Yes	Yes	Yes
Media Buy	$5,000	$5,000	$5,000	$5,000	$5,000
Special Events	5	5	5	5	5
Website Information	Yes	Yes	Yes	Yes	Yes
Actual/Projected Expenditures ($)	$13,000	$13,000	$13,000	$15,000	$15,000

Implementation Schedule: The City will continue to provide public information to remind the public about water issues, as detailed above.

7.1.8 School Education Program

The City performs multiple educational sessions throughout the year targeting the age groups listed in Table 7-8. The City has identified education as one of the major elements of their conservation program and therefore will maintain a proactive school educational program. The City's Water Conservation Coordinator currently directs educational field trips with community schools and during the visit, students are educated in Water Conservation, Storm Drain and Recycling. School Education Programs will continue to be evaluated similar to Public Information Programs (see Section 7.1.7). A summary of planned school education programs is provided in **Table 7-8.**

Table 7-8: School Education Program Implementation

# of Class Presentations	Actual				
	2006	2007	2008	2009	2010
Grades K-3	1	1	1	1	1
Grades 4-6	1	1	1	1	1
Grades 7-8	1	1	1	1	1
High School	2	2	2	2	2
College	0	0	0	0	0

	Projected				
	2011	2012	2013	2014	2015
Grades K-3	1	1	1	1	1
Grades 4-6	1	1	1	1	1
Grades 7-8	2	2	2	2	2
High School/College	2	2	2	2	2

Educational materials will be given to the students that meet state education framework requirements. Each presentation will be given to a multiple grade assembly including about 350 to 400 students. Currently there are no plans to give teacher workshops.

Implementation Schedule: The City will continue to provide this program in the manner described above.

7.1.9 Commercial, Industrial, and Institutional Conservation Programs

Commercial, industrial and institutional customers are treated the same as residential customers. As a result, any demand reduction measures which are available and marketed to residential customers are also available for commercial, industrial and institutional customers. All commercial and industrial projects are reviewed by the City for conformance with the City's water efficient landscape ordinance

Water usage from these accounts has averaged about 20% of the total City water usage. Large water users include about 150,000 gallons per day (estimated) at a local hospital, and 100,000 gallons per day (estimated) at a large poultry processing plant.

The City currently requires new car washes to install water recycling systems. These systems have the potential to reduce water consumption from 12,000 to 4,500 gallons per day at each car wash. The systems cost approximately $40,000. Presently, the City only monitors the recycling systems for one year but will consider more long-term monitoring in the future. Statistics are not available on the number of car washes or

estimated water savings. The number of car washes that will be installed in the next five years is also unknown.

The City does not plan to implement a toilet replacement program for commercial, industrial and institutional water users. Toilet replacements are not considered the most economical means to conserve water and are often removed by customers (see Section 7.1.15), and, as a result, other water conservation programs will be pursued.

The City has no immediate plans to implement other conservation programs for commercial, industrial and institutional water users. However, over the next five years, the City plans to study the merits and benefits of the following programs:

1. Provide funding to businesses to install water efficient systems and processes;
2. Require large water users to submit a water conservation plan;
3. Perform on-site surveys of water users for water efficiency and water waste;
4. Distribute promotional information on water conservation to all parties that apply for building permits.

Table 7-9: CII Conservation Program Implementation

	Actual				
	2006	2007	2008	2009	2010
# of surveys completed	1	1	1	1	1
Incentives provided?	No	No	No	No	No
# of follow-up visits	0	0	0	0	0
Actual expenditures ($)	$160	$160	$160	$160	$160

	Planned				
	2011	2012	2013	2014	2015
# of surveys to be completed	1	1	1	1	1
Incentives to be provided?	No	No	No	No	No
# of follow-up visits	0	0	0	0	0
Projected expenditures ($)	$160	$160	$160	$160	$160

Implementation Schedule: The City will continue to provide this program in the manner described above.

7.1.10 Wholesale Agency Programs

The City of Porterville does not provide any wholesale water to other entities, and therefore this DMM does not apply.

7.1.11 Conservation Pricing

Currently, about 98% of the water used in the City is metered. In addition, all new connections in the City are required to be metered and billed by volume of use. All potable water users are charged the same volumetric rate regardless of the volume used or purpose of use. Water users are also charged a fixed monthly fee based on the size of their flowmeter. In 2007, the volumetric rate for water was $0.72/100 cubic feet = $314/acre-foot. The unit rate, however, can be increased by 20% during droughts. The City is not considering a tiered rate structure that increases volumetric water fees as water usage increases. The current rate structure (volumetric pricing and increases during droughts) appears to encourage water conservation, and additional water conservation will be sought through various voluntary and mandatory programs (education, water surveys, watering restrictions, etc.). If these measures are not successful in reducing demands, then the City will consider tiered pricing when the UWMP is revised in five years.

Residential sewer rates are assessed a fixed monthly fee for sewer services. Commercial, industrial and institutional customers are charged sewer fees based on volume of wastewater, but the rate also varies for different customer types (restaurants, car washes, schools, etc.) since the chemistry of their wastewater varies. Some customers, such as retail stores, have two meters, one for indoor use and one for landscaping, since the landscaping accounts are not billed for sewerage.

The impact of metering on water consumption is described in Section 7.1.4. In summary, it is estimated to reduce consumption by about 60 gpcd. The impact of the 20% rate increase during drought on consumption is not known and will have to be tested during an actual drought. However, the City estimates that it will reduce consumption by about 20%.

7.1.12 Water Conservation Coordinator

The City of Porterville has one designated part-time Water Conservation Coordinator (WCC). The person is employed full time with the City and devotes part of their time to water conservation efforts and the rest of their time to other topics such as recycling and stormwater education. More information on the WCC is provided below:

Name: Roman Ferro

Title: Water Systems Specialist

Experience: Grade D2 Water Distribution.

Date position created: 1989

Percent of time spent on water conservation efforts: 6%

The City plans to increase water conservation efforts, particularly education, over the next five years. At this time it is anticipated that the current WCC can accommodate this additional workload. It should also be noted that many other staff in the Public Works Department and Community Development Department spend time supporting and assisting the WCC.

Evaluating the effectiveness of the WCC's efforts is difficult. The WCC performs a wide array of tasks, but many of them are related to water conservation education. Therefore, the effectiveness of the WCC will be evaluated similar to the public information programs (See Section 7.1.7).

Table 7-10 provides data on past and anticipated future efforts for the WCC.

Table 7-10: Water Conservation Coordinator Program Implementation

	Actual				
	2006	2007	2008	2009	2010
# of full-time positions	0	0	0	0	0
# of part-time positions	1	1	1	1	1
Actual expenditures ($)	$3,000	$3,200	$3,400	$3,600	$3,800

	Planned				
	2011	2012	2013	2014	2015
# of full-time positions	0	0	0	0	0
# of part-time positions	1	1	1	1	1
Projected expenditures ($)	$4,000	$4,000	$4,000	$4,000	$4,000

Implementation Schedule: Ongoing.

7.1.13 Water Waste Prohibition

According to Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."

The City has a Water Conservation Plan (WCP) that is implemented during droughts (see Section 6.2.2). When a drought is declared the WCP moves from Phase I to Phase II, Phase III or Phase IV, depending on the severity of the drought. During droughts, City staff will be more diligent in enforcing the water waste prohibition and if necessary will issue notices and fines.

Detailed data is not available on water waste violations and fines. More detailed records will be maintained in the future. The effectiveness of this policy is difficult to

determine and quantify since it is a deterrent and prevents waste before it can occur. Nonetheless, the City will track the number of warnings and violations, especially during droughts.

Table 7-11: Water Waste Prohibition Program Implementation

	Actual				
	2006	2007	2008	2009	2010
Waste Ordinance in effect	Yes	Yes	Yes	Yes	Yes
# of citations issued	0	0	0	0	0
Actual expenditures ($)	$500	$500	$500	$500	$500

	Planned				
	2011	2012	2013	2014	2015
Waste Ordinance in effect	Yes	Yes	Yes	Yes	Yes
Projected # of citations to be issued	0	0	0	500	500
Projected expenditures ($)	$500	$500	$500	$2500	$2500

Implementation Schedule: The City has permanently incorporated this program into its ordinances.

7.1.14 Ultra-Low Flush Toilet Replacement

Due to the potentially high cost per volume of water saved and possible problems with customer satisfaction, Porterville has chosen not to provide rebates for low flow toilet replacements, and will achieve water conservation goals through other programs. Refer to Section 7.1.15 for more details on why this DMM is not being implemented.

7.1.15 Evaluation of Programs not Implemented

The City has chosen not to implement the following demand management measures:

1. High Efficiency Washing Machine Rebates Programs
2. Residential Low Flow Toilet Replacements

These water conservation programs were evaluated according to several criteria as discussed below:

Legal Authority. The City of Porterville has the legal authority to implement these programs.

Technology. The technology is readily available for the City to implement these programs.

Environmental. These programs would have some environmental benefit through the conservation of water. Plumbing retrofits and replacements would retire appliances before their life expectancy and expedite their delivery to landfills.

Social. By implementing these programs the City would help to spread a 'culture' of water conservation.

Health. There are no known health impacts from implementing or not implementing these programs.

Customer Impact. These programs would have a positive impact on customers by reducing their water demands and thus reducing their water bills. They may have a negative impact as some people believe that high efficiency water appliances do not perform as well as standard appliances. The City may also lack the available staff to implement these programs.

Cost Sharing. No cost sharing programs were identified that would lower the financial burden on the City for implementing these programs. The City will monitor grant opportunities that could assist with these programs in the future.

Economics. The economics of certain water management programs are difficult or impossible for the City to evaluate without detailed and expensive studies. As a result, the City looked at a study by Little (2006) that provided typical costs to implement common programs.

The economics of these programs was evaluated by comparing the cost to customers for delivered water versus the cost of the programs. Currently, water deliveries in Porterville cost $314/AF (a small monthly assessment for flowmeters is ignored in this analysis).

According to Little, washing machine rebates have a lifetime cost of $404/AF of water saved based on a 12-year life expectancy. Therefore, the benefit cost ratio would be $314/$404 = 0.78.

Little also states that the lifetime cost (based on 20 years) per volume of water saved for toilet rebates is $436/AF, resulting in a benefit/cost ratio of $314/$436 = 0.72. However, toilet replacements have a lower cost of $181, resulting in a benefit/cost ratio of $314/$181 = 1.73. This difference was surmised to be because distributions programs

allow a utility to assert total quality control by offering only highly efficient models, ensures that toilets are installed properly, and also check for leaks or other conservation opportunities in the household during installation.

In summary, the washing machine rebates and toilet rebates will not be implemented because they are not economical. Toilet distributions appear economical according to Little's study, but the City is lacking staff to implement a program.

8 CLIMATE CHANGE

8.1 UWMP Requirement

The UWMP Guidebook does not require a section on Climate Change but suggests it be included for a more complete representation of the water situation, as water supply and demand are related to the climate change phenomena.

8.2 Introduction

California currently enjoys a Mediterranean climate, which is not expected to change with climate change projections in the future. The climate consists of cool, wet winters and hot, dry summers typically.

Increases in global greenhouse gas levels are changing climate patterns around the world and, it is speculated, may begin to change at an accelerated pace from what has occurred in the past. This accelerated rate of change could result in impacts to the local climate of the city in the form of higher temperatures, increased droughts and floods, decreased snow pack amounts and durations and other extreme variations in weather patterns. As the UWMP projects until 2035, these changes could be expected to manifest themselves over that period. The climate variations could affect the availability and volume of water resources.

8.3 Potential Impacts

In the past, the amount of rainfall has been fairly consistent, with periods of drought and periods of excess precipitation spaced relatively far apart. With climate change, the rainfall levels could begin to vary more from year to year, incurring droughts followed by excesses with less time between them. Typically, climate change predicts a decrease in average rainfall for the area, while temperatures are expected to increase. However, increased temperatures could intensify the El Nino Southern Oscillation cycle (ENSO), possibly resulting in very wet, wet years and drought level dry years.

For areas that rely on surface water deliveries, this weather pattern change could mean less dependable surface water deliveries, as the snow pack diminishes in some years. Increasing temperatures could start the snow pack spring melting period earlier and at an increased rate, which will increase the need for capacity in storage facilities and open channel conveyance facilities (i.e. canals). The increased melting rate could also lead to extensive flooding in lower lying areas due to lack of storage infrastructure.

8.4 Mitigation and Adaptation

To respond to the climate change predictions, the City's response must be two-fold: mitigation and adaptation. Mitigation consists of reducing the amount of greenhouse gas emissions. Adaptation is the process of modifying behaviors in response to the warming climate and related changes.

In relation to water management, emission reduction can be achieved by reducing the amount of water usage, thereby decreasing the energy used to move, treat, and discharge water supplies. As the City implements the DMMs discussed above, their usage will decrease and by association so will their energy use. DMMs that conserve water but utilize excess energy supplies to do so will need to be considered seriously to determine if they are desirable.

Adaptation is generally considered a local principle and, as such, must be contemplated in a very specific manner for each area. Adaptation can consist of more extensive master planning, enhanced management and storage of surface water supplies, increased usage of recycled water, and investment in infrastructure to support the previously stated measures.

