

## SECTION 11 – WATER FACILITIES

The information for this section was acquired from the 2003 City of Calexico (City) Draft Water Master Plan, the 1999 Service Area Plan, and from interviews and letters from City staff. This section of the Service Area Plan is not for detailed engineering but rather as a means to summarize for LAFCO the City's plans to both fund and build new water facilities within the Sphere of Influence to meet the needs of future growth. For additional details relating to existing and proposed water facilities, the latest version of the City's Water Master Plan or the City engineer should be consulted.

### I. PERFORMANCE STANDARDS

There are design criteria that must be met to ensure that adequate potable water supply and fire flow needs are provided. The design criteria are based on three scenarios, Peak Hour Demand (PHD), Maximum Day Demand (MDD) plus fire flow, and Tank Refill, with the most stringent of the scenarios governing the design. The design criterion includes the following:

- 200 gal/person/day average day consumption
- Flow velocity shall be limited to 20 feet per second
- 20 psi shall be maintained system-wide during all conditions
- Maximum Day Demand (MDD) is 1.5 times Average Day Demand (ADD)
- Peak Hour Demand (PHD) is 1.8 times MDD
- Storage required is based on maximum day demand plus a 2,500 gallons per minute (GPM) fire flow for a four-hour duration
- Treatment plant capacity shall meet the demands of the maximum daily flow
  
- Fire Flow Minimums <sup>6</sup> - 1,500 GPM Residential  
Two 1,000 GPM Residential  
2,500 GPM Commercial

### II. FACILITY PLANNING AND ADEQUACY ANALYSIS

Raw water comes from the Colorado River and is distributed by the Imperial Irrigation District (IID) via the All American Canal near the Southern Pacific Railroad. Raw water is pumped through a 42" pipeline to the City's 25 million gallon reservoir.

The City's raw water pumps (3 total) transfer the raw water from the canal to the City's 25 MG raw water reservoir. The water is then pumped from the raw water reservoir through a

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<sup>6</sup> Fire flow requirements per City's public works and engineering department

30" pipeline to the City's water treatment plant, located at 545 Pierce Avenue, a distance of approximately one mile from the diversion point.

The existing 12 MGD surface water treatment plant is a conventional type plant consisting of two upflow clarifiers, gravity filtration, and chlorine disinfection. This water is treated in compliance with the Surface Water Filtration and Disinfection Treatment Regulations (Chapter 17 Title 22, California Code of Regulations), the California Department of Health Services, and Local Agency requirements. The level of treatment and compliance with safe drinking water requirements varies with the quality of the raw water delivered.

#### A. Inventory of Existing Facilities

##### Water Treatment Plant

The City's Water Treatment Plant (WTP) currently has a capacity of 12 million gallons per day (MGD), which is currently capable of providing adequate service for the entire City.

The following is a summary of the present capacity of the individual plant components.

<u>Item</u>	<u>Existing Capacity</u>
- Raw water transfer pump station (Canal to Reservoir)	15 MGD
- Raw water reservoir	25 MG
- Raw water transfer pump station (Reservoir to WTP)	15 MGD
- Existing 30" diameter raw water line	20 MGD
- Clarifier (2)	20 MGD
- Filtering system	12 MGD
- Finished water pump station	24 MGD

##### Storage

The City's raw water supply is stored in a single 25 MG open water reservoir. The finished water is stored in three (3) above grade, fabricated steel, tanks located at the treatment plant site. They have the following capacities of 1.0 MG, 3.0 MG, and 4.0 MG for a total of 8.0 MG available storage for distribution.

The City's total storage capacity is 33 MG or approximately five days of storage at the current average daily flow (ADF).

##### Pump Station

The City has one (1) finished water pump station at the WTP, which currently maintains water pressure for the City. The current peak flowrate of the finished water pump station is 17,500 GPM or 24 MGD. The discharge pressure of this pump station is approximately 55 psi.

