City of Quinlan

2020

WATER & WASTEWATER MASTER PLAN

October 2020

PREPARED FOR:

City of Quinlan

PREPARED BY:

Freese and Nichols, Inc.
2711 North Haskell Ave., Suite 3300
Dallas, Texas 75204

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HONORING OUR PAST

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

WATER AND WASTEWATER MASTER PLAN

Prepared for:

City of Quinlan

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FREESE AND NICHOLS, INC.
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
214-217-2200

Innovative approaches
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WATER AND WASTEWATER MASTER PLAN

Prepared for:

City of Quinlan

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

Prepared by:

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FNI Project Number: QNL18498

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1.0 INTRODUCTION

The City of Quinlan is a community located in north Texas, within Hunt County. The City currently provides water service to approximately 1,469 people. The population within the service area is projected to increase by almost 4,700 people over the next 25 years. Accommodating this growth in an efficient and cost-effective manner, is the purpose of this 2019 Water and Wastewater Master Plan. This report has been prepared to provide the City of Quinlan with a planning tool that will serve as a guide for short-term and long-term improvements to water distribution and wastewater collection system infrastructure.

1.1 SCOPE OF WORK

In 2018, the City of Quinlan contracted with Freese and Nichols, Inc. (FNI) to prepare a Water and Wastewater Master Plan as part of the development of a new Comprehensive Plan. The primary goal of the Water and Wastewater Master Plan was to build a water distribution system model which would enhance understanding of the existing water system's configuration and operations; permitting an evaluation of the capacity of the existing water system and the development of a phased Capital Improvements Plan (CIP) through buildout. A high-level assessment of the wastewater collection system was performed to determine where additional wastewater improvements are needed. The recommended improvements will serve as a basis for the design, construction, and financing of facilities required to meet Quinlan's water and wastewater capacity needs. The major elements of the scope of this project included:

- Water Demand and Wastewater Flow Projections
- Water Model Development
- Hydraulic Analyses and System Evaluation
- Capital Improvements Plan
- Water and Wastewater Master Plan Report

1.2 ABBREVIATIONS

Table 1-1 provides a list of abbreviations used in this report.

Table 1-1: List of Abbreviations

Abbreviation	Full Nomenclature
ADF	Average Day Flow
AWWA	American Water Works Association
CCN	Certificate of Convenience and Necessity
CIP	Capital Improvements Plan
EPS	Extended Period Simulation
EST	Elevated Storage Tank
ETJ	Extraterritorial Jurisdiction
FNI	Freese and Nichols, Inc.
gpcd	gallons per capita per day
GST	Ground Storage Tank
I/I	Inflow and Infiltration
MD	Maximum Day
MG	Million Gallons
MGD	Million Gallons per Day
NCTCOG	North Central Texas Council of Governments
PF	Peaking Factor
PH	Peak Hour
PS	Pump Station
psi	pounds per square inch
SCADA	Supervisory Control and Data Acquisition
SUD	Special Utility District
TCEQ	Texas Commission on Environmental Quality
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

2.0 POPULATION AND NON-RESIDENTIAL LAND USE

Growth projections are an important component of the master planning process. The magnitude and distribution of the growth in population and non-residential development will dictate where future water and wastewater infrastructure are required. It is important to note that projecting future population is challenging, especially for relatively small geographic areas such as individual cities because it can be difficult to predict how fast or slow development will occur. For the purposes of this report, population projections were developed for the planning years 2019 through buildout (2055).

2.1 SERVICE AREA

The City currently provides water and wastewater service to approximately 1,469 people according to 2019 projections from the North Central Texas Council of Governments (NCTCOG). The City's existing water service area is defined by the city limits, but the City also provides water service to the Shady Oaks subdivision through groundwater wells. For this study, the water service area is projected to grow to the limits of the City's Certificate of Convenience and Necessity (CCN). A CCN is issued by the Public Utility Commission and authorizes a utility to provide water service to the area within the CCN boundary. The CCN for the City of Quinlan overlaps, but is not identical to the City's Extraterritorial Jurisdiction (ETJ). The existing wastewater service area is also defined by the city limits, but the city does not provide wastewater service to the Shady Oaks subdivision. The City does provide wastewater service to the Ford High School outside of the city limits through a lift station. For this study, the future wastewater service area is assumed to be similar to the future water service area boundary. The water and wastewater service area is shown on **Figure 2-1**.

2.2 HISTORICAL POPULATION

Historical population data from 2012 to 2016 was provided by the City. Population projections for 2017 through 2018 were obtained from NCTCOG annual population estimates. **Table 2-1** shows the population estimate for each year. The average annual growth rate over the last 6 years was 1.1%, with a maximum growth rate of 3.3% occurring from 2012 to 2013.

