CITY OF MANTECA
2005 URBAN
WATER MANAGEMENT PLAN

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City of Manteca
2005 Urban Water Management Plan
Contact Sheet

Date plan submitted to the Department of Water Resources: **01/19/05**

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The Water supplier is a: **Municipality**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Public Participation

Law

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

Public Participation

The City prepared the 2005 Urban Water Management Plan (2005 Plan) from previous Urban Water Management Plans, the City of Manteca General Plan, Water Master Plans and other water planning documents adopted by the City. The public has been involved in the City's water planning and development process, as well as other City planning, through public hearings and meetings as required and conducted as part of the normal City planning and development process. A public meeting was held on November 16, 2005 to solicit and obtain public input during the development of the 2005 Plan. A Public Hearing prior to adoption of the plan was also held.

Draft copies of the 2005 Plan were made available to the public at the City Clerk's Office, the City Public Works' Office and at the City library prior to the holding of a public hearing as required for adoption of the plan. Notices on the availability of the draft Plan were issued through two notices published in the Manteca Bulletin. Public comments were received and addressed prior to City Council approval and adoption 2005 Plan. A list of the 2005 Plan reviewers and comments received during the review period and public hearing along with the City's response is included in Appendix A.

Plan Adoption

The 2005 Plan was adopted by City Council on December 19, 2005 and submitted to the California Department of Water Resources within 30 days after Council approval. Appendix B contains a copy of the cover letter addressed to the Department of Water Resources and the City of Manteca Minute Order on the adoption of the 2005 Urban Water Management Plan. This plan includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Urban Water Management Planning).

Agency Coordination

Law

> 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.

Coordination Within the City

The City of Manteca Public Works staff prepared the 2005 Plan, which was reviewed by the City Council, the City Manager's Office, and the City Community Development Department.

The City of Manteca Community Development Department guidelines require that adequate water supply and wastewater treatment capacities be available before new development can be approved. The City Community Development Department must review and approve new development with respect to approved City planning documents, which include availability of water and sewage facilities needed to support the development.

The City Public Works and Community Development Departments have developed plans and policies to develop and provide an adequate water supply for the City to 2030. The plans and policies include the City of Manteca General Plan adopted in 2003, the 1985 and 2002 Water Master Plans, the Water Master Plan for City of Manteca Public Facilities Implementation Plan. Data and information from these plans were utilized in the preparation of the 2005 Plan.

Interagency Coordination

The City of Manteca worked with the South San Joaquin Irrigation District (SSJID) in the development of the South County Surface Water Project to provide treated surface water to the Cities of Escalon, Lathrop, Tracy and Manteca. Current and future water supply information and needs of these cities have been coordinated and shared with SSJID in the development of the South County Surface Water Project since 1991. Information from the Project Environmental Impact Report was utilized in the preparation of the 2005 Plan.

Projected water supply requirements for the City of Manteca were provided to SSJID. SSJID provided information on the reliability of the surface water supply.

SSJID, the San Joaquin County Flood Control and Water Conservation District and the City of Lathrop were provided a copy of the 2005 Plan for comment. Table 1 summarizes the efforts the City has taken to include various agencies and citizens in its 2005 Plan.

Table 1. Coordination and Public Involvement						
Entities	**Coordination and Public Involvement Actions**					
	Helped write the plan	**Was contacted for assistance**	**Was sent a copy of the draft**	**Commented on the draft**	**Attended public meetings**	**Was sent a notice of intention to adopt**
SSJID		x	x			x
City of Lathrop			x			x
San Joaquin County Flood Control and Water Conservation District		x	x			
Special Interest Groups		x				
Citizen Groups						
General Public		x			x	
Public Library						
Other						

Supplier Service Area

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Climate

Located in the San Joaquin Valley, the City of Manteca experiences hot summer temperatures with many days over 100°F during July and August. Nighttime temperatures during July and August only drop into the seventies. The winter temperatures are much colder, with daytime highs in the forties and fifties. Winter lows are in thirties and forties. Overnight freezes are infrequent. Spring and fall provide moderate temperature ranges. The mean annual precipitation is 14 inches.

Monthly climate data is provided in Table 2. The Eto data in Table 2 data was obtained from theCalifornia Irrigation Management Information Service (CIMIS) for Station 70-Manteca in the San Joaquin Region. Rainfall and temperature data was obtained from NOAA website.

TABLE 2.
MONTHLY AVERGE CLIMATE DATA
FOR MANTECA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Eto, In[1]	0.90	1.73	3.38	5.04	6.45	7.54	8.02	7.11	5.19	3.33	1.60	0.86	51.15
Rainfall, In	2.85	2.27	2.06	1.12	0.41	0.08	0.03	0.04	0.27	0.73	1.81	2.33	14.0
Temp. F	45.5	50.5	54.3	59.5	66.3	72.7	77.3	76.2	72.7	64.3	53.2	45.6	61.5

1. California Irrigation Information System, DWR Office of Water Use Efficiency. Station 70-Manteca San Joaquin Region.

As indicated by the Eto and rainfall data there is a significant difference between evapotranspiration and rainfall though much of the year, which results in a significant water demand for landscape irrigation during summer months.

Other Demographic Factors

The City of Manteca is located in the flat plain at the northern end of California's San Joaquin Valley in south San Joaquin County. The City is located approximately 10 miles south of Stockton and 15 miles north of Modesto as shown in Figure 1. Rich agricultural lands abut Manteca on the north, east and south while areas to the west are used primarily for industry. Southern Pacific Railroad cuts the City diagonally from southeast to northwest. State Highway 120 crosses the southern portion of the City and provides a connection between Interstate 5, located about four miles to the west of the City, and Highway 99 along the eastern boundary of the City. This location creates a good setting for Bay area commuter housing as well as new commercial and industrial locations.

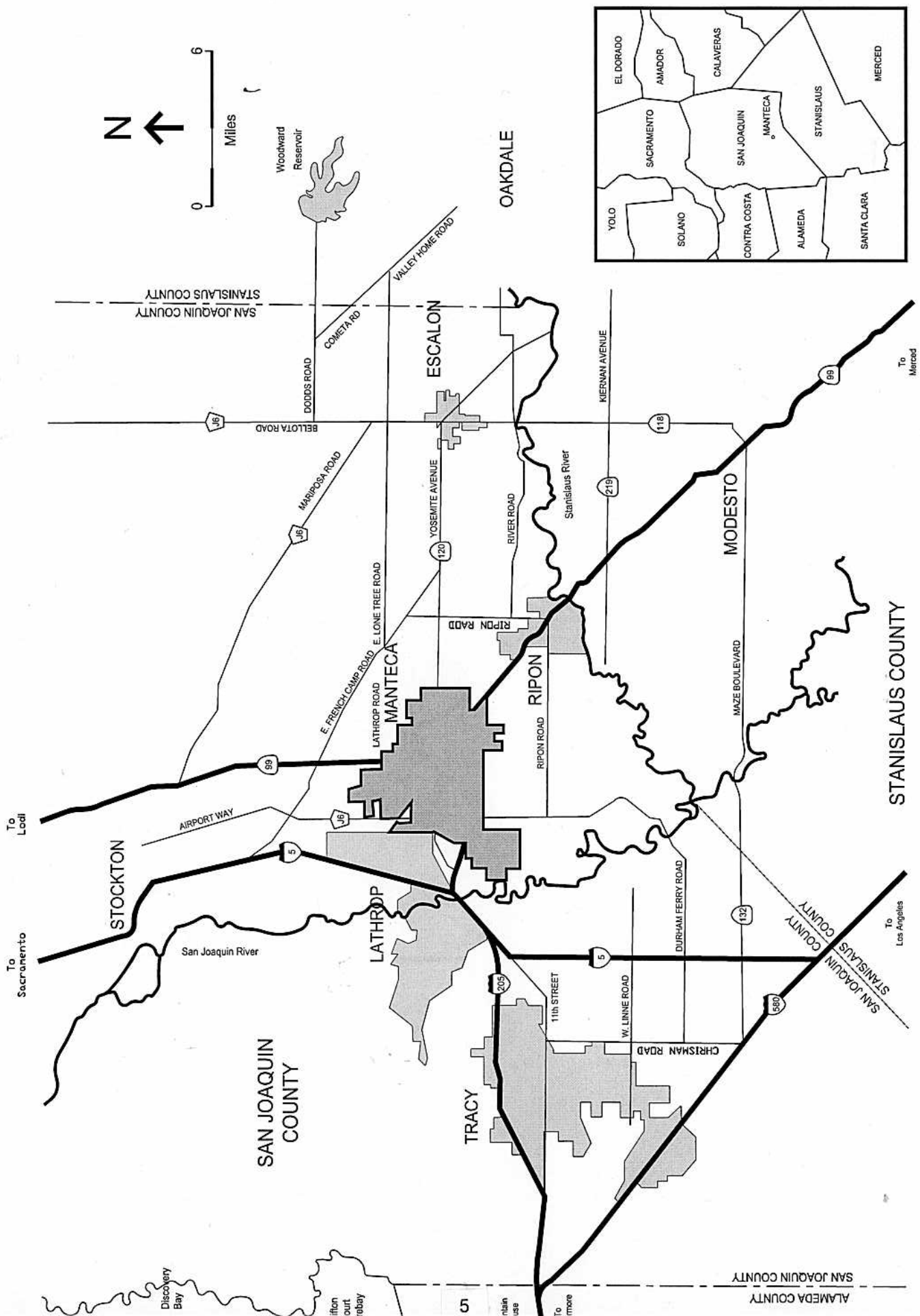


FIGURE 1
City of Manteca Location

Historically, Manteca developed as an agricultural and cattle area. The development of irrigation water in 1913 spurred additional agricultural development as well industrial and residential development in the area. Early industrial development included the Manteca Canning Company (1914-1977), and Spreckels Sugar Company (1916-1991). The City incorporated in 1918, and has continued to grow both residentially and industrially despite the closing of the early industries.

Presently, the City limits encompass an area of about 17 square miles (10,890 acres). Approximately 67 percent (7,281 acres) of the area within in the City limits have been developed. The City provides water service to about 16,000 residential and 700 institutional, commercial and industrial customers. The City along with much of the San Joaquin Valley anticipates substantial future growth given the City's proximity to the San Francisco Bay area. Current water planning is for the City of Manteca 2003 General Plan Primary Urban Service Area (PUSA) shown in Figure 2. The gross area within the PUSA is 13,790 acres.

For water development planning, the City uses an annual growth rate of 3.4 percent. The maximum allowable growth rate for the City is 3.9 percent. Table 3 shows the population projection for the City from 2005 to 2030 at a 3.4 percent annual growth rate. The Public Facilities Implementation Plan (PFIP) estimates growth to occur at 3.41 percent per year between 2005 and 2010 and growth at 2.64 percent between 2011 and 2020 for an overall growth of 2.93 percent. The difference in growth rates assumed for water development and the PFIP is not considered a significant issue as future water supply will be developed by constructing groundwater wells and purchase of surface water from the South San Joaquin Irrigation District's South County Water Supply Project on the basis of actual development. The ability to develop groundwater wells and purchase surface water provides the City with great flexibility in developing its water supply to meet future demand.

Table 3.

Population Projections

	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Service Area Population	61,500	72,600	85,900	101,500	119,950	141,778

Past Drought, Water Demand, and Conservation Information

The City of Manteca experienced severe droughts during 1976-77 and 1987-94. In 1976 a countywide ordinance was adopted to suspend all residential and commercial landscape watering for the duration of the water shortage. In 1989 the City of Manteca adopted an emergency water conservation ordinance for that water year. In 1990 the City adopted a permanent water conservation ordinance (City of Manteca Ordinance 986). The water conservation ordinance is in effect during daylight saving each year.

The water conservation ordinance was adopted because of the peak mid day demands placed on the water system on hot summer days. The high mid day demand caused low water pressures throughout the City. The intent of the conservation ordinance was to shift outdoor uses of water to periods of low demand, and to conserve water by restricting landscape irrigation to the evening and morning when evaporation losses are lower.

The historical per capita consumption of water is about 214 gallons per person per day. During the 1976-77 drought the per capita water consumption dropped to 186 gallons per person per day. The per capita consumption remained at historical levels during the 1987-94 drought and averaged 212 gallons per person per day. Since Manteca relied only on groundwater during the drought periods there was little effect on the Manteca water supply. Groundwater levels dropped during the drought but did not affect the production at any well.

The City water conservation program evolved with each of its Urban Water Management Plans as discussed

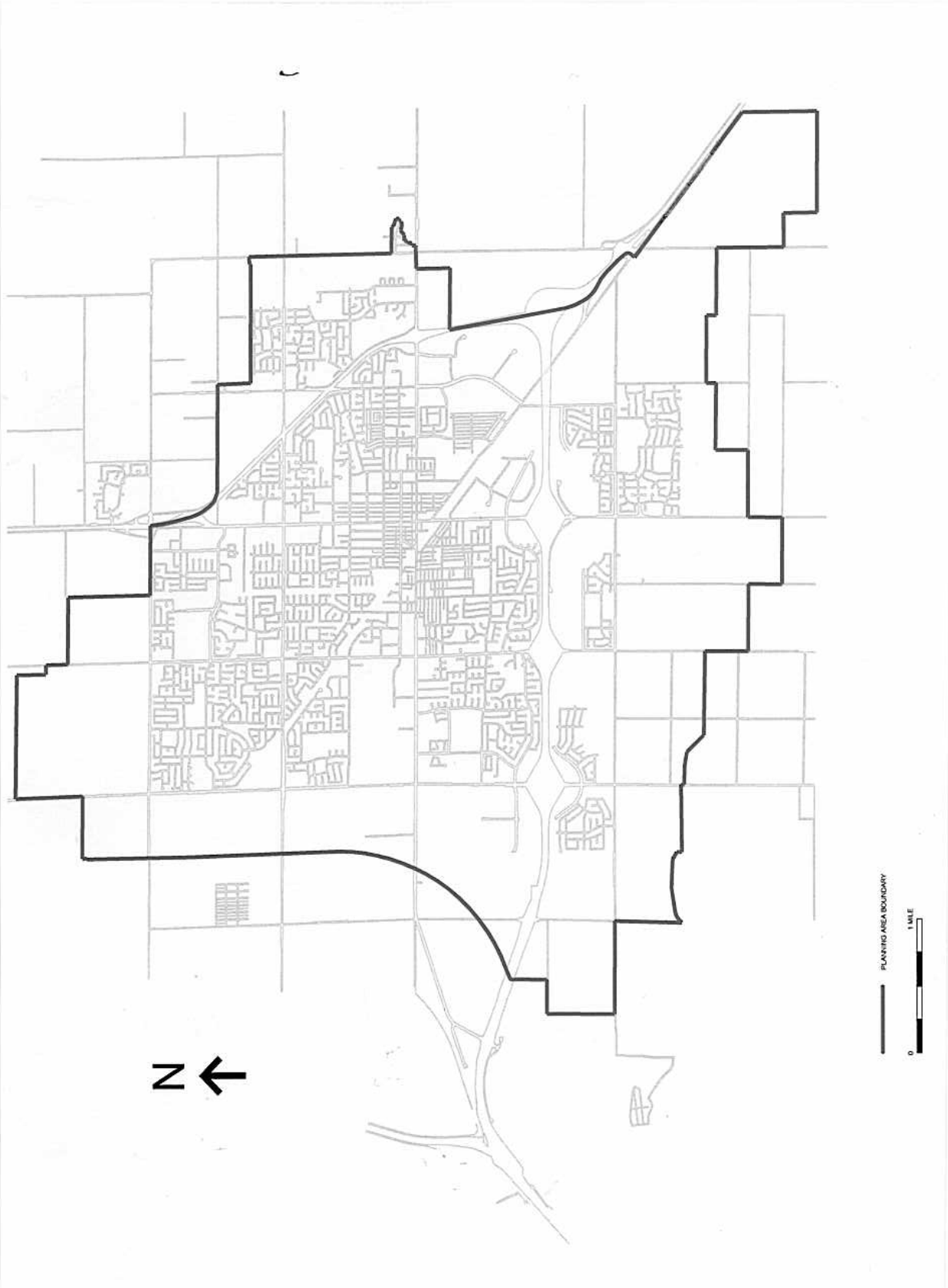


FIGURE 2
City of Manteca Planning Area

below. The City implemented seven water conservation program elements with its 1985 Urban Water Management Plan.The seven program elements remained the core of the City water conservation program through 1997. The seven program elements consisted of the following:

- Retrofit residences/businesses with low-flow showerheads
- Retrofit residences with low-flush toilets
- Landscape with lower water maintenance plants
- Advertisement Campaign
- Distribute DWR-type water conservation kits
- Education program in local schools
- Industrial conservation and reclamation measures

The City's 1990 Urban Water Management Plan Update expanded its conservation program to include the following nine program elements:

- Residential and commercial customer Retrofit Kit Program
- Information and Education program for residential customers
- System Water Audit, Leak Detection, and Repair
- Ultra Low-Flush Toilet Ordinance for new residential developments
- Lawn Watering Guides for existing residential customers
- Standards for new large landscape projects
- Xeriscaping Ordinance for new residential developments
- Ultra Low-Flow Showerhead Ordinance for new residential developments
- Removal of City street median landscaping

The above programs were retained in the 1995 Urban Water Management Plan Update. In 1998 the City became a signatory in the California Urban Water Conservation Council (CUWCC) and began implementing the water conservation best management practices (BMP) of the CUWCC. The following BMPs were implemented in the City's water conservation plan:

- BMP 1 Water Survey Programs for Single and Multi-Family Residential Customers
- BMP 2 Residential Plumbing Retrofit
- BMP 3 System Water Audit, Leak Detection and Repair
- BMP 4 Metering with Commodity Rates for All New Connections and Retrofit of Existing
- BMP 5 Large Landscape Conservation Programs and Incentives
- BMP 7 Public Information Programs
- BMP 8 School Education Programs
- BMP 9 Conservation Programs for CII Accounts
- BMP 11 Conservation Pricing
- BMP 12 Conservation Coordinator
- BMP 13 Water Waste Prohibition

In 2004 and 2005 the City also participated in the LightWash program to provide rebates for high efficiency washing machines to commercial laundries, industrial and multi-family use clothes washing facilities. Participation in the LightWash Program will provide input into BMP 6 High Efficiency Washing Machine Rebates. The City plans to implement all 13 of the urban water supplier CUWCC BMPs in the future.

Water Sources (Supply)

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 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 [to 20 years or as far as data is available.]

Water Supply Sources

The City water supply is from groundwater from City owned and operated wells and surface water from South County Water Supply Project. The wells are located within the City limits. In 2005, the South San Joaquin Irrigation District began operation to provide treated surface water for South County Water Supply Project, which serves the Cities of Manteca, Lathrop and Tracy. The City of Manteca will receive up to 11,500 acre-feet per year in Phase 1. Future expansion of the South County Water Supply Project will increase the maximum supply for Manteca to 18,500 acre-feet per year. The projected City water supplies are presented in Table 4.

In 2005, there are 17 operating wells in the City water system. Two additional wells are currently planned for construction in 2006-07. The wells range in depth from 190 feet to 400 feet. The locations of the existing and planned wells are shown on Figure 3.

The City's annual water groundwater production increased from 4,600 acre-feet in 1975 to 14,900 acre-feet in 2004. Based on the developed acreage of 7,281 acres within the City limits the 2004 water withdrawal was 2.05 acre feet per acre. The combined production capacity of the 17 wells is 27,960 gallons per minute. With the start of the South County Water Supply Project, Manteca will reduce groundwater extraction to 1 acre-foot per acre per year.

Table 4.

Current and Projected Water Supplies

Water Supply Sources	2005	2010	2015	2020	2025	2030
Purchased from USBR						
Purchased from DWR						
Purchased from wholesaler (SSJID South County Surface Water Project)	4,100	9,704	11,470	13,557	16,444	18,500
City produced groundwater	11,491	8,606	10,171	12,022	13,790	13,790
City produced surface water						
Transfers						
Exchanges In						
Recycled Water		161	645	1,700	2,100	2,300
Recycled Water used for ground water recharge (adds to gw supply)						
Other						
Total	15,591	18,471	22,286	27,279	32,334	34,590
Units of Measure: Acre-feet/Year						

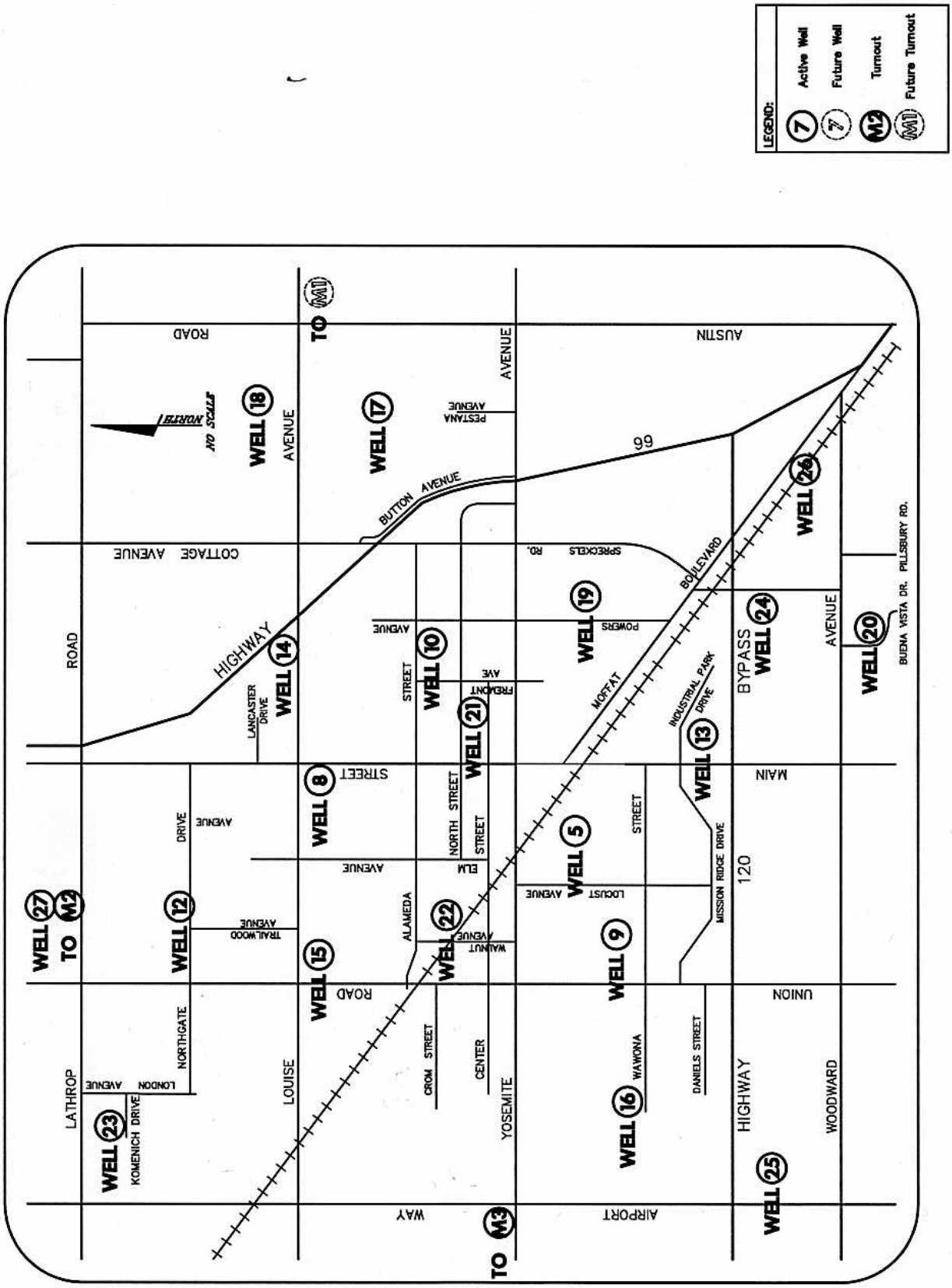


FIGURE 3
City of Manteca Well Location Map

Groundwater

The City is located in the Eastern San Joaquin County Groundwater Basin (ESJCGB), which is a sub-basin of the San Joaquin Valley Groundwater Basin. The ESJCGB subbasin number is 5-22.01. DWR's Bulletin 118 – 80, *Ground Water Basins in California* classified the ESJCGB as a basin in a critical condition of overdraft. The Northeastern Groundwater Banking Authority and the San Joaquin County Flood Control and Water Conservation District undertook the development of a groundwater management plan for San Joaquin County, which includes most of the ESJCGB. The San Joaquin County Board of Supervisors adopted the groundwater management plan in September of 2005. The South County Water Supply Project is discussed in the groundwater management plan as an integrated conjuctive use program element.