There are eight (8) pumps available to transfer potable water from the storage tanks to the City's distribution system. The individual pump capacities are as follows:

- 1-600 gpm – (electric, constant speed)
- 3-1200 gpm – (electric, constant speed)
- 2-2500 gpm – (natural gas, constant speed)
- 2-4000 gpm – (electric, variable frequency drive)

The present water system is operated in one pressure zone which is sustained by pumping only. Because the topography is essentially flat throughout the City, there are no reservoirs in the system that can provide a hydraulic gradient to sustain even the minimum pressures required by users. Hence, the system is considered a closed system.

**Water Pipelines**

The existing water distribution system includes over 75 miles of pipelines ranging from 2” to 30” diameter.

**B. Adequacy of Existing Facilities**

Water demand data available for estimating flow rates in the water distribution system consists of total flow from the treatment plant. Based on the 1999 Service Area Plan prepared by Canty Engineering Group, Inc., for the year 1998 the average day demand, max day demand, and peak hour demand were 5.6 MGD, 8.4 MGD, and 10,481 GPM, respectively. The current demands for the water system are as shown in *Table 11-A*.

**Table 11-A: Existing Water Demands**

<b>YEAR</b>	<b>ADD</b>	<b>MDD</b>	<b>PHD</b>
1998	5.6 MGD	8.4 MGD	10,481 GPM (15.1 MGD)
2005 (current)	6.7 MGD	10.0 MGD	12,960 GPM ( 18.0 MGD)

For this project, the MDD is 1.5 x ADD and the PHD is 1.8 x MDD.

The existing raw water transfer pumps, which deliver water from the canal to the storage reservoir, have a total capacity of 15 MGD and the pumps delivering raw water from the storage reservoir to the WTP have a total capacity of 15 MGD.

The MDD of 10.0 MGD can be processed through the existing water treatment plant, which has a total capacity of 12 MGD. The peak hour demand of 12,960 GPM can be delivered to the system by the existing finished water pump station, which has a total capacity of 17,200 GPM.

A computer model of the existing water distribution system was prepared by David Evans and Associates (DEA) as part of the 2003 Draft Water Master Plan preparation. Based on the model results a significant area of the City will not meet fire flow requirements due to insufficient pipeline capacity. DEA recommended pipeline improvements including a small diameter pipeline replacement program to improve the fire flow capabilities of the existing system.

As part of this service area plan analysis another computer model was developed to simulate the existing and ultimate water system. The computer modeling program used is H2ONET<sup>®</sup> Version 5 developed by MWH Soft, Inc. This model was utilized to confirm that the proposed improvements described in the phasing section of this report will compensate for deficiencies in water supply.

### **C. Future Demand for Facilities**

The projected population growth utilized to predict future demands and the needs of new facilities was based on the 2005 Proposed General Plan Update prepared by Albert A. Webb Associates. The projected population growth and water demands are shown in *Table 11-B*. The City has established the following long-term water supply goals relating to storage, treatment and pumping facilities.

1. The City will always maintain at least five days worth of total storage at average day demand. In addition, over the next 20 years the City will work towards having seven days of total storage available at all times.
2. The City will have the ability to meet maximum day demand at 80% of its treatment plant capacity.
3. The City will have the ability to meet peak hour flow rates at 75% of its pumping capacity.

*Tables 11-B, 11-C, and 11-D* show the implementation schedule necessary to meet these goals based upon the current population projections.

**Table 11-B: Water Demands and Total Storage**

Year	Projected Population	ADD (MGD)	MDD (MGD)	Raw Water Storage (MG)	Finished Water Storage (MG)	Total Storage (MG)
2005	32,600	6.7	10.0	25	8	33
2010	41,100	8.2	12.3	25	14	39
2015	53,300	10.6	15.9	50	28	78
2020	69,000	13.8	20.7	70	33	103
2025	89,500	17.9	26.8	90	38	125

**Table 11-C: Water Demands and Treatment Capacity**

Year	Projected Population	ADD (MGD)	MDD (MGD)	Total Treatment Capacity (MGD)
2005	32,600	6.7	10.0	12.0
2010	41,100	8.2	12.3	16.0
2015	53,300	10.6	15.9	20.0
2020	69,000	13.8	20.7	26.0
2025	89,500	17.9	26.8	32.0

