Sabine River Authority of Texas

HUNT COUNTY REGIONAL SEWER SYSTEM PLANNING STUDY

Final Report
September 2007

Prepared For:

Sabine River Authority of Texas
City of Greenville
City of Caddo Mills
City of Quinlan
Cash Special Utility District
Caddo Basin Special Utility District

Texas Water Development Board (TWDB)

Prepared by:

Freese and Nichols, Inc.
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STATE OF TEXAS
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9/25/07

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDIX

EXECUTIVE SUMMARY

The majority of Hunt County does not currently have a centralized wastewater collection and treatment system in place. Most of the development in the area is characterized as low density residential consisting primarily of scattered large lot home sites served by on-site treatment systems. The City of Greenville is the largest wastewater service provider in the study area and has a wastewater treatment facility located in the eastern half of its service area. Much of the future growth for the City of Greenville is expected to occur in the western half of the City's service area which is in a different sewershed than the existing treatment plant. The City of Greenville desires to investigate options for handling flows from the western sections of its service area as an alternative to pumping to, and expanding its existing treatment plant.

The Sabine River Authority (SRA) initiated this study to investigate the alternatives for a centralized wastewater collection and treatment system to facilitate higher density development and to avoid proliferation of new septic systems. A regional sewer system would enable higher levels of wastewater treatment within the Lake Tawakoni water shed and protect the water quality. Other study participants were the Cities of Greenville, Caddo Mills and Quinlan as well as Cash Special Utility District (SUD) and Caddo Basin SUD.

Historical growth patterns were reviewed and populations were projected for the study participants and other potential regional system customers in the study area for the planning year of 2030. Major sewer basins within the study area were delineated based on natural drainage conditions. Average and peak day wastewater flows from each sewer basin were projected for the planning year.

The following alternatives for providing centralized sewer service to the study area were evaluated:

- Alternative 1: Multi Plant Regional System *(multiple smaller regional plants in different sewer basins to serve the entire study area)*
- Alternative 1a: Multi Plant Regional System (Phased Approach)
- Alternative 2: Local plants to serve each of the study participants *(non-regional)*
- Alternative 3: Single Plant Regional System *(one large regional plant to serve the entire study area)*

Potential locations for the proposed treatment plants were investigated and selected for the alternatives based on topography of sewer basins, projected wastewater flows and potential discharge limits to the receiving streams. The Texas Commission on Environmental Quality (TCEQ) performed water quality modeling to assess any potential permit issues and limits for discharge into the water bodies in the study area. The water bodies included in this study are unclassified which means specific dissolved oxygen (DO) criteria have not yet been established by TCEQ. In addition, TCEQ may not set DO standards until a discharge permit is applied for. A 3 mg/L DO criterion was assumed since some streams in the area have a DO criterion of 3 mg/L and conversations with TCEQ suggested that this level would be the best case scenario and would provide less stringent discharge limits for the proposed treatment plants. The results of the water quality models are preliminary and may change if TCEQ adopts more stringent site-specific DO criteria for the study streams or revises its water quality modeling protocols.

The opinion of probable capital cost (OPCC) was estimated for the sewer systems in each of the alternatives which included the cost of the collection system, treatment facility, and land acquisition and permitting. The construction costs were based on the most recent bid results of similar projects in the area. The prorata share of the cost for each entity was based on the flow contributed to the regional system. All the costs estimated in this study are present year costs. Operating cost of each of the treatment facilities would be proportional to the average flow treated at each facility. Therefore, operating costs would be proportional to the capital

costs. Refer to Appendices E, E1, F and G for the OPCC of Alternatives 1, 1a, 2, and 3, respectively. Below is a summary of the costs of Alternatives 1, 1a, 2 and 3.

Table 1 Alternatives Cost Comparison

Study Participant	**Prorata Share of Total System Cost**				
	Alternative 1: *Multi Plant Regional System*	**Alternative 1a:** *Multi Plant Regional System (Phased Approach)*	**Alternative 2:** *Local Plant Option (Non-regional)*	**Alternative 3:** *Single Plant Regional System*	
				Caddo Creek Discharge	**Lake Tawakoni Discharge**
City of Greenville	$41,807,000	$26,728,000[c]	$20,543,000[a]	$63,318,000	$68,875,000
Cash SUD	$36,365,000	$16,486,000	$45,638,000	$38,518,000	$41,898,000
Caddo Basin SUD	$11,982,000	$5,906,000	$15,000,000	$18,146,000	$19,739,000
City of Quinlan	$2,358,000	N/A	N/A[b]	$2,389,000	$2,598,000
City of Caddo Mills	$1,929,000	N/A	N/A[b]	$2,922,000	$3,178,000
Other Entities (non-study participants)	$42,771,000	$9,023,000	N/A	$46,344,000	$50,340,000
Total Regional System Cost	**$137,212,000**	**$39,837,000**	N/A	**$171,637,000**	**$186,628,000**

a – Cost of expanding City of Greenville's existing treatment plant was estimated in City of Greenville Water Reclamation Center (WRC) Condition Assessment and Concept Design study conducted by Freese and Nichols, Inc that concluded in June 2007.
b – Cost of future upgrades needed to replace aging infrastructure at the existing facilities of Cities of Quinlan and Caddo Mills were not estimated.
c – Includes the cost of upgrading the existing City of Greenville WWTP to 4.23 MGD and the prorata share of the regional system.

Among the regional sewer system options, the multi plant regional system costs considerably less than the single plant regional system. Since the study area consists of several drainage basins, having a single regional treatment facility requires a rather complex collection system leading to higher capital costs. With multiple regional plants, the collection systems are less extensive with fewer lift stations and multiple smaller treatment plants. Both the multi plant and the single plant regional options will not utilize any of the existing infrastructure or treatment facilities. Since new infrastructure would need to be constructed to collect the wastewater from the entire service area and convey it to the proposed new treatment facilities, the capital costs of the regional alternatives are very high.

Alternative 1a, which is the phased implementation of the multi plant regional system, provides centralized sewer service to areas most likely to experience near-term development

which is the primary goal of this study. At the same time, it does not require immediate investment for sewer lines in sparsely developed areas with lower growth rates. This alternative also provides flexibility in the collection system and treatment plant for future growth and centralization. With this alternative, a centralized sewer system can be provided to portions of the service areas for three major entities in the study area (Caddo Basin SUD, Cash SUD and BHP WSC) that currently do not have a sewer system. Though Alternative 1a is the least expensive option, it would provide sewer service to a much smaller population of the study area than Alternatives 1 or 3.

Alternatives 1 and 3 provide centralized sewer service to the entire study area and a larger population compared to Alternatives 1a and 2, which provide the sewer service only to a portion of the study area and smaller population. Therefore, the total system costs for Alternatives 1 and 3 are not exactly comparable to Alternatives 1a and 2. For Cash SUD and Caddo Basin SUD, participating in the multi plant regional system would be more economical than constructing their own treatment system since the cost of the regional system would be shared along with other contributing entities. However, the feasibility of the regional alternatives is dependent on the City of Greenville's participation in the regional system since it is the largest entity in the region. And participating in the regional system is not the most economical option for the City of Greenville. By upgrading and/or expanding its existing treatment plant, the City of Greenville can make the best use of its existing infrastructure like collection system, land, power transmission and access roads. Also, the plant is in immediate need of upgrade and improvements due to its aged infrastructure. Other study participants are yet to experience enough growth that would substantiate the participation in the regional system without City of Greenville's involvement. Consequently, a regional system is not feasible at this point of time without the City of Greenville's participation.

Alternative 2, which is the alternative of each study participant operating its own local treatment plant, is the recommended alternative for providing sewer service to the study area. With alternative 2, study participants that currently own and operate wastewater treatment facilities would continue to provide sewer service and new treatment facilities would be built

for Cash SUD and Caddo Basin SUD that currently do not provide sewer service. This alternative utilizes the existing sewer systems within the study area and identifies new sewer systems to serve Cash SUD and Caddo Basin SUD.

As development occurs within the study area in future, it may be practical for the new sewer systems identified in Alternative 2 to be expanded and at that time form a regional system to serve additional areas. For instance, the proposed Bearpen Creek WWTP identified in Alternative 2 to serve Cash SUD population could be expanded to provide sewer service to neighboring entities like BHP WSC and Poetry WSC. Similarly, Caddo Creek WWTP could be expanded to provide service to BHP WSC population in West and East Caddo basins.

Recommendations:

- Upgrade/expand the existing City of Greenville WWTP to take advantage of cost savings associated with existing infrastructure (land, collection system, power transmission and access roads)
- Since several developments are being planned in the Bearpen Creek wastewater system area, begin a detailed WWTP siting study and interceptor routing study. Initiate discussions with Cash SUD, BHP WSC, Poetry WSC and Combined Consumers WSC to determine interest in participating in a future regional wastewater system in the Bearpen Creek area.
- As development occurs, begin detailed WWTP siting studies and interceptor routing studies for the Caddo Creek system and Caney Creek system.

1.0 INTRODUCTION

The Sabine River Authority, Cities of Greenville, Caddo Mills, and Quinlan, as well as Cash Special Utility District, and Caddo Basin Special Utility District are jointly participating in this study, partially funded by the Texas Water Development Board (TWDB) to identify technically feasible options for centralized wastewater collection and treatment to meet the wastewater treatment needs in Hunt County and to avoid the proliferation of new on-site treatment systems and to encourage higher levels of wastewater treatment within the Lake Tawakoni water shed.

1.1 Background

The majority of the area in Hunt County does not currently have access to centralized wastewater collection and treatment system. Most development in the area can be characterized as low density residential consisting primarily of scattered large lot home sites served by on-site treatment systems. The City of Greenville is the largest wastewater service provider in the study area and has a wastewater treatment facility located in the eastern half of its service area. Much of the future growth for the City of Greenville is expected to occur in the western half of the City's service area which is in a different sewershed than the existing treatment plant. The City of Greenville desires to investigate options for handling flows from the western sections of its service area as an alternative to pumping to, and expanding its existing treatment plant.

Although the North Central Texas Council of Governments (NCTCOG) forecast a growth rate of around 3% for the county, the Cities of Greenville, Caddo Mills and Quinlan, as well as the Cash SUD have all received numerous inquiries from developers proposing new residential developments within their service areas which could result in significantly higher localized growth rates.

The planning area includes most of the southwestern portion of Hunt County and extends from the Hunt County line to the west, the Caddo Basin SUD water certificate of convenience and necessity (CCN) service area to the northwest, City of

Greenville water CCN boundary to the north and the Cowleech Fork of the Sabine River drainage basin to the east. The planning area extends to the south and includes the City of West Tawakoni, the area along the north shore of the South Fork arm of Lake Tawakoni and extends west to the Hunt County line. **Figure 1** shows the planning area under consideration for this study.

Efforts toward regionalization within the study area will include making provisions for connection by other existing or proposed developments even though they may not directly participate in the study. Providing the opportunity for centralized collection and treatment of wastewater to as many existing developments as possible will further the cause of improved water quality in the watershed and encourage the highest, best use of land within the study area.

The Sabine River Authority (SRA) agreed to coordinate this study on behalf of the interested utility providers in Hunt County and was responsible for coordinating Texas Water Development Board funding to assist with the study.

1.2 Project Scope

The scope of work for this study includes the following tasks:

Task 1 – Gather Background Information

- Current wastewater service providers
- Population served
- Service area
- Wastewater plants
- Permitted flow and discharge limits
- Age, condition, general description of process
- Capital improvement plans

Task 2 – Develop Population and Flow Projections

- Review historical population growth based on data from Census Bureau, TWDB, NCTCOG, study participants

- Review WWTP operating records for average and peak flows
- Delineate major sewer basins
- Develop population and flow projections by sewer basin with input from study participants

Task 3 – Wastewater Discharge Permit Assessment

- Meet with TCEQ to review potential wastewater treatment plant locations and discuss discharge permit limitations and permitting concerns
- Perform a "fatal flaw" analysis of potential wastewater treatment plant locations

Task 4 – Wastewater Treatment Alternatives

- Identify alternatives for providing wastewater service in the study area
- Alternative 1 – Multiple Regional Treatment Facilities
- Alternative 2 – Multiple Local Treatment Facilities
- Alternative 3 – Single Large Regional Treatment Facility
- Evaluate the feasibility of expanding the existing wastewater treatment facilities to treat the flow from all or part of the proposed the study area.

Task 5 – Perform Detailed Alternative Evaluation

- Evaluate the alternatives based on
    - Capital and O&M Costs
    - Potential for cost sharing
    - Permitting Issues
    - Potential for Long Term Development

FROGNOT WSC

HICKORY CREEK SUD

CADDO BASIN SUD

CITY OF GREENVILLE

SHADY GROVE WSC

CITY OF CADDO MILLS

CITY OF JOSEPHINE

CASH WSC

B H P WSC

CITY OF ROYSE CITY

WILLIAMS WSC

CITY OF QUINLAN

CITY OF WEST TAWAKONI

CASH WSC

WHISPERING OAKS WTR CO-OP PHAS

COMBINED CONSUMERS WSC

BLACKLAND WSC

POETRY WSC

0 2.5
SCALE IN MILES

FIGURE 1
SRA REGIONAL
WASTEWATER PLANNING STUDY AREA

Water Service Areas
(Approximate Water CCN's)

- StudyArea
- County Boundaries

Water CCN's

- B H P WSC
- Blackland WSC
- Caddo Basin SUD
- Cash WSC
- City of Caddo Mills
- City of Josephine
- City of Quinland
- City of Royse City
- City of West Tawakoni
- Combined Consumers WSC
- Frognot WSC
- Hickory Creek SUD
- Poetry WSC
- Shady Grove WSC
- Whispering Oaks Wtr Co
- Williams WSC

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2.0 POPULATION AND FLOW PROJECTIONS

This chapter discusses the drainage basins in the study area and the population and flow projections for the utility service providers in the study area.

2.1 Major Sewer Basins

The study area was divided into drainage basins based on natural topography. The delineation of sewer basins helped to identify potential locations for treatment facilities and also helped in classifying the proposed sewer lines as gravity or force mains. The classification of the sewer lines helped in estimating the cost of the wastewater conveyance system. Six major sewer basins were delineated for the study area and were named by the major creek it contained. The major drainage basins are:

- South Fork Sabine Creek Basin
- West Caddo Creek Basin
- East Caddo Creek Basin
- Cowleech Fork Basin
- Cedar Creek Basin
- Caney Creek Basin

Figure 2.1 illustrates the major drainage basins in the study area.

2.2 Population Projections

Year 2000 census data and population projections for each utility service provider in Hunt County were obtained from Texas Water Development Board (TWDB) website. North Central Texas Council of Governments (NCTCOG) also lists population estimates till year 2006, by city and by county. Hunt County falls within the region covered by NCTCOG and recent population estimates were obtained from their website. Year 2000 census tracts and blocks for Hunt County were also available from NCTCOG website.

The population projections for each of the utility service provider in Hunt County are discussed in the following sections.

Sewer Shed Basins
- Caney Creek
- Cedar Creek
- Cowleech Fork
- East Caddo
- South Fork Sabine Creek
- West Caddo

FANNIN COUNTY
DELTA COUNTY
HUNT COUNTY
HOPKINS COUNTY
COLLIN COUNTY
ROCKWALL COUNTY
KAUFMAN COUNTY
RAINS COUNTY
VAN ZANDT COUNTY

Wolfe City
Celeste
Blue Ridge
Commerce
Neylandville
Campbell
Greenville
Farmersville
Josephine
Nevada
Caddo Mills
Royse City
Fate
Rockwall
McLendon-Chisholm
Quinlan
West Tawakoni
Hawk Cove
Lone Oak

Cowleech Fork Basin (23,434)

East Caddo Basin (5,412)

Caney Creek Basin (1,725)

West Caddo Basin (7,496)

Cedar Creek Basin (5,156)

South Fork Sabine Creek Basin (13,117)

CITY OF GREENVILLE WWTP

CITY OF CADDO MILLS WWTP

CITY OF QUINLAN WWTP

VERANDAH COMMUNITIES LP (SEWER CCN)

FIGURE 2.1

REGIONAL WASTEWATER PLANNING STUDY

SEWER SHED BASINS AND POPULATION (2000 CENSUS DATA)

LEGEND
- Study Area
- City Limits
- County Boundaries
- Roads
- Streams
- (#####) Population
- Lakes

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A. City of Greenville

Growth rate for the City of Greenville was available from the following sources:

- TWDB
- NCTCOG
- City's Comprehensive Master Plan for year 2025

NCTCOG's estimated annual growth rate for the City of Greenville is 3.0%. City of Greenville's comprehensive master plan recommends a growth rate of 2.0% for planning purposes. The comprehensive master plan analyzed different scenarios for population projection and recommends a moderately aggressive growth rate of two percent based on the reasonable assumption that several of Greenville's peer communities, specifically Ennis, Waxahachie, and Weatherford, experienced similar growth rates. The population projected using the growth rate recommended by the City's comprehensive master plan was used in this planning study. **Table 2.1** shows population projections based on the different growth rates.

Table 2.1 City of Greenville Population Projection

Year	Population Projection		
	TWDB	City's Comprehensive Master Plan	NCTCOG
2000	23,960	23,960	24,117
2010	24,431	28,154	29,561
2020	25,178	34,320	39,728
2030	26,189	41,835	53,391

Note: Comprehensive Master Plan projections were used in this planning study.

The City of Greenville's sewer CCN extends into East and West Caddo Basins and Cowleech Fork Basins. As the Dallas-Fort Worth metroplex continues to expand geographically, growth to the North would become increasingly difficult due to distance and growth to the east is more likely. Hence it is reasonable to assume that 90% of the City's growth would occur in the southern half of the city which is located east of the metroplex. This 90% of the City's growth was split

between East Caddo and Cedar Creek Basins. The City annexed about 4000 acres in the southwest region located in the East Caddo basin. Hence it is assumed that 50% of the city's growth occurs in this basin. 40% of the growth is assumed to occur in the south eastern region of the city which lies in Cedar Creek Basin and the remaining 10% in Cowleech Fork Basin. The population of City of Greenville in East Caddo and Cedar Creek drainage basins were projected based on this assumption and is shown in **Table 2.2**

Table 2.2 Greenville Population Projection in East Caddo and Cedar Creek Basins

Year	Population Projection	
	East Caddo Basin (Western Region)	Cedar Creek Basin (South Eastern Region)
2006	641	2,322
2010	1,713	3,179
2020	4,796	5,646
2030	8,553	8,652

B. Cash SUD

Population projections for Cash SUD were based on data from TWDB and the utility's meter distribution data. Cash SUD has divided its CCN into six different regions and has estimated growth rates for each of these regions based on the projected increase in number of service connections. Population projections of Cash SUD in each drainage basin were derived using these growth rates. Per information provided by Cash SUD, 2.8 people per service connection was assumed in developing the population projections. **Table 2.3** shows the population projections for Cash SUD based on this approach and **Table 2.4** compares these projections with the TWDB projections for Cash SUD

Table 2.3 Cash SUD Population Projection Based on Meter Distribution Data

Year	Population Projection						
	SF Sabine	West Caddo	East Caddo	Cedar	Cowleech	Caney	Total
2006	2,473	1,397	3,411	4,017	440	1,407	13,145
2010	2,998	1,551	3,692	4,348	476	1,531	14,596
2020	4,850	2,013	4,501	5,300	581	1,891	19,135
2030	7,846	2,613	5,486	6,461	708	2,335	25,449
Annual Growth Rate:	4.9%	2.6%	2.0%	2.0%	2.0%	2.1%	

Table 2.4 Cash SUD Population Projections

Year	Population Projection	
	TWDB	Based on Cash SUD Growth Rates
2000	11,699	N/A
2006	N/A	13,145
2010	13,401	14,596
2020	16,574	19,135
2030	21,155	25,449

The population projection based on Cash SUD growth rates was more conservative and was used in this planning study.

C. Caddo Basin SUD

Information on total number of service connections in year 2004, 2005 and 2006 was obtained from Caddo Basin SUD. Three people per connection was assumed to estimate the population served. Based on the year end number of connections served, the annual average growth rate between 2004 and 2006 was estimated to be 3.4%. It was assumed that 50% of the connections of Caddo Basin SUD are located in Hunt County. This growth rate and population served in Hunt County in 2006 was used to project the population through 2030.

The Caddo Basin SUD CCN covers a significant portion of the study area. However, no data was available identifying the distribution of the population within the CCN. Hence, another set of projections were derived by counting the

number of rooftops on a recent aerial map of Caddo Basin CCN in Hunt County. And assuming 3 people per rooftop. This population and a growth rate of 3.4% was used for population projection. These projections were compared to the TWDB projections for Caddo Basin SUD as shown in **Table 2.5**.

Table 2.5 Population Projection Caddo Basin SUD

Year	Population Projection		
	TWDB	Based on # of Service Connections	Aerial Counting of Rooftops
2000	4,043	N/A	N/A
2006	N/A	3,978	5,412
2010	4,631	4,541	6,179
2020	5,728	6,326	8,607
2030	7,311	8,812	11,989

Population projection estimated by counting the number of rooftops was the most conservative of the projections and hence it was used in this planning study.

D. City of Caddo Mills

Population projections for the City of Caddo Mills were obtained from TWDB. Estimated population for year 2006 was obtained from NCTCOG. The growth rates of the neighboring utility providers were compared to assume a growth rate for the City of Caddo Mills. Caddo Basin SUD, City of Greenville and Cash SUD are the neighboring service providers and their growth rates used in this study were 3%, 2% and 2% respectively. Based on this, a reasonable growth rate of 2% was assumed for the City of Caddo Mills to project the population through 2030. **Table 2.6** shows the population projection for City of Caddo Mills.

Table 2.6 Population Projection for City of Caddo Mills

Year	Population Projection	
	TWDB	Based on Growth Rates of Neighboring Utility Providers
2000	1,180	N/A
2006	N/A	1,200
2010	1,315	1,299
2020	1,450	1,583
2030	1,585	1,930

Population projections based on growth rates of neighboring utility providers were used in this planning study.

E. City of Quinlan

Population projections made by TWDB for the City of Quinlan were obtained from the TWDB website. The historical growth rates of City of Quinlan from NCTCOG are shown in **Table 2.7**

Table 2.7 Historical Growth Rate – City of Quinlan

Year	Population	% Growth
1970	844	
1980	1,002	18.7%
1990	1,360	35.7%
2000	1,370	0.7%
2005	1,400	2.2%
2006	1,400	0.0%

The growth rate has steadily decreased since 1990. The area with the city limits is small and is almost completely developed and hence, for this planning study a reasonable growth rate of 0.5% was assumed to project the population. The projections are shown in **Table 2.8**

Table 2.8 Population Projections – City of Quinlan

Year	Population Projection	
	TWDB	Based on Historical NCTCOG Growth Rate
2000	1,370	N/A
2006	N/A	1,400
2010	1,375	1,428
2020	1,383	1,501
2030	1,394	1,578

F. Other Utility Providers in the Study Area

1. BHP WSC

TWDB growth rate for BHP WSC was compared with the growth rate of its neighboring utility providers. An annual average growth rate of 5% was assumed for BHP WSC based on the growth rate of the Cash SUD in the same region and the population projections thus derived were used in this planning study. The population projections are shown in **Table 2.9**.

Table 2.9 Population Projections – BHP WSC

Year	Population Projection	
	TWDB	Based on Growth Rates of Neighboring Utility Providers
2000	1,740	N/A
2010	2013	3,452
2020	2496	5,623
2030	3193	9,159

2. Combined Consumers WSC

Data on number of service connections in year 2006 were obtained from Combined Consumers WSC. Three people per connection was assumed and the population served in 2006 was estimated. An average annual growth rate

of 3% was assumed based on the growth rate of the neighboring utility providers and population projections thus derived was used in this study. **Table 2.10** shows the population projections for Combined Consumers WSC.

Table 2.10 Population Projections – Combined Consumers WSC

Year	Population Projection	
	TWDB	Based on # of Service Connections
2000	6,110	N/A
2010	6,999	9,063
2020	8,656	11,048
2030	11,048	13,467

3. City of West Tawakoni

Population in year 2000 was obtained from the census data and population in year 2006 was obtained from NCTCOG. Population of City of West Tawakoni had increased by approximately 10% between 2000 and 2006. Hence, an average growth rate of 10% for a 5 year period was assumed to project the population in year 2030. **Table 2.11** shows the population projections.

Table 2.11 Population Projections – City of West Tawakoni

Year	Population Projection	
	TWDB	Based on Growth Rate in Past 5 Years
2000	1,462	N/A
2010	1,663	1,760
2020	1,859	2,130
2030	2,004	2,577

4. Poetry WSC

Population projections for Poetry WSC were not available from TWDB. Population in year 2000 was obtained from the census data and a growth rate of 5% was assumed based on the growth rates of neighboring utility providers in the region. **Table 2.12** shows the population projections through year 2030.

Table 2.12 Population Projections – Poetry WSC

Year	Population Projection	
	TWDB	Based on Growth Rates of Neighboring Utility Providers
2000	N/A	2,698
2010		3,066
2020		3,738
2030		4,557

5. Campbell WSC

Only TWDB projections were available for Campbell WSC and are shown in **Table 2.13**.