The groundwater aquifers underlying the City extend to depths in excess of 600 feet have been identified to include four geologic formations. In increasing depth from the surface, the identified aquifers are Victor Formation, Laguna Formation, Mehrten Formation, and Valley Springs Formation. Due to the alluvial generation of these aquifers, there is significant variation in grain size, with lenses and strata of high yield gravel, permeable sandy material and lower permeability clays. In general, the strata slope from the hills east of the City downward to the west, providing good recharge from hill runoff as well as from the Stanislaus River. The City's wells primarily withdraw water from the Laguna and Victor Formations.

The groundwater basin safe yield was estimated in a 1985-groundwater study at 1.0 acre-foot per acre per year. Historically, the City extracted groundwater at a rate of approximately 2.4 acre-feet per acre per year, based on the developed City area. As discussed previously, the South County Water Supply project will allow the City's to reduce local groundwater extraction to the basin safe yield of 1.0 acre-foot per acre per year. Groundwater pumping by City wells from 2000 to 2004 is summarized in Table 5.

Table 5.

City of Manteca Groundwater Pumping

Year	2000	2001	2002	2003	2004
Acre Feet	12,609	12,974	13,516	14,451	14,933
Percent of Water Supply	100	100	100	100	100

Recycled Water

The City wastewater quality control facility (WQCF) treats an average dry-weather wastewater flow of about 6 mgd and has an average dry weather design capacity of 6.95 mgd. A WQCF expansion is currently in progress to increase the average dry weather capacity to 9.87 mgd. Approximately 15 percent of the wastewater treated at the WQCF is from the City of Lathrop.

The City currently disposes of treated wastewater to both land and the San Joaquin River. The wastewater disposed to land is used to irrigate fodder crops on City owned and leased agricultural lands near the WQCF. The discharges to land averaged about 0.87 mgd (1,030 acre-feet) but will be reduced to 0.73 mgd (870 acre-feet) in 2005 as 30 acres of disposal land is converted to a softball field complex. The remainder of the wastewater is discharged to the San Joaquin River. The treated wastewater for agricultural irrigation is unchlorinated secondary effluent. Wastewater discharged to the San Joaquin River is secondary effluent that has been disinfected to 23-mpn/100 ml with chlorine and dechlorinated with sulfur dioxide before discharge.

The 2005 Water Quality Control Facility Master Plan City evaluated the use of recycled wastewater for

irrigation of City parks, public areas and other open spaces in lieu of the currently used potable water and onsite groundwater supplied irrigation systems. To provide reclaimed water for these uses additional treatment (filtration and disinfection system improvements) would be required along with a recycled water distribution system. The City is currently required to construct tertiary filtration facilities for discharge to the San Joaquin River and will construct an ultra-violet disinfection system. Construction of the filtration and disinfection facilities will begin and 2006 and is scheduled for completion in 2007.

The construction of the tertiary filters and disinfection facility will promote the development of water recycling in Manteca. Two recycled water projects are currently planned. One project is a water truck fill station to provide water for dust control at construction sites. The second project will provide irrigation water to softball playing complex located near the WQCF.

The 2005 Water Quality Control Facility Master plan includes urban landscape irrigation with recycled water as a future component for disposal of the WQCF wastewater. The WQCF Master Plan estimates the potential demand for urban landscape irrigation with recycled water at 3,670 acre-ft/yr at buildout. The 2005 Plan estimates the recycle water use for landscape irrigation at 2,300 acre-ft/yr by 2030 as indicated in Table 4.

Development of Desalinated Water

Law

> 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.

Saline groundwater is known to exist in deeper aquifers underlying the City. The depth of the saline aquifers is estimated at 600 feet below ground surface. There is no planning to develop these saline waters for potable use. There are several factors that would need to be resolved before considering developing this water source. Desalination for a long term water supply is not considered highly feasible for the area at this time.

Disposal of the brine resulting from the desalination is a major obstacle. Desalination technologies produce concentrated waste brines (typically equal to 30 percent of the total water treated). At present there are no known disposal alternatives other than hauling the brine to the ocean for disposal or disposal by deep well injection. Neither of these disposal alternatives is attractive. Discharge to local surface waters would impair the water for designated uses and disposal to land would also be a concern due to impairment of local groundwater.

Drilling wells to the saline aquifers would penetrate the overlaying freshwater aquifers. This could jeopardize the freshwater aquifer by introducing a connection to the saline aquifer.

Reliability Planning

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.

10631 (c) 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 replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (c) Provide data for each of the following:
(1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

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's water supply.

Reliability

The City has two water supply sources, local groundwater and surface water from the SSJID South County Water Supply Project. On an annual basis, groundwater will provide 47 percent of the City water supply and surface water 53 percent of the water supply. The reliability of these sources is discussed below.

Groundwater

The reliability of the City's groundwater was evaluated with respect to seasonal conditions, climatic variations and long term groundwater overdraft. The effects of seasonal conditions and climatic variations on the water supply were assessed on the basis of historical groundwater levels in the Manteca area. Long-term water reliability was assessed from groundwater modeling on the groundwater level and saline intrusion along the western edge of the groundwater basin.

The City's groundwater supply has been highly reliable with respect to seasonal conditions and climatic variations. During the peak summer water demands, the static and pumped water levels at the wells remain fairly consistent throughout the season. Fluctuations in groundwater levels from climatic variations have been documented in monitoring by the San Joaquin County Flood Control and Water Conservation District (Flood Control District), which monitors water quality and groundwater levels at a number of wells throughout San Joaquin County. The Flood Control District groundwater monitoring includes one SSJID well located in southeast part of the City. The most notable variations in groundwater from climatic conditions were the steep declines observed at this well during the droughts of 1976-77 and 1987-94 as shown on Figure 4.

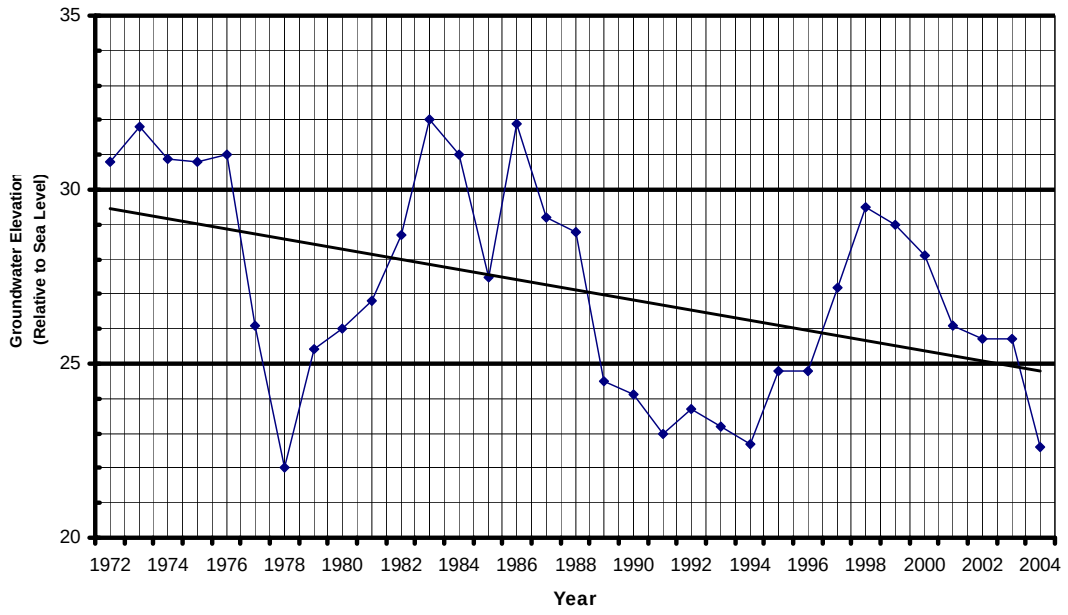


Figure 4
Manteca Area Groundwater Level

Although the groundwater levels declined during the drought, the City did not experience any groundwater pumping problems. The groundwater levels recovered following the droughts, but the recovered level was below the predrought level and tended to follow the long-term pattern of groundwater decline observed in the area.

Groundwater overdraft in the basin and the City's groundwater withdrawal rate of 2.4 acre-feet per acre per year is a concern to the City as this poses a long-term threat to the reliability of the groundwater supply. There has been a gradual drop in groundwater levels over time with the current groundwater level is about 4 to 5 feet below the 1974 groundwater level. Basin groundwater modeling predicts a continued decline in groundwater levels if the overdraft continues. The models predict groundwater levels drops of 10 to 15 feet in the Manteca area by the 2030 if there are no changes in groundwater pumping in the basin. The most recent model results reported in the Flood Control District's Comprehensive Water Management Plan Report of 2001 predicted a groundwater decline of 10 feet from the 2000 levels by 2030 if there is no change groundwater pumping. The drop in groundwater level is primarily due to the excessive groundwater pumping in the central and eastern portion of the groundwater basin but all groundwater withdrawals contribute to the basin overdraft problem, including the City of Manteca's withdrawal.

A 10-foot drop in groundwater levels would not result in a significant loss in well capacity as the pump bowls at all but two wells are located at greater depths and would not be affected by 10-foot drop in groundwater levels. The pumps in the two wells that would be affected by 10-foot groundwater drop could be lowered to maintain production if necessary.

One of the most serious consequences of the drop in groundwater levels is the possible saline intrusion along the western boundary of the basin. Saline intrusion has already occurred in portions of Stockton. The City of Lathrop has identified the saline intrusion as a 500 part million TDS boundary along the

western Southern Pacific Railroad track in Lathrop. Saline intrusion would be a significant issue on the reliability of the existing groundwater system as this may require well abandonment or treatment to maintain water quality.

The periodic droughts as experienced in the past have caused short-term fluctuations in the groundwater levels. Future droughts are expected to cause similar groundwater fluctuations and could create a need to lower pump bowls at the two wells discussed above if the short-term drop exceeded 10 feet. A more significant concern is an accelerated eastward movement of the saline water due to the rapid drop in groundwater levels during a drought.

Contamination of a well or the groundwater and changes in regulatory water quality standards could effect the reliability of the City's water supply but are not considered to be significant for the following reasons. Changes in water quality are likely to occur gradually and would not effect all wells simultaneously. The gradual change in water quality would allow time for treatment or alternative supplies to be investigated and developed. Similarly, changes in regulatory water quality requirements would be known in advance and allow time for treatment or alternative supplies to be developed. Should these conditions occur, the City would undertake well modification or treatment to eliminate or remove the contaminant or if necessary drill new wells to maintain the water supply. Even if the contamination occurred rapidly at a single well, the City has sufficient capacity to take the well out of service without serious loss in system reliability.

Surface Water

The South County Water Supply Project provides treated surface water from the Stanislaus River. SSJID entitlement is 300,000 acre-feet per year. However, the entitlement is dependent on New Melones Reservoir inflow and is subject to curtailment in dry years. Normal water deliveries would be provided when the New Melones inflows exceed 600,000 AF. Water deliveries are reduced when inflows are less than 600,000 AF according to the following.

$$\text{Inflow} + [(600{,}000 - \text{Inflow}) \div 3]$$

The water available for distribution when inflows are less than 600,000 acre-feet is shared equally between SSJID and Oakdale Irrigation District. Oakdale Irrigation District also holds a 300,000 acre-feet per year entitlement. The South County Surface Water Project participants' agreement with SSJID indicates the municipal and agricultural users would share surface water reductions equally.

An examination of the Stanislaus River flows from 1922 to 2005 indicated the full entitlement has been available about 80 percent of the time. The lowest inflow year into New Melones Reservoir was 1977 at 271,000 acre-feet and would have resulted in 37 percent reduction in surface water delivery. Other low inflow years were 1924 (385,000 acre-feet) and 1988 (390,000 acre-feet) and would have reduced surface water delivery by 24 percent and 23 percent, respectively. The average reduction in dry years between 1922 and 2005 is 14.5 percent.

Supply Deficiencies

The City experienced supply deficiencies in the early 1990's from limited well capacity and distribution system deficiencies, which resulted in low water system pressures during periods of peak water demand. The low pressures experienced were due to a lack of well capacity and deficiencies in the distribution system and not from the availability of the groundwater supply. The City has subsequently constructed new wells to assure an adequate supply of water to its existing customers and requires new residential and commercial developers to fund the construction of new water wells for development projects. The City also began correcting deficiencies in the water distribution system to provide a more redundant and robust system throughout the City. The City continues to develop new wells and improve its distribution system to correct and prevent future capacity problems.

Although the City has developed additional wells and improved the water distribution system since the early 1990's, the system pressures can drop during periods of peak water demand. This becomes especially acute if two or more wells are offline during the peak demand period of summer. The pressure drops are not as severe as experienced in the early 1990's but underscores the need for the City to continue developing new wells to keep up with new development in the City.

Based on this historical record of inflows and potential reductions in surface water delivery, the City plans to continue to develop new wells to maintain full water delivery with a 50 percent surface water reduction. This planning will help assure there is an adequate supply of water in the future.

Plans to Assure a Reliable Water Supply

The planned use of surface water and groundwater by the City in 2005 will reduce the groundwater withdrawal to the safe aquifer yield of 1 acre-foot per year per acre. The resulting reduction in groundwater withdrawal is expected to stabilize groundwater levels in the Manteca area in the near term and reduce the long-term drop in groundwater levels. Preserving Manteca's groundwater supply will help assure the reliability of the water supply in drought conditions as groundwater will be available for use should there be a reduction in surface water delivery during drought conditions. Without the surface water supply, the groundwater levels are projected to drop 10 feet over the next 20 to 25 years. Maintaining the groundwater level also reduces the potential for saline intrusion into the aquifers underlying the City.

Groundwater modeling conducted for the South County Water Supply project to assess the impact the use of surface water and the reduction in groundwater use would have on the local groundwater level. This modeling indicated a gain in Manteca groundwater levels of approximately 2.5 feet through 2010. By the year 2025 the modeling indicated a lesser gain in groundwater over present levels of about 1.5 feet. The loss in groundwater level by 2025 is the result of the continued groundwater pumping and loss of surface water imports in the central and eastern portion of the groundwater basin. These combine to cause a greater groundwater depression in the central basin and increase the outflow of local groundwater to the central basin depression. The South County Water Supply Project did result in an improvement over the no project alternatives in which the local groundwater levels drop by 10 feet by 2025. The San Joaquin Groundwater Management Plan addresses the groundwater pumping in the basin and identifies projects to maintain groundwater levels in the eastern and central areas of the basin.

Water conservation by the City and public, and the planned use of recycled water for landscape irrigation will help maintain the reliability of the water supplies by preserving groundwater and extending the use of the available surface water supply. Conversion of agricultural lands to urban use will reduce local groundwater recharge that was provided by the agricultural irrigation.

Reliability Comparison

Table 6 details the existing water supply for single and multiple dry year water scenarios. Water supply is based on withdrawal of 7,281 acre-feet per year, estimated from the developed City area and an annual withdrawal of 1 acre-feet per acre. Because the groundwater has been a reliable supply there is no projected decrease in water supply during the single or multiple dry year supply reliability scenarios presented in Table 6. During past droughts the groundwater levels did drop but there was no loss in well capacity.

Surface water delivery for the normal year is based on the SSJID entitlement between 1922 and 2005. During this period the New Melones inflow averaged nearly 1,100,000 acre-feet. Considering that SSJID's entitlement is 300,000 acre-feet and is subject to curtailment during dry periods result in an average supply of 292,000 acre-feet, which is about 97.3 percent of the entitlement. Based on the City's 11,500 acre-feet share of surface water results in a normal year delivery of 11,193 acre-feet. (Note: Between 1922 and 2005 SSJID would have received its full allocation 80 percent of the time.) This is a conservative estimate for the delivery of surface water to the City as it is assumed that SSJID entitlement is fully allocated and SSJID's entitlement is limited to the natural New Melones inflow.

The single dry year surface water delivery is based on the New Melones inflow of 1977, which results in 65 percent of the normal surface water delivery. The multiple dry water years are based on the four dry year sequence of 1989 through 1992.

City policy requires adequate water and sewer capacity to support new development. As population growth is projected to increase by 3.4 percent per year, additional groundwater supplies must be developed as indicated in Table 6. The normal water year is adjusted in Table 6 for the increase in groundwater supply for the multiple dry year sequence. As shown in Table 6, the single dry year scenario results in a 79 percent reduction in total water supply in 2005. The multiple dry year sequence results in water shortage of 5 to 8 percent of normal supply.

Table 6.

Supply Reliability

			Multiple Dry Water Years			
	Average/ Normal Water Year 2005	**Single Dry Water Year 2005**	**Year 1 2006**	**Year 2 2007**	**Year 3 2008**	**Year 4 2009**
Surface Water Normal Year, AF	11,193	11,193	11,193	11,193	11,193	11,193
Groundwater, AF	7,281	7,281	7,528	7,784	8,049	8,323
Normal Year Total, AF	18,474	18,474	18,721	18,977	19,242	19,516
Dry Year Surface Water, AF	--	7,283	11,500	10,120	10,273	9,698
Groundwater, AF	--	7,281	7,528	7,784	8,049	8,323
Dry YearTotal, AF	--	14,564	19,028	17,904	18,322	18,021
Percent of Normal	--	79%	102%	94%	95%	92%

Multiple Year Minimum Water Supply

The aquifer has provided an adequate supply to meet multiple year minimum water supplies as experienced in the dry years of 1987 through 1994. Projected supply shown in Table 6 would be at a withdrawal of 1 acre-foot/acre. For withdrawals at this rate we would expect to see some decline in groundwater during a drought.

If the drop in groundwater was significant enough in a multi-year drought to threaten well production capacity it would be possible to implement more extensive water conservation measures within the City. More restrictive landscape irrigation requirements can provide significant reductions in water demand during the peak summer months.

The surface water supply has a significant effect on the multiple-year minimum supply planning. The surface water supply reduces demand on the groundwater supply, thus preserving it for use during dry periods when the surface water supply is reduced. The demand on the groundwater during the drought would also be reduced as some surface water is anticipated to be available. For example, in fourth year of multiple dry years, an increase in groundwater withdrawal to 1.17 acre-feet per acre would sufficient to maintain the normal water year total. In a more severe dry condition requiring a surface water supply was reduction of 50 percent, the groundwater withdrawal rate, to make up the difference would be 2.0 acre-feet per acre year, as compared to the 2.4 acre-feet per acre per year without a surface water supply. These comparisons do not consider conservation efforts, which would reduce the actual demand and result in a lower groundwater withdrawal than indicated.

Transfer or Exchange Opportunities

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Water Transfers

Currently, there are no opportunities to share or import groundwater into or from the City. There are irrigation wells in the agricultural lands surrounding the City. These wells are not suitable for potable water use as they are not constructed to potable water well standards and generally withdraw water from the upper part of the aquifer (within 100 feet of the ground surface). The nearby City of Lathrop operates its own groundwater wells, and distribution system that is independent of the Manteca water system. There are no plans to connect the two city systems.

The South County Water Supply Project could provide some opportunities for the transfer or exchange of water. The South County Surface Water Project will provide water to the cities of Manteca, Lathrop, Escalon and Tracy. The City of Manteca is scheduled to receive 11,500 acre-feet per year of surface water through 2011 and 18,500 acre-feet per year by 2025. The total water delivery planned for the project is 31,522 acre-feet in 2010 and 43,090 acre-feet in 2025. With the surface water supply, it is possible that some water could be obtained from other project participants if the water demands in their respective areas are lower than projected. These are most likely to be short-term transfers, although long term agreements for this water supply are possible. Water transfer arrangements and protocols among the surface water project participants can be expected to develop over the next five years.

There may also be opportunities to obtain additional water that could be treated and transported to Manteca through the South County Surface Water Project facilities. The most likely supply would be agricultural irrigation water from SSJID and Oakdale Irrigation District, which have rights to this water. Additional conservation measures implemented by SSJID or the Oakdale Irrigation District could also provide additional water. There is no planning to obtain additional surface water through the South County Water Supply Project at this time.

To accommodate additional flows above the planned surface water delivery, Manteca and Tracy had additional capacity built into the surface water transmission line. The total transmission capacity available to Manteca is 26,900 acre-feet. There is no planning to expand the water treatment system to match the

transmission system capacity. Any planning and construction of treatment capacity to match the transmission system capacity would not be expected prior to 2025.

WATER QUALITY

Law

> 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.

Future Water Quality

The quality of Manteca's groundwater and surface water is expected to remain relatively unchanged for the next 20 years. Appendix H presents a summary of existing and future water quality. While the water quality is expected to remain unchanged within the planning period, there are conditions that could effect water quality, management strategy and reliability of the water supply as discussed below.

Saline intrusion, as discussed previously, poses a long-term threat to the groundwater quality in Manteca. The saline intrusion is the possible result of excessive groundwater withdrawal from the aquifer. The planned conjunctive use of surface water and groundwater in 2005 is directed at stabilizing existing groundwater levels and thereby prevent or delay the possibility of saline intrusion into the area. If City wells are impacted at some point in the future the City will evaluate treatment or abandonment of an affected well based on water demands and the ability to construct a replacement well. Currently, the San Joaquin County Flood Control and Water Conservation District is investigating the saline intrusion to provide better information on the extent and progression of saline water into San Joaquin County that will enable the development of strategies to control the saline intrusion.

There are several known contaminants with the potential to affect the water supply. The concentrations of these have remained relatively stable for a number of years but could change as a result of groundwater movement. The known contaminants are nitrate, arsenic, manganese, organic chemicals (dibromo chloro propane (DBCP), ethylene dibromide (EDB), perchloro ethylene (PCE)) and radiological contaminants. The effect of these contaminants on the City water supply is discussed below.