**Table 11-D: Water Demands and Finished Water Pumping Capacity**

Year	Projected Population	ADD (MGD)	MDD (MGD)	Peak Hour Flow Demand (GPM)	Total Finished Water Pumping Capacity (GPM)
2005	32,600	6.7	10.0	12,960	17,200
2010	41,100	8.2	12.3	15,940	26,200
2015	53,300	10.6	15.9	20,600	26,200
2020	69,000	13.8	20.7	26,800	35,200
2025	89,500	17.9	26.8	34,800	46,500

#### D. Opportunities for Shared Facilities

The City of Calexico does not have any neighboring cities, within the United States, which are immediately adjacent to the existing Sphere of Influence. Therefore, the opportunity to share water facilities with other cities is limited. The townsite of Heber, within the County of Imperial, is located north and west of the city of Calexico. According to the Heber Urban Area Plan, the Heber Public Utilities District provides water and sewer services of the Heber townsite area. The District operates a water treatment plant with capacity of 1.3 MG. As Calexico and the townsite of Heber grow closer together in the future, there may be opportunities to share water facilities. The City should also contact the County to explore opportunities for shared facilities.

#### E. Phasing

To maintain an adequate water supply for the existing population, provide for future development, and meet the goals previously discussed, the following improvements and future facilities are recommended within the time frames provided (refer to *Figure 13* for improvement item number locations):

##### **Phase I, Within 5 Years (Short-Term Improvements)**

Finish implementing the line size upgrades and looping improvements recommended in the 2003 Water Master Plan (see Master Plan for details)

1. Construct the proposed six million gallon Eastside reservoir, booster station (ultimate capacity = 18,000 gpm), 36" inlet pipeline, and 24" outlet pipeline.
2. Install new raw water transfer pump approximately 4,000 GPM capacity. This will increase the raw water pumping capacity to 20 MGD.
3. Install 30" pipeline along Bowker Road between Cole Road and La Vigne Road.
4. Install 24" pipeline along Bowker Road between La Vigne Road and Anza Road.
5. Install 18" pipeline along Anza Road between Anaya Ave and Bowker Road.
6. Install 12" pipeline along Seventh Street between E. Rivera Road and Bowker Road.
7. Install 12" pipeline along La Vigne Road between Anaya Ave and E. Rivera Avenue
8. Install 18" pipeline along La Vigne Road between E. Rivera and Bowker Road.
9. Install 12" pipeline along the State Highway 111 between Jasper Road and just north of Spud Moreno Street.

10. Upgrade the existing WTP from 12 MGD to 16 MGD, including new clarifier, additional filters, chlorination modifications, and new standby generator.

**Phase II, Within 10 Years**

11. Install 12” pipeline along Seventh Street east of Bowker Road as development requires.
12. Install 18” pipeline along Anza Road east of Bowker Road as development requires.
13. Install 24” pipeline along Bowker Road between Cole Road and Jasper Road.
14. Install 18” pipeline along Meadows Road between Cole Road and Jasper Road.
15. Install 24” pipeline along Jasper Road between Meadows Road and Bowker Road.
16. Construct second 6 MG reservoir at Eastside reservoir site for reliability and redundancy.
17. Begin design and construct new water treatment plant, approximately 12 MGD, at Eastside reservoir site (to be completed within 15 years).
18. Install 18” pipeline along La Vigne Road east of Bowker Road as development requires.
19. Increase raw water storage by adding 25 MG of new storage.
20. Increase finished water storage by adding 8 MG of finished water storage at the WTP.
21. Upgrade the existing water treatment plant by adding two additional filters to increase treatment capacity from 16 MGD to 20 MGD.

**Phase III, Within 20 Years**

22. Install 24” pipeline along Jasper Road between Meadows Road and Sunset Boulevard.
23. Install 18” pipeline along Sunset Blvd between Jasper Road and Cole Road.
24. Install 18” pipeline along Cole Road between Sunset Blvd and Dogwood Road.
25. Install Westside Reservoir and pump station near the intersection of Cole Road and Dogwood Road (capacity and location to be determined based upon development).