9 COMPLETED UWMP CHECKLIST

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 2 Appendix B
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 2 Appendix B
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)		Section 2 Appendix B
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 2 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 2 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		Section 7

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 2 Appendix A
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 2 Appendix B
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 3
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 3
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 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 3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 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 4
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 2
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		N/A until 2015

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
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 4
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.	Not Applicable
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 4
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 5
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 5
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 5
16	Describe the groundwater basin.	10631(b)(2)		Section 5
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 5

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)		Not Applicable
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 5
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 5
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 5
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 5
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)		Sections 4, 5 and 6
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 5
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
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

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		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)		Sections 5, 6 and 7
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
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)		Section 6
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
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

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
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
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
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
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 6
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
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Section 6 Appendix A
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 6
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 6
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
DEMAND MANAGEMENT MEASURES				

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
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
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 7
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
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
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)		Not Applicable

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APPENDIX A
RESOLUTIONS AND ORDINANCES

RESOLUTION NO. 59-2014

A RESOLUTION ADOPTING THE CITY OF PORTERVILLE 2010 URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-84 Regular Session, and as amended subsequently, which requires all urban water suppliers providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, to prepare and submit an Urban Water Management Plan (Plan), the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, the City of Porterville (City) is an urban supplier of water providing water to over 3,000 customers; and

WHEREAS, the Plan shall be periodically reviewed at least once every five years, and the City shall make any amendments or changes to its plan which are indicated by the review; and

WHEREAS, the City has, therefore, prepared and circulated for public review a draft Urban Water Management Plan, and properly noticed Public Hearing regarding said Plan was held by the city Council on August 19, 2014; and

WHEREAS, the City of Porterville did prepare and shall file said Plan with the California Department of Water Resources within 30 days of adoption;

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Porterville as follows:

1. The Porterville City Council does hereby adopt the 2010 Urban Water Management Plan (Plan) as presented to this Council on August 19, 2014.

2. That copies of said Plan be forwarded to the State of California, Department of Water Resources, Tulare County, and the California State Library for filing within 30 days of this date.

3. The Public Works Director is hereby authorized and directed to implement the demand management measures as set forth in the 2010 Urban Water Management Plan, which includes water shortage contingency analysis and recommendations to the City Council regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation and water recycling programs.

4. In a water shortage, the Public Works Director shall recommend to the City Council the appropriate phase of water conservation as indicated in the Plan and implement necessary elements of the Plan.

5. The Public Works Director shall recommend to the City Council additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources.

PASSED, APPROVED, AND ADOPTED this 19th day of August, 2014.

Milt Stowe, Mayor

ATTEST:

John D. Lollis, City Clerk

By: _____
Patrice Hildreth, Chief Deputy City Clerk

STATE OF CALIFORNIA)
CITY OF PORTERVILLE) SS
COUNTY OF TULARE)

I, JOHN D. LOLLIS, the duly appointed City Clerk of the City of Porterville do hereby certify and declare that the foregoing is a full, true and correct copy of the resolution passed and adopted by the Council of the City of Porterville at regular meeting of the Porterville City Council duly called and held on the 19th day of August, 2014.

THAT said resolution was duly passed, approved, and adopted by the following vote:

Council:	REYES	WARD	STOWE	HAMILTON	GURROLA
AYES:	X	X	X	X	X
NOES:					
ABSTAIN:					
ABSENT:					

JOHN D. LOLLIS, City Clerk

Luisa M. Zavala

By: Luisa M. Zavala, Deputy City Clerk

RESOLUTION NO. 62-2014

A RESOLUTION OF THE CITY COUNCIL
OF THE CITY OF PORTERVILLE
AMENDING APPENDIX D OF THE CITY OF PORTERVILLE 2010 URBAN WATER MANAGEMENT PLAN ADOPTED BY RESOLUTION NO. 59-2014

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-84 Regular Session, and as amended subsequently, which requires all urban water suppliers providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, to prepare and submit an Urban Water management Plan (Plan), the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, Appendix D of the City of Porterville 2010 Urban Water Management Plan was adopted by Resolution No. 59-2014 on August 19, 2014; and

WHEREAS, Appendix D of the City of Porterville 2010 Urban Water Management Plan adopted by Resolution No. 59-2014 needs to be amended to add ornamental water features prohibition to Phase II of the City's Water Conservation Plan;

NOW, THEREFORE, LET IT BE RESOLVED by the City Council of the City of Porterville that the following change be made to Phase II of the Water Conservation Plan, which is Appendix D of the City of Porterville 2010 Urban Water Management Plan adopted by Resolution No. 59-2014:

1. Add the following to Drought Response Phase II of the City's Water Conservation Plan:

   Ornamental Water Features Prohibition:

   Filling or refilling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life.

   The operation of ornamental fountains or other structures making similar use of water is prohibited unless the fountain uses a recycling system.

PASSED, APPROVED, AND ADOPTED this 2nd day of September, 2014.

Milt Stowe, Mayor

ATTEST:
John D. Lollis, City Clerk

By: _____
Patrice Hildreth, Chief Deputy City Clerk

DROUGHT RESPONSE PHASE II: WATER SUPPLY SHORTAGE

Drought Response Phase II applies during periods when there is a water supply shortage. When water supply conditions start to deteriorate, the City is mandated to implement more stringent water conservation provisions for the benefit of its community. In addition to upholding the programs and provisions outlined in Phases I, the City must be diligent in its water conservation efforts by issuing penalties for non-compliance.

ACTIONS BY THE CITY:

Adoption and Enforcement of Stricter Water Regulations and Restrictions	• The City of Porterville will enforce an odd/even watering schedule for all residents. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. Excessive run-off is prohibited. • Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."
Public Information Program	The City will pursue a more aggressive distribution of information than its efforts initiated in the initial Water Conservation Phase to promote public awareness of the need to conserve water with a stronger emphasis on the water shortage condition.
Water System Pressure Reduction	The City's water system may experience reduced water pressures during high usage periods. This may deter water use for nonessential activities and encourage scheduling of landscape watering to late nights or early mornings.
City Landscapes and Watering Schedules	All City parks, median islands, and public facility landscapes will be watered during the late night or early morning hours to reduce impact on the water system during peak usage hours.
Leak Detection Water Waste	The City will continue in its proactive plan to audit water supply usage. All City staff will be reminded of the necessity of reporting any evidence of leaks or water waste for immediate action. There will be an emphasis on coordinated community efforts to reduce water waste.
"Waste of Water" Notices	City staff will be equipped to issue "Waste of Water" notices to consumers identified as misusing water.
Mandatory Odd/Even Watering days	Increase public education on the mandatory watering schedule program. Public outreach will emphasize changes from the Water Conservation Phase I (Voluntary) to Phase II (Mandatory).

Continuation of all Conservation Programs Established in Phase I	See Phase I

ACTIONS BY THE GENERAL PUBLIC:

Mandatory Odd/Even Watering Schedule	• Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday, Thursday and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday, Friday and Sunday. There is no watering on Monday. See Exhibit 2 below. • Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. • Excessive runoff is prohibited.
Ornamental Water Features	• Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life. • The operation of ornamental fountains or other structure making similar use of water is prohibited unless the fountain uses a recycling system.
Conservation Efforts	The general public will be strongly encouraged to utilize those water conservation measures contained within the City's public information program.
Restaurants	Notices will be sent to all restaurants within the city limits requesting support of water conservation efforts by serving water to customers upon request only.
Lawn and Landscaping Watering	Mandatory implementation of the Odd/Even Watering Program initiated in the Water Conservation Phase I, all residential, commercial, and industrial landscape watering scheduled times.
Vehicle Washing and Sidewalk Hosing	• The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. • The washing of automobiles, trucks, trailers, boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done either by automatic car washes that recycle water or with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."

Mandatory Odd/Even Water Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
DO NOT WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER
---	ODD	EVEN	ODD	EVEN	ODD	EVEN

Odd Address Even Address

Exhibit 2

STATE OF CALIFORNIA)
CITY OF PORTERVILLE) SS
COUNTY OF TULARE)

I, JOHN D. LOLLIS, the duly appointed City Clerk of the City of Porterville do hereby certify and declare that the foregoing is a full, true and correct copy of the resolution passed and adopted by the Council of the City of Porterville at regular meeting of the Porterville City Council duly called and held on the 2nd day of September, 2014.

THAT said resolution was duly passed, approved, and adopted by the following vote:

Council:	REYES	WARD	STOWE	HAMILTON	GURROLA
AYES:	X	X	X	X	X
NOES:					
ABSTAIN:					
ABSENT:					

JOHN D. LOLLIS, City Clerk

Luisa M. Zavala

By: Luisa M. Zavala, Deputy City Clerk

ORDINANCE NO. 1816

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PORTERVILLE ADDING SECTION 25-5.1 TO CHAPTER 25, ARTICLE I, DIVISION 1 OF THE PORTERVILLE MUNICIPAL CODE REGARDING ENFORCEMENT OF ADOPTED WATER CONSERVATION PLAN

THE CITY COUNCIL OF THE CITY OF PORTERVILLE DOES ORDAIN AS FOLLOWS:

Section 1. *Code Amendment*. Section 25-5.1 IS hereby added to Chapter 25, Article I, Division 1 of the Porterville Municipal Code, to read as follows:

Section 25-5.1. City Water Conservation Plan.

The City Council has adopted by Resolution its Water Conservation Plan which sets forth water conservation phases and conservation measures including mandatory restrictions on water usage by property owners and water consumers. Violation of the measures in effect, currently and as may be amended by Resolution from time-to-time, pursuant to the applicable phase of Water Conservation Plan, shall be enforceable as set forth per any applicable remedy provisions in this Municipal Code, including but not limited to Chapter 1, Sections 1-9 and 1-10; Chapter 2, Article XIV; and/or Chapter 25, Article I. The City's Water Conservation Plan is deemed to be the City's "Water Shortage Contingency Plan" per applicable State law.

Section 2. *Severability*. Should any provision of this Ordinance, or its application to any person or circumstance, be determined by a court of competent jurisdiction to be unlawful, unenforceable or otherwise void, that determination shall have no effect on any other provision of this Ordinance or the application of this Ordinance to any other person or circumstance and, to that end, the provisions hereof are severable.

Section 3. *Effective Date*. This Ordinance shall take effect thirty days after adoption as provided by Porterville Charter Section 12.

Section 4. *Certification*. The City Clerk shall certify to the passage and adoption of this Ordinance and shall cause the same to be published according to law.

PASSED, APPROVED AND ADOPTED, this 2nd day of September, 2014.

Milt Stowe, Mayor

ATTEST:
John D. Lollis, City Clerk

By: _____
Patrice Hildreth, Chief Deputy City Clerk

STATE OF CALIFORNIA)
CITY OF PORTERVILLE) (SS)
COUNTY OF TULARE)

I, JOHN D. LOLLIS, the duly qualified City Clerk of the City of Porterville do hereby certify:

THAT the foregoing ordinance is a true and correct copy of Ordinance No. 1816, passed and adopted by the Council of the City of Porterville at a regular meeting held on the 2nd day of September, 2014, that said ordinance has been duly published pursuant to law, and that by the terms and provisions of the Charter of the City of Porterville, said ordinance to become effective October 2, 2014, at which time said ordinance is deemed to be in full force and effect.

THAT said ordinance was introduced by Council and the same was duly passed and adopted by the following vote:

COUNCIL:	REYES	WARD	STOWE	HAMILTON	GURROLA
AYES:	X	X	X	X	X
NOES:					
ABSTAIN:					
ABSENT:					

JOHN D. LOLLIS, City Clerk

Luisa M. Zavala

By: Luisa M. Zavala, Deputy City Clerk

APPENDIX B
PUBLIC NOTIFICATION

Published in the Porterville, Calif. Recorder
Friday, June 20, 2014
Page 5B

Public Notices

PUBLIC NOTICE

NOTICE OF PUBLIC HEARING and AVAILABILITY OF DRAFT URBAN WATER MANAGEMENT PLAN FOR PUBLIC REVIEW CITY OF PORTERVILLE URBAN WATER MANAGEMENT PLAN (UWMP)

Pursuant to the California Water Code section 10642 and 10608, the City Council of the City of Porterville will conduct a Public Hearing to take testimony regarding the adoption of the 2010 Urban Water Management Plan (UWMP) for the City of Porterville.

The public hearing is scheduled for the following public meeting:

Porterville City
Council Meeting
6:30 p.m. Tuesday
August 19, 2014
City Council Chambers
291 North Main Street
Porterville, California

Any interested person may present written comments concerning the proposed UWMP up to the date of the hearing.

Inquiries concerning the proposed UWMP should be directed to Baldomero S. Rodriguez, Public Works Director at (559) 782-7462.

The draft report may be reviewed during regular business hours at:

Office of the City Clerk
291 North Main Street
Porterville, CA 93257

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

All interested persons are invited to be present at aforesaid hearing and be heard thereon. The meeting facility is accessible to the handicapped. Auxiliary aides will be made available, upon request in advance, for persons with hearing or vision disabilities.