Nitrate

Nitrate at elevated levels is found at six City wells at 30 mg/l or higher (as NO_3). The nitrate levels are below the Maximum Contaminant Level (MCL) of 45 mg/l. The source of the nitrate is believed to be from past agricultural activities in the Manteca area and is generally in upper portion of the aquifer (100 to 150 ft below ground surface). If the levels were to increase above the MCL it would be necessary to stop production from the well immediately and either modify the well by screening off the upper portion of the aquifer, or treat the water. Screening off the upper portion well has proven effective in lowering the nitrate level from 35 mg/l to 25 mg/l in one City well. There was no measurable loss in water production from the modified well.

Long term expectation is for the nitrate levels to decline as sources of contamination have been removed. However, levels could increase, as it is possible for more highly contaminated water to move into the well pumping zone.

Arsenic

The MCL for arsenic was lowered from 50 ug/l to 10 ug/l in 2001 and will become effective in 2006. The lower arsenic MCL will effect the City water supply as 12 of the 17 wells have arsenic concentrations of 12

to 19 ug/l. The City plans to install treatment to lower the arsenic level to acceptable levels and is currently investigating methods of treatment. The City will begin design and installation of arsenic treatment systems to meet the new MCL in 2006. Arsenic treatment would be installed at any new wells constructed that exceed the 10 ug/l MCL. Some loss in production (2 to 3 percent) may result from the arsenic treatment. Some wells may be abandoned or placed in standby mode due to the cost of arsenic treatment. Abandoning a well or placing it in standby does not effect the City's water supply on an annual basis, but does effect the peak hour delivery. The loss in peak hour delivery will be recovered by the construction of storage tanks.

Manganese

Manganese is a secondary MCL that affects the aesthetic quality of the water by imparting a bitter taste to the water and staining fixtures. The City has one well (Well 14) that exceeds the manganese MCL of 50 ug/l. The well was shut down temporarily for the installation of a greensand filter to remove the manganese. Well 14 is also one of the wells that exceeds the proposed arsenic MCL. The greensand filter can remove arsenic by the addition of iron to the filter feed water. The treatment will result in some loss of production (2 to 3 %) from filter backwashing.

Organic Chemicals

Three organic contaminants have been detected at low levels in seven of the City's wells. The three contaminants are ethylene dibromide (EDB), dibromo chloro propane (DBCP) and perchloro ethylene (PCE). EDB and DBCP are agricultural pesticides that were used in the surrounding agricultural areas and have been detected in six wells. With the exception of one well (Well 17) these contaminants have been below the MCL. An activated carbon filter was installed at Well 17 to remove the EDB and DBCP. PCE has also been found at one City well and is also below the MCL.

The long-term expectation is for these chemical contaminants to decline over time as EDB and DBCP have not been used for over 20 years. The EDB and DBCP levels have declined below the MCL at Well 17 and resulted in the removal of the activated carbon filters at the well in 2003. PCE is also expected to decline as the use of these organic chemicals is more closely regulated.

Should the City encounter these or other organic contaminants above their MCL, an activated carbon treatment would be installed to remove the contaminant from the water supply. There is a minimal loss of production from such treatment.

Radiological

Gross alpha and Uranium have been detected at several of the City wells. None of these radiological contaminants are at concentrations that affect the reliability of the water supply. Historically, Well 7 was abandoned in 1993 because of an elevated level of Uranium. Well 7 was a shallow well with a capacity of 700 gpm. The City opted to abandon the well rather than treat the well water given the well's age, its limited capacity and cost of treatment. A similar analysis to abandon or treat would be performed should radiological parameters at any of the existing wells exceed the MCL.

Water Use Provisions

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

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

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

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

Past, Current and Projected Water Use

Table 7 quantifies City water uses from 1990 to 2030 in acre-feet per year for residential, commercial, institutional and government, industrial, landscape, and unaccounted water losses. Table 8 summarizes the number of residential, commercial, institutional and government, industrial, and landscape connections from 1990 to 2030. A brief description of these water use sectors is provided below.

Residential Sector

The single and multi-family residential sectors account for 76 percent of the City water produced. The projected water demand and number of connections in Tables 7 and 8 is based on the average growth of 3.4 percent per year between 2005 and 2030.

The single-family residential customers average 3 persons per connection. Multi-family residential customers average 2.7 persons per housing unit, and average 10 units per multi-family complex. Total system per capita water demand averaged about 225 gallons per day between 2000 and 2004. The recent water use is slightly higher than the long-term average (1960 to 2000) of about 214 gallons per capita per day.

Commercial Sector

The City has a complex mix of commercial customers, ranging from markets, restaurants, stores, beauty shops, gas stations, retail stores, outlet and regional shopping centers, and high-volume restaurants and other facilities serving the visitor population. The growth in the commercial sector is driven by the need for services for the increasing permanent population. Businesses for the visiting population along Highway 99 and Interstate 5 are also contributing to the growth. The number of commercial water accounts increased by about 23 percent between 1990 and 2000 but the water use by this sector increased by only about 8.4

Table 7.
Past, Current and Projected Water Use

Water Use Sectors	1990	1995	2000	2005	2010	2015	2020	2025	2030
Single family residential	6,235	5,789	8,035	10,467	12,372	14,622	17,282	20,428	24,145
Multi-family residential	1,267	1,068	1,260	1,314	1,553	1,836	2,170	2,565	3,031
Commercial	828	815	1,103	1,211	1,431	1,692	2,000	2,364	2,794
Industrial	173	213	145	107	126	149	177	209	247
Institutional and governmental	220	251	363	329	390	460	543	642	759
Landscape	548	598	658	617	729	862	1,019	1,204	1,423
Sales to other agencies	0	0	0						
Saline barriers	0	0	0						
Groundwater recharge (recycled water)	0	0	0						
Conjunctive use	0	0	0						
Agriculture	0	0	0						
Unaccounted-for system losses	602	1,988	1,044	1,446	1,709	2,020	2,388	2,822	3,336
Total	9,873	10,631	12,608	15,491	18,310	21,641	25,579	30,234	35,735
Unit of Measure: Acre-feet/Year									

Table 8.
Number of Connections by Customer Type

Customer Type	1990	1995	2000	2005	2010	2015	2020	2025	2030
Single family residential	9,263	10,507	12,200	15900	18,800	22,200	26,250	31050	36700
Multi-family residential	539	546	549	560	661	780	920	1100	1300
Commercial	457	491	562	654	770	910	1080	1280	1510
Industrial	11	13	15	21	24	29	35	40	50
Institutional and governmental	63	72	75	87	100	120	140	170	200
Landscape/recreati on	68	74	81	89	110	120	150	170	200
Agriculture	0	0	0	0	0	0	0	0	0
Other (Recycle water)	0	0	0	0	2	4	10	20	25
Total	10,401	11,703	13,482	17311	20,467	24,163	28,585	33,830	39,985

percent. A 3.4 percent annual growth rate in the commerical sector is projected to occur beween 2005 and 2030. The commercial sector accounts for about 8 percent of the City water demand.

Industrial Sector

The City has a small industrial sector, which includes one large food processor, electronics manufacturing, trucking and warehousing, and light manufacturing. The industrial sector has grown slowly in the last decade. Water demand has declined due to the closure of several large water using industries. The industrial sector accounts for less than one percent of the City water demand.

Institutional/Governmental Sector

The City has a stable institutional/governmental sector, primarily local government, schools, and hospitals. This sector will keep pace with the growth of the city. This sector accounts for about 2 percent of the City water use.

Landscape/Recreational Sector

Landscape and Recreational customer demand is expected to increase due to continued growth in the City. Conversion of some existing City park irrigation systems to shallow groundwater wells and installation of irrigation wells in new City parks may decrease the demand for water in this sector. The landscape/recreational sector use accounts for about 4 percent of the City water demand. Dedicated irrigation wells were installed in 6 parks to reduce demand on the potable water system.

Agricultural Sector

The City does not provide water for agricultural irrigation. The conversion of agricultural land to residential areas will be expected to decrease groundwater pumping from private wells for agricultural purposes. Agricultural irrigation water provided by SSJID contributes to groundwater recharge. The loss of agricultural land to urban use will decrease groundwater recharge provided by agricultural irrigation.

Unaccounted Water Losses

Unaccounted water losses are about 8 to 10% of total production. The unaccounted water loss included unmetered water uses, such as traffic island landscape irrigation, irrigation of unmetered City property and construction site dust control. Other unnaccounted water losses include water main flushing, fire fighting, leakage, and water main breaks.

Supply and Demand Comparison

Law

> 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 the state, regional, or local agency population projections within the service area of the urban water supplier.

Supply and Demand Comparison

Table 9 compares current and projected water supply and demand. It indicates that in average water years, the City has sufficient water to meet its customers' needs, through 2025. This is based on continued development of groundwater wells and completion of the South County Surface Water Project. As noted in Table 9, the supply totals assume a groundwater withdrawal rate of 1.0 acre ft per acre per year beginning in 2005.

Table 9.
Projected Supply and Demand Comparison

	2005	2010	2015	2020	2025	2030
Supply totals	15,591	18,471	22,286	27,279	32,334	34,590
Demand totals	15,491	18,310	21,641	25,579	30,234	35,735
Difference	100	161	645	1,700	2,100	-1,145
Units of Measure: Acre-feet/Year						

It is estimated that water demand will exceed supply in 2030 by about 3.3 percent.

Table 10 presents a supply and demand comparison where surface water supply decreases in response to dry year conditions. This analysis assumes that groundwater is extracted at 1 acre-foot/acre per year. The groundwater supply is increased yearly as required to conform to City policy of assuring there is adequate water and sewer capacity for new development. This requires the development of additional groundwater supplies to maintain the groundwater supply at 47 percent of the water supply. The water demands presented in Table 10 assume a 3.4 percent annually increase. The water supply demand scenario calculation is included in Appendix C.

Table 10.

Single Dry Year and Multiple Dry Water Years
Water Demand-Supply Comparison

Water Supply Sources	Current Supply	Single Dry Water Year 2005	Multiple Dry Water Years			
			Year 1 2006	Year 2 2007	Year 3 2008	Year 4 2009
Supply totals	18,474	14,564	19,028	17,904	18,322	18,021
Percent supply reduction	0	22	0	6	5	8
Demand totals	15,491	15491	16,018	16,562	17,125	17,708
Difference	2,983	-927	3,010	1,342	1,197	313
Unit of Measure: Acre-feet/Year						

Water Demand Management Measures

Law

> 10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
> (1) A description of 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:……..

The City of Manteca is a signatory to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and is therefore a member of the California Urban Water Conservation Council (CUWCC). For the purpose of complying with the submission of water demand management measures, the City's 2003 and 2004 Best Management Practices (BMP) Reports are included in Appendix D. The City has, in good faith, tried to address and comply with the BMP targets listed in the CUWCC MOU where applicable.

Historically, the City responded to the Urban Water Management Planning Act by implementing a number of water conservation measures beginning in 1985. In 1998 the City became a signatory of the California Urban Water Conservation Council. At that time it began implementing various Best Management Practices. Water conservation measures from previous Water Management Plans as described below were incorporated into the CUWCC Best Management Practices.

1985 PLAN

Here is a synopsis of those first program elements:

Retrofit with low-flow showerheads

The City began a showerhead replacement program at no cost to residents. Two City employees canvassed neighborhoods offering to install the free showerheads for any resident who wanted them. This was a mildly effective campaign, but involved many man-hours.

Retrofit residences with low-flush toilets
This program aspect wasn't implemented due to budgetary constraints.

Landscape with lower water maintenance plants
Publications were made available to residents encouraging changes in landscape as well as some water conservation guidelines for outdoor water use. One of the best sources of information was the Sunset Magazine, a publication out of Menlo Park, California. Reprints of some of the best articles from this magazine were made available at City offices.

Advertisement Campaign
The City initiated an advertisement utilizing a cartoon character named "Wally" who provided tips on water conservation in and around the home. The campaign included advertisements in local papers, posters, merchant ads and public service messages promoting water conservation. Much of the advertisement campaign was used to let residents know that water conservation kits were available from City Hall.

Distribute DWR-type Water Conservation Kits
Halfway through 1987, the City shifted its' conservation focus from just showerheads to full house-plumbing retrofit kits. These kits included a showerhead, two faucet flow restrictors, a toilet tank dam, and simple

instructions on how to install each of the units.

Education program in local schools
Publication of a water conservation guide (City Ordinance No. 870) came in mid-1990. The school education program was initiated at the end of 1990.

1990 PLAN
The Urban Water Management Plan 1990 Update included the following nine program elements:

- Retrofit Kit Program
- Information and Education, Residential
- System Water Audit, Leak Detection, and Repair
- Ultra Low-Flush Toilet Ordinance, new Residential
- Lawn Watering Guides, existing Residential
- Standards for new Large Landscapes
- Xeriscaping Ordinance, new Residential
- Ultra Low-Flow Showerhead Ordinance, new Residential
- Removal of City Median Landscaping

Retrofit Kit Program
The City of Manteca continued its giveaway program, having refocused from just showerheads to complete home Retrofit Kits containing low-flow showerheads, toilet tank dams, faucet flow restrictors and dye tablets (which help determine if a resident's toilet leaks). These kits are available to any resident at any time, but specifically made available at the City of Manteca's annual Earth Day event held in April. The April event is typically two or three weeks after the beginning of the City's mandatory water conservation program so that residents are very aware of water conservation.

Information and Education, Residential
A semi-monthly newspaper column sharing water conservation tips and information with Manteca residents was also initiated as the most broadly-based, cost effective informational reach. The City of Manteca also maintains an information broadcast on the local cable channel that allows access to many homes in the City of Manteca at no-cost. At the annual Earth Day event each year, the City of Manteca's water engineer sets up a booth with displays and information to encourage water conservation in the community.

System Water Audit, Leak Detection, and Repair
In 1992 the City of Manteca's water use history was evaluated by comparing water production and water delivery numbers. It was decided that since the amount of non-accountable water was less than 8% of the total production rate, a leak detection and repair project wouldn't be necessary at that time. An audit of the water use has highlighted some areas that need to be assessed with regard to conservation, namely water use at City of Manteca parks and public facilities.

Ultra Low-Flush Toilet Ordinance, new Residential
The City of Manteca adopts each new edition of the Uniform Plumbing Code and Chapter 4, entitled Plumbing Fixtures, now addresses the requirement for low-flush toilets.

Lawn Water Guides, existing Residential
In 1992 the City of Manteca mailed lawn watering guides to all residents as part of the mandatory Water Conservation program notification. The guide was prepared by City staff utilizing several formats found in various publications. It included instructions on how to determine how much water an irrigation system was producing as well as a saturation guide based on soil types. This guide is distributed each year at Earth Day and in packets presented to school students as part of the City's education program.

Standards for new Large Landscapes and **Xeriscaping Ordinance, new Residential**
Both of these issues were addressed in 1992 through the City of Manteca's Community Development Department with their adoption of State guidelines for Xeriscape requirements and Irrigation auditing. In

August 1993 the City Council approved Zoning Ordinance Amendment No. ZOA-92-2 regarding Landscape Provisions. This amendment incorporated AB325 legislation water conservation provisions and consolidated all existing (at that time) City of Manteca zoning ordinance landscape provisions into a single section, clarified tree preservation guidelines, established landscape plan submittal criteria, and added flexibility to the tree shading provisions of the existing Zoning Ordinance. Workshops and public hearings were conducted prior to adoption so that local business and trade representatives could have input during the development of the ordinance.

Ultra Low-Flow Showerhead Ordinance, new Residential
In 1992 the State of California Energy Commission established requirements for low-flow showerhead installation for all new construction.

Removal of City Median Landscaping
In 1991 the City of Manteca began this aspect of their water conservation plan by removing all plants in the South Main Street median. The South Main Street median consists of several islands approximately 16 feet wide and a combined length of several hundred feet. Existing trees were left in place, some native trees were added to the central median strips, and the irrigation system was dramatically modified to provide drip irrigation for the trees. The balance of the median was hardscaped with stamped concrete areas and raised cobblestone areas. Some low water requirement plants were added near the base of trees to provide relief within the extensive hardscape.

1995 PLAN
Six water conservation programs are selected by the City of Manteca for evaluation as part of the City of Manteca's Urban Water Management Plan 1995 Update. These six programs are:

- Consumer Education
- Water Saving Fixtures and Appliances
- Lawn/Garden Irrigation Techniques
- System Water Audit
- Water Conservation Enforcement
- Rate Schedule Evaluation

Here is a synopsis of the six program elements:

Consumer Education
The City of Manteca participated in the annual Earth Day celebration at Library Park providing free water conservation kits for the home and literature on all aspects of water conservation. An engineering staff person is available to answer questions about the City of Manteca's water quality and water conservation program.

Classroom education is available in several different formats, depending on the grade level and the wishes of individual teachers. The City of Manteca has a portable groundwater model, which is used to demonstrate where the City's water supply comes from and how rainfall, drought and pollution affect that water supply. Children are provided with literature on effective water conservation. Various forms of hand-outs, such as coloring books, pencils, buttons, puppets and stickers, are provided as a reminder to use water wisely. Water conservation kits for the home are also handed out in the classrooms for the students to take home.

Water Saving Fixtures and Appliances
The City of Manteca has previously addressed the issue of low-flush toilets and low-flow showerheads for new construction with the adoption of the Uniform Plumbing Code and the State of California Energy Commission guidelines. In addition to this, the City will continue to provide home retrofit kits for water conservation.

Lawn and Garden Irrigation Techniques
The City of Manteca has provided consumers with articles and information on how to make alterations to their landscaping in order to reduce irrigation demands which will reduce water consumption. The landscape information has been provided through the classroom education and Earth Day participation activities in the Public Education activity.

System Water Audit
A water system audit was conducted in 1991, which established a database for future water audits. A second water audit was conducted in 1996 in order to establish a more precise water education program for the commercial and industrial sector as well as improve existing residential education. One specific area of concentration will be the City of Manteca's use of water for irrigation at park sites within the City limits.

Water Conservation Enforcement
During the mandatory Water Conservation Program each year (which begins with Daylight Savings Time and ends with reversion back to Standard Time), all City of Manteca employees provide information on various misuses of water to the Public Works Department. The Department sends out "reminder" letters to those addresses where the infractions occurred along with basic rules of the Water Conservation Program.

Water Rate Evaluation
In an effort to provide the City of Manteca with the most effective water conservation/management practices, the City's Public Works Department completed a water rate evaluation and implementation of an inclining rate structure. The new rate structure was adopted to encourage conservation and to fund the City's cost for development of the South County Surface Water Project.

Benefit to Cost Analyses
Section 10633 of the California Urban Water Management Planning Act requires a benefit-to-cost comparison of the alternative practices proposed for implementation during the next Plan phase. The City of Manteca completed those comparisons using the Department of Water Resources Water Plan software program. In the analysis technique, a ratio of the present worth of benefits to the present worth cost is computed and analyzed. A benefit-to-cost ratio greater than 1.0 is considered a cost-effective program.

Each water conservation program analyzed predicted the fiscal impact to the City, to a participant and to society as a whole as described below.

- The City's perspective examines the impact of each program on the City's revenues. A program is considered cost effective to the City if resultant water rates are at or below what water rates would be if the program were not implemented.
- The participant's perspective evaluates whether the savings in the water bill exceed the amount of money required to install and maintain a program.
- The societal perspective examines the impacts of installing and maintaining a water conservation program to society as a whole. This includes the impact to the City and to the participant.

The results of the benefit to cost analysis is provided in Table 11.

Table 11.

Benefit to Cost Analysis

Program	Society Perspective	City Perspective	Participant Perspective	Program Implementation
Retrofit Kits	6.6	0.8	3.8	Yes
Consumer Education	7	0.7	Infinite	Yes
Water Saving Fixtures	6.1	2.7	2.8	Yes
Lawn and Garden Guides	22.8	1.2	Infinite	Yes
System Audit	4.1	3.8	Infinite	Yes
Water Conservation Enforcement	8.6	0.9	2.1	Yes

1998 MEMORANDUM OF UNDERSTANDING SIGNATORY

As discussed previously the City of Manteca became a signatory to the Urban Water Management MOU in 1998. At this time the City began to implement 9 of the 14 Best Management Practices (BMPs). The BMPs implemented were :

BMP 1 – Water Survey for Single-Family and Multi-Family Residential Customers
BMP 2 – Residential Plumbing Retrofit
BMP 3 – System Water Audits, Leak Detection
BMP 4 – Metering with Commodity Rates for all New Connections and Retrofit Existing
BMP 7 – Public Information Programs
BMP 8 – School Education Programs
BMP 11 – Conservation Pricing
BMP 12 – Conservation Coordinator
BMP 13 – Water Waste Prohibition

The City has since implemented BMP 6 High Efficiency Washing Machines Rebates, and plans to implement BMP 5 – Large Landscape Conservation Programs and Incentives, and BMP 14 Residential ULFT Replacement Programs in 2006.

Water Shortage Contingency Plan

Preparation for Catastrophic Water Supply Interruption

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 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.

Water Shortage Emergency Response

The City has a Water System Disaster Response Plan. The plan identifies responsible City personnel for implementation of the plan in an emergency, contacts for the State of California Department of Health Services and San Joaquin County Department of Health Services. The plan identifies City resources that can be used in during a disaster caused water shortage.

Regional power outages and earthquakes are the most likely disaster conditions that would effect the City. Power outages have the potential to disrupt communications, and groundwater pumping operations. Earthquakes can also disrupt power, damage communication systems, water distribution piping and wells. Contamination of the City's groundwater wells is not likely to occur rapidly and would therefore not cause an immediate water shortage, but contamination of the water distribution system or storage tank could immediately disrupt the water supply.

The City has several communication networks that can be used during a disaster, which include radio communications, and wireless communications systems. The Police Department, City offices, and fire department communication centers, and the City wastewater treatment plant also have standby power generators, which can provide power to the communication systems. The alternative communication systems and standby power capability at critical City facilities provides the City with a robust communication system and the ability to operate for prolonged periods of time without power. Twelve of the City wells have standby power generators that start automatically with a loss of power. Standby power will be installed at one additional well in 2006.

The City well capacity is sufficient to maintain the maximum day demand should there be a loss of surface water due to power outage or other catastrophic surface water supply interruption.

Emergency procedures and service restoration procedures are included in the disaster response plan. During an emergency, such as a major line break or natural disaster that damages the water system, the City would identify visible damage to the distribution system and wells, and evaluate the possibility of system contamination. Severely damaged and leaking pipe segments would be isolated for repair. Undamaged wells would be returned to service. Wells with standby power would be given priority in the inspection and restarted if power is disrupted either locally or regionally. The water lines would be inspected for hidden leaks and hidden damage as system pressure is restored. If necessary to maintain pressure for fire fighting purposes, these damaged pipe segments would also be isolated. Notification would be given to regulatory authorities if contamination is suspected and appropriate notification issued

to the public by radio, newspaper, or letter as needed. In the case of a severe disaster that disrupts normal notification methods, City employees would issue house to house notification.

The City has not established a formal mutual aid agreement with other local cities or agencies, and is not a member of the Water Agency Response Network (WARN). The City will consider participation in WARN.

The City has not developed an alternative water supply and emergency water distribution plan for a catastrophic event that renders the existing water system inoperable. There are alternative supplies, such as the San Joaquin and Stanislaus Rivers as well as shallow irrigation wells in the City that could be used as an emergency supply. The City does not have any surface water rights to San Joaquin or the Stanislaus River water, which would limit the ability of the City to utilize these sources except in an extreme emergency. The City plans to develop an alternative water supply plan that will include alternative water sources, treatment requirements, a distribution plan and identification of available and additional resources needed to implement the plan.