Table 2.13 Population Projection – Campbell WSC

Year	TWDB Population Projection
2000	734
2010	761
2020	804
2030	862

2.3 Flow Projections

Tables 2.14 through **2.17** show the projected flows for each of the sewer basin in the study area. A per capita production of 115 gallons per day was assumed in estimating the wastewater flows. Due to lack of any historical data, a peaking factor of four was assumed. Per Texas Commission on Environmental Quality (TCEQ) Design Criteria for Sewerage Systems, Chapter 317 (b) (4) (B), peaking factors for new systems are normally in the range of 3 to 5.

Table 2.14 Flow Projections – South Fork Sabine Creek Sewer Basin

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	2,998	4,850	7,846	0.34	0.56	0.90	1.38	2.23	3.61	24.0%
Poetry WSC	3,066	3,738	4,557	0.35	0.43	0.52	1.41	1.72	2.10	13.9%
BHP WSC	1,021	1,663	2,709	0.12	0.19	0.31	0.47	0.77	1.25	8.3%
City of Quinlan	1,428	1,501	1,578	0.00	0.00	0.18	0.00	0.00	0.73	4.8%
Combined Consumers WSC	9,063	11,048	13,467	1.04	1.27	1.55	4.17	5.08	6.20	41.1%
City of West Tawakoni	1,760	2,130	2,577	0.00	0.00	0.30	0.00	0.00	1.19	7.9%
Total =	**21,347**	**26,950**	**34,764**	**1.86**	**2.45**	**3.76**	**7.43**	**9.80**	**15.06**	100.0%

Table 2.15 Flow Projections – East and West Caddo Sewer Basins

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Caddo Basin SUD	6,179	8,607	11,989	0.71	0.99	1.38	2.84	3.96	5.52	17.1%
Cash SUD	5,243	6,514	8,099	0.60	0.75	0.93	2.41	3.00	3.73	11.5%
BHP WSC	2,431	3,960	6,450	0.28	0.46	0.74	1.12	1.82	2.97	9.2%
City of Caddo Mills	1,299	1,583	1,930	0.15	0.18	0.22	0.60	0.73	0.89	2.7%
City of Greenville	28,154	34,320	41,835	3.24	3.95	4.81	12.95	15.79	19.24	59.5%
Total =	**18,315**	**26,784**	**38,188**	**4.98**	**6.32**	**8.08**	**19.92**	**25.29**	**32.34**	100.0%

Table 2.16 Flow Projections – Cedar Creek Sewer Basin

Region	Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	**4,017**	**5,300**	**6,461**	**0.46**	**0.61**	**0.74**	**1.85**	**2.44**	**2.97**	100.0%

Table 2.17 Flow Projections – Caney Creek Sewer Basin

Region	Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	2,007	2,471	3,043	0.23	0.28	0.35	0.92	1.14	1.40	77.9%
Campbell WSC	761	804	862	0.09	0.09	0.10	0.35	0.37	0.40	22.1%
Total =	**2,768**	**3,275**	**3,905**	**0.32**	**0.38**	**0.45**	**1.27**	**1.51**	**1.80**	100.0%

2.4 Existing Septic Systems in Hunt County

Information on the existing septic systems in Hunt County was obtained from the County Health Department. Table 2.18 shows the number of septic systems present in Hunt County since year 2000. It also shows the number of complaints pertaining to septic systems that the Health Department received. Geographical reference to location of the septic systems where not available and hence, it was concluded that septic systems exist where there is development that is not served by an existing collection system.

Table 2.18 Septic Systems in Hunt County

Year	Number of New Septic Tanks	Total Number of Septic Tanks	Number of Septic Tank Complaints Received
2000	698	8,878	N/A
2001	572	9,576	N/A
2002	594	10,148	N/A
2003	513	10,742	N/A
2004	471	11,255	N/A
2005	462	11,726	183
2006	432	12,188	105
2007 (YTD)	299	12,620	71

N/A – accurate log books on septic complaints prior to 2005 were not available

3.0 WASTEWATER DISCHARGE PERMIT ASSESSMENT

Since the water bodies included in this study are unclassified, specific dissolved oxygen (DO) criteria have not been established by TCEQ. TCEQ may not set DO standards until a discharge permit is applied for. A 3 mg/L DO criterion was assumed since some streams in the area have a DO criterion of 3 mg/L and conversations with TCEQ suggested that this level would be the best case scenario and would provide less stringent discharge limits for the proposed treatment plants. The most stringent DO criterion that TCEQ has suggested for the streams in the study area is 5 mg/L.

A DO criterion of 3 mg/L was assumed for this study with the understanding that more stringent levels could be applied. The results of the water quality models are preliminary and may change if TCEQ adopts more stringent site-specific DO criteria for the study streams or revises its water quality modeling protocols.

3.1 South Fork Sabine Creek Basin

The South Fork of the Sabine River originates approximately two miles southeast of Royce City in the northeast corner of Rockwall County (at 32°54' N, 96°18' W) and runs easterly in its upper reaches, and, upon entering Hunt County, generally southeasterly in its middle and lower reaches, for a total length of 12½ miles. The region drained by the stream is generally flat and marked with occasional local shallow depressions; its soil consists largely of clay loams, sandy loams, and moderately shallow to deep sandy and clay loams. Water-tolerant hardwoods, conifers, and grasses are common along the stream's course. The South Fork empties into the Kitsee Inlet of Lake Tawakoni two miles south of Quinlan in south central Hunt County (Source: The Handbook of Texas Online, Texas State Historical Association (TSHA). 2007).

The City of Royse City discharges effluent into the Sabine Creek and is required to meet a DO criterion of 4 mg/L. The Royse City effluent was not included by TCEQ in the water quality model base input file due to its distance from the proposed regional WWTP site.

South Fork Sabine Creek is on the draft 2006 303(d) list for elevated bacteria levels from the confluence with Lake Tawakoni upstream to the confluence with Klutts and Sabine Creeks. Bacteria monitoring and/or limits may be required by future permits authorizing discharges into South Fork Sabine Creek.

Although South Fork Sabine Creek is not proposed to be listed for depressed DO, two of the ten samples collected at TCEQ Station 14967 (upstream of the prospective outfall) were below 2 mg/L, and another samples were below 3 mg/L. Even though these were grab samples, they could be used to list a water body as impaired for not meeting minimum DO criteria. Depending on additional data, this could become an issue in the future.

If TCEQ were to assign a 5 mg/L DO criterion to the river, effluent limits would have to meet the DO level for both the 3 mg/L and 5 mg/L scenarios, as outlined in Table 5 of the Texas Surface Water Quality Standards. The criteria in Table 5 apply to streams in Texas which are east of a line defined by Interstate Highway 35 and 35W from the Red river to the community of Moore in Frio County, and by U.S. Highway 37 from the community of Moore to the Rio Grande. TCEQ uses the bed slopes to set differing headwater flow values in the water quality models base input files. TCEQ used a lower headwater value for the 3 mg/L set when compared to the 5 mg/L set, and as a result, the 3 mg/L DO model was the limiting factor when determining effluent limits.

3.2 West Caddo Basin and East Caddo Basin

The Caddo Fork of the Sabine River rises a mile north of Quinlan in southwestern Hunt County (at 32°59' N, 96°09' W) and flows southeast for 6½ miles, over flat to rolling terrain surfaced with clay and sandy loams that support water-tolerant hardwoods and grasses. The stream is intermittent in its upper reaches.

The Caddo Fork rises in two tributary forks, the East Caddo Fork and the West Caddo Fork, in northwestern Hunt County. These streams converge in the southern part of the county to form the Caddo Fork, which flows southeast to Lake Tawakoni (TSHA, 2007).

A DO criterion of 3 mg/L was applied to the water quality models. As stated previously, TCEQ may apply more stringent limits to the West Caddo and/or East Caddo Basins in the future.

3.3 Cowleech Fork Basin

The Cowleech Fork of the Sabine River rises two miles northwest of Celeste in northwestern Hunt County (at 33°19' N, 96°13' W) and runs southeast for about forty miles, passing Celeste and crossing U.S. Highway 69, then running between the two municipal reservoirs just east of Greenville before reaching its mouth on the Pawnee Inlet of Lake Tawakoni, about miles west of Lone Oak (at 33°00' N, 96°01' W). Its tributaries include Hickory and Wolf creeks. The Cowleech Fork, which is intermittent in its upper reaches, traverses generally flat land surfaced with clay loams and clayey sand loams that support grasses and water-tolerant hardwoods (TSHA, 2007).

The City of Greenville discharges into the Cowleech Fork and is currently required to meet a DO criterion of 2 mg/L. This area of Cowleech Fork is perennial as a result of the effluent it receives from the City of Greenville. The issue of "created use" has been discussed between the EPA and TCEQ in the past. It is possible that a higher DO standard could be applied in the future.

The Cowleech Fork water quality model contains a number of uncertain variables. Chlorophyll A levels in the main lake body are high, so TCEQ prorated them (based on Secchi depth) in the backwater. There is little information on depth, and widths were obtained from the USGS Digital Ortho Quarter Quad (DOQQ) aerial photograph. If a proposed WWTP is to discharge into Cowleech Fork, TCEQ would

encourage that transect data (widths and depths) be collected in the backwater area when the lake is close to normal pool elevation (437.5 feet).

3.4 Cedar Creek Basin

Cedar Creek rises nine miles southeast of Greenville in south central Hunt County (at 33°06' N, 96°06' W) and runs southeast for two miles to its mouth on Lake Tawakoni, just south of Greenville Club Lake (at 33°00' N, 96°01' W). It crosses flat to rolling terrain surfaced by sandy and clay loams that support hardwoods and grasses (TSHA, 2007).

The Cedar Creek water quality model was largely based on TCEQ default modeling values. Due to the variability of the hydraulics in the lake backwater reach, it is suggested that transect data be collected in this area if a proposed facility discharging into Cedar Creek is seriously considered so that more accurate effluent limits can be determined.

4.0 WASTEWATER TREATMENT ALTERNATIVES

alternatives were evaluated to provide wastewater treatment to the study area. They are:

- Alternative 1: Multi Plant Regional System
- Alternative 1a: Multi Plant Regional System (Phased Approach)
- Alternative 2: Local treatment facilities to serve each study participants' CCN
- Alternative 3: Single Plant Regional System

A summary of the Alternatives 1, 1a, 2 and 3 is shown in Appendices A, A1, B, and C. The results of the water quality modeling for the alternatives are summarized in Appendix D.

4.1 Alternative 1: Multi Plant Regional System

Since the study area consists of several drainage basins, the option of multiple small treatment facilities to serve each sewer basin was evaluated. After population and flows were projected for each sewer basin, potential sites for the regional treatment facilities were investigated. Based on topography, drainage conditions and wastewater flow projected, sites were selected for the treatment facilities to serve the sewer basins in the study area. This section will discuss each of the treatment facilities in detail.

A. South Fork Sabine Creek WWTP

South Fork Sabine Creek wastewater treatment plant would be located near the intersection of Dry Creek and Bearpen Creek, at CR (County Road) 2316, in South Fork Sabine River Sewer Basin. Based on drainage conditions this is the ideal location in South Fork Sabine River sewer basin where minimal pumping of wastewater would be required. The facility would be sized to handle an average flow of 3.76 MGD and a peak flow of 15.06 MGD and would discharge into South Fork of the Sabine River.

1. Service Area:

   The South Fork Sabine system would serve South-West Hunt County in South Fork Sabine Creek sewer basin including the following entities:

- Cash SUD
- Poetry WSC
- BHP WSC
- City of Quinlan
- Combined Consumers WSC
- City of West Tawakoni

2. Conveyance System:

   The following assumptions were made in planning the collection system components in this study:

   - Maximum velocity through a gravity sewer line: 5 feet per second
   - Maximum velocity through a force main: 8 feet per second
   - Minimum velocity through a force main: 2 feet per second

   The collection system which includes the sewer lines and the pump stations, was sized to handle the peak flow from the service area. **Figure 4.1** shows the conceptual layout of the collection system for Alternative 1. Primary gravity sewer lines of size 12 inch and above and force mains of size 8 inch and above are shown in the layout.

3. Potential Discharge Limits

   South Fork Sabine creek is currently unclassified and a specific DO criterion has not been set for it by the TCEQ. Assuming a DO criterion of 3 mg/L, water quality modeling was performed by the TCEQ on South Fork Sabine creek. The results indicate that, for an effluent flow of 3.76 million gallons per day, an effluent set of 10 milligrams per liter (mg/L) of 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), 15 mg/L of Total Suspended Solids (TSS), 3 mg/L of ammonia-nitrogen (NH_3-N) and 6 mg/L of dissolved oxygen would be required. As mentioned earlier, this is the scenario that would result in the least stringent discharge limits for this stream. More stringent discharge limits may apply if the TCEQ DO criteria for the streams in the study area are more stringent than initial assumptions.

FIGURE 4.1
REGIONAL WASTEWATER PLANNING STUDY -
ALTERNATIVE - 1

Water Treatment Service Areas

- B H P WSC
- BLACKLAND WSC
- CADDO BASIN SUD
- CAMPBELL WSC
- CASH WSC
- CITY OF CADDO MILLS
- CITY OF CELESTE
- CITY OF GREENVILLE
- CITY OF JOSEPHINE
- CITY OF QUINLAN
- CITY OF ROYSE CITY
- CITY OF WEST TAWAKONI
- COMBINED CONSUMERS WSC
- COMMUNITY WATER COMPANY
- FROGNOT WSC
- HICKORY CREEK SUD
- POETRY WSC
- SHADY GROVE WSC
- W-OAKS PHOENIX CORP
- WEST LEONARD WSC
- WHISPERING OAKS WATER CO-OP PHAS
- WILLIAMS WSC

WEST LEONARD WSC (Water CCN)

FANNIN COUNTY

HICKORY CREEK SUD (Water CCN)

CITY OF WOLFE CITY (Sewer CCN)

Wolfe City

FROGNOT WSC (Water CCN)

Blue Ridge

CITY OF CELESTE (Water CCN)

Celeste

CITY OF COMM (Sewer CCN)

Commerce

East Caddo Basin

Cowleech Fork Basin

Caney Creek Basin

Cedar Creek Basin

West Caddo Basin

South Fork Sabine Creek

Neylandville

CADDO BASIN SUD (Water CCN)

COLLIN COUNTY

Farmersville

HUNT COUNTY

CAMPBELL WATER SUPPLY CORPORAT (Water CCN)

Campbell

CITY OF GREENVILLE (Sewer CCN)

Greenville

CITY OF GREENVILLE WWTP (Converted to 18 MGD Lift Station)

CITY OF GREENVILLE (Water CCN)

SHADY GROVE WSC (Water CCN)

HOPKINS COUNTY

CITY OF CADDO MILLS (Sewer CCN)

CITY OF CADDO MILLS (Water CCN)

CITY OF CADDO MILLS WWTP (0.375 MGD)

Caddo Mills

CITY OF JOSEPHINE (Sewer CCN)

CITY OF JOSEPHINE (Water CCN)

Josephine

CITY OF ROYSE CITY (Water CCN)

Royse City

CITY OF ROYSE CITY (Sewer CCN)

CITY OF FATE (Sewer CCN)

ROCKWALL COUNTY

B H P WSC (Water CCN)

CADDO CREEK WWTP (8.08 MGD)

WHISPERING OAKS WTR CO-OP PHAS (Water CCN)

WILLIAMS WSC (Water CCN)

CITY OF QUINLAN (Sewer CCN)

Quinlan

CITY OF QUINLAN (Water CCN)

CITY OF QUINLAN WWTP (0.3 MGD)

COMMUNITY WATER COMPANY (Water CCN)

CANEY CREEK WWTP (1.19 MGD)

12" F.M.

0" F.M.

12" F.M.

CASH WSC (Water CCN)

Lone Oak

West Tawakoni

CITY OF WEST TAWAKONI (Water CCN)

CITY OF WEST TAWAKONI WWTP (0.3 MGD)

Hawk Cove

CITY OF HAWK COVE WWTP (0.2 MGD)

COMBINED CONSUMERS WSC (Water CCN)

SOUTH FORK SABINE RIVER WWTP (3.76 MGD)

W-OAKS PHOENIX CORP (Water CCN)

BLACKLAND WSC (Water CCN)

POETRY WSC (Water CCN)

KAUFMAN COUNTY

VAN ZANDT COUNTY

RAINS COUNTY

0 5,000 10,000

SCALE IN FEET

LEGEND

- Existing WWTP
- Potential Location of Regional WWTP
- Potential Lift Station Location
- Existing Lift Station
- Proposed Gravity Main
- Proposed Force Main
- Existing Sewer Lines
- Study Area
- Sewer Shed Basins
- Wastewater CCN
- County Boundaries
- City Limits

Freese and Nichols

SRA

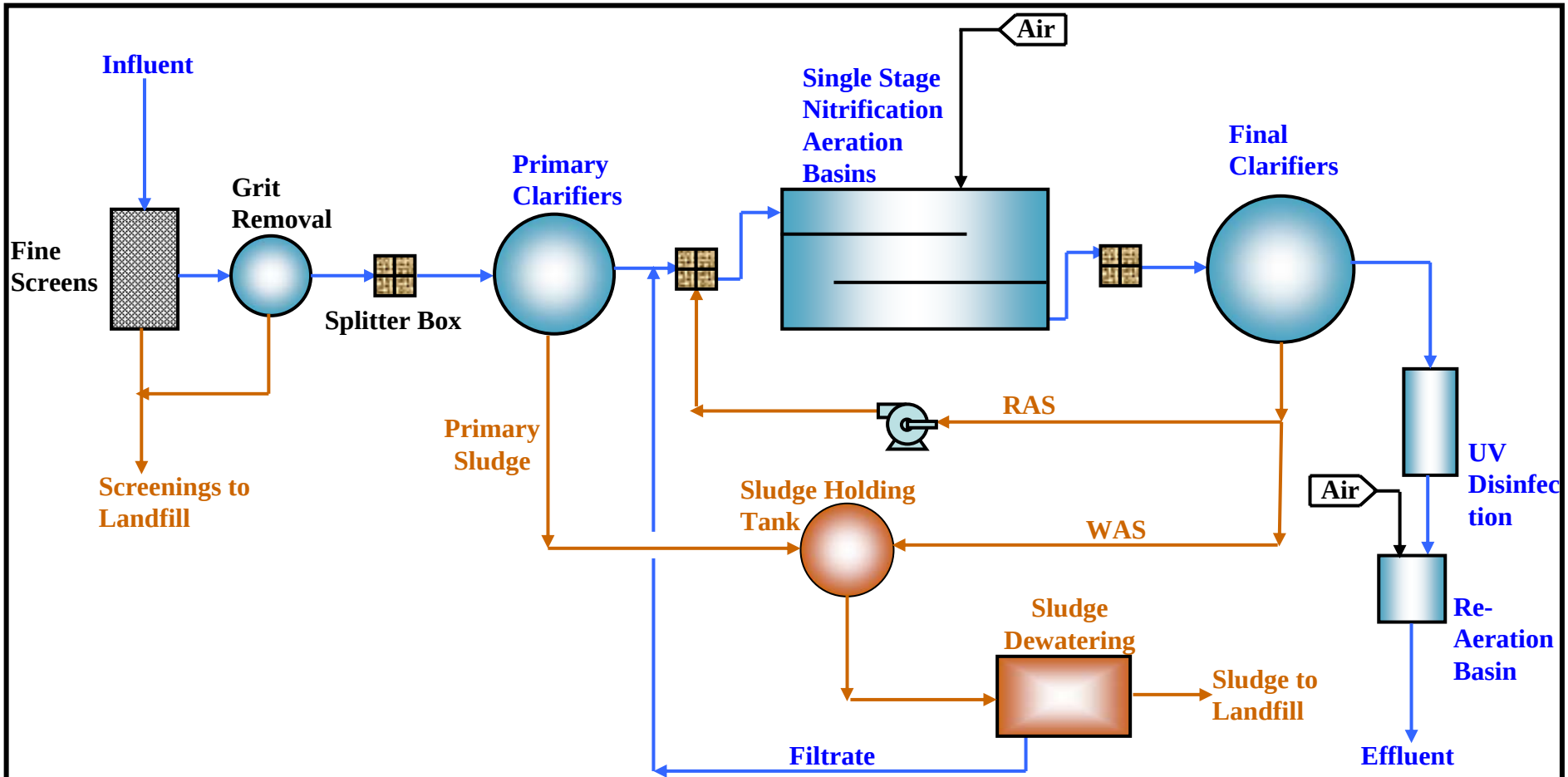
3

4. Treatment Process

   For treatment plants of capacity 1 MGD and more, there are a number of options available with respect to treatment processes to achieve the desired effluent quality. The choice of the treatment process and facility needs for a new treatment plant depends on land availability, discharge limits, and capital cost. In this study, two most likely treatment processes for this capacity – Conventional flow through treatment system and Sequencing Batch Reactor (SBR) treatment systems were considered. **Figures 4.2** and **4.3** shows the process flow schematics for Conventional flow through and SBR systems respectively, to achieve a discharge limit of 10/15/3/6 (BOD_5/TSS/NH_3-N/DO). Some treatment units like fine screens, grit removal, solids dewatering and re-aeration tanks are common to both the treatment processes. Re-aeration is required to increase the DO of the effluent to 6 mg/L.

B. Caddo Creek WWTP

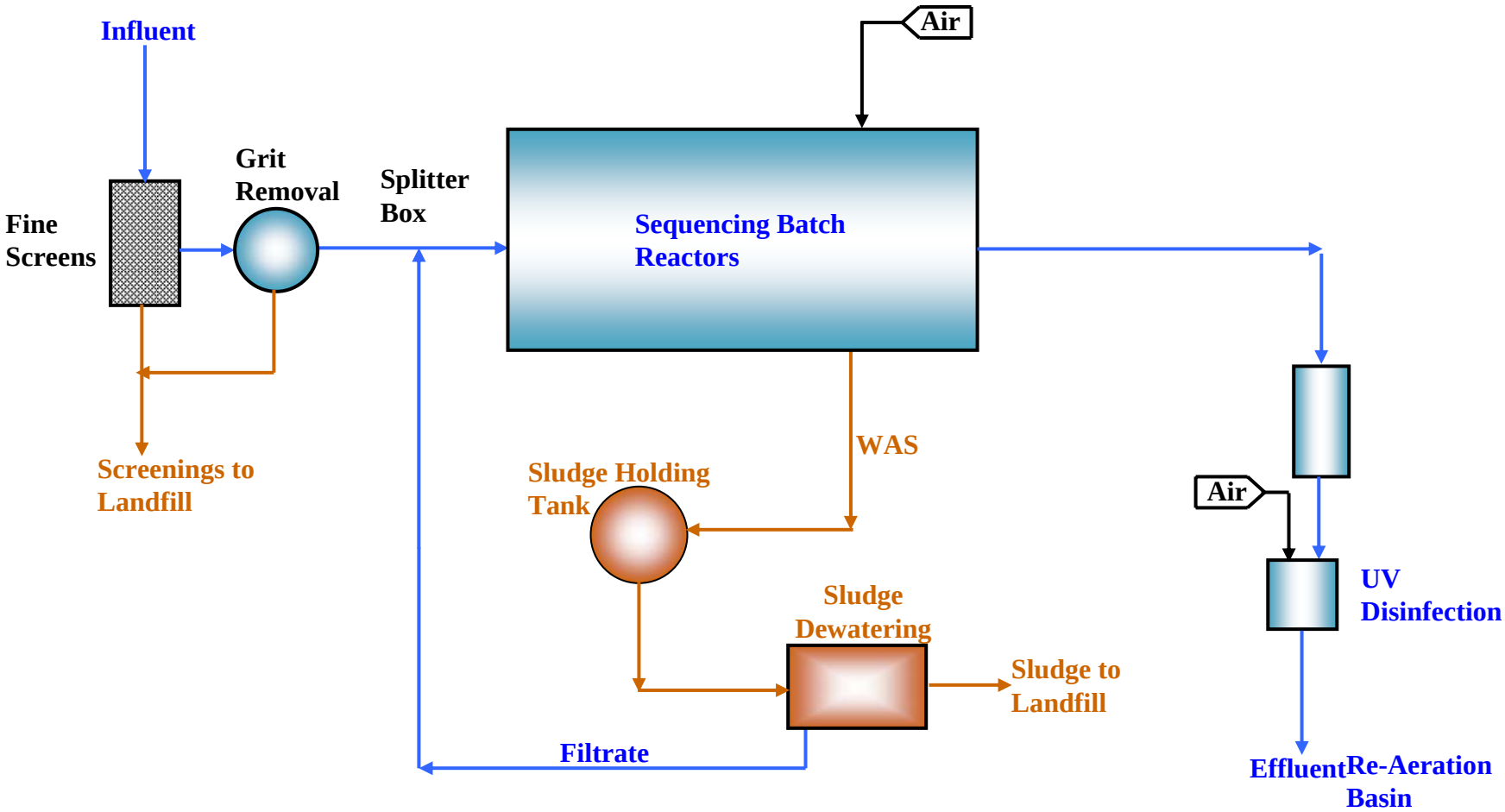
Caddo Creek wastewater treatment plant would be located near the confluence of East and West Caddo Creeks and South of CR 2264. Based on drainage conditions this is the ideal location to serve both East and West Caddo creek sewer basins. This facility was sized on the assumption that City of Greenville would abandon its existing wastewater treatment plant and convert it to a lift station and all of the flow would then be diverted to Caddo Creek WWTP. The plant would be sized to handle an annual average flow 8.08 MGD and a peak flow of 32.34 MGD. The treated effluent would be discharged into Caddo Creek.



