

PUBLIC UTILITIES

The Falfurrias Utility Board (FUB) and the City of Falfurrias's water distribution system was originally installed in the late 1920s. The City formed the FUB and took over the system in 1949. There have been many changes to the distribution lines since that time. Board staff believes that approximately 15 percent of the system is original with most of the original lines made of cast iron (CI) and asbestos cement (AC). Smith, Russo, & Mercer Engineering did the most recent study of its water system in July 2001. Castillo Engineering produced the most recent maps of the system in 2000.

The City has been eligible for several TxCDBG grant projects over the past 15 years including the following:

- 2000 – Replaced 15,000 LF of 6” and 8” PVC water line, 12 fire hydrants, and 80 service re-connections;
- 2002 - Replaced 11,500 LF of 8” PVC water line, 12 fire hydrants, and 100 service re-connections;
- 2012 - Replaced 1,175 LF of 6” PVC water line and appurtenances.

The following sections provide an inventory of the major components of the City's water system as of the date of this Comprehensive Plan. The plan will also identify areas of operation in which system improvements should be implemented in order to improve the safety, efficiency, and economy of the treatment and distribution operations.

WATER SUPPLY & STORAGE

The water supply source for the City of Falfurrias is groundwater drawn from the Goliad Sands within the Gulf Coast Aquifer. The FUB owns and operates six (6) wells that are capable of combined production capacity of approximately 3,470 gallons per minute (GPM), or 4.996 million gallons per day (MGD). The FUB also owns one well that is currently offline and provides irrigation water to the local golf course and another two wells that have been plugged and abandoned. FUB staff describes all wells as being in fair to good condition as of the date of this plan. The staff has indicated that the Board intends to drill a new well in the near future to provide a reliable back-up source in an emergency.

There are no known established limits at this time regulating the amount of groundwater that the City is permitted to draw from the aquifer in any given year.

Water from the wells is treated at well sites with gaseous chlorination and stored in two (2) elevated storage tanks (EST) and four (4) ground storage tanks (GST). High Service pumps at Well # 11, Well # 13, and Well # 15 provide system pressure in addition to the EST's that “float” on the system.

The City of Falfurrias Water Utility and the TCEQ Water Utility Database records indicate the daily production capacity for the wells currently in operation are as follows:

<u>Well Identifier</u>	<u>TCEQ Water Utility Database</u>
Well #6	600GPM
Well #11	600 gpm
Well #12	610 gpm
Well #13	610 gpm
Well #15	650 gpm
Well #16	400 gpm
<u>Total Capacity</u>	<u>3,470GPM</u>
<u>Total # Connections</u>	<u>2,757</u>

For water systems with more than 250 connections, The Texas Administrative Code, Title 30, Chapter 290, Subchapter D, Sections 290.45(b)(1) (D)(ii) and 290.45(b)(1) (D)(iv) mandates that the systems have: a) 200 gallons of total storage per connection; and, b) 100 gallons of elevated storage per connection or a pressure tank capacity of 20 gallons per connection. According to the FUB Utility Billing Office and the most recent TCEQ Comprehensive Compliance Investigation (4-10-2010), the City has 2,757 active connections. The FUB water system meets the established minimum standards for water storage.

The FUB has a total of 4 ground storage tanks and 2 elevated storage tanks. One of the elevated storage tanks is located in the La Parrita Colonia outside of the City's ETJ. FUB staff describes all storage tanks as being in good condition. The staff has indicated that the Board will pursue funds to construct additional storage in conjunction with the new well project.

WATER DISTRIBUTION

Table 5A: Major Water System Components

Component	Location	Capacity or Size
Elevated Storage Tank	US 285/Jersey St.	500,000 gal
Elevated Storage Tank	CR 221	100,000 gal
Ground Storage Tank	CR 221	20,000 gal
Ground Storage Tank (Offline)	1102 FM 1418	25,000 gal
Ground Storage Tank	US 285/Jersey St.	20,000 gal
Ground Storage Tank	Noble/Negri Streets	20,000 gal
Ground Storage Tank	625 S. Pineda	600,000 gal
Service Pumps	CR 221, Pineda St. and US 285/Jersey St.	
Well #5	1198 E Hwy 285	600 gpm (offline for golf course only)
Well #6	1102 FM 1418	600 gpm
Well #8 (Abandoned)	625 S. Pineda	N/A
Well #9 (Abandoned)	709 W Hwy 285	N/A
Well #11	625 S. Pineda	600 gpm
Well #12	Noble/Negri Streets	610 gpm
Well #13	709 W. Hwy 285	610 gpm
Well #15	CR 221	650 gpm
Well #16	625 S. Pineda	400 gpm