The following items will also be addressed as part of the alternative and emergency water distribution plan.

- Conditions and requirements to declare a water shortage
- Funding sources to cover additional costs during a water shortage
- Identify support agencies for water shortages
- Develop an emergency response team
- Identify an emergence response coordinator
- Prepare a public notification plan

Supplemental Water Supplies

There are no supplemental water supplies available to offset future potential water shortages due to drought or disaster.

Water Transfers

As discussed previously, water transfers are not possible at present. With the development South County Surface Water Project water transfers may be feasible in wet years. While water transfers to the City are possible the surface water treatment plant capacity would limit the City's ability to make use of the water. Water transfers during dry years are unlikely.

Long Term Additional Water Supply Options

To meet future long-term water demand the City is participating in the South County Surface Water Supply project, which provides 53 percent of the City's future water demand. Approximately 20 new wells may need to be developed within the City to provide additional water in the future. With surface water, groundwater withdrawals will be reduced from the present 2.4 acre feet per year per acre to the recommended safer aquifer yield of 1.0 acre foot per year per acre.

Water Shortage Contingency Ordinance/Resolution

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 10632 (h) A draft water shortage contingency resolution or ordinance.

City of Manteca Water Use Ordinance

The City of Manteca adopted an emergency water conservation ordinance in June of 1990 for the period from July 1, 1990 through October 1, 1990; the City then adopted a mandatory Water Conservation ordinance in 1991 that restricts various types of water uses between July 1 and October 1. Penalties for violation of the water use restriction were also established in the ordinance. In January 1995, the ordinance was amended to expand the time frame of mandatory water conservation (Ordinance No. 986). The revised water conservation "season" coincides with Daylight Saving Time each year. Every residence and business within the City limits receives notification in late March outlining the requirements of mandatory water conservation.

The ordinance does not contain provisions for restricting water use during water shortages. Should a severe water shortage occur as a result of a prolonged drought or other disaster, the City would need to adopt an emergency ordinance to restrict water use as needed.

A draft ordinance for adoption during a water shortage is included in Appendix F.

Charges for Excessive Use

The City of Manteca has a fixed monthly charge plus an inclining block rate water use charge to encourage water conservation. The water rate charges are listed in the City of Manteca Muncipal Code (Code 13.04.060). The water rate structure is summarized in Table 12. The Water Rates are adjusted annually to reflect current cost of water production and treatment.

Table 12.

City of Manteca Water Rate Schedule
For Year 2005

Meter Size	Fixed Monthly Charge	Block 1 @ $0.64 per Hcf	Block 2 @ $0.84 per Hcf	Block 3 @ $1.69 Per Hcf
5/8" x3/4"	13.55	20 Hcf	21 to 300 Hcf	Above 300 Hcf
1"	20.95	30 Hcf	31 to 300 Hcf	Above 300 Hcf
1-1/2"	39.25	60 Hcf	61 t0 300 Hcf	Above 300 Hcf
2"	61.35	90 Hcf	91 to 300 Hcf	Above 300 Hcf
3"	112.95	180 Hcf	181 to 300 Hcf	Above 300 Hcf
4"	186.65	280 Hcf	281 to 300 Hcf	Above 300 Hcf
6"	370.70	340 Hcf	--	Above 300 Hcf
8"	591.65	520 Hcf	--	Above 300 Hcf

To date, the water use charges, and the mandatory and voluntary conservation program has succeeded in reducing water usage so that the City of Manteca has not had to adopt more stringent restriction regulations.

Stages of Action

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 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.

Rationing Stages and Reduction Goals

The City would adopt a staged rationing plan to invoke during declared water shortages. The proposed rationing plan is presented in Table 13. The existing City water conservation ordinance is in effect during daylight savings each year regardless of the water shortage condition. The water conservation ordinance encompasses much of the water reductions of a Stage I or II goal. The implementation of a Stage III or IV goal would involve more restrictive use of water, such as limiting water use for landscape irrigation on both public and private property. More restrictive water use limits and mandatory reductions for a Stage II, III or IV water reduction goal would require action by the City Council to implement.

Table 13.
Water Rationing Stages and Reduction Goals

Shortage Condition	Stage	Customer Reduction Goal	Type of Rationing Program
Up to 10%	I	10%	Voluntary
10 – 20%	II	20%	Mandatory
20 - 35%	III	35%	Mandatory
35 - 50%	IV	50% or >	Mandatory

Priority by Use

Priorities for use of available potable water during shortages were based on legal requirements set forth in the California Water Code, Sections 350-358. Water allocations are established for all customers according to the following ranking system:

- Minimum health and safety allocations for interior residential needs (includes single family, multi-family, hospitals and convalescent facilities, retirement and mobile home communities, and student housing, and fire fighting and public safety)
- Commercial, industrial, institutional/governmental operations (where water is used for manufacturing and for minimum health and safety allocations for employees and visitors), to maintain jobs and economic base of the community (not for landscape uses)
- Existing landscaping
- New customers, proposed projects without permits when shortage declared.

Health and Safety Requirements

Based on commonly accepted estimates of interior residential water use in the United States, Table 14 indicates per capita health and safety water requirements. In Stage I shortages, customers may adjust either interior or outdoor water use (or both), in order to meet the voluntary water reduction goal. Under Stage ll shortages, the mandatory outside water use restriction, combined with interior water use conservation will help meet water reduction requirements.

Under Stage III and Stage IV a more stringent water rationing and water use program would be required. To meet the Stage III conservation requirements the City would limit outdoor water uses and landscape irrigation and would consider a ration allotment of 68 gpcd (which translates to 33 hundred cubic feet per person per year), based on Table 14 Per Capita Health and Safety Water Quantity calculation for non-conserving fixtures without habit or plumbing fixture changes. If customers wish to change water use habits or plumbing fixtures, 68 gpcd could provide a limited amount of water for non-essential (i.e. outdoor) uses.

Stage IV mandatory rationing, which is likely to be declared only as the result of a prolonged water shortage or as a result of a disaster, would require that customers to eliminate outdoor water uses and make changes in their interior water use habits (for instance, not flushing toilets unless “necessary” or taking less frequent and shorter showers)

Table 14.

Per Capita Health and Safety Water Quantity Calculations

	Non-Conserving Fixtures		**Habit Changes** 1		**Conserving Fixtures** 2	
Toilets	5 flushes x 5.5 gpf	27.5	3 flushes x 5.5 gpf	16.5	5 flushes x 1.6 gpf	8.0
Shower	5 min x 4.0 gpm	20.0	4 min x 3.0 gpm	12.0	5 min x 2.0	10.0
Washer	12.5 gpcd	12.5	11.5 gpcd	11.5	11.5 gpcd	11.5
Kitchen	4 gpcd	4.0	4 gpcd	4.0	4 gpcd	4.0
Other	4 gpcd	4.0	4 gpcd	4.0	4 gpcd	4.0
Total (gpcd)		68.0		48.0		37.5
HCF per capita per year		33.0		23.0		18.0

1 Reduced shower use results from shorter and reduced flow. Reduced washer use results from fuller loads.
2 Fixtures include ULF 1.6 gpf toilets, 2.0 gpm showerheads and water efficient clothes washers.

Water Shortage Stages and Triggering Mechanisms

The City must provide the minimum health and safety water needs of the community at all times. The water shortage response is designed to provide a minimum of 50% of normal supply during a severe or extended water shortage. The rationing program triggering levels shown in Table 14 were established to ensure that this goal is met.

Rationing stages may be triggered by groundwater or surface water supply shortages. Groundwater shortages caused by depletion of the groundwater, by the loss of one or more wells by failure of either the well or mechanical equipment, or by well contamination. Surface water shortages may be caused by failures at the treatment plant or water transmission line, drought, water contamination, or power failure.

Table 15. Water Shortage Stages and Triggering Mechanisms				
Percent Reduction of Supply	**Stage I Up to 10%**	**Stage II 10 – 20%**	**Stage III 20 - 35%**	**Stage IV 35 - 50% >**
Water Supply Condition				
Current Supply	Total supply is 90% of "normal." Or	Total supply is 80 – 90% of "normal." Or	Total supply is 65 – 80% of "normal." Or	Total supply is less than 65% of "normal." Or
Future Supply	Projected supply insufficient to provide 90% of "normal" deliveries for the next two years. Or	Projected supply insufficient to provide 80% of "normal" deliveries for the next two years. Or	Projected supply insufficient to provide 65% of "normal" deliveries for the next two years. Or	Projected supply insufficient to provide 50% of "normal" deliveries for the next two years. Or
Water Quality	Contamination of 10% of water supply (exceeds primary drinking water standards)	Contamination of 20% of water supply (exceeds primary drinking water standards)	Contamination of 30% of water supply (exceeds primary drinking water standards)	Or
Disaster Loss				Disaster Loss

Water Reductions

Comparison of historical water usage with water shortage stages indicates the City has an adequate supply during the winter, spring and fall. Peak water demand would exceed the water system peak capacity during the months of June through October. The severity of the peak shortage and months in effect depend on the water shortage stage. The total water demand is mostly residential and ranges between 75 and 77 percent of the annual demand. Comparison of the winter and summer demands indicate that landscape irrigation is the major water use during the summer.

Table 16 presents the City established reductions for each customer type during the summer months when peak capacity shortage would occur. The reductions are based on winter and summer water demands. The winter demand provides a basis for minimum essential supply (non-irrigation use) for all customers. For residential customers the winter and summer per capita demand are considered to define the required reduction. For other customer types, total winter and summer use are used to define the required reductions, with winter use defining the minimum essential use. The percent reductions shown in Table 16 would be applied during the City's peak water demand period of June through October. Application of the water reductions provides water in excess of the winter water usage for all customer groups and maintains an additional 2000 gpm reserve capacity based on maximum day capacity (70% of well capacity). The reductions are for landscape irrigation and other outdoor water use and have minimal impact on indoor water use. Differences in the total reduction achieved and supply shortage for Stages I, II and III are made up from the system's excess capacity. Appendix E provides a breakdown of the water reductions presented in Table 16.

Table 16.

Customer Water Reductions During Water Shortage

Customer	Stage 1 Reduction, %	Stage 2 Reduction, %	Stage 3 Reduction, %	Stage 4 Reduction, %
Residential	5	15	35	55
Markets	--	--	5	10
Hotels/Motels	--	10	20	20
Trailer Parks	5	10	30	50
Rooming Houses	5	10	20	20
Professional Offices	--	10	25	35
Retail Stores	--	10	20	30
Car Wash	--	--	5	10
Service Stations	--	--	5	10
Restaurants	--	--	5	10
Schools	--	10	15	30
Hospitals	--	--	10	15
Churches	--	--	10	20
Institutions/ Non-Profit	--	--	5	20
Industrial	--	--	5	10
City Landscape and Parks	--	15	35	60
Total Reduction	4	14	33	52

Any customer may appeal the classification on the basis of use or the allotment on the basis of incorrect calculation.

Prohibitions, Consumption Reduction Methods and Penalties

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 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.

Mandatory Prohibitions on Water Wasting

The City Ordinance includes provisions on Unlawful Water Use, which include specific types of water use as well as water waste. The Unlawful Water Use provisions are in effect during Daylight Savings and include prohibitions and limitations for the following types of water use. The Unlawful Water Use provisions are included in Appendix F.

- Washing of nonlandscaped exterior ground surfaces,
- Watering landscape, exterior building washing, or swimming pool filling on Tuesday, Thursday and Saturday for odd-number addresses, or on Monday, Wednesday and Friday for even-number

addresses, or at any location between noon and 6 p.m. on any day; with exceptions for newly planted landscaping, the city golf course and city parks.

- Taking of water from any fire hydrant except by fire protection agencies, or for construction purposes by permit from the public works department.
- Allowing the escape of water through leaks, breaks or malfunction in plumbing or distribution system for more than 24-hours after discovery or notification of discovery.
- Washing of automobiles or boats; except at a commercial car wash, or by use of a quick-acting positive shut-off nozzle on the hose, or with bucket and sponge.
- No serving of water by restaurants except upon request of a customer.
- Watering which causes water to flow into a gutter or other drainage area for a period exceeding five minutes.

More restrictive water use limits that can be inacted to reduce water demand and include further reduction in landscape water use such as once a week watering, no vehicle washing, and the reduction or elimination of park irrigation.

No 'cut-off' number has been adopted for maximum allowable consumption but the City of Manteca implemented an increasing block schedule for all customer types to encourage water conservation and penalties for unlawful water uses defined in the City Ordinance. Table 17 lists consumption reductions methods the City would use during water short stages.

Table 17.

Consumption Reduction Methods

Examples of Consumption Reduction Methods	Stage When Method Takes Effect
Demand reduction program	All stages
Reduce pressure in water lines	--
Flow restriction	--
Restrict building permits	Stage IV
Restrict for only priority uses	--
Use prohibitions	All stages
Water shortage pricing	--
Per capita allotment by customer type	--
Plumbing fixture replacement	--
Voluntary rationing	All stages
Mandatory rationing	Stage II, III and IV
Cost incentives to reduce water consumption	All Stages
Education Program	All Stages
Percentage reduction by customer type	All Stages
Penalties for unlawful water use	All Stages

The Unlawful Water Use provisions of the City Ordinance are in effect for only part of the year but could be applied during any water short period if necessary by action of the City Council. Additional water conservation methods not included in the Unlawful Water Use Ordinance could also be implemented during a water shortage by action of the City Council.

Excessive Use Penalties

Any customer violating the regulations and restrictions on water use set forth in the City Ordinance receives a written notice for the first such violation. A second violation, is an infraction of the City Ordinance, and is punishable by a fine of fifty dollars ($50.00). A third violation is an infraction of the City Ordinance and is punishable by one hundred dollar fine ($100.00). Any subsequent violation is a misdemeanor and is punishable by a fine of one thousand dollars ($1,000.00), or by imprisonment in the county jail for a period not to exceed six months, or by both a fine and imprisonment.

Penalties for not reducing water use during a declared water shortage stage could be implemented by action of the City Council.

Revenue and Expenditure Impacts and Measures to Overcome Impacts

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 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 of the urban water supplier and [An analysis of the impacts of each of the] proposed measures to overcome those [revenue and expenditure] impacts, such as the development of reserves and rate adjustments.

In 1996, the City initiated a water service rate study to evaluate the current City rate and recommend a new rate structure as necessary to cover the future cost of supplying water to City customers. The result of the study was the adoption of an inclining block rate for all City water customers. The rate structure included a fixed cost component for the fixed cost component of the water supply, and three use rate blocks for the variable cost of water supply. The rate study included costs for City participation in the South County Surface Water Supply project as well as cost of providing water from the City groundwater wells and funding cash reserves and capital replacements. The rate study also included recommendations for increasing the fixed and variable cost of water over a five year period (through the 2002 fiscal year) to account for inflation, and other system cost increases. The recommended rate increases also provide a gradual transition from the low cost groundwater supply to the more costly combined surface water and groundwater supply.

In 2002, the City conducted another rate study to update the water rates and water development fees. Based on the findings of the study water rates and development fees were developed and adopted the five year period between 2003 and 2007. The existing rate structure and fee structures were retained. The adopted rates include provisions for construction of arsenic treatment facilities as well as retaining the rate increase structure to pay for surface water and fund reserves. Reserves established in the 2002 rate study included an operating reserve equal to 33 percent of the annual operating budget and a rate stabilization reserve. The operating reserve requirement is estimated to reach $2,744,000 by 2007. The rate stabilization reserve is $1,500,000.

As there is a fixed fee component in the water rate structure to cover fixed costs, reductions in water use will not adversely affect the financial stability of the water enterprise. Reserve requirements were developed to build and maintain reserves for capital improvements and short term operating expenses. An operating reserve fund and rate stabilization reserve were established

The 2002 water rate study also evaluated the effect of different growth rates on the ability of the water enterprise to meet financial obligations. It was found that only in a zero growth condition would the City need to increase water rates above the scheduled rate increases at the end of the rate study's five year

planning period.

Reduction Measuring Mechanism

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Mechanism to Determine Reductions in Water Use

All of the City groundwater wells are metered and well operations are monitored and recorded by the City's SCADA system. Water production reports can be generated to track reductions in use that may result from water conservation programs implemented by the City. In addition, all City provided water services are metered, which allows tracking of individual customer water use. Typically, the customer water meters are read monthly, but during a water shortage more frequent readings could be taken if necessary to identify excessive water use and monitor customer water reductions. The City has implemented an automated meter reading system and is gradually converting all services to the automated meter reading system. Automated meter reading will facilitate a more frequent meter reading schedule if necessary.

Water Recycling

Wastewater System Description

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area…

Wastewater Collection and Treatment in Manteca

The City of Manteca treats all the wastewater produced in the City at the City of Manteca Wastewater Quality Control Facility (WQCF). The WQCF also treats a portion of wastewater from the City of Lathrop. An agreement between the City of Manteca and the City of Lathrop makes 14.7% of the plant capacity available to Lathrop. The City maintains and operates the WQCF and its wastewater collection system. Lathrop maintains its wastewater collection system as well as its own wastewater treatment plant.

Wastewater Treatment Processes

A schematic diagram showing wastewater treatment is included in Appendix G. The current wastewater treatment processes at the WQCF includes the following:

1) Primary Sedimentation
2) Roughing Filter
3) Activated Sludge
4) Chlorination/Dechlorination
5) Wastewater Disposal

The WQCF expansion for denitrification of the wastewater was recently completed. Additional treatment processes for tertiary filtration and ultra-violet disinfection are scheduled for completion in 2007.

Wastewater Generation, Collection & Treatment

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A […] quantification of the amount of wastewater collected and treated…

Wastewater Quality Control Facility

The WQCF was constructed in 1971 and has undergone two upgrade/expansions. The original WQCF was a contact stablization activated sludge plant. The WQCF was first upgraded and expanded in 1987 with biofiltration and conventional activated sludge process. The 1987 upgrade/expansion provided a treatment capacity of 5.45 mgd. The second expansion was in 1992 and increased the capacity of WQCF to 6.95 mgd. A third expansion was completed in 2005 and increased the capacity to 9.87 mgd. Table 18 summarizes the WQCF wastewater flows for the existing wastewater treatment plant in the 2000 and at planned buildout.

The treatment system is designed to provide disinfection to 23-mpn/100 ml. There are two methods of wastewater disposal available, discharge to the San Joaquin River and land disposal. Wastewater discharged to the San Joaquin River must be dechlorinated before discharge. From April through September a portion of the treated wastewater is discharged to land. The remainder of the treated wastewater is discharged to the San Joaquin River. All of the treated effluent is discharged to the San Joaquin River from October through March.

Tertiary filtration, solids handling and ultra violet disinfection facilities will added as part of the current WQCF expansion and are scheduled for completion in 2007. The tertiary filtration is required for continued discharge to the San Joaquin River and the ultra violet disinfection to eliminate chlorination of the effluent and reduce disinfection by product production. These facilities lend themselves to the development of reclaimed water within Manteca.

Table 18.

Wastewater Treatment

Treatment Plant Name	Location	Average Daily (1) (2003)	Maximum Daily (2003)	Year of Planned Buildout	Planned Average Daily Volume(2)	Planned Maximum Daily Volume(2)
WQCF	City of Manteca	5.81 MGD	7.86 MGD	2030+	27.0 MGD	36.7 MGD

1. 4.8 mgd from Manteca and 1.0 mgd from Lathrop
2. 14.7 % of the daily volume is allocated to the City of Lathrop

Wastewater Disposal and Recycled Water Uses

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the […] methods of wastewater disposal.
>
> 10633 (b) A description of 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) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

Current Recycled Water Use

A portion of the treated water is used to irrigate fodder crops grown on land adjacent to the WQCF. The use of treated wastewater for fodder irrigation is done to reduce wastewater discharge to the San Joaquin River during critical periods of the year (April through September) and can be considered a recycled water use. The water is applied at hydraulic-agronomic rates to prevent degradation of the groundwater. There is no other recycled water use in the City of Manteca. Table 19 presents a summary of the projected wastewater disposal and recycled water use.

Table 19.

Wastewater Disposal and Recycled Water Use

Destination	Treatment Level	Time of use	2005	2010	2015	2020	2025	2030
San Joaquin River	Denitrified Secondary	All year	6,030	11,019	15,685	19,780	24,530	27,080
Recycled	Tertiary filtration and Disinfection to 2.2 mpn	All year	--	161	645	1,700	2,100	2,300
Agriculture	Secondary or better	April – Sept.	870	870	870	870	870	870
Total			6,900	12050	17200	22350	27,500	30250
Units of Measure: Acre-feet								

Potential Uses of Recycled Water

The City evaluated the potential uses and demand for recycled water for urban landscape irrigation as part of the WQCF expansion project. Large irrigation users such as parks, schools, golf courses, and cemeteries were identified throughout the City as potential customers. A total of 94 potential sites were identified with a net irrigated area of 711 acres at buildout. The estimated annual irrigation requirement for the identified sites is 3,677 acre-feet.

The peak hour demand for landscape irrigation was estimated at 15,000 gpm based on seasonal requirements and application schedules at sites with public access. Storage facilities, pumps and pipeline to provide the peak demand requirements will need to be constructed. In addition to the distribution requirements, tertiary treatment, and additional disinfection facilities are required to meet Department of Health Services requirements for unrestricted landscape irrigation.

With the construction of the tertiary filtration system the potential use of reclaimed water increased significantly. Two projects are currently planned for reclaimed water, a water truck fill station for construction site dust control and irrigation at a softball playing field. Additional projects for golf course irrigation and other landscape irrigation are anticipated. The use of reclaimed water is incorporated into the water supply planning of this Urban Water Management Plan. It is anticipated that reclaimed water use for various landscape uses will reach 2,300 acre-feet per year by 2030.

Encouraging Recycled Water Use

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (e) A description of 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) 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 and to promote recirculating uses.

The City Wastewater Quality Control Master Plan Update of 2005 includes plans to provide recycled water for landscape irrigation. Current water supply planning includes use of recycled water for irrigation at new softball playing fields. Suitably treated wastewater for recycle water use will not be available until 2007 and then only to a limited area in the vicinity of the WQCF. Recycled water distribution lines will be constructed in stages through 2030 to supply recycled water to greater areas within the City. As recycled water is not currently available and there are no immediate plans to construct distribution lines there are no policies to encourage recycled water use at present. Currently planned recycled water uses for dust control at construction sites and irrigation of softball playing fields avoid meter fees and water use charges required for potable water use.

APPENDIX A

PLAN REVIEW LIST AND COMMENTS

2005 Urban Water Management Plan
Public Comments and Questions

Meeting and Hearing

No comments were received at the public meeting and hearing.

Review Draft Urban Water Management Plan

No public comments or questions received.

2005 Urban Water Management Plan
Agency/City Review Comments and Questions

City of Lathrop

Comments and questions from the City of Lathrop were received. The comments and questions are addressed below and where appropriate included in the text of the report. The City of Lathrop response letter follows.

1. Lathrop comment on saline boundary.

   Amended text in report to indicate saline boundary is within the City of Lathrop. The 500 part per million (ppm) boundary is located approximately along the western Southern Pacific Railroad tracks in Lathrop.

2. Lathrop comment on need for connection between Lathrop and Manteca for use during a water emergency or catastrophic event.

