Chapter 4

SYSTEM SUPPLIES

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on the groundwater basin such as water rights, determination if the basin is in overdraft, adjudication decree, and other information from the groundwater management plan.

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 described in subdivision (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

10631 (b) (1). (Provide a) copy of any groundwater management plan adopted by the urban water supplier…

10631 (b) (2). (Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or by the board…(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the decree…For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

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

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

4.1 WATER SUPPLY SOURCES

This section summarizes the existing and projected water supply sources for the City of Hanford (City).

4.1.1 Water Supply Facilities

The City currently utilizes local groundwater as it's sole source of supply. The City's municipal water system extracts its water supply from underground aquifers via 14 active groundwater wells scattered throughout the water service area (Figure 4.1). Maps showing specific location of each well are included in Appendix E. The pumping capacities of the City wells are shown on Table 4.1.

Table 4.1 Water Supply Wells
2010 Urban Water Management Plan
City of Hanford

Well No.	Location	Current Status	Well Capacity (gpm)
18	Kensington Wy. and Richardson Wy.	Standby	900
33	10th Ave. at Kings County Fairgrounds	Active	900
34	4th St. and Irwin St.	Active	1,400
35	Grangeville Blvd. and Mulberry Dr.	Active	1,000
36	Grangeville Blvd. and 9-1/4 Ave.	Standby	1,000
37	Hanford-Armona Rd. and Ogden St.	Abandoned	850
38	Cortner St. at Hidden Valley Park	Active	1,600
39	Pine Castle Dr. and Sherwood Dr.	Abandoned	2,000
40	Grangeville Blvd. and 12th Ave.	Active	2,000
41	Fargo Ave. and Stonecrest Wy.	Active	2,000
42	Grangeville Blvd. and Centennial Dr.	Active	2,000
43	Centennial Dr. s/o Grangeville Blvd.	Active	2,000
44	Fargo Ave. at the BNSF Railroad	Active	2,500
45	E. Lacey Blvd.	Active	1,750
46	Brown St. and Hill St. (Johnson Park)	Active	2,000
47	Lakewood Dr. and Neil Wy.	Active	2,000
48	Fairmont Dr. and Palm Cr.	Active	1,750
49	9-1/4 Ave at Freedom Park	Active	1,750
		Total Active Well Capacity	**24,650**
		Standby Well Capacity	**1,900**

Note:
(1) Source: City staff records.