26. Install 18” pipeline along Dogwood Road between Cole Road and State Highway 98.
27. Install 18” pipeline along State Highway 98 between Dogwood Road and Kloke Avenue.
28. Install 18” pipeline along Kloke Road between Cole Road and the 12” pipeline stub out 800’ north of State Highway 98.
29. Install 24” pipeline along Camacho Road between Kloke Road and Estrada Boulevard.

### **III. MITIGATION**

The City should continue to pursue various means by which to obtain funding for and to provide adequate water distribution facilities for the existing and future residents. The following are recommendations to achieve adequacy for water distribution facilities.

Recommendations:

- A. Facilities identified in the 2003 Draft Water Master Plan plans adopted by City staff engineers should be constructed as needed as new development and annexation of land occurs.
- B. A Potable Water Supply Assessment Report shall be prepared for all annexation projects of 500 units or more.
- C. Prior to the recordation of a final map within any of the annexation areas, a detailed engineering study shall be prepared and a will serve letter shall be in place to ensure that adequate water facilities will be provided during the MDD plus fire and peak hour flow conditions for the water distribution system being utilized by said annexation area.
- D. Adequate fire flow, subject to the approval of the fire department, shall be provided for all annexation areas.
- E. All system improvements shall be designed and constructed in accordance with federal, state, and local regulations.
- F. The City should reevaluate their development impact fees (at least every five years).

## IV. FINANCING

The primary sources of revenue for water treatment and distribution facilities are the water service charges, water capacity fees, and water connection fees. The City will continue to utilize these funding sources in addition to searching for other sources to improve the existing system to meet funding demands. Currently, the City is designing upgrades to the water treatment plant and seeking funding for the necessary improvements.

### A. Per Capita Costs

The current annual cost for the continued maintenance and operation of the water system in the City of Calexico is approximately \$208.53 per capita. The 2005-2006 City of Calexico's operations budget allocated \$6,798,161 for water treatment, transmission, and improvement services. Using the City's current population of 32,600 residents, maintenance, and operation of the water facilities cost approximately \$208.53 per resident per year.

$$\$6,798,161/32,600 \text{ population} = \$208.53 \text{ per capita}$$

### B. Future Funding Sources

The City will continue to utilize the existing funding sources for water facilities. The water service charge collected by the City is the primary funding source. These are charges based on the actual water usage. The current fees will need to be reviewed annually and during proposed annexations to ensure that there is sufficient funding to supply water service to new development.

As stated in the above section, there are short- and long-term improvements which must be made to the system. The identified improvements and cost estimates for short-term (Phase I) improvements to the water distribution system are identified in *Table 11-E*. The cost to complete these improvements is estimated to be \$16,800,000.

The costs estimated for the future water system improvements for the 10 year and 20 year increments are also provided in *Table 11-E*. The total cost to complete these improvements is estimated to be \$49,100,000.

The combined short-term and ultimate improvement costs total approximately \$65,900,000.

There are a number of financing mechanisms available to assist in the funding for capital facilities related to the delivery of potable water. Special assessment districts, community facilities districts, local bond issuance, developer contributions, and development impact fees can be used to fund water treatment and distribution facilities. Also, there are a number of state and federal grant and loan programs available such as USDA Water and Waste Disposal Loans and Grants for Public Works and Infrastructure Development. Additional descriptions of specific methods for financing these facilities are discussed in *Section 12, Financing*.