3. Comment on water demand exceeding supply by 2030.

   The 2005 Urban Water Management Plan utilizes the Primary Urban Service Area (PUSA) as the limit for the City of Manteca development and is approximately 13,790 acres. This limits the future development and extraction of groundwater in Manteca to the 13,790 acre feet per acre per year. The PUSA was established in the City of Manteca 2003 General Plan and sets a limit on land eligible for annexation and urban development by the City of Manteca. The established PUSA area limit is in effect through 2013, or unless the General Plan is amended to increase the PUSA. After 2013 land within the Secondary Urban Service Area is eligible for annexation and urban development upon its inclusion in the Primary Urban Service Area.

   The 2005 Urban Water Management Plan and the Water Master Plan consider only development with the PUSA, which will limit amount of groundwater available to the City of Manteca. In actuality, expansion of the PUSA may be required to reach the population projected in the 2005 Urban Water Management Plan, which is close to the upper limit of the 2003 General Plan population projection. Expansion of the PUSA would increase the amount of groundwater available to the City of Manteca.

   The supply demand projection also does not consider reduction in water demand due to conservation or increased use of recycled water. These are conservative assumption used in the 2005 Urban Water Management Plan. Water demand reductions through conservation or increased use of recycled water may provide additional water and result in the supply exceeding the demand in 2030.

4. Comment on Single Dry Year water demand in 2005 exceeding supply.

The expected reductions in surface water supply for a single dry year and limiting groundwater extraction to the safe aquifer yield of 1 acre foot per acre per year result in demand exceeding available supply. This is a worst case scenario on the water supply and indicates the level of conservation that would be required to lower demand to the available supply. A demand reduction of approximately 6 percent would be required to balance the water supply and demand. A demand reduction of 6 percent is considered achievable with the existing water conservation planning.

5. Comment on water supply provided by additional wells and effect on saline intrusion.

   An important consideration in the City of Manteca's participation in the South County Water Supply Project is limit groundwater extraction to the safe aquifer yield of 1 acre foot per year per acre. Groundwater modeling conducted for the South County Water Supply Project indicates this will help stabilize the groundwater levels in the Manteca area and reduce the potential for saline intrusion. Further saline intrusion into the Lathrop and Manteca aquifer is a serious concern to the City of Manteca. Additional information on groundwater conditions within Lathrop and Manteca provided by the Source Groups groundwater modeling would be helpful in planning our groundwater management.

6. Question on future Water Quality Control Facility capacity inclusion for Lathrop.

   The 36.7 mgd maximum daily volume in Table 18 includes a 14.7 percent contribution from Lathrop.

<u>South San Joaquin Irrigation District</u>

1. Comment on surface water supply and minimum flow in 1977 drought.

   The New Melones inflow information was taken from the South County Water Supply Project Environment Impact Report. We will investigate the difference in the reported New Melones inflow and if necessary amend the 2005 Urban Water Supply Plan.

2. Comment on Supply Reliability and availability limited to natural flow.

   Comment on SSJID limit on water supply during dry years noted and included in report text.

3. Comment on conversion of agricultural land to urban uses on groundwater recharge.

   Comment noted and included in report text that loss of agricultural land can reduce groundwater recharge from agricultural irrigation.

4. Comment on surface water quality and blended water quality.

Surface water quality to be included. Blended water quality will also be added but it should be understood that customers do not receive a blended water throughout the system. Some customers receive only surface water, some only groundwater, and some a mix of groundwater and surface water. Planned use of surface to meet new arsenic maximum contaminant levels may result in a more fully blended water delivered to customers in some areas of the City.

5. Comment on conversion of agricultural land to urban use decreases groundwater recharge.

   Comment on reduced groundwater recharge included in text.

6. Comment on SSJID use of agricultural wells in areas with urban development.

   Comment noted. City will need to coordinate future well development with SSJID in agricultural areas and identify potential conflicts between agricultural well and urban wells.

City of Lathrop

Department of Public Works
We are building a City!

390 Towne Centre Drive, Lathrop, CA 95330
Phone (209) 941-7430 – fax (209) 941-7449
www.ci.lathrop.ca.us

January 10, 2006

Keith Conarroe
City of Manteca
1001 W. Center Street
Manteca, CA 95337

RE: City of Manteca 2005 Urban Water Management Plan Review Comments

Dear Mr. Conarroe;

We have reviewed the draft 2005 Urban Water Management Plan for the City of Manteca and have the following comments:

1) p.16; The extent of the saline intrusion, or the 500 ppm TDS 'front' is actually located within the City of Lathrop instead of west of Lathrop as indicated. The approximate location of the 500 ppm TDS front is along the former SPRR (western) railroad tracks in Lathrop. This issue is of serious concern to the City of Lathrop, and additional monitoring and modeling studies are needed to better understand the potential migration of high TDS into the City of Lathrop's (and/or Manteca's) wellfields resulting from lowering the water table due to historic and planned groundwater pumping within the basin. A groundwater management plan may ultimately need to be developed between the City's of Lathrop and Manteca and/or possibly coordinated through the Northeastern San Joaquin County Groundwater Banking Authority as part of the Eastern San Joaquin Groundwater Basin Groundwater Management Plan to mitigate this issue.

2) p.19; Although it is true that there are currently no plans to connect the water systems of Lathrop and Manteca, an emergency connection may prove to be useful during an emergency or catastrophic event and/or to provide water transfers through mutual agreement(s).

3) p. 26; Table 9 indicates that the water demand is projected to exceed the water supply in 2030 by 1,145 ac-ft/yr. An explanation should be provided on why this is so, and how it will be mitigated.

4) p.27; Table 10 indicates that the water demand will exceed the water supply during the Single Dry Water Year 2005 by 927 ac-ft/yr. An explanation should be provided on why this is so, and how it will be mitigated.

5) p.34; Addition of 20 more wells may not actually provide additional supply due to pumping limitations to prevent overdraft. The additional wells would likely only operate at a small percentage of their pumping capacity and would actually only be utilized for meeting peak demand. The Source Group, Inc., (SGI) has performed a groundwater study for the City of Lathrop which indicated that increased groundwater pumping by Manteca and Lathrop would likely cause groundwater degradation by drawing high TDS into the well field, and that a groundwater management plan was needed to optimize groundwater production and minimize groundwater quality degradation. The SGI study should be updated to include these additional wells in their hydraulic model and analysis of pumping alternatives. Typos in units were noted in last paragraph (gallons per acre should be ac-ft/ac/yr).

6) p.44; Does the 36.7 MGD buildout capacity for the WQCF include 14.7% capacity for Lathrop?

Other miscellaneous minor typos were noted in the report; a copy of our red-line comments is provided for your review.

Should you have any questions or concerns please contact Greg Gibson the staff engineer directly involved with this project at (209) 941-7442.

Sincerely,

Cary Keaten
Director of Public Works

Eclosure: City of Manteca 2005 Urban Water Management Plan
Draft Red-line Comments

Copy: Pam Carder, City Manager
Yvonne Quiring, Assistant City Manager
Lynn Garcia, Deputy Director of Public Works-Operations
Greg Gibson, Associate Engineer

SOUTH
SAN JOAQUIN
IRRIGATION DISTRICT

December 22, 2005

Keith Connaroe
101 W. Center Street
Manteca, California 95337

RE: Manteca Urban Water Management Plan – 2005 Update

Dear Keith:

Thank you for providing South San Joaquin Irrigation District (SSJID) with an opportunity to offer the following comment on your 2005 UWMP update:

1. Pg. 16, Surface Water. Many hydrologic models seem to state the 1977 hydrology as you do in your letter. Actually, the 1977 hydrology was less than 130,000 acre-feet. The lowest theoretical inflow to New Melones going back to 1922 would have been about 129,300 acre-feet in 1977. While the formula indicates SSJID's share would have been 143,100 acre-feet, this assumes the extra water would be in storage. The project's share would likely be less in the repeat of such a year as the District can only legally supply it with natural flow.
2. Pg. 17-18, Reliability Comparison. While your characterization of the effect of the 1988 Agreement on the District's water supply is largely correct, the use of the supply has to be considered in light of the District's water rights. The South County Water Supply Project is supplied from natural flow under the District's pre-1914 water rights. Therefore, contrary to the statement on Pg. 18, the District cannot legally supply the Project with extra water from previous years' conservation in years where the supply is less than 300,000 acre-feet, because the Project is supplied with natural flow.
3. Pg. 17, Plans to Assure a Reliable Water Supply. Conversion of ag land irrigated with surface water to urban uses will decrease the rate of groundwater recharge, especially in the area south of the Hwy 120 Bypass.
4. Pg. 20-21, Water Quality. Since you are planning to use surface water for 53% of your supply (average annual basis), it may be advisable to include surface water quality information in addition to the groundwater quality information provided. Blended quality information would be easy to calculate.
5. Pg. 25, Agricultural Sector. Conversion of ag land irrigated with surface water to urban uses will decrease the rate of groundwater recharge, especially in the area south of the Hwy 120 Bypass.
6. Since SSJID uses wells to control groundwater level <u>and</u> to meet some ag supply needs, there may be conflicts between ag wells and urban wells. Urban development around one of our ag wells will not eliminate the need for our well until all ag land served by the well has been developed.

Again, we appreciate the opportunity to comment on your update. Please let me know if you have any questions.

Sincerely,

Stevan M. Stroud
General Manager

P. O. Box 747, Ripon, CA 95366-0747 • Phone 209/249-4600 • FAX 209/249-4640

APPENDIX B

2005 Urban Water Management Plan
Resolution of Adoption

RESOLUTION NO. R2005-560

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MANTECA APPROVING THE 2005 URBAN WATER MANAGEMENT PLAN

RESOLVED, that the City Council of the City of Manteca hereby approves the 2005 Urban Water Management Plan and authorizes sending it to the State of California Department of Water Reserve as required by California Water Code Division 6, Part 2.6 (Urban Water Management Planning).

DATED: December 19, 2005

ROLL CALL:

AYES: Councilmembers DeBrum, Harris, Hernandez, Snyder and Weatherford

NOES: None

ABSENT: None

ABSTAIN: None

WILLIE W. WEATHERFORD
MAYOR

ATTEST:

JOANN TILTON, MMC
CITY CLERK

APPENDIX C

WATER SUPPLY SCENARIOS

APPENDIX C

Future Water Supply
Scenarios for Normal and Dry Years

		Average Year Water Production		Single Dry Year (5% Reduction)		Multiple Dry Year (10 Percent Reduction)	
Year	Population	AF	per capita gpd	AF	per capita gpd	AF	per capita gpd
2000	49,258	12,609	229	11,974	217	11,312	205
2001	51,920	12,974	223	12,156	209	11,923	205
2002	54,975	13,516	219	13,117	213	12,440	202
2003	57,485	14,451	224	13,716	213	13,008	202
2004	59,439	14,933	224	14,183	213	13,450	202
2005	61,460	15,491	225	14,734	214	13,907	202
2006	63,550	16,018	225	15,235	214	14,380	202
2007	65,711	16,562	225	15,753	214	14,869	202
2008	67,945	17,125	225	16,288	214	15,375	202
2009	70,255	17,708	225	16,842	214	15,898	202
2010	72,644	18,310	225	17,415	214	16,438	202
2011	75,114	18,932	225	18,007	214	16,997	202
2012	77,668	19,576	225	18,619	214	17,575	202
2013	80,308	20,242	225	19,252	214	18,172	202
2014	83,039	20,930	225	19,907	214	18,790	202
2015	85,862	21,641	225	20,583	214	19,429	202
2016	88,781	22,377	225	21,283	214	20,090	202
2017	91,800	23,138	225	22,007	214	20,773	202
2018	94,921	23,925	225	22,755	214	21,479	202
2019	98,148	24,738	225	23,529	214	22,209	202
2020	101,485	25,579	225	24,329	214	22,964	202
2021	104,936	26,449	225	25,156	214	23,745	202
2022	108,504	27,348	225	26,011	214	24,553	202
2023	112,193	28,278	225	26,896	214	25,388	202
2024	116,007	29,240	225	27,810	214	26,251	202
2025	119,952	30,234	225	28,756	214	27,143	202
2026	124,030	31,262	225	29,733	214	28,066	202
2027	128,247	32,290	225	30,744	214	29,020	202
2028	132,607	32,290	217	31,789	214	30,007	202
2029	137,116	32,290	210	32,870	214	31,027	202
2030	141,778	32,290	203	33,988	214	32,082	202

New water supply added to maintain normal per capita demand at 225 gallons per day

Per Capita gpd

225 Avarage per capita demand from 2000 and 2004
214 5% Reduction in Per Capita Use in Single Dry Year
202 10% Reduction in Per Capita Use in Multiple Dry Year
3.40% Annual Population Increase

APPENDIX D

BMP 2003 & 2004

Accounts & Water Use

Reporting Unit Name:	Submitted to	Year:
City of Manteca	CUWCC **02/28/2005**	**2003**

A. Service Area Population Information:

1. Total service area population 57200

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	14627	9566.49	0	0
2. Multi-Family	550	1226.45	0	0
3. Commercial	599	1093.65	0	0
4. Industrial	20	119.67	0	0
5. Institutional	77	254.304	0	0
6. Dedicated Irrigation	53	954.56	0	0
7. Recycled Water	0	0	0	0
8. Other	0	0	0	0
9. Unaccounted	NA	1163.21	NA	0
Total	15926	14378.334	0	0
	Metered		**Unmetered**	

Reported as of 12/8/05

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Based on your signed MOU date, 11/16/1998, your Agency STRATEGY DUE DATE is:	11/15/2000
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	4/22/1993
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	3/1/1999

B. Water Survey Data

Survey Counts:	**Single Family Accounts**	**Multi-Family Units**
1. Number of surveys offered:	1000	3
2. Number of surveys completed:	51	1
Indoor Survey:		
3. Check for leaks, including toilets, faucets and meter checks	yes	yes
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	yes	yes
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	yes	yes
Outdoor Survey:		
6. Check irrigation system and timers	yes	yes
7. Review or develop customer irrigation schedule	yes	yes
8. Measure landscaped area (Recommended but not required for surveys)	yes	yes
9. Measure total irrigable area (Recommended but not required for surveys)	yes	yes
10. Which measurement method is typically used (Recommended but not required for surveys)		Other
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	yes	yes
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	yes	yes
a. If yes, in what form are surveys tracked?		spreadsheet

b. Describe how your agency tracks this information.

The information is entered into a spreadsheet as surveys are offered and completed.

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1300	1300
2. Actual Expenditures	1000	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Manteca activated marketing for this BMP in late 2003.

BMP 02: Residential Plumbing Retrofit

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	no
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	no
3. Estimated percent of single-family households with low-flow showerheads:	41%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	no
5. Estimated percent of multi-family households with low-flow showerheads:	37%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?	yes
a. If YES, when did your agency begin implementing this strategy?	3/1/2000
b. Describe your targeting/ marketing strategy.	

Provide low-flow devices to customers upon request. Distribute low-flow devices when participating at community events/fairs.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	217	0
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	217	0

6. Does your agency track the distribution and cost of low-flow devices?	no
a. If YES, in what format are low-flow devices tracked?	
b. If yes, describe your tracking and distribution system :	

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2500	2500
2. Actual Expenditures	1500	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	12331
b. Determine other system verifiable uses (AF)	955
c. Determine total supply into the system (AF)	14448
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.92
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	no
6. Does your agency operate a system leak detection program?	no
a. If yes, describe the leak detection program:	

B. Survey Data

1. Total number of miles of distribution system line.	174
2. Number of miles of distribution system line surveyed.	0

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1800	1800
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Does your agency require meters for all new connections and bill by volume-of-use?	yes
2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use?	no
a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?	
b. Describe the program:	
3. Number of previously unmetered accounts fitted with meters during report year.	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	no
a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
b. Describe the feasibility study:	
2. Number of CII accounts with mixed-use meters.	379
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	53
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	0
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	0
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	0
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	no

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	yes
a. If YES, when did your agency begin implementing this strategy?	2/1/1994

b. Description of marketing / targeting strategy:

City planning department adopted State guidelines for xeriscape and irrigation auditing in 1992. City provides information on irrigation practices on request and at various public functions. City provides irrigation system audits on request. City parks maintains a irrigation management plan for City public areas.

2. Number of Surveys Offered.	0
3. Number of Surveys Completed.	0
4. Indicate which of the following Landscape Elements are part of your survey:	
a. Irrigation System Check	yes
b. Distribution Uniformity Analysis	yes
c. Review / Develop Irrigation Schedules	yes
d. Measure Landscape Area	yes
e. Measure Total Irrigable Area	yes
f. Provide Customer Report / Information	yes
5. Do you track survey offers and results?	no
6. Does your agency provide follow-up surveys for previously completed surveys?	no

a. If YES, describe below:

C. Other BMP 5 Actions

1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program.	no

Does your agency provide mixed-use accounts with landscape budgets?

2. Number of CII mixed-use accounts with landscape budgets.	0

3. Do you offer landscape irrigation training? yes

4. Does your agency offer financial incentives to improve landscape water use efficiency? no

Type of Financial Incentive:	Budget (Dollars/ Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates			
b. Loans			
c. Grants			

5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes

a. If YES, describe below:

City provides written information on landscape requirements and irrigation efficiency.

6. Do you have irrigated landscaping at your facilities? yes

a. If yes, is it water-efficient? yes

b. If yes, does it have dedicated irrigation metering? no

7. Do you provide customer notices at the start of the irrigation season? yes

8. Do you provide customer notices at the end of the irrigation season? yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1000
2. Actual Expenditures	0	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

   a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

   California Public Utility Commission $150 rebate

2. Does your agency offer rebates for high-efficiency washers? yes
3. What is the level of the rebate? 200
4. Number of rebates awarded. 20

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	4000	2000
2. Actual Expenditures	4000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

Public works department issues notices on water conservation at least annually and provide information on water conservation practices at selected public functions. Water department personnel provide information to public on request and to customers in violation of water conservation ordinance.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	1
b. Public Service Announcement	yes	2
c. Bill Inserts / Newsletters / Brochures	yes	2
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	1
g. Speaker's Bureau	yes	1
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1500
2. Actual Expenditures	1000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	0	0	0
Grades 4th-6th	yes	0	0	0
Grades 7th-8th	yes	0	0	0
High School	no	0	0	0

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 9/1/1991

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1200
2. Actual Expenditures	453	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	yes
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	yes
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	yes

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	yes

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes

Agency CII Customer Incentives	Budget ($/Year)	No. Awarded to Customers	Total $ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

BMP 09a: CII ULFT Water Savings

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

1. Did your agency implement a CII ULFT replacement program in the reporting year? If No, please explain why on Line B. 10. — No

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply.

   a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

2. How does your agency advertise this program? Check all that apply.

   a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.)

2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency?

3. What is the total number of customer accounts participating in the program during the last year ?

CII Subsector	Number of Toilets Replaced				
4.	**Standard Gravity Tank**	**Air Assisted**	**Valve Floor Mount**	**Valve Wall Mount**	**Type Not Specified**
a. Offices					
b. Retail / Wholesale					
c. Hotels					
d. Health					
e. Industrial					
f. Schools: K to 12					

g. Eating

h. Government

i. Churches

j. Other

5. Program design.

6. Does your agency use outside services to implement this program?

a. If yes, check all that apply.

7. Participant tracking and follow-up.

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

a. Disruption to business

b. Inadequate payback

c. Inadequate ULFT performance

d. Lack of funding

e. American's with Disabilities Act

f. Permitting

g. Other. Please describe in B. 9.

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other isues affecting program implementation or effectiveness.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

Funding for this BMP has not been secured. The City continues to work towards implementation of this BMP.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor		
b. Materials		
c. Marketing & Advertising		
d. Administration & Overhead		
e. Outside Services		
f. Total	0	0

2. CII ULFT Program: Annual Cost Sharing

a. Wholesale agency contribution	
b. State agency contribution	
c. Federal agency contribution	
d. Other contribution	
e. Total	0

D. Comments

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	yes
6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	no
7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991.	1
8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991.	.25

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Non-volumetric Flat Rate
c. Total Revenue from Volumetric Rates	$2875401.83
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$2092390.86

2. Commercial

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$394086.27
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$186089.98

3. Industrial

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$53086.15
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$12688.6

4. Institutional / Government

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$96535.05
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$59472.06

5. Irrigation

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

6. Other

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0

d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources $0

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	no
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	no
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	10%
b. Coordinator's Name	Keith Conarroe
c. Coordinator's Title	Associate Civil Engineer
d. Coordinator's Experience and Number of Years	Water and Wastewater 31 years/ Conservation 1
e. Date Coordinator's position was created (mm/dd/yyyy)	9/1/1991
6. Number of conservation staff, including Conservation Coordinator.	2

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	350
2. Actual Expenditures	1000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 13: Water Waste Prohibition

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area? yes

a. If YES, describe the ordinance:

Restricts outdoor water uses during daylight savings period. Alternate day landscape watering between 6 pm and 11 am only. Various outdoor water waste prohibitions.

2. Is a copy of the most current ordinance(s) on file with CUWCC? no

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Manteca	Title 13 Public Services Chapter 13.04.210 Unlawful water use.

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	yes
b. Single-pass cooling systems for new connections	yes
c. Non-recirculating systems in all new conveyor or car wash systems	yes
d. Non-recirculating systems in all new commercial laundry systems	yes
e. Non-recirculating systems in all new decorative fountains	yes
f. Other, please name	no

2. Describe measures that prohibit water uses listed above:

Water use prohibitions are stated in City ordinance. Plan review of facilities identifies violation of such uses prior to construction. Water audits/inspections by City and reported observation of violation detect other prohibition violation.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	yes
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	no
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	yes
c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an	yes

adverse effect on the reclaimed water or groundwater supply.

4. Does your agency include water softener checks in home water audit programs?	no
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1000
2. Actual Expenditures	800	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 14: Residential ULFT Replacement Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2003**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	no	no

Number of Toilets Replaced by Agency Program During Report Year

Replacement Method	SF Accounts	MF Units
2. Rebate		
3. Direct Install		
4. CBO Distribution		
5. Other		
Total		

6. Describe your agency's ULFT program for single-family residences.

7. Describe your agency's ULFT program for multi-family residences.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

Water Supply & Reuse

Reporting Unit:

Year:
2004

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type

Total AF:

Reported as of 12/8/05

Accounts & Water Use

Reporting Unit Name:	Submitted to	Year:
City of Manteca	CUWCC **02/28/2005**	**2004**

A. Service Area Population Information:

1. Total service area population 59998

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	15454	10046.24	0	0
2. Multi-Family	549	1261.74	0	0
3. Commercial	610	1094.82	0	0
4. Industrial	20	102.84	0	0
5. Institutional	84	316.63	0	0
6. Dedicated Irrigation	61	1013.6	0	0
7. Recycled Water	0	0	0	0
8. Other	0	0	0	0
9. Unaccounted	NA	0	NA	0
Total	16778	13835.87	0	0
	Metered		**Unmetered**	

Reported as of 12/8/05

Reported as of 12/8/05

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Based on your signed MOU date, 11/16/1998, your Agency STRATEGY DUE DATE is:	11/15/2000
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	4/22/1993
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	3/1/1999

B. Water Survey Data

Survey Counts:	**Single Family Accounts**	**Multi-Family Units**
1. Number of surveys offered:	1000	2
2. Number of surveys completed:	63	0
Indoor Survey:		
3. Check for leaks, including toilets, faucets and meter checks	yes	yes
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	yes	yes
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	yes	yes
Outdoor Survey:		
6. Check irrigation system and timers	yes	yes
7. Review or develop customer irrigation schedule	yes	yes
8. Measure landscaped area (Recommended but not required for surveys)	yes	yes
9. Measure total irrigable area (Recommended but not required for surveys)	yes	yes
10. Which measurement method is typically used (Recommended but not required for surveys)		Other
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	yes	yes
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	yes	yes
a. If yes, in what form are surveys tracked?		spreadsheet

b. Describe how your agency tracks this information.

