

City of Clifton Community Development Plan

SECTION 10 - Water

INTRODUCTION

Adequate water utilities are more important to a city's growth, health and well being, perhaps than all other aspects of planning. Development occurs where water lines are available, even if supplies are insufficient.

The growth and land use mix of development will determine the amount of water needed for an area. Because systems are generally planned for an ultimate residential population, variation from one land use to another requires reevaluation of the water system. It is essential, therefore, that a progressive city plan in advance to provide sufficient water services to its customers.

This Plan will outline the existing and future demands for water in Clifton. These future demands will be based upon the projected changes in population, the local economy, resources and land use. Once these demands are projected, they will be compared with the capabilities of the existing system. In this way, by balancing demand against supply, deficiencies and future needs can be determined. Implementation of the Water Plan will then become a method of eliminating these needs and deficiencies.

WATER DEMAND

Within a community, the demand for water comes from many sectors: industrial, commercial, agricultural, recreational and domestic, among others. Many of these demands, such as agricultural and recreational, can often be economically met by natural water supplies such as precipitation and streams. However, many demands for water can only be met adequately by the construction of water supply and distribution systems. It is these demands that can only be met with constructed supply and distribution systems that this study is primarily concerned. Traditionally, this includes the demands of the domestic, commercial, industrial and public sectors of municipalities.

One of the most important factors in the domestic demand for water is that it is needed for human consumption. However, quantitatively, the amount of water thus used is relatively low. The average daily consumption of water as a beverage accounts for only one quart per person. Domestic water demands is approximately 10 to 20 gallons per

person per day once domestic uses are considered. Household appliances such as garbage disposals, washing machines and air conditioners have further increased the daily amount of water required per person. Thus, total domestic consumption averages from 35 to 55 gallons per capita per day.

The demands of the industrial and commercial sectors of a community can be quite important in the design of a water system. The type and number of these uses present determine their needs. Often, the only loads that they place upon water and sewer systems are those resulting from the beverage and personal sanitation uses of water. However, some activities that use water for processing and storage can place extremely heavy loads upon an otherwise adequate system. In developing industrial parks and seeking new businesses for the city, it should be remembered that a new activity may completely overload any existing facilities and result in a burden and hardship for all residents of the community. Often, separate water and sewer systems for an industrial park may be the best solution for the community as a whole.

Public buildings such as schools, jails and town halls as well as public services such as street cleaning and fire protection, require water for which a city may not be reimbursed. Generally, this water can amount to 10 to 15 gallons per capita per day. Water used extinguishing fires does not greatly affect the average consumption since such use is for only a short duration. However, when it does exist, the demand from fire fighting is quite large and it has a significant impact upon the peak demand of a water system.

Although not a demand in the same sense as domestic demand, water lost internally in the water works system is another demand upon the storage and supply facilities of the system. Leakage and other losses are generally about 10 to 15 percent of the water supplied to the system. In a poorly maintained system, or one that is not metered, this will be higher - possibly up to 50 percent.

Because many people make large peak demands upon water systems at common times such as early morning or evening and because the daily per capita use also varies with the seasons, the average daily per capita consumption can seldom be used

to design water supply and distribution systems. More appropriate are systems that are based upon peak daily use. Studies indicate that peak daily use averages about twice the average daily use.

STATE WATER SUPPLIES

Texans have long recognized the importance of planning for the State's future water needs, primarily because of the frequency of droughts that have occurred and will continue to occur in Texas. However, a rapidly growing population and economy requiring reliable supplies and additional water to replace declines in the amount of water currently available, resulting from mining of aquifers and sedimentation in reservoirs, have also heightened our awareness of the need for good water planning.

Currently, groundwater and surface water resources each supply roughly equal shares in meeting the State's water needs. As a result of ground-water supply depletion, the TWDB predicts that by the year 2050, surface water use will meet about 69 percent of the State's water needs with the ground-water share of total statewide water supplies declining to about 31 percent.

According to the TWDB, a comparison of ground-water quality analysis to State drinking-water standards indicate that water from 32 percent of the wells sampled around the State contain one or more of the following constituents in excess of State drinking-water standards: dissolved solids, chloride, nitrate and/or fluoride. It is also estimated that about 1 to 2 percent of the State population had, at some time, used drinking water from ground-water sources that had one or more of these constituents in excess of Texas drinking-water standards.

FUTURE DEMAND

By 2050, municipal water demand in Texas is projected to increase by 67 percent, serving a population that is projected to nearly double (90-percent increase). It can be expected, therefore, that per capita consumption will increase in Clifton. (The anticipated future growth patterns for Clifton are detailed in the city's Population Study).

At present, Clifton has an adequate existing system to supply its needs. An analysis of the effectiveness of the existing system at the present time and in 2025 is included later in this section. Also, included is an analysis of the effectiveness of the present system to handle fire flow requirements.

WATER SYSTEM PLANNING

WATER MANAGEMENT

Water is a finite resource that requires careful and proactive management, and the era of plentiful and inexpensive water is rapidly ending. Water conservation, sound water management strategies, and efficient and adequate investment in a range of solutions are all essential to the development of the additional water supplies required to meet Texas' growing population and economic needs, including agriculture, and to protect our natural resources.

In order to assess the new water management needs of Texas, the TWDB prepares a "no action" scenario that portrays statewide demographic/economic growth occurring as anticipated with only currently available water supply infrastructure and no further improvement in water demand management. Their forecasts indicate that water shortage problems could blanket the entire State with every Texas county in deficit at some point in the next 50 years.