Table 5B: Water Distribution System Components

Component	Linear Feet (LF)	Component	# Of Units
2" Line	7,385	Fire hydrants	181
3" Line	845	Gate Valves	300
4" Line	2,621	Service connections	2,757
6" Line	136,534		
8" Line	462,908		
10" Line	4,331		
12" Line	22,812		

Water distribution system pipes in the FUB service area range in size from 2" to 12" in diameter. The system is comprised of approximately 637,436 linear feet (LF) of distribution lines. According to staff, the materials contained in these pipes are mostly new PVC, with a relatively small percentage of the original cast iron and asbestos cement pipes remaining.

The FUB has pursued a fairly aggressive approach for routine line replacement. The FUB does not dedicate specific revenues such as a water utility fund for annual repair and maintenance. However, they do attempt to obtain funding whenever possible for line replacements, upgrades, and expansion. The city replaces lines periodically when required by events such as line breakage, valve malfunctions, or other related system failures.

2" diameter lines and smaller diameter lines represent about 1 percent of the water distribution system in FUB service area. Undersized water lines limit both volume and pressure within the distribution system. The Texas Administrative Code (TAC), Subchapter D, Section 290.44(c) prohibits the installation of new water lines smaller than 2". The standards permit more than ten (10) connections on existing water mains only when a licensed professional engineer deems it necessary. There are very few segments of 2" and smaller diameter pipe in the distribution system.

FIRE PROTECTION

The primary consideration for fire protection issues is whether or not the system is capable of delivering sufficient flow volume at sufficient pressure to effectively respond to emergencies. The standards for adequate fire protection are established in the International Fire Code (IFC). The code recommends minimum flow volume, flow pressure, hydrant spacing, and construction standards. Examples of the IFC recommendations are as follows:

- ❑ Every building in a community should be located no more than 500' from a fire hydrant; and
- ❑ All fire hydrants should be installed on water mains no smaller than 6" in diameter; and
- ❑ Each hydrant should provide a minimum flow volume of 1,500 GPM; and
- ❑ The minimum flow volume should be delivered at a minimum residual pressure of 20 psi.

Fire departments perform individual hydrant flow tests to determine if adequate pressure and flow rates are available at specified hydrant locations. Testing every hydrant is usually beyond the capabilities of most small communities, but field-testing at selected hydrants can give the FUB some preliminary information on water system firefighting capabilities. When any major new subdivision construction is proposed, a computer-aided water system model of the existing conditions and the effects of the proposed development should be prepared by the consulting engineer. This model will assist the FUB and its representatives to evaluate the existing system's capacity to provide adequate flow volume at sufficient pressure to effectively respond to emergencies.

According to available mapping information, there are very few homes within the City of Falfurrias that are not within 500 feet of a hydrant connected to a 6" or larger water main. These are located in the southwest part of the City. A 4 inch line will provide adequate flow volume and pressure for firefighting purposes under ideal conditions, but the configuration is usually not effective. A 2 inch line cannot provide adequate flow and pressure for firefighting purposes under any conditions. This plan will recommend several line replacement projects that will replace aging, deteriorating, and/or undersized lines. All of these line replacement projects will include lines of sufficient size to provide adequate flow and pressure for firefighting purposes. These projects will also include fire hydrants at the appropriate locations.

WASTEWATER COLLECTION

Most of the Falfurrias Utility Board's (FUB) existing sewage collection system was installed in the late 1930s. The FUB took it over in 1949. The current wastewater treatment facility (WWTF) was constructed in 1992. Improvements have been completed to it over the years. Garcia & Wright Engineering performed the last formal analysis of the system and the most recent set of system maps. The most recent TCEQ Comprehensive Compliance Investigation (CCI) report issued the Board minor violation notices in the April 2010 investigation, however compliance documents indicate that those issues have been resolved.