RAS – Return Activated Sludge WAS – Waste Activated Sludge

Figure 4.2 Process Flow Schematic -
Conventional Flow Through Wastewater Treatment Plant
10/15/3/6 Permit Limits

Freese and Nichols



WAS – Waste Activated Sludge

Figure 4.3 Process Flow Schematic -
Sequencing Batch Reactor (SBR) Treatment Plant
10/15/3/6 Permit Limits

Freese and Nichols

1. Service Area:
   The Caddo Creek system would serve East and West Caddo Creek sewer basins in Hunt County including the following entities:
   - Cash SUD
   - Caddo Basin SUD
   - BHP WSC
   - City of Caddo Mills
   - City of Greenville
2. Conveyance System
   Refer to **Figure 4.1** for the conceptual layout of the collection system which conveys flow to the Caddo Creek WWTP.
3. Potential Discharge Limits
   Water quality modeling was performed on Caddo Creek assuming a DO criterion of 3.0 mg/L. The results indicate that, for an effluent flow of 8.08 million gallons per day, an effluent set of 10 milligrams per liter (mg/L) of 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), 15 mg/L of Total Suspended Solids (TSS), 3 mg/L of ammonia-nitrogen (NH_3-N) and 6 mg/L of dissolved oxygen would be required. More stringent discharge limits may apply if the TCEQ DO criteria for the streams in the study area are more stringent than initial assumptions.
4. Treatment Process
   Refer to **Figures 4.2** and **4.3** for the process flow schematics for Conventional flow through and SBR systems respectively, to achieve a discharge limit of 10/15/3/6 (BOD_5/TSS/NH_3-N/DO).

C. Caney Creek WWTP

Caney Creek wastewater treatment plant would be located in Caney Creek sewer basin, South of CR 3128 and Cowleech Fork of the Sabine River. The plant would be sized to handle an annual average flow of 1.19 MGD and a peak flow of 4.47 MGD. The treated effluent would be discharged into Cowleech Fork of the Sabine River.

1. Service Area:
   The Caney Creek system would serve the Cowleech Fork, Cedar Creek and Caney Creek sewer basins in Hunt County including the following entities:
   - Cash SUD
   - Campbell WSC

   City of Greenville's wastewater CCN covers most of the Cowleech Fork sewer basin. In this scenario, the wastewater flows from City of Greenville would be diverted to the Caddo Creek WWTP and the flows from the area not covered by the City of Greenville's CCN would be sent to Caney Creek WWTP.

2. Conveyance System:
   Refer **to Figure 4.1** for the conceptual layout of the collection system which conveys flow to the Caney Creek WWTP.

3. Potential Discharge Limits
   Water quality modeling was performed on Caddo Creek assuming a DO criterion of 3.0 mg/L. The results indicate that, for an effluent flow of 1.19 million gallons per day, an effluent set of 10 milligrams per liter (mg/L) of 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), 15 mg/L of Total Suspended Solids (TSS), 3 mg/L of ammonia-nitrogen (NH_3-N) and 6 mg/L of dissolved oxygen would be required. More stringent limits may apply if TCEQ decides to change the DO criteria for the streams in the study area.

4. Treatment Process
   Refer to **Figures 4.2** and **4.3** for the process flow schematics for Conventional flow through and SBR systems respectively, to achieve a discharge limit of 10/15/3/6 (BOD_5/TSS/NH_3-N/DO).

4.2 Alternative 1a: Multi Plant Regional System (Phased Approach)

This alternative was developed to evaluate a phased implementation of the multi plant regional system. The major entities in the study area that currently do not have a centralized sewer system are Caddo Basin SUD, Cash SUD and BHP WSC. These entities cover a significant portion of the study area. Most of the future development in the study area is expected to occur along the following areas:

- Highway 276 corridor in Cash SUD CCN located in South Fork Sabine Creek sewer basin,
- Interstate 30 corridor in BHP WSC CCN and City of Greenville CCN located in East and West Caddo sewer basins, and
- Highway 380 corridor in Caddo Basin SUD CCN located in East and West Caddo sewer basins.

A centralized sewer system will benefit and promote the development in these areas where a high potential for growth is expected. Hence, options to provide sewer service to these areas were evaluated. The City of Caddo Mills operates a wastewater treatment facility with a design capacity of 0.375 MGD. The projected average wastewater flow from the City of Caddo Mills is only 0.22 MGD in year 2030. The additional 0.155 MGD capacity at this plant could temporarily be used to treat the flows from Caddo Basin SUD in West Caddo Creek sewer basin. When flows exceed the treatment capacity at the plant, the plant could be expanded if adjacent land is available, or either all or the excess flow could be diverted to the regional system.

In this alternative, population in East Caddo, West Caddo and South Fork Sabine sewer basins is only considered. The population in Cedar Creek and Caney Creek sewer basins is very sparsely distributed and a regional sewer system would be feasible only when a higher growth is experienced. The City of Greenville's existing treatment facility would continue to provide sewer service to most of the population in Cowleech Fork sewer basin.

A. East Caddo Creek WWTP

A regional treatment plant would be located in East Caddo Creek sewer basin south of the City of Greenville, at the intersection of Farber Creek and East Caddo Creek. Initially, this regional treatment plant would treat the flows from the following regions:

- Caddo Basin SUD in East Caddo sewer basin,
- South western region of the City of Greenville in East Caddo sewer basin,
- BHP WSC in East and West Caddo sewer basins, and
- Cash SUD in East Caddo sewer basin

The majority of the City of Greenville's growth is expected to occur in the south western quarter which is located in a different sewer basin than its existing treatment plant. Flows from this section of the service area could be diverted south to the regional plant as an alternative to pumping to and expanding its existing treatment plant. The City of Greenville's existing treatment plant would still have to be upgraded due to its aged infrastructure which has reached its expected life. The upgraded plant would continue to serve the eastern and southeastern region and the flows from the south western region would be diverted to the regional plant.

Most of BHP WSC's population is located in the West Caddo sewer basin and hence a central lift station would be required to pump the flows to the regional plant in the East Caddo sewer basin.

Cash SUD's CCN extends in to all the sewer basins in the study area. About 26% of the total population is located in East Caddo sewer basin, and flows from this region would be treated at the regional treatment plant.

Initial capacity of the East Caddo Creek WWTP would be 2.0 MGD, which is sufficient to treat the flows from the above mentioned service area until year 2020. Further expansion would be required as growth warrants.

B. Bearpen Creek WWTP

Bearpen Creek regional WWTP would be located south of Highway 276, at the intersection of CR 2400 and Bearpen Creek in South Fork Sabine sewer basin. It would initially be sized to handle an average flow of 0.5 MGD from the Cash SUD population in South Fork Sabine sewer basin. Further expansion would depend on the growth experienced. The collection system however, would be sized to handle the ultimate peak capacity of the plant.

The cities of Quinlan, Hawk Cove and West Tawakoni would continue to operate their existing treatment facilities. When growth exceeds the treatment capacity of their respective facilities or if treatment upgrades become cost prohibitive, flows could be diverted to the Bearpen Creek regional plant.

C. Conveyance System

Figure 4.1a shows the conceptual layout of the collection system which conveys flow to the East Caddo Creek and Bearpen Creek WWTPs for Alternative 1a.

D. Potential Discharge Limits

Assuming a stream DO criterion of 3.0 mg/L, effluent discharge limits of 10 mg/L of $CBOD_5$, 15 mg/L of TSS, 3 mg/L of NH_3-N and 6 mg/L of dissolved oxygen can be expected. More stringent discharge limits may apply if the TCEQ DO criteria for the streams in the study area are more stringent than initial assumptions.

E. Treatment Process

Refer to **Figures 4.2** and **4.3** for the process flow schematics for Conventional flow through and SBR systems respectively, to achieve a discharge limit of 10/15/3/6 (BOD_5/TSS/NH_3-N/DO).

This alternative meets the most critical needs of the area most likely to experience near-term growth. It does not require immediate investment in sewer lines in sparsely

populated areas that will not be necessary for sometime, but it still provides flexibility for future growth and centralization.

FIGURE 4.1a
REGIONAL WASTEWATER PLANNING STUDY - ALTERNATIVE - 1a

Water Treatment Service Areas

- B H P WSC
- BLACKLAND WSC
- CADDO BASIN SUD
- CAMPBELL WSC
- CASH WSC
- CITY OF CADDO MILLS
- CITY OF CELESTE
- CITY OF GREENVILLE
- CITY OF JOSEPHINE
- CITY OF QUINLAN
- CITY OF ROYSE CITY
- CITY OF WEST TAWAKONI
- COMBINED CONSUMERS WSC
- COMMUNITY WATER COMPANY
- FROGNOT WSC
- HICKORY CREEK SUD
- POETRY WSC
- SHADY GROVE WSC
- W-OAKS PHOENIX CORP
- WEST LEONARD WSC
- WHISPERING OAKS WATER CO-OP PHAS
- WILLIAMS WSC

WEST LEONARD WSC (Water CCN)

HICKORY CREEK SUD (Water CCN)

FROGNOT WSC (Water CCN)

CITY OF CELESTE (Water CCN)

CITY OF WOLFE CITY (Sewer CCN)

CITY OF COMM (Sewer CCN)

CADDO BASIN SUD (Water CCN)

CITY OF GREENVILLE (Sewer CCN)

CITY OF GREENVILLE (Water CCN)

CITY OF GREENVILLE WWTP (Upgraded to 4.23 MGD)

SHADY GROVE WSC (Water CCN)

CAMPBELL WATER SUPPLY CORPORAT (Water CCN)

CITY OF CADDO MILLS (Sewer CCN)

CITY OF CADDO MILLS (Water CCN)

CITY OF CADDO MILLS WWTP (0.375 MGD)

CITY OF JOSEPHINE (Sewer CCN)

CITY OF JOSEPHINE (Water CCN)

CITY OF ROYSE CITY (Water CCN)

EAST CADDO CREEK WWTP (3.04 MGD)

CITY OF ROYSE CITY (Sewer CCN)

CITY OF FATE (Sewer CCN)

WILLIAMS WSC (Water CCN)

CITY OF QUINLAN (Sewer CCN)

CITY OF QUINLAN (Water CCN)

CITY OF QUINLAN WWTP (0.3 MGD)

COMMUNITY WATER COMPANY (Water CCN)

BEARPEN CREEK WWTP (0.79 MGD)

WHISPERING OAKS WTR CO-OP PHAS (Water CCN)

W-OAKS PHOENIX CORP (Water CCN)

CITY OF HAWK COVE WWTP (0.2 MGD)

CITY OF WEST TAWAKONI (Water CCN)

CITY OF WEST TAWAKONI WWTP (0.3 MGD)

COMBINED CONSUMERS WSC (Water CCN)

BLACKLAND WSC (Water CCN)

POETRY WSC (Water CCN)

B H P WSC (Water CCN)

CASH WSC (Water CCN)

East Caddo Basin

Cowleech Fork Basin

Caney Creek Basin

Cedar Creek Basin

West Caddo Basin

South Fork Sabine Creek

FANNIN COUNTY

COLLIN COUNTY

HUNT COUNTY

ROCKWALL COUNTY

KAUFMAN COUNTY

VAN ZANDT COUNTY

HOPKINS COUNTY

RAINS COUNTY

Blue Ridge

Farmersville

Celeste

Wolfe City

Greenville

Caddo Mills

Josephine

Royse City

Quinlan

Commerce

Campbell

Lone Oak

Neylandville

West Tawakoni

Hawk Cove

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SCALE IN FEET

3

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4.3 Alternative 2: Multiple Local Plants to Serve Each Study Participant

The study participants' goal for this study is to evaluate the opportunities for providing centralized collection and treatment of wastewater to as many existing and proposed developments as possible and also to improve the water quality in the water shed by avoiding the proliferation of new septic systems. An alternative to participating in a regional sewer system would be that each entity that does not currently have a central wastewater treatment system in place could build its own collection system and treatment facility. This alternative was evaluated to provide the study participants with a basis of comparison to participating in a regional sewer system.

Of the study participants, Cities of Greenville, Quinlan and Caddo Mills own and operate wastewater treatment facilities. In order to meet its projected growth, the City of Greenville will have to upgrade and expand its existing treatment plant from its current rated capacity of 4.23 MGD to 6.0 MGD. The cost of expanding the City of Greenville's existing wastewater treatment plant was estimated in a separate study conducted by Freese and Nichols, Inc. City of Quinlan operates a 0.3 MGD treatment plant and has enough capacity to meet the projected growth. City of Caddo Mills operates a 0.375 MGD treatment plant and also has enough capacity to meet the projected growth in year 2030.

Cash SUD and Caddo Basin SUD are the two study participants that currently do not own a facility to provide wastewater treatment. This section will discuss the treatment facilities proposed for Cash and Caddo Basin SUDs under this scenario.

A. Cash SUD Treatment Facilities

Since Cash SUD's existing water CCN is spread out in all the five sewer basins in the study area, a single treatment facility to serve the entire CCN would make the conveyance system very complex and expensive. Multiple smaller treatment plants dispersed within the Cash SUD CCN across the sewer basins would be a

more feasible option. Based on the projected flows for Cash SUD and drainage conditions of its CCN, sites were selected for the local treatment facilities. The proposed treatment plants are:

- Bearpen Creek WWTP (Average flow – 0.79 MGD)
- Caddo Creek WWTP (Average flow – 0.95 MGD)
- Caney Creek WWTP (Average flow – 0.7 MGD)

Figure 4.4 shows the conceptual layout of the collection system for Alternative #2. For treatment plants less than 1 MGD in size, package treatment system is the most economical option. They are simple, efficient, and significantly reduce the capital and operating costs. Water quality modeling was performed to determine the potential discharge limits. Refer to Alternative #2 summary sheet for more details.

B. Caddo Basin SUD Treatment Facility

1. The CCN of Caddo Basin SUD covers the North West region of the study area, in East and West Caddo Creek sewer basins. Based on the drainage conditions and the projected flows, one treatment plant would be sufficient to provide sewer service to the entire Caddo Basin SUD CCN. The proposed treatment plant would discharge into Elm Creek and would have an average capacity of 0.85 MGD.

Water Treatment Service Areas

- B H P WSC
- BLACKLAND WSC
- CADDO BASIN SUD
- CAMPBELL WSC
- CASH WSC
- CITY OF CADDO MILLS
- CITY OF CELESTE
- CITY OF GREENVILLE
- CITY OF JOSEPHINE
- CITY OF QUINLAN
- CITY OF ROYSE CITY
- CITY OF WEST TAWAKONI
- COMBINED CONSUMERS WSC
- COMMUNITY WATER COMPANY
- FROGNOT WSC
- HICKORY CREEK SUD
- POETRY WSC
- SHADY GROVE WSC
- W-OAKS PHOENIX CORP
- WEST LEONARD WSC
- WHISPERING OAKS WATER CO-OP PHAS
- WILLIAMS WSC

WEST LEONARD WSC
(Water CCN)

HICKORY CREEK SUD
(Water CCN)

FROGNOT WSC
(Water CCN)

CITY OF CELESTE
(Water CCN)

CITY OF WOLFE CITY
(Sewer CCN)

CITY OF COMME
(Sewer CCN)

CAMPBELL WATER SUPPLY CORPORAT
(Water CCN)

SHADY GROVE WSC
(Water CCN)

CITY OF GREENVILLE
(Water CCN)

CITY OF GREENVILLE
(Sewer CCN)

CITY OF GREENVILLE
WWTP (Expanded to 6.0 MGD)

CADDO BASIN SUD
(Water CCN)

CITY OF FARMERSVILLE
(Sewer CCN)

CADDO BASIN SUD
WWTP (0.85 MGD)

CITY OF CADDO MILLS
(Water CCN)

CITY OF CADDO MILLS
(Sewer CCN)

CITY OF CADDO MILLS
WWTP (0.375 MGD)

CITY OF JOSEPHINE
(Sewer CCN)

CITY OF JOSEPHINE
(Water CCN)

CITY OF ROYSE CITY
(Water CCN)

B H P WSC
(Water CCN)

CITY OF ROYSE CITY
(Sewer CCN)

CADDO CREEK
WWTP (0.95 MGD)

WILLIAMS WSC
(Water CCN)

CITY OF QUINLAN
(Sewer CCN)

CITY OF QUINLAN
(Water CCN)

CITY OF QUINLAN
WWTP (0.3 MGD)

BEARPEN CREEK
WWTP (0.79 MGD)

WHISPERING OAKS WTR CO-OP PHAS
(Water CCN)

W-OAKS PHOENIX CORP
(Water CCN)

BLACKLAND WSC
(Water CCN)

POETRY WSC
(Water CCN)

CITY OF HAWK COVE
WWTP (0.2 MGD)

COMBINED CONSUMERS WSC
(Water CCN)

CITY OF WEST TAWAKONI
(Water CCN)

CITY OF WEST TAWAKONI
WWTP (0.3 MGD)

COMMUNITY WATER COMPANY
(Water CCN)

CANEY CREEK
WWTP (0.70 MGD)

CASH WSC
(Water CCN)

East Caddo Basin

Cowleech Fork Basin

Caney Creek Basin

West Caddo Basin

Cedar Creek Basin

South Fork Sabine Creek Basin

FANNIN COUNTY

HUNT COUNTY

COLLIN COUNTY

ROCKWALL COUNTY

KAUFMAN COUNTY

VAN ZANDT COUNTY

RAINS COUNTY

HOPKINS COUNTY

Blue Ridge

Celeste

Wolfe City

Farmersville

Greenville

Josephine

Caddo Mills

Royse City

Neylandville

Campbell

Commerce

Lone Oak

Quinlan

Hawk Cove

West Tawakoni

3

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SCALE IN FEET

FIGURE 4.4

REGIONAL WASTEWATER PLANNING STUDY -

ALTERNATIVE - 2

LEGEND

- Existing WWTP
- Potential Location of Regional WWTP
- Potential Lift Station Location
- Existing Lift Station
- Proposed Force Main
- Proposed Gravity Main
- Existing Sewer Lines
- Study Area
- Sewer Shed Basins
- Wastewater CCN
- County Boundaries
- City Limits

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4.4 Alternative 3: Single Plant Regional System

A. Caddo Creek WWTP

With multiple regional plants, labor and laboratory costs would be high and hence to address this, the option of having a single large regional plant to serve the entire study area was evaluated. It was assumed that all the existing treatment facilities within the study area would either be abandoned or converted to a lift station and all the flows would be diverted to the regional plant.

Based on the drainage conditions of the study area, the confluence point of East and West Caddo Creeks seemed to be the ideal location for the regional plant where least number of pump stations would be required. The plant would be located south of CR 2264 near the confluence of East and West Caddo Creeks. To handle the flow from the entire study area, the plant would have to be sized for an average flow of 13.04 MGD and peak flow of 52.17 MGD.

B. Conveyance System:

Figure 4.5a shows the conceptual layout of the collection system which conveys flow to the Caddo Creek WWTP.

C. Potential Discharge Limits

Water quality modeling was performed on Caddo Creek assuming a DO criterion of 3.0 mg/L. The results indicate that, for an effluent flow of 13.04 million gallons per day, an effluent set of 10 milligrams per liter (mg/L) of 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), 15 mg/L of Total Suspended Solids (TSS), 3 mg/L of ammonia-nitrogen (NH_3-N) and 6 mg/L of dissolved oxygen would be required. More stringent discharge limits may apply if the TCEQ DO criteria for the streams in the study area are more stringent than initial assumptions.

D. Treatment Process

Refer to **Figures 4.2** and **4.3** for the process flow schematics for Conventional flow through and SBR systems respectively, to achieve a discharge limit of 10/15/3/6 (BOD_5/TSS/NH_3-N/DO).

Due to the permitting uncertainty for discharge of effluent into Caddo Creek, alternate locations for the single regional plant were investigated. The best alternative option is to locate the regional plant by Lake Tawakoni and discharge directly into the lake. TCEQ analyzed this option and determined that very stringent and definitive limits of 5/5/1/6/<1 (BOD_5/TSS/NH_3-N/DO/ Total Phosphorous) would be required for direct discharge into the lake. Given the stringent discharge limits and flood control measures required with locating the treatment plant by the lake, the cost of the whole system will be considerably high. With such stringent discharge limits, larger aeration basins, filtration system, filtrate equalization tanks and backup chemical phosphorous removal system would be required which would increase the cost of the treatment facility considerably. The cost of the regional sewer system which includes the cost of the treatment plant designed to discharge a higher quality effluent and the cost of the conveyance system to the plant was estimated and is presented in the following section. **Figure 4.5b** shows the conceptual layout of the collection system which conveys flow to the Caddo Creek WWTP located by Lake Tawakoni. **Figure 4.6** shows the treatment process required to treat the effluent to the limits set by the TCEQ for direct discharge into the lake.

4.5 Expansion of Existing Facilities

As mentioned earlier, of the study participants, Cities of Greenville Caddo Mills and Quinlan own and operate wastewater treatment facilities. The treatment plant for the City of Greenville is far upstream in the study area and is not feasible to be converted to a regional treatment facility since the cost associated with pumping majority of the study area flow would be significant. The treatment plant operated by the City of Quinlan is located on a small site and is surrounded by existing development. Therefore site limitations prohibit future expansion at this site to take the flows from

the entire study area. The treatment plant for the City of Caddo Mills is ideally positioned in the West Caddo Basin to receive initial flows from a portion of Caddo Basin SUD and could be expanded if land is available.

Water Treatment Service Areas

- B H P WSC
- BLACKLAND WSC
- CADDO BASIN SUD
- CAMPBELL WSC
- CASH WSC
- CITY OF CADDO MILLS
- CITY OF CELESTE
- CITY OF GREENVILLE
- CITY OF JOSEPHINE
- CITY OF QUINLAN
- CITY OF ROYSE CITY
- CITY OF WEST TAWAKONI
- COMBINED CONSUMERS WSC
- COMMUNITY WATER COMPANY
- FROGNOT WSC
- HICKORY CREEK SUD
- POETRY WSC
- SHADY GROVE WSC
- W-OAKS PHOENIX CORP
- WEST LEONARD WSC
- WHISPERING OAKS WATER CO-OP PHAS
- WILLIAMS WSC

WEST LEONARD WSC
(Water CCN)

FANNIN COUNTY

CITY OF WOLFE CITY
(Sewer CCN)

Wolfe City

HICKORY CREEK SUD
(Water CCN)

CITY OF CELESTE
(Water CCN)

Celeste

FROGNOT WSC
(Water CCN)

Blue Ridge

CITY OF COMM
(Sewer CCN)

Commerce

East Caddo Basin

Cowleech Fork Basin

Caney Creek Basin

Cedar Creek Basin

West Caddo Basin

South Fork Sabine Creek

Neylandville

CAMPBELL WATER SUPPLY CORPORAT
(Water CCN)

Campbell

CADDO BASIN SUD
(Water CCN)

COLLIN COUNTY

Farmersville

HUNT COUNTY

CITY OF GREENVILLE
(Sewer CCN)

SHADY GROVE WSC
(Water CCN)

CITY OF GREENVILLE
WWTP (4.23 MGD)
Converted to 18 MGD Lift Station

CITY OF GREENVILLE
(Water CCN)

Greenville

HOPKINS COUNTY

CITY OF CADDO MILLS
(Water CCN)

CITY OF CADDO MILLS
(Sewer CCN)

CITY OF CADDO MILLS
WWTP (0.375 MGD)
Flow diverted to Regional WWTP

Josephine

CITY OF JOSEPHINE
(Sewer CCN)

CITY OF JOSEPHINE
(Water CCN)

Caddo Mills

CITY OF ROYSE CITY
(Water CCN)

CASH WSC
(Water CCN)

Lone Oak

B H P WSC
(Water CCN)

Royse City

CITY OF ROYSE CITY
(Sewer CCN)

CADDO CREEK
WWTP (13.04 MGD)

WHISPERING OAKS WTR CO-OP PHAS
(Water CCN)

WILLIAMS WSC
(Water CCN)

COMMUNITY WATER COMPANY
(Water CCN)

CITY OF QUINLAN
(Sewer CCN)

Quinlan

CITY OF QUINLAN
(Water CCN)

CITY OF QUINLAN
WWTP (0.3 MGD)
Flow diverted to Regional WWTP

CITY OF FATE
(Sewer CCN)

ROCKWALL COUNTY

RAINS COUNTY

West Tawakoni

CITY OF WEST TAWAKONI
(Water CCN)

Hawk Cove

CITY OF HAWK COVE
WWTP (0.2 MGD)
Flow diverted to Regional WWTP

CITY OF WEST TAWAKONI
WWTP (0.3 MGD)
Flow diverted to Regional WWTP

COMBINED CONSUMERS WSC
(Water CCN)

W-OAKS PHOENIX CORP
(Water CCN)

BLACKLAND WSC
(Water CCN)

POETRY WSC
(Water CCN)

KAUFMAN COUNTY

VAN ZANDT COUNTY

3

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SCALE IN FEET

FIGURE 4.5a
ALTERNATIVE 3
DISCHARGE INTO CADDO CREEK
LEGEND

- Existing WWTP
- Potential Location of Regional WWTP
- Potential Lift Station Location
- Existing Lift Station
- Proposed Force Main
- Proposed Gravity Main
- Existing Sewer Lines
- Study Area
- Sewer Shed Basins
- Wastewater CCN
- County Boundaries
- City Limits

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Water Treatment Service Areas