To properly plan a future water system capable of meeting the requirements of the projected community, it is necessary to evaluate the present system, including the water supply and distribution system network and its ability to provide service for present and projected demands. The city must have a dependable water supply that will provide for domestic, industrial, and commercial demands, as well as an allowance of about 25 percent for distribution system leakage, fire fighting and other un-metered uses. The present average usage throughout the United States is around 100 gallons per person per day.

In the past when resources were plentiful, the traditional response was to build a nearby lake or drill some wells, and decisions were less complex and more straightforward.

However, because the State is in an era of increasing resource scarcity, there is a more pronounced competition for those limited resources and a heightened environmental awareness. The older traditional methods or just building a new water supply are not only less politically and regulatively feasible, but increasingly more costly, and sometimes still insufficient to meet the full extent of anticipated water needs.

Today, and even more in the future, municipalities will have to utilize both traditional and more innovative management measures to not only meet the physical or volumetric aspects of these needs, but also the growing political and regulatory expectations that water is being managed and used wisely before new major development occurs.

PLANNING GUIDELINES

Effective February 1, 1998, the Texas Department of Insurance implemented Insurance Services Office's Fire Suppression Rating Schedule and the Public Protection Classification System. The Key Rating System, which has been repealed, uses population as the primary basis for determining fire protection requirements. Key rates were based on a time when Texas cities had a single core area business district. The new rating system should not be used for purposes other than insurance rating. Since Clifton better fits the Key Rate System identity, it is still a good measure and useful for planning purposes. Planning for the water system must take into account the basis on which this key rate is computed as affected by the entire water system which includes pumping facilities, fire flow pressures, water supply, ground level storage, elevated storage, fire hydrants, water distribution and pumping facilities.

The Texas Commission on Environmental Quality (TCEQ) has also set guidelines for the location, installation and operation of water lines and all other water works utilities. In planning for a growing city, consideration must be given to the extension of the utility system into new areas as building construction progresses. Unless utility expansion is orderly and adequate, city growth into new areas cannot and will not occur. Building may not be completely stopped by failure to extend service into the new areas, but the character of the development, which does occur, is likely to be inferior and have an adverse effect on the city as a whole.

WATER SYSTEM INVENTORY

How the System Currently Operates

The water supply distribution system serving the City of Clifton is owned and operated by the city. The system obtains raw water from a combination of five (5) wells and surface water. The wells are all located within the city limits and obtain raw water from the Trinity Water Aquifer. All well water is treated at the ground storage tanks.

Treated water is injected into the system from two points; Site #3 and Moulding Mill. Site #3 is fed by one well located at the site and site #7 which is fed by one (1) well and water from the surface water plant. The Moulding Mill tank is fed by two (2) wells. Site #3 is responsible for providing the majority of the water and pressure to the system while the Moulding Mill site is primarily utilized to supplement Site #3.

Surface water is obtained from the Bosque River where a river intake, located just north of the RCC Channel Dam, pumps water through an 18-inch supply line into a 50 acft. Off-Channel Water Reservoir. Raw water is then transported into a Surface Water Plant where it is treated before being pumped into ground and elevated storage facilities. The plant is designed to treat 1,000,000 gallons per day. The city is permitted to pump four (4) cubic feet per second.

A SCADA (Supervisory Control And Data Acquisition) network is utilized to help manage the water system. If a problem is detected at any site, a call is sent to an operator. The operator can then log onto the system and find the location of the problem.

There are currently 1,588 connections served, five (5) of which are outside the city limits. Water consumption and rates for the City of Clifton are depicted in Table 10.1.

TABLE 10.1
CITY OF CLIFTON

FISCAL YEAR 2005 WATER CONSUMPTION & REVENUES

TOTAL WATER PUMPED	282,815,000 gallons
Estimated Water System Losses	28,281,500 gallons
TOTAL ANNUAL WATER CONSUMPTION	143,632,500 gallons
ANNUAL WATER COST TO CITY (EXCLUDING DEPRECIATION)	\$675,476
Average Annual Cost Per Thousand Gallons (including est. loss)	\$2.39
Average Annual Cost Per Customer	\$425.36
ANNUAL WATER REVENUES	\$1,021,511
Average Annual Revenue Per Thousand Gallons	\$3.61
Average Annual Revenue Per Customer	\$643.27
Average Monthly Revenue Per Customer	\$53.61
Approximate Cost to Customer for 1,000 gallons	\$3.61
Approximate City Cost to Produce 1,000 gallons	\$2.39

Source: City of Clifton

As illustrated in Table 10.1, the cost to produce 1,000 gallons (\$2.39) and revenue generated from 1,000 gallons (\$3.61) reveals that the city water system operates at a financial gain of approximately \$1.22 per 1,000 gallons which is used for water system maintenance.

PREVIOUS STUDIES

There have been no previous studies on the Clifton Water System.

INVENTORY

In August 2006, an inventory of the existing system was compiled to identify the water system in and around the City of Clifton. The results of the inventory are graphically depicted in Figure 10.1. Water system capacities are also indicated in Table 10.2. Pipe diameter ranges in size from 2-inch to 18-inches.