The FUB has replaced some of the original collection system over the past 20 years. The line replacement and treatment plant improvements have been funded mostly through the Texas Community Development Block Grant (TxCDBG) program. Some of the improvements included:

- 2000 – Replaced an existing lift station with a new lift station at Taylor Road and US 281
- 2002 - Replaced approximately 10,500 LF of 8” sewer line, 20 Manholes, and 125 service re-connections
- 2007 – Constructed one new clarifier unit, plant piping, and electrical improvements at the WWTF
- 2011 – Constructed new clarifier skimmer equipment, electrical controls, and piping at the original clarifier at the WWTF
- 2012 - Replacing approximately 3,300 LF of sewer line, 10 manholes, and service re-connections

Table 6A: Major Sewer System Components

Sewer Lines			
	DIAMETER	LENGTH (ft.)	PERCENT
Force Main			
	4" FM	5,881	2.7%
	8" FM	12,598	5.9%
	10" FM	12,970	6.0%
Sub total - Force Main		31,449	14.7%

	DIAMETER	LENGTH (ft.)	PERCENT
Gravity Feed			
	4"	291	0.1%
	6"	23,903	11.1%

	8"	148,942	69.4%
	10"	6,126	2.9%
	12"	3,989	1.9%
Subtotal - Gravity Feed		183,251	85.3%
Total Sewer Lines		214,700	100%

Table 6B: Lift Station Inventory

Lift Stations			
Name	Pump Capacity (gpm)	Year Built	Condition
Clancey Lift Station	225-325 gpm	2011	Good
Bennett Lift Station	225-325 gpm	Prior to 1988	Fair-Poor
Whistler Addition LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Warehouse LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Detention Center LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Magnolia Heights LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Nat Best LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Swimming Pool LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Forrest Street LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Ranchito LS	2 @ 3 HP	Prior to 1988	Fair-Poor
Bradley LS	2 @ 3 HP	Prior to 1988	Fair-Poor

Wastewater Treatment Facility

The City of Falfurrias owns and operates the WWTF. The plant is an extended aeration/activated sludge system consisting of a head works portion with a bar screen and a grit removal system, one oxidation ditch with three rotors, two clarifiers, and eight sludge drying beds. The plant was built in 1992 and improved in 2007 and 2011.

The current Permit to Discharge Wastes (WQ0010084001) authorizes the discharge of treated domestic wastewater effluent at a daily average flow not to exceed 0.460 million gallons per day (MGD) via surface irrigation on 158 acres of land. Application rates are not permitted to exceed 3.26 acre-feet per year per acre irrigated. The design capacity of the plant is 0.89 MGD.

According to FUB staff, 2-hour peak wet-weather flows are reported to reach as high as approximately 1,000,000 GPD during and after a severe storm event. This value indicates that the system is experiencing a considerable amount of inflow and infiltration (I/I) into the collection system.

FUB staff has indicated the facility currently meets TCEQ permitted levels for effluent quality with regard to five day Biochemical Oxygen Demand (BOD-5), 100mg/l.

In the area of operational procedures, there are several issues that all sewer systems should address concerning its treatment and collection systems that require a minimum of capital outlay. These issues are continuous and should be addressed by routine, scheduled operational procedures such as the following:

- Establish a routine to locate sources of I/I and a plan to address these problems in a timely fashion
- Establish a program for routine scheduled maintenance of plant mechanical equipment, possibly incorporating currently available technological systems such as SCADA (Supervisor Control And Data Acquisition) packages designed for this task
- Monitor influent and effluent quality on a regularly scheduled basis, with appropriate recording and reporting procedures
- Establish a routine line and manhole inspection schedule and a plan for the required line and manhole replacement and/or rehabilitation

In many systems these operational/maintenance practices occur in the form of repair as opposed to preventive maintenance. This situation appears to have occurred frequently in the Falfurrias Utility Board. The FUB is making use of TxCDBG funds and Texas Water Development Board (TWDB) loan funding to finance projects to rehabilitate and/or replace manholes and collection lines to the greatest extent possible.

GAS

The City of Falfurrias’s gas distribution system was installed in the early 1990’s. The City of Falfurrias owns, operates, and maintains the system. The Falfurrias gas system serves customers within the corporate city limits and in the greater Brooks County area. A planning team of Mauro Garcia, Jr. and Horacio Castillo produced the most recent study of the gas system in April 2000. This study also produced the most recent maps of the system.