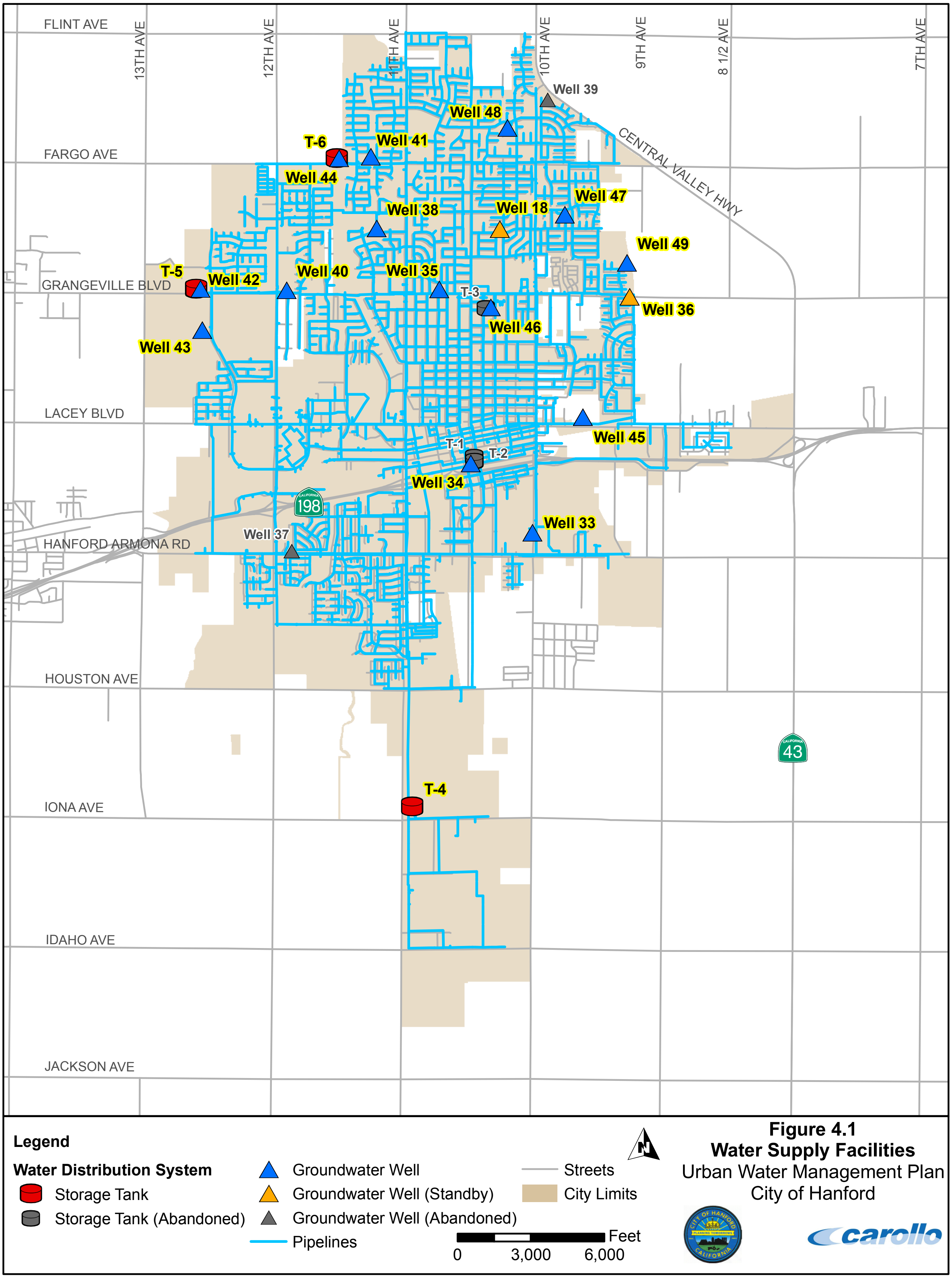


Figure 4.1
Water Supply Facilities
Urban Water Management Plan
City of Hanford

In 2005, the City developed an implementation plan for reducing arsenic concentrations in its water system to comply with the United States Environmental Protection Agency's (EPA's) new maximum contaminant level (MCL) of 0.010 milligrams per liter (mg/L), which became effective on January 23, 2006. More information regarding the arsenic implementation plan is provided in Chapter 5.

4.1.2 Distribution System and Storage

Water is conveyed from the City wells to the consumers via an approximately 203 mile distribution system with pipe sizes ranging between 2- and 24-inches in diameter. The City currently maintains four active storage reservoirs within the distribution system for a total capacity of 3.5 million gallons (MG). These reservoirs include one 0.5 MG ground level storage reservoir serving the industrial park (T-4), two 1.0 MG ground level tanks on Grangeville Boulevard (T-5), and a recently constructed 1.0 MG ground level storage tank on Fargo Avenue, as summarized in Table 4.2. Three older elevated tanks (T-1 to T-3) have been abandoned.

Table 4.2 Storage Tank Summary
2010 Urban Water Management Plan
City of Hanford

Tank No.	Location	Type	Current Status	Volume (gal)
T-1	*4th St. and Irwin St.*	*Elevated Steel Tank*	*Abandoned*	*100,000*
T-2	*4th St. and Irwin St.*	*Elevated Steel Tank*	*Abandoned*	*75,000*
T-3	*Brown St. and Hill St. (Johnson Park)*	*Elevated Steel Tank*	*Abandoned*	*300,000*
T-4	11th Ave. and Iona Ave.	Ground-Level Steel Tank	Active	500,000
T-5	Grangeville Blvd. and Centennial Dr.	Two Ground-Level Steel Tanks	Active	2,000,000
T-6	Fargo Ave. at the BNSF Railroad	Ground-Level Steel Tank	Active	1,000,000
			Total Active Volume	**3,500,000**

Note:
(1) Source: City staff records.

4.1.3 Current and Projected Water Sources

Table 4.3 summarizes the current and projected water supply sources for the City. As shown on Table 4.3, the City plans to utilize local groundwater as its sole source of supply for the foreseeable future.

Table 4.3	Water Supplies - Current and Projected (Guidebook Table 16) 2010 Urban Water Management Plan City of Hanford						
Water Supply Sources		**Projected Water Supply (AFY)**					
Water Purchased From:	**Wholesale Supplied Volume (Yes/No)**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wholesale Agencies (None)	n/a	0	0	0	0	0	0
Supplier-Produced Groundwater	No	12,170	13,886	14,563	16,690	19,131	21,934
Supplier-Produced Surface Water	No	0	0	0	0	0	0
Transfers In	No	0	0	0	0	0	0
Exchanges In	No	0	0	0	0	0	0
Recycled Water	No	0	0	0	0	0	0
Desalinated Water	No	0	0	0	0	0	0
Other	No	0	0	0	0	0	0
Total		**12,170**	**13,886**	**14,563**	**16,690**	**19,131**	**21,934**

Note:

(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

4.1.4 Wholesale Supplies

As indicated on Table 4.4, the City does not receive wholesale water, nor does it plan to in the future.

Table 4.4	Wholesale Supplies – Existing and Planned Sources of Water (Guidebook Table 17) 2010 Urban Water Management Plan City of Hanford					
		Projected Water Supply (AFY)				
Wholesale Sources	**Contracted Volume (AFY)**	**2015**	**2020**	**2025**	**2030**	**2035**
None	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**

Note:

(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

4.2 GROUNDWATER BASIN

For planning purposes, the Department of Water Resources (DWR) has subdivided the State of California into ten separate hydrologic regions, corresponding to the State's major drainage basins. The City is located within the Tulare Lake Hydrologic Region.

Groundwater within the State is divided into distinct groundwater basins, some of which are further divided into smaller interconnected subbasins. This section summarizes the groundwater basin underlying the City.

4.2.1 Groundwater Basin Description

The groundwater underlying the City is located within the San Joaquin Valley Groundwater Basin (Figure 4.2). This Basin contains multiple interconnected subbasins that transmit, filter, and store water. These subbasins are the Kings, Kern County, Kaweah, Tulare Lake, Tule, Pleasant Valley, and Westside groundwater subbasins. Hanford is specifically located within the Tulare Lake Groundwater Subbasin.

