

SECTION 10 – WASTEWATER FACILITIES

The City of Calexico’s (City) most recent Master Sewer Plan was prepared in 1991. The information for this section was acquired from the 1991 Master Sewer 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 wastewater facilities within the sphere of influence to meet the needs of future growth. For additional details relating to existing and proposed wastewater facilities, the City engineer should be consulted.

I. PERFORMANCE STANDARDS

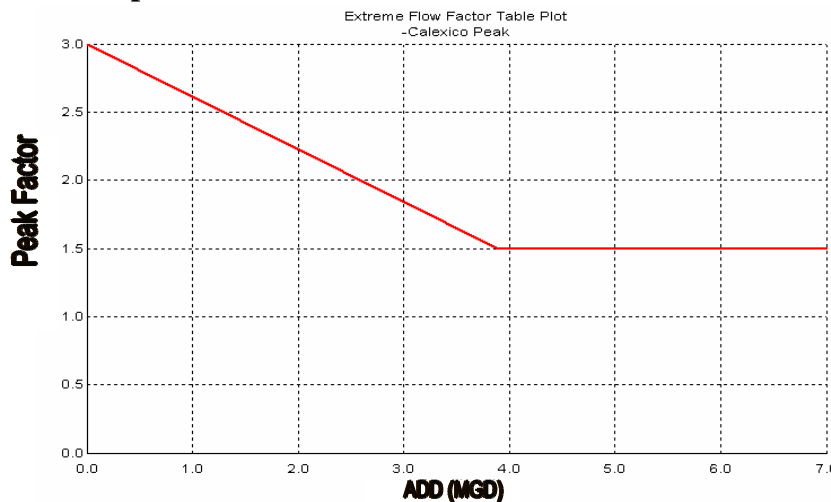
To ensure adequate wastewater treatment and conveyance the City has established the following design criteria⁴ for determining sewer pipeline capacity:

- Average Daily Flow (ADF) = 85 gpd/capita
- Infiltration and Inflow (I/I) = 10% of ADF
- Manning’s roughness coefficient “n” = 0.012
- Flow velocities shall be no greater than 20 feet per second (fps)
- Flow velocities shall be no less than 2 fps
- Depth to Diameter Ratio (d/D) as follows:

Pipe Diameter	Design Criteria
6” to 12” diameter	d/D = 0.50
15” to 18” diameter	d/D = 0.75
21” and greater	d/D = 0.93

- Peaking Factors are shown on the following graph:

Peaking Factor Graph



⁴ City of Calexico Service Area Plan, March 1999

II. FACILITY PLANNING AND ADEQUACY ANALYSIS

Over the last few years, the average daily flow to the City's Wastewater Treatment Plant (WWTP) has varied. Currently the average daily flow is approximately 2.7 million gallons per day (MGD).

The existing City WWTP is located in the southwest part of the City. The WWTP is bounded by the Calexico International Airport to the south and the New River to the north. Treated effluent is discharged to the New River.

A. Inventory of Existing Facilities

Wastewater Treatment Plant

The existing activated sludge WWTP has an average daily flow (ADF) capacity of 4.3 MGD and a peak daily flow capacity of 5.5 MGD. The process flow scheme consists of a headworks structure, primary clarifier, aeration tanks, secondary clarifiers, and sludge drying beds⁵.

Wastewater Collection System

The City currently operates a wastewater collection system of pipelines, ranging from 6 to 30 inches in diameter. Lateral and trunk sewer lines discharge into one of two interceptor sewers. The South Interceptor Sewer primarily serves east of the Southern Pacific Railroad and south of Highway 98. Wastewater flows from the north and west portions of the City discharge into the North Interceptor Sewer.

Because of the relative flatness of the area, most sewer lines have been constructed at minimum slopes and the interceptors are relatively deep, some as much as 20-feet. Also due to the flat topography, many small sewage lift-stations have been constructed throughout the City to provide service to new developments.

B. Adequacy of Existing Facilities

Wastewater Treatment Plant

As stated previously, the existing WWTP has an ADF capacity of 4.3 MGD and a PDF capacity of 5.5 MGD. During the fall of 2004 and early spring of 2005, the City experienced much higher than normal precipitation. On one occasion the daily flowrate reached 5.0 MG. This was the highest daily flow ever recorded at the City's WWTP. The excess flow was able to be contained in the on-site aeration basins but a majority of the available freeboard was utilized in the process of storing the peak flow.