TABLE 10.2
CITY OF CLIFTON
 2006 WATER SYSTEM INVENTORY

<u>FACILITY</u>	<u>CAPACITY</u>	<u>YEAR</u>
Elevated Storage - (Site 3 - Kruger Hill)	200,000	1995
Ground Storage - (Surface Water Plant)	250,000	1999
Ground Storage - (Moulding Mill)	180,000	UNK
Ground Storage - (Site 7)	75,000	2005
Ground Storage - (Site 3 - Kruger Hill)	76,000	1997
Ground Storage - (Site 3 - Kruger Hill)	125,000	2005
Well #2 – (Site 2 - Maintenance Barn)	165 gpm	1915
Well #4 – (Moulding Mill)	180 gpm	1954
Well #5 – (Site 3 - Kruger Hill)	165 gpm	1963
Well #6 – (Kruger Pasture)	160 gpm	1971
Well #7 – (Site 7)	170 gpm	1977
Transfer pump – (Site 3 - Kruger Hill)	500 gpm	2005
Transfer pump – (Site 3 - Kruger Hill)	500 gpm	2005
Transfer pump – (Site 7)	250 gpm	1995
Transfer pump – (Site 7)	250 gpm	2006
Transfer pump – (Moulding Mill)	500 gpm	2006
Service Pump – (Treatment Plant)	750 gpm	1999
Service Pump – (Treatment Plant)	750 gpm	1999
Intake Pump – (at Bosque River)	1,800 gpm	1999
Intake Pump – (at Bosque River)	1,800 gpm	1999

Source: City of Clifton

The TCEQ requires that properly trained and certified operators run public water systems. These requirements have been illustrated in Table 10.3:

TABLE 10.3
CITY OF CLIFTON
OPERATOR STANDARDS

<u>SYSTEM SIZE</u>	<u>CERTIFIED OPERATORS</u>
250 Connections or fewer	One (1) Class "D"
250 Connections or more	One (1) Class "C" or higher
1,000 Connections or more*	Two (2) Class "C" or higher

* Applicable Rule to Clifton System

It should be noted that, beginning January 1, 2004, systems that treat surface water must employ at least one operator who holds a Class "B" or higher surface water certificate. Until January 1, 2004, systems that treat surface water must employ at least one operator who holds a Class "B" or higher surface water certificate or who holds a Class "C" surface water certificate and has completed an executive director recognized 20-hour water laboratory course.

The City currently has five (5) operators, three (3) with class "C" Certification, and two (2) with class "D" Certification, which complies with TCEQ requirements. Daily operation and maintenance of the water facilities should consist of the following.

1. Check chlorine residual;
2. General maintenance as needed and required;
3. Checking water Ph; and
4. Checking water alkalinity.

With respect to system standards and design criteria, the TCEQ has developed specific minimum guidelines which can be found in Title 30 of the Texas Administrative Code (30 TAC), Chapter 290. Additional standards for water systems are those set forth in the Texas Department of Insurance "Key Rating System". While no longer used to determine insurance rates, this system still provides a good guideline for distribution lines and fire hydrants for smaller cities. Specifically, the system sets forth standards

requiring minimum line sizes in residential areas be not less than 6-inches in diameter. In addition, all lines must be looped to ensure uninterrupted service should a line break occur. In commercial areas, 8-inch lines must be installed. No 6-inch dead-end water mains should extend beyond 1,800 feet.

Additionally, standard three-way fire hydrants require a 6-inch or larger diameter water main with a minimum of 5-inch valve openings. Fire hydrants are to be located every 300 feet in commercial areas and every 600 feet in residential areas so that every building in the city limits will be within 500 feet of a standard city fire hydrant. Fire hydrants on mains less than 6 inches are not recognized as providing effective fire protection. As illustrated in Figure 10.1, there are several areas of the city in need of additional fire hydrants.

Current and future data from the Clifton water system, as compared with TCEQ and TDI standards, are indicated in Table 10.4. As shown, the city's standards with regard to line size standards are currently out of compliance with TDI requirements and will remain so for the remainder of the planning period. However, both total and elevated water storage are currently in compliance with TCEQ standards and will be able to serve the projected population.

TABLE 10.4
CITY OF CLIFTON
WATER SYSTEM STANDARDS

<u>FACILITY CAPACITY</u>	<u>TCEQ</u>	<u>Clifton (2006) *</u>	<u>Clifton (2030) **</u>
Total Storage – 656,000 gallons	200 gallons per connection	414 gallons per connection	330 gallons per connection
Elevated Storage – 476,000 gallons	100 gallons per connection	300 gallons per connection	239 gallons per connection
Minimal Residual Pressure	20 psi	30 psi	30 psi
Normal Operating Pressure	35 psi	55 psi	55 psi
	<u>TDI</u>		
Minimum Water Main Size	6 -inch	(2-inch)	(2-inch)

TCEQ = Texas Commission on Environmental Quality

TDI – Texas Department of Insurance

() = Out of compliance

* Based Upon 1,588 existing connections citywide and a service population of 4,035.

** Based Upon 1,991 future connections citywide and a service population of 5,060.

As illustrated in Table 10.5, there are a sufficient number of available connections to support future population growth as it pertains to total storage.

TABLE 10.5
CITY OF CLIFTON

POTENTIAL WATER SERVICE CAPACITY

<u>FACILITY</u>	<u>MAXIMUM CONNECTIONS</u>	<u>OCTOBER 2006 CONNECTIONS</u>	<u>AVAILABLE CONNECTIONS</u>	<u>CONNECTIONS NEEDED BY 2030</u>
Total Storage – 906,000 gallons	3,280	1,588	1,692	1,991
Elevated Storage – 476,000 gallons	4,760	1,588	3,172	1,991

Based Upon minimum TCEQ standards.

WATER SYSTEM ANALYSIS

REGIONAL INFORMATION – 2006 REGION C WATER PLAN

Clifton is located in the Region G of the State. The 2006 Texas Water Development Board Plan discusses this region in detail. Below is a summary of the TWDB discussion of Region G.

Introduction:

Stretching from the piney woods of Grimes County in the southeast to the rolling plains of Kent County in the northwest, the Brazos G Regional Water Planning Area includes 37 counties. Over 90 percent of the region lies within the Brazos River Basin, with the Brazos River being the region's primary source of water. The largest economic sectors in the region are service, manufacturing, and retail trade. Major cities in the region include Abilene, Bryan, College Station, Killeen, Round Rock, Temple, and Waco.