According to the DWR Bulletin 118, the Tulare Lake Subbasin (Groundwater Subbasin Number 5-22.12) covers a surface area of approximately 524,000 acres (818 square miles) in Kings County. It is bounded on the south by the Kings-Kern county line, on the west by the California Aqueduct, the eastern boundary of Westside Groundwater Subbasin, and Tertiary marine sediment of the Kettleman Hills. On the north, it is bounded by the southern boundary of the Kings Groundwater Subbasin, and on the east by the westerly boundaries of the Kaweah and Tule Groundwater Subbasins. The southern half of the Tulare Lake Subbasin consists of lands in the former Tulare Lakebed in Kings County.

The Tulare Lake Groundwater Subbasin is not an adjudicated groundwater basin. DWR has assigned the subbasin a 'Type B' groundwater budget, which means that enough data is available to estimate groundwater extraction to meet local water needs, but not enough data is available to characterize the groundwater budget. Well yields average 300 to 1,000 gallons per minute (gpm), with a maximum of 3,000 gpm.

According to the DWR, estimations of the total storage capacity of the Tulare Lake Subbasin and the amount of water storage as of 1995 were calculated using an estimated specific yield of 8.5 percent and water levels collected by the DWR and cooperators. Based on these calculations, the total storage capacity of the Tulare Lake Subbasin was estimated to be 17,100,000 acre feet (af) to a depth of 300 feet and 82,500,000 af to the base of fresh groundwater. These same calculations give an estimate of 12,100,000 af of groundwater to a depth of 300 feet stored in this subbasin as of 1995. The amount of stored groundwater in this subbasin as of 1961 was 37,000,000 af to a depth of less than 1,000 feet.

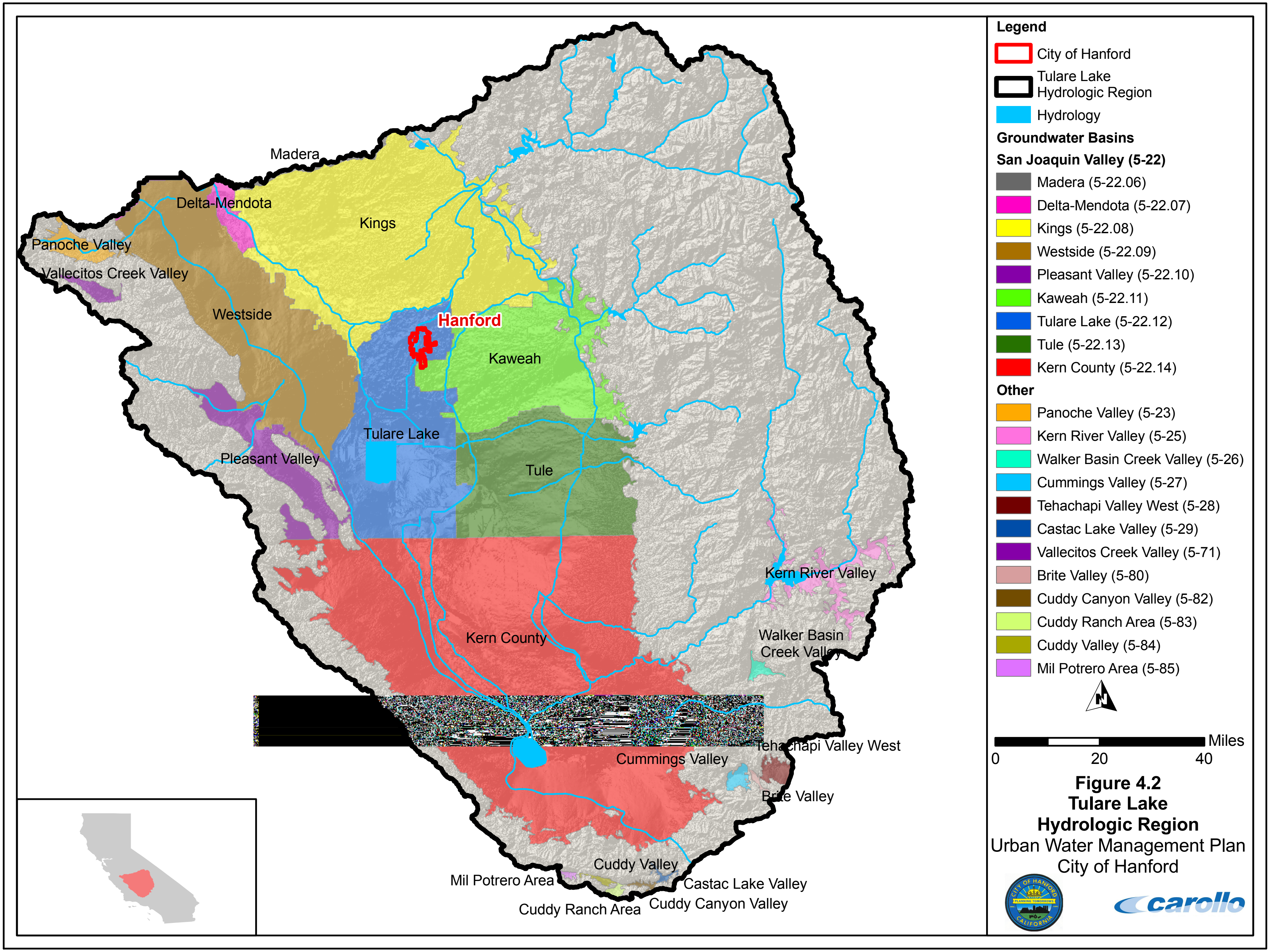


Figure 4.2
Tulare Lake
Hydrologic Region
Urban Water Management Plan
City of Hanford