Lake Tawakoni
Hawk Cove
COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2276
COUNTY ROAD 3601
COUNTY ROAD 3603
W STATE HIGHWAY 276
E QUINLAN PKWY
COUNTY ROAD 3604
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 2304
COUNTY ROAD 3606
COUNTY ROAD 3788
OLE WAGON RD
COUNTY ROAD 2306
COUNTY ROAD 3630
NORTH SHORE RD
COUNTY ROAD 3619
COUNTY ROAD 3620
COUNTY ROAD 3623
S STATE HIGHWAY 34
0 900 1,800
SCALE IN FEET
FIGURE 2-1
CITY OF QUINLAN
WATER AND WASTEWATER
SERVICE AREA
LEGEND
Road
Stream
Lake
City Limit
Other City Limit
ETJ Boundary
Water/Wastewater Service Area
Water CCN Boundary
City of Quinlan
Aqua Texas Inc.
Cash SUD
Combined Consumers SUD
Combined Consumer/ Quinlan CCN
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Table 2-1: Historical Population

Year	Population	Population Growth	Growth Rate
2012	1,350	-	-
2013	1,394	44	3.3%
2014	1,402	8	0.6%
2015	1,400	-2	-0.1%
2016	1,419	19	1.4%
2017	1,430	11	0.8%
2018	1,440	10	0.7%
Average	**-**	**-**	**1.1%**
Maximum	**-**	**-**	**3.3%**

2.3 POPULATION PROJECTIONS

The City is currently developing a Comprehensive Plan that sets forth the aspirations for long term growth within the City. The Comprehensive Plan estimates an ultimate population capacity of city limits plus the ETJ to be 10,611 people in **Chapter 3** of the report. Since the ETJ boundary is larger than the water CCN boundary, the estimated water and wastewater service area population is projected to be less than the ultimate capacity of the planning area. The ultimate population capacity of the water and wastewater service areas is projected to be 6,137. Based on the assumed growth rate of 4.0% presented in the Comprehensive Plan, buildout of the water and wastewater service area will occur in the year 2055. **Table 2-2** contains residential population projections for each planning year. The projected population growth was distributed over the service area based on existing vacant land. It was assumed that infill will only occur in the vacant properties as the City continues to grow; that is, the existing residential areas in the City are already at maximum density.

Table 2-2: Service Area Population Projections

Year	Population[1]
2019	1,469
2020	1,528
2030	2,261
2040	3,348
2050	4,955
2055	6,137

[1] Population growth assumes a 4.0% growth per year per the Comprehensive Plan.

2.4 NON-RESIDENTIAL LAND USE PROJECTIONS

To capture growth within the service area related to commercial and industrial development, a non-residential developed acreage for each planning period was calculated. Existing non-residential acreage was determined from future land use data developed as part of the Comprehensive Plan. Non-residential developed acreage projections for each planning year are provided in **Table 2-3**.

Table 2-3: Non-Residential Land Use Projections

Year	Acreage
2019	198
2020	203
2030	256
2040	323
2050	408
2055	459

3.0 WATER DEMAND PROJECTIONS

3.1 HISTORICAL WATER DEMANDS

A water utility must be able to supply water at rates that fluctuate over time. Yearly, monthly, daily, and hourly variations in water use occur, with higher use occurring during dry years and in hot months. Also, water use typically follows a diurnal pattern, being low at night with peaks in the early morning and evening. Flow rates most important to the hydraulic design and operation of a distribution system are average day (AD), maximum day (MD), and peak hour (PH) demands. Average day use is the total annual water use divided by the number of days in the year. The average day demand rate is used as a basis for estimating maximum day and peak hour demands. Maximum day demand is the maximum quantity of water used on any one day of the year. Water supply facilities are typically designed based on the maximum day demand. Peak hour use is the peak rate at which water is required during any one hour of the year. Since minimum distribution pressures are usually experienced during peak hour, the sizes and locations of distribution facilities are generally determined based on this condition.

Reviewing historical water demands provides insight into selecting design criteria used to project future water demands. For this study, water consumption data was provided by the City for 2012 through 2018. Consumption data comes from metered billing data, which provides a record of the amount of water used by each household. Historical AD demand was calculated for each year from 2012 to 2018 by dividing the annual usage in gallons by days in the year. Historical usage rates in gallons per capita per day (gpcd) were calculated by dividing the historical AD demand in gallons per day by the residential population for each year from 2012 through 2018. **Table 3-1** shows the historical AD demand in millions of gallons per day (MGD) and historical residential per capita usage.