John Lollis,City Clerk
Dated: June 16, 2014
Publish: June 20 and June 27, 2014

June 20, 27, July 7, 21

COUNCIL AGENDA: AUGUST 19, 2014

PUBLIC HEARING

SUBJECT: ADOPTION OF A RESOLUTION APPROVING THE CITY'S URBAN WATER MANAGEMENT PLAN

SOURCE: Public Works Department - Field Services Division

COMMENT: The Urban Water Management Plan (UWMP) is a requirement of the Urban Water Management Planning Act (UWMPA) (Division 6, Part 2.6 of the California Water Code (CWC) §10610-10656). The UWMPs must be submitted to the Department of Water Resources (DWR). The submittal is required to meet the requirements of the UWMPA, including the most current amendments that have been made. The UWMPA applies to urban water suppliers with 3,000 or more connections being served or supplying more than 3,000 acre-feet (AF) of water annually.

UWMPs are required of the state's urban water suppliers in an effort to assist their resource planning and to ensure adequate water supplies are available for future use. A secondary purpose of the UWMP is to provide for a plan or series of plans during water drought situations. This plan was prepared according to the requirements of the CWC, UWMPA and the UWMP Guidebook 2010.

In 1983, SB797 altered Division 6 of the CWC by producing the UWMPA. Since 1983, several amendments to the original document have increased the requirements of the UWMPs submitted today. One such amendment required projections for water use to extend 20 years at 5-year intervals. Recently, this has been increased to a 25 year projection providing for a minimum 20-year projection up until the next UWMP is completed.

Various other amendments have increased requirements to include sections on recycled water use, demand management measures (DMMs), and water shortage contingency plans. Recycled water use sections were added to assist in evaluation of alternate water supplies for future use when projects exceed the current water supplies. Demand management measures must be clearly described, including which measures are being implemented and which are scheduled for implementation in the future. Water contingency plans are to be prepared and coordinated with other water suppliers in the area for use during times of drought.

In 2009, the Legislature passed Senate Bill x7-7 (SBx7-7), which requires that all water suppliers, on average, reduce their gallons per capita per day (gpcd) water used by 20% by the year 2020. SBx7-7 also requires water suppliers to establish a 2015 "interim" target that reflects, on average, a 10% reduction. SBx7-7 lays out methods that water suppliers may use to determine the baseline from which to reduce and methods that the water suppliers may use to calculate both their 2015 interim per capita water use target and their 2020 final per capita water use target. While each water supplier must choose one of the methods and hold a public hearing before adoption of the method, SBx7-7

allows water suppliers to revisit these and modify these choices when developing their 2015 Urban Water Management Plans.

Based on the water use target methods in the UWMP, the City's water use target for 2020 is 179 gpcd, while the interim 2015 target is 197 gpcd. The 2020 target was determined using Method 3, 95% of the regional water conservation goal, which provided the most conservative water target goal.

On January 17, 2014, Governor Brown issued a drought emergency proclamation following three dry years in California. The proclamation asked all Californians to reduce water consumption by 20%. On July 15, 2014, the State Water Resources Control Board (State Water Board) adopted emergency water conservation regulations that went into effect July 28, 2014. With this regulation, all Californians will be expected to stop:

- washing down driveways and sidewalks;
- watering of outdoor landscapes that cause excess runoff;
- using a hose to wash a motor vehicle, unless the hose is fitted with a shut-off nozzle, and
- using potable water in a fountain or decorative water feature, unless the water is recirculated.

The regulation makes an exception for health and safety circumstances.

Larger water suppliers will be required to activate their Water Shortage Contingency Plan to a level where outdoor irrigation restrictions are mandatory. In communities where no water shortage contingency plan exists, the regulation requires that water suppliers either limit outdoor irrigation to twice a week or implement other comparable conservation actions. Finally, large water suppliers must report water use to the state on a monthly basis to track progress.

Per the new regulation, local agencies can ask courts to fine water users up to $500 a day for failure to comply with conservation requirements. The State Water Board could initiate enforcement actions against water agencies that do not comply with the new regulations. Failure to comply with a State Water Board enforcement order by water agencies is subject up to a $10,000 a day penalty.

The City of Porterville water production for the month of July 2014 had an 11% decrease from 2013. This reduction has been achieved with only voluntary water conservation measures. The regulations anticipate that mandatory outdoor irrigation restrictions can result in up to 20% reduction in outdoor water use.

The Water Conservation Plan, which is an element of the UWMP, has been modified to incorporate the mandatory restriction requirements of the new regulations.

The modifications to the Phases of the Water Conservation Plan are summarized below:

Phase	Description of Change
Water Conservation Phase 1	Title change to include the words "Water Conservation," no other changes.
Drought Response Phase 2	Title change to include the words "Drought Response," and added a three day per week odd/even water schedule as a mandatory restriction, and prohibits washing sidewalks, driveways and other paved areas.
Drought Response Phase 3	Title change to include the words "Drought Response," and added a two day per week odd/even water schedule as a mandatory restriction.
Emergency Response Phase 4	Title change to include the words "Emergency Response." The elements of the old Phase 3 were moved to this new Phase 4, which includes a 20% water rate increase. A new element was added that would prohibit outdoor watering.

Staff has confirmed with the State that we can implement the mandatory three day per week water schedule and meet the requirements of the regulations. This scenario is acceptable to the State since we have a water shortage plan (Water Conservation Plan) in place. Water suppliers without a plan are required to either limit outdoor irrigation to twice a week or implement other comparable conservation actions.

Staff's recommendation is to open the public hearing, receive comments, and adopt the updated UWMP.

RECOMMENDATION: That City Council:

1) Conduct a public hearing and adopt the draft resolution approving the UWMP, which includes the Water Conservation Plan in Appendix D;

2) Remain in Phase 2 of the Water Conservation Plan, which restricts landscape watering to three days per week;

3) Submit the UWMP to the DWR, the California State Library, and the County; and

4) Make the UWMP available to the public for review within 30 days after filing a copy of the plan with the DWR.

ATTACHMENTS: Draft Resolution Adopting the Urban Water Management Plan
Urban Water Management Plan

APPENDIX C
GROUNDWATER BASIN INFORMATION

Tulare Lake Hydrologic Region

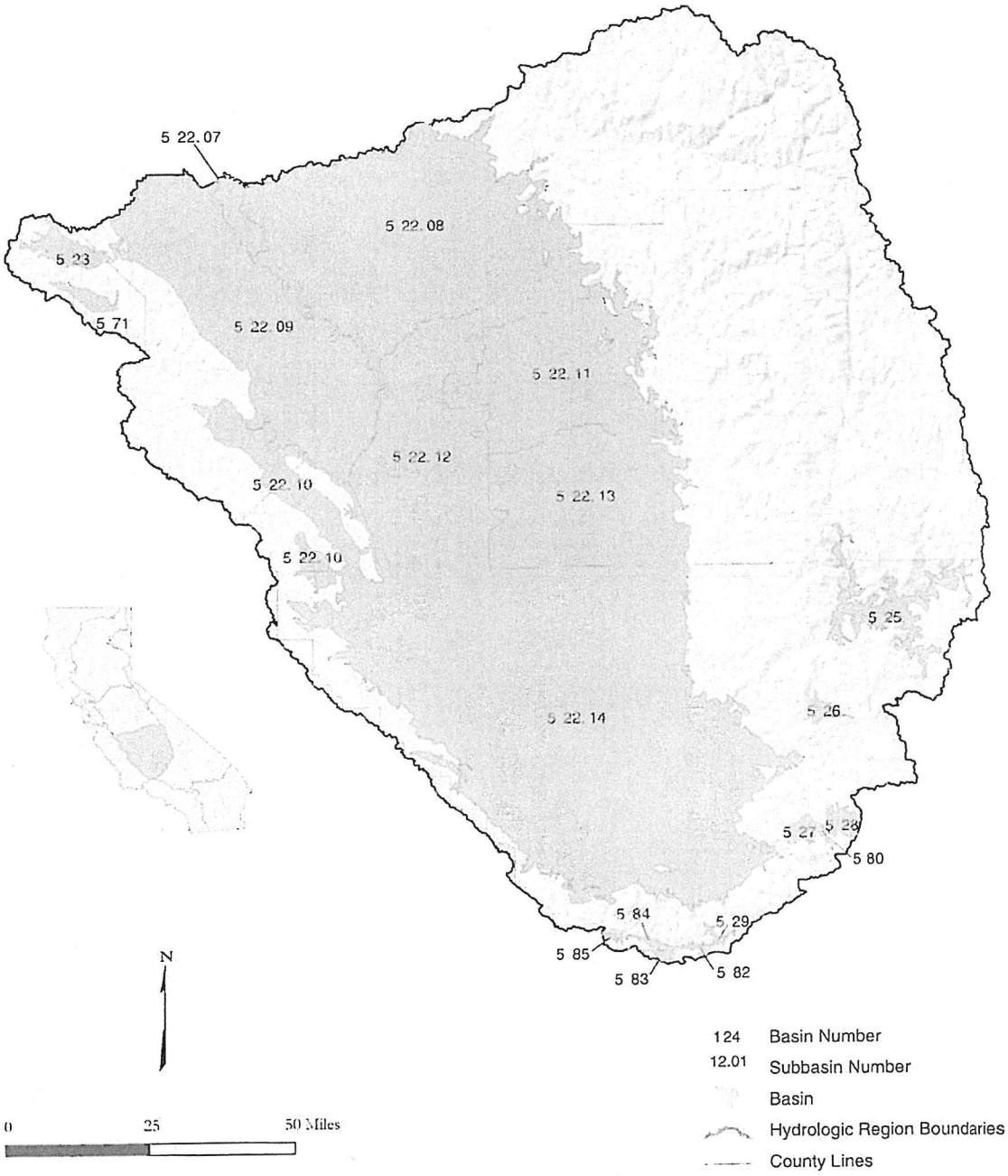

Figure 37 Tulare Lake Hydrologic Region

Basins and Subbasins of Tulare Lake Hydrologic Region

Basin/subbasin	Basin name
5-22	San Joaquin Valley
5-22.08	Kings
5-22.09	Westside
5-22.10	Pleasant Valley
5-22.11	Kaweah
5-22.12	Tulare Lake
5-22.13	Tule
5-22.14	Kern County
5-23	Panoche Valley
5-25	Kern River Valley
5-26	Walker Basin Creek Valley
5-27	Cummings Valley
5-28	Tehachapi Valley West
5-29	Castaic Lake Valley
5-71	Vallecitos Creek Valley
5-80	Brite Valley
5-82	Cuddy Canyon Valley
5-83	Cuddy Ranch Area
5-84	Cuddy Valley
5-85	Mil Potrero Area

Description of the Region

The Tulare Lake HR covers approximately 10.9 million acres (17,000 square miles) and includes all of Kings and Tulare counties and most of Fresno and Kern counties (Figure 37). The region corresponds to approximately the southern one-third of RWQCB 5. Significant geographic features include the southern half of the San Joaquin Valley, the Temblor Range to the west, the Tehachapi Mountains to the south, and the southern Sierra Nevada to the east. The region is home to more than 1.7 million people as of 1995 (DWR, 1998). Major population centers include Fresno, Bakersfield, and Visalia. The cities of Fresno and Visalia are entirely dependent on groundwater for their supply, with Fresno being the second largest city in the United States reliant solely on groundwater.

Groundwater Development

The region has 12 distinct groundwater basins and 7 subbasins of the San Joaquin Valley Groundwater Basin, which crosses north into the San Joaquin River HR. These basins underlie approximately 5.33 million acres (8,330 square miles) or 49 percent of the entire HR area.

Groundwater has historically been important to both urban and agricultural uses, accounting for 41 percent of the region's total annual supply and 35 percent of all groundwater use in the State. Groundwater use in the region represents about 10 percent of the State's overall supply for agricultural and urban uses (DWR 1998).

The aquifers are generally quite thick in the San Joaquin Valley subbasins with groundwater wells commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the San Joaquin Valley. Typical well yields in the San Joaquin Valley range from 300 gpm to 2,000 gpm with yields of 4,000 gpm possible. The smaller basins in the mountains surrounding the San Joaquin Valley have thinner aquifers and generally lower well yields averaging less than 500 gpm.

The cities of Fresno, Bakersfield, and Visalia have groundwater recharge programs to ensure that groundwater will continue to be a viable water supply in the future. Extensive groundwater recharge programs are also in place in the south valley where water districts have recharged several million acre-feet for future use and transfer through water banking programs.

The extensive use of groundwater in the San Joaquin Valley has historically caused subsidence of the land surface primarily along the west side and south end of the valley.

Groundwater Quality

In general, groundwater quality throughout the region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high TDS, nitrate, arsenic, and organic compounds.

The areas of high TDS content are primarily along the west side of the San Joaquin Valley and in the trough of the valley. High TDS content of west-side water is due to recharge of stream flow originating from marine sediments in the Coast Range. High TDS content in the trough of the valley is the result of concentration of salts because of evaporation and poor drainage. In the central and west-side portions of the valley, where the Corcoran Clay confining layer exists, water quality is generally better beneath the clay than above it. Nitrates may occur naturally or as a result of disposal of human and animal waste products and fertilizer. Areas of high nitrate concentrations are known to exist near the town of Shafter and other isolated areas in the San Joaquin Valley. High levels of arsenic occur locally and appear to be associated with lakebed areas. Elevated arsenic levels have been reported in the Tulare Lake, Kern Lake and Buena Vista Lake bed areas. Organic contaminants can be broken into two categories, agricultural and industrial. Agricultural pesticides and herbicides have been detected throughout the valley, but primarily along the east side where soil permeability is higher and depth to groundwater is shallower. The most notable agricultural contaminant is DBCP, a now-banned soil fumigant and known carcinogen once used extensively on grapes. Industrial organic contaminants include TCE, DCE, and other solvents. They are found in groundwater near airports, industrial areas, and landfills.