Kings County Water District's (KCWD's) 2001 Groundwater Management Plan (GWMP) provided an estimate of 8,900,000 af of groundwater storage for the entire district area (KCWD covers multiple groundwater subbasins, including the Tulare Lake Subbasin). According to KCWD's Draft 2011 GWMP Update, from 1993 to 2010, average groundwater levels decreased in the district area, reducing the amount of groundwater storage by about 252,000 AF.

4.2.2 Groundwater Management Plan

The KCWD was formed in 1954 under the County Water District Act to provide a legal entity for water management in the Northeast portion of Kings County. KCWD prepared a GWMP in January 1993, with the date of last finalized revision, November 2001. In addition, at the time this UWMP was prepared, a 2011 revision of the KCWD GWMP was available in draft form.

The groundwater information presented in this plan is based on the information presented in the Draft 2011 GWMP Update, which provides a clear understanding of KCWD groundwater management role within the County. It also documents the exiting groundwater management efforts of KCWD and planned efforts to improve groundwater management.

Since its creation, KCWD has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. The Draft 2011 GWMP Update identifies ten "Basin Management Objectives," which were developed by KCWD to address specific groundwater needs and challenges. These include:

- Stabilize groundwater levels
- Prevent all surface water exports
- Import new surface water supplies
- Increase groundwater storage potential
- Increase adaptive management practices
- Prevent land subsidence
- Prevent groundwater degradation
- Maintain good groundwater quality for agricultural irrigation
- Increase knowledge of local geology and hydrogeology
- Maintain/strengthen KCWD's authority for local groundwater management

A compact disc containing copies of the 2001 GWMP, as well as the Draft 2011 GWMP Update are included in Appendix F.

4.2.3 Groundwater Levels and Historical Trends

According to the Draft 2010 GWMP, groundwater levels in the KCWD area were fairly stable prior to 1987, but have seen a steep decline since then. Water levels have continued to fluctuate in response to drought and flood years. Recently, water levels have dropped significantly due to a 3-year long drought, but prior to the drought water levels raised across the District for a period of several years.

Information obtained from DWR indicates that on average, the Tulare Lake Subbasin water levels declined nearly 17 feet (ft.) from 1970 to 2000. The period from 1970 through 1978, showed moderate declines with many fluctuations, totaling about 12 ft. The ten-year period from 1978 to 1988 saw more fluctuations and a general increase of about 24 ft., bringing water levels up to 12 ft. above the 1970 water levels. 1988 through 1993 showed steep declines, bottoming out in 1993 at 23 ft. below the 1970 level. From 1999 to 2000, water levels dropped another 7 ft., bringing the water levels to about 17 ft., below the 1970 water levels. Fluctuations in water levels have been most exaggerated in the lakebed area of the subbasin. This area has the steepest decrease in water levels as well as some of the strongest increases in water levels.

Groundwater generally flows southwest, toward the Tulare Lakebed. Based on current and historical groundwater elevation maps (Appendix G), horizontal groundwater barriers do not appear to exist in the subbasin. Water-level maps obtained from DWR indicate a decline in groundwater elevations under the City. In Spring 2006, groundwater was at roughly 130 ft. above mean sea level, which is 120 ft. below the ground surface (Figure 4.3).