⁵ Wastewater Treatment Facilities Master Plan, Oct. 1991

The excessive flow during inclement weather is a sign of infiltration/inflow problems within the collection system. Infiltration/inflow problems can be reduced by the construction of proper storm drain conveyance systems, and the replacement or lining of damaged wastewater pipe reaches and manholes. For an interim solution to accommodate excessive flows at the WWTP due to infiltration/inflow, the City should construct an additional equalization basin at the WWTP. When the plant's treatment capacity is exceeded, flows could be diverted to the equalization basin for temporary storage and treatment during off peak hours. It is anticipated that this basin should be sized to contain 3 MG which would cost the City approximately \$300,000. It should be noted that the City receives an average of 2-3 inches of rain per year and therefore peak days due to excessive rainfall are very rare.

Wastewater Collection System

A hydraulic analysis of the City's existing and future sewer collection system within the Sphere of Influence was performed using the SewerCAD[®] software, version 5.5, as developed by Haestad Methods, Inc. Using this model, the hydraulic capacity of the existing system was evaluated under average daily flow and peak wet weather flow (PWWF) conditions.

The results of the modeling indicated that the existing system provides adequate capacity at ADF conditions, but during PWWF conditions the 12" pipeline on Ollie Avenue between Hacienda Dr. and West Canal Street, and the 15" pipeline on Fifth Street between State Highway 111 and the downstream 18" pipeline are flowing full.

The model also confirmed that proposed future improvements as described in the phasing section of this report will compensate for capacity deficiencies.

C. Future Flows for Facilities

Based on the projected population growth provided in the proposed General Plan Update prepared by Albert A. Webb Associates the average daily flow was determined by using 85 gal per day per capita, 1,600 gal per day per acre (GPD/AC) for commercial, 800 GPD/AC for industrial, 800 GPD/AC for public open space, and infiltration and inflow is 10% of the average daily flow. Average annual projected wastewater flow demand is shown in *Table 10-A*.

Table 10-A: Projected Population, Wastewater Flows, and Treatment Capacity

Year	Projected Population	ADF (MGD)	PWWF (MGD)	ADF Treatment Capacity (MGD)	PWWF Treatment Capacity (MGD)
2005	32,600	2.7	5.0	4.3	5.5
2010	41,100	3.8	6.5	8.5	17.0
2015	53,300	5.0	8.0	8.5	17.0
2020	69,000	6.7	10.7	8.5	17.0
2025	89,500	8.7	13.9	12.5	25.0

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 wastewater 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 sewer treatment plant with capacity of 0.63 MG. As Calexico and the townsite of Heber grow closer together in the future, there may be opportunities to share wastewater treatment facilities. The City should also contact the County to explore opportunities for shared facilities.

E. Phasing

Based on the results of the hydraulic analysis and the treatment capacity described in *Table 10-A*, the following treatment and collection facility improvements are recommended to provide adequate capacity during PWWF conditions (refer to *Figure 12* for improvement item number locations):

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

1. Install the regional pump station near the intersection of La Vigne Road and Bowker Road
2. Install 18" gravity pipeline along La Vigne Road between E. Rivera to proposed regional pump station at Bowker Road

3. Design and construct the WWTP improvements/upgrades as proposed to increase the ADF capacity from 4.3 MGD to 8.5 MGD
4. Install 18" force main along State Route 98/La Vigne Road between Andrade Avenue and proposed regional pump station
5. Install 18" gravity pipeline along Bowker Road between La Vigne Road and Fifth Street
6. Replace existing 12" gravity pipeline with 18" pipeline along Ollie Ave between Hacienda Dr. and West Canal Street
7. Replace existing 15" gravity pipeline with 18" pipeline along Fifth Street between State Highway 111/Imperial Avenue and the downstream 18" pipeline
8. Install 42" pipeline along Kloke Road between State Route 98 and the All American Canal
9. Install 48" pipeline along Kloke Road between State Route 98/Birch Street and the existing WWTP
10. Install sewer bridge across the New River north of the WWTP for 48" pipeline
11. Install 18" force main from proposed regional pump station (Bowker Road & La Vigne Road) north on Bowker Road to Cole Road and west on Cole Road to Kloke Road