- B H P WSC
- BLACKLAND WSC
- CADDO BASIN SUD
- CAMPBELL WSC
- CASH WSC
- CITY OF CADDO MILLS
- CITY OF CELESTE
- CITY OF GREENVILLE
- CITY OF JOSEPHINE
- CITY OF QUINLAN
- CITY OF ROYSE CITY
- CITY OF WEST TAWAKONI
- COMBINED CONSUMERS WSC
- COMMUNITY WATER COMPANY
- FROGNOT WSC
- HICKORY CREEK SUD
- POETRY WSC
- SHADY GROVE WSC
- W-OAKS PHOENIX CORP
- WEST LEONARD WSC
- WHISPERING OAKS WATER CO-OP PHAS
- WILLIAMS WSC

WEST LEONARD WSC
(Water CCN)

FANNIN COUNTY

HICKORY CREEK SUD
(Water CCN)

FROGNOT WSC
(Water CCN)

CITY OF WOLFE CITY
(Sewer CCN)

Wolfe City

CITY OF CELESTE
(Water CCN)

Celeste

CITY OF COMM
(Sewer CCN)

Commerce

Neylandville

East Caddo Basin

Cowleech Fork Basin

Cedar Creek Basin

Caney Creek Basin

West Caddo Basin

South Fork Sabine Creek

CADDO BASIN SUD
(Water CCN)

COLLIN COUNTY

Farmersville

HUNT COUNTY

CITY OF GREENVILLE
(Sewer CCN)

Greenville

CITY OF GREENVILLE
WWTP (4.23 MGD)
Converted to 18 MGD Lift Station

CITY OF GREENVILLE
(Water CCN)

SHADY GROVE WSC
(Water CCN)

CAMPBELL WATER SUPPLY CORPORAT
(Water CCN)

Campbell

HOPKINS COUNTY

CITY OF CADDO MILLS
(Water CCN)

CITY OF CADDO MILLS
(Sewer CCN)

CITY OF CADDO MILLS
WWTP (0.375 MGD)
Flow diverted to Regional WWTP

Caddo Mills

CITY OF JOSEPHINE
(Sewer CCN)

CITY OF JOSEPHINE
(Water CCN)

Josephine

CITY OF ROYSE CITY
(Water CCN)

Royse City

CITY OF ROYSE CITY
(Sewer CCN)

CITY OF FATE
(Sewer CCN)

ROCKWALL COUNTY

B H P WSC
(Water CCN)

WHISPERING OAKS WTR CO-OP PHAS
(Water CCN)

CADDO CREEK
WWTP (13.04 MGD)

COMMUNITY WATER COMPANY
(Water CCN)

WILLIAMS WSC
(Water CCN)

CITY OF QUINLAN
(Water CCN)

Quinlan

CITY OF QUINLAN
(Sewer CCN)

CITY OF QUINLAN
WWTP (0.3 MGD)
Flow diverted to Regional WWTP

CASH WSC
(Water CCN)

Lone Oak

RAINS COUNTY

West Tawakoni

CITY OF WEST TAWAKONI
(Water CCN)

Hawk Cove

CITY OF HAWK COVE
WWTP (0.2 MGD)
Flow diverted to Regional WWTP

CITY OF WEST TAWAKONI
WWTP (0.3 MGD)
Flow diverted to Regional WWTP

COMBINED CONSUMERS WSC
(Water CCN)

W-OAKS PHOENIX CORP
(Water CCN)

BLACKLAND WSC
(Water CCN)

POETRY WSC
(Water CCN)

KAUFMAN COUNTY

VAN ZANDT COUNTY

3

0 5,000 10,000
SCALE IN FEET

FIGURE 4.5b
ALTERNATIVE 3
DIRECT DISCHARGE TO LAKE TAWAKONI

LEGEND

- Existing WWTP
- Potential Location of Regional WWTP
- Potential Lift Station Location
- Existing Lift Station
- Proposed Force Main
- Proposed Gravity Main
- Existing Sewer Lines
- Study Area
- Sewer Shed Basins
- Wastewater CCN
- County Boundaries
- City Limits

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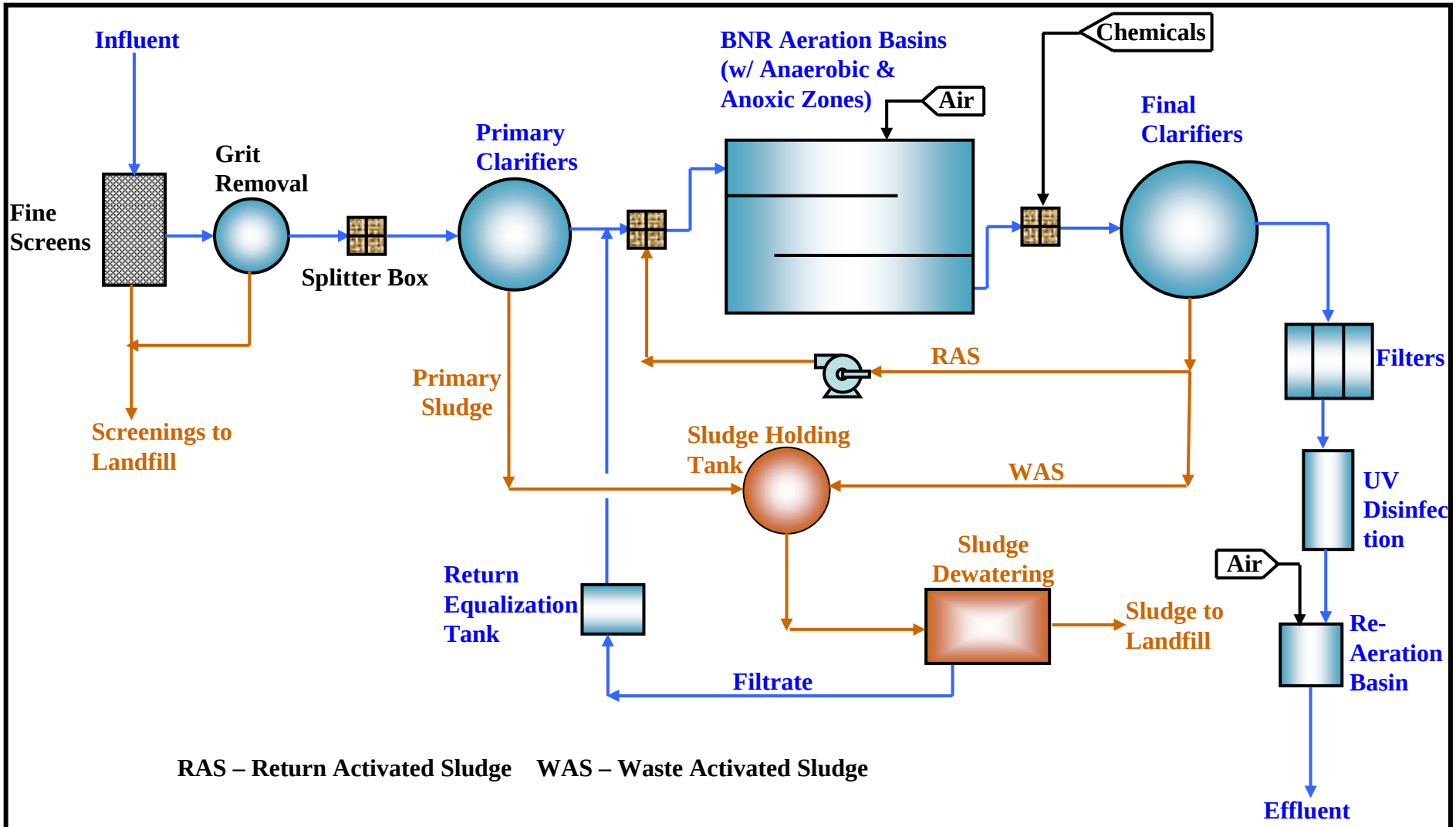

Figure 4.6 Process Flow Schematic -
Conventional Flow Through Wastewater Treatment Plant
5/5/1/6 Permit Limits

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4.6 Opinion of Probable Capital Cost

This section presents the capital costs of the alternatives discussed in the previous sections.

The opinion of probable capital cost (OPCC) for the sewer system for each of the alternatives included the following components:

- Collection system cost (including engineering, surveying and geotechnical)
- Treatment facility - Construction cost
- Treatment facility – Engineering and construction administration
- Land acquisition and permitting cost

The construction costs were based on the most recent bid results of similar projects in the area. The collection system construction costs includes the costs of the lift stations and sewer interceptors 12-inch and above in size only. Land acquisition costs were estimated from the land unit costs obtained from a rural real estate agent in Hunt County. Permitting costs were estimated based on the assumption that the permitting process is uncontested and that a standard Texas Pollutant Discharge Elimination System (TPDES) permit and a US Army Corps of Engineers Clean Water Act Section 404 permit for the outfall structure would be required for a new wastewater treatment plant. The prorata share of the cost for each entity was based on the flow contributed to the regional system. All the costs estimated in this study are present year costs.

Operating cost of each of the treatment facilities would be proportional to the average flow treated at each facility. Therefore, operating costs would be proportional to the capital costs. Although there would be some reduced labor for the single regional plant alternative, the higher capital costs for this alternative far outweighs any reduced operating cost realized by this alternative.

Refer to **Appendices E, E1, F** and **G** for the OPCC of Alternatives 1, 1a, 2, and 3, respectively. **Appendix H** shows the land acquisition and permitting cost estimation

for each of the alternatives. **Appendix I** contains the detailed cost estimation worksheets for the alternatives.

Table 4.1 Opinion of Probable Capital Costs – Summary

Study Participant	**Prorata Share of Total System Cost**				
	Alternative 1: *Multi Plant Regional System*	**Alternative 1a:** *Multi Plant Regional System (Phased Approach)*	**Alternative 2:** *Local Plant Option (Non-regional)*	**Alternative 3:** *Single Plant Regional System*	
				Caddo Creek Discharge	**Caddo Creek Discharge**
City of Greenville	$41,807,000	$26,728,000[c]	$20,543,000[a]	$63,318,000	$68,875,000
Cash SUD	$36,365,000	$16,486,000	$45,638,000	$38,518,000	$41,898,000
Caddo Basin SUD	$11,982,000	$5,906,000	$15,000,000	$18,146,000	$19,739,000
City of Quinlan	$2,358,000	N/A	N/A[b]	$2,389,000	$2,598,000
City of Caddo Mills	$1,929,000	N/A	N/A[b]	$2,922,000	$3,178,000
Other Entities (non-study participants)	$42,771,000	$9,023,000	N/A	$46,344,000	$50,340,000
Total Regional System Cost	**$137,212,000**	**$39,837,000**	N/A	**$171,637,000**	**$186,628,000**

a – Cost of expanding City of Greenville's existing treatment plant was estimated in City of Greenville Water Reclamation Center (WRC) Condition Assessment and Concept Design study conducted by Freese and Nichols, Inc that concluded in June 2007.
b – Cost of future upgrades needed to replace aging infrastructure at the existing facilities of Cities of Quinlan and Caddo Mills were not estimated.
c – Includes the cost of upgrading the existing City of Greenville WWTP to 4.23 MGD and the prorata share of the regional system.

5.0 ALTERNATIVE EVALUATION

The sewer system alternatives discussed in this study can be broadly classified into two categories – the regional sewer system option and the local sewer system option. Alternatives 1, 1a and 3 can be grouped as the regional system options and Alternative 2 as the local system option. With the regional sewer system option, wastewater treatment service can be provided to the entire study area whereas with the local sewer system option, the same can be provided only to the regions that come under the study participant's jurisdiction which is only 73% of the whole study area. Sabine River Authority's and other study participants' primary motive behind this study is to enable higher levels of wastewater treatment within the Lake Tawakoni water shed and improve its water quality through a centralized wastewater collection and treatment system. This goal cannot be completely achieved with the local sewer system option which would provide sewer service to only a part of the study area.

The alternatives can be evaluated based on the following criteria:

- Capital and O&M Costs
- Potential for Cost Sharing
- Long-term Development Potential
- Permitting issues

5.1 Capital and O&M Costs

Among the regional sewer system options, Alternatives 1 or 1a, multiple regional plants serving the study area, cost considerably less than Alternative 3 which is the scenario of a single large regional facility to serve the entire study area. Since the study area consists of several drainage basins, having a single regional treatment facility requires a rather complex collection system which is the reason for the increased capital cost. With multiple regional plants, the collection systems are less extensive with fewer lift stations and multiple smaller treatment plants. But the combined operating costs of the multiple regional plants would be higher than that of

the single large regional plant since number of staff and laboratory expenses increase with the increase in the number of plants.

Alternative 1a which is the phased implementation of the multi plant regional system is the most economical of all the alternatives. This alternative provides centralized sewer service to areas most likely to experience near-term development which is the primary goal of this study. At the same time, it does not require immediate investment in sewer lines that would serve sparsely populated low growth areas. This alternative also provides flexibility in the collection system and treatment plant for future growth and centralization.

With the local sewer system option, the study participants who already own and operate a treatment facility would need to continue operating their plant with either upgrading or expanding it to meet the future growth. Cash SUD and Caddo Basin SUD, which currently do not provide sewer service, would have to construct a new collection and treatment system in order to provide centralized sewer service. To make a comparison of the cost of the regional and local sewer system options, the prorata share of the study participants for the regional system has to be compared with the cost of either upgrading the study participants' existing treatment facility or constructing a new local treatment facility for itself. This comparison is shown in **Table 4.1**.

The treatment plants for the cities of Quinlan and Caddo Mills have enough capacity to meet the projected growth for year 2030. Besides the operating cost of the facility and expenses incurred due to aging of the facility, no additional cost would have to be spent on expansion. However, future upgrades would be needed to replace aging equipment and structures. For the City of Greenville, expanding its existing treatment plant is more economical than investing in the regional system. Also, the city needs an immediate expansion of its treatment facility due to its aging infrastructure and growing population in south and western regions of the city. For Cash SUD investing in the multi plant regional system with a phased approach is the most economical

option. However, with that option only the population in East Caddo and South Fork Sabine sewer basins of Cash SUD will be initially served. Since the population in other sewer basins is sparsely distributed and not much growth is expected in the near future, a centralized sewer system in these basins is not very feasible at this point of time.

For Caddo Basin SUD, significant cost savings can be seen in participating in the regional system with a phased approach. The capital costs involved would be the prorata share of the East Caddo regional system and the cost of treatment of its flow from West Caddo sewer basin at the City of Caddo Mills WWTP.

5.2 Potential for Cost Sharing

The prorata share of cost of the regional sewer system for the study participants is shown in **Table 4.1.** The potential for cost sharing is the same with both the regional sewer system options of Alternative 1 and 3. With the local sewer system option where each study participants provides sewer service locally instead of participating in the regional system, there is no potential for sharing the cost of proposed system.

5.3 Long –Term Development Potential

A centralized sewer system will benefit and promote development in the study area as well as protect water quality. The economic benefit brought by development to the region should be considered in evaluating the feasibility of a centralized sewer system. With the population growth and development occurring in nearby Collin County, planning for future growth will become critical as higher density development moves into Hunt County.

5.4 Permitting Issues

All the streams in the study area currently have not been classified by the TCEQ and hence no specific DO standards have been set. For the purpose of analysis, a best case scenario of 3.0 mg/L of DO criterion was assumed in this study. Appendix D summarizes the results of water quality modeling performed for the streams for the alternatives. The lowest DO in the streams for probable sets of effluent quality were

determined by modeling the streams. It can be seen from the results that if TCEQ proposes a stream DO criterion of 5.0 mg/L instead of 3.0 mg/L, a very stringent discharge limit of 5/5/1/6 would be required for both the local and regional sewer system options. This would increase the cost of the alternatives.

6.0 CONCLUSIONS

Among the regional sewer system options, the multi plant regional system costs considerably less than the single plant regional system. Since the study area consists of several drainage basins, having a single regional treatment facility requires a rather complex collection system leading to higher capital costs. With multiple regional plants, the collection systems are less extensive with fewer lift stations and multiple smaller treatment plants. Both the multi plant and the single plant regional options will not utilize any of the existing infrastructure or treatment facilities. Since new infrastructure would need to be constructed to collect the wastewater from the entire service area and convey it to the proposed new treatment facilities, the capital costs of the regional alternatives are very high.

Alternative 1a, which is the phased implementation of the multi plant regional system, provides centralized sewer service to areas most likely to experience near-term development which is the primary goal of this study. At the same time, it does not require immediate investment for sewer lines in sparsely developed areas with lower growth rates. This alternative also provides flexibility in the collection system and treatment plant for future growth and centralization. With this alternative, a centralized sewer system can be provided to portions of the service areas for three major entities in the study area (Caddo Basin SUD, Cash SUD and BHP WSC) that currently do not have a sewer system. Though Alternative 1a is the least expensive option, it would provide sewer service to a much smaller population of the study area than Alternatives 1 or 3.

Alternatives 1 and 3 provide centralized sewer service to the entire study area and a larger population compared to Alternatives 1a and 2, which provide the sewer service only to a portion of the study area and smaller population. Therefore, the total system costs for Alternatives 1 and 3 are not exactly comparable to Alternatives 1a and 2. For Cash SUD and Caddo Basin SUD, participating in the multi plant regional system would be more economical than constructing their own treatment system since the

cost of the regional system would be shared along with other contributing entities. However, the feasibility of the regional alternatives is dependent on the City of Greenville's participation in the regional system since it is the largest entity in the region. And participating in the regional system is not the most economical option for the City of Greenville. By upgrading and/or expanding its existing treatment plant, the City of Greenville can make the best use of its existing infrastructure like collection system, land, power transmission and access roads. Also, the plant is in immediate need of upgrade and improvements due to its aged infrastructure. Other study participants are yet to experience enough growth that would substantiate the participation in the regional system without City of Greenville's involvement. Consequently, a regional system is not feasible at this point of time without the City of Greenville's participation.

Alternative 2, which is the alternative of each study participant operating its own local treatment plant, is the recommended alternative for providing sewer service to the study area. With alternative 2, study participants that currently own and operate wastewater treatment facilities would continue to provide sewer service and new treatment facilities would be built for Cash SUD and Caddo Basin SUD that currently do not provide sewer service. This alternative utilizes the existing sewer systems within the study area and identifies new sewer systems to serve Cash SUD and Caddo Basin SUD.

As development occurs within the study area in future, it may be practical for the new sewer systems identified in Alternative 2 to be expanded and at that time form a regional system to serve additional areas. For instance, the proposed Bearpen Creek WWTP identified in Alternative 2 to serve Cash SUD population could be expanded to provide sewer service to neighboring entities like BHP WSC and Poetry WSC. Similarly, Caddo Creek WWTP could be expanded to provide service to BHP WSC population in West and East Caddo basins.

The permitting restrictions on the proposed treatment facilities are hypothetical in the absence of DO standards set by TCEQ for the streams in the study area. And hence, the costs presented in this study are subject to increase if more stringent discharge limits are required.

7.0 RECOMMENDATIONS

- Upgrade/expand the existing City of Greenville WWTP to take advantage of cost savings associated with existing infrastructure (land, collection system, power transmission and access roads)
- Since several developments are being planned in the Bearpen Creek wastewater system area, begin a detailed WWTP siting study and interceptor routing study. Initiate discussions with Cash SUD, BHP WSC, Poetry WSC and Combined Consumers WSC to determine interest in participating in a future regional wastewater system in the Bearpen Creek area.
- As development occurs, begin detailed WWTP siting studies and interceptor routing studies for the Caddo Creek system and Caney Creek system.

APPENDIX A - Alternative 1: Multi Plant Regional System – Summary Sheet

APPENDIX - A

ALTERNATIVE #1: Multi Plant Regional System

Regional Facility #1: South Fork Sabine River WWTP

Scenario: The regional plant to serve the CCNs of Cash SUD, Poetry WSC, Combined Consumers WSC and county other region in the South Fork Sabine Creek sewer basin. City of Quinlan and City of West Tawakoni sewered to the regional plant by 2030

Potential Location of WWTP: Intersection of Dry Creek and Bearpen Creek, at FM 2316, in South Fork Sabine River Sewer Basin

Service Area: South Fork Sabine River Sewer Basin

Population & Flow Projections:
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	2,998	4,850	7,846	0.34	0.56	0.90	1.38	2.23	3.61	24.0%
Poetry WSC	3,066	3,738	4,557	0.35	0.43	0.52	1.41	1.72	2.10	13.9%
BHP WSC	1,021	1,663	2,709	0.12	0.19	0.31	0.47	0.77	1.25	8.3%
City of Quinlan	0	0	1,578	0.00	0.00	0.18	0.00	0.00	0.73	4.8%
Combined Consumers WSC	9,063	11,048	13,467	1.04	1.27	1.55	4.17	5.08	6.20	41.1%
City of West Tawakoni	0	0	2,577	0.00	0.00	0.30	0.00	0.00	1.19	7.9%
Total =	18,158	23,319	34,764	1.86	2.45	3.76	7.43	9.80	15.06	100.0%

Sewer System:
WWTP Capacity based on planning year of 2030:
Design = 3.76 MGD
2-hr Peak = 15.06 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = 7.38 MGD

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

Regional Facility #2:Caddo Creek WWTP

Scenario: All of Greenville's flow sent to the regional WWTP #2

Potential Location of WWTP: Intersection of West and East Caddo Creeks, Close to FM 2264

Service Area: West and East Caddo Creek Sewer Basins

Population & Flow Projections:
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Caddo Basin SUD	6,179	8,607	11,989	0.71	0.99	1.38	2.84	3.96	5.52	17.1%
Cash SUD	5,243	6,514	8,099	0.60	0.75	0.93	2.41	3.00	3.73	11.5%
BHP WSC	2,431	3,960	6,450	0.28	0.46	0.74	1.12	1.82	2.97	9.2%
City of Caddo Mills	1,299	1,583	1,930	0.15	0.18	0.22	0.60	0.73	0.89	2.7%
City of Greenville	28,154	34,320	41,835	3.24	3.95	4.81	12.95	15.79	19.24	59.5%
Total =	45,316	57,004	72,334	4.98	6.32	8.08	19.92	25.29	32.34	100.0%

Sewer System:
WWTP Capacity based on planning year of 2030:
Design = 8.08 MGD
2-hr Peak = 32.34 MGD

Major Lift Stations Capacity based on planning year of 2030: NONE

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

Regional Facility #3: Caney Creek WWTP

Scenario: Flow from Cash SUD CCN in Caney Creek sewer basin and Cedar Creek sewer basin

Potential Location of WWTP: Intersection of FM 3128 and Cowleech Fork of Sabine River

Service Area: Caney Creek sewer basin, Cedar Creek sewer basin and Southern tip of Cowleech Fork Sewer Basins

Population & Flow Projections:
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Region	Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	6,355	7,772	9,504	0.73	0.89	1.09	2.92	3.57	4.37	91.7%
Campbell WSC	761	804	862	0.09	0.09	0.10	0.35	0.37	0.40	8.3%
Total =	7,116	8,576	10,366	0.82	0.99	1.19	3.27	3.94	4.77	100.0%

Sewer System:
WWTP Capacity based on planning year of 2030:
Design = 1.19 MGD
2-hr Peak = 4.77 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = 0.57 MGD
#2 = 1.02 MGD
#3 = 2.97 MGD

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

APPENDIX A1 - Alternative 1a: Multi Plant Regional System (Phased Approach) – Summary Sheet

APPENDIX - A1

ALTERNATIVE #1a: Multi Plant Regional System (Phased Approach)

Regional Facility #1: Bearpen Creek WWTP

Scenario: A regional WWTP in South Fork Sabine Creek sewer basin to serve to Cash SUD population initially. Other existing treatment facilities (Cities of Quinaln, Hawk Cove, West Tawakoni) would continue to operate and would tie in to the regional plant when short of treatment capacity or as when desired.

Potential Location of WWTP: South of 276, close to FM 2400 & Bearpen Creek in South Fork Sabine Creek Sewer Basin

Service Area: South Fork Sabine River Sewer Basin

Population & Flow Projections:

Annual Average Growth Rate = 5.0%
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Region	Contributing Population in Year				Average Wastewater Flow Projection (MGD)				Peak Wastewater Flow Projection (MGD)			
	2006	2010	2020	2030	2006	2010	2020	2030	2006	2010	2020	2030
Cash SUD	2,138	2,599	4,233	6,895	0.25	0.30	0.49	0.79	0.98	1.20	1.95	3.17

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 0.79 MGD
2-hr Peak = 3.17 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = 0.94 MGD
#2 = 0.44 MGD

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

Regional Facility #2: East Caddo Creek WWTP

Scenario: A regional WWTP in East Caddo sewer basin to serve Caddo Basin SUD (in East Caddo sewe basin), BHP WSC, Cash SUD (in East Caddo sewer basin) and south western region of the City of Greenville. Caddo Basin SUD CCN in West Caddo sewer basin to be temporarily sewered to City of Caddo Mills WWTP and eventually all the flow diverted to the regional WWTP. It was assumed that Caddo Basin SUD's population in Hunt County in equally distributed in East and West Caddo sewer basins.