The information is entered into a spreadsheet as surveys are offered and completed.

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1300	1300
2. Actual Expenditures	1000	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 12/8/05

BMP 02: Residential Plumbing Retrofit

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	no
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	no
3. Estimated percent of single-family households with low-flow showerheads:	44%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	no
5. Estimated percent of multi-family households with low-flow showerheads:	37%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?	yes
a. If YES, when did your agency begin implementing this strategy?	3/1/2000
b. Describe your targeting/ marketing strategy.	

Provide low-flow devices to customers upon request. Distribute low-flow devices when participating at community events/fairs.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	250	0
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	250	0

6. Does your agency track the distribution and cost of low-flow devices?	no
a. If YES, in what format are low-flow devices tracked?	
b. If yes, describe your tracking and distribution system :	

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2500	2500
2. Actual Expenditures	1700	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 12/8/05

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	12889
b. Determine other system verifiable uses (AF)	1013.6
c. Determine total supply into the system (AF)	14930
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.93
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	no
6. Does your agency operate a system leak detection program?	no
a. If yes, describe the leak detection program:	

B. Survey Data

1. Total number of miles of distribution system line.	178
2. Number of miles of distribution system line surveyed.	0

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1800	1800
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 12/8/05

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Does your agency require meters for all new connections and bill by volume-of-use?	yes
2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use?	no
a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?	
b. Describe the program:	
3. Number of previously unmetered accounts fitted with meters during report year.	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	no
a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
b. Describe the feasibility study:	
2. Number of CII accounts with mixed-use meters.	395
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

Reported as of 12/8/05

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	61
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	0
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	0
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	0
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	no

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	yes
a. If YES, when did your agency begin implementing this strategy?	2/1/1994

b. Description of marketing / targeting strategy:

City planning department adopted State guidelines for xeriscape and irrigation auditing in 1992. City provides information on irrigation practices on request and at various public functions. City provides irrigation system audits on request. City parks maintains a irrigation management plan for City public areas

2. Number of Surveys Offered.	0
3. Number of Surveys Completed.	0
4. Indicate which of the following Landscape Elements are part of your survey:	
a. Irrigation System Check	yes
b. Distribution Uniformity Analysis	yes
c. Review / Develop Irrigation Schedules	yes
d. Measure Landscape Area	yes
e. Measure Total Irrigable Area	yes
f. Provide Customer Report / Information	yes
5. Do you track survey offers and results?	no
6. Does your agency provide follow-up surveys for previously completed surveys?	no

a. If YES, describe below:

C. Other BMP 5 Actions

1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program.	no

Does your agency provide mixed-use accounts with landscape budgets?

2. Number of CII mixed-use accounts with landscape budgets.	0
3. Do you offer landscape irrigation training?	yes
4. Does your agency offer financial incentives to improve landscape water use efficiency?	no

Type of Financial Incentive:	Budget (Dollars/ Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates			
b. Loans			
c. Grants			

5. Do you provide landscape water use efficiency information to new customers and customers changing services?	yes

a. If YES, describe below:

City provides written information on landscape requirements and irrigation efficiency.

6. Do you have irrigated landscaping at your facilities?	yes
a. If yes, is it water-efficient?	yes
b. If yes, does it have dedicated irrigation metering?	no
7. Do you provide customer notices at the start of the irrigation season?	yes
8. Do you provide customer notices at the end of the irrigation season?	yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1000
2. Actual Expenditures	0	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

Reported as of 12/8/05

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

   a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

   California Public Utility Commission $150 rebate

2. Does your agency offer rebates for high-efficiency washers? yes
3. What is the level of the rebate? 200
4. Number of rebates awarded. 10

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2000	2000
2. Actual Expenditures	2000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

Public works department issues notices on water conservation at least annually and provide information on water conservation practices at selected public functions. Water department personnel provide information to public on request and to customers in violation of water conservation ordinance.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	1
b. Public Service Announcement	yes	2
c. Bill Inserts / Newsletters / Brochures	yes	2
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	yes	2
f. Special Events, Media Events	yes	2
g. Speaker's Bureau	yes	1
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1500	1500
2. Actual Expenditures	1200	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	7	324	0
Grades 4th-6th	yes	0	0	0
Grades 7th-8th	yes	0	0	0
High School	no	0	0	0

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 9/1/1991

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1200	1200
2. Actual Expenditures	600	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 09: Conservation Programs for CII Accounts

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	yes
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	yes
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	yes

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	yes

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes

Agency CII Customer Incentives	Budget ($/Year)	No. Awarded to Customers	Total $ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	yes
6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	no
7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991.	1
8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991.	.25

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 09a: CII ULFT Water Savings

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

1. Did your agency implement a CII ULFT replacement program in the reporting year? If No, please explain why on Line B. 10. No

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply.

   a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

2. How does your agency advertise this program? Check all that apply.

   a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.)

2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency?

3. What is the total number of customer accounts participating in the program during the last year ?

CII Subsector	Number of Toilets Replaced				
4.	**Standard Gravity Tank**	**Air Assisted**	**Valve Floor Mount**	**Valve Wall Mount**	**Type Not Specified**
a. Offices					
b. Retail / Wholesale					
c. Hotels					
d. Health					
e. Industrial					

f. Schools:
K to 12

g. Eating

h. Government

i. Churches

j. Other

5. Program design.

6. Does your agency use outside services to implement this program?

a. If yes, check all that apply.

7. Participant tracking and follow-up.

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

a. Disruption to business

b. Inadequate payback

c. Inadequate ULFT performance

d. Lack of funding

e. American's with Disabilities Act

f. Permitting

g. Other. Please describe in B. 9.

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other isues affecting program implementation or effectiveness.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

Funding for this BMP has not been secured. The City continues to work towards implementation of this BMP.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor		
b. Materials		
c. Marketing & Advertising		
d. Administration & Overhead		

e. Outside Services		
f. Total	0	0

2. CII ULFT Program: Annual Cost Sharing

a. Wholesale agency contribution		
b. State agency contribution		
c. Federal agency contribution		
d. Other contribution		
e. Total		0

D. Comments

Reported as of 12/8/05

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Non-volumetric Flat Rate
c. Total Revenue from Volumetric Rates	$3685423.26
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$2681928.6

2. Commercial

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$513252.76
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$242361.14

3. Industrial

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$54432.65
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$13009.61

4. Institutional / Government

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	$142243.86
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$87631.75

5. Irrigation

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

6. Other

a. Water Rate Structure	Service Not Provided

b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	no
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	no
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	10%
b. Coordinator's Name	Keith Conarroe
c. Coordinator's Title	Associate Civil Engineer
d. Coordinator's Experience and Number of Years	Water and Wastewater 32 years/ Conservation 2
e. Date Coordinator's position was created (mm/dd/yyyy)	9/1/1991
6. Number of conservation staff, including Conservation Coordinator.	2

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	350	350
2. Actual Expenditures	350	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 12/8/05

BMP 13: Water Waste Prohibition

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area? yes

a. If YES, describe the ordinance:

Restricts outdoor water uses during daylight savings period. Alternate day landscape watering between 6 pm and 11 am only. Various outdoor water waste prohibitions.

2. Is a copy of the most current ordinance(s) on file with CUWCC? yes

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Manteca	Title 13 Public Services Chapter 13.04.210 Unlawful water use.

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	yes
b. Single-pass cooling systems for new connections	yes
c. Non-recirculating systems in all new conveyor or car wash systems	yes
d. Non-recirculating systems in all new commercial laundry systems	yes
e. Non-recirculating systems in all new decorative fountains	yes
f. Other, please name	no

2. Describe measures that prohibit water uses listed above:

Water use prohibitions are stated in City ordinance. Plan review of facilities identifies violation of such uses prior to construction. Water audits/inspections by City and reported observation of violation detect other prohibition violation.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	yes
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	no
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	yes
c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site	

regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	yes
4. Does your agency include water softener checks in home water audit programs?	no
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1000	1000
2. Actual Expenditures	600	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 12/8/05

BMP 14: Residential ULFT Replacement Programs

Reporting Unit:	BMP Form Status:	Year:
City of Manteca	**100% Complete**	**2004**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	no	no

Number of Toilets Replaced by Agency Program During Report Year

Replacement Method	SF Accounts	MF Units
2. Rebate		
3. Direct Install		
4. CBO Distribution		
5. Other		
Total		

6. Describe your agency's ULFT program for single-family residences.

7. Describe your agency's ULFT program for multi-family residences.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

APPENDIX E

WATER REDUCTIONS

APPENDIX E
WATER REDUCTIONS

Manteca Baseline
Water Consumption

Rationing Evaluation												
Baseline Water Consumption												
2004 WATER CONSUMPTION DATA (cubic feet)												
Month	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Days	31	28	31	30	31	30	31	31	30	31	30	31
Single Family	19613410	17851440	17291870	28149050	43554780	50632240	49856320	54340190	54658680	48017060	31990820	21754090
Duplex	652300	579200	546590	615190	1075950	1264860	1282050	1548580	1345960	1352760	894870	610030
Triplex	305730	264440	256230	263480	405120	469790	495280	553380	481710	527980	342060	291970
Multiples	2670710	2073400	2047720	2432020	3731210	3809560	3831740	4416250	4051050	4171900	2928200	2383920
Markets	176150	157140	165490	222110	253380	266100	229170	309960	278070	260040	195550	164170
Hotels/Motels	153510	146220	120190	147410	170910	198090	232070	211420	225360	235250	170720	150550
Trailer Parks	432410	368590	330060	432930	614390	729050	741590	809910	730950	800450	555230	377640
Rooming Houses	2970	2280	3150	2780	4360	4000	3650	4580	4140	4200	3850	3260
Prof Office	624550	457030	514800	718170	1762580	1798950	1507430	1951680	2033390	1824350	1159330	625740
Retail Stores	880080	669810	715780	888930	1408800	1537440	1495220	1551110	1768200	1718150	1314530	925580
Car Wash	141150	138810	144180	146230	198050	196520	145210	172470	160770	169560	150930	154360
Svc Stations	118490	123940	137020	120020	175930	166670	164250	167750	201740	172320	153380	123630
Mortuary												
Restaurants	400460	385120	366540	364370	501530	482340	425310	498020	492110	492270	412590	406330
Schools	291110	127850	176950	311350	646560	821290	1049180	631770	927260	766710	606230	210530
Hospitals	124600	147390	184200	213700	415310	424880	368290	448730	465060	449570	414310	471910
Churches	149640	79400	76540	129110	254660	339250	337420	350860	306170	348580	235500	116700
Non-Profit	13320	13030	14680	13840	28380	32660	30350	66340	57990	52510	31690	21920
Industrial	148420	142480	114860	233880	378490	423410	290920	390340	736540	809580	715640	96150
City Landscape and Park Irr.			267,400	2,700,000	2,700,000	5,187,000	5,240,000	5,147,000	3,008,000	1,992,000		
Residential Total	23,242,150	20,768,480	20,142,410	31,459,740	48,767,060	56,176,450	55,465,390	60,858,400	60,537,400	54,069,700	36,155,950	25,040,010
Commercial Total	2,929,770	2,448,940	2,497,210	3,042,950	5,089,930	5,379,160	4,943,900	5,676,900	5,894,730	5,676,590	4,116,110	2,931,260
Institutions	578,670	367,670	719,770	3,368,000	4,044,910	6,805,080	7,025,240	6,644,700	4,764,480	3,609,370	1,287,730	821,060
Industrial Total	148,420	142,480	114,860	233,880	378,490	423,410	290,920	390,340	736,540	809,580	715,640	96,150
Total	26,899,010	23,727,570	23,474,250	38,104,570	58,280,390	68,784,100	67,725,450	73,570,340	71,933,150	64,165,240	42,275,430	28,888,480
	617.52	544.71	538.89	874.76	1,337.93	1,579.07	1,554.76	1,688.94	1,651.36	1,473.03	970.51	663.19
Gallons Used:												
Residential Total	173,851,282	155,348,230	150,665,227	235,318,855	364,777,609	420,199,846	414,881,117	455,220,832	452,819,752	404,441,356	270,446,506	187,299,275
Single	146,708,307	133,528,771	129,343,188	210,554,894	325,789,754	378,729,155	372,925,274	406,464,621	408,846,926	359,167,609	239,291,334	162,720,593
Multiple	27,142,975	21,819,459	21,322,039	24,763,961	38,987,854	41,470,691	41,955,844	48,756,211	43,972,826	45,273,747	31,155,172	24,578,682
Commercial Total	21,914,680	18,318,071	18,679,131	22,761,266	38,072,676	40,236,117	36,980,372	42,463,212	44,092,580	42,460,893	30,788,503	21,925,825
Institutions	4,328,452	2,750,172	5,383,880	25,192,640	30,255,927	50,901,998	52,548,795	49,702,356	35,638,310	26,998,088	9,632,220	6,141,529
Commercial and Inst.	26,243,131	21,068,243	24,063,010	47,953,906	68,328,603	91,138,115	89,529,167	92,165,568	79,730,891	69,458,981	40,420,723	28,067,354
Industrial Total	1,110,182	1,065,750	859,153	1,749,422	2,831,105	3,167,107	2,176,082	2,919,743	5,509,319	6,055,658	5,352,987	719,202
Total	201,204,595	177,482,224	175,587,390	285,022,184	435,937,317	514,505,068	506,586,366	550,306,143	538,059,962	479,955,995	316,220,216	216,085,830
Daily Average	6,490,471	6,338,651	5,664,109	9,500,739	14,062,494	17,150,169	16,341,496	17,751,811	17,935,332	15,482,451	10,540,674	6,970,511
Monthly Capacities												
Available Peak Capacity MG	976.5	882	976.5	945	976.5	945	976.5	976.5	945	976.5	945	976.5
Capacity MG-Max Day	697.5	630	697.5	675	697.5	675	697.5	697.5	675	697.5	675	697.5
Capacity MG-Avg	348.75	315	348.75	337.5	348.75	337.5	348.75	348.75	337.5	348.75	337.5	348.75
	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
% Residential Total	86%	88%	86%	83%	84%	82%	82%	83%	84%	84%	86%	87%
% Residential Single	73%	75%	74%	74%	75%	74%	74%	74%	76%	75%	76%	75%
%Residential Multiple	13%	12%	12%	9%	9%	8%	8%	9%	8%	9%	10%	11%
% Comm/Inst.	13%	12%	14%	17%	16%	18%	18%	17%	15%	14%	13%	13%
% Industrial	1%	1%	0%	1%	1%	1%	0%	1%	1%	1%	2%	0%
Single Family Residential Pop	42708											
Multi family Residential Pop.	9211											
Total Population	51920											
Daily Per Capita Use												
Residential Total	108	107	94	151	227	270	258	283	291	251	174	116
Residential Single	111	112	98	164	246	296	282	307	319	271	187	123
Residential Multiple	95	85	75	90	137	150	147	171	159	159	113	86
Monthly Balance	496,295,405	452,517,776	521,912,610	389,977,816	261,562,683	160,494,932	190,913,634	147,193,857	136,940,038	.217,544,005	358,779,784	481,414,170
Daily Balance	16,009,529	16,161,349	16,835,891	12,999,261	8,437,506	5,349,831	6,158,504	4,748,189	4,564,668	7,017,549	11,959,326	15,529,489
Peak Capacity Available, gpm	35,100											
Daily Average	12,019,076											
Max Day	24,038,151											
Peak Hour	33,653,412											
Peak Hour gpm	23,370											

APPENDIX E
WATER REDUCTIONS

Stage 1												
10%	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Capacity Loss	31	28	31	30	31	30	31	31	30	31	30	31
Monthly Available, Gal.	1,007,269,714	909,792,000	1,007,269,714	974,777,143	1,007,269,714	974,777,143	1,007,269,714	1,007,269,714	974,777,143	1,007,269,714	974,777,143	1,007,269,714
Monthly Balance Without Conservation	806,065,119	732,309,776	831,682,324	689,754,959	571,332,397	460,272,075	500,683,348	456,963,571	436,717,181	527,313,719	658,556,926	791,183,884
Daily Balance	26,002,101	26,153,921	26,828,462	22,991,832	18,430,077	15,342,402	16,151,076	14,740,760	14,557,239	17,010,120	21,951,898	25,522,061
Single Family Residential Pop	42708											
Multi family Residential Pop.	9211											
	51920											
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Residential Total	103	102	89	144	215	256	245	269	276	239	165	111
Residential Single	105	106	93	156	234	281	268	292	303	258	177	117
Residential Multiple	90	80	71	85	130	143	140	162	151	151	107	82
Average Check	103	102	89	144	215	256	245	269	276	239	165	111
Residential Total	5,327,701	5,270,744	4,617,160	7,451,764	11,178,669	13,306,328	12,714,099	13,950,316	14,339,292	12,394,171	8,564,139	5,739,816
Residential Single	4,495,900	4,530,440	3,963,743	6,667,572	9,983,880	11,993,090	11,428,355	12,456,174	12,946,819	11,006,749	7,577,559	4,986,599
Residential Multiple	831,801	740,303	653,417	784,192	1,194,789	1,313,239	1,285,744	1,494,142	1,392,473	1,387,421	986,580	753,218
Total Check	5,327,701	5,270,744	4,617,160	7,451,764	11,178,669	13,306,328	12,714,099	13,950,316	14,339,292	12,394,171	8,564,139	5,739,816
Residential Total	165,158,718	147,580,819	143,131,965	223,552,912	346,538,728	399,189,854	394,137,061	432,459,790	430,178,764	384,219,288	256,924,181	177,934,311
Markets	1,317,602	1,175,407	1,237,865	1,661,383	1,895,282	1,990,428	1,714,192	2,318,501	2,079,964	1,945,099	1,462,714	1,227,992
Hotels/Motels	1,148,255	1,093,726	899,021	1,102,627	1,278,407	1,481,713	1,735,884	1,581,422	1,685,693	1,759,670	1,276,986	1,126,114
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Trailer Parks	3,072,705	2,619,201	2,345,406	3,076,401	4,365,855	5,180,629	5,269,739	5,755,220	5,194,131	5,687,998	3,945,464	2,683,510
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Rooming Houses	21,105	16,202	22,384	19,755	30,982	28,424	25,937	32,545	29,419	29,845	27,358	23,166
Prof Office	4,671,634	3,418,584	3,850,704	5,371,912	13,184,098	13,456,146	11,275,576	14,598,566	15,209,757	13,646,138	8,671,788	4,680,535
Retail Stores	6,582,998	5,010,179	5,354,034	6,649,196	10,537,824	11,500,051	11,184,246	11,602,303	13,226,136	12,851,762	9,832,684	6,923,338
Car Wash	1,055,802	1,038,299	1,078,466	1,093,800	1,481,414	1,469,970	1,086,171	1,290,076	1,202,560	1,268,309	1,128,956	1,154,613
Svc Stations	886,305	927,071	1,024,910	897,750	1,315,956	1,246,692	1,228,590	1,254,770	1,509,015	1,288,954	1,147,282	924,752
Mortuary	-	-	-	-	-	-	-	-	-	-	-	-
Restaurants	2,995,441	2,880,698	2,741,719	2,725,488	3,751,444	3,607,903	3,181,319	3,725,190	3,680,983	3,682,180	3,086,173	3,039,348
Schools	2,177,503	956,318	1,323,586	2,328,898	4,836,269	6,143,249	7,847,866	4,725,640	6,935,905	5,734,991	4,534,600	1,574,764
Hospitals	932,008	1,102,477	1,377,816	1,598,476	3,106,519	3,178,102	2,754,809	3,356,500	3,478,649	3,362,784	3,099,039	3,529,887
Churches	1,119,307	593,912	572,519	965,743	1,904,857	2,537,590	2,523,902	2,624,433	2,290,152	2,607,378	1,761,540	872,916
Non-Profit	99,634	97,464	109,806	103,523	212,282	244,297	227,018	496,223	433,765	392,775	237,041	163,962
Industrial	1,110,182	1,065,750	859,153	1,749,422	2,831,105	3,167,107	2,176,082	2,919,743	5,509,319	6,055,658	5,352,987	719,202
City Landscape and Park Irrigation			2,000,152	20,196,000	20,196,000	38,798,760	39,195,200	38,499,560	22,499,840	14,900,160		
Total Consumption	192,349,199	169,576,107	167,929,508	273,093,285	417,467,024	493,220,915	485,563,590	527,240,482	515,144,051	459,432,988	302,488,795	206,578,410
Average Daily Consumption'	6,204,813	6,056,290	5,417,081	9,103,110	13,466,678	16,440,697	15,663,342	17,007,757	17,171,468	14,820,419	10,082,960	6,663,820
Monthly Balance	814,920,516	740,215,893	839,340,206	701,683,857	589,802,690	481,556,228	521,706,124	480,029,232	459,633,092	547,836,726	672,288,348	800,691,304
Daily Balance	26,287,759	26,436,282	27,075,491	23,389,462	19,025,893	16,051,874	16,829,230	15,484,814	15,321,103	17,672,152	22,409,612	25,828,752
Monthly Reduction from Baseline	8,855,396	7,906,117	7,657,882	11,928,898	18,470,293	21,284,153	21,022,776	23,065,661	22,915,911	20,523,007	13,731,421	9,507,420
Percent Reduction from Baseline	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Annual Percent Reduction	4%											
Peak Capacity Available	28,382,400	2.5	Peaking Ratio									
Daily Average	11,508,203											
Daily Peak	23,016,406											
Hourly Peak	32,222,968											