**Table 11-E  
City of Calexico  
Water Facilities Improvements**

**Phase I**

No. <sup>1</sup>	Street	Description	Limits From	Limits To	Quantity	Unit	Unit Price <sup>2</sup>	Amount
1	Intersection	Install Eastside Reservoir	State Hwy 98	Cole Road	1	EA	\$5,625,000	\$5,625,000
2	Raw Water Storage	Transfer pump 4,000 gpm & Booster Station	-	-	1	LS	\$1,000,000	\$1,000,000
3	Bowker Road	Install 30"	Cole Road	La Vigne	5500	LF	\$175	\$962,500
4	Bowker Road	Install 24"	La Vigne	Anza Road	4340	LF	\$150	\$651,000
5	Anza Road	Install 18"	Anaya Ave	Bowker	4000	LF	\$125	\$500,000
6	Seventh Street	Install 12"	E. Rivera Road	Bowker Road	2750	LF	\$85	\$233,750
7	La Vigne Road	Install 12"	Anaya Ave	E. Rivera Ave	2600	LF	\$85	\$221,000
8	La Vigne Road	Install 18"	E. Rivera Ave	Bowker Road	2750	LF	\$125	\$343,750
9	State Highway 111	Install 12"	Jasper Road	Spud Moreno Street	3000	LF	\$85	\$255,000
10	WTP	Upgrade WTP (12 MGD to 16 MGD)	WTP	-	1	LS	\$7,000,000	\$7,000,000
<b>Total:</b>								<b>\$16,800,000</b>

**Phase II**

No. <sup>1</sup>	Street	Description	Limits From	Limits To	Quantity	Unit	Unit Price <sup>2</sup>	Amount
11	Seventh Street	Install 12"	Bowker Road	East	7000	LF	\$85	\$595,000
12	Anza	Install 18"	Bowker Road	East	7000	LF	\$125	\$875,000
13	Bowker Road	Install 24"	Cole Road	Jasper Road	5440	LF	\$150	\$816,000
14	Meadow Road	Install 18"	Cole Road	Jasper Road	5440	LF	\$125	\$680,000
15	Jasper Road	Install 24"	Meadow Road	Bowker Road	5300	LF	\$150	\$795,000
16	Eastside Reservoir	2nd 6 MG Tank	State Hwy 98	Cole Road	1	EA	\$3,000,000	\$3,000,000
17	Eastside Reservoir	New WTP 12 MGD	State Hwy 98	Cole Road	1	EA	\$25,000,000	\$25,000,000
18	La Vigne Road	Install 18"	Bowker Road	East	5600	LF	\$125	\$700,000
19	Intersection	Additional 25 MG Raw Water Storage	AAC	Union Pacific Rail Rd	1	LS	\$1,200,000	\$1,200,000
20	WTP	Additional 8 MG Storage	WTP	-	1	LS	\$4,800,000	\$4,800,000
21	WTP	Upgrade WTP (16 MGD to 20 MGD)	WTP	-	1	LS	\$2,000,000	\$2,000,000
<b>Total:</b>								<b>\$40,500,000</b>

**Phase III**

No. <sup>1</sup>	Street	Description	Limits From	Limits To	Quantity	Unit	Unit Price <sup>2</sup>	Amount
22	Jasper Road	Install 24"	Meadows Road	Sunset Blvd	7900	LF	\$150	\$1,185,000
23	Sunset Blvd	Install 18"	Jasper Road	Cole Road	5300	LF	\$125	\$662,500
24	Cole Road	Install 18"	Sunset Blvd	Dogwood Road	7400	LF	\$125	\$925,000
25	-	Westside Reservoir & Pump Station	Intersection of Cole Road & Dogwood Rd.	-	1	EA	\$3,500,000	\$3,500,000
26	Dogwood Road	Install 18"	Dogwood Road	Cole Road	5500	LF	\$125	\$687,500
27	State Highway 98	Install 18"	Dogwood Road	Kloke Ave.	5500	LF	\$125	\$687,500
28	Kloke Ave	Install 18"	Cole Road	State Hwy 98	4700	LF	\$125	\$587,500
29	Camacho Road	Install 24"	Kloke Road	Estrada Blvd.	2500	LF	\$150	\$375,000
<b>Total:</b>								<b>\$8,600,000</b>
<b>Grand Total:</b>								<b>\$65,900,000</b>