Population and Water Demands:

According to the plan, approximately 8 percent of the state's 2010 population is projected to reside in the Brazos G Region, and between 2010 and 2060 the region's population is projected to increase 77 percent to 3,332,100. Its water demands, however, will increase less dramatically. By 2060, the total water demands for the region are projected to increase 38 percent from 835,691 acre-feet in 2010 to 1,150,973 acre-feet. Municipal water use makes up the largest share of these demands in all decades and is projected to experience the greatest increase, from 311,581 acre-feet in

2010 to 547,028 acre-feet in 2060—a 76 percent increase. Manufacturing and steam-electric power generation demands are also projected to grow significantly, by 61 percent (from 19,787 acre-feet to 31,942 acre-feet) and 64 percent (from 147,734 acre-feet to 242,344 acre-feet), respectively. Irrigation water demand, however, declines 10 percent, from 232,541 acre-feet in 2010 to 208,386 acre-feet in 2060, because of projected reductions in irrigated land and technological advances in irrigation techniques.

Existing Water Supplies:

The region has a large number of surface water and groundwater supply sources, with over three-fourths of the existing water supply in the Brazos G Region associated with surface water. The principal surface water sources are the Brazos River, its tributaries, and the 41 major reservoirs throughout the region. There are six major aquifers in the region: the Seymour and Edwards-Trinity aquifers in the western portion of the region, the Trinity and Edwards (Balcones Fault Zone) aquifers in the central portion, and the Carrizo-Wilcox and Gulf Coast aquifers in the eastern portion. By 2060, the total surface water and groundwater supply is projected to decline 3 percent from 1,150,098 acre-feet to approximately 1,112,155 acre-feet. This projected decline in water supply is due to both reservoir sedimentation and a greater emphasis on sustainable use of groundwater resources in the region.

Needs:

Although on a region-wide basis it might appear that the Brazos G Region has enough water supply to meet demands through 2050, with only a small deficit in 2060, the total water supply volume is not accessible to all water users throughout the region. Consequently, in the event of drought, Region G is projected to have a total water supply need of 141,800 acre-feet by 2010. Irrigation accounts for nearly half of those needs at 65,303 acre-feet. By 2060, overall water needs are expected to increase to 347,804 acre-feet, with almost half of this need associated with municipal users.

Recommended Water Management Strategies and Cost:

The Brazos G Planning Group recommended a variety of water management strategies that would provide more water than is required to meet future needs. In all, the strategies would provide 735,935 acre-feet of additional water supply by the year 2060 at a total capital cost of \$1,076,323,034. Some of this water could be made available to other regions with needs. Because there were no economically feasible strategies identified to meet their needs, five counties in the region have unmet irrigation needs (37,273 acre-feet).

Conservation Recommendations:

Conservation strategies represent 6 percent of the total volume of water associated with all recommended strategies. Water conservation was recommended for every municipal water user group that had both a need and a gallons-per-capita-per-day use greater than 140 gallons. The plan recommends that all non-municipal water user groups with needs reduce their water use through conservation by 3, 5, and 7 percent in 2010, 2020, and 2030, respectively.

Ongoing Issues:

The planning group continues to be concerned about the methods of estimating groundwater availability.

Select Policy Recommendations:

- Encourage more active participation by state natural resource agencies in the water planning process
- Improve coordination between groundwater conservation districts and the planning group to ensure the sustainable use of groundwater
- Develop a more efficient and cost-effective process to amend the regional water plan

STATE REQUIREMENTS

As mentioned earlier, the Texas Department of Insurance “Key Rating System” requires a minimum line size of 6-inches for residential areas and 8-inches for commercial and industrial areas. Many of the water lines in the Clifton water system do not meet these criteria. All future water system line expansions should continue to comply with TDI “Key Rating System” standards. Smaller lines should be installed as service lines only. Also, as water lines are replaced, the appropriately sized lines should be installed.

According to the TCEQ, as of September 1, 2000, all public water systems must accommodate drought contingencies and conservation practices. Additionally, all water systems serving fewer than 3,300 retail connections must develop a drought contingency plan. This plan is designed to combine strategies to achieve lasting, long-term improvements in water use efficiency with response measures aimed at avoiding, minimizing or mitigating the risks and impacts of drought-related water shortages and other emergencies. The plan adopted by the provider should ensure its capability of providing water under drought conditions. The City of Clifton has developed and adopted such a plan in accordance with guidelines set forth by the TCEQ (Ordinance 000401).

WATER SUPPLY

The City of Clifton has been designated as the Regional Water Provider for Southern Bosque County. As part of this responsibility, the city has recently entered into an agreement with the City of Meridian to sell them up to 10% of all treated water produced by the Clifton water treatment plant. However, due to drought conditions and inadequate water levels, no water sales have taken place.

Water Service Area

The City of Clifton’s Certificate of Convenience and Necessity (CCN) boundary primarily follows the city limits. (A CCN is granted by the Texas Commission on Environmental Quality (TCEQ) and authorizes a utility to be the sole service provider to an area so that it can confidently make the capital investments necessary.) The city is currently in the process of extending this boundary to follow the extraterritorial jurisdiction line, which

extends approximately ½ mile past the city limits. This will ensure the city will be able to provide water to new residents and businesses located within that area.

Wells:

As mentioned earlier, Clifton relies on the Trinity aquifer and the Bosque River for its water supply. This aquifer has remained a fairly stable water supply in the area, though its level has been steadily declining. Other than routine maintenance, the existing wells have performed adequately for the city. However, well #4 recently went down for several days. While out of service, the well depth was increased.