Potential Location of WWTP: Intersection of Farber Creek and East Caddo Creek, South of CR 2208

Service Area: West and East Caddo Creek Sewer Basins

Population & Flow Projections:

Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Caddo Basin SUD	3,090	4,304	5,995	0.36	0.49	0.69	1.42	1.98	2.76	22.7%
BHP WSC	3,452	5,623	9,159	0.40	0.65	1.05	1.59	2.59	4.21	34.7%
Cash SUD	1,825	2,225	2,712	0.21	0.26	0.31	0.84	1.02	1.25	10.3%
City of Greenville	1,713	4,796	8,553	0.20	0.55	0.98	0.79	2.21	3.93	32.4%
Total =	12,089	18,967	28,449	1.16	1.95	3.04	4.64	7.80	12.15	100.0%

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 3.04 MGD
2-hr Peak = 12.15 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 (BHP Lift Station): 4.21 MGD

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

APPENDIX B – Alternative 2: Local Plants to Serve Each Study Participant – Summary Sheet

APPENDIX - B

ALTERNATIVE #2: Local Plants to Serve Each Study Participant

Cash SUD WWTPs

Scenario: Cash SUD to own and operate WWTPs to provide sewer services with in its CCN in the study area

BEARPEN CREEK WWTP

Potential Location of WWTP: South of 276, close to FM 2400 & Bearpen Creek in South Fork Sabine Creek Sewer Basin

Service Area: Cash SUD CCN in South Fork Sabine Creek Sewer Basin

Population & Flow Projections:

Annual Average Growth Rate = 5.0%
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Contributing Population in Year				Average Wastewater Flow				Peak Wastewater Flow Projection			
2006	2010	2020	2030	2006	2010	2020	2030	2006	2010	2020	2030
2,138	2,599	4,233	6,895	0.25	0.30	0.49	0.79	0.98	1.20	1.95	3.17

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 0.79 MGD
2-hr Peak = 3.17 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = **0.94 MGD**
#2 = **0.44 MGD**

Best Case Discharge Limits: 10/15/3/6 **(BOD_5/TSS/NH_3-N/DO)**

CADDO CREEK WWTP

Potential Location of WWTP: Intersection of West and East Caddo Creeks

Service Area: Cash SUD CCN in West and East Caddo Creek Sewer Basins

Population & Flow Projections:

Growth Rate of Cash CCN in West Cado Creek Sewer Basin = 2.6%
Growth Rate of Cash CCN in East Cado Creek Sewer Basin = 2.0%
Average growth rate of central Cash CCN = 2.3%
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Contributing Population in Year				Average Wastewater Flow				Peak Wastewater Flow Projection			
2006	2010	2020	2030	2006	2010	2020	2030	2006	2010	2020	2030
4,808	5,266	6,610	8,298	0.55	0.61	0.76	0.95	2.21	2.42	3.04	3.82

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 0.95 MGD
2-hr Peak = 3.82 MGD

Major Lift Stations Capacity based on planning year of 2030: **NONE**

Best Case Discharge Limits: 10/15/3/6 **(BOD_5/TSS/NH_3-N/DO)**

CANEY CREEK WWTP

Potential Location of WWTP: Intersection of FM 3128 and Cowleech Fork of Sabine River

Service Area: Cash SUD CCN in all the sewer basins in the study area.

Population & Flow Projections:

Annual Average Growth Rate = 2.0%
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Contributing Population in Year				Average Wastewater Flow				Peak Wastewater Flow Projection			
2006	2010	2020	2030	2006	2010	2020	2030	2006	2010	2020	2030
3,805	4,119	5,021	6,120	0.44	0.47	0.58	0.70	1.75	1.89	2.31	2.82

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 0.70 MGD
2-hr Peak = 2.82 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = **0.57 MGD**
#2 = **0.29 MGD**
#3 = **1.02 MGD**

Best Case Discharge Limits: 10/15/3/6 **(BOD_5/TSS/NH_3-N/DO)**

APPENDIX - B

ALTERNATIVE #2: Local Plants to Serve Each Study Participant

Caddo Basin SUD WWTP

Scenario: Caddo Basin SUD to provide sewer services by operating its own WWTP

Potential Location of WWTP: South of 380, FM 3211 & 2154, Discharge into Elm Creek in East Caddo Sewer Basin

Service Area: Caddo Basin SUD CCN in the West Caddo and East Caddo Sewer Basins

Population & Flow Projections:

Annual Average Growth Rate = 3.4%
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

Contributing Population in Year				Average Wastewater Flow				Peak Wastewater Flow Projection			
2006	2010	2020	2030	2006	2010	2020	2030	2006	2010	2020	2030
3,308	3,781	5,283	7,380	0.38	0.43	0.61	0.85	1.52	1.74	2.43	3.39

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 0.85 MGD
2-hr Peak = 3.39 MGD

Major Lift Stations Capacity based on planning year of 2030:
#1 = 2.08 MGD
#2 = 1.31 MGD

Best Case Discharge Limits: 10/15/3/6 (BOD_5/TSS/NH_3-N/DO)

APPENDIX C – Alternative 3: Single Plant Regional System – Summary Sheet

APPENDIX - C

ALTERNATIVE #3: Single Plant Regional System

Regional Facility: Caddo Creek WWTP

Scenario: One large regional plant to serve the entire study area. All the flow from City of Greenville would be directed to the regional plant and the existing plant would be decommissioned and used as a lift station.

Potential Location of WWTP: Intersection of West and East Caddo Creeks, Close to FM 2264

Service Area: Entire study area

Population & Flow Projections:
Per capita wastewater generation = 115 gpcd
2-hr Peaking Factor = 4.0

SOUTH FORK SABINE CREEK BASIN

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	2,998	4,850	7,846	0.34	0.56	0.90	1.38	2.23	3.61	24.0%
Poetry WSC	3,066	3,738	4,557	0.35	0.43	0.52	1.41	1.72	2.10	13.9%
BHP WSC	1,021	1,663	2,709	0.12	0.19	0.31	0.47	0.77	1.25	8.3%
City of Quinlan	0	0	1,578	0.00	0.00	0.18	0.00	0.00	0.73	4.8%
Combined Consumers WSC	9,063	11,048	13,467	1.04	1.27	1.55	4.17	5.08	6.20	41.1%
City of West Tawakoni	0	0	2,577	0.00	0.00	0.30	0.00	0.00	1.19	7.9%
Total =	**18,158**	**23,319**	**34,764**	**1.86**	**2.45**	**3.76**	**7.43**	**9.80**	**15.06**	100.0%

WEST & EAST CADDO BASINS

Region	Contributing Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Caddo Basin SUD	6,179	8,607	11,989	0.71	0.99	1.38	2.84	3.96	5.52	17.1%
Cash SUD	5,243	6,514	8,099	0.60	0.75	0.93	2.41	3.00	3.73	11.5%
BHP WSC	2,431	3,960	6,450	0.28	0.46	0.74	1.12	1.82	2.97	9.2%
City of Caddo Mills	1,299	1,583	1,930	0.15	0.18	0.22	0.60	0.73	0.89	2.7%
City of Greenville	28,154	34,320	41,835	3.24	3.95	4.81	12.95	15.79	19.24	59.5%
Total =	**18,315**	**26,784**	**38,188**	**4.98**	**6.32**	**8.08**	**19.92**	**25.29**	**32.34**	100.0%

CEDAR CREEK BASIN

Region	Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	**4,017**	**5,300**	**6,461**	**0.46**	**0.61**	**0.74**	**1.85**	**2.44**	**2.97**	100.0%

CANEY CREEK BASIN

Region	Population in Year			Average Flow Projection (MGD)			Peak Flow Projection (MGD)			% of Total Flow
	2010	2020	2030	2010	2020	2030	2010	2020	2030	
Cash SUD	2,007	2,471	3,043	0.23	0.28	0.35	0.92	1.14	1.40	77.9%
Campbell WSC	761	804	862	0.09	0.09	0.10	0.35	0.37	0.40	22.1%
Total =	**2,768**	**3,275**	**3,905**	**0.32**	**0.38**	**0.45**	**1.27**	**1.51**	**1.80**	100.0%

Sewer System:

WWTP Capacity based on planning year of 2030:
Design = 13.04 MGD
2-hr Peak = 52.17 MGD

Major Lift Stations Capacity based on planning year of 2030:
South Fork Sabine Lift Station = **15.06** MGD
Cowleech Fork Lift Station = **1.80** MGD
Fannin Creek Lift Station = **2.92** MGD
Little Creek Lift Station = **3.67** MGD

Best Case Discharge Limits: 10/15/3/6 **(BOD_5/TSS/NH_3-N/DO)** **(For Caddo Creek discharge)**
5/5/1/6/<1 **(BOD5/TSS/NH3-N/DO/TP)** **(For Lake Tawakoni discharge)**

Total System cost = **$171,637,000** (Caddo Creek Discharge)
$186,700,000 (Lake Tawakoni Discharge)

Study Participant	Flow Contributed (MGD)	% of Total Flow	Prorata Share of Total System Cost (Caddo Creek Discharge)	Prorata Share of Total System Cost (Lake Discharge)
City of Greenville	4.81	36.9%	$ 63,318,000	$ 68,875,000
Cash SUD	2.93	22.4%	$ 38,518,000	$ 41,898,000
Caddo Basin SUD	1.38	10.6%	$ 18,146,000	$ 19,739,000
City of Caddo Mills	0.22	1.7%	$ 2,922,000	$ 3,178,000
City of Quinlan	0.18	1.4%	$ 2,389,000	$ 2,598,000

APPENDIX D – Sewer Alternatives: Discharge Limit Comparison

APPENDIX - D

Sewer Alternatives Evaluation
Discharge Limits Comparison

ALTERNATIVE #1 : Multi Plant Regional System

S. No.	Facility	Discharge Water Body	Flow (MGD)	Lowest DO Value for Discharge Parameters (BOD/TSS/NH_3-N/DO)			Best Case Stream DO Criterion	Best Case Discharge Limit
				(10/15/3/6)	(7/7/2/6)	(5/5/1/6)		
1	South Fork Sabine River WWTP	South Fork Sabine River	3.76	4.66	5.24	5.77	3.0	(10/15/3/6)
2	Caddo Creek WWTP	Caddo Creek	8.08	3.34	4.34	5.28	3.0	(10/15/3/6)
3	Caney Creek WWTP	Cowleech Fork	1.19	3.16	4.44	5.42	3.0	(10/15/3/6)

ALTERNATIVE #1a : Multi Plant Regional System (Phased Approach)

S. No.	Facility	Discharge Water Body	Flow (MGD)	Lowest DO Value for Discharge Parameters (BOD/TSS/NH_3-N/DO)			Best Case Stream DO Criterion	Best Case Discharge Limit
				(10/15/3/6)	(7/7/2/6)	(5/5/1/6)		
1	Bearpen Creek WWTP	Bearpen Creek	0.79	N/A	N/A	N/A	3.0	(10/15/3/6)
2	East Caddo Creek WWTP	East Caddo Creek	3.04	N/A	N/A	N/A	3.0	(10/15/3/6)

ALTERNATIVE #2 : Local Plants to Serve Each Study Participant

S. No.	Facility	Discharge Water Body	Flow (MGD)	Lowest DO Value for Discharge Parameters (BOD/TSS/NH_3-N/DO)			Best Case Stream DO Criterion	Best Case Discharge Limit
				(10/15/3/6)	(7/7/2/6)	(5/5/1/6)		
1	Bearpen Creek WWTP	Bearpen Creek	0.79	4.3	4.95	5.55	3.0	(10/15/3/6)
2	Caddo Creek WWTP	Caddo Creek	0.95	4.08	4.8	5.46	3.0	(10/15/3/6)
3	Caddo Basin SUD WWTP	Elm Creek	0.85	4.15	4.84	5.49	3.0	(10/15/3/6)
4	Caney Creek WWTP	Cowleech Fork	0.71	4.14	5.14	6.01	3.0	(10/15/3/6)

ALTERNATIVE #3 : Single Plant Regional System

S. No.	Facility	Discharge Water Body	Flow (MGD)	Lowest DO Value for Discharge Parameters (BOD/TSS/NH_3-N/DO)			Best Case Stream DO Criterion	Best Case Discharge Limit
				(10/15/3/6)	(7/7/2/6)	(5/5/1/6)		
1	Caddo Creek WWTP	Caddo Creek	13.04	3.12	4.19	5.2	3.0	(10/15/3/6)
		Lake Tawakoni		N/A	N/A	N/A	6.0	(5/5/1/6)

APPENDIX E – Alternative 1: Opinion of Probable Capital Cost

APPENDIX - E

Opinion of Probable Capital Cost
ALTERNATIVE #1: Multi Plant Regional System

Regional Facility #1: South Fork Sabine River WWTP

Collection System Cost:	$	24,662,050
Treatment Plant Construction Cost:	$	21,102,500
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$	2,954,350
Land Acquistion & Permitting Cost:	$	192,000
Total Cost:	$	48,911,000

Region	% of Total Flow	Prorata share of Cost
Cash SUD	24.0%	$ 11,725,000
Poetry WSC	13.9%	$ 6,809,000
BHP WSC	8.3%	$ 4,048,000
City of Quinlan	4.8%	$ 2,358,000
Combined Consumers WSC	41.1%	$ 20,123,000
City of West Tawakoni	7.9%	$ 3,851,000
Total =	100.0%	$ 48,911,000

Regional Facility #2:Caddo Creek WWTP

Collection System Cost:	$	23,863,560
Treatment Plant Construction Cost:	$	40,400,000
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$	5,656,000
Land Acquistion & Permitting Cost:	$	335,000
Total Cost:	$	70,255,000

Region	% of Total Flow	Prorata share of Cost
Caddo Basin SUD	17.1%	$ 11,982,000
Cash SUD	11.5%	$ 8,094,000
BHP WSC	9.2%	$ 6,446,000
City of Caddo Mills	2.7%	$ 1,929,000
City of Greenville	59.5%	$ 41,807,000
Total =	100.0%	$ 70,255,000

Regional Facility #3:Caney Creek WWTP

Collection System Cost:	$	10,119,200
Treatment Plant Construction Cost:	$	6,842,500
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$	957,950
Land Acquistion & Permitting Cost:	$	126,000
Total Cost:	$	18,046,000

Region	% of Total Flow	Prorata share of Cost
Cash SUD	91.7%	$ 16,546,000
Campbell WSC	8.3%	$ 1,501,000
Total =	59.5%	$ 18,046,000

TOTAL SYSTEM COST: **$ 137,212,000**

Study Participant	Cost
City of Greenville	$ 41,807,000
Cash SUD	$ 36,365,000
Caddo Basin SUD	$ 11,982,000
City of Caddo Mills	$ 1,929,000
City of Quinlan	$ 2,358,000

APPENDIX E1 – Alternative 1a: Opinion of Probable Capital Cost

APPENDIX - E1

Opinion of Probable Capital Cost

ALTERNATIVE #1a: Multi Plant Regional System (Phased Approach)

Regional Facility #1: Bear Pen Creek WWTP

Collection System Cost:	$	9,978,080
Treatment Plant Construction Cost:	$	3,250,000
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$	455,000
Land Acquistion & Permitting Cost:	$	130,000
Total Cost:	$	13,814,000

Region	% of Total Flow	Prorata share of Cost
Cash SUD	100.0%	$ 13,814,000

Regional Facility #2: East Caddo Creek WWTP

Collection System Cost:	$	12,736,588
Treatment Plant Construction Cost:	$	11,500,000
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$	1,610,000
Land Acquistion & Permitting Cost:	$	177,000
Total Cost:	$	26,024,000

Region	% of Total Flow	Prorata share of Cost
Caddo Basin SUD	22.7%	$ 5,906,000
BHP WSC	34.7%	$ 9,023,000
Cash SUD	10.3%	$ 2,672,000
City of Greenville	32.4%	$ 8,426,000
Total =	100.0%	$ 26,024,000

COST: $ 39,838,000

Study Participant	Cost
City of Greenville	$ 8,426,000
Cash SUD	$ 16,486,000
Caddo Basin SUD	$ 5,906,000
BHP WSC	$ 9,023,000

APPENDIX F – Alternative 2: Opinion of Probable Capital Cost

APPENDIX - F

Opinion of Probable Capital Cost

ALTERNATIVE #2: local Treatment Plants to Serve Each Study Participant

Entity	WWTP	Capacity (MGD)	Construction Cost	Engineering	Land & Permitting	Total WWTP Cost
Cash SUD	Bearpen Creek WWTP	0.79	$ 5,135,000	$ 718,900	$ 130,000	**$ 5,983,900**
Cash SUD	Caddo Creek WWTP	0.95	$ 6,175,000	$ 864,500	$ 133,000	**$ 7,172,500**
Cash SUD	Caney Creek WWTP	0.7	$ 4,550,000	$ 637,000	$ 118,000	**$ 5,305,000**
Caddo Basin SUD	Elm Creek WWTP	0.85	$ 5,525,000	$ 773,500	$ 148,000	**$ 6,446,500**

TOTAL SYSTEM COSTS

Cash SUD WWTP	Collection System Cost	WWTP Cost	Total Cost
Bearpen Creek WWTP	**$ 9,880,080**	**$ 5,983,900**	**$ 5,983,900**
Caddo Creek WWTP	**$ 5,424,300**	**$ 7,172,500**	**$ 7,172,500**
Caney Creek WWTP	**$ 11,872,140**	**$ 5,305,000**	**$ 5,305,000**
			$18,461,400

Caddo Basin SUD	Collection System Cost	WWTP Cost	Total Cost
Elm Creek WWTP	**$ 8,543,640**	**$ 6,446,500**	**$14,990,140**

APPENDIX G – Alternative 3: Opinion of Probable Capital Cost

APPENDIX - G

Opinion of Probable Capital Cost
ALTERNATIVE #3: Single Plant Regional System

Caddo Creek WWTP

Discharge Water Body:	Caddo Creek	Lake Tawakoni
Collection System Cost:	$ 106,956,157	$ 121,724,932
Treatment Plant Construction Cost:	$ 56,385,000	$ 56,385,000
Treatment Plant - Engineering, Surveying & Const. Admin. Cost	$ 7,893,900	$ 7,893,900
Land Acquistion & Permitting Cost:	$ 401,000	$ 624,000
Total Cost:	$ 171,637,000	$ 186,628,000

Study Participant	Flow Contributed (MGD)	% of Total Flow	Prorata Share of Total System Cost (Caddo Creek Discharge)	Prorata Share of Total System Cost (Lake Discharge)
City of Greenville	4.81	36.9%	$ 63,318,000	$ 68,875,000
Cash SUD	2.93	22.4%	$ 38,518,000	$ 41,898,000
Caddo Basin SUD	1.38	10.6%	$ 18,146,000	$ 19,739,000
City of Caddo Mills	0.22	1.7%	$ 2,922,000	$ 3,178,000
City of Quinlan	0.18	1.4%	$ 2,389,000	$ 2,598,000

APPENDIX H – Sewer Alternative: Land Acquisition and Permitting Cost

APPENDIX - H

Sewer Alternatives Evaluation
Land Acquistion & Permitting Costs

ALTERNATIVE #1 : Multi Plant Regional System

S. No.	Facility	Discharge Water Body	Flow (MGD)	Land Area Required (sq. ft.)			Total Land Area Required (acre)	Total Misc. Costs
				Biological Unit	Other	Total		
1	South Fork Sabine River WWTP	South Fork Sabine River	3.76	225,600	140,000	365,600	10.5	$ 192,000
2	Caddo Creek WWTP	Caddo Creek	8.08	484,800	140,000	624,800	18.0	$ 335,000
3	Caney Creek WWTP	Cowleech Fork	1.19	71,400	140,000	211,400	6.1	$ 126,000

Notes: 400 x 300 for 2 MGD Biological Unit
Other: Headworks, Influent Lift Station (200 x 200), Disinfection (200 x 200), Solids Handling (200 x 200), Admin Building (100 x 100), Miscellaneous (100 x 100)
25% more area for buffer, easement and roads
TPDES Permit - $30,000
404 Permit - $25,000
Archaelogy Survey - $10,000 (for > 5 acres)
} For uncontested permitting process

ALTERNATIVE #1a : Multi Plant Regional System (Phased Approach)

S. No.	Facility	Discharge Water Body	Flow (MGD)	Land Area Required (sq. ft.)			Total Land Area Required (acre)	Total Misc. Costs
				Biological Unit	Other	Total		
1	Bearpen Creek WWTP	Bearpen Creek	0.79	47,577	140,000	187,577	5.4	$ 130,000
2	East Caddo Creek WWTP	East Caddo Creek	3.04	182,293	140,000	322,293	9.3	$ 177,000

ALTERNATIVE #2 : Local Plants to Serve Each Study Participant

S. No.	Facility	Discharge Water Body	Flow (MGD)	Land Area Required (sq. ft.)			Total Land Area Required (acre)	Total Misc. Costs
				Biological Unit	Other	Total		
1	Bearpen Creek WWTP	Bearpen Creek	0.79	47,400	140,000	187,400	5.4	$ 130,000
2	Caddo Creek WWTP	Caddo Creek	0.95	57,000	140,000	197,000	5.7	$ 133,000
3	Caddo Basin SUD WWTP	Elm Creek	0.85	51,000	140,000	191,000	5.5	$ 148,000
4	Caney WWTP	Cowleech Fork	0.71	42,600	140,000	182,600	5.2	$ 118,000

ALTERNATIVE #3 : Single Plant Regional System

S. No.	Facility	Discharge Water Body	Flow (MGD)	Land Area Required (sq. ft.)			Total Land Area Required (acre)	Total Misc. Costs
				Biological Unit	Other	Total		
1	Caddo Creek WWTP	Caddo Creek	13.04	782,400	189000	971,400	27.9	$ 401,000
		Lake Tawakoni	13.04	782,400	189000	971,400	27.9	$ 624,000

APPENDIX I – Detailed Cost Estimation Worksheets

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

Project Number	Alternative 1 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 1	**Regional WWTP #1 (3.67 MGD) South Fork Sabine River WWTP**					
1	6.2 MGD Lift Station ; 18" Force Main	Lift Station - New 6.2 MGD	1	LS	$1,418,000	$1,418,000
		32" Boring and Casing	-	LF	$385	$0
		18" Force Main	12,000	LF	$100	$1,200,000
		Pavement Repair	300	LF	$30	$9,000
		60" Diameter Manhole	15	EA	$5,000	$75,000
					Subtotal	$2,702,000
					Contingency @ 25%	$675,500
					Total Construction Cost	$3,377,500
					Engineering, Surveying & Geotech @ 12%	$405,300
					Total Project Cost	$3,782,800
2	12"/15" Sewer Line along /running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		15" Sanitary Sewer	7,250	LF	$85	$616,250
		48" Diameter Manhole	24	EA	$3,500	$84,000
		60" Diameter Manhole	15	EA	$5,000	$75,000
		Pavement Repair	1,650	LF	$30	$49,500
					Subtotal	$1,616,750
					Contingency @ 25%	$404,188
					Total Construction Cost	$2,020,938
					Engineering, Surveying & Geotech @ 12%	$242,513
					Total Project Cost	$2,263,450
3	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,000	LF	$66	$594,000
		20" Boring and Casing	450	LF	$240	$108,000
		48" Diameter Manhole	12	EA	$3,500	$42,000
		Pavement Repair	-	LF	$30	$0
					Subtotal	$744,000
					Contingency @ 25%	$186,000
					Total Construction Cost	$930,000
					Engineering, Surveying & Geotech @ 12%	$111,600
					Total Project Cost	$1,041,600
4	18"/21"/24" Sewer Line along / running parallel to	18" Sanitary Sewer	9,000	LF	$100	$900,000
		21" Sanitary Sewer	12,000	LF	$116	$1,392,000
		24" Sanitary Sewer	4,500	LF	$132	$594,000
		60" Diameter Manhole	32	EA	$5,000	$160,000
		32" Boring and Casing	-	LF	$385	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$3,059,500
					Contingency @ 25%	$764,875
					Total Construction Cost	$3,824,375
					Engineering, Surveying & Geotech @ 12%	$458,925
					Total Project Cost	$4,283,300
5	12" Sewer Line along / running parallel to	48" Diameter Manhole	48	EA	$3,500	$168,000
		12" Sanitary Sewer	24,000	LF	$66	$1,584,000
		20" Boring and Casing	-	LF	$240	$0
		Pavement Repair	900	LF	$30	$27,000
					Subtotal	$1,779,000
					Contingency @ 25%	$444,750
					Total Construction Cost	$2,223,750
					Engineering, Surveying & Geotech @ 12%	$266,850
					Total Project Cost	$2,490,600

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	11,500	LF	$66	$759,000
		48" Diameter Manhole	23	EA	$3,500	$80,500
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$961,000
					Contingency @ 25%	$240,250
					Total Construction Cost	$1,201,250
					Engineering, Surveying & Geotech @ 12%	$144,150
					Total Project Cost	$1,345,400
7	18"/21" Sewer Line along / running parallel to	18" Sanitary Sewer	8,500	LF	$100	$850,000
		21" Sanitary Sewer	10,500	LF	$116	$1,218,000
		32" Boring and Casing	-	LF	$385	$0
		34" Boring and Casing	-	EA	$410	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$2,081,500
					Contingency @ 25%	$520,375
					Total Construction Cost	$2,601,875
					Engineering, Surveying & Geotech @ 12%	$312,225
					Total Project Cost	$2,914,100
8	27" Sewer Line along / running parallel to	27" Sanitary Sewer	26,500	LF	$150	$3,975,000
		72" Diameter Manhole	34	EA	$7,500	$255,000
		Pavement Repair	900	LF	$30	$27,000
		40" Boring and Casing	-	LF	$480	$0
					Subtotal	$4,257,000
					Contingency @ 25%	$1,064,250
					Total Construction Cost	$5,321,250
					Engineering, Surveying & Geotech @ 12%	$638,550
					Total Project Cost	$5,959,800
9	27" Sewer Line along / running parallel to	27" Sanitary Sewer	19,000	LF	$150	$2,850,000
		72" Diameter Manhole	24	EA	$7,500	$180,000
		Pavement Repair	1,350	LF	$30	$40,500
		40" Boring and Casing	-	LF	$480	$0
					Subtotal	$3,070,500
					Contingency @ 25%	$767,625
					Total Construction Cost	$518,750
					Engineering, Surveying & Geotech @ 12%	$62,250
					Total Project Cost	$581,000
	Total System Costs for WWTP 1 of Alternative 1					**$24,662,050**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