Water Quality in Public Supply Wells

From 1994 through 2000, 1,476 public supply water wells were sampled in 14 of the 19 groundwater basins and subbasins in the Tulare Lake HR. Evaluation of analyzed samples shows that 1,049 of the wells, or 71 percent, met the state primary MCLs for drinking water. Four-hundred-twenty-seven wells, or 29 percent, exceeded one or more MCL. Figure 38 shows the percentages of each contaminant group that exceeded MCLs in the 427 wells.

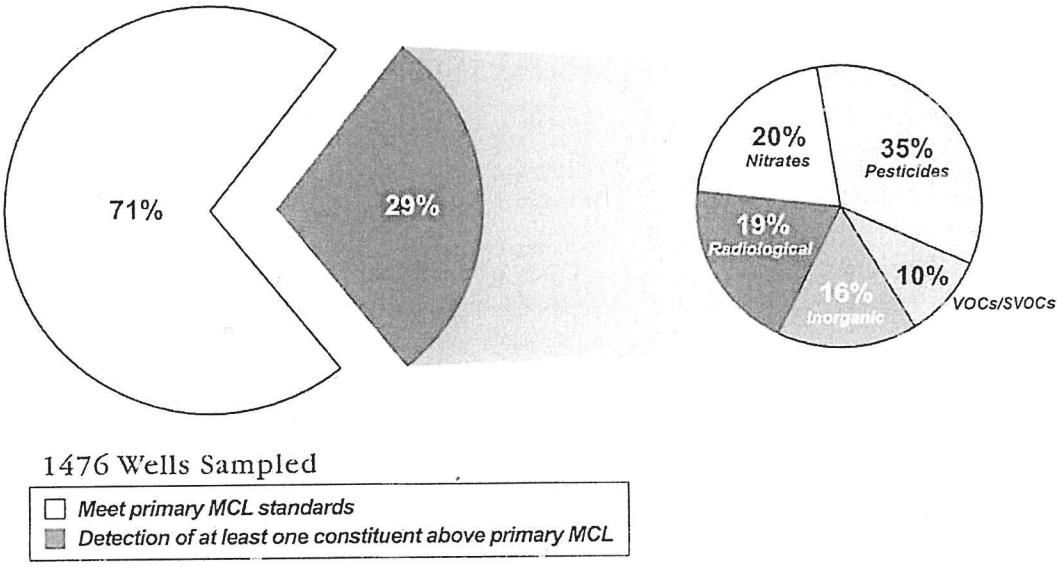

Figure 38 MCL exceedances by contaminant group in public supply wells in the Tulare Lake Hydrologic Region

Table 31 lists the three most frequently occurring contaminants in each of the six contaminant groups and shows the number of wells in the HR that exceeded the MCL for those contaminants.

Table 31 Most frequently occurring contaminants by contaminant group in the Tulare Lake Hydrologic Region

Contaminant group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics - Primary	Fluoride – 32	Arsenic – 16	Aluminum – 13
Inorganics - Secondary	Iron – 155	Manganese – 82	TDS – 9
Radiological	Gross Alpha – 74	Uranium – 24	Radium 228 – 8
Nitrates	Nitrate(as NO_3) – 83	Nitrate + Nitrite – 14	Nitrite(as N) – 3
Pesticides	DBCP – 130	EDB – 24	Di(2-Ethylhexyl)phthalate – 7
VOCs/SVOCs	TCE – 17	PCE – 16	Benzene – 6 MTBE – 6

DBCP = Dibromochloropropane
EDB = Ethylenedibromide
TCE = Trichloroethylene
PCE = Tetrachloroehylene
VOC = Volatile organic compound
SVOC = Semivolatile organic compound

Changes from Bulletin 118-80

There are no newly defined basins since Bulletin 118-80. However, the subbasins of the San Joaquin Valley, which were delineated as part of the 118-80 update, are given their first numeric designation in this report (Table 32).

Table 32 Modifications since Bulletin 118-80 of groundwater basins and subbasins in Tulare Lake Hydrologic Region

Subbasin name	New number	Old number
Kings	5-22.08	5-22
Westside	5-22.09	5-22
Pleasant Valley	5-22.10	5-22
Kaweah	5-22.11	5-22
Tulare Lake	5-22.12	5-22
Tule	5-22.13	5-22
Kern County	5-22.14	5-22
Squaw Valley	deleted	5-24
Cedar Grove Area	deleted	5-72
Three Rivers Area	deleted	5-73
Springville Area	deleted	5-74
Templeton Mountain Area	deleted	5-75
Manache Meadow Area	deleted	5-76
Sacator Canyon Valley	deleted	5-77
Rockhouse Meadows Valley	deleted	5-78
Inns Valley	deleted	5-79
Bear Valley	deleted	5-81

Several basins have been deleted from the Bulletin 118-80 report. In Squaw Valley (5-24) all 118 wells are completed in hard rock. Cedar Grove Area (5-72) is a narrow river valley in Kings Canyon National Park with no wells. Three Rivers Area (5-73) has a thin alluvial terrace deposit but 128 of 130 wells are completed in hard rock. Springville Area (5-74) is this strip of alluvium adjacent to Tule River and all wells are completed in hard rock. Templeton Mountain Area (5-75), Manache Meadow Area (5-76), and Sacator Canyon Valley (5-77) are all at the crest of mountains with no wells. Rockhouse Meadows Valley (5-78) is in wilderness with no wells. Inns Valley (5-79) and Bear Valley (5-81) both have all wells completed in hard rock.

Table 33 Tulare Lake Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
5-22	SAN JOAQUIN VALLEY									
5-22.08	KINGS	976,000	C	3,000	500-1,500	909	-	722	200-700	40-2000
5-22.09	WESTSIDE	640,000	C	2,000	1,100	960	-	50	520	220-35,000
5-22.10	PLEASANT VALLEY	146,000	B	3,300	-	151	-	2	1,500	1000-3000
5-22.11	KAWEAH	446,000	B	2,500	1,000-2,000	568	-	270	189	35-580
5-22.12	TULARE LAKE	524,000	B	3,000	300-1,000	241	-	86	200-600	200-40,000
5-22.13	TULE	467,000	B	3,000	-	459	-	150	256	200-30,000
5-22.14	KERN COUNTY	1,950,000	A	4,000	1,200-1,500	2,258	249	476	400-450	150-5000
5-23	PANOCHE VALLEY	33,100	C	-	-	48	-	-	1,300	394-3530
5-25	KERN RIVER VALLEY	74,000	C	3,650	350	-	-	92	378	253-480
5-26	WALKER BASIN CREEK VALLEY	7,670	C	650	-	-	-	1	-	-
5-27	CUMMINGS VALLEY	10,000	A	150	56	51	-	15	344	-
5-28	TEHACHAPI VALLEY WEST	14,800	A	1,500	454	64	-	19	315	280-365
5-29	CASTAC LAKE VALLEY	3,600	C	400	375	-	-	3	583	570-605
5-71	VALLECITOS CREEK VALLEY	15,100	C	-	-	-	-	0	-	-
5-80	BRITE VALLEY	3,170	A	500	50	-	-	-	-	-
5-82	CUDDY CANYON VALLEY	3,300	C	500	400	-	-	3	693	695
5-83	CUDDY RANCH AREA	4,200	C	300	180	-	-	4	550	480-645
5-84	CUDDY VALLEY	3,500	A	160	135	3	-	3	407	325-645
5-85	MIL POTRERO AREA	2,300	C	3,200	240	7	-	7	460	372-657

gpm - gallons per minute
mg/L - milligram per liter
TDS -total dissolved solids

APPENDIX D
WATER CONSERVATION PLAN

Version 3.0

WATER CONSERVATION PLAN

EVERY DROP COUNTS.

PRESENTED BY: FIELD SERVICES DIVISION
PUBLIC WORKS DEPARTMENT

CITY OF PORTERVILLE
555 N. PROSPECT ST., PORTERVILLE, CA 93257

REVISED BY:

JOHN LOLLIS,
CITY MANAGER

BALDOMERO S. RODRIGUEZ,
PUBLIC WORKS DIRECTOR

BRYAN B. STYLES,
DEPUTY PUBLIC WORKS DIRECTOR
& FIELD SERVICES MANAGER

MICHAEL KNIGHT,
WATER UTILITIES SUPERINTENDENT

ROMAN FERRO,
WATER SYSTEMS SPECIALIST

DENYS THOMPSON,
ADMINISTRATIVE AIDE

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PREFACE

The City of Porterville water system is municipally-owned with more than 15,299 service connections, 97% of which are metered, serving a population of 55,490, with approximately 1,100 service connections outside the city limits. Water supplies for the City system are produced entirely from groundwater underlying the city, which is recharged from rainfall and runoff of the Western Sierra Nevada. The major stream contributing to the recharge of the Tule Basin Aquifer underlying Porterville is the Tule River.

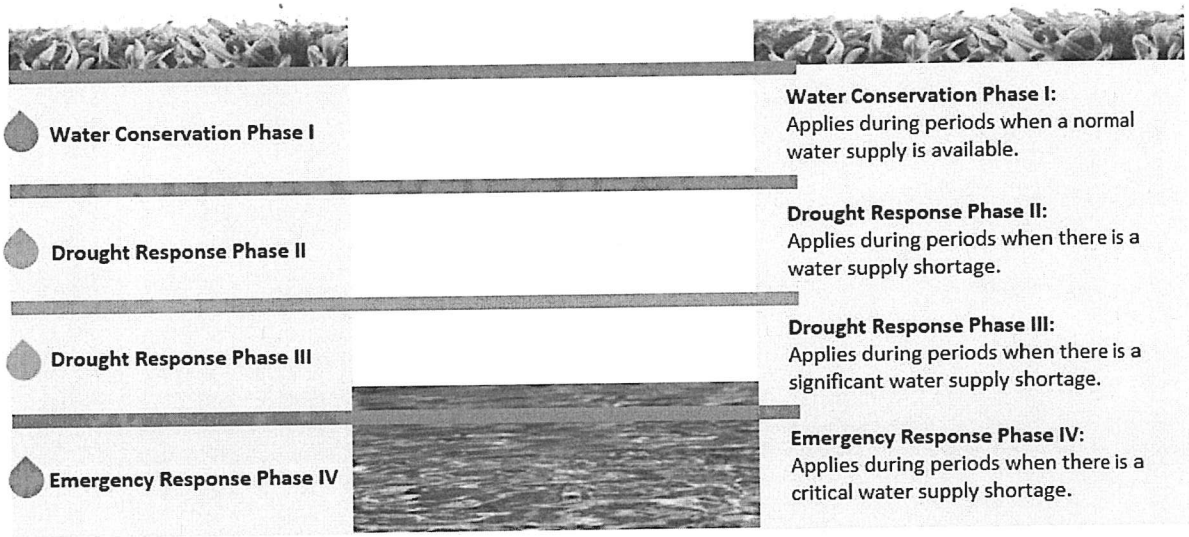
Storage capacity represents over ten million gallons within the distribution system and five hillside reservoirs, three with a capacity of three million gallons, one with a capacity of three hundred and five thousand gallons, one with the capacity of five hundred and fifty thousand gallons.

A telemetry system controls the operation of 23 of the City's 35 active well pumps to maintain system pressure under varying loads. The water levels in the reservoirs are also monitored and controlled by the computerized telemetry control system.

Water conservation and awareness have always been areas of concern for the Porterville community. Less than normal rainfall and runoff makes efforts to promote water conservation a high priority. In addition to the benefits of conserving water as a limited natural resource, additional benefits accrue to the community in the form of a reduced impact on the Wastewater Treatment Plant and a reduction in energy costs when water supplies are conserved.

It is vitally important that the Water Conservation Plan be a joint partnership between the City and the General Public in order to achieve optimal effect. The Plan has been developed in four phases with each phase defined in terms of the available water supply.

Well Storage Levels and Drought Phase Triggers



Actions within each phase have been defined as either actions to be undertaken by the City or by the General Public. Due to the number of variables which affect the water conditions in existence at any one point in time, a City staff analysis of those variables will be utilized in determining the transition of the City from one phase to a more (or less) stringent phase. At such time as staff determines that water supply conditions warrant a phase change, staff will present the request to the City Council for their approval.

This plan differs from other valley community plans because the city of Porterville is in a more favorable position of having almost all of its water customers metered, which allows the City to basically control the water conservation program.

CITY WATER SYSTEM

The City has always been diligent in its efforts to provide sufficient safe and affordable drinking water to the residents of the community. Water conservation has long been a permanent part of the City's water resource management program. Efforts to that end include:

- NEW WELLS:

Over the past five years new wells have been added to the City water system in order to serve the needs of the community. Additional wells are planned for completion within the next few years.

- TELEMETRY SYSTEM:

This system controls the operation of the well pumps to maintain system pressure under varying loads. Water levels in the reservoirs are also monitored and controlled by the computerized telemetry control system. Water is usually pumped to the reservoirs during the off peak usage hours for later use by consumers. This system was designed to operate the City wells in the most efficient and productive way possible with additional benefits of energy cost savings.