Surface Water:

In the past, raw water supplied by the Bosque River has been plentiful. However, the recent drought has caused its' water level to drop significantly, preventing the city from drawing any water from it. Consequently, the reservoir has been reduced to 50% of its capacity, which, according to city staff, at full capacity, was designed to supply the city for one year.

The current water supply should be adequate to meet the health (drinking and sanitary use) and safety (fire protection) of Clifton's domestic customers during normal conditions. However, if drought conditions persist for an extended period of time, the city's water supply may become inadequate.

The overall quality of the water supplied to the city's water system is of good quality. Water demand in the Clifton water system has been listed in Table 10.6. As shown, the City is in compliance with the TCEQ rules 290.45, section B, relating to water production standards.

TABLE 10.6
CITY OF CLIFTON
 WATER PRODUCTION

<u>TCEQ STANDARDS</u>	<u>.6 gpm / connection</u>
MAXIMUM PUMPING CAPACITY – 2,640 gpm*	1.47 gpm / connection or 3,801,600 gpd
PEAK DEMAND	1,000,000 gpd
AVERAGE DEMAND	700,000 gpd

Based on TCEQ Minimum Acceptable Standards, current Clifton data and 1,588 connections citywide

* Calculation:

$$\begin{array}{r}
 \text{Total well pumping capacity (840 gpm)} \\
 + \quad \text{Total (current) intake pumping (1,800 gpm)} \\
 \hline
 \end{array}$$

Should a water shortage occur, the city can instigate it's Water Conservation Plan. The plan has six (6) stages:

1. Stage 1 (Mild Water Shortages)

- a. Daily water demand exceeds 1,000,000 gallons or 75% of treatment capacity for seven (7) consecutive days.
- b. Customers shall be requested to voluntarily conserve water and adhere to prescribed restrictions on certain water uses.

2. Stage 2 (Moderate Water Shortages)

- a. Daily water demand exceeds 1,100,000 gallons or 85% of treatment capacity for seven (7) consecutive days.
- b. Customers shall be required to comply with requirements and restrictions on certain non-essential water uses.

3. Stage 3 (Severe Water Shortages)

- a. Daily water demand exceeds 1,225,000 gallons or 95% of treatment capacity for three (3) consecutive days.
- b. Customers shall be required to comply with requirements and restrictions on certain non-essential water uses.

4. Stage 4 (Critical Water Shortages)

- a. Daily water demand exceeds 1,400,000 gallons or 105% of treatment capacity for two (2) consecutive days.
- b. Customers shall be required to comply with requirements and restrictions on certain non-essential water uses.

5. Stage 5 (Emergency Water Shortages)

- a. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service or natural or man-made contamination of the water supply source.
- b. Customers shall be required to comply with requirements and restrictions on water uses.

6. Stage 6 (Water Allocation)

- a. When Stage 5 has been in effect for two (2) consecutive days and necessary reductions in water demand or corrections to system failures have not been achieved or rectified.
- b. Customers shall be required to comply with requirements and restrictions on water uses.

WATER RATES

The current water rates for all customers as adopted by the City of Clifton are as follows:

Residential:

- ❑ \$29.50 for 1st 3,000 gallons
- ❑ \$3.00 for each additional 1,000 gallons (3,001 – 7,000 gallons)
- ❑ \$4.25 for each additional 1,000 gallons (7,100 – 15,000 gallons)
- ❑ \$5.25 for each additional 1,000 gallons (15,100 gallons and up)

Commercial:

- ❑ \$34.50 for 1st 2,000 gallons
- ❑ \$4.00 for each additional 1,000 gallons (2,100 – 7,000 gallons)
- ❑ \$5.25 for each additional 1,000 gallons (7,100 – 15,000 gallons)
- ❑ \$6.25 for each additional 1,000 gallons (15,100 gallons and up)

FACILITY OPERATION

Presently, operation of the city's water system facilities is adequate with maintenance conducted on a regular basis. However, the Moulding Mill ground storage tank is in fair to poor condition and needs to be replaced.

This project has allowed for the production of improved computer mapping in color showing an accurate display of the city's distribution system. With the assistance of this study, locating necessary elements of the water system will be easier. As updates are made, a more effective approach can be achieved in evaluating future projects.

WATER SYSTEM OVERVIEW

The water system is currently meeting the majority of the city's needs. Generally, the critical elements of the system where deficiencies exist are.

- ❑ The water treatment plant is currently in violation with TCEQ requirements relating to the handling of backwash at the water treatment plant;
- ❑ The existing CCN line needs to be expanded;
- ❑ The water supply needs to be stabilized to accommodate potential future drought conditions;
- ❑ Water supplied to the system from the Moulding Mill ground storage tank needs to be routed to Site #3;
- ❑ There are an insufficient number of cut-off valves in the system;
- ❑ Undersized, dilapidated line exists throughout the system;
- ❑ There is a lack of complete fire protection;
- ❑ The Moulding Mill Ground Storage tank needs to be replaced;
- ❑ The city needs to prepare for the potential service of 160 new homes;
- ❑ The treatment capacity of the water treatment plant needs to be expanded; and
- ❑ Dead end lines exist in some areas of the system.