WWTP 2 **Regional WWTP #2 (4.16 MGD)**
Caddo Creek WWTP

1	12"/18" Sewer Line along / running parallel to	12" Sanitary Sewer	10,000	LF	$66	$660,000
		18" Sanitary Sewer	16,500	LF	$100	$1,650,000
		48" Diameter Manhole	20	EA	$3,500	$70,000
		60" Diameter Manhole	21	EA	$5,000	$105,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$2,602,000
					Contingency @ 25%	$650,500
					Total Construction Cost	$3,252,500
					Engineering, Surveying & Geotech @ 12%	$390,300
					Total Project Cost	$3,642,800
2	12"/15" Sewer Line along / running parallel to	12" Sanitary Sewer	26,500	LF	$66	$1,749,000
		15" Sanitary Sewer	39,000	LF	$85	$3,315,000
		48" Diameter Manhole	78	EA	$3,500	$273,000
		60" Diameter Manhole	53	EA	$5,000	$265,000
		Pavement Repair	1,650	LF	$30	$49,500
		20" Boring and Casing	450	LF	$240	$108,000
		26" Boring and Casing	900	LF	$312	$280,800
					Subtotal	$6,040,300
					Contingency @ 25%	$1,510,075
					Total Construction Cost	$7,550,375
					Engineering, Surveying & Geotech @ 12%	$906,045
					Total Project Cost	$8,456,420
3	21" Sewer Line along / running parallel to	21" Sanitary Sewer	7,500	LF	$116	$870,000
		60" Diameter Manhole	10	EA	$5,000	$50,000
		Pavement Repair	150	LF	$30	$4,500
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$924,500
					Contingency @ 25%	$231,125
					Total Construction Cost	$1,155,625
					Engineering, Surveying & Geotech @ 12%	$138,675
					Total Project Cost	$1,294,300
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$885,000
					Contingency @ 25%	$221,250
					Total Construction Cost	$1,106,250
					Engineering, Surveying & Geotech @ 12%	$132,750
					Total Project Cost	$1,239,000
5	21" Sewer Line along / running parallel to	21" Sanitary Sewer	5,500	LF	$116	$638,000
		60" Diameter Manhole	7	EA	$5,000	$35,000
		Pavement Repair	-	LF	$30	$0
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$673,000
					Contingency @ 25%	$168,250
					Total Construction Cost	$841,250
					Engineering, Surveying & Geotech @ 12%	$100,950
					Total Project Cost	$942,200

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	52,500	LF	$66	$3,465,000
		48" Diameter Manhole	105	EA	$3,500	$367,500
		Pavement Repair	750	LF	$30	$22,500
		20" Boring and Casing	1,350	LF	$240	$324,000
					Subtotal	$4,179,000
					Contingency @ 25%	$1,044,750
					Total Construction Cost	$5,223,750
					Engineering, Surveying & Geotech @ 12%	$626,850
					Total Project Cost	$5,850,600
7	21" Sewer Line along / running parallel to	21" Sanitary Sewer	10,500	LF	$116	$1,218,000
		60" Diameter Manhole	21	EA	$5,000	$105,000
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,327,500
					Contingency @ 25%	$331,875
					Total Construction Cost	$1,659,375
					Engineering, Surveying & Geotech @ 12%	$199,125
					Total Project Cost	$1,858,500
8	24" Sewer Line along / running parallel to	24" Sanitary Sewer	1,300	LF	$132	$171,600
		60" Diameter Manhole	2	EA	$5,000	$10,000
		Pavement Repair	300	LF	$30	$9,000
		38" Boring and Casing	-	LF	$456	$0
					Subtotal	$190,600
					Contingency @ 25%	$47,650
					Total Construction Cost	$238,250
					Engineering, Surveying & Geotech @ 12%	$28,590
					Total Project Cost	$266,840
9	36" Sewer Line along / running parallel to	36" Sanitary Sewer	1,000	LF	$216	$216,000
		72" Diameter Manhole	1	EA	$7,500	$7,500
		Pavement Repair	-	LF	$30	$0
		50" Boring and Casing	-	LF	$600	$0
					Subtotal	$223,500
					Contingency @ 25%	$55,875
					Total Construction Cost	$279,375
					Engineering, Surveying & Geotech @ 12%	$33,525
					Total Project Cost	$312,900

Total System Costs for WWTP 2 of Alternative 1	**$23,863,560**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

WWTP 3 **Regional WWTP #3 (1.19 MGD)**
Caney Creek WWTP

1	12" Sewer Line along / running parallel to	12" Sanitary Sewer	15,500	LF	$66	$1,023,000
		48" Diameter Manhole	31	EA	$3,500	$108,500
		Pavement Repair	900	LF	$30	$27,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,158,500
					Contingency @ 25%	$289,625
					Total Construction Cost	$1,448,125
					Engineering, Surveying & Geotech @ 12%	$173,775
					Total Project Cost	$1,621,900
2	0.57 MGD Lift Station ; __" Force Main	Lift Station - New 0.57 MGD	1	LS	$185,250	$185,250
		20" Boring and Casing	-	LF	$240	$0
		6" Force Main	11,000	LF	$35	$385,000
		Pavement Repair	300	LF	$30	$9,000
		48" Diameter Manhole	22	EA	$3,500	$77,000
					Subtotal	$656,250
					Contingency @ 25%	$164,063
					Total Construction Cost	$820,313
					Engineering, Surveying & Geotech @ 12%	$98,438
					Total Project Cost	$918,750
2	12" Sewer Line along / running parallel to	12" Sanitary Sewer	6,500	LF	$66	$429,000
		48" Diameter Manhole	13	EA	$3,500	$45,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$483,500
					Contingency @ 25%	$120,875
					Total Construction Cost	$604,375
					Engineering, Surveying & Geotech @ 12%	$72,525
					Total Project Cost	$676,900
3	1.02 MGD Lift Station ; __" Force Main	Lift Station - New 1 MGD	1	LS	$325,000	$325,000
		20" Boring and Casing	-	LF	$240	$0
		8" Force Main	16,000	LF	$45	$720,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	32	EA	$3,500	$112,000
					Subtotal	$1,179,500
					Contingency @ 25%	$294,875
					Total Construction Cost	$1,474,375
					Engineering, Surveying & Geotech @ 12%	$176,925
					Total Project Cost	$1,651,300
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	15,500	LF	$66	$1,023,000
		48" Diameter Manhole	31	EA	$3,500	$108,500
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,136,000
					Contingency @ 25%	$284,000
					Total Construction Cost	$1,420,000
					Engineering, Surveying & Geotech @ 12%	$170,400
					Total Project Cost	$1,590,400
5	3.0 MGD Lift Station ; 12" Force Main (from Cedar Creek sewer basin across the divide to WWTP in Caney Creek sewer basin)	Lift Station - New 3.0 MGD	1	LS	$693,750	$693,750
		20" Boring and Casing	-	LF	$240	$0
		12" Force Main	9,000	LF	$66	$594,000
		Pavement Repair	450	LF	$30	$13,500
		48" Diameter Manhole	18	EA	$3,500	$63,000
					Subtotal	$1,364,250
					Contingency @ 25%	$341,063
					Total Construction Cost	$1,705,313
					Engineering, Surveying & Geotech @ 12%	$204,638

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1: Multi Plant Regional System

Opinions Of Probable Project Cost

					Total Project Cost	$1,909,950
6	12" Sewer Line along / running parallel	12" Sanitary Sewer	17,000	LF	$66	$1,122,000
	to	48" Diameter Manhole	34	EA	$3,500	$119,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,250,000
					Contingency @ 25%	$312,500
					Total Construction Cost	$1,562,500
					Engineering, Surveying & Geotech @ 12%	$187,500
					Total Project Cost	$1,750,000
	Total System Costs for WWTP 4 of Alternative 1					**$10,119,200**
	Total Collection System Cost for Alternative 1					**$58,644,810**

WWTP Construction Costs

1	3.67 MGD	$21,102,500	(South Fork Sabine River WWTP)
2	8.08 MGD	$40,400,000	(Caddo Creek WWTP)
3	1.19 MGD	$6,842,500	(Caney Creek WWTP)
	Total WWTP Construction Cost:	**$68,345,000**	
	Engineering & Surveying Cost	**$9,568,300**	
	Land Acquistion and Permitting Costs:	**$653,000**	
	Total WWTP Cost	**$78,566,300**	

Total Cost for Alternative 1: **$137,212,000**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1a: Multi Plant Regional System (Phased Approach)

Opinions Of Probable Project Cost

Project Number	Alternative 1 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 1	**Regional WWTP #1 (0.79 MGD) Bearpen Creek WWTP**					
1	12" Sewer Line along / running parallel to	12" Sanitary Sewer	7,000	LF	$66	$462,000
		48" Diameter Manhole	14	EA	$3,500	$49,000
		Pavement Repair	-	LF	$30	$0
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$619,000
					Contingency @ 25%	$154,750
					Total Construction Cost	$773,750
					Engineering, Surveying & Geotech @ 12%	$92,850
					Total Project Cost	$866,600
2	0.44 MGD Lift Station ; 8" Force Main	Lift Station - New 0.44 MGD	1	LF	$611,600	$611,600
		8" Force Main	17,500	LF	$45	$787,500
		48" Diameter Manhole	35	EA	$3,500	$122,500
		Pavement Repair	900	LF	$30	$27,000
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$1,548,600
					Contingency @ 25%	$387,150
					Total Construction Cost	$1,935,750
					Engineering, Surveying & Geotech @ 12%	$232,290
					Total Project Cost	$2,168,040
3	12" Sewer line along / running parallel to	12" Sanitary Sewer	12,500	LF	$66	$825,000
		48" Diameter Manhole	25	EA	$3,500	$87,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$1,029,500
					Contingency @ 25%	$257,375
					Total Construction Cost	$1,286,875
					Engineering, Surveying & Geotech @ 12%	$154,425
					Total Project Cost	$1,441,300
4	12" Sewer line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$997,500
					Contingency @ 25%	$249,375
					Total Construction Cost	$1,246,875
					Engineering, Surveying & Geotech @ 12%	$149,625
					Total Project Cost	$1,396,500
5	18" Sewer Line along / running parallel to	18" Sanitary Sewer	9,000	LF	$100	$900,000
		60" Diameter Manhole	12	EA	$5,000	$60,000
		Pavement Repair	150	LF	$30	$4,500
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$964,500
					Contingency @ 25%	$241,125
					Total Construction Cost	$1,205,625
					Engineering, Surveying & Geotech @ 12%	$144,675
					Total Project Cost	$1,350,300

6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,000	LF	$66	$594,000
		72" Diameter Manhole	12	EA	$7,500	$90,000
		Pavement Repair	450	LF	$30	$13,500
		40" Boring and Casing	450	LF	$480	$216,000
					Subtotal	$913,500
					Contingency @ 25%	$228,375
					Total Construction Cost	$1,141,875
					Engineering, Surveying & Geotech @ 12%	$137,025
					Total Project Cost	$1,278,900
7	0.94 MGD Lift Station ; 8" Force Main	Lift Station - New 0.94 MGD	1	LF	$681,600	$681,600
		8" Force Main	7,000	LF	$45	$315,000
		48" Diameter Manhole	14	EA	$3,500	$49,000
		Pavement Repair	300	LF	$30	$9,000
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$1,054,600
					Contingency @ 25%	$263,650
					Total Construction Cost	$1,318,250
					Engineering, Surveying & Geotech @ 12%	$158,190
					Total Project Cost	$1,476,440
	Total System Costs for WWTP 1 of Alternative 1					**$9,978,080**

WWTP 2 **Regional WWTP #2 (3.04 MGD)**
East Caddo Creek WWTP

1	12"/18" Sewer Line along (BHP)	12" Sanitary Sewer	10,000	LF	$66	$660,000
		18" Sanitary Sewer	16,500	LF	$100	$1,650,000
		48" Diameter Manhole	20	EA	$3,500	$70,000
		60" Diameter Manhole	21	EA	$5,000	$105,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$2,602,000
					Contingency @ 25%	$650,500
					Total Construction Cost	$3,252,500
					Engineering, Surveying & Geotech @ 12%	$390,300
					Total Project Cost	$3,642,800
2	12" Sewer Line to City of Caddo Mills WWTP	12" Sanitary Sewer	34,500	LF	$66	$2,277,000
		48" Diameter Manhole	69	EA	$3,500	$241,500
		Pavement Repair	1,650	LF	$30	$49,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$2,676,000
					Contingency @ 25%	$669,000
					Total Construction Cost	$3,345,000
					Engineering, Surveying & Geotech @ 12%	$401,400
					Total Project Cost	$3,746,400
3	18" Sewer Line along / running parallel to	18" Sanitary Sewer	7,500	LF	$100	$750,000
		60" Diameter Manhole	9	EA	$5,000	$46,875
		Pavement Repair	150	LF	$30	$4,500
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$801,375
					Contingency @ 25%	$200,344
					Total Construction Cost	$1,001,719
					Engineering, Surveying & Geotech @ 12%	$120,206
					Total Project Cost	$1,121,925
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$885,000
					Contingency @ 25%	$221,250
					Total Construction Cost	$1,106,250
					Engineering, Surveying & Geotech @ 12%	$132,750
					Total Project Cost	$1,239,000

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 1a: Multi Plant Regional System (Phased Approach)

Opinions Of Probable Project Cost

5	12" Sewer Line (Caddo Basin SUD)	12" Sanitary Sewer	52,500	LF	$66	$3,465,000
		48" Diameter Manhole	105	EA	$3,500	$367,500
		Pavement Repair	750	LF	$30	$22,500
		20" Boring and Casing	1,350	LF	$240	$324,000
					Subtotal	$4,179,000
					Contingency @ 25%	$1,044,750
					Total Construction Cost	$5,223,750
					Engineering, Surveying & Geotech @ 12%	$626,850
					Total Project Cost	$5,850,600
6	12" Sewer Line (Greenville)	12" Sanitary Sewer	10,500	LF	$66	$693,000
		48" Diameter Manhole	21	EA	$3,500	$73,500
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$771,000
					Contingency @ 25%	$192,750
					Total Construction Cost	$963,750
					Engineering, Surveying & Geotech @ 12%	$115,650
					Total Project Cost	$1,079,400
7	4.2 MGD Lift Station ; 12" Force Main (BHP)	Lift Station - New 4.22 MGD	1	LS	$1,173,688	$1,173,688
		20" Boring and Casing	-	LF	$240	$0
		12" Force Main	12,500	LF	$66	$825,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	32	EA	$3,500	$112,000
					Subtotal	$2,133,188
					Contingency @ 25%	$533,297
					Total Construction Cost	$2,666,484
					Engineering, Surveying & Geotech @ 12%	$319,978
					Total Project Cost	$2,986,463

	Total System Costs for WWTP 2 of Alternative 1	**$12,736,588**
	Total Collection System Cost for Alternative 1	**$22,714,668**

WWTP Construction Costs

1	2 MGD	$11,500,000	(East Caddo Creek WWTP)
2	0.5 MGD	$3,250,000	(Bearpen Creek WWTP)
	Total WWTP Construction Cost:	**$14,750,000**	
	Engineering & Surveying Cost	**$2,065,000**	
	Land Acquistion and Permitting Costs:	**$307,000**	
	Total WWTP Cost	**$17,122,000**	

Total Cost for Alternative 1: **$39,837,000**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 2: Local Plants to Serve Each Study Participants

Opinions Of Probable Project Cost

Project Number	Alternative 2 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 1	**Regional WWTP #1 (0.79 MGD) Bearpen Creek WWTP**					
1	12" Sewer Line along / running parallel to	12" Sanitary Sewer	7,000	LF	$66	$462,000
		48" Diameter Manhole	14	EA	$3,500	$49,000
		Pavement Repair	-	LF	$30	$0
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$619,000
					Contingency @ 25%	$154,750
					Total Construction Cost	$773,750
					Engineering, Surveying & Geotech @ 12%	$92,850
					Total Project Cost	$866,600
2	0.44 MGD Lift Station ; __" Force Main	Lift Station - New 0.44 MGD	1	LF	$611,600	$611,600
		8" Force Main	17,500	LF	$45	$787,500
		48" Diameter Manhole	35	EA	$3,500	$122,500
		Pavement Repair	900	LF	$30	$27,000
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$1,548,600
					Contingency @ 25%	$387,150
					Total Construction Cost	$1,935,750
					Engineering, Surveying & Geotech @ 12%	$232,290
					Total Project Cost	$2,168,040
3	12" Sewer line along / running parallel to	12" Sanitary Sewer	12,500	LF	$66	$825,000
		48" Diameter Manhole	25	EA	$3,500	$87,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$1,029,500
					Contingency @ 25%	$257,375
					Total Construction Cost	$1,286,875
					Engineering, Surveying & Geotech @ 12%	$154,425
					Total Project Cost	$1,441,300
4	12" Sewer line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$997,500
					Contingency @ 25%	$249,375
					Total Construction Cost	$1,246,875
					Engineering, Surveying & Geotech @ 12%	$149,625
					Total Project Cost	$1,396,500
5	18" Sewer Line along / running parallel to	18" Sanitary Sewer	9,000	LF	$100	$900,000
		60" Diameter Manhole	12	EA	$5,000	$60,000
		Pavement Repair	150	LF	$30	$4,500
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$964,500
					Contingency @ 25%	$241,125
					Total Construction Cost	$1,205,625
					Engineering, Surveying & Geotech @ 12%	$144,675
					Total Project Cost	$1,350,300
6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,000	LF	$66	$594,000
		72" Diameter Manhole	12	EA	$7,500	$90,000
		Pavement Repair	450	LF	$30	$13,500
		40" Boring and Casing	450	LF	$480	$216,000
					Subtotal	$913,500
					Contingency @ 25%	$228,375
					Total Construction Cost	$1,141,875
					Engineering, Surveying & Geotech @ 12%	$137,025
					Total Project Cost	$1,278,900
7	0.94 MGD Lift Station ; __" Force Main	Lift Station - New 0.94 MGD	1	LF	$681,600	$681,600
		6" Force Main	7,000	LF	$35	$245,000
		48" Diameter Manhole	14	EA	$3,500	$49,000
		Pavement Repair	300	LF	$30	$9,000
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$984,600
					Contingency @ 25%	$246,150
					Total Construction Cost	$1,230,750
					Engineering, Surveying & Geotech @ 12%	$147,690
					Total Project Cost	$1,378,440
	Total System Costs for WWTP 1 of Alternative 2					**$9,880,080**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 2: Local Plants to Serve Each Study Participants

Opinions Of Probable Project Cost

Project Number	Alternative 2 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 2	**Regional WWTP #2 (0.95 MGD) Caddo Creek WWTP**					
1	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,500	LF	$66	$627,000
		48" Diameter Manhole	19	EA	$3,500	$66,500
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$707,000
					Contingency @ 25%	$176,750
					Total Construction Cost	$883,750
					Engineering, Surveying & Geotech @ 12%	$106,050
					Total Project Cost	$989,800
2	21" Sewer Line along / running parallel to	21" Sanitary Sewer	1,500	LF	$116	$174,000
		60" Diameter Manhole	2	EA	$5,000	$10,000
		Pavement Repair	-	LF	$30	$0
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$184,000
					Contingency @ 25%	$46,000
					Total Construction Cost	$230,000
					Engineering, Surveying & Geotech @ 12%	$27,600
					Total Project Cost	$257,600
3	12" Sewer Line along / running parallel to	12" Sanitary Sewer	28,000	LF	$66	$1,848,000
		48" Diameter Manhole	56	EA	$3,500	$196,000
		Pavement Repair	750	LF	$30	$22,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$2,066,500
					Contingency @ 25%	$516,625
					Total Construction Cost	$2,583,125
					Engineering, Surveying & Geotech @ 12%	$309,975
					Total Project Cost	$2,893,100
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	12,500	LF	$66	$825,000
		48" Diameter Manhole	25	EA	$3,500	$87,500
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$917,000
					Contingency @ 25%	$229,250
					Total Construction Cost	$1,146,250
					Engineering, Surveying & Geotech @ 12%	$137,550
					Total Project Cost	$1,283,800
	Total System Costs for WWTP 2 of Alternative 2					**$5,424,300**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 2: Local Plants to Serve Each Study Participants

Opinions Of Probable Project Cost

Project Number	Alternative 2 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 3	**Regional WWTP #3 (0.7 MGD) Caney Creek WWTP**					
1	0.57 MGD Lift Station ; __" Force Main	Lift Station - New 0.57 MGD	1	LS	$629,800	$629,800
		20" Boring and Casing		LF	$240	$0
		6" Force Main	16,000	LF	$35	$560,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	32	EA	$3,500	$112,000
					Subtotal	$1,324,300
					Contingency @ 25%	$331,075
					Total Construction Cost	$1,655,375
					Engineering, Surveying & Geotech @ 12%	$198,645
					Total Project Cost	$1,854,020
2	12" Sewer Line along / running parallel to	12" Sanitary Sewer	16,000	LF	$66	$1,056,000
		48" Diameter Manhole	32	EA	$3,500	$112,000
		Pavement Repair	1,050	LF	$30	$31,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,199,500
					Contingency @ 25%	$299,875
					Total Construction Cost	$1,499,375
					Engineering, Surveying & Geotech @ 12%	$179,925
					Total Project Cost	$1,679,300
3	1.02 MGD Lift Station ; __" Force Main	Lift Station - New 1.02 MGD	1	LS	$692,800	$692,800
		20" Boring and Casing	-	LF	$240	$0
		8" Force Main	16,000	LF	$45	$720,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	32	EA	$3,500	$112,000
					Subtotal	$1,547,300
					Contingency @ 25%	$386,825
					Total Construction Cost	$1,934,125
					Engineering, Surveying & Geotech @ 12%	$232,095
					Total Project Cost	$2,166,220
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	6,500	LF	$66	$429,000
		48" Diameter Manhole	13	EA	$3,500	$45,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$483,500
					Contingency @ 25%	$120,875
					Total Construction Cost	$604,375
					Engineering, Surveying & Geotech @ 12%	$72,525
					Total Project Cost	$676,900
5	2.68 MGD Lift Station ; __" Force Main	Lift Station - New 1.02 MGD	1	LS	$619,750	$619,750
		20" Boring and Casing	-	LF	$240	$0
		8" Force Main	9,000	LF	$45	$405,000
		Pavement Repair	450	LF	$30	$13,500
		48" Diameter Manhole	18	EA	$3,500	$63,000
					Subtotal	$1,101,250
					Contingency @ 25%	$275,313
					Total Construction Cost	$1,376,563
					Engineering, Surveying & Geotech @ 12%	$165,188
					Total Project Cost	$1,541,750
6	3.0 MGD Lift Station ; __" Force Main	Lift Station - New 3 MGD	1	LS	$693,750	$693,750
		20" Boring and Casing	-	LF	$240	$0
		12" Force Main	11,500	LF	$66	$759,000
		Pavement Repair	150	LF	$30	$4,500
		48" Diameter Manhole	23	EA	$3,500	$80,500
					Subtotal	$1,537,750
					Contingency @ 25%	$384,438
					Total Construction Cost	$1,922,188
					Engineering, Surveying & Geotech @ 12%	$230,663
					Total Project Cost	$2,152,850
7	12" Sewer Line along / running parallel to	12" Sanitary Sewer	17,500	LF	$66	$1,155,000
		48" Diameter Manhole	35	EA	$3,500	$122,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,286,500
					Contingency @ 25%	$321,625
					Total Construction Cost	$1,608,125
					Engineering, Surveying & Geotech @ 12%	$192,975
					Total Project Cost	$1,801,100
	Total System Costs for WWTP 3 of Alternative 2					**$11,872,140**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 2: Local Plants to Serve Each Study Participants