Phase II, Within 10 Years

12. Install 30" pipeline along Kloke Road between the All American Canal and Cole Road
13. Install 18" pipeline along State Hwy 98 between Kloke Road and the west side of the All American Canal
14. Install 18" pipeline along Camacho Road between Kloke Road and 2,650' west
15. Install 18" pipeline along Cole Road between Kloke Road and 2,650' west
16. Install 30" pipeline along the New River between the existing 30" trunk line and the proposed 48" pipeline just north of the WWTP
17. Replace existing 21" and 27" gravity pipeline with 36" pipeline along Birch Street/State Route 98 between Kloke Road and Meadows Road
18. Install 24" pipeline along La Vigne Road between Bowker Road and 5,450' east

Phase III, Within 20 Years

19. Install 30" pipeline along Kloke Road between Cole Road and the Southern Pacific Railroad Right-of-Way

20. Install pump station near the intersection of Jasper Road and Meadows Road
21. Install 30" pipeline along Jasper Road between Meadows Road and the Central Main Canal
22. Install pump station near the intersection of Jasper Road and the Central Main Canal
23. Install 12" force main from the proposed pump station near the intersection of Jasper Road and the Central Main Canal to the proposed 30 gravity line in Kloke Avenue
24. Install 18" pipeline along Bowker between La Vigne Road and All American Canal
25. Design and construct a new WWTP northeast of the existing City limits. Phase 1 should be approximately 4 MGD with ultimate capacity of approximately 10 MGD

If for some reason the City determines that upgrading the existing WWTP from 4.3 MGD to 8.5 MGD is not feasible, then an alternative to many of the above facility improvements as suggested in the City's 1991 Wastewater Treatment Facilities Master Plan is to construct a new satellite WWTP on the east side of town. The new WWTP would need to have an initial capacity of approximately 4 MGD and be expandable to at least 10 MGD. For budgetary purposes this plant will be estimated to cost \$8 per gallon and excludes the cost for collection pipe lines, lift stations for wastewater conveyance to the WWTP, and engineering. If this alternative was chosen to be implemented then a detailed engineering study would need to be performed to determine WWTP location, WWTP process, and collection facility sizes/locations.

III. MITIGATION

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

Recommendations:

- A. A Wastewater Master Plan shall be prepared within the next five years to provide detailed information regarding facility phasing necessary to support new development and annexation of land.
- B. 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 wastewater facilities will be provided during the PWWF conditions for the wastewater conveyance system being utilized by said annexation area.
- C. All system improvements shall be designed and constructed in accordance with federal, state, and local regulations.
- D. The City will continue to reevaluate their development impact fees (at least every five years).

IV. FINANCING

The primary sources of revenue for wastewater treatment and conveyance facilities are the sewer service charges, sewer capacity fees, and sewer connection fees. The sewer service charges function to subsidize off-site facilities such as sewer interceptors and sewer treatment plants. The sewer capacity fee is based on the equivalent dwelling unit (EDU) impact created and funds the future expansion of the City Wastewater Treatment Plant. The City will continue to utilize these funding sources in addition to searching for other sources to improve the existing system to meet future flows. Currently, the City is designing upgrades to the wastewater 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 wastewater system in the City of Calexico is approximately \$142.52 per capita. The 2005-2006 City of Calexico's operations budget allocated \$4,646,420 for wastewater services, operation, and maintenance. Using the City's current population of 32,600 residents, maintenance, and operation of the wastewater facilities cost approximately \$142.52 per resident per year.

$$\$4,646,420 / 32,600 \text{ population} = \$142.52 \text{ per capita}$$

B. Future Funding Sources

The City will continue to utilize the existing funding sources for wastewater facilities. The sewer service charge collected by the City is the primary funding source. The current fees will need to be reviewed annually and during proposed annexations to ensure that there is sufficient funding to supply wastewater service to new development.

As stated in the above section, there are several improvements which must be made to the system to accommodate growth throughout the City. The identified improvements and cost estimates for short-term improvements (Phase I) to the wastewater system are identified in *Table 10-B. Figure 12, Wastewater Facilities*, shows the location of each numbered improvement. The cost to complete these improvements is estimated to be \$30,400,000.