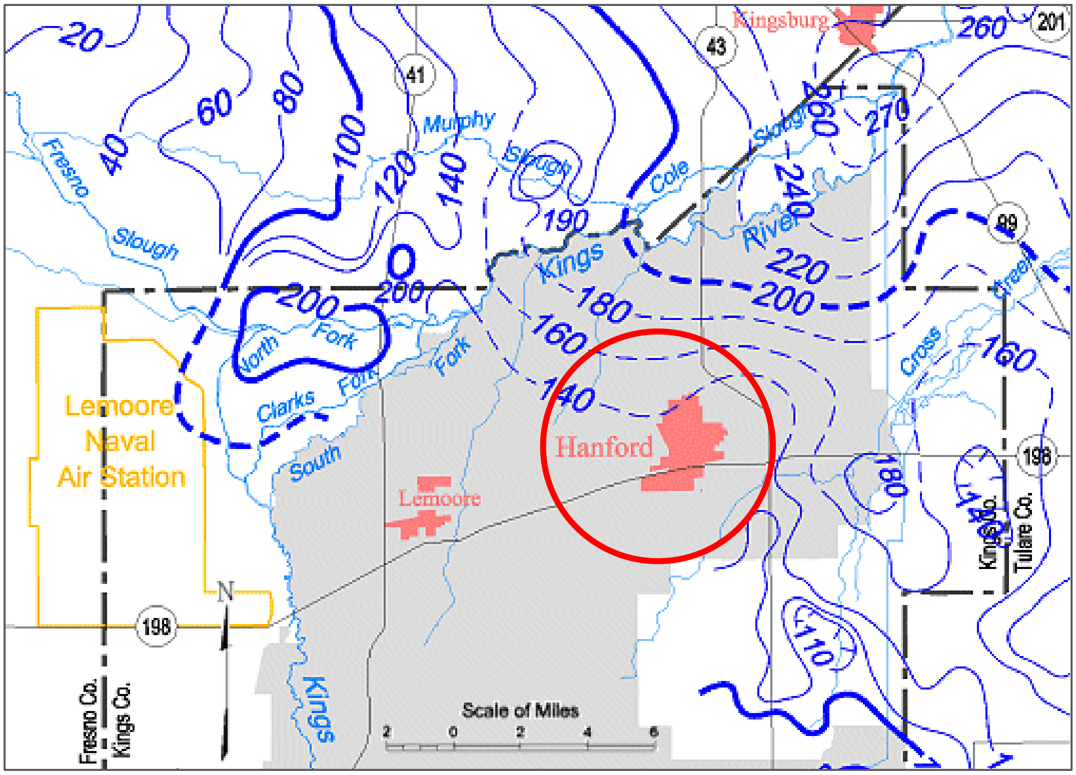
4.2.4 Groundwater Overdraft

The 2003 update to DWR Bulletin 118 identifies eleven groundwater basins in a critical state of overdraft. These eleven groundwater basins were identified as overdrafted by DWR in the 1980 publication of DWR Bulletin 118. No additional analysis was performed to update the status of the eleven groundwater basins for the 2003 update to DWR Bulletin 118, or to identify additional groundwater basins in a state of critical overdraft.

The Tulare Lake Subbasin is identified as one of the eleven groundwater basins in a critical state of overdraft by DWR Bulletin 118. No additional information regarding the current overdraft status of the Tulare Lake Subbasin is available.

The following provides a general summary of the efforts being undertaken or planned to be undertaken by KCWD to address the long-term overdraft condition, as identified in its Draft 2011 GWMP Update.

- **Groundwater Level Monitoring.** The District began routinely measuring groundwater levels in 1950s. Through cooperative efforts between the District and several other public agencies KCWD now monitors groundwater levels in 230 to 280 wells each spring and fall, some of which are in the vicinity of the City of Hanford.



Source: www.water.ca.gov/groundwater/

Figure 4.3
Groundwater Elevation Contours - Spring 2006
2010 Urban Water Management Plan
City of Hanford

- **Groundwater Recharge/Recharge.** There are about 25 recharge basins within District boundaries and water is recharged via unlined canals throughout the District. The total area of the recharge basins and un-lined ponds is estimated to be 1,300 acres.

  KCWD also plans to expand the number of recharge basins where feasible in the future. Efforts are currently underway to expand recharge capabilities in KCWD, in an around the City of Hanford, and at other locations as opportunities arise. KCWD is currently in the process of constructing the 36.5 acre Garner Recharge Basin along Highway 198 east of the City.

- **Surface Water Deliveries.** KCWD prices surface water so that it is competitive with groundwater, which encourages the use of surface water irrigation by growers where it is available.
- **Conjunctive Use.** KCWD currently has facilities in place to operate a conjunctive use program, and in fact, has been operating in such a manner for some time. Through additional measures, KCWD hopes to provide a greater capacity for using excess Kings River flows, and hopefully a long-term groundwater balance can be obtained.

  KCWD's conjunctive use program includes surface water delivery in lieu of groundwater pumping, groundwater recharge and banking, and, when practical, transfers to neighboring areas sharing a common groundwater supply.
- **Water Conservation and Education.** KCWD considers water conservation and education important aspects of its overall groundwater management efforts. The District participated in several water conservation and education programs including the Kings County Water Education Committee, Education and Agriculture Together Foundation, California Farm Water Coalition, Association of California Water Agencies, and Water Education Foundation. The District contributes funds and staff time to these agencies.

Appendix F contains more detailed information regarding the KCWD activities to address groundwater basin overdraft. The City will cooperate with and assist KCWD where appropriate in its continued efforts to eliminate basin overdraft and to protect groundwater quality.

4.3 EXISTING AND PROJECTED GROUNDWATER PUMPING

The City's current sole source of supply is groundwater, which is extracted from underground aquifers via 14 active groundwater wells (Figure 4.1). The historical volume of groundwater pumped by the City over the past five years is provided in Table 4.5. As shown in Table 4.5, the City's water supplies are entirely obtained from the Tulare Lake Groundwater Subbasin. The City's groundwater has historically been capable of reliably meeting the City's water demands.

The projected amount of groundwater anticipated to be pumped through year 2030 is included in Table 4.6. As shown in Table 4.6, the City anticipates it will supply all of its water demands from the Tulare Lake Groundwater Subbasin through the year 2035.