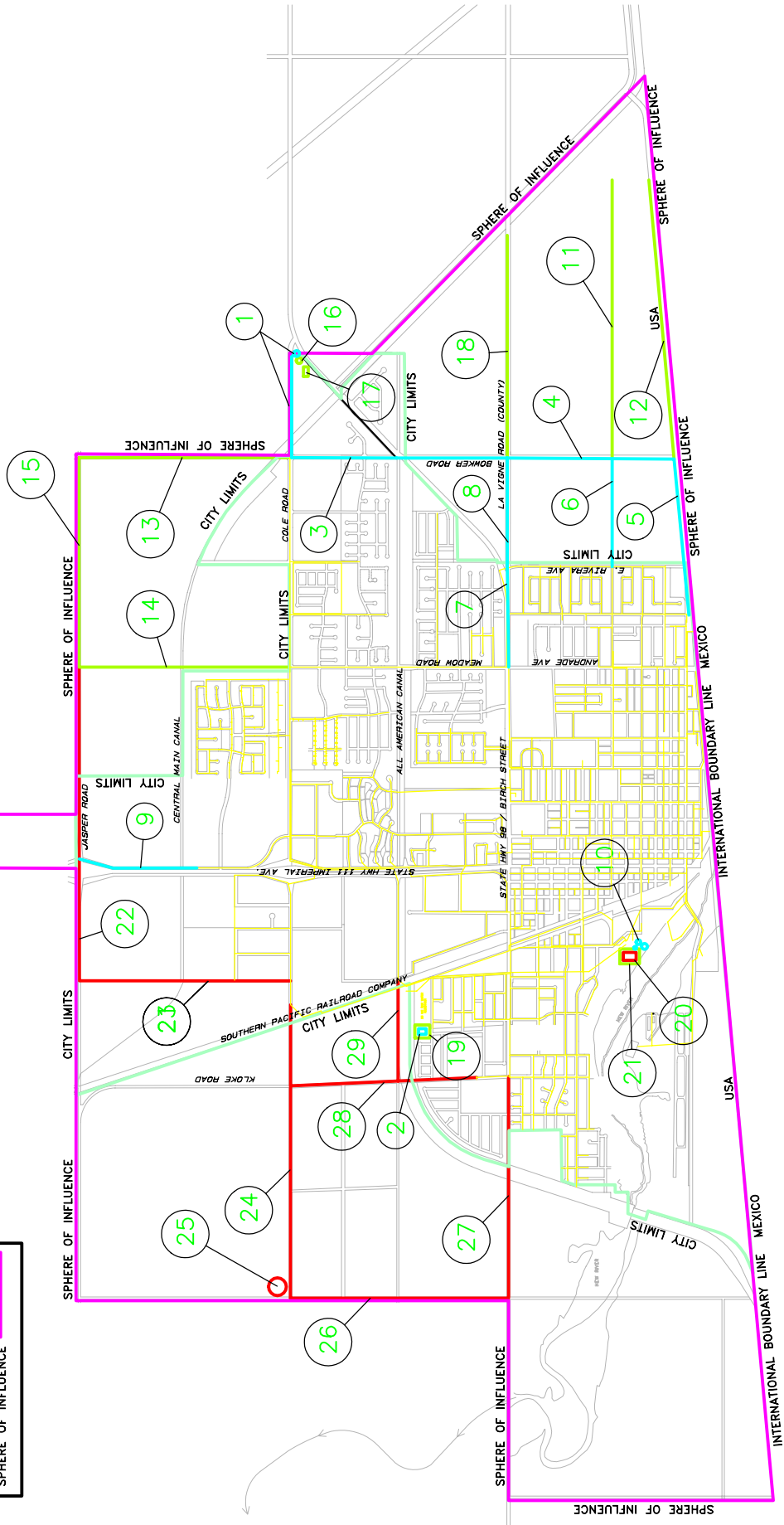
<sup>1</sup>Refer to Figure 13 for point locations.

<sup>2</sup>Unit Prices were based off of the City of Calexico Infrastructure Master Plan Design/Development Guidelines, May 2005.

<sup>3</sup>Rounded to the nearest \$100,000

# CITY OF CALEXICO WATER FACILITIES IMPROVEMENTS

LEGEND	
PHASE I	
PHASE II	
PHASE III	
EXISTING PIPES	
CITY LIMITS	
SPHERE OF INFLUENCE	



GRAPHIC SCALE  
1"=4000'  
1000 2000 0 1000 2000 3000

Figure 13  
Water Facilities Improvements  
City of Calexico Service Area Plan