LOCALLY IDENTIFIED PROBLEMS

Based on input from the public, staff and City Council, the following problems were developed and ranked according to the perceived need of the water system of Clifton:

1. Water Treatment Plant - Discharge – The city was recently cited by the TCEQ for discharging water without a permit due to the operation of its surface water plant backwash system. In order to eliminate this problem, the city will need to obtain a discharge permit, or discharged the water as irrigation.
2. CCN boundary – The current CCN boundary encompasses primarily areas within the existing city limits. Private wells provide water to the areas outside of the city limits. This boundary needs to be expanded to allow the city to serve new developments which will occur outside the city limits.
3. Water Supply – While the city's water supply has been adequate to serve its customers, the recent drought has prevented the city from drawing water from its surface source, the Bosque River. Consequently, the city's reservoir is at 50% capacity which is estimated to be approximately six months worth of water. Should drought conditions continue, further preventing access to surface water, the city's water supply could be jeopardized. Possible solutions to this potential problem include implementing new conservation practices and reducing water system losses.
4. Water Pressure – Water injected into the system from the Moulding Mill ground storage tank causes severe pressure spikes in the system. This injection point needs to be abandoned and water rerouted to Site #3.
5. Cut-off valves – According to city staff, there are an insufficient number of cut-off valves in the system. As a result, line repairs often require a larger portion of the system to be shut down than necessary. Additional valves need to be added to the system and technologies allowing for the insertion of temporary valving for sections of line to be repaired need to be utilized.
6. Undersized distribution lines – Undersized lines exist throughout the system. A large number of the existing water lines in the city are old with diameters as small as 2-inches. These small lines limit system pressures in some areas of the city, below that necessary for fire protection. In addition, the Central Business District

and commercial areas have inadequately sized lines. It is recommended that these areas have a minimum of 8-inch distribution lines.

7. Inadequate fire protection – As illustrated in Figure 10.1, several areas of the city have inadequate fire protection. Additional fire hydrants are needed.
8. Ground Storage Tank – The Moulding Mill ground storage tank is old and is not in compliance with TCEQ rules pertaining to hatch sizes. A new tank needs to be constructed.
9. Future Growth – Two (2) new subdivisions with over 160 possible homes are being proposed. Water service will need to be extended to these areas. In addition, the water treatment plant capacity will need to be increased.
10. Incomplete system looping – Some lines in the system are at “dead-ends” which could allow water to stagnate, thereby creating the possibility of foul tasting and smelling water. These lines can also cause inadequate pressures. All lines in the system should be looped.

No other problems are perceived as being in need of resolution.

GOALS AND OBJECTIVES

GOAL 1: OPERATE THE CITY’S WATER SYSTEM USING THE MOST EFFICIENT AND COST-EFFECTIVE METHODS.

OBJECTIVE 1:1

Throughout the planning period, ensure adequate valving in the distribution system by adding additional valves as finances allow and utilizing other valving techniques which enable minimal system shutdowns during maintenance operations.

OBJECTIVE 1:2

Throughout the planning period, provide and document preventative maintenance of all facilities.

OBJECTIVE 1:3

Throughout the planning period, replace undersized and dilapidated lines rather than repairing them.

OBJECTIVE 1:4

Throughout the planning period, ensure all drawings pertaining to the water system are accounted for, are in a secure location and can be easily accessed.

OBJECTIVE 1:5

Before the end of the planning period, consider establishing procedures requiring record drawings for all future projects and dictating the storage and care thereof.

GOAL 2: PROVIDE RESIDENTS WITH CLEAN, SAFE, POTABLE WATER THROUGH A CITYWIDE WATER SYSTEM.

OBJECTIVE 2:1

By the end of 2010, bring the water treatment plant into compliance with regard to the handling of backwash.

OBJECTIVE 2:2

By the end of 2011, replace the Moulding Mill ground storage tank.

OBJECTIVE 2:3

Throughout the planning period, continue maintaining and repairing the existing system.

OBJECTIVE 2:4

Provide and document professional inspection of all facilities according to a regular schedule, at least once a year.

GOAL 3: ENSURE ADEQUATE WATER PRESSURE AND SUPPLY FOR GENERAL USE AND FIRE PROTECTION.

OBJECTIVE 3:1

By the end of 2007, begin investigating methods of stabilizing the city's water supply during periods of drought conditions.

OBJECTIVE 3:2

Eliminate water pressure spikes by re-routing the Moulding Mill ground storage tank water to Site #3.

OBJECTIVE 3:3

By the end of 2010, ensure the city's water supply has been stabilized to accommodate future drought conditions.

OBJECTIVE 3:4

Before the end of the planning period, provide adequate fire protection for all occupied areas in the city limits.

OBJECTIVE 3:5

Before the end of the planning period, ensure the Central Business District and all commercial areas are served with adequately sized distribution lines.

OBJECTIVE 3:6

Throughout the planning period, upgrade old and undersized lines wherever they do not meet minimum state standards.

OBJECTIVE 3:7

Throughout the planning period, eliminate dead end lines by looping them into the system.

OBJECTIVE 3:8

Throughout the planning period, expand the system by adding new lines as needs arise.

OBJECTIVE 3:9

Before the end of the planning period, expand the treatment capacity of the water treatment plant.

SYSTEM PLAN

YEAR 1 – 5

A five-year action plan listing priorities, estimated costs, and possible funding sources has been developed in strict accordance with criteria established by the TCEQ, TWDB, and TDI. Each Phase, with its respective improvement, represents a priority of the water system plan. The physical aspects of the plan are graphically presented in Figure 10.2.

In order to bring the city's water system into compliance with TCEQ standards, recommended improvements should be an integral part of an overall five-year Capital Improvements Program. To avoid unnecessary street repairs, it is recommended that, where possible, new utility lines be located along roadways rather than beneath them.

PHASE I – (2007-2010)

Eliminate water treatment plant backwash issues by establishing a procedure to allow backwash to be utilized as irrigation. Construction activities will include the construction of a stand pipe and approximately 2,000 linear feet of irrigation line to a city-owned hay field and the Clifton Baseball Association.

Cost: \$350,000 (To be partially paid for with a \$250,000 grant from the Office of Rural Community Affairs.)