Table 4.5 Historic Groundwater Pumping (Guidebook Table 18)
2010 Urban Water Management Plan
City of Hanford

Basin Name	Metered or Unmetered(3)	Historic Pumping Rates (AFY)				
		2006	**2007**	**2008**	**2009**	**2010**
Tulare Lake Subbasin(2)	Metered	9,816	10,608	10,447	10,490	9,881
	Unmetered	1,797	2,323	2,293	2,302	2,289
Total Groundwater Pumped		**11,613**	**12,931**	**12,741**	**12,792**	**12,170**
Groundwater as Percent of Total Water Supply		**100%**	**100%**	**100%**	**100%**	**100%**

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) The City receives its groundwater from the Tulare Lake Subbasin, which is part of the San Joaquin Valley Groundwater Basin.
(3) The City's total production is metered at the individual well sites. Many individual customer accounts, but not all, are also metered.

Table 4.6 Projected Groundwater Pumping (Guidebook Table 19)
2010 Urban Water Management Plan
City of Hanford

Basin Name	Projected Pumping Rates (AFY)				
	2015	**2020**	**2025**	**2030**	**2035**
Tulare Lake Subbasin(2)	13,886	14,563	16,690	19,131	21,934
Total Groundwater Pumped	**13,886**	**14,563**	**16,690**	**19,131**	**21,934**
Groundwater as Percent of Total Water Supply	**100%**	**100%**	**100%**	**100%**	**100%**

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) The City receives its groundwater from the Tulare Lake Subbasin, which is part of the San Joaquin Valley Groundwater Basin.

4.4 TRANSFER AND EXCHANGE OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for transfers or exchanges.

Law

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

The City's dominant water supply source (i.e., groundwater) is expected to have sufficient capacity for the planning horizon. Therefore, the use of water transfers or exchanges is not necessary to augment supply. For this reason, the City does not anticipate any opportunities for water transfers or exchanges (Table 4.7).

The City currently does not have any emergency interties with neighboring agencies.

Table 4.7 Transfer and Exchange Opportunities (Guidebook Table 20)
2010 Urban Water Management Plan
City of Hanford

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume (AFY)
None	n/a	n/a	0
Total			**0**

Note:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

4.5 DESALINATED WATER OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water and groundwater.

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.*

4.5.1 Brackish Water and/or Groundwater Desalination

As summarized in Table 4.8, the groundwater that underlies the City is not brackish in nature and does not require desalination. However, the City could provide financial assistance to other purveyors in exchange for water supplies. Should the need arise, the City could consider this option.

Table 4.8 Opportunities for Desalinated Water 2010 Urban Water Management Plan City of Hanford	
Sources of Water	**Opportunities for Desalinated Water**
Ocean Water	None
Brackish Ocean Water	None
Brackish Groundwater	None
Other	None

4.5.2 Seawater Desalination

Because the City is not located in a coastal area, it is not practical nor economically feasible to implement a seawater desalination program (Table 4.8). However, the City could provide financial assistance to other purveyors in exchange for water supplies. Should the need arise, the City could consider this option.

4.6 RECYCLED WATER OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for development of recycled water, including the description of existing recycled water applications, quantities of wastewater currently being treated to recycled water standards, limitations on the use of available recycled water, an estimate of projected recycled water use, the feasibility of said projected uses, and practices to encourage the use of recycled water.

Law

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

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

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

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

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

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

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

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

The City is the sole agency responsible for the collection, treatment, and disposal of wastewater in the City limits.

4.6.1 Wastewater Treatment Facilities

The City provides wastewater service to its residential, commercial, and industrial users within the City limits and some unincorporated areas. The Wastewater Treatment Facility (WWTF) operates under Waste Discharge Requirements Order No. 5-01-153, issued by the Regional Water Quality Control Board (RWQCB).

The WWTF is a two-stage trickling filter and extended aeration facility and was originally constructed in 1948/49. Five upgrades and expansions have occurred since then.

The existing facility has a design capacity of 8.0 million gallons per day (mgd), on an average annual wastewater flow basis (AAWF). The facility includes: a headworks, two primary clarifiers, two primary trickling filters, two secondary trickling filters, one oxidation ditch, four secondary clarifiers, three anaerobic digesters, one dissolved air flotation sludge thickener; sixteen sludge drying beds, one facultative sludge lagoon, one effluent equalization basin, six effluent disposal/percolation ponds, and two emergency effluent storage ponds.

A 2.5 mgd capacity oxidation ditch facility has been constructed that will provide secondary treatment. Additionally, a new headworks has been installed with an influent pump station, a parshall flume, two mechanical bar screens, grit classifier/removal structure, and a two-way splitter box to deliver flows to both the trickling filter and oxidation ditch facilities. Secondary treated wastewater from the oxidation ditch facility is routed back to the trickling filter plant for chlorination prior to discharge to storage ponds.

If the population growth continues as expected, the capacity of the 8.0 mgd WWTF will be exceeded before the year 2025. Future upgrades will increase the capacity to 10.5 mgd.

4.6.2 Water Recycling Facilities

The WWTF's recycled water system currently consists of:

- Two Primary Clarifiers
- Two Primary Trickling filters
- Two Secondary Trickling filters
- One Oxidation Ditch
- Four Secondary Clarifiers
- Three Anaerobic Digesters
- One Dissolved Air Floatation Sludge Thickener
- Sixteen Sludge Beds
- One Facultative Sludge Lagoon
- Effluent Pump Station
- Six Evaporation/Percolation Ponds
- Two Emergency Effluent Storage Ponds
- An Effluent Distribution System with one existing booster pump station and an irrigation pump station.
- 11,500 acres of irrigated farmland

Chlorinated secondary-treated effluent is discharged to the equalization basin, then pumped to evaporation/percolation ponds or farmlands. The effluent pump station is set up for four pumps. Three pumps (30 hp, 3.0 mgd each) are currently installed.