- RESERVOIRS:

The City currently operates and maintains five (5) hillside reservoirs, three (3) with a capacity of three million gallons, one (1) with a capacity of 305,000 gallons, and one (1) with a capacity of 550,000. The three largest reservoirs are usually filled during off peak hours and then release water during the high usage hours. There is also a 300,000 gallon reservoir located at the Airport which is also part of the City system. The reservoirs increase the City's ability to maintain system pressure during peak demand and fire flow situations.

- METERIZATION PROGRAM:

With over 97% of all service connections metered, the City has a goal of 100% meterization. All new connections are required to have meters.

- UTILITY BILLING NOTICE:

The City's computerized utility billing system provides consumers with their current and past water usage history for comparison purposes. While variations may be attributable to a change known to the consumer (i.e. additional persons in the home, addition of a swimming pool), it may also be the result of an undetected leak or other controllable occurrence.

- WATER AUDIT/LEAKAGE DETECTION & REPAIR PLAN:

The City will continue in its proactive plan to audit water supply usage. Upon detection of the source of any leakage, corrective action will be taken immediately in order to promote the efficient use of the existing water supply and in turn reduce the energy required to operate the system.

- NEW WATER LINE TESTING:

The City requires full pressure and leak testing of all newly constructed water lines.

- FIRE HYDRANT TESTING:

The City Fire Department schedules their annual fire hydrant testing program during the early spring and late fall to avoid the peak water use season. Such testing is required to maintain the integrity of the fire protection system.

CONSERVATION PHASING

The effectiveness of any voluntary plan ultimately depends on the public's awareness of the need for the plan. Local residents have a history of commitment to their community and support of the public welfare. It is a reliance upon this tradition that makes the distribution of public information the cornerstone of the City's Water Conservation Plan.

WATER CONSERVATION PHASE I: NORMAL WATER SUPPLY

The Water Conservation Phase I applies during periods when a normal water supply is available.

ACTIONS BY THE CITY:

Public Information Program	• Distribution of suggestions for residential, commercial, and industrial water conservation and awareness. • Coordination of public information with the local news media. • City participation in Water Awareness Month (May). • Lawn and Landscape Watering Guides will be made available upon request. • City staff will coordinate with local nurseries to compile a list of low water using trees and plants. The list will be made available at City Hall, the Corporation Yard, and the Parks & Leisure Services Department for local residents. • Coordination with local schools to encourage young people to become aware of local water issues and conditions.
Project Review Committee	• The City's Project Review Committee (PRC) will include the evaluation of all submitted projects for water use and conservation efforts. The goal of City staff in cooperation with the developer will be to voluntarily reduce consumption of water used in the project. • City staff will assist the developer in familiarization with the Xeriscape Concept, combining creative landscaping and efficient irrigation to save water and promote attractive alternatives to traditional, high water use landscapes.
City Landscapes and Watering Schedules	• City parks, median islands, and landscaped public facilities will be watered during late night or early morning hours to the greatest extent possible. • All new landscaping projects undertaken by the City will incorporate conservation design.
Retrofit Bathroom Facilities	Water saving kits which contain toilet water conservation and low flow shower head devices will be made available to City water consumers, both residential and commercial, upon request, as funds are available.

Fire Hydrant Testing	The City's fire hydrant testing program will be scheduled during non-peak water usage times to the greatest extent possible without impairing the integrity of the City's fire protection service.

ACTIONS BY THE GENERAL PUBLIC:

Mindful Water Use	The general public will be encouraged to utilize those water conservation measures contained within the City's Public Information Program.
Voluntary Odd/Even Watering Schedule	• This schedule is encouraged, but not mandated. This plan is designed to minimize water usage and requests that the public water their lawn and shrubs according to their street address, per Exhibit 1 below. • Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday, Thursday, and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday, Friday, and Sunday. There is no watering on Monday. **Watering should be avoided between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM.**

Voluntary Odd/Even Water Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
DO NOT WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER
---	ODD	EVEN	ODD	EVEN	ODD	EVEN

Odd Address Even Address

Exhibit 1

DROUGHT RESPONSE PHASE II: WATER SUPPLY SHORTAGE

Drought Response Phase II applies during periods when there is a water supply shortage. When water supply conditions start to deteriorate, the City is mandated to implement more stringent water conservation provisions for the benefit of its community. In addition to upholding the programs and provisions outlined in Phases I, the City must be diligent in its water conservation efforts by issuing penalties for non-compliance.

ACTIONS BY THE CITY:

Adoption and Enforcement of Stricter Water Regulations and Restrictions	• The City of Porterville will enforce an odd/even watering schedule for all residents. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. Excessive run-off is prohibited. • Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."
Public Information Program	The City will pursue a more aggressive distribution of information than its efforts initiated in the initial Water Conservation Phase to promote public awareness of the need to conserve water with a stronger emphasis on the water shortage condition.
Water System Pressure Reduction	The City's water system may experience reduced water pressures during high usage periods. This may deter water use for nonessential activities and encourage scheduling of landscape watering to late nights or early mornings.
City Landscapes and Watering Schedules	All City parks, median islands, and public facility landscapes will be watered during the late night or early morning hours to reduce impact on the water system during peak usage hours.
Leak Detection Water Waste	The City will continue in its proactive plan to audit water supply usage. All City staff will be reminded of the necessity of reporting any evidence of leaks or water waste for immediate action. There will be an emphasis on coordinated community efforts to reduce water waste.
"Waste of Water" Notices	City staff will be equipped to issue "Waste of Water" notices to consumers identified as misusing water.

Mandatory Odd/Even Watering days	Increase public education on the mandatory watering schedule program. Public outreach will emphasize changes from the Water Conservation Phase I (Voluntary) to Phase II (Mandatory).
Continuation of all Conservation Programs Established in Phase I	See Phase I

ACTIONS BY THE GENERAL PUBLIC:

Mandatory Odd/Even Watering Schedule	• Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday, Thursday and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday, Friday and Sunday. There is no watering on Monday. See Exhibit 2 below. • Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. • Excessive runoff is prohibited.
Ornamental Water Features	• Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life. • The operation of ornamental fountains or other structure making similar use of water is prohibited unless the fountain uses a recycling system.
Conservation Efforts	The general public will be strongly encouraged to utilize those water conservation measures contained within the City's public information program.
Restaurants	Notices will be sent to all restaurants within the city limits requesting support of water conservation efforts by serving water to customers upon request only.
Lawn and Landscaping Watering	Mandatory implementation of the Odd/Even Watering Program initiated in the Water Conservation Phase I, all residential, commercial, and industrial landscape watering scheduled times.
Vehicle Washing and Sidewalk Hosing	• The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. • The washing of automobiles, trucks, trailers, boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done either by automatic car washes that recycle water or with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."

Mandatory Odd/Even Water Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
DO NOT WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER	OK TO WATER
---	ODD	EVEN	ODD	EVEN	ODD	EVEN

Odd Address Even Address

Exhibit 2

DROUGHT RESPONSE PHASE III: SIGNIFICANT WATER SUPPLY SHORTAGE

Drought Response Phase III applies during periods when there is a significant water supply shortage. In addition to upholding the programs and provisions outlined in Phases I and II, the City must be diligent in its water conservation efforts by issuing penalties for non-compliance.

ACTIONS BY THE CITY:

Adoption and Enforcement of Stricter Water Regulations and Restrictions	• The City of Porterville will enforce a two day a week odd/even watering schedule for all residents. Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. Excessive run-off is prohibited. • Per Section 25-5.1 of the City Municipal Code, Non-compliance with the City of Porterville's water conservation regulations will result in one written warning from the City of Porterville before the issuance of a citation. A second violation within a 12 month period will result in the issuance of a citation with a fine of $100.00; a second citation will result in a fine of $200.00; a third citation will result in a fine of $500.00. Willful and egregious violations will result in issuance of a citation without a warning. Each day that a violation continues shall be regarded as a new and separate offense. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."
Public Information Program	The utility billing system will begin to notify customers of restrictions on water use. The program to promote public awareness will be intensified with emphasis placed on communicating the mandatory water conservation requirements to the public.
City Landscapes and Watering Schedules	All City parks, median islands, and public facility landscapes will adopt a two-day watering schedule. If it becomes necessary, watering of City parks and median islands will be suspended and evaluated each day.
Continuation of all Conservation Programs and Regulations Established in Phases I and II	See Phases I and II

ACTIONS BY THE GENERAL PUBLIC:

Mandatory Reduction in Watering Days Durations	• Addresses ending in an odd number (1, 3, 5, 7, or 9) water on Tuesday and Saturday. Addresses ending in an even number (0, 2, 4, 6, or 8) water on Wednesday and Sunday. There is no watering on Monday, Thursday, or Friday. See Exhibit 3 below.

	• Watering is prohibited between the hours of 5:00 AM to 10:00 AM and 5:00 PM to 10:00 PM. Watering shall only occur on designated watering days. • Excessive runoff is prohibited.
Ornamental Water Features	• Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life. • The operation of ornamental fountains or other structure making similar use of water is prohibited unless the fountain uses a recycling system.
Vehicle Washing and Sidewalk Hosing	• The washing of sidewalks, driveways, parking areas, patios or other paved areas is prohibited, unless it is necessary for the health and safety of the public. • The washing of automobiles, trucks, trailers, boats, and airplanes is only permitted on designated watering days. Such washing, when allowed, shall be done with a hand held bucket, or hand held hose equipped with a positive shutoff nozzle for quick rinses. • Per Section 25-5 of the City Municipal Code, "The consumer shall use reasonable care to prevent the waste of water, shall not allow water to run or waste from his property onto streets or highways, shall not use water in washing sidewalks, building entrances or lobbies or other properties to such excess that water shall flow in street gutters beyond the frontage of the properties occupied by them."
Water Leaks	All leaks must be treated as a priority upon discovery and repaired at the safest scheduled opportunity.

Mandatory Odd/Even Water Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
DO NOT WATER	OK TO WATER	OK TO WATER	DO NOT WATER	DO NOT WATER	OK TO WATER	OK TO WATER
—	ODD	EVEN	—	—	ODD	EVEN

Odd Address Even Address

Exhibit 3

EMERGENCY RESPONSE PHASE IV: CRITICAL WATER SUPPLY SHORTAGE

Applies during periods when there is a severe water supply shortage as determined by California State mandate, City Manager, system outage, equipment failure, contamination of water supply, or other emergency. . In addition to upholding the programs and provisions outlined in Phases I, II and III, the City must be diligent in its water conservation efforts by issuing penalties for non-compliance.

ACTIONS BY THE CITY:

Rate Structure Enhancement	A 20% water rate increase on all residential and landscape accounts will go into effect. This rate increase will encourage water conservation and will also serve as a provision to recover the lost revenues from water conservation.
City Landscapes and Watering Schedules	Watering of City parks and median islands will be suspended and evaluated each day.
Continuation of all Conservation Programs and Regulations Established in Phases I, II, and III	See Phases I, II, and III

ACTIONS BY THE GENERAL PUBLIC:

Lawn and Landscaping Watering	Lawn and landscaping watering is prohibited.
Vehicle Washing	Vehicle washing should be accomplished either by automatic car washes that recycle water or with buckets and hoses equipped with a shut-off nozzle.
Continuation of all Conservation Programs and Regulations Established in Phases I, II, and III	See Phases I, II, and III

1 Chapter One

INTRODUCTION

This chapter presents a brief background of the City's sewer system, the need for this sewer system master plan, and the objectives of the study. A list of abbreviations is also provided to assist the reader in understanding the information presented in this report.

1.0 BACKGROUND

The City of Porterville is currently experiencing moderate population and industry growth. Recognizing the importance of planning, developing, and financing sewer system facilities to provide reliable service for existing customers and to serve anticipated growth, the City initiated the preparation of this sewer master plan.

The City's sewer collection system consists of approximately 150 miles of 6-inch through 36- inch diameter sewers, and includes 18 sewage lift stations and associated force mains. In 1997, flows measured at the wastewater treatment facility averaged at 4.82 million gallons per day (mgd), with a maximum day dry weather measurement of 5.41 mgd and a maximum day wet weather measurement of 5.64 mgd. Previous studies relevant to this master plan include the 1989 Sewer System Master Plan.

2.0 AUTHORIZATION AND SCOPE

On December 4, 1997, the City authorized Carollo Engineers to prepare a sewer system master plan that evaluates the existing sewer collection system, provides recommended improvements, and develops a Capital Improvement Program.

The sewer system master plan provides the City of Porterville with a tool for planning the sewer infrastructure facilities through the projected planning horizon year of 2015. If planning conditions change, and depending on their magnitude, adjustments to the master plan recommendations might be necessary.

This report addresses the following tasks:

- Evaluation of the existing sewer collection system, using computer hydraulic modeling techniques.
- Determination of existing system deficiencies and proposing improvements to correct deficiencies.
- Recommendations of improvements needed to service anticipated future growth, within the Urban Development Boundary.
- Developing a Capital Improvement Program with a horizon year of 2015.
- Performing a sewer rate analysis based on a review of the constructed 1989 Master Plan facilities.

- Training City staff on the use of the hydraulic model.