The costs estimated for the future wastewater system improvements for, 10 year and 20 year increments are also provided in *Table 10-B*. The total cost to complete these improvements is estimated to be \$40,900,000.

The combined short-term and ultimate improvement costs total approximately \$71,300,000.

There are a number of financing mechanisms available to assist in the funding for capital facilities related to the treatment and conveyance of wastewater. Special assessment districts, community facilities districts, local bond issuance, developer contributions and development impact fees can be used to fund wastewater treatment and collection 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 10 - B

City of Calexico

Wastewater Facilities Improvements

Phase I

No. ¹	Street	Item	Limits From	Limits To	Quantity	Unit	Unit Price ²	Amount
1	Lavigne Rd	Reg. SPS	At Lavigne Rd and Bowker Rd	-	1	EA	\$3,000,000	\$3,000,000
2	Lavigne Rd.	18" Gravity	E. Rivera Ave	Bowker Rd	2,600	LF	\$125	\$325,000
3	Ex. Sewer Plant	Upgrade WWTP (to 8.5 MGD)	WWTP	-	1	EA	\$21,000,000	\$21,000,000
4	Lavigne Rd & SR 98	18" Force Main	Andrade Ave	Regional Pump Station	2,750	LF	\$150	\$412,500
5	Bowker Road	18" Gravity	La Vigne Road	Fifth Street	3,400	LF	\$125	\$425,000
6	Ollie Ave	18" Upgrade	Hacienda Dr.	West Canal St.	1,200	LF	\$200	\$240,000
7	Fifth Street	18" Upgrade	State Hwy 11	Down Stream 18"	1,250	LF	\$200	\$250,000
8	Kloke Rd	42" Gravity	SR 98 / Birch Street	All American Canal	3,350	LF	\$225	\$753,750
9	Kloke Rd	48" Gravity	SR 98 / Birch Street	WWTP	2,300	LF	\$250	\$575,000
10	New River	Sewer Bridge	Across New River	-	100	LF	\$2,000	\$200,000
11	Bowker & Cole	18" Force Main	Prop. Regional Pump Station	Cole Road	21,300	LF	\$150	\$3,195,000
Total:								\$30,400,000

Phase II

No. ¹	Street	Item	Limits From	Limits To	Quantity	Unit	Unit Price ²	Amount
12	Kloke Rd	30" Gravity	All American Canal	Cole Rd	2,700	LF	\$175	\$472,500
13	State Hwy 98	18" Gravity	Kloke Rd	All American Canal	2,700	LF	\$125	\$337,500
14	Camacho Rd	18" Gravity	Kloke Rd	2,650' West	2,650	LF	\$125	\$331,250
15	Cole Rd	18" Gravity	Kloke Rd	2,650' West	2,650	LF	\$125	\$331,250
16	New River	30" Gravity (Ext)	30" to 48" at Ex. STP.	-	270	LF	\$225	\$60,750
17	SR 98 / Birch	36" Upgrade	Kloke Rd	Meadows Rd	10,200	LF	\$200	\$2,040,000
18	Lavigne Rd.	24" Gravity	Bowker Rd	5450 Ft East	5,450	LF	\$150	\$817,500
Total:								\$4,400,000

Phase III

No. ¹	Street	Item	Limits From	Limits To	Quantity	Unit	Unit Price ²	Amount
19	Kloke Rd	30" Gravity	Cole Rd	Pacific Railroad	4,400	LF	\$175	\$770,000
20	Jasper Rd	Lift Station	At Jasper Rd and Meadows Rd	-	1	EA	\$750,000	\$750,000
21	Jasper Rd	30" Gravity	Meadows Rd	Central Main Canal	9,722	LF	\$175	\$1,701,350
22	Kloke Rd	Lift Station	At Jasper Rd and Central Main Canal	-	1	EA	\$750,000	\$750,000
23	Kloke Rd	12" Force Main	Kloke Rd	Jasper Rd	1,200	LF	\$125	\$150,000
24	Bowker Rd	18" Gravity	All American Canal	Reg SPS @ Lavigne Rd	2,700	LF	\$125	\$337,500
25	North East of City	New 4 MGD WWTP	To be determined	-	4,000,000	LF	\$8	\$32,000,000
Total:								\$36,500,000
Grand Total:								\$71,300,000

¹Refer to Figure 12 for point locations.