PHASE II – (2007-2008)

Re-route the following section of line:

<u>Section</u>	<u>From</u>	<u>To</u>
“A” Existing right-of-way	North from FM 3220 between State Hwy. 6 and western city limits	North approximately 800 feet
“B” Existing right-of-way	North end of Section “A”	northwest approximately 1,000 feet

Cost: \$25,000

PHASE III – (2007-2008)

Re-route and replace the following sections of line:

<u>Section</u>	<u>From</u>	<u>To</u>
Avenue I *	W. 13 th Street	W. 11 th Street
Avenue J **	W. 13 th Street	W. 11 th Street

* Re-route

**Replace with higher capacity PVC water line.

Cost: \$30,000

PHASE IV – (2008-2010)

Construct new pump and transmission line from Moulding Mill Ground Storage Tank to Site #3.

Cost: \$300,000

PHASE V – (2009-2011)

Replace the Moulding Mill Ground Storage Tank

Cost: \$350,000 (To be partially paid for with a \$250,000 grant from the Office of Rural Community Affairs.)

In addition to the phased improvements, the city should immediately begin investigating ways of bolstering its water supply to accommodate future drought conditions. This may include the recycling of treated wastewater and the elimination of major system water losses.

YEAR 6 – 20

By the end of the fifth year, the system will be closer to compliance with TCEQ and TDI requirements. By the end of year ten, the city's water supply should be stabilized utilizing methods determined in years one thru five.

Before the end of the planning period, the treatment capacity of the water treatment plant will need to be increased to accommodate a pair of new subdivisions being proposed. This will require the installation of a new filter at the plant.

For the remainder of the planning period and to accommodate existing development with capacity to serve additional residents, the city will need to continue replacing undersized line, providing additional fire hydrants until there is one within 500 feet of all buildings in the city limits, adding additional valves and continue to keep water cost as low as possible.

POSSIBLE FUNDING SOURCES

The existing financial condition of the city is such that assistance for the aforementioned system improvements would be required in the form of low-interest, long-term loans or a grant program. The following options, therefore, are available to the city.

- ✓ The Texas Community Block Grant (TxCBG) – The recommended funding source for qualified improvements would be through a grant from TxCBG as administered by the Office of Rural Community Affairs (ORCA). This program allows for some repairs and upgrades to water systems. While funding is available annually from the program year allocations, competitions are conducted bi-annually. Under this fund, each of the 24 planning regions receives an allocation from the funds available that year. Applications are accepted from non-entitlement communities and are scored both on a regional and state level. Grants through this program are typically \$250,000 or less with a minimal match requirement (typically 15% or less).
- ✓ STEP Program – This program is a branch of the TxCBG and functions similar to it. A significant difference, however, is that an applicant must provide at least 50% of the labor for the project from volunteers, and only supplies, engineering and administration are eligible expenses. Applications are accepted throughout the year, or until all available funds have been exhausted.
- ✓ The Texas Capital Fund (TCF) – These program funds are available on a quarterly basis for economic development funding for project, which primarily create or retain permanent employment opportunities. The various forms of assistance available under this fund include: grants for infrastructure improvements; grants for real property or acquisition, construction, reconstruction, or rehabilitation of public facilities; grants for the acquisition, construction or rehabilitation or real estate and to provide public improvements of non-profit incubator sponsors. Applications are accepted from non-entitlement

cities/counties who apply in conjunction with a private business. Applications for such funds are often structured with no city matching requirements.

- ✓ Texas Water Development Board (TWDB) State Revolving Fund (SRF) – Another funding option is the TWDB SRF program. Funds from this source are in the form of a loan financed for 20 years and offered at an interest rate of .7% below the rate the borrower would receive on the open market at the time the loan closes. It can be expected to take at least a year before results would be seen from such an application. Engineering costs are generally higher with this program due to extensive reporting and environmental assessments which are required during the application process.
- ✓ Rural Economic Community Development (RECD) – This program can generally provide financing over a longer term (20 – 30 years) for economically depressed communities. RECD offers possible partial grant funding for projects if the applicant city's median income is low compared to the average median income, and if the project will require a relatively high impact on user rates. Like the TWDB SRF program, time involved in processing an RECD application usually exceeds that involved in most grant programs, taken at least 18 months before results would be realized. Engineering costs are generally higher with this program as application requirements are similar to the TWDB SRF program.
- ✓ General Obligation Bonds – Debt ceiling permitting and with approval of registered voters, this funding option can raise large amounts of capital, usually carrying the lowest available interest rates. Capital costs are shared by current and future users, both of whom will benefit from the improvements.
- ✓ Revenue Bonds – This option usually demands higher interest rates than general obligation bonds. However, this method does not require voter approval and is not subject to legislative limits. Debt service is paid by user fees, rather than from general revenues. Unless the city has a local bank which is interested in purchasing the bond, either of these bonding options would require the city to

obtain an investment grade bond rating. This rating would be required to market the bond nationally. Such rating is quite difficult for most small rural communities to obtain. If a local bank is interested in purchasing the bond, maturation schedules are typically less than 10 years. If this relatively short timetable does not overextend the city financially, it may be a viable option.