Delivery of effluent to permitted lands is handled through two separate pump stations. For land west of the WWTF, flow is pumped from the WWTF effluent pump station through a 24-inch diameter reinforced concrete pipe (RCP) installed during the 1976 expansion. Effluent is delivered to property east and south of the WWTF by pumping flow through a City-owned 24 inch diameter PVC pipeline.

Effluent is used to irrigate crops on privately owned land. Reclamation sites are permitted under the City's two monitoring report programs (MRP) from the Regional Water Quality Control Board (RWQCB) (5-00-222 and 5-00-223). MRP 5-00-222 governs water recycling on the 11,500 acres of privately owned farmland within the Lakeside Irrigation Water District (LIWD). MRP 5-00-223 governs water recycling on a City-owned 1,600 acre site (for future use), plus several small privately-owned farms near the WWTF (current users).The City's recycled water is reused as stipulated in the Reclamation Project Agreement (Appendix H). The City pays $30 per acre-foot to LIWD to recycle its wastewater effluent.

Because the City recycles disinfected secondary effluent on agricultural farmland, this recycled water use does not directly offset potable water use, and therefore will not aid the

City in meeting its 2020 per capita water use target identified in Chapter 3 of the UWMP. However, the City's recycling program does reduce the amount of water used by farmers in the area that would otherwise come from surface water and/or groundwater sources.

4.6.3 Wastewater Generation

A summary of the City's historical and projected future wastewater flow volume is provided in Table 4.9. The quantity of effluent that meets or will meet recycled water standards is also included in this table. The City's WWTF provides disinfected secondary treatment, and has a daily maximum coliform limit of 23 MPN/100 mL for discharges to irrigation lands.

Table 4.9 Recycled Water – Wastewater Collection and Treatment (Guidebook Table 21)
2010 Urban Water Management Plan
City of Hanford

	Volume (AFY)						
Type of Wastewater	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wastewater Collected and Treated in Service Area[(2)]	n/a	5,442	8,401	9,555	10,865	12,355	14,047
Volume that meets recycled water standard[(3)]	n/a	5,442	8,401	9,555	10,865	12,355	14,047

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) Projected wastewater flows are based on the City's Wastewater Treatment and Disposal Engineering Report, dated April 2000.
(3) The City's WWTF provides disinfected secondary effluent.

The City's primary method of effluent disposal is to recycle it on agricultural land through contracts with local farmers. For simplicity, it has been assumed that 100 percent of the effluent is recycled on agricultural lands, although in reality a portion of the effluent flow will be lost to evaporation and percolation. Therefore, Table 4.10 lists the projected non-recycled wastewater disposal as "0" through year 2035.

4.6.4 Current Recycled Water Use

Table 4.11 summarizes the 2010 recycled water deliveries from the City's WWTF. For comparison, the projected recycled water flow volumes presented in the City's 2005 UWMP are also presented in this table. The difference in the actual 2010 recycled water use and the 2005 UWMP projected recycled water use is due to the fact that wastewater flows to the City's WWTF did not grow at the rate projected in the 2005 UWMP. This is due in part to the recent economic recession, which has led to reduced wastewater flows in many agencies in the state.

Table 4.10 Recycled Water – Non-Recycled Wastewater Disposal (Guidebook Table 22)
2010 Urban Water Management Plan
City of Hanford

Method of Disposal	**Treatment Level**	**Volume (AFY)**					
		2010	**2015**	**2020**	**2025**	**2030**	**2035**
Equalization Basin(2)	Disinfected Secondary	0	0	0	0	0	0
Total		**0**	**0**	**0**	**0**	**0**	**0**

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) Volume presented assumes that percolation/evaporation losses in the City's WWTF ponds are negligible.

Table 4.11 2010 Recycled Water Use Compared to 2005 UWMP Use Projections (Guidebook Table 24)
2010 Urban Water Management Plan
City of Hanford

User Type	**Volume (AFY)**	
	2010 Actual	**2005 Projection for 2010(2)**
Agricultural Irrigation	5,442	6,493
Landscape Irrigation	0	0
Commercial Irrigation	0	0
Golf Course Irrigation	0	0
Wildlife Habitat	0	0
Wetlands	0	0
Industrial Reuse	0	0
Groundwater Recharge	0	0
Seawater Barrier	0	0
Geothermal Energy	0	0
Indirect Potable Reuse	0	0
Total	**5,442**	**6,493**

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) Source: 2005 UWMP, July 2006.

4.6.5 Projected Recycled Water Use

Irrigation demand for the LIWD lands alone (27,103 AFY[1]) will exceed the amount of effluent discharged by the WWTF. For this reason, continued recycled use through LIWD permitted farmland is the most economically and technically feasible approach for the City to recycle its WWTF effluent in the future. Projections for annual recycled water use are shown on Table 4.12, assuming that the City will continue to utilize agricultural irrigation as its sole means of recycling WWTF effluent water. Detail on the recycled water irrigation program is provided in the Recycled Water Engineering Report prepared by Carollo Engineers in February 2000.