The following section provides an inventory of the major components of the City’s gas system as of the date of this Comprehensive Plan. The plan will also identify areas of operation in which system improvements should be implemented in order to improve the safety, efficiency, and economy of distribution operations. The plan will conclude by providing a prioritized summary of the needed improvements and their estimated costs.

Table 7A: Major Gas System Components

Component	Linear Feet (LF)	Component	# Of Units
1 1/4" Line	3,999	City Gate Station	1
2" Line	176,382	Regulator Station	1
3" Line	555	Service connections	Varies
4" Line	16,417		

The gas supply source for the City of Falfurrias/Falfurrias Utility Board is Center Point Energy operating out of Houston. The gas is delivered to the City at +/- 80 PSI to the City Gate Station. The main supply line is a 4" steel line that runs south from the Gate Station to the regulator station located on West Travis Street near the intersection of Larriette LN/Center Street. From the regulator station the gas enters the distribution network. The Utility Board operates the distribution lines and the transmission line from the Gate Station in Jim Wells County.

The FUB has no gas storage facilities.

Gas distribution system pipes in the City of Falfurrias range in size from 1-1/4" to 4" in diameter. The system is comprised of approximately 197,353 linear feet (LF) of distribution lines. According to Board staff, the materials contained in these pipes are mostly steel, polyvinyl chloride (PVC), and polyethylene (Poly).

The Texas Railroad Commission (Commission) has recently adopted policies that will require the FUB to replace all steel lines in the system with polyethylene in the near future. The Board also expects the Commission to require replacement of all PVC lines within the planning period (2012-2032).

POLICY GOALS AND OBJECTIVES FOR THE WATER SYSTEM:

Goal 1: A local water system that operates efficiently and cost-effectively.

- Objective 1.1: By 2016, reduce operating costs and take steps to prevent TCEQ violations.
 - Policy 1.1.1: Promote and exercise preventative maintenance by inspecting all facilities once per year.
- Objective 1.2: The Board is financially able to maintain and improve the system to improve quality of life for residents and enable growth.
 - Policy 1.2.1: Beginning in 2012 and continuing throughout the planning period, regularly apply for CDBG grants through the Texas Department of Agriculture to fund replacement of aging, deteriorated water lines.

Goal 2: City and area residents have clean, safe, potable water.

- Objective 2.1: Over the planning period, deteriorated lines and equipment are replaced and/or improved.
 - Policy 2.1.1: Continue maintaining and inspecting the existing system facilities according to a regular schedule and providing repairs as the need arises.
 - Policy 2.1.2: In phases throughout the planning period, replace deteriorated lines with PVC lines 6" or larger in diameter.
 - Policy 2.1.3: In phases throughout the planning period, replace all cast iron lines with the appropriate-sized PVC pipes.

Goal 3: Customers have access to a sustainable water supply that provides sufficient pressure and fire protection, particularly in times of drought.

- Objective 3.1: By 2032, upgrade the system to ensure adequate pressure and coverage for fire safety.
 - Policy 3.1.1: By 2032, replace all lines that are less than 4" in diameter and that connect to at least one fire hydrant.
 - Policy 3.1.2: Install fire hydrants in areas with inadequate fire protection coverage.

POLICY GOALS AND OBJECTIVES FOR THE WASTEWATER SYSTEM:

The wastewater system analysis and input from FUB staff has identified the following problems with the current municipal wastewater collection and treatment system:

- Desire to continue to replace aging and deteriorating collection lines throughout the City
- Desire to bring all lift stations up to excellent working order
- Desire to reduce system infiltration in large rain events due to inflow of water runoff
- Presence of brick and mortar manholes in the system contributes to excessive inflow and infiltration
- Presence of aging and deteriorated collection lines in the system, also a major contributor to excessive inflow/infiltration

Goal 1: An efficient wastewater system with minimal operational and maintenance costs.

- Objective 1.1: Deteriorating lines and equipment are replaced by 2032.
 - Policy 1.1.1: Replace deteriorating and undersized lines, manholes, and cleanouts in the system to reduce inflow and infiltration in the system and thereby reduce operational costs.
 - Policy 1.1.2: Apply for grants and/or loans from the TxCDBG Program, TWDB, USDA Rural Development, and other sources in order to keep the costs of system improvements at a minimum.