3.0 REPORT ORGANIZATION

The Sewer System Master Plan report contains six chapters, followed by appendices that provide supporting documentation for the information presented in this report. The chapters are briefly described below.

Chapter 1 - Introduction presents a brief background of the City's sewer system, the need for this Sewer System Master Plan, and the objectives of the study. A list of abbreviations is also provided to assist the reader in understanding the presented information.

Chapter 2 - Planning Area Characteristics defines the study area of the master plan, provides a summary of land use categories within the Urban Development Boundary (UDB), presents potential trends for future growth, and lists historical as well as projected population within the UDB. The projections of future land use trends and population growth was performed to estimate future sewer flows.

Chapter 3 - Planning and Design Criteria included in this chapter served as a guide for evaluating Porterville's sewer system. Historical flows at the wastewater treatment facility were reviewed and analyzed to determine daily, monthly and seasonal fluctuations experienced by the Porterville sewer system. The developed criteria addresses the sewer system capacity, acceptable pipe gravity slopes, acceptable depths of flow within pipes, average sewer flow coefficients, and daily and hourly peaking factors.

Chapter 4 - Existing Sewer System and Hydraulic Model describes the existing sewer system and the hydraulic sewer model assembled for evaluating the collection system. This chapter also presents the results of the flow monitoring program and calibration effort which was performed to establish a level of confidence in the City's hydraulic model.

Chapter 5 - Sewer System Evaluation and Proposed Facilities Improvements includes the capacity evaluation of the City's sewer collection system, which was performed utilizing the assembled computer hydraulic model, and was based on the criteria established in a previous chapter. This chapter presents proposed facilities improvements to mitigate existing deficiencies and for expansion of the future sewer system.

Chapter 6 - Capital Improvement Program presents the recommended Capital Improvement Program (CIP) for the City of Porterville sewer collection system. The program is based on the evaluation of the Porterville sewer collection system, and on the recommended projects described in the previous chapter. The CIP has been staged to the planning horizon year 2015.

4.0 ACKNOWLEDGMENTS

Carollo Engineers wishes to acknowledge and thank Mr. Michael Unser, Community Development and Services Director; Mr. Harold Hill, City Engineer; Mr. Baldomero Rodriguez, Principal Civil Engineer and Project Manager; Mr. Michael Reed, Assistant Engineer; Mr. Richard Bartlett, Water Utility Superintendent, and Ron Mauck, Planning Director. Their own and their staff's cooperation and courtesy in obtaining the variety of necessary information were valuable components in completing and producing this report.

5.0 ABBREVIATIONS AND DEFINITIONS

To conserve space and to improve readability, the following abbreviations are used in this report.

ADD	average day demand
ADF	average day flow
AF	acre-feet
CIP	capital improvement program
City	City of Porterville
cfs	cubic feet per second
DI	ductile iron
ENR	Engineering News Records Construction Cost Index
GIS	geographic information system
gpm	gallons per minute
gpd	gallons per day
gpdc	gallons per day per capita
HGL	hydraulic grade line
HP	horsepower
ISO	Insurance Service Office
kWh/AF	kilowatt hours per acre-feet
LF	linear feet
MG	million gallons
MSL	mean sea level
mgd	million gallons per day
PDWF	peak dry weather flow
PWWF	peak wet weather flow
ppb	parts per billion
psi	pounds per square inch
SCADA	supervisory control and data acquisition
SCE	Southern California Edison
SOI	sphere of influence
sq.ft.	square feet
TDH	total dynamic head
UAB	Urban Area Boundary
UDB	Urban Development Boundary
WWTF	Wastewater Treatment Facility

PLANNING AND DESIGN CRITERIA

Porterville's water system was evaluated based on the analysis and design criteria defined in this chapter. Historical water consumption and production records were reviewed and analyzed to determine daily, monthly and seasonal fluctuations experienced by the Porterville water system. The developed criteria addresses the water supply capacity, storage capacity, acceptable service pressures, distribution mains performance, average annual water demand coefficients, and daily and hourly peaking factors.

1.0 WATER SUPPLY CAPACITY

In determining the adequacy of the water supply facilities, the source must be large enough to meet the varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural or created disasters.

Normal Production Capacity

Ideally, a water distribution system should be operated at a constant water-supply rate with consistent supply from water-source pumps at the wells. On the day of maximum demand, it is desirable to maintain a water supply rate equal to the maximum day demand rate. Water required for peak hour demands or for fire flows would come from either of: 1) storage, 2) additional well capacities, or 3) combination of storage and additional well capacities. Porterville's proximity to the base of the Sierra Nevada Foothills provides a desirable topography for fully incorporating water storage reservoirs to satisfy fluctuations in excess of the maximum day water demand conditions.

Standby Production Capacity

Standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be placed out of service during maximum day demand conditions due to equipment malfunction for servicing, or for water quality concerns. To mitigate the impact of lost production capabilities, the City should have two to three standby wells, in surplus of the maximum day demand requirements. It is recommended that standby production for Porterville be equivalent to two or three wells with a total production capacity of 3,000 gpm.

Therefore, the adequate source of supply for Porterville will consist of groundwater wells with a combined production capacity that continues to meet the maximum day demand, in addition to standby wells that have a total production capacity of 3,000 gpm.

2.0 STORAGE CAPACITY

The principle function of storage is to provide reserve supply of water for: 1) operational equalization, 2) fire reserve, and 3) emergency needs. Operational storage is directly related to the amount of water necessary to meet peak demands. The intent of operational

storage is to provide the difference in quantity between the customer's peak demands and the system's reliable available supply. The volume of water allocated for emergency uses is based on the historical record of emergencies experienced, and on the amount of time which is expected to lapse before a hypothetical problem can be corrected.

Operational Storage

This storage is the amount of desirable stored water in a system to regulate fluctuations in demand so that extreme variations will not be imposed on the source of supply. Since the peak demand could be as much as 3.5 times the average demand, providing supply for that demand without storage would require 3.5 times the supply source capacity. With operational storage, system pressures are improved and stabilized to better serve customers throughout the service area. Operational storage is commonly estimated between 25 percent and 50 percent of the maximum day demand.

Fire Storage

This storage is the amount required when the capacity of the production facilities is insufficient to meet the necessary maximum day demand plus fire flow demands for a certain duration of time. The Insurance Service Office (ISO), a non-profit association of insurers that sets guidelines on which it evaluates the relative insurance risks in communities, recommends the provision of a fire flow rate of 3,500 gpm for a duration of 3 hours. This provision, equated to a storage requirement of 0.63 million gallons, will allow the water system to respond to hypothetical fire in residential, commercial, or industrial areas.

Emergency Storage

This storage is the volume recommended to meet demand during emergency situations such as pipeline failures, major trunk main failures, pump failures, electrical power outages, or natural disasters. The amount of emergency storage included within a particular water distribution system is an owner option, based on an assessment of risk, the desired degree of system dependability, economic considerations, and water quality concerns. In California, emergency storage is usually estimated at 50 to 100 percent of the maximum day demand. Based on historical data that point to the rarity of prolonged power outages in California cities, the water stored in the City's underlying groundwater basin offsets the need to store water above ground, provided that pumping methods are reliable.

Total Storage

The minimum recommended operational storage capacity for Porterville is equal to 25 percent of the maximum day water demand. Additionally, the recommended fire storage capacity is 0.63 MG. Emergency storage can be considered available underground, provided that it can be pumped reliably during power outages.

3.0 SERVICE PRESSURES

There are differences in the pressures maintained in distribution systems in various cities. It is essential that the water pressure in a consumer's residence or place of business be neither too high nor too low. Low pressures, below 30 psi, cause annoying flow reductions when more than one water-using appliance is used. High pressures may cause faucets to leak and valve seats to wear out quickly. Additionally, high service pressures usually result in wasted water and high water utility bills. The Uniform Plumbing Code (UPC) requires water pressures not exceed 80 psi at service connections, unless the service is provided with a pressure-reducing device.

Due to the relatively flat topography in the central and west pressure zones of Porterville, it is recommended that the maximum pressure criteria during static conditions be set between 55 psi and 65 psi, and the minimum pressure criteria during maximum day conditions be set at 40 psi. Due to the hilly topography of the east pressure zone, it is recommended that the maximum pressure criteria during static conditions be set at no greater than 80 psi. The minimum acceptable service pressure criteria during peak hour conditions is 35 psi.

Another service pressure criteria is related to fire flows and was devised to ensure adequate positive pressure head for the booster pumps in fire trucks. The fire pressure criteria requires a minimum acceptable residual pressure of 20 psi at the connecting hydrant used for fighting the fire.

4.0 DISTRIBUTION MAINS

Transmission grid mains are generally sized to carry the greater of: 1) the peak hour demand, or 2) the maximum day demand plus fire flow. Other criteria related to the distribution piping include the maximum and minimum velocities and the maximum allowable friction losses.

It is normally good practice to become concerned when pipe velocities exceed 8 fps on a continuous basis. High velocities may cause damage to the pipes and to their appurtenances. Velocities of 10 feet per second (fps), or higher, do not usually cause ill effects if they occur for a limited duration.

As long as the maximum velocity criteria and the pressure criteria are not violated, high head loss by itself is not an important factor. However, it may be a warning that the pipe is nearing the limit of its carrying capacity, and may not have sufficient capacity to perform under stringent conditions. It is normally good practice to monitor pipes that have a head loss in excess of 10 feet per 1,000 feet. The roughness coefficients for calculating head loss in pipes will be based on industry standards for similar pipe materials and service age (Table 3.1).

Table 3.1 Pipe Roughness Coefficients
City of Porterville Water System Master Plan

Pipe Material	Age (Years)						
	0	5	10	20	30	40	50
Asbestos Cement	140	138	136	132	128	124	120
Cast Iron	130	120	111	96	87	80	60
Ductile Iron	130	120	111	96	87	80	60
Plastic (PVC)	150	149	148	146	144	142	140
Steel	125	115	106	91	82	75	65

Notes:
1. Roughness Coefficients are applicable to the Hazen-Williams equation, $V=1.318\ C\ R^{0.63}\ S^{0.54}$ Where: V is the velocity (fps), C is the Hazen-Williams Coefficient, R is the Hydraulic Radius (ft), S is the slope of the energy grade line (ft/ft).
2. At age 0 (New Pipe), the roughness coefficients are commonly used values for new pipes. Roughness coefficients decrease with age at a rate that depends on pipe material. For planning purposes, Roughness of Asbestos Cement and PVC pipes are assumed slightly decreasing, while the remaining pipe materials decrease at higher rates.

5.0 METHODS FOR ESTIMATING WATER REQUIREMENTS

There are two methods to determine water requirements, the Population Method and the Land Use Method. Both methods will be used in this study, each serving a different function during the evaluation process.

The Population Method

The primary purpose of the Population Method is for estimating the City's future water requirements, and for evaluating the adequacy of the supply source. This method utilizes historical annual water consumption and develops water consumption rates based on the corresponding historical population. After evaluating future trends in population that affect water consumption, a rate for future water consumption is developed. This rate can then be applied to the projected future population to estimate the City's future water requirements.

The Land Use Method

The primary purpose of the Land Use Method is for distributing water requirements using a procedure that is sensitive to land use categories to simulate accurate computer modeling of the water system. This method utilizes the City's current land use categories, as defined in the City's General Plan, and develops average annual demand coefficients. These coefficients were determined by distributing the current annual water production to the current acreage of the land use categories. Metering records are essential in the development of the current coefficients. The units of the coefficients are in gallons per minute per acre (gpm/acre), and are directly applied to the acreage throughout the City to determine water requirements. Future water requirements, in any particular area, are determined by applying the developed coefficients to anticipated future growth in that area.

6.0 PER CAPITA CONSUMPTION

The per-capita water consumption rates are based on City-wide population figures, and are calculated by dividing the annual water production by that year's population. This rate is applied to the projected population to estimate the future water requirements.

Historical monthly water production data from 1993 to 1997 were obtained from City staff and summarized in Table 3.2, with monthly production values listed in million gallons (MG). Production fluctuates between months, with the maximum water use months in Porterville occurring in July, as shown in Figure 3.1. Table 3.2 includes an annual water use analysis, listing the maximum month, minimum month, and average month for each year. The average month for a particular year represents the average water consumption during that year, expressed in million gallons.

Based on the City's historical annual population, Table 3.2 also lists the calculated water consumption, per-capita, for each year. The per-capita water consumption rates were calculated by dividing the annual water production by that year's population. Based on the City's population figures, the 1997 City-wide water consumption rate was at 321 gallons per day per capita (gpdpc), while the 5-year average City-wide water consumption rate is 277 gallons per day per capita (gpdpc).

Since the City services extend outside the current City limits, the City's serviced population is higher than the City's published population. The City's 1989 Water Master Plan estimated this population at approximately 15 percent higher than the actual City population, thus reducing the 5-year average City-wide water consumption rate to 241 gpdpc. Table 3.2 also lists a 5-year average City-wide water consumption rate of 252, for a serviced population that is 10 percent higher than the actual population.

This Master Plan will use a City-wide water consumption rate of 250 gpdpc for projecting Porterville's future water requirements. While this rate is lower than rates for unmetered San Joaquin Valley cities, as shown in Table 3.3, it is higher than rates for other metered cities.