APPENDIX E
WATER REDUCTIONS

Stage 2												
20%	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Capacity Loss	31	28	31	30	31	30	31	31	30	31	30	31
Max Day Available	895,350,857	808,704,000	895,350,857	866,468,571	895,350,857	866,468,571	895,350,857	895,350,857	866,468,571	895,350,857	866,468,571	895,350,857
Monthly Balance Without Conservation	694,146,262	631,221,776	719,763,467	581,446,388	459,413,540	351,963,503	388,764,491	345,044,714	328,408,609	415,394,862	550,248,355	679,265,027
Daily Balance	22,391,815	22,543,635	23,218,176	19,381,546	14,819,792	11,732,117	12,540,790	11,130,475	10,946,954	13,399,834	18,341,612	21,911,775
Single Family Residential Pop	42708											
Multi family Residential Pop.	9211											
Total Population	51920											
	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Residential Total	92	91	80	128	193	229	219	240	247	214	148	99
Residential Single	94	95	83	140	209	251	239	261	271	231	159	104
Residential Multiple	81	72	63	76	116	128	125	145	135	135	96	73
Average Check	92	91	80	128	193	229	219	240	247	214	148	99
Residential Total	4,766,890	4,715,928	4,131,143	6,667,368	10,001,967	11,905,662	11,375,773	12,481,862	12,829,893	11,089,521	7,662,651	5,135,625
Residential Single	4,022,647	4,053,552	3,546,507	5,965,722	8,932,945	10,730,659	10,225,370	11,144,998	11,583,996	9,848,144	6,779,921	4,461,694
Residential Multiple	744,243	662,376	584,637	701,646	1,069,022	1,175,003	1,150,402	1,336,864	1,245,897	1,241,377	882,730	673,932
Total Check	4,766,890	4,715,928	4,131,143	6,667,368	10,001,967	11,905,662	11,375,773	12,481,862	12,829,893	11,089,521	7,662,651	5,135,625
Residential Total	147,773,590	132,045,996	128,065,443	200,021,027	310,060,967	357,169,869	352,648,950	386,937,707	384,896,789	343,775,153	229,879,530	159,204,384
Markets	1,317,602	1,175,407	1,237,865	1,661,383	1,895,282	1,990,428	1,714,192	2,318,501	2,079,964	1,945,099	1,462,714	1,227,992
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Hotels/Motels	1,033,429	984,353	809,119	992,364	1,150,566	1,333,542	1,562,295	1,423,279	1,517,124	1,583,703	1,149,287	1,013,503
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Trailer Parks	2,910,984.12	2,757,053	2,468,849	3,238,316	4,595,637	5,453,294	5,547,093	6,058,127	5,467,506	5,987,366	4,153,120	2,824,747
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Rooming Houses	19,994	15,349	21,206	18,715	29,352	26,928	24,572	30,833	27,870	28,274	25,918	21,946
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Prof Office	4,204,471	3,076,726	3,465,634	4,834,720	11,865,689	12,110,531	10,148,019	13,138,710	13,688,781	12,281,524	7,804,610	4,212,482
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Retail Stores	5,924,699	4,509,161	4,818,631	5,984,277	9,484,042	10,350,046	10,065,821	10,442,073	11,903,522	11,566,586	8,849,416	6,231,005
Car Wash	1,055,802	1,038,299	1,078,466	1,093,800	1,481,414	1,469,970	1,086,171	1,290,076	1,202,560	1,268,309	1,128,956	1,154,613
Svc Stations	886,305	927,071	1,024,910	897,750	1,315,956	1,246,692	1,228,590	1,254,770	1,509,015	1,288,954	1,147,282	924,752
Mortuary	-	-	-	-	-	-	-	-	-	-	-	-
Restaurants	2,995,441	2,880,698	2,741,719	2,725,488	3,751,444	3,607,903	3,181,319	3,725,190	3,680,983	3,682,180	3,086,173	3,039,348
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Schools	1,959,753	860,686	1,191,227	2,096,008	4,352,642	5,528,924	7,063,080	4,253,076	6,242,314	5,161,492	4,081,140	1,417,288
Hospitals	932,008	1,102,477	1,377,816	1,598,476	3,106,519	3,178,102	2,754,809	3,356,500	3,478,649	3,362,784	3,099,039	3,529,887
Churches	1,119,307	593,912	572,519	965,743	1,904,857	2,537,590	2,523,902	2,624,433	2,290,152	2,607,378	1,761,540	872,916
Non-Profit	99,634	97,464	109,806	103,523	212,282	244,297	227,018	496,223	433,765	392,775	237,041	163,962
Industrial	1,110,182	1,065,750	859,153	1,749,422	2,831,105	3,167,107	2,176,082	2,919,743	5,509,319	6,055,658	5,352,987	719,202
			15%	15%	15%	15%	15%	15%	15%	15%		
City Landscape and Park Irrigation			1,700,129	17,166,600	17,166,600	32,978,946	33,315,920	32,724,626	19,124,864	12,665,136		
Total Consumption	173,343,200	153,130,404	151,542,493	245,147,613	375,204,356	442,394,170	435,267,832	472,993,866	463,053,178	413,652,371	273,218,755	186,558,026
Daily Consumption	5,591,716	5,468,943	4,888,468	8,171,587	12,103,366	14,746,472	14,040,898	15,257,867	15,435,106	13,343,625	9,107,292	6,018,001
Monthly Balance	722,007,657	655,573,596	743,808,364	621,320,958	520,146,502	424,074,402	460,083,025	422,356,991	403,415,393	481,698,486	593,249,816	708,792,831
Daily Balance	23,290,570	23,413,343	23,993,818	20,710,699	16,778,919	14,135,813	14,841,388	13,624,419	13,447,180	15,538,661	19,774,994	22,864,285
Monthly Reduction from Baseline	27,861,395	24,351,820	24,044,897	39,874,570	60,732,962	72,110,898	71,318,534	77,312,277	75,006,784	66,303,624	43,001,461	29,527,804
Percent Reduction from Baseline	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Annual Percent Reduction	14%											
Peak Capacity Available	25,228,800	2.4	Peaking Ratio									
Daily Average	10,347,778											
Daily Peak	20,695,557											
Hourly Peak	28,973,779											

APPENDIX E
WATER REDUCTIONS

Stage 3												
35%	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Capacity Loss	31	28	31	30	31	30	31	31	30	31	30	31
Max Day Available	727,472,571	657,072,000	727,472,571	704,005,714	727,472,571	704,005,714	727,472,571	727,472,571	704,005,714	727,472,571	704,005,714	727,472,571
Monthly Balance Without Conservation	526,267,977	479,589,776	551,885,181	418,983,531	291,535,254	189,500,646	220,886,205	177,166,428	165,945,752	247,516,576	387,785,498	511,386,741
Daily Balance	16,976,386	17,128,206	17,802,748	13,966,118	9,404,363	6,316,688	7,125,361	5,715,046	5,531,525	7,984,406	12,926,183	16,496,346
Single Family Residential Pop	42708											
Multi family Residential Pop.	9211											
	51920											
	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
Residential Total	70	69	61	98	147	175	168	184	189	163	113	76
Residential Single	72	73	64	107	160	192	183	200	207	176	121	80
Residential Multiple	62	55	49	58	89	98	96	111	103	103	73	56
Average Check	70	69	61	98	147	175	168	184	189	163	113	76
Residential Total	3,645,269	3,606,298	3,159,110	5,098,575	7,648,563	9,104,330	8,699,120	9,544,953	9,811,095	8,480,222	5,859,674	3,927,243
Residential Single	3,076,142	3,099,775	2,712,035	4,562,023	6,831,075	8,205,798	7,819,401	8,522,645	8,858,350	7,530,934	5,184,646	3,411,883
Residential Multiple	569,127	506,523	447,075	536,552	817,487	898,532	879,719	1,022,308	952,745	949,288	675,029	515,359
Total Check	3,645,269	3,606,298	3,159,110	5,098,575	7,648,563	9,104,330	8,699,120	9,544,953	9,811,095	8,480,222	5,859,674	3,927,243
Residential Total	113,003,333	100,976,350	97,932,397	152,957,256	237,105,446	273,129,900	269,672,726	295,893,541	294,332,839	262,886,881	175,790,229	121,744,529
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Markets	1,251,722	1,116,637	1,175,972	1,578,314	1,800,518	1,890,907	1,628,482	2,202,576	1,975,965	1,847,844	1,389,578	1,166,592
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Hotels/Motels	918,604	874,980	719,217	882,101	1,022,725	1,185,371	1,388,707	1,265,137	1,348,554	1,407,736	1,021,588	900,891
	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Trailer Parks	2,264,099	1,929,937	1,728,194	2,266,821	3,216,946	3,817,306	3,882,965	4,240,689	3,827,254	4,191,156	2,907,184	1,977,323
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Rooming Houses	17,772	13,644	18,850	16,636	26,090	23,936	21,842	27,407	24,774	25,133	23,038	19,508
	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Prof Office	3,503,726	2,563,938	2,888,028	4,028,934	9,888,074	10,092,110	8,456,682	10,948,925	11,407,318	10,234,604	6,503,841	3,510,401
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Retail Stores	5,266,399	4,008,143	4,283,228	5,319,357	8,430,259	9,200,041	8,947,396	9,281,842	10,580,909	10,281,410	7,866,148	5,538,671
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Car Wash	1,003,012	986,384	1,024,543	1,039,110	1,407,343	1,396,471	1,031,862	1,225,572	1,142,432	1,204,893	1,072,509	1,096,882
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Svc Stations	841,990	880,718	973,664	852,862	1,250,159	1,184,357	1,167,161	1,192,032	1,433,564	1,224,506	1,089,918	878,515
Mortuary	-	-	-	-	-	-	-	-	-	-	-	-
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Restaurants	2,845,669	2,736,663	2,604,633	2,589,213	3,563,872	3,427,508	3,022,253	3,538,930	3,496,934	3,498,071	2,931,865	2,887,381
	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Schools	1,850,877	812,870	1,125,048	1,979,563	4,110,828	5,221,762	6,670,686	4,016,794	5,895,519	4,874,742	3,854,410	1,338,550
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Hospitals	838,807	992,229	1,240,034	1,438,628	2,795,867	2,860,292	2,479,328	3,020,850	3,130,784	3,026,505	2,789,135	3,176,898
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Churches	1,007,376	534,521	515,267	869,169	1,714,371	2,283,831	2,271,511	2,361,990	2,061,136	2,346,641	1,585,386	785,624
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Non-Profit	94,652	92,591	104,316	98,347	201,668	232,082	215,667	471,412	412,077	373,136	225,189	155,764
	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Industrial	1,054,673	1,012,463	816,195	1,661,951	2,689,550	3,008,751	2,067,278	2,773,756	5,233,853	5,752,875	5,085,338	683,242
			35%	35%	35%	35%	35%	35%	35%	35%		
City Landscape and Park Irrigation			1,300,099	13,127,400	13,127,400	25,219,194	25,476,880	25,024,714	14,624,896	9,685,104		
Total Consumption	135,762,712	119,532,070	118,449,688	190,705,665	292,351,120	344,173,820	338,401,429	367,486,168	360,928,811	322,861,239	214,135,359	145,860,772
Daily Comsumption	4,379,442	4,269,002	3,820,958	6,356,856	9,430,681	11,472,461	10,916,175	11,854,393	12,030,960	10,414,879	7,137,845	4,705,186
Monthly Balance	591,709,859	537,539,930	609,022,883	513,300,049	435,121,452	359,831,894	389,071,142	359,986,404	343,076,904	404,611,332	489,870,356	581,611,799
Daily Balance	19,087,415	19,197,855	19,645,899	17,110,002	14,036,176	11,994,396	12,550,682	11,612,465	11,435,897	13,051,978	16,329,012	18,761,671
Monthly Reduction from Baseline	65,441,882	57,950,154	57,137,702	94,316,518	143,586,198	170,331,248	168,184,937	182,819,976	177,131,151	157,094,756	102,084,858	70,225,058
Percentage Reduction from Baseline	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	32%	32%
Annual Percent Reduction	33%											
Peak Capacity Available	20,498,400	2.5	Peaking Ratio									
Daily Average	8,065,737											
Daily Peak	16,131,473											
Hourly Peak	22,584,062											

APPENDIX E
WATER REDUCTIONS

Stage 4												
50%	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Capacity Loss	31	28	31	30	31	30	31	31	30	31	30	31
Max Day Available	559,594,286	505,440,000	559,594,286	541,542,857	559,594,286	541,542,857	559,594,286	559,594,286	541,542,857	559,594,286	541,542,857	559,594,286
Monthly Balance without Conservation	358,389,691	327,957,776	384,006,896	256,520,674	123,656,969	27,037,789	53,007,920	9,288,143	3,482,895	79,638,291	225,322,641	343,508,455
Daily Balance	11,560,958	11,712,778	12,387,319	8,550,689	3,988,934	901,260	1,709,933	299,618	116,097	2,568,977	7,510,755	11,080,918
Single Family Residential Pop	42708											
Multi family Residential Pop.	9211											
Total Population	51920											
	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Residential Total	49	48	42	68	102	121	116	127	131	113	78	52
Residential Single	50	50	44	74	111	133	127	138	144	122	84	55
Residential Multiple	43	38	34	40	61	68	66	77	72	71	51	39
Average Check	49	48	42	68	102	121	116	127	131	113	78	52
Residential Total	2,523,648	2,496,668	2,187,076	3,529,783	5,295,159	6,302,998	6,022,468	6,608,044	6,792,296	5,870,923	4,056,698	2,718,860
Residential Single	2,129,637	2,145,998	1,877,562	3,158,323	4,729,206	5,680,937	5,413,431	5,900,293	6,132,704	5,213,723	3,589,370	2,362,073
Residential Multiple	394,011	350,670	309,513	371,459	565,953	622,060	609,036	707,751	659,592	657,200	467,328	356,787
Total Check	2,523,648	2,496,668	2,187,076	3,529,783	5,295,159	6,302,998	6,022,468	6,608,044	6,792,296	5,870,923	4,056,698	2,718,860
Residential Total	78,233,077	69,906,704	67,799,352	105,893,485	164,149,924	189,089,931	186,696,503	204,849,374	203,768,888	181,998,610	121,700,928	84,284,674
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Markets	1,185,842	1,057,866	1,114,079	1,495,245	1,705,754	1,791,385	1,542,772	2,086,651	1,871,967	1,750,589	1,316,443	1,105,192
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Hotels/Motels	918,604	874,980	719,217	882,101	1,022,725	1,185,371	1,388,707	1,265,137	1,348,554	1,407,736	1,021,588	900,891
	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Trailer Parks	1,617,213	1,378,527	1,234,424	1,619,158	2,297,819	2,726,647	2,773,547	3,029,063	2,733,753	2,993,683	2,076,560	1,412,374
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Rooming Houses	17,772	13,644	18,850	16,636	26,090	23,936	21,842	27,407	24,774	25,133	23,038	19,508
	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
Prof Office	3,036,562	2,222,080	2,502,958	3,491,743	8,569,664	8,746,495	7,329,125	9,489,068	9,886,342	8,869,990	5,636,662	3,042,348
	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Retail Stores	4,608,099	3,507,125	3,747,824	4,654,437	7,376,477	8,050,036	7,828,972	8,121,612	9,258,295	8,996,233	6,882,879	4,846,337
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Car Wash	950,222	934,469	970,620	984,420	1,333,273	1,322,973	977,554	1,161,068	1,082,304	1,141,478	1,016,061	1,039,152
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Svc Stations	797,675	834,364	922,419	807,975	1,184,361	1,122,022	1,105,731	1,129,293	1,358,114	1,160,058	1,032,554	832,277
Mortuary	-	-	-	-	-	-	-	-	-	-	-	-
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Restaurants	2,695,897	2,592,628	2,467,547	2,452,939	3,376,300	3,247,113	2,863,187	3,352,671	3,312,885	3,313,962	2,777,556	2,735,414
	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Schools	1,524,252	669,423	926,510	1,630,229	3,385,388	4,300,274	5,493,506	3,307,948	4,855,133	4,014,494	3,174,220	1,102,335
	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Hospitals	792,207	937,106	1,171,144	1,358,705	2,640,541	2,701,387	2,341,588	2,853,025	2,956,851	2,858,366	2,634,183	3,000,404
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Churches	895,446	475,130	458,015	772,594	1,523,885	2,030,072	2,019,121	2,099,546	1,832,121	2,085,903	1,409,232	698,333
	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Non-Profit	79,707	77,972	87,845	82,819	169,826	195,437	181,614	396,979	347,012	314,220	189,633	131,169
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Industrial	999,163	959,175	773,238	1,574,480	2,547,995	2,850,396	1,958,473	2,627,769	4,958,387	5,450,093	4,817,688	647,282
			60%	60%	60%	60%	60%	60%	60%	60%		
City Landscape and Park Irrigation			800,061	8,078,400	8,078,400	15,519,504	15,678,080	15,399,824	8,999,936	5,960,064		
Total Consumption	98,351,740	86,441,194	85,714,105	135,795,368	209,388,425	244,902,983	240,200,325	261,196,439	258,595,321	232,340,614	155,709,229	105,797,691
Daily Consumption	3,172,637	3,087,186	2,764,971	4,526,512	6,754,465	8,163,433	7,748,398	8,425,692	8,619,844	7,494,859	5,190,308	3,412,829
Monthly Balance	461,242,545	418,998,806	473,880,181	405,747,489	350,205,861	296,639,874	319,393,960	298,397,847	282,947,536	327,253,671	385,833,628	453,796,594
Daily Balance	14,878,792	14,964,243	15,286,457	13,524,916	11,296,963	9,887,996	10,303,031	9,625,737	9,431,585	10,556,570	12,861,121	14,638,600
Monthly Reduction from Baseline	102,852,854	91,041,029	89,873,285	149,226,816	226,548,892	269,602,085	266,386,041	289,109,705	279,464,641	247,615,381	160,510,987	110,288,139
Percent Reduction from Baseline	51%	51%	51%	52%	52%	52%	53%	53%	52%	52%	51%	51%
Annual Percent Reduction	52%											
Peak Capacity Available	15,768,000	2.7	Peaking Ratio									
Daily Average	5,780,094											
Daily Peak	11,560,189											
Hourly Peak	16,184,264											

APPENDIX F

UNLAWFUL WATER USE ORDINANCE

Title 13 PUBLIC SERVICES

Chapter 13.04 WATERWORKS SYSTEM

13.04.210 Unlawful water use.

It is unlawful during the period of Daylight Savings Time each year for any person to use, permit or allow the use of water in any of the following manners:

A.1. For washing of sidewalks, driveways, patios, parking lots, aprons or other non-landscaped exterior ground areas, except as allowed by a city issued washing permit for the washing of driveways, parking lots, aprons and other non-landscaped areas of commercial and industrial properties for the purpose of maintaining the area in a clean, safe and sanitary condition.

2. All businesses proposing to water wash areas identified in Subsection (A)(1) shall obtain a washing permit from the department of public works.

B. Watering of landscaping, washing of exterior buildings or filling of swimming pools:

1. At locations bearing a street address ending in an even number except on Tuesday, Thursday and Saturday;

2. At locations bearing a street address ending in an odd number except on Monday, Wednesday and Friday;

3. At any location between the hours of twelve noon to six p.m. on any day;

4. Except landscaping planted within twenty-one

days of the water use; and

5. Except the Manteca Park public golf course; and

6. Except the city parks, and the city hall complex; and

7. Except that all locations may water on Sunday.

For purposes of this subsection all city-owned property shall be considered to have a street address ending in an odd number.

C. Taking of water from any fire hydrant except by regularly constituted fire protection agencies or provided a permit for construction water has been obtained through the public works department.

D. Allowing the escape of water through leaks, breaks or malfunction in the user's plumbing or distribution system for more than twenty-four hours after discovery thereof by, or notice thereof to, the user.

E. Washing of automobiles or boats except:

1. By use of a quick-acting positive shut-off nozzle on the hose or bucket and sponge;

2. At a commercial car wash.

F. Serving water by restaurants except upon request of a customer.

G. In such a manner so that water flows into a gutter or other drainage area for a period exceeding five minutes. (Ord. 1239 § 1, 2003; Ord. 1126 § 1, 2000; Ord. 1111 § 2, 1999; Ord. 1110 § 2, 1999; Ord. 986 § 1, 1994; Ord. 915 § 1, 1991: Ord. 911 § 2, 1991: Ord. 870 § 1, 1990)

ORDINANCE NO.

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF MANTECA AMENDING THE MUNICIPAL CODE REGARDNING WATER SHORTAGE EMERGENCY RESPONSE

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

SECTION I: There is hereby added to the Manteca Municipal Code Sec. 13.04.230 to read as follows:

Purpose

It is in the public interest to promote the conservation of the city's water supply in order to protect the health, welfare, and safety of water users. To accomplish this declared purpose, the city reserves the right to exercise its police powers through emergency measures set forth in the City of Manteca Urban Water Management Plan and Water Shortage Contingency Plan.

Authority

The mayor, when necessary for the protection of the public health, safety, and welfare, shall have the authority to declare various stages of water emergencies and to implement the water conservation measures set forth the in Urban Water Management Plan and Water Shortage Contingency Plan. The mayor shall also have authority to determine whether the various stage of water emergencies and water conservation measure apply to the entire city service area or to such portion as may b particularly affected.

Enforcement

The public works director or designee, code enforcement officer, fire department, or police officers of the city shall have the authority to enforce provisions of the Urban Water Management Plan and Water Shortage Contingency Plan.

Variances

The public works director may grant temporary variances of the water conservation provisions of the Urban Water Management Plan or Water Shortage Contingency Plan. Such temporary variances shall be in writing and shall be based on a determination by the director that, due to unusual circumstances, application of the water conservation requirement would cause an extraordinary hardship adversely affecting the health, sanitation or fire protection of the applicant or the public. The director's determination shall be final unless appealed as follows: a party adversely affected by the director's determination may appeal the determination to the mayor or designee with 24 hours of the director's determination or such later time as the mayor may designate. The mayor's determination shall be final and nonappealable. Said 24-hour periods shall exclude Saturday, Sunday and legal holidays.

Penalties
Violations of the water use provisions shall be punishable as follows:

First violation of any water use provision: Issuance by personal service or first class delivery of a written notice to the person occupying the premises stating the nature of the violation. A copy of the notice shall be mailed to billing address of the premises.

Second violation: A second violation shall constitute an infraction, punishable by fine of fifty dollars ($50).

Third violation: A third violation shall constitute and infraction, punishable by a fine of one hundred dollars ($100)

Subsequent violations: Subsequent violations shall constitute a misdemeanor, punishable by a fine of one thousand dollars ($1,000) or imprisonment in the County Jail for a period not exceeding six moths or by both such fine and imprisonment.

SECTION II: EFFECTIVE DATE. This ordinance amending the Manteca Municipal Code shall become effective thirty (30) days from its adoption.

SECTION III: PUBLICATION. Within fifteen (15) days after the adoption of this Ordinance, the City Clerk shall cause a copy of this Ordinance to be publish once in the Manteca Bulletin, a newspaper of general circulation, along with a notice setting forth the date of the adoption and the title of this Ordinance.