Opinions Of Probable Project Cost

Project Number	Alternative 2 Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
WWTP 4	**Regional WWTP #5 (0.85 MGD) Caddo Basin SUD WWTP**					
1	12" Sewer Line along / running parallel to	12" Sanitary Sewer	26,000	LF	$66	$1,716,000
		48" Diameter Manhole	52	EA	$3,500	$182,000
		Pavement Repair	1,050	LF	$30	$31,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,929,500
					Contingency @ 25%	$482,375
					Total Construction Cost	$2,411,875
					Engineering, Surveying & Geotech @ 12%	$289,425
					Total Project Cost	$2,701,300
2	2.08 MGD Lift Station ; __" Force Main	Lift Station - New 2.08 MGD	1	LS	$841,200	$841,200
		20" Boring and Casing	-	LF	$240	$0
		10" Force Main	12,500	LF	$55	$687,500
		Pavement Repair	600	LF	$30	$18,000
		48" Diameter Manhole	25	EA	$3,500	$87,500
					Subtotal	$1,634,200
					Contingency @ 25%	$408,550
					Total Construction Cost	$2,042,750
					Engineering, Surveying & Geotech @ 12%	$245,130
					Total Project Cost	$2,287,880
3	1.31 MGD Lift Station ; __" Force Main	Lift Station - New1.31 MGD	1	LS	$733,400	$733,400
		20" Boring and Casing	-	LF	$240	$0
		8" Force Main	7,000	LF	$45	$315,000
		Pavement Repair	300	LF	$30	$9,000
		48" Diameter Manhole	14	EA	$3,500	$49,000
					Subtotal	$1,106,400
					Contingency @ 25%	$276,600
					Total Construction Cost	$1,383,000
					Engineering, Surveying & Geotech @ 12%	$165,960
					Total Project Cost	$1,548,960
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	19,500	LF	$66	$1,287,000
		48" Diameter Manhole	39	EA	$3,500	$136,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,432,500
					Contingency @ 25%	$358,125
					Total Construction Cost	$1,790,625
					Engineering, Surveying & Geotech @ 12%	$214,875
					Total Project Cost	$2,005,500
	Total System Costs for WWTP 4 of Alternative 2					**$8,543,640**

SUD	WWTP Costs		Construction	Engineering	Land & Permitting Cost	Total WWTP Cost
Cash	1	0.79 MGD	$ 5,135,000	$ 718,900	$ 130,000	**$ 5,983,900**
Cash	2	0.95 MGD	$ 6,175,000	$ 864,500	$ 133,000	**$ 7,172,500**
Cash	3	0.7 MGD	$ 4,550,000	$ 637,000	$ 118,000	**$ 5,305,000**
Caddo	4	0.85 MGD	$ 5,525,000	$ 773,500	$ 148,000	**$ 6,446,500**

Total System Cost

	Collection System Cost	WWTP Cost	Total Cost
1 **Cash SUD (Three WWTP)**			
Bearpen Creek WWTP (0.79 MGD)	**$ 9,880,080**	**$ 5,983,900**	**$ 15,863,980**
Caddo Creek WWTP (0.95 MGD)	**$ 5,424,300**	**$ 7,172,500**	**$ 12,596,800**
Caney Creek WWTP (0.67 MGD)	**$ 11,872,140**	**$ 5,305,000**	**$ 17,177,140**
		Grand Total:	**$45,637,920**
2 **Caddo Basin SUD**			
Caddo Basin SUD WWTP (0.85 MGD)	**$ 8,543,640**	**$ 6,446,500**	**$14,990,140**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 1	**South Fork Sabine Creek Basin**					
1	15.06 MGD South Fork Lift Station ; 24" Force Main	Lift Station - New 15.06 MGD	1	LS	$2,448,384	$2,448,384
		38" Boring and Casing	450	LF	$456	$205,200
		24" Force Main	32,500	LF	$132	$4,290,000
		Pavement Repair	2,100	LF	$30	$63,000
		60" Diameter Manhole	41	EA	$5,000	$203,125
					Subtotal	$7,209,709
					Contingency @ 25%	$1,802,427
					Total Construction Cost	$9,012,136
					Engineering, Surveying & Geotech @ 12%	$1,081,456
					Total Project Cost	$10,093,593
2	12"/15" Sewer Line along /running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		15" Sanitary Sewer	7,250	LF	$85	$616,250
		48" Diameter Manhole	24	EA	$3,500	$84,000
		60" Diameter Manhole	15	EA	$5,000	$72,500
		Pavement Repair	1,650	LF	$30	$49,500
					Subtotal	$1,614,250
					Contingency @ 25%	$403,563
					Total Construction Cost	$2,017,813
					Engineering, Surveying & Geotech @ 12%	$242,138
					Total Project Cost	$2,259,950
3	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,000	LF	$66	$594,000
		20" Boring and Casing	450	LF	$240	$108,000
		48" Diameter Manhole	18	EA	$3,500	$63,000
		Pavement Repair	-	LF	$30	$0
					Subtotal	$765,000
					Contingency @ 25%	$191,250
					Total Construction Cost	$956,250
					Engineering, Surveying & Geotech @ 12%	$114,750
					Total Project Cost	$1,071,000
4	18"/21"/24" Sewer Line along / running parallel to	18" Sanitary Sewer	9,000	LF	$100	$900,000
		21" Sanitary Sewer	12,000	LF	$116	$1,392,000
		24" Sanitary Sewer	4,500	LF	$132	$594,000
		60" Diameter Manhole	32	EA	$5,000	$159,375
		32" Boring and Casing	-	LF	$385	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$3,058,875
					Contingency @ 25%	$764,719
					Total Construction Cost	$3,823,594
					Engineering, Surveying & Geotech @ 12%	$458,831
					Total Project Cost	$4,282,425
5	12" Sewer Line along / running parallel to	48" Diameter Manhole	48	EA	$3,500	$168,000
		12" Sanitary Sewer	24,000	LF	$66	$1,584,000
		20" Boring and Casing	450	LF	$240	$108,000
		Pavement Repair	900	LF	$30	$27,000
					Subtotal	$1,887,000
					Contingency @ 25%	$471,750
					Total Construction Cost	$2,358,750
					Engineering, Surveying & Geotech @ 12%	$283,050
					Total Project Cost	$2,641,800

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	11,500	LF	$66	$759,000
		48" Diameter Manhole	23	EA	$3,500	$80,500
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$961,000
					Contingency @ 25%	$240,250
					Total Construction Cost	$1,201,250
					Engineering, Surveying & Geotech @ 12%	$144,150
					Total Project Cost	$1,345,400
7	18"/21" Sewer Line along / running parallel to	18" Sanitary Sewer	8,500	LF	$100	$850,000
		21" Sanitary Sewer	10,500	LF	$116	$1,218,000
		60" Diameter Manhole	24	LF	$5,000	$118,750
		32" Boring and Casing	-	LF	$385	$0
		34" Boring and Casing	-	EA	$410	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$2,200,250
					Contingency @ 25%	$550,063
					Total Construction Cost	$2,750,313
					Engineering, Surveying & Geotech @ 12%	$330,038
					Total Project Cost	$3,080,350
8	24" Sewer Line along / running parallel to	24" Sanitary Sewer	16,500	LF	$132	$2,178,000
		60" Diameter Manhole	21	EA	$5,000	$103,125
		Pavement Repair	150	LF	$30	$4,500
		38" Boring and Casing	450	LF	$456	$205,200
					Subtotal	$2,490,825
					Contingency @ 25%	$622,706
					Total Construction Cost	$3,113,531
					Engineering, Surveying & Geotech @ 12%	$373,624
					Total Project Cost	$3,487,155
9	27" Sewer Line along / running parallel to	27" Sanitary Sewer	26,500	LF	$150	$3,975,000
		72" Diameter Manhole	34	EA	$7,500	$255,000
		Pavement Repair	900	LF	$30	$27,000
		40" Boring and Casing	900	LF	$480	$432,000
					Subtotal	$4,689,000
					Contingency @ 25%	$1,172,250
					Total Construction Cost	$5,861,250
					Engineering, Surveying & Geotech @ 12%	$703,350
					Total Project Cost	$6,564,600
10	27" Sewer Line along / running parallel to	27" Sanitary Sewer	19,000	LF	$150	$2,850,000
		72" Diameter Manhole	24	EA	$7,500	$180,000
		Pavement Repair	1,350	LF	$30	$40,500
		40" Boring and Casing	-	LF	$480	$0
					Subtotal	$3,070,500
					Contingency @ 25%	$767,625
					Total Construction Cost	$3,838,125
					Engineering, Surveying & Geotech @ 12%	$460,575
					Total Project Cost	$4,298,700
	Total System Costs for Basin 1 of Alternative 3a					**$39,124,973**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 2	**West & East Caddo Basins**					
1	12"/18" Sewer Line along / running parallel to	12" Sanitary Sewer	10,000	LF	$66	$660,000
		18" Sanitary Sewer	16,500	LF	$100	$1,650,000
		48" Diameter Manhole	20	EA	$3,500	$70,000
		60" Diameter Manhole	21	EA	$5,000	$105,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$2,602,000
					Contingency @ 25%	$650,500
					Total Construction Cost	$3,252,500
					Engineering, Surveying & Geotech @ 12%	$390,300
					Total Project Cost	$3,642,800
2	12"/15" Sewer Line along / running parallel to	12" Sanitary Sewer	26,500	LF	$66	$1,749,000
		15" Sanitary Sewer	39,000	LF	$85	$3,315,000
		48" Diameter Manhole	53	EA	$3,500	$185,500
		60" Diameter Manhole	78	EA	$5,000	$390,000
		Pavement Repair	1,650	LF	$30	$49,500
		20" Boring and Casing	-	LF	$240	$0
		26" Boring and Casing	450	LF	$312	$140,400
					Subtotal	$5,829,400
					Contingency @ 25%	$1,457,350
					Total Construction Cost	$7,286,750
					Engineering, Surveying & Geotech @ 12%	$874,410
					Total Project Cost	$8,161,160
3	21" Sewer Line along / running parallel to	21" Sanitary Sewer	7,500	LF	$116	$870,000
		60" Diameter Manhole	10	EA	$5,000	$50,000
		Pavement Repair	150	LF	$30	$4,500
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$924,500
					Contingency @ 25%	$231,125
					Total Construction Cost	$1,155,625
					Engineering, Surveying & Geotech @ 12%	$138,675
					Total Project Cost	$1,294,300
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$885,000
					Contingency @ 25%	$221,250
					Total Construction Cost	$1,106,250
					Engineering, Surveying & Geotech @ 12%	$132,750
					Total Project Cost	$1,239,000
5	21" Sewer Line along / running parallel to	21" Sanitary Sewer	7,500	LF	$116	$870,000
		60" Diameter Manhole	10	EA	$5,000	$50,000
		Pavement Repair	-	LF	$30	$0
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$920,000
					Contingency @ 25%	$230,000
					Total Construction Cost	$1,150,000
					Engineering, Surveying & Geotech @ 12%	$138,000
					Total Project Cost	$1,288,000

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	52,500	LF	$66	$3,465,000
		48" Diameter Manhole	105	EA	$3,500	$367,500
		Pavement Repair	750	LF	$30	$22,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$3,963,000
					Contingency @ 25%	$990,750
					Total Construction Cost	$4,953,750
					Engineering, Surveying & Geotech @ 12%	$594,450
					Total Project Cost	$5,548,200
7	36" Sewer Line along / running parallel to	36" Sanitary Sewer	29,500	LF	$216	$6,372,000
		72" Diameter Manhole	30	EA	$7,500	$221,250
		Pavement Repair	1,050	LF	$30	$31,500
		50" Boring and Casing	-	LF	$600	$0
					Subtotal	$6,624,750
					Contingency @ 25%	$1,656,188
					Total Construction Cost	$8,280,938
					Engineering, Surveying & Geotech @ 12%	$993,713
					Total Project Cost	$9,274,650
8	48" Sewer Line along / running parallel to	48" Sanitary Sewer	15,500	LF	$288	$4,464,000
		72" Diameter Manhole	16	EA	$7,500	$116,250
		Pavement Repair	300	LF	$30	$9,000
		60" Boring and Casing	-	LF	$720	$0
					Subtotal	$4,589,250
					Contingency @ 25%	$1,147,313
					Total Construction Cost	$5,736,563
					Engineering, Surveying & Geotech @ 12%	$688,388
					Total Project Cost	$6,424,950
9	48" Sewer Line along / running parallel to	48" Sanitary Sewer	1,000	LF	$288	$288,000
		72" Diameter Manhole	1	EA	$7,500	$7,500
		Pavement Repair	-	LF	$30	$0
		60" Boring and Casing	-	LF	$720	$0
					Subtotal	$295,500
					Contingency @ 25%	$73,875
					Total Construction Cost	$369,375
					Engineering, Surveying & Geotech @ 12%	$44,325
					Total Project Cost	$413,700
	Total System Costs for Basin 2 of Alternative 3a					**$37,286,760**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 3	**Cedar Creek and Canney Creek Basin**					
1	3.67 Little Creek MGD Lift Station ; 14 " Force Main	Lift Station - New 3.67 MGD	1	LS	$1,276,488	$1,276,488
		26" Boring and Casing	-	LF	$312	$0
		14" Force Main	20,000	LF	$77	$1,540,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	40	EA	$3,500	$140,000
					Subtotal	$2,978,988
					Contingency @ 25%	$744,747
					Total Construction Cost	$3,723,735
					Engineering, Surveying & Geotech @ 12%	$446,848
					Total Project Cost	$4,170,583
2	21" Sewer Line along / running parallel to	21" Sanitary Sewer	12,500	LF	$116	$1,450,000
		60" Diameter Manhole	16	EA	$5,000	$80,000
		Pavement Repair	600	LF	$30	$18,000
		34" Boring and Casing	450	LF	$410	$184,500
					Subtotal	$1,732,500
					Contingency @ 25%	$433,125
					Total Construction Cost	$2,165,625
					Engineering, Surveying & Geotech @ 12%	$259,875
					Total Project Cost	$2,425,500
3	12" Sewer Line along / running parallel to Little Creek	12" Sanitary Sewer	15,500	LF	$66	$1,023,000
		48" Diameter Manhole	31	EA	$3,500	$108,500
		Pavement Repair	900	LF	$30	$27,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,158,500
					Contingency @ 25%	$289,625
					Total Construction Cost	$1,448,125
					Engineering, Surveying & Geotech @ 12%	$173,775
					Total Project Cost	$1,621,900
4	2.92 MGD Fannin Lift Station ; 12" Force Main	Lift Station - New 6.2 MGD	1	LS	$1,196,688	$1,196,688
		20" Boring and Casing	-	LF	$240	$0
		12" Force Main	11,000	LF	$66	$726,000
		Pavement Repair	300	LF	$30	$9,000
		48" Diameter Manhole	22	EA	$3,500	$77,000
					Subtotal	$2,008,688
					Contingency @ 25%	$502,172
					Total Construction Cost	$2,510,860
					Engineering, Surveying & Geotech @ 12%	$301,303
					Total Project Cost	$2,812,163
5	12" Sewer Line along / running parallel to Fannin Creek	12" Sanitary Sewer	6,500	LF	$66	$429,000
		48" Diameter Manhole	13	EA	$3,500	$45,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$483,500
					Contingency @ 25%	$120,875
					Total Construction Cost	$604,375
					Engineering, Surveying & Geotech @ 12%	$72,525
					Total Project Cost	$676,900
6	15" Sewer Line along / running parallel to	15" Sanitary Sewer	16,000	LF	$85	$1,360,000
		60" Diameter Manhole	32	EA	$5,000	$160,000
		Pavement Repair	750	LF	$30	$22,500
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$1,542,500
					Contingency @ 25%	$385,625
					Total Construction Cost	$1,928,125
					Engineering, Surveying & Geotech @ 12%	$231,375
					Total Project Cost	$2,159,500
7	12" Sewer Line along / running parallel to Cedar Creek	12" Sanitary Sewer	11,500	LF	$66	$759,000
		48" Diameter Manhole	23	EA	$3,500	$80,500
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$844,000
					Contingency @ 25%	$211,000
					Total Construction Cost	$1,055,000
					Engineering, Surveying & Geotech @ 12%	$126,600
					Total Project Cost	$1,181,600

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Caddo Creek Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3a Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
8	1.8 MGD Cowleech Fork Lift Station ; 6" Force Main	Lift Station - New 1.8 MGD	1	LS	$1,077,520	$1,077,520
		20" Boring and Casing	-	LF	$240	$0
		6" Force Main	9,000	LF	$35	$315,000
		Pavement Repair	450	LF	$30	$13,500
		48" Diameter Manhole	18	EA	$3,500	$63,000
					Subtotal	$1,469,020
					Contingency @ 25%	$367,255
					Total Construction Cost	$1,836,275
					Engineering, Surveying & Geotech @ 12%	$220,353
					Total Project Cost	$2,056,628
9	12" Sewer Line along / running parallel to	12" Sanitary Sewer	29,000	LF	$66	$1,914,000
		48" Diameter Manhole	58	EA	$3,500	$203,000
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$2,130,500
					Contingency @ 25%	$532,625
					Total Construction Cost	$2,663,125
					Engineering, Surveying & Geotech @ 12%	$319,575
					Total Project Cost	$2,982,700
9	**66"** Sewer Line along / running parallel to	**66" Sanitary Sewer**	18,500	LF	$396	$7,326,000
		72" Diameter Manhole	19	EA	$7,500	$138,750
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$7,469,250
					Contingency @ 25%	$1,867,313
					Total Construction Cost	$9,336,563
					Engineering, Surveying & Geotech @ 12%	$1,120,388
					Total Project Cost	$10,456,950
8	50 MGD Caddo Creek Fork Lift Station **42"** Force Main	Lift Station - New 50 MGD	1	LS	$7,466,667	$7,466,667
		54" Boring and Casing	450	LF	$650	$292,500
		42" Force Main	2,500	LF	$252	$630,000
		Pavement Repair	-	LF	$30	$0
		72" Diameter Manhole	3	EA	$7,500	$18,750
					Subtotal	$8,407,917
					Contingency @ 25%	$2,101,979
					Total Construction Cost	$10,509,896
					Engineering, Surveying & Geotech @ 12%	$1,261,188
					Total Project Cost	$11,771,084
	Total System Costs for Basin 3 of Alternative 3a					**$30,544,424**
	Total Collection System Cost for Alternative 3a					**$106,956,157**

WWTP Construction Costs

1	12.53 MGD	**$56,385,000**
	Engineering (Design & Construction Phase), Surveying	**$7,893,900**
	Land Acquistion & Permitting Cost	**$401,000**
	Total WWTP Cost:	**$64,679,900**
	Total Cost for Alternative 3a:	**$171,637,000**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 1	**South Fork Sabine Creek Basi**					
1	15.06 MGD South Fork Lift Station ; 24" Force Main	Lift Station - New 15.06 MGD	1	LS	$2,448,384	$2,448,384
		38" Boring and Casing	450	LF	$456	$205,200
		24" Force Main	32,500	LF	$132	$4,290,000
		Pavement Repair	2,100	LF	$30	$63,000
		60" Diameter Manhole	41	EA	$5,000	$203,125
					Subtotal	$7,209,709
					Contingency @ 25%	$1,802,427
					Total Construction Cost	$9,012,136
					Engineering, Surveying & Geotech @ 12%	$1,081,456
					Total Project Cost	$10,093,593
2	12"/15" Sewer Line along /running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		15" Sanitary Sewer	7,250	LF	$85	$616,250
		48" Diameter Manhole	24	EA	$3,500	$84,000
		60" Diameter Manhole	15	EA	$5,000	$72,500
		Pavement Repair	1,650	LF	$30	$49,500
					Subtotal	$1,614,250
					Contingency @ 25%	$403,563
					Total Construction Cost	$2,017,813
					Engineering, Surveying & Geotech @ 12%	$242,138
					Total Project Cost	$2,259,950
3	12" Sewer Line along / running parallel to	12" Sanitary Sewer	9,000	LF	$66	$594,000
		20" Boring and Casing	450	LF	$240	$108,000
		48" Diameter Manhole	18	EA	$3,500	$63,000
		Pavement Repair	-	LF	$30	$0
					Subtotal	$765,000
					Contingency @ 25%	$191,250
					Total Construction Cost	$956,250
					Engineering, Surveying & Geotech @ 12%	$114,750
					Total Project Cost	$1,071,000
4	18"/21"/24" Sewer Line along / running parallel to	18" Sanitary Sewer	9,000	LF	$100	$900,000
		21" Sanitary Sewer	12,000	LF	$116	$1,392,000
		24" Sanitary Sewer	4,500	LF	$132	$594,000
		60" Diameter Manhole	32	EA	$5,000	$159,375
		32" Boring and Casing	-	LF	$385	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$3,058,875
					Contingency @ 25%	$764,719
					Total Construction Cost	$3,823,594
					Engineering, Surveying & Geotech @ 12%	$458,831
					Total Project Cost	$4,282,425
5	12" Sewer Line along / running parallel to	48" Diameter Manhole	48	EA	$3,500	$168,000
		12" Sanitary Sewer	24,000	LF	$66	$1,584,000
		20" Boring and Casing	450	LF	$240	$108,000
		Pavement Repair	900	LF	$30	$27,000
					Subtotal	$1,887,000
					Contingency @ 25%	$471,750
					Total Construction Cost	$2,358,750
					Engineering, Surveying & Geotech @ 12%	$283,050
					Total Project Cost	$2,641,800

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	11,500	LF	$66	$759,000
		48" Diameter Manhole	23	EA	$3,500	$80,500
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$961,000
					Contingency @ 25%	$240,250
					Total Construction Cost	$1,201,250
					Engineering, Surveying & Geotech @ 12%	$144,150
					Total Project Cost	$1,345,400
7	18"/21" Sewer Line along / running parallel to	18" Sanitary Sewer	8,500	LF	$100	$850,000
		21" Sanitary Sewer	10,500	LF	$116	$1,218,000
		60" Diameter Manhole	24	LF	$5,000	$118,750
		32" Boring and Casing	-	LF	$385	$0
		34" Boring and Casing	-	EA	$410	$0
		Pavement Repair	450	LF	$30	$13,500
					Subtotal	$2,200,250
					Contingency @ 25%	$550,063
					Total Construction Cost	$2,750,313
					Engineering, Surveying & Geotech @ 12%	$330,038
					Total Project Cost	$3,080,350
8	24" Sewer Line along / running parallel to	24" Sanitary Sewer	16,500	LF	$132	$2,178,000
		60" Diameter Manhole	21	EA	$5,000	$103,125
		Pavement Repair	150	LF	$30	$4,500
		38" Boring and Casing	450	LF	$456	$205,200
					Subtotal	$2,490,825
					Contingency @ 25%	$622,706
					Total Construction Cost	$3,113,531
					Engineering, Surveying & Geotech @ 12%	$373,624
					Total Project Cost	$3,487,155
9	27" Sewer Line along / running parallel to	27" Sanitary Sewer	26,500	LF	$150	$3,975,000
		72" Diameter Manhole	34	EA	$7,500	$255,000
		Pavement Repair	900	LF	$30	$27,000
		40" Boring and Casing	450	LF	$480	$216,000
					Subtotal	$4,473,000
					Contingency @ 25%	$1,118,250
					Total Construction Cost	$5,591,250
					Engineering, Surveying & Geotech @ 12%	$670,950
					Total Project Cost	$6,262,200
10	27" Sewer Line along / running parallel to	27" Sanitary Sewer	19,000	LF	$150	$2,850,000
		72" Diameter Manhole	24	EA	$7,500	$180,000
		Pavement Repair	1,350	LF	$30	$40,500
		40" Boring and Casing	-	LF	$480	$0
					Subtotal	$3,070,500
					Contingency @ 25%	$767,625
					Total Construction Cost	$3,838,125
					Engineering, Surveying & Geotech @ 12%	$460,575
					Total Project Cost	$4,298,700
	Total System Costs for Basin 1 of Alternative 3					**$38,822,573**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 2	**West & East Caddo Basins**					
1	12"/18" Sewer Line along / running parallel to	12" Sanitary Sewer	10,000	LF	$66	$660,000
		18" Sanitary Sewer	16,500	LF	$100	$1,650,000
		48" Diameter Manhole	20	EA	$3,500	$70,000
		60" Diameter Manhole	21	EA	$5,000	$105,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	450	LF	$240	$108,000
		32" Boring and Casing	-	LF	$385	$0
					Subtotal	$2,602,000
					Contingency @ 25%	$650,500
					Total Construction Cost	$3,252,500
					Engineering, Surveying & Geotech @ 12%	$390,300
					Total Project Cost	$3,642,800
2	12"/15" Sewer Line along / running parallel to	12" Sanitary Sewer	26,500	LF	$66	$1,749,000
		15" Sanitary Sewer	39,000	LF	$85	$3,315,000
		48" Diameter Manhole	53	EA	$3,500	$185,500
		60" Diameter Manhole	78	EA	$5,000	$390,000
		Pavement Repair	1,650	LF	$30	$49,500
		20" Boring and Casing	-	LF	$240	$0
		26" Boring and Casing	450	LF	$312	$140,400
					Subtotal	$5,829,400
					Contingency @ 25%	$1,457,350
					Total Construction Cost	$7,286,750
					Engineering, Surveying & Geotech @ 12%	$874,410
					Total Project Cost	$8,161,160
3	21" Sewer Line along / running parallel to	21" Sanitary Sewer	7,500	LF	$116	$870,000
		60" Diameter Manhole	10	EA	$5,000	$50,000
		Pavement Repair	150	LF	$30	$4,500
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$924,500
					Contingency @ 25%	$231,125
					Total Construction Cost	$1,155,625
					Engineering, Surveying & Geotech @ 12%	$138,675
					Total Project Cost	$1,294,300
4	12" Sewer Line along / running parallel to	12" Sanitary Sewer	12,000	LF	$66	$792,000
		48" Diameter Manhole	24	EA	$3,500	$84,000
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$885,000
					Contingency @ 25%	$221,250
					Total Construction Cost	$1,106,250
					Engineering, Surveying & Geotech @ 12%	$132,750
					Total Project Cost	$1,239,000
5	21" Sewer Line along / running parallel to	21" Sanitary Sewer	7,500	LF	$116	$870,000
		60" Diameter Manhole	10	EA	$5,000	$50,000
		Pavement Repair	-	LF	$30	$0
		34" Boring and Casing	-	LF	$410	$0
					Subtotal	$920,000
					Contingency @ 25%	$230,000
					Total Construction Cost	$1,150,000
					Engineering, Surveying & Geotech @ 12%	$138,000
					Total Project Cost	$1,288,000