Table 3.2 Monthly Water Production (1993-1997)
City of Porterville Water System Master Plan

Month	1993 (MG)	1993 (% of total)	1994 (MG)	1994 (% of total)	1995 (MG)	1995 (% of total)	1996 (MG)	1996 (% of total)	1997 (MG)	1997 (% of total)	5-Year Avg (MG)	5-Year Avg (% of total)
January	130	4%	165	5%	161	5%	147	4%	157	4%	152	4%
February	141	5%	139	4%	135	4%	119	3%	147	4%	136	4%
March	165	5%	180	6%	154	4%	137	4%	225	5%	170	5%
April	222	7%	261	8%	224	7%	230	7%	315	8%	250	7%
May	302	10%	304	9%	261	8%	355	10%	454	11%	335	10%
June	320	11%	389	12%	485	14%	444	13%	467	11%	421	12%
July	444	15%	423	13%	517	15%	467	14%	465	11%	463	14%
August	373	12%	415	13%	425	12%	384	11%	585	14%	437	13%
September	392	13%	336	10%	370	11%	308	9%	344	8%	350	10%
October	220	7%	282	9%	315	9%	419	12%	435	10%	334	10%
November	181	6%	165	5%	224	7%	268	8%	395	10%	247	7%
December	147	5%	144	4%	151	4%	166	5%	161	4%	154	4%
Annual Total	3,027		3,203		3,426		3,444		4,150		3,450	
Water Use Analysis												
Minimum Month	130	4%	139	4%	135	4%	119	3%	147	4%		4%
Average Month	252	8%	267	8%	286	8%	287	8%	346	8%		8%
Maximum Month	444	15%	423	13%	517	15%	467	14%	585	14%		14%
Monthly Peaking Factors												
Min-Month/Avg-Month Ratio	0.52		0.52		0.47		0.41		0.43		0.47	
Max-Month/Avg-Month Ratio	1.76		1.58		1.81		1.63		1.69		1.69	
Per Capita Consumption												
Published Population[1]	32,840		33,603		33,636		34,581		35,428			
Per Capita Consumption, gpdc		253		260		279		273		321		277
Serviced Population												
Scenario 1[2] (Population plus 15 %)	37,766		38,873		38,681		39,768		40,742			
Per Capita Consumption, gpdc		220		226		243		237		279		241
Scenario 2[3] (Population plus 10 %)	36,124		37,183		37,000		38,039		38,971			
Per Capita Consumption, gpdc		230		236		254		248		292		252

Notes:

1. Federal Census of Housing and Population.
2. In scenario 1, the population serviced by the water system is estimated at 15 % higher than the City population, per the 1989 Water System Master Plan
3. In scenario 2, the population serviced by the water system is estimated at 10% higher than the City population.

Figure 3.1 Monthly Diurnal Water Production Pattern (1993-1997)
City of Porterville Water System Master Plan

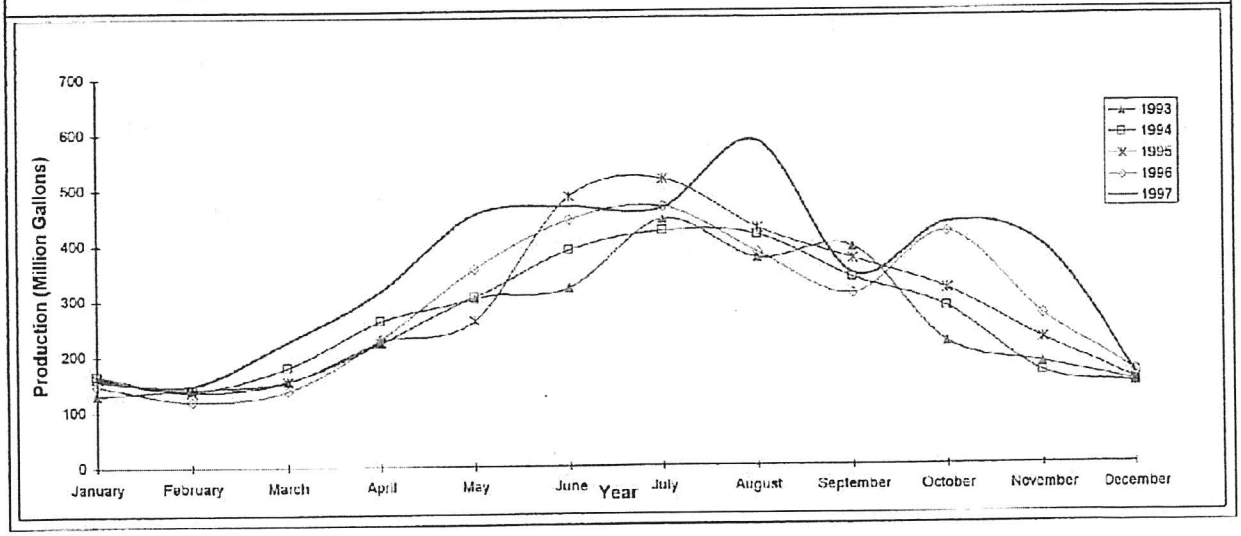


Table 3.3 Typical City-Wide Water Consumption Rates City of Porterville Water System Master Plan		
City	Metered	Per Capita Consumption (gpdpc)
Clovis	Yes	205
Coalinga	No	280
Dinuba	Yes	200
Fresno	No	300
Madera	No	280
Modesto	No	250
Porterville	Yes	250
Tulare	No	260
Turlock	No	280
Visalia	No	300

Notes:
1. Per Capital consumption rates change from year to year depending on climate. The rates in this table are based on multiple-year averages.

7.0 AVERAGE ANNUAL DEMAND COEFFICIENTS

In distributing the water demands to the existing hydraulic water model, water requirements are calculated based on actual land uses and their corresponding water demand factors. Since some land uses require larger amounts of water than others, an assessment of water consumption by land use category provides a more accurate representation of water patterns. Water consumption records for the past 5 years, obtained from the City's Finance Department, were evaluated to identify consumption patterns and trends between the land use categories. Figure 3.2 is a graphical representation of the distribution of the 1997 water consumption between the land use categories. It should be noted that the Finance Department consolidates the land use categories for billing purposes. Figure 3.2 shows the combined residential consumption at 75 percent, the consolidated commercial consumption at 10 percent, the industrial consumption at 3 percent, the institutional consumption at 7 percent, and the City-related consumption at 5 percent. An analysis of monthly historical water consumption records, for the period between 1993 and 1997, indicates a pattern of distribution between the land use categories consistent with Figure 3.2.

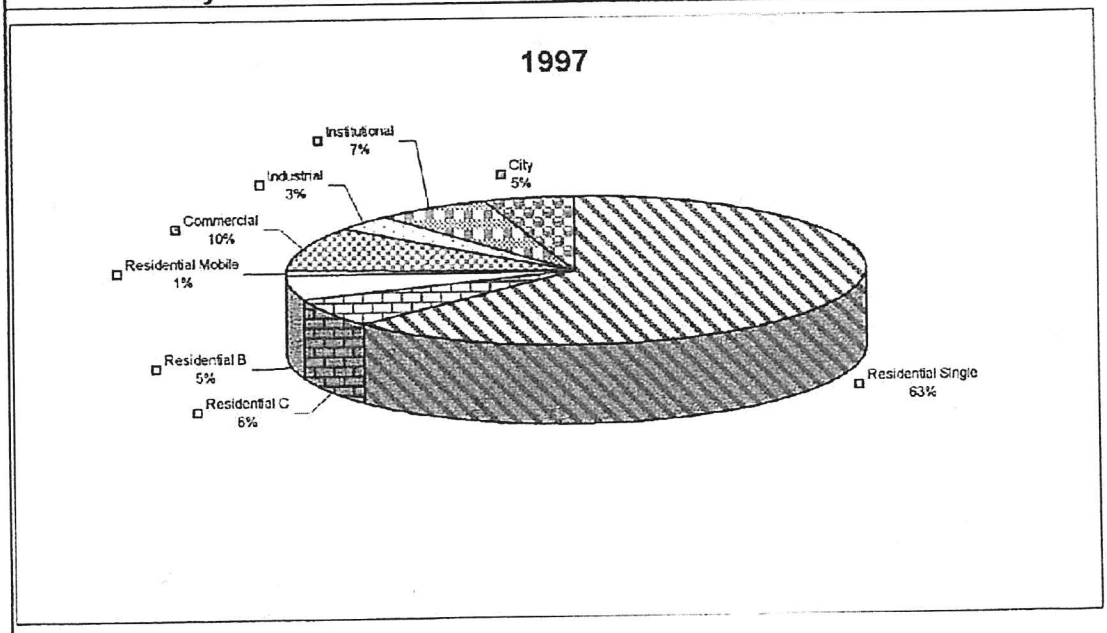
The Average Annual Water Demand Coefficients are factors, usually expressed in gallons per minute per acre (gpm/acre), applied to gross acreage to generate water demands based on land use categories. These factors were established for Porterville based on a 1997 water balance of 4.15 billion gallons (7,900 gpm) distributed to each land use

Table 3.4 Average Annual Water Demand Coeffcients
City of Porterville Water System Master Plan

Land Use Category[1]	Land Use Code	UDB[1] (acres)	Existing Water Service Area[5] (acres)	(%)	Average Annual Water Demand Coefficients[6] (gpd/acre)	(gpm/acre)	1997 Water Balance[3] (gpm)
Hillside Density Residential	HR	*Note 7*			500	0.35	n/a
Rural Density Residential	RD	540	81	1%	720	0.50	41
Low Density Residential	LD	6,931	3,211	48%	1,584	1.10	3,532
Medium Density Residential	MD	823	657	10%	3,168	2.20	1,445
High Density Residential	HD	433	356	5%	4,608	3.20	1,139
Commercial[4]	GC,HC, HWYC, PO	1,253	833	12%	1,440	1.00	833
Industrial	IND	868	395	6%	1,440	1.00	395
Public/Quasi Public	PQ	1,097	306	5%	720	0.50	153
Open Space	OS	584	133	2%	288	0.20	27
Agriculture	AG	137	137	2%	0	0.00	0
Airport	PAT	333	333	5%	72	0.05	17
Schools	SCH	351	300	4%	1,728	1.20	360
Totals		13,350	6,742	100%			7,941

Notes:
1. Urban Development Boundary, per Porterville's Land Use Element of the General Plan.
2. Residential density is based on gross acres.
3. The 1997 water production of 4.15 billion gallons (7,900 gpm) was distributed to the land use categories, per metered records.
4. Commercial categories have been consolidated into one category.
5. Existing Serviced Acreage. The percent was calculated by dividing the land use Serviced Acreage by the total Serviced Acreage.
6. Calculated, for each category, by dividing the 1997 Water Balance amount (gpm) by the Existing Serviced Acreage.
7. In accordance with on-going proposed Land Use modifications, The Hillside Residential Density will include a conversion of approx. 200 acres of Rural Density in the South, 800 acres of Low Density Residential in the east, and 400 acres of Low Density Residential in the north. For a total of 1,400 acres.

Figure 3.2 Water Consumption, by Land Use Category
City of Porterville Water System Master Plan



Source: City of Porterville Finance Department.

category in accordance with the distribution observed in historical records (Figure 3.2). Table 3.4 lists, for each land use category, the land use code, the existing service area (in acres), the residential densities, the population densities, and the average annual water demand coefficients.

8.0 WATER USE PEAKING FACTORS

Peaking factors represent the increase above the average annual water demand, experienced during a specified time period. The various peaking conditions are either statistical concepts or numerical values established through a review of historical data and are, at times, adjusted to reflect a level of conservatism.

Peaking conditions that are of particular significance to hydraulic analysis of the water system include the average day demand (ADD), maximum month demand (MMD), maximum day demand (MDD), and the peak hour demand (PHD). Peaking factors for expressing these demands as a function of the average day demand (ADD) were developed based on the City's demand patterns.

Average Day Demand

The Average Day Demand (ADD) for a particular year is equal to the total production for that year, expressed daily units. For example, Table 3.2 indicates that the total production for 1997 was 4.15 billion gallons, translating into an average daily production of 11.4 million gallons per day (7,900 gallons per minute). The ADD is the baseline demand used for calculating other demand conditions including maximum day and peak hour demands.

Maximum Month Demand

The maximum month demand (MMD) is the highest water demand during a calendar month of the year, usually occurring in Porterville during either July or August. The MMD peaking factor is expressed as a multiplier applied to the average day demand, and is used primarily in the evaluation of supply capabilities.

Historical monthly water production for the period between 1993 and 1997 (Table 3.2) indicates maximum-month-to-average-month ratios ranging between 1.58 (July 1994) and 1.81 (July 1995). In 1997, the maximum month occurred in August at a maximum-month-to-average-month ratio of 1.69. Based on an analysis of the 5-year average monthly production (1993-1997), this ratio is highest during the month of July, accounting for approximately 14 percent of the annual production. Figure 3.3 provides a graphical representation of the monthly diurnal patterns from 1993 to 1997. The City's 1985 Water Management Plan established a peaking factor of 1.9, compared to the 1989 Water System Master Plan peaking factor of 1.8. This study recommends a peaking factor of 1.9, which is approximately 5 percent higher than the 1.81 value recorded during July 1995.