Table 4.12 Recycled Water – Potential Future Use (Guidebook Table 23)
2010 Urban Water Management Plan
City of Hanford

User Type	Description	Feasible?	Volume (AFY)				
			2015	2020	2025	2030	2035
Agricultural Irrigation	LIWD Permitted Land	Yes	8,401	9,555	10,865	12,355	14,047
Landscape Irrigation	n/a	n/a	0	0	0	0	0
Commercial Irrigation	n/a	n/a	0	0	0	0	0
Golf Course Irrigation	n/a	n/a	0	0	0	0	0
Wildlife Habitat	n/a	n/a	0	0	0	0	0
Wetlands	n/a	n/a	0	0	0	0	0
Industrial Reuse	n/a	n/a	0	0	0	0	0
Groundwater Recharge	n/a	n/a	0	0	0	0	0
Seawater Barrier	n/a	n/a	0	0	0	0	0
Geothermal Energy	n/a	n/a	0	0	0	0	0
Indirect Potable Reuse	n/a	n/a	0	0	0	0	0
Total			**8,401**	**9,555**	**10,865**	**12,355**	**14,047**

Note:
(1 "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

In the future, however, the City may decide to reevaluate the need for or desirability of constructing a recycled water (purple pipe) distribution system to serve its municipal customers. As an example, implementation of an urban recycled water distribution system could help the City to meet its 2020 per capita water conservation target. This, however, would require the City to upgrade its WWTF to provide tertiary treatment.

[1] Source: Appendix F of the City of Hanford Recycled Water Engineering Report, dated February 2000.

4.6.6 Encouraging Recycled Water Use

As noted in Section 4.6.5, the most economically and technically feasible method for the City to recycle its WWTF effluent is through the LIWD permitted farmland. As such, additional measures taken by the City, such as future financial incentives, would likely not result in additional recycled water use, as summarized in Table 4.13.

Table 4.13 Methods to Encourage Recycled Water Use (Guidebook Table 25)
2010 Urban Water Management Plan
City of Hanford

	Projected Volume (AFY)					
Actions	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Financial Incentives	0	0	0	0	0	0
Other	0	0	0	0	0	0

Note:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

4.6.7 Recycled Water Use Optimization Plan

Because the City should be capable of recycling all projected wastewater flows through year 2035 on LIWD permitted land, as well as City owned land as needed, a plan for optimizing the use of recycled water in the City's service area would not result in any additional use of recycled water.

Should it become necessary or desirable in the future, the City will consider actions to facilitate the use of recycled water, such as requiring the installation of dual distribution systems in new development.

4.7 FUTURE WATER PROJECTS

The UWMPA requires that suppliers describe water supply projects and programs may be undertaken to meet the projected water demands.

Law

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

As previously noted, the City intends to meet its projected future water demands through the continued use of groundwater alone. As such, no specific future water projects are planned at this point. Additional wells will periodically be drilled in the future. The timing of the construction of future wells, as well as the capacity of the wells, will depend on several variables, such as the future City growth rate, actual water conservation achieved, well yield, future water quality regulations, and a variety of other factors.

As noted in Table 4.1, the City's existing active supply capacity is 24,650 gpm, or 35.5 mgd. The City's active supply capacity is considered to be the reliable, or firm, capacity of the water distribution system, because the City has an additional 1,900 gpm of standby well capacity. Based on the supply projections presented in Chapter 3, the City's average day demand (ADD) is projected to reach 19.6 mgd by year 2035, assuming that the City meets its 2020 per capita water use target of 179 gallons per capita per day (gpcd). Applying a maximum day demand (MDD) to ADD factor of 1.8, the City's 2035 MDD is projected to be 35.3 mgd. Based on these projections, the City's would be capable of meeting the projected 2035 MDD through the existing total active well capacity[2] (Table 4.14). This assumes that the yield of the existing wells is not reduced in the future due to water quality or other concerns.

The previous analysis assumes that the City will achieve future water conservation to meet its "20x2020" water use target. Without future water conservation, the City's future MDD could approach 41.8 million gallons per day (mgd) by year 2035, assuming a baseline per capita water use of 212 gpcd. Based on this assumption, the City would need to obtain an additional supply capacity of 6.3 mgd, which equates to roughly 3.5 mgd, or 3,902 AFY, on an annual basis (determined by dividing 6.3 mgd by the MDD factor of 1.8).

[2] Demands in excess of the MDD are assumed to be provided through storage.

Table 4.14 Future Water Supply Projects (Guidebook Table 26)
2010 Urban Water Management Plan
City of Hanford

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Projected Annual Supply (AFY)				
				Normal Year	Single Dry Year	Multiple Dry Year First Year	Multiple Dry Year Second Year	Multiple Dry Year Third Year
Future Groundwater Wells(2)	2011	2035	None	0	0	0	0	0
Total				**0**	**0**	**0**	**0**	**0**

Notes:
(1) "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
(2) The City's active supply capacity is capable of meeting the projected 2035 MDD, assuming that the City meets its target water use of 179 gpcd.