Goal 2: Safe and sanitary wastewater disposal.

- Objective 2.1: By 2032, lines and equipment that pose a safety hazard will have been replaced as needed and an annual program put in place to ensure the continued safety of the wastewater system.
 - Policy 2.1.1: After major improvements are made according to the phased projects in this report, begin an annual program to smoke test and pressure test all existing manholes and cleanouts for leakage. Install waterproofing and seals as needed.

The following section describes a series of proposed improvements to the existing wastewater collection and treatment system. The improvement projects are presented as phased improvements that are suggested for implementation over the 20-year planning period encompassed by this Comprehensive Plan.

The projects are listed in a sequence that represents just one of several possible avenues, all of which should lead to the achievement of the long-term goals adopted by the Falfurrias Utility Board for the operation and maintenance of the wastewater collection and treatment system. The sequence shown in this plan is a logical, step-by-step process intended to increase the safety, efficiency, and economy of the wastewater system operations. The sequence is intended only as a suggested program of phased improvements, and alternative sequences are recommended if funding availability requires significant changes to this proposed system improvements program.

Table 6D contains the estimated projected costs for each phase of the improvements program. These costs are based on current costs of record for similar projects in the same geographical area of the state. Every effort has been made to include appropriate cost factors such as inflation, variations in the market, and advances in wastewater technology. The costs do not include administrative fees that may be associated with project completion. The suggested phases for the system improvements are as follows:

- Implement the proposed line replacements and lift station rehabilitations as funded by current TWDB loan(s). Project includes the rehabilitation of nine (9) lift stations and replacement of approximately 20,100 LF of 8" gravity and 4", 6", and 10" force main lines. Project will also include manholes, service re-connects as required, street, pavement, and driveway repair, and Engineering & Surveying services;
- Obtain funding to replace aging and/or deteriorated collection lines and manholes in the central portion of the City and the 8" force main from the Bennett Lift Station to the WWTF. Project will include approximately 2,700 LF of 6"-8" SDR-26 PVC, +/- 5 manholes, approximately 12,600 LF of 8" Class 150 PVC force main, service re-connects as required, street, pavement, and driveway repair, and Engineering & Surveying services;
- Obtain funding to continue replacing aging and/or deteriorated collection lines and manholes in the central portion of the City. Project will also include approximately 7,980 LF of 6", 8", 10", and 12" SDR-26 PVC, +/- 15 manholes, service re-connects as required, street, pavement, and driveway repair, and Engineering & Surveying services;
- Obtain funding to replace aging and/or deteriorated collection lines and manholes in the south central portion of the City. Project will also include approximately 8,520 LF of 8" and 15" SDR-26 PVC, +/- 16 manholes, service re-connects as required, street, pavement, and driveway repair, and Engineering & Surveying services.

POLICY GOALS AND OBJECTIVES FOR THE GAS SYSTEM:

City leaders, staff, and consulting engineers have identified the following areas of concern with regard to the gas system:

- Texas Railroad Commission policies require the replacement of all steel lines during the beginning of the planning period
- Future Texas Railroad Commission policies may require the replacement of all PVC lines within the next 8-10 years toward the end of the planning period
- City Gate Station is in need of rehabilitation work

Goal 1: A local gas system that operates efficiently and cost-effectively.

- Objective 1.1: By 2016, replace steel lines as per TRRC policies
 - Policy 1.1.1: Begin replacement of the main 4” transmission line north of the City
 - Policy 1.1.2: Consider commissioning a detailed rate study to determine if continued ownership of the system is the best course of action
- Objective 1.2: The city is financially able to maintain and improve the system to improve quality of life for residents and enable growth
 - Policy 1.2.1: By 2014, evaluate rate structure and usage characteristics to determine if a rate increase would be feasible and enable the city to complete more line replacement projects

Goal 2: City and area residents have clean, safe, gas.

- Objective 2.1: Over the planning period, deteriorated lines and equipment are replaced and/or improved
 - Policy 2.1.1: Continue maintaining and inspecting the existing system facilities according to a regular schedule and providing repairs as the need arises

The City strives to provide a safe, efficient, and uninterrupted gas supply while meeting all applicable gas system standards. **These goals can be accomplished over the planning period of 2012 through 2032.**