Maximum Month Demand = 1.9 x Average Day Demand

Maximum Day Demand

The maximum day demand (MDD) is the highest water demand during a 24-hour period of the year. The MDD peaking factor is expressed as a multiplier applied to the average day demand. A water system is customarily tested under "maximum day" plus fire flow conditions. Water system sources, such as wells, are typically sized to meet the anticipated maximum day demands of a water system.

Maximum day plus fire flows stress the water system in the specific area of the fire and often show existing deficiencies, if any, in the general area of the fire. To evaluate the effect of maximum day plus fire flow throughout a system, the fire has to be simulated at various critical areas of the system. This condition also demonstrates the performance of supply sources such as water wells, booster pumps, and storage tanks operating under stressful conditions.

In general, the maximum day flow is 2.0 to 2.5 times greater than the average annual demand. No recent City metering records were available to evaluate the maximum day peaking factor. The City's 1985 Water Management Plan established a peaking factor of 2.2, compared to the 1989 Water System Master Plan peaking factor of 2.0. Neither historical nor current daily records were available to perform an analysis of this factor, however, this Master Plan recommends a peaking factor of 2.2, which is approximately 10 percent higher than the 2.0 value suggested in the previous master plan.

Maximum Day Demand = 2.2 x Average Day Demand

Peak Hour Demand

The peak hour demand (PHD) is the highest water demand during any one-hour period of the year. The PHD is expressed as a multiplier applied to the average annual demand. Peak hour flow simulates high water flows throughout the system during peak demands and identifies areas of the water system that experience low pressures. This condition is similar to applying maximum day plus fire flow, only in this case the entire system is exposed to stressful conditions and there are no additional high point demands.

In general, the peak hour demand is 2.8 to 3.5 times greater than the average annual demand. No recent City metering records were available to evaluate the peak hour peaking factor. The City's 1985 Water Management Plan established a peaking factor of 3.9, compared to the 1989 Water System Master Plan peaking factor of 3.0. Neither historical nor current hourly records were available to perform an analysis of this factor, however, it is likely that Porterville experiences higher hourly peaking factors than 3.0, and a factor of 3.40 is recommended for evaluating Porterville's water system.

Peak Hour Demand = 3.4 x Average Day Demand

9.0 PLANNING AND DESIGN CRITERIA SUMMARY

Table 3.5 provides a summary of the recommended planning and design criteria for the Porterville water system master plan.

Table 3.5 Planning and Design Criteria Summary
City of Porterville Water System Master Plan

Source of Supply

The adequate source of supply is required to meet:	Maximum Day Demand + 3,000 gpm (equivalent to three wells).

Storage

The adequate City-wide storage shall meet:	Operational Storage = 25% of Maximum Day Demand Fire Storage = 0.63 MG Emergency Storage = underground (provided emergency pumping methods are available for supplying 25% of Maximum Day Demand)

Distribution Mains

The distribution system should be sized to meet the greater of:	Peak Hour Demand, or Maximum Day Demand + Fire Flow.
Criteria for judging the adequacy of existing pipelines:	Maximum desirable pipeline velocity: 8 feet per second Maximum desirable head loss: 10 feet/1,000 feet

Headloss in Existing Pipes

Headloss in the Hazen Williams equation for pipes shall be calculated based on the following table:

	Age (Years)						
Pipe Material	**0**	**5**	**10**	**20**	**30**	**40**	**50**
Asbestos Cement	140	138	136	132	128	124	120
Cast Iron	130	120	111	96	87	80	60
Ductile Iron	130	120	111	96	87	80	60
Plastic (PVC)	150	149	148	146	144	142	140
Steel	125	115	106	91	82	75	65

Service Pressures

The recommended high/low pressures are as follows:	Maximum Pressure =	65 psi
	Minimum Pressure (during Maximum Day) =	40 psi
	Minimum Pressure (during Peak Hour) =	35 psi
	Minimum Residual Pressure (during fires) =	20 psi

Water Use Peaking Factors

Fluctuations in water demands shall be based on:	Maximum Month Demand =	1.9 x Average Day Demand
	Maximum Day Demand =	2.2 x Average Day Demand
	Peak Hour Demand =	3.4 x Average Day Demand

Per Capita Water Consumption

Demand forecasting shall be based on:	City-Wide = 250 gpdc

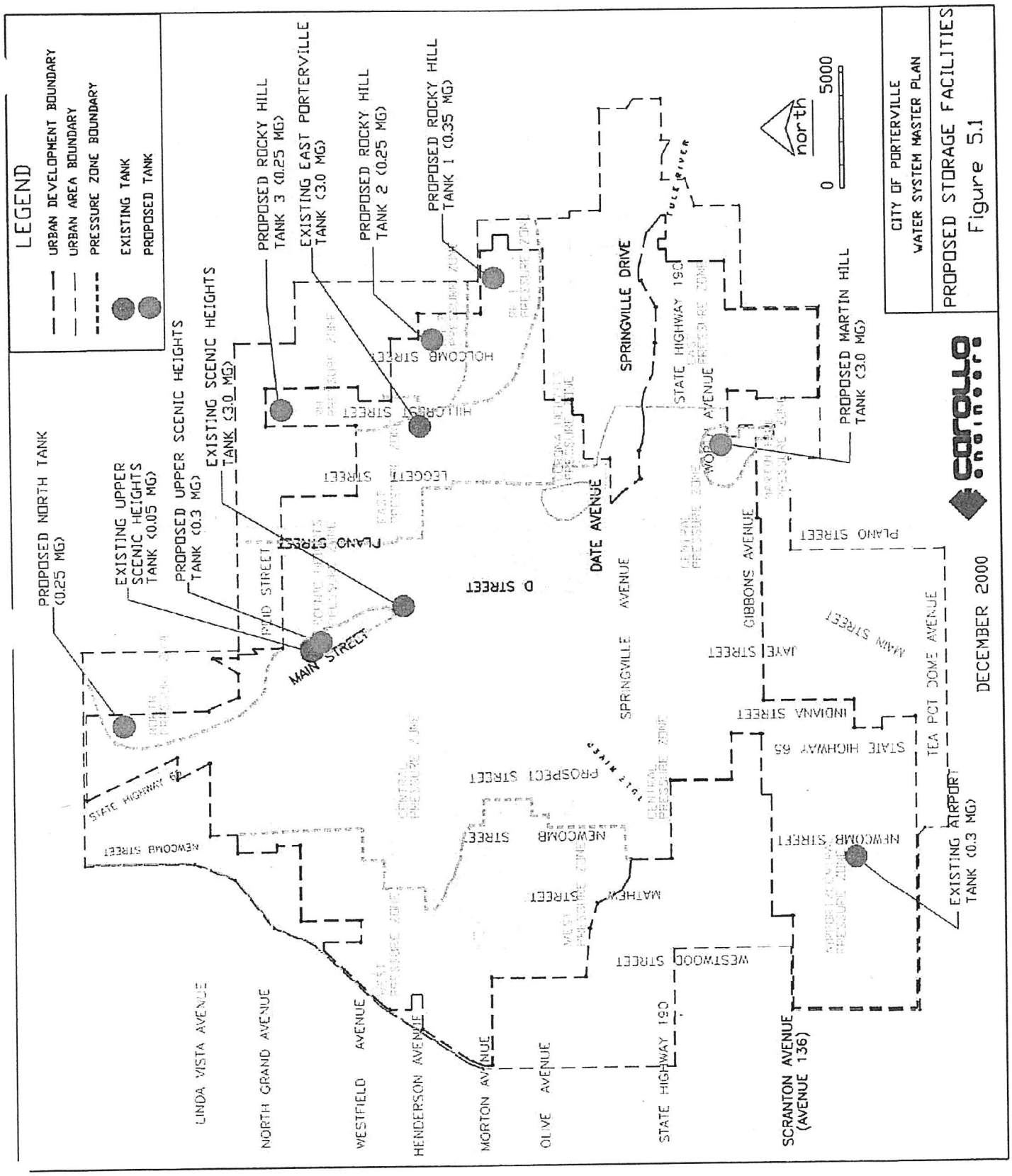
Average Annual Demand Coefficients

These demand coefficients are applied to the gross land use acreages to yield average day water demands

Land Use Category	Code	Coefficients (gpd/acre)	Coefficients (gpm/acre)
Hillside Density Residential	HR	500	0.35
Rural Density Residential	RD	720	0.50
Low Density Residential	LD	1,584	1.10
Medium Density Residential	MD	3,168	2.20
High Density Residential	HD	4,608	3.20
Commercial	NC, GC, HWYC, HC, PO	1,440	1.00
Industrial	IND	1,440	1.00
Public and Quasi Public	PQ	720	0.50
Open Space	OS	288	0.20
Agriculture	AG	0	0.00
Porterville Air Terminal	PAT	72	0.05
Schools	SCH	1,728	1.20

Fire Flows

Per the City of Porterville Fire Department, water system response to the following fire flows is considered adequate:	Residential fire flow =	1,000 gpm
	Residential fire flow =	1,500 gpm (Floor Area greater than 3,600 sq. ft.)
	Commercial fire flow =	2,500 gpm
	Industrial fire flow =	3,500 gpm


LEGEND
URBAN DEVELOPMENT BOUNDARY
URBAN AREA BOUNDARY
PRESSURE ZONE BOUNDARY
EXISTING TANK
PROPOSED TANK
PROPOSED NORTH TANK (0.25 MG)
EXISTING UPPER SCENIC HEIGHTS TANK (0.05 MG)
PROPOSED UPPER SCENIC HEIGHTS TANK (0.3 MG)
EXISTING SCENIC HEIGHTS TANK (3.0 MG)
PROPOSED ROCKY HILL TANK 3 (0.25 MG)
EXISTING EAST PORTERVILLE TANK (3.0 MG)
PROPOSED ROCKY HILL TANK 2 (0.25 MG)
PROPOSED ROCKY HILL TANK 1 (0.35 MG)
PROPOSED MARTIN HILL TANK (3.0 MG)
EXISTING AIRPORT TANK (0.3 MG)
north
0
5000
CITY OF PORTERVILLE
WATER SYSTEM MASTER PLAN
PROPOSED STORAGE FACILITIES
Figure 5.1
corollo engineers
DECEMBER 2000
MAIN STREET
D STREET
PLANO STREET
HOLCOMB STREET
HILLCREST STREET
LEGGETT STREET
SPRINGVILLE DRIVE
DATE AVENUE
SPRINGVILLE AVENUE
STATE HIGHWAY 190
GIBBONS AVENUE
JAVE STREET
INDIANA STREET
STATE HIGHWAY 65
TEA POT DOME AVENUE
PROSPECT STREET
NEWCOMB STREET
MATHEW STREET
WESTWOOD STREET
STATE HIGHWAY 65
LINDA VISTA AVENUE
NORTH GRAND AVENUE
WESTFIELD AVENUE
HENDERSON AVENUE
MORTON AVENUE
OLIVE AVENUE
SCRANTON AVENUE (AVENUE 136)

Scenic Heights Specific Area
Preliminary Water Storage Requirements

1. Water Demand Criteria

Maximum Day Demand = 2.2 x Average Day Demand
Peak Hour Demand = 3.4 x Average Day Demand

2. Water Supply Criteria

2.1 City Wide
Source of Supply to Provide Maximum Day + 3,000 gpm
Peak Hour provided by Storage

2.2 Scenic Heights Specific Area
No Source of Supply Available in Area
Supply to Rely on Scenic Heights 3 MG tank

3. Water Storage Criteria

3.1 City Wide

Operational Storage	25 % of Maximum Day Demand
Fire Storage	3,500 gpm for 3 hours
Emergency Storage	Underground. (However, NEED Emergency Power Generators)

3.2 Scenic Heights Specific Area

Operational Storage	From Other Zone (3 MG Scenic Heights). Also, see (note b)
Fire Storage	1,000 gpm for 2 hours
Emergency Storage	50% of Maximum Day Demand

4. Water Demand - Scenic Heights Specific Area

	Code	acres
Existing Service Area (approximate)	A	50
Ultimate Service Area (approximate)	B	60

	Code	gpd/acre	gpm/acre
Land Use Coefficient (preliminary)			
Low Density Residential	C	1,200	0.83
Average Day Demand (B x C)	D	72,000	50
Maximum Day Demand (D * 2.2)	E	158,400	110
Peak Hour Demand (D * 3.4)	F	244,800	170

Scenic Heights Specific Area
Preliminary Water Storage Requirements (Cont'd)

5. Water Supply - Scenic Heights Specific Area

Supply from 3 MG Scenic Heights Storage Tank
No Other Source of Supply Available.
Therefore, Emergency Storage is Needed.

6. Water Storage - Scenic Heights Specific Area

	gallons	
Operational Storage		(Note b)
Fire Storage (1,000 gpm * 2 hours)	120,000	
Emergency Storage (0.5 * E)	79,200	
Total Storage Needed	199,200	

7. New Storage Tank Size - Scenic Heights Specific Area

Minimum Storage Tank Size	200,000	(Note a)
Recommended Storage Tank Size	300,000	(Note b)

Notes:

a) Accounts for 2-hour residential fire plus emergency storage at 50% maximum day

b) During water system operation, it is likely that the New tank may inadvertently be used for operation purposes. To account for that possibility, It is recommended that the tank be upsized by one-third (1/3). This additional 1/3 capacity, reserved for operation purposes, can also be used for energy management.