DATED:
ROLL CALL:
AYES:
NOES:
ABSENT:
ATTEST:

JOANN TILTON CITY CLERK	WILLIE J. WEATHERFORD MAYOR

CERTIFICATE

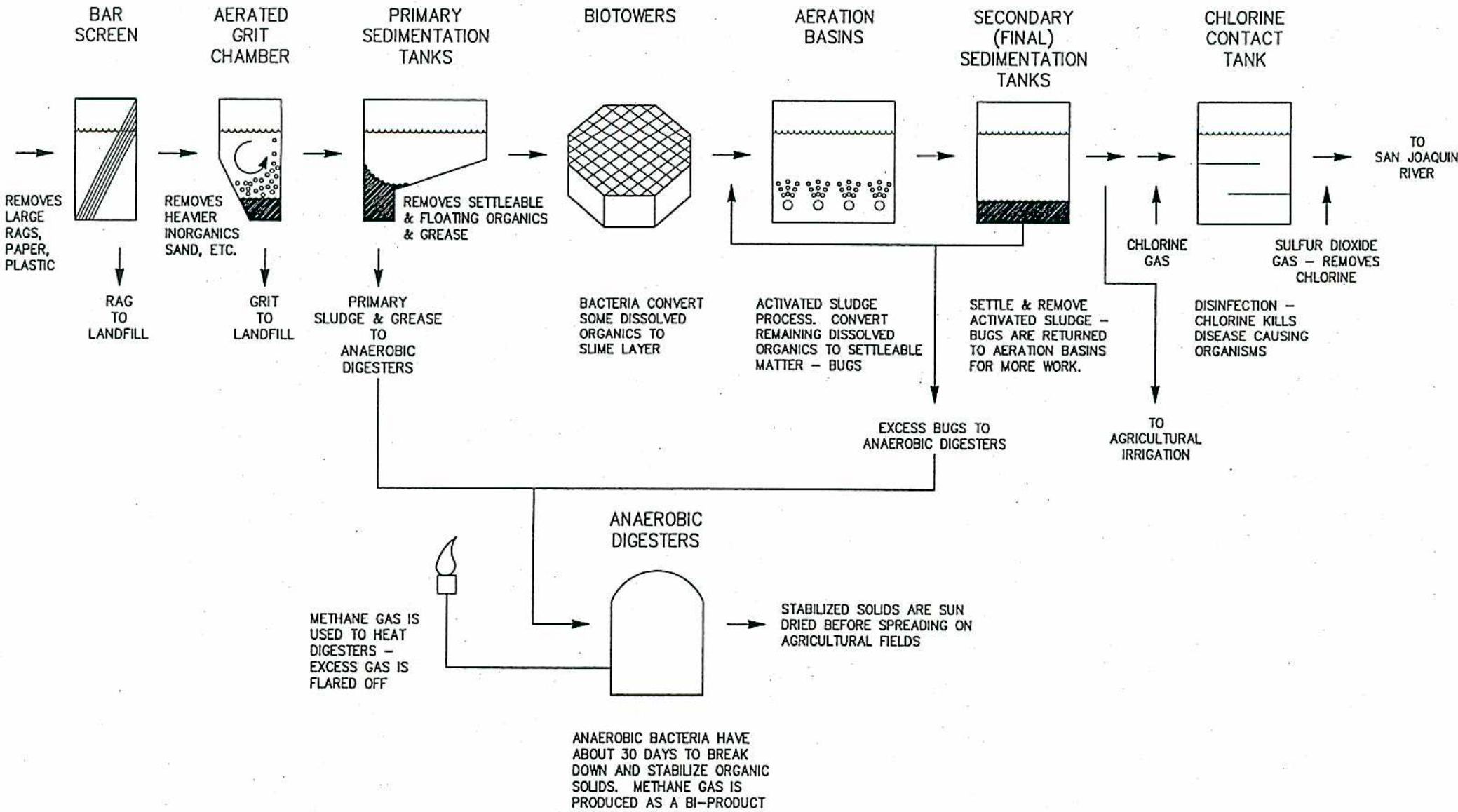
I, JOANN TILTON, City Clerk of the City of Manteca, do hereby state that Ordinance No, _____was INTRODUCED at an adjourned regular meeting of the Manteca City Council held the ____day of _____, and was thereafter PASSED, ADOPTED, and ORDERED TO PRINT, at regular meeting of the Manteca City Council held on the ___ day of _____.

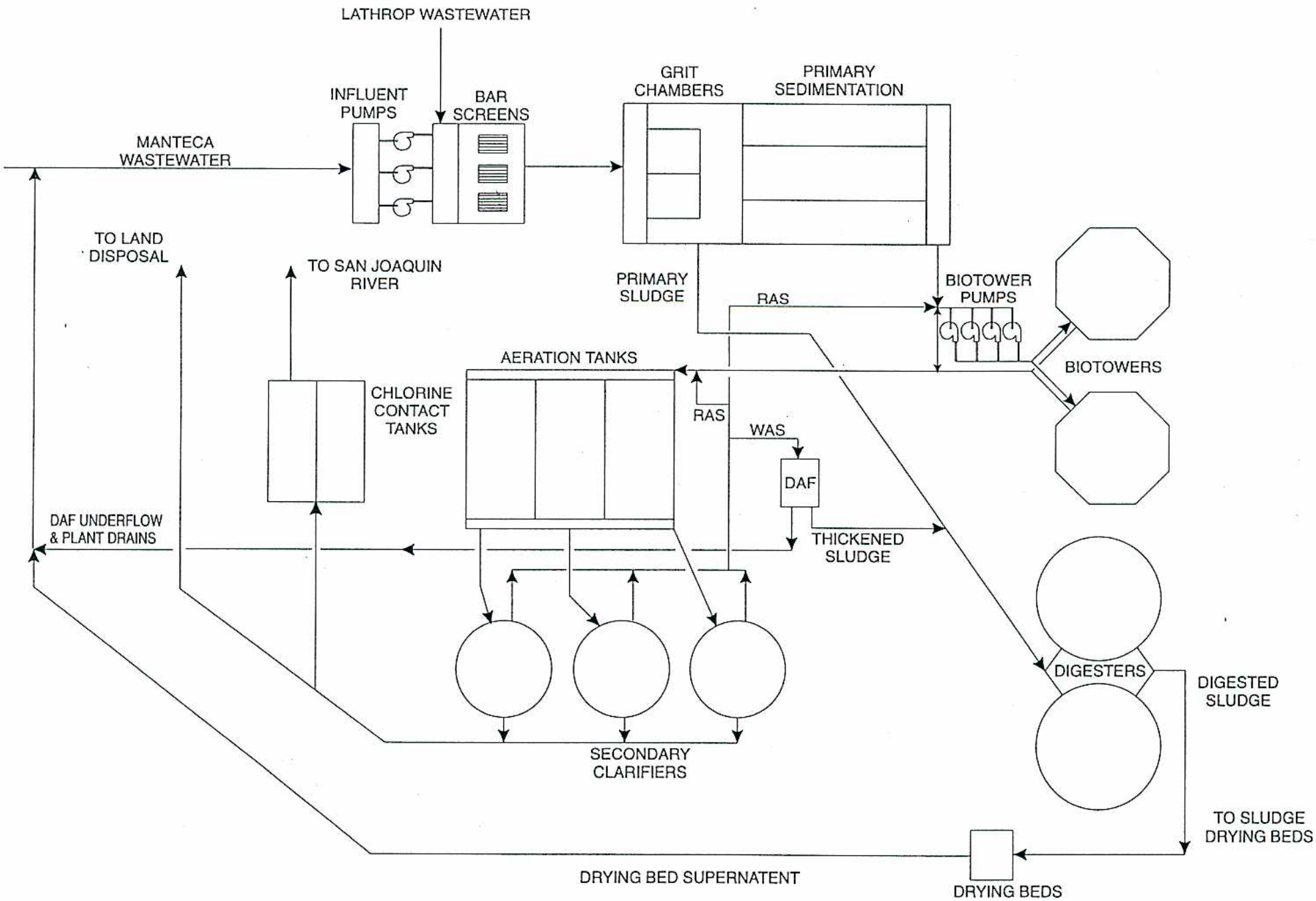
JOANN TILTON
CITY CLERK

APPENDIX G

WASTEWATER TREATMENT PLANT SCHEMATIC

CITY OF MANTECA
WASTEWATER QUALITY CONTROL FACILITIES
PROCESS FLOW SCHEMATIC





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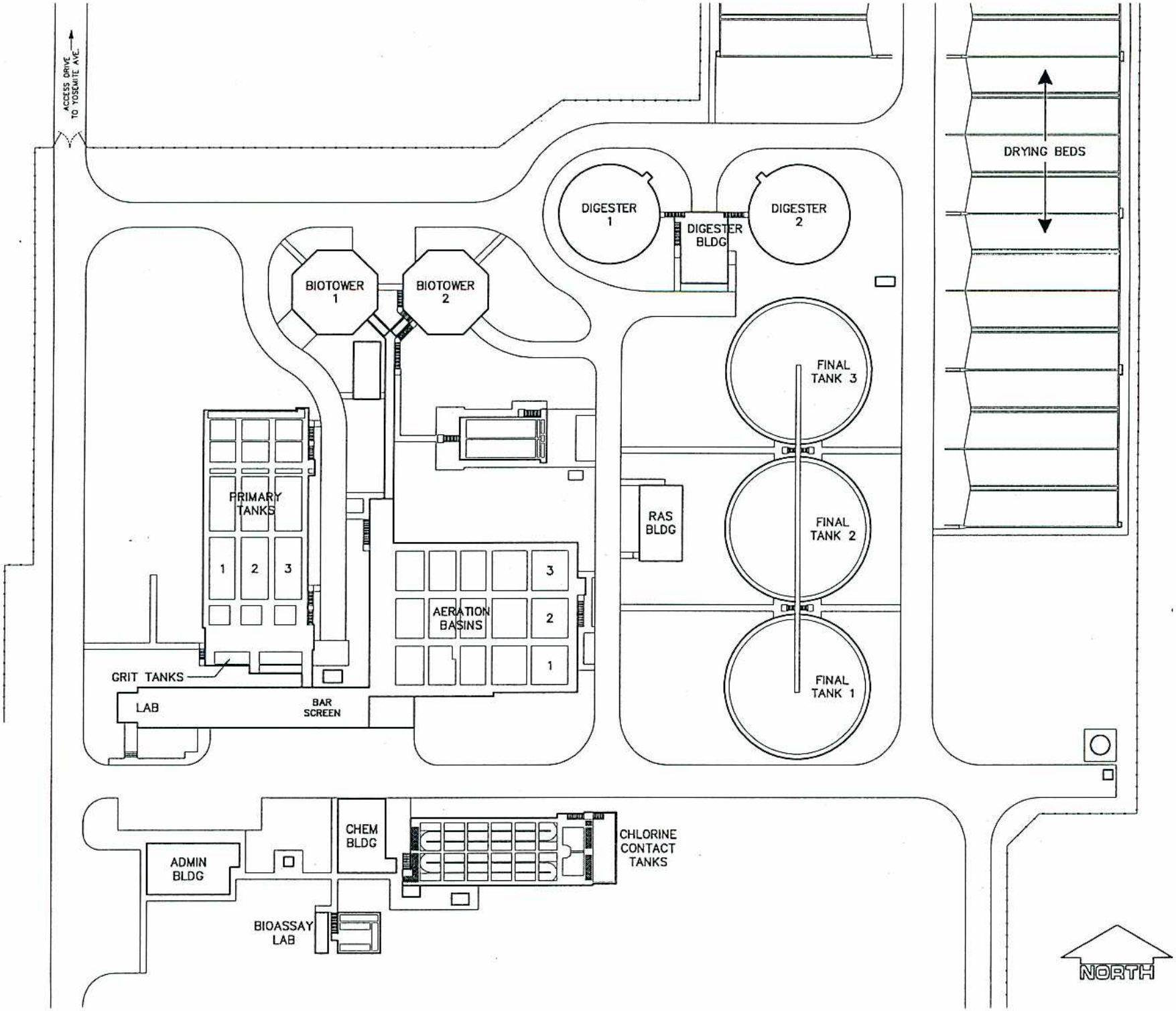
CITY OF MANTECA
WASTEWATER QUALITY CONTROL FACILITIES



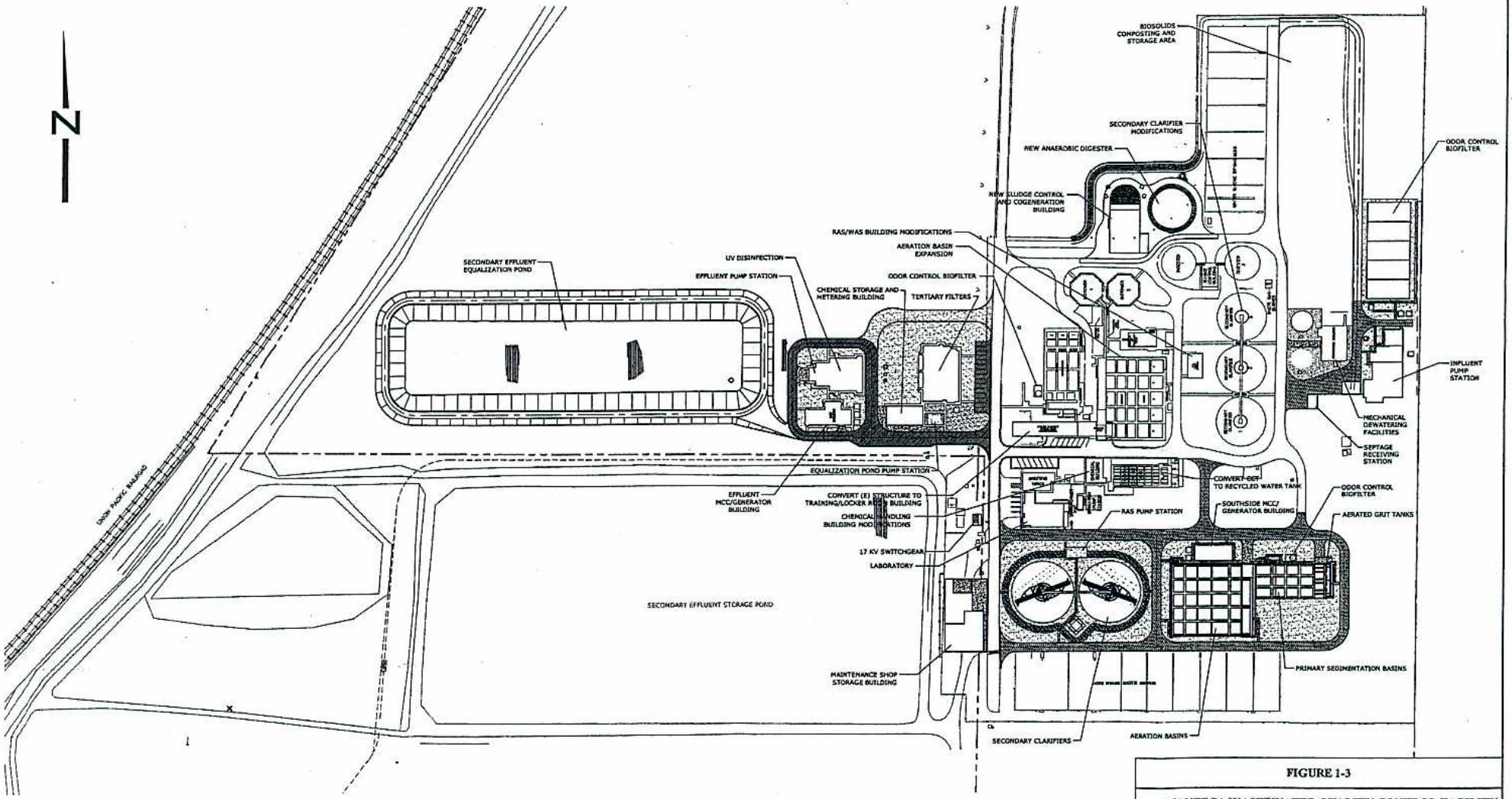


FIGURE 1-3

MANTECA WASTEWATER QUALITY CONTROL FACILITY MASTER PLAN UPDATE

PHASE III EXPANSION PROJECT - SITE PLAN

NOLTE

BEYOND ENGINEERING

APPENDIX H

WATER QUALITY

APPENDIX H

EXISTING AND PROJECTED GROUNDWATER WATER QUALITY FOR 2005 TO 2030

Well #		#5	#8	#9	#10	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25
Capacity, gpm		1075	684	575	740	2000	1430	1900	2010	2145	1150	1310	1500	1200	1000	1000	2200	2000	2500
INORGANIC CHEMICALS	**UNITS**																		
Aluminum	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	ug/l	11	8.6	14	9.2	12	14	19	13	19	10	4.4	14	19	12	12	12	12	17
Barium	ug/l	150	120	ND	ND	110	140	110	ND	100	100	220	190	110	160	ND	110	120	100
Beryllium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	4	ND	5	3	6	5	ND	7	ND
Copper	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ug/l	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	ug/l	ND	ND	ND	ND	ND	ND	70	ND	ND	ND	ND	ND	40	ND	ND	ND	ND	ND
Zinc	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	ND	ND	ND	ND	ND	ND	ND	ND
PHYSICAL	**MEASURE**																		
Color	Units	--	--	--	--	--	--	--	ND	--	<1	--	<1	<1	<1	<1	<1	1	<1
Foaming Agents (MBAs)	mg/l	ND	ND	ND	ND	ND	ND	<0.05	ND	ND	ND	ND	<.05	<0.05	<0.05	<.05	<.05	ND	<.05
Odor Threshold	Units	--	--	--	--	--	--	1	ND	--	1		1	1	1	1	1	1	1
pH	Std units	7.7	7.7	7.8	7.6	7.7	7.8	7.7	7.6	7.5	7.6	7.7	7.2	7.6	7.9	7.8	7.6	8.2	8.1
Specific conductance	umho/cm	620	520	440	510	540	390	270	420	380	370	590	640	310	580	400	420	310	330
Total Dissolved Solids	mg/l	420	350	270	330	320	220	210	280	260	280	400	370	230	420	300	300	250	240
Turbidity	Units	--	--	--	--	--	--	<0.1	0.14	--	0.8	--	<.1	0.4	<.1	<.1	<.1	0.6	0.1
MINERAL																			
Calcium	mg/l	45	51	39	52	45	35	23	40	33	41	66	62	24	71	47	45	30	34
Hardness (CaCO3)	mg/l	250	190	140	200	180	130	82	160	120	150	260	230	84	270	180	170	110	120
Magnesium	mg/l	20	17	11	17	15	10	6	14	8.5	12	22	19	5.9	22	14	14	8.4	9.4
Potassium	mg/l	6.2	6.6	4.8	6.4	5.5	5	3	4.9	4	4	8.5	4	3	5	4	5	4	3
Sodium	mg/l	34	33	33	26	36	29	31	27	35	25	34	36	39	30	22	36	24	27
Bicarbonate (HCO3)	mg/l	260	230	190	200	230	170	120	190	170	140	260	200	120	200	160	160	120	170
Carbonate (CO3)	mg/l	ND	ND	ND	ND	ND	ND	<1	ND	ND	ND	ND	<1	<1	<1	<1	<1	ND	<1
Chloride	mg/l	24	15	12	22	22	9.1	10	14	12	9	12	54	18	35	17	12	14	13
Fluoride	mg/l	ND	0.19	0.25	ND	ND	ND	ND	0.16	0.26	--	0.14	--	--	--	--	0.1	0.1	ND
Hydroxide (OH)	mg/l	ND	ND	ND	ND	ND	ND	<1	ND	ND	ND	ND	ND	<1	<1	<1	<1	ND	<1
Nitrate (as NO3)	mg/l	32	36	19	38	26	24	3	18	9.3	26	32	6	5	29	10	40	24	13
Nitrite	mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.09	ND
Nitrate + Nitrite	ug/l	7300	8200	4400	8600	5900	5300	--	4000	2100		7100						8	
Sulfate	mg/l	53	27	21	35	21	19	11	18	14	25	29	11	12	32	16	22	8	ND
Total alkalinity (as CaCO3)	mg/l	210	190	150	160	190	140	120	160	140	140	210	200	120	200	160	160	120	140
Silica	mg/l	--	--	--	--	--	--	--	--	45	--	--	--	--	--	--	--	--	54
Total Phosphate	mg/l	--	--	--	--	--	--	--	--	ND	--	--	--	--	--	--	--	--	ND
Ortho Phosphate	mg/l	--	--	--	--	--	--	--	--	ND	--	--	--	--	--	--	--	--	ND
RADIOLOGICAL																			
Gross Alpha	pCi/L	17.5	ND	ND	ND	ND	ND	1.6	ND	4.82	3.11	ND	5.61	2.5	9	4.8	4.3	2.83	3.94
Uranium	pCi/L	17.8	ND	ND	ND	ND	ND	ND	ND	2.53	ND	ND	15.6	ND	8.9	10.3	3.4	4.96	--
ORGANIC CHEMICALS																			
Tetrachloroethylene (PCE)	ug/l	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloropropane	ug/l	ND	0.07	0.04	0.039	ND	0.1	ND	ND	ND	0.04	0.014	ND	ND	ND	ND	0.02	ND	ND
Ethylene Dibromide	ug/l	ND	ND	ND	0.02	ND	0.02	ND	ND	ND	0.05	0.03	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected

--- Not Analyzed

APPENDIX H
SURFACE WATER QUALITY

			Reservoir Raw Water		
1998-2000 DATA			Average	Max	Min
INORGANIC CHEMICALS	**UNITS**				
Aluminum	ug/l		357	1500	34
Antimony	ug/l		--	--	--
Arsenic	ug/l		2	--	--
Barium	ug/l		22.5	26	19
Beryllium	ug/l		--	--	--
Cadmium	ug/l		ND	ND	ND
Chromium	ug/l		ND	ND	ND
Copper	ug/l		7.5	15	ND
Lead	ug/l		0.26	0.68	ND
Mercury	ug/l		--	--	--
Nickel	ug/l		0.5	1	ND
Selenium	ug/l		--	--	--
Thallium	ug/l		--	--	--
Cyanide	ug/l		--	--	--
Silver	ug/l		--	--	--
Iron	ug/l		273	1000	ND
Manganese	ug/l		4.1	10	ND
Zinc	ug/l		3.7	21	ND
PHYSICAL	**MEASURE**				
Color	Units		14.2	50	5
Foaming Agents (MBAs) second.	mg/l		--	--	--
Odor Threshold	Units		4.2	17	ND
pH second.	Std units		7.6	9	6.5
Specific conductance second.	umho/cm		--	--	--
Total Dissolved Solids	mg/l		54.4	81	34
Turbidity	Units		5.2	14	1.3
MINERAL					
Calcium (as CaCO3)	mg/l		12.9	22.5	5
Hardness (CaCO3)	mg/l		22.6	33.9	13.4
Magnesium (as CaCO3)	mg/l		4.4	18.3	ND
Potassium	mg/l		0.9	2.9	ND
Sodium	mg/l		2.7	5.1	2
Bicarbonate (HCO3)	mg/l		--	--	--
Carbonate (CO3)	mg/l		--	--	--
Chloride second.	mg/l		1.1	2	ND
Fluoride	mg/l		--	--	--
Hydroxide (OH)	mg/l		--	--	--
Nitrate (as NO3)	mg/l		0.4	1.5	ND
Nitrite	mg/l		--	--	--
Nitrate + Nitrite	mg/l		--	--	--
Sulfate second.	mg/l		2.6	5	ND
Total alkalinity (as CaCO3)	mg/l		30.2	45.3	19

Appendix H
Estimated Blended Water Quality

Constituent	Concentratior	Units
Aluminum	ND	ug/l
Antimony	ND	ug/l
Arsenic	6	ug/l
Barium	100	ug/l
Beryllium	ND	ug/l
Cadmium	ND	ug/l
Chromium	ND	ug/l
Copper	ND	ug/l
Lead	ND	ug/l
Mercury	ND	ug/l
Nickel	ND	ug/l
Selenium	ND	ug/l
Cyanide	ND	ug/l
Silver	ND	ug/l
Manganese	ND	ug/l
Zinc	ND	ug/l
Calcium (as CaCO3)	27	mg/l
Hardness (CaCO3)	35	mg/l
Magnesium (as CaCO3)	7.5	mg/l
Potassium	2.6	mg/l
Sodium	16.5	mg/l
Bicarbonate (HCO3)	105	mg/l
Carbonate (CO3)	<1	mg/l
Chloride	8.7	mg/l
Nitrate (as NO3)	15	mg/l
Nitrite	<1	mg/l
Nitrate + Nitrite	4	mg/l
Sulfate	9.8	mg/l
Total alkalinity (as CaCO3)	94	mg/l