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

³Rounded to the nearest \$100,000

CITY OF CALEXICO WASTEWATER FACILITIES IMPROVEMENTS

LEGEND	
PHASE 1	
PHASE 2	
PHASE 3	
EXISTING PIPES	
CITY LIMITS	
SPHERE OF INFLUENCE	

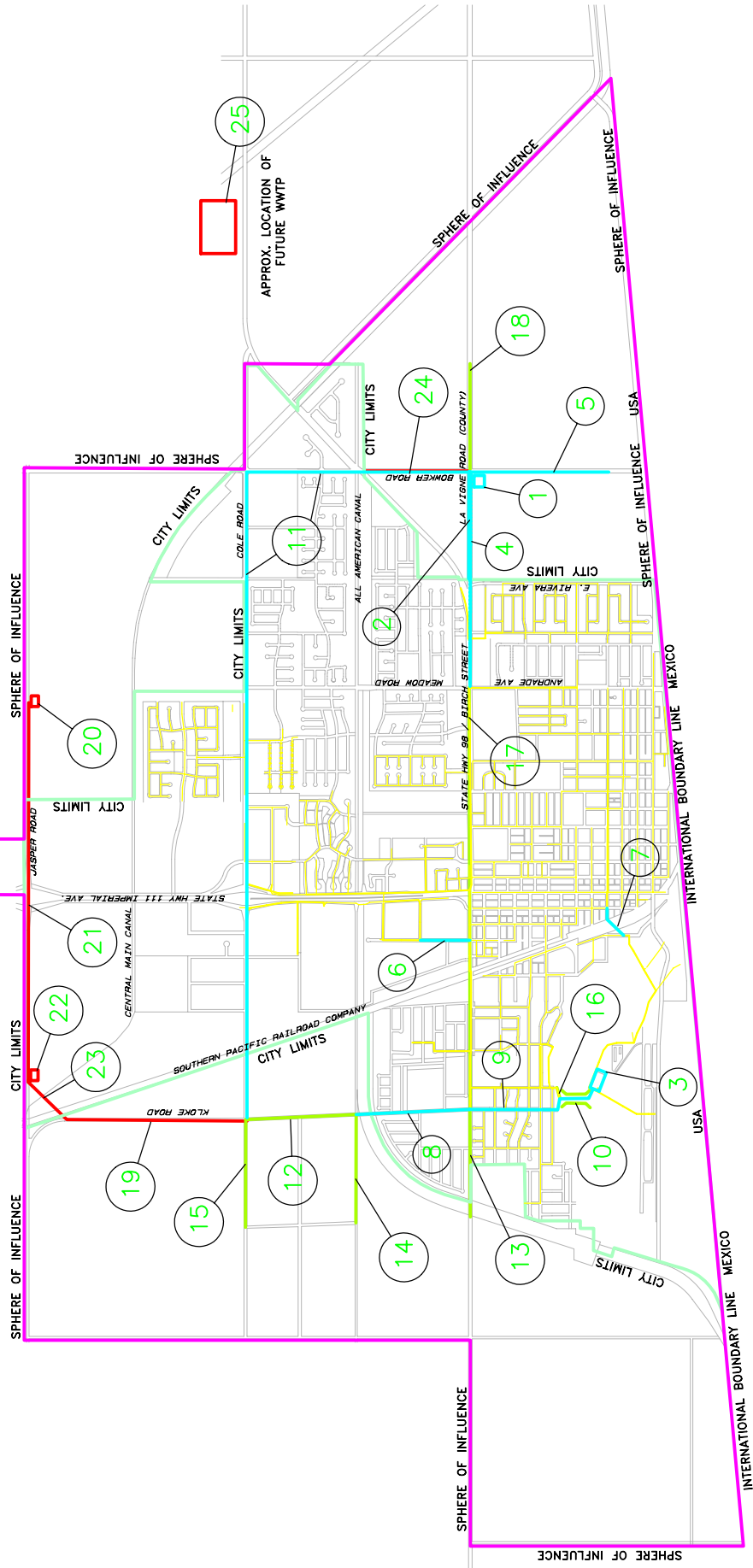


Figure 12
Wastewater Facilities Improvements
City of Calexico Service Area Plan