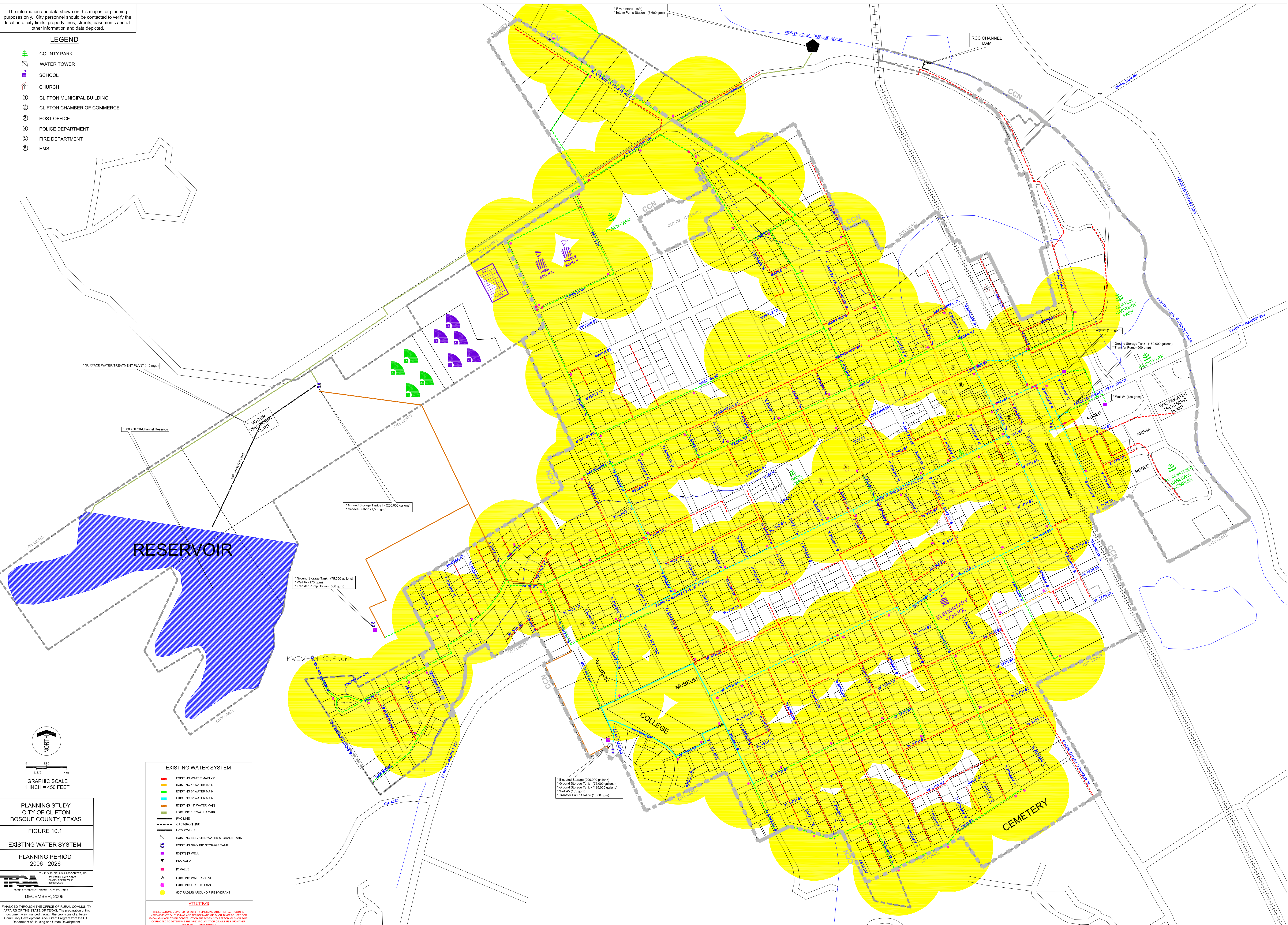
- ✓ City Water and Sewer Fund – A final financing option includes increasing water rates to customers. This option would provide a greater income to the fund and should make more funds available for operational and maintenance improvements.

Additionally, adopting a pay-as-you-go policy could be used.

The information and data shown on this map is for planning purposes only. City personnel should be contacted to verify the location of city limits, property lines, streets, easements and all other information and data depicted.

LEGEND

- COUNTY PARK
- WATER TOWER
- SCHOOL
- CHURCH
- CLIFTON MUNICIPAL BUILDING
- CLIFTON CHAMBER OF COMMERCE
- POST OFFICE
- POLICE DEPARTMENT
- FIRE DEPARTMENT
- EMS



RESERVOIR

- EXISTING WATER SYSTEM**
- EXISTING WATER MAIN - 2"
 - EXISTING 4" WATER MAIN
 - EXISTING 6" WATER MAIN
 - EXISTING 8" WATER MAIN
 - EXISTING 12" WATER MAIN
 - EXISTING 16" WATER MAIN
 - PVC LINE
 - CAST IRON LINE
 - RAW WATER
 - EXISTING ELEVATED WATER STORAGE TANK
 - EXISTING GROUND STORAGE TANK
 - EXISTING WELL
 - PRV VALVE
 - IC VALVE
 - EXISTING WATER VALVE
 - EXISTING FIRE HYDRANT
 - 500' RADIUS AROUND FIRE HYDRANT

ATTENTION!
THE LOCATION OF EXISTING WATER MAINS AND OTHER INFRASTRUCTURE IMPROVEMENTS ON THIS MAP ARE APPROXIMATE AND SHOULD NOT BE USED FOR CONSTRUCTION OR OTHER CONSTRUCTION PURPOSES. CITY PERSONNEL SHOULD BE CONTACTED TO OBTAIN THE SPECIFIC LOCATION OF ALL LINES AND OTHER INFRASTRUCTURE ELEMENTS.



GRAPHIC SCALE
1 INCH = 450 FEET

PLANNING STUDY
CITY OF CLIFTON
BOSQUE COUNTY, TEXAS

FIGURE 10.1
EXISTING WATER SYSTEM

PLANNING PERIOD
2006 - 2026

DECEMBER, 2006

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