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
6	12" Sewer Line along / running parallel to	12" Sanitary Sewer	52,500	LF	$66	$3,465,000
		48" Diameter Manhole	105	EA	$3,500	$367,500
		Pavement Repair	750	LF	$30	$22,500
		20" Boring and Casing	450	LF	$240	$108,000
					Subtotal	$3,963,000
					Contingency @ 25%	$990,750
					Total Construction Cost	$4,953,750
					Engineering, Surveying & Geotech @ 12%	$594,450
					Total Project Cost	$5,548,200
7	36" Sewer Line along / running parallel to	36" Sanitary Sewer	29,500	LF	$216	$6,372,000
		72" Diameter Manhole	30	EA	$7,500	$221,250
		Pavement Repair	1,050	LF	$30	$31,500
		50" Boring and Casing	-	LF	$600	$0
					Subtotal	$6,624,750
					Contingency @ 25%	$1,656,188
					Total Construction Cost	$8,280,938
					Engineering, Surveying & Geotech @ 12%	$993,713
					Total Project Cost	$9,274,650
8	48" Sewer Line along / running parallel to	48" Sanitary Sewer	15,500	LF	$288	$4,464,000
		72" Diameter Manhole	16	EA	$7,500	$116,250
		Pavement Repair	300	LF	$30	$9,000
		60" Boring and Casing	-	LF	$720	$0
					Subtotal	$4,589,250
					Contingency @ 25%	$1,147,313
					Total Construction Cost	$5,736,563
					Engineering, Surveying & Geotech @ 12%	$688,388
					Total Project Cost	$6,424,950
9	48" Sewer Line along / running parallel to	48" Sanitary Sewer	1,000	LF	$288	$288,000
		72" Diameter Manhole	1	EA	$7,500	$7,500
		Pavement Repair	-	LF	$30	$0
		60" Boring and Casing	-	LF	$720	$0
					Subtotal	$295,500
					Contingency @ 25%	$73,875
					Total Construction Cost	$369,375
					Engineering, Surveying & Geotech @ 12%	$44,325
					Total Project Cost	$413,700
	Total System Costs for Basin 2 of Alternative 3					**$37,286,760**

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
Basin 3	**Cedar Creek and Canney Creek Basin**					
1	3.67 Little Creek MGD Lift Station ; 14 " Force Main	Lift Station - New 3.67 MGD	1	LS	$1,276,488	$1,276,488
		26" Boring and Casing	-	LF	$312	$0
		14" Force Main	20,000	LF	$77	$1,540,000
		Pavement Repair	750	LF	$30	$22,500
		48" Diameter Manhole	40	EA	$3,500	$140,000
					Subtotal	$2,978,988
					Contingency @ 25%	$744,747
					Total Construction Cost	$3,723,735
					Engineering, Surveying & Geotech @ 12%	$446,848
					Total Project Cost	$4,170,583
2	21" Sewer Line along / running parallel to	21" Sanitary Sewer	12,500	LF	$116	$1,450,000
		60" Diameter Manhole	16	EA	$5,000	$80,000
		Pavement Repair	600	LF	$30	$18,000
		34" Boring and Casing	450	LF	$410	$184,500
					Subtotal	$1,732,500
					Contingency @ 25%	$433,125
					Total Construction Cost	$2,165,625
					Engineering, Surveying & Geotech @ 12%	$259,875
					Total Project Cost	$2,425,500
3	12" Sewer Line along / running parallel to Little Creek	12" Sanitary Sewer	15,500	LF	$66	$1,023,000
		48" Diameter Manhole	31	EA	$3,500	$108,500
		Pavement Repair	900	LF	$30	$27,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$1,158,500
					Contingency @ 25%	$289,625
					Total Construction Cost	$1,448,125
					Engineering, Surveying & Geotech @ 12%	$173,775
					Total Project Cost	$1,621,900
4	2.92 MGD Fannin Lift Station ; 12" Force Main	Lift Station - New 6.2 MGD	1	LS	$1,196,688	$1,196,688
		20" Boring and Casing	-	LF	$240	$0
		12" Force Main	11,000	LF	$66	$726,000
		Pavement Repair	300	LF	$30	$9,000
		48" Diameter Manhole	22	EA	$3,500	$77,000
					Subtotal	$2,008,688
					Contingency @ 25%	$502,172
					Total Construction Cost	$2,510,860
					Engineering, Surveying & Geotech @ 12%	$301,303
					Total Project Cost	$2,812,163
5	12" Sewer Line along / running parallel to Fannin Creek	12" Sanitary Sewer	6,500	LF	$66	$429,000
		48" Diameter Manhole	13	EA	$3,500	$45,500
		Pavement Repair	300	LF	$30	$9,000
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$483,500
					Contingency @ 25%	$120,875
					Total Construction Cost	$604,375
					Engineering, Surveying & Geotech @ 12%	$72,525
					Total Project Cost	$676,900

Hunt County Regional Wastewater Facilities Planning Study

ALTERNATIVE 3: Single Plant Regional System - Lake Tawakoni Discharge

Opinions Of Probable Project Cost

Project Number	Alternative 3 Caddo Creek WWTP - 12.53 MGD Project Description:	Construction Items	Quantity	Units	Unit Price	Costs
6	15" Sewer Line along / running parallel to	15" Sanitary Sewer	16,000	LF	$85	$1,360,000
		60" Diameter Manhole	32	EA	$5,000	$160,000
		Pavement Repair	750	LF	$30	$22,500
		26" Boring and Casing	-	LF	$312	$0
					Subtotal	$1,542,500
					Contingency @ 25%	$385,625
					Total Construction Cost	$1,928,125
					Engineering, Surveying & Geotech @ 12%	$231,375
					Total Project Cost	$2,159,500
7	12" Sewer Line along / running parallel to Cedar Creek	12" Sanitary Sewer	11,500	LF	$66	$759,000
		48" Diameter Manhole	23	EA	$3,500	$80,500
		Pavement Repair	150	LF	$30	$4,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$844,000
					Contingency @ 25%	$211,000
					Total Construction Cost	$1,055,000
					Engineering, Surveying & Geotech @ 12%	$126,600
					Total Project Cost	$1,181,600
8	1.8 MGD Cowleech Fork Lift Station ; 6" Force Main	Lift Station - New 1.8 MGD	1	LS	$1,077,520	$1,077,520
		20" Boring and Casing	-	LF	$240	$0
		6" Force Main	9,000	LF	$35	$315,000
		Pavement Repair	450	LF	$30	$13,500
		48" Diameter Manhole	18	EA	$3,500	$63,000
					Subtotal	$1,469,020
					Contingency @ 25%	$367,255
					Total Construction Cost	$1,836,275
					Engineering, Surveying & Geotech @ 12%	$220,353
					Total Project Cost	$2,056,628
9	12" Sewer Line along / running parallel to	12" Sanitary Sewer	29,000	LF	$66	$1,914,000
		48" Diameter Manhole	58	EA	$3,500	$203,000
		Pavement Repair	450	LF	$30	$13,500
		20" Boring and Casing	-	LF	$240	$0
					Subtotal	$2,130,500
					Contingency @ 25%	$532,625
					Total Construction Cost	$2,663,125
					Engineering, Surveying & Geotech @ 12%	$319,575
					Total Project Cost	$2,982,700
9	**42"** Force Main Line along / running parallel to	**42" Force Main**	21,000	LF	$252	$5,292,000
		72" Diameter Manhole	21	EA	$7,500	$157,500
		Pavement Repair	150	LF	$30	$4,500
		54" Boring and Casing	450	LF	$650	$292,500
					Subtotal	$5,746,500
					Contingency @ 25%	$1,436,625
					Total Construction Cost	$7,183,125
					Engineering, Surveying & Geotech @ 12%	$861,975
					Total Project Cost	$8,045,100
10	50 MGD Caddo Creek Fork Lift Station	Lift Station - New 50 MGD	1	LS	$7,466,667	$7,466,667
					Subtotal	$7,466,667
					Contingency @ 25%	$1,866,667
					Total Construction Cost	$9,333,334
					Engineering, Surveying & Geotech @ 12%	$1,120,000
					Total Project Cost	$10,453,334
11	18 MGD Greenville Fork Lift Station ; 30" Force Main	Lift Station - New 18 MGD	1	LS	$2,133,333	$2,133,333
		48" Boring and Casing	450	LF	$575	$258,750
		30" Force Main	15,000	LF	$165	$2,475,000
		Pavement Repair	450	LF	$30	$13,500
		72" Diameter Manhole	19	EA	$7,500	$140,625
					Subtotal	$5,021,208
					Contingency @ 25%	$1,255,302
					Total Construction Cost	$6,276,510
					Engineering, Surveying & Geotech @ 12%	$753,181
					Total Project Cost	$7,029,691
	Total System Costs for Basin 3 of Alternative 3					**$45,615,599**
	Total Collection System Cost for Alternative 3					**$121,724,932**

WWTP Construction Costs

1	12.53 MGD	**$56,385,000**
	Engineering (Design & Construction Phase), Surveying	**$7,893,900**
	Land Acquistion & Permitting Cost	**$624,000**
	Total WWTP Cost:	**$64,902,900**
	Total Cost for Alternative 3:	**$186,700,000**

APPENDIX J – Public Meetings & Workshop Agenda and Notice

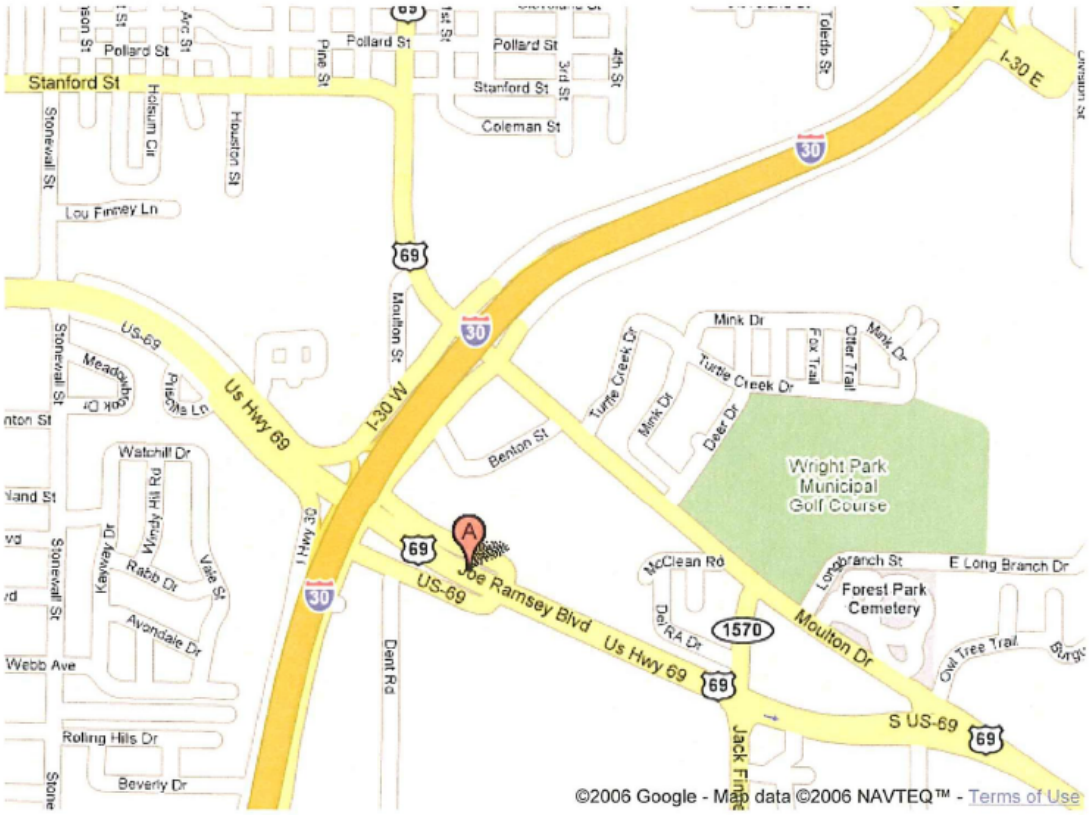
Public Meeting #1
Sabine River Authority Regional Wastewater Facilities Planning

Date: **Tuesday, January 16, 2007**
Time: **6:00 pm – 8:00 pm**
Location: **Civic Center**
5501 S Business Hwy 69
Greenville, TX 75402
(903) 457-3144

AGENDA

1. Welcome and Introductions	6:00 pm – 6:10 pm
2. Objectives of Study	6:10 pm – 6:20 pm
3. Project Approach	6:20 pm – 6:40 pm
4. Potential Service Area	6:40 pm – 7:00 pm
5. Open Discussion/ Public Comment	7:00 pm – 8:00 pm

A. Greenville City of: Fletcher Warren **Civic Center**
5501 S Business Hwy 69, Greenville, TX
(903) 457-3144



Regional Wastewater Facility Planning Study – Public Meeting #1

The Sabine River Authority, Cities of Greenville, Caddo Mills, and Quinlan, as well as Cash Special Utility District, and Caddo Basin Special Utility District are jointly participating in a study, partially funded by the Texas Water Development Board (TWDB) to identify technically feasible options for a centralized wastewater collection and treatment system to meet the wastewater treatment needs within the study area and to avoid the proliferation of new septic systems in the study area.

The planning area includes most of the southwestern portion of Hunt County and extends from the Hunt County line to the west, the Caddo Basin SUD water certificate of convenience and necessity (CCN) service area to the northwest, City of Greenville water CCN boundary to the north and the Cowleech Fork of the Sabine River drainage basin to the east. The planning area extends to the south and includes the City of West Tawakoni, the area along the north shore of the South Fork arm of Lake Tawakoni and extends west to the Hunt County line.

The Cities of Greenville, Caddo Mills and Quinlan, as well as the Cash SUD have all received numerous inquiries from developers proposing new residential developments within their service areas which could result in significantly higher localized growth rates. Efforts toward regionalization within the study area will include making provisions for connection by other existing or proposed developments even though they may not directly participate in the study. Providing the opportunity for centralized collection and treatment of wastewater to as many existing developments as possible will further the cause of improved water quality in the watershed and encourage the highest, best use of land within the study area.

This meeting is a part of the first phase of the study, which is to gather background information on the study area like population, service area, wholesale customers, permitted discharge etc. The current plans and possible alternatives for providing wastewater service in Greenville regional wastewater planning area will be discussed at this meeting. The Sabine River Authority and other study participants believe that the open exchange of ideas and the active involvement of the public and water and sewer service providers in the study area are crucial to achieving a meaningful outcome of the study.

Study Participants Workshop & Public Meeting #2

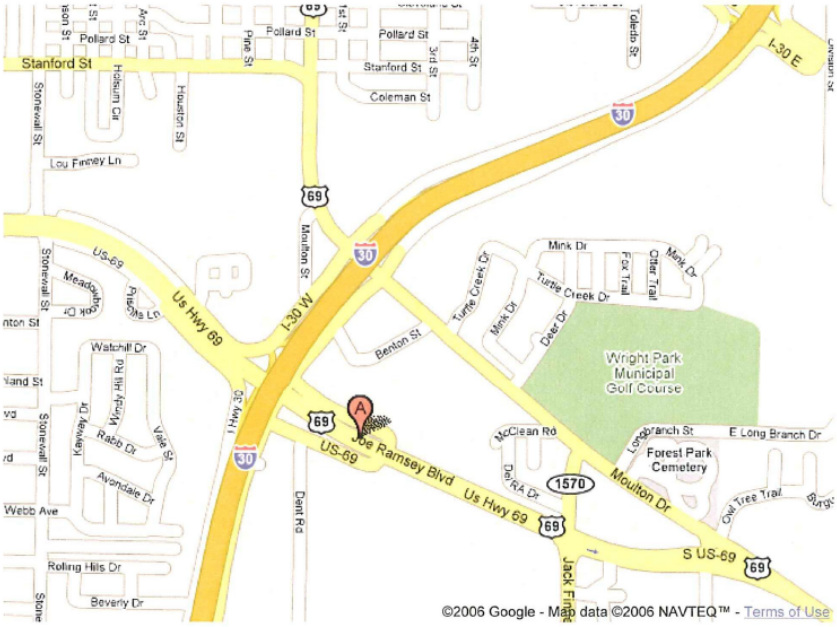
Hunt County Regional Wastewater Facility Planning Study

Date: **Wednesday, February 28, 2007**
Time: **3:00 pm – 8:00 pm**
Location: **Civic Center**
5501 S Business Hwy 69
Greenville, TX 75402
(903) 457-3144

AGENDA

Study Participants Workshop	**3:00 pm – 5:00 pm**
Public Meeting #2	**6:00 pm – 8:00 pm**
1. Welcome and Introductions	6:00 pm – 6:10 pm
2. Project Background	6:10 pm – 6:20 pm
3. Population and Wastewater Flow Projections	6:20 pm – 6:40 pm
4. Potential Location of Treatment Facilities	6:40 pm – 7:00 pm
5. Regulatory Concerns and Likely Discharge Limits	7:00 pm – 7:10 pm
6. Alternatives for Wastewater Conveyance and Treatment	7:10 pm – 7:30 pm
7. Open Discussion and Comments	7:30 pm – 8:00 pm

A. Greenville City of: Fletcher Warren **Civic Center**
5501 S Business Hwy 69, Greenville, TX
(903) 457-3144



Hunt County Regional Wastewater Facility Planning Study

Public Meeting #2

The Sabine River Authority, Cities of Greenville, Caddo Mills, and Quinlan, as well as Cash Special Utility District, and Caddo Basin Special Utility District are jointly participating in a study, partially funded by the Texas Water Development Board (TWDB) to identify technically feasible options for a centralized wastewater collection and treatment system to meet the wastewater treatment needs within the study area and to avoid the proliferation of new septic systems in the study area.

As part of the initial phase of the study, a public meeting was conducted on January 16,' 2007 to present to the project stakeholders a description of the study objectives, technical approach and schedule. In the weeks following Public Meeting #1, background information including population projections, existing and planned service area boundaries, and proposed developments in the service area, etc. was gathered from the study participants, potential customers of the regional sewer system and existing water/wastewater service providers in the study area. At the second public meeting, the following items will be discussed:

- Population and wastewater flow projections for utility service providers in the study area and estimated wastewater flows by sewer shed.

- Potential locations of regional wastewater treatment facilities and regulatory and discharge permit considerations for each potential location.

- Description of the concepts for providing centralized wastewater collection and treatment service to the study area to evaluated in further detail by the project team.

The primary purpose of this meeting is to discuss the alternatives that will be studied in greater detail and receive comments from the study participants, water/wastewater service providers in the study area and general public. The Sabine River Authority and other study participants believe that the open exchange of ideas and the active involvement of the public and water and sewer service providers in the study area are crucial to achieving a meaningful outcome of the study.

Final Workshop – Project Participants

Hunt County Regional Sewer System Planning Study

Date: **Tuesday, June 19, 2007**
Time: **2:30 pm – 8:00 pm**
Location: **Civic Center**
5501 S Business Hwy 69
Greenville, TX 75402
(903) 457-3144

DRAFT AGENDA

1. Project Background	2:30 pm – 2:40 pm
2. Population and Wastewater Flow Projections	2:40 pm – 2:50 pm
3. Wastewater Treatment Alternatives	2:50 pm – 3:30 pm
4. Wastewater Discharge Permit Assessment	3:30 pm – 3:40 pm
5. Capital Costs of Alternatives	3:40 pm – 4:00 pm
5. Alternatives Evaluation	4:00 pm – 4:30 pm
6. Open Discussion and Comments	4:30 pm – 5:00 pm
7. Break	5:00 pm – 6:00 pm
8. Public Meeting #3	6:00 pm – 8:00 pm

Hunt County Regional Sewer System Planning Study

Public Meeting #3

The Sabine River Authority, Cities of Greenville, Caddo Mills, and Quinlan, as well as Cash Special Utility District, and Caddo Basin Special Utility District are jointly participating in a study, partially funded by the Texas Water Development Board (TWDB) to identify technically feasible options for a centralized wastewater collection and treatment system to meet the wastewater treatment needs within the study area and to avoid the proliferation of new septic systems in the study area.

As part of the initial phase of the study, a public meeting was conducted on January 16, 2007 to present to the project stakeholders a description of the study objectives, technical approach and schedule. In the weeks following Public Meeting #1, background information including population projections, existing and planned service area boundaries, and proposed developments in the service area, etc. was gathered from the study participants, potential customers of the regional sewer system and existing water/wastewater service providers in the study area. At the second public meeting held on February 28, the population and wastewater flow projections for utility service providers in the study area and estimated wastewater flows by sewer shed was presented. Alternatives for providing wastewater treatment service to the defined study area were introduced and potential locations of regional wastewater treatment facilities and initial regulatory and discharge permit considerations for each potential location were discussed.

Following the second public meeting, the capital costs for each of the alternatives were estimated. Water quality modeling was performed to estimate the potential discharge limits for the proposed regional wastewater treatment facilities. The alternatives for providing wastewater service to the study area were evaluated based on capital costs, permitting issues and potential for cost sharing of the system. The results of the evaluation will be presented at this final public meeting.

The primary purpose of this meeting is to discuss the alternatives that will be studied in greater detail and receive comments from the study participants, water/wastewater service providers in the study area and general public. The Sabine River Authority and other study participants believe that the open exchange of ideas and the active involvement of the public and water and sewer service providers in the study area are crucial to achieving a meaningful outcome of the study.

Public Meeting #3
Hunt County Regional Sewer System Planning Study

Date: **Tuesday, June 19, 2007**
Time: **6:00 pm – 8:00 pm**
Location: **Civic Center**
5501 S Business Hwy 69
Greenville, TX 75402
(903) 457-3144

AGENDA

1. Welcome and Introductions	6:00 pm – 6:10 pm
2. Project Background	6:10 pm – 6:20 pm
3. Population and Wastewater Flow Projections	6:20 pm – 6:30 pm
4. Wastewater Treatment Alternatives	6:30 pm – 7:00 pm
5. Capital Costs of Alternatives	7:00 pm – 7:10 pm
6. Alternatives Evaluation	7:10 pm – 7:30 pm
7. Open Discussion and Comments	7:30 pm – 8:00 pm

A. Greenville City of: Fletcher Warren **Civic Center**
5501 S Business Hwy 69, Greenville, TX
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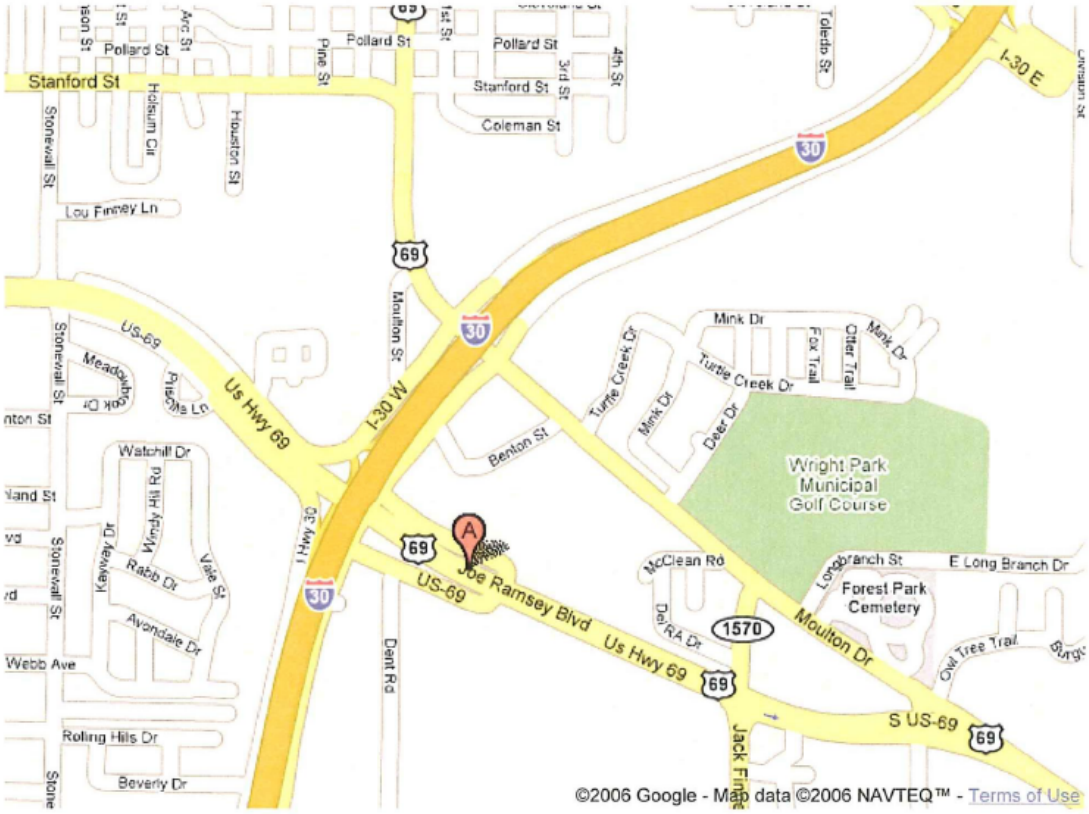

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