Maximum day demand is calculated by multiplying average day demand by a peaking factor (PF). To calculate historical maximum day to average day peaking factors, maximum day demand data from the City for the years of 2015, 2016, and 2018 was divided by the calculated average day demand for the corresponding year. A summary of historical maximum day water demands and peaking factors is shown in **Table 3-1.**

Table 3-1: Historical Water Consumption

Year	Population	Total Average Day Demand (MGD)	Maximum Day Demand (MGD)	Total Per Capita Demand (gpcd)	Maximum Day to Average Day Peaking Factor
2012	1,350	0.18	-	135	-
2013	1,394	0.14	-	104	-
2014	1,402	0.14	-	99	-
2015	1,400	0.17	0.42	118	2.51
2016	1,419	0.14	0.75	102	5.16
2017	1,430	-	-	-	-
2018	1,440	0.17	0.45	117	2.68
Average	**-**	**0.16**	**0.54**	**113**	**3.5**
Maximum	**-**	**0.18**	**0.75**	**135**	**5.2**

3.2 WATER DEMAND PROJECTIONS

Water demands were projected for 2019 through 2055 conditions for the City's water service area. The evaluation of historical trends in the per capita data provided a basis for determining the design criteria used to project average day water demands. Based on the review of this data and the need to plan for low rainfall (dry) years with minimal water restrictions, FNI recommended a design residential per capita usage of 120 gpcd. After examining the historical data presented in **Table 3-1**, an average day to maximum day peaking factor of 2.50 was recommended for use in calculating projected maximum day demands. Information on peak hour demand was not available. As such, a maximum day to peak hour peaking factor of 1.80 was recommended, which is in line with maximum day to peak hour peaking factors observed in comparably sized cities. **Table 3-2** summarizes the design criteria used to calculate the water demand projections. **Table 3-3** shows the demand projections for 2019, 2020, 2030, 2040, 2050, and 2055.

Table 3-2: Water Demand Design Criteria

Average Day Demand (gpcd)	Maximum Day to Average Day Peaking Factor	Peak Hour to Maximum Day Peaking Factor
120	2.5	1.8

Table 3-3: Water Demand Projections by Planning Year

Year	Population	Average Day Water Demand (MGD)	Maximum Day Water Demand (MGD)	Peak Hour Water Demand (MGD)
2019	1,469	0.18	0.44	0.79
2020	1,528	0.18	0.46	0.82
2030	2,261	0.27	0.68	1.22
2040	3,348	0.40	1.00	1.81
2050	4,955	0.59	1.49	2.68
2055	6,137	0.74	1.84	3.31

4.0 WATER SYSTEM ANALYSES

4.1 EXISTING WATER SYSTEM

The City of Quinlan's water distribution system consists of one pressure plane that contains a network of water lines ranging in size from 0.75-inches to 12-inches, two pump stations (PS) with three ground storage tanks (GST), and two elevated storage tanks (EST). The City is a wholesale customer of the Cash Special Utility District (SUD) and receives water through two separate 2-inch water lines at the Main GST and the Gin GSTs. **Figure 4-1** displays the existing water distribution system for the City of Quinlan.

4.2 WATER MODEL DEVELOPMENT

The water system hydraulic model was built in InfoWater® hydraulic modeling software by Innovyze, which makes use of engineering equations and mathematical algorithms to determine the flows and pressures that would occur in a distribution system under a specified set of conditions. In general, the flow and gradient patterns depend upon the magnitude and location of system supplies and demands and on the characteristics of the water mains and other facilities in the distribution network. The headloss through each main is a function of the flow rate and the pipe diameter, length, and interior roughness.

4.2.1 Extended Period Simulation (EPS) Calibration

In order to verify that the hydraulic model accurately represented the actual distribution system, a model calibration analysis was performed. The calibration process involved adjusting system operations, C-values, demand allocation, and peaking factors to match a known condition. The City provided Supervisory Control and Data Acquisition (SCADA) data from the GSTs and ESTs from the week of May 4, 2019 through May 10, 2019 for calibration of the model.

A. Demands

Demands were allocated to the model from metered billing data provided by the city for 2018. FNI geocoded the billing meter data based on the corresponding address. The geocoded billing meter data was used to allocate the existing water demand in the wastewater model. **Figure 4-2** displays the geocoded billing meters that were allocated in the water distribution model.

FIGURE 4-1
CITY OF QUINLAN
EXISTING WATER SYSTEM

LEGEND

- Connection Point
- Pump Station
- Well Pressure Tank
- Elevated Storage Tank
- Ground Storage Tank
- Water Main
- Road
- Stream
- Lake
- City Limit
- Other City Limit
- *Water CCN Boundary*
- City of Quinlan
- Aqua Texas Inc.
- Cash SUD
- Combined Consumers SUD
- Combined Consumer/ Quinlan CCN

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Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST

Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST

Cash SUD
Connection Point

Cash SUD
Connection Point

0.1 MG College St
Elevated Storage Tank

0.25 MG Hwy 276
Elevated Storage Tank

CCWS
Pump Station

Well Pressure Tanks
8,800 gal GST

Well Pressure Tanks
6,000 gal GST

Lake Tawakoni

Hawk Cove

COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2276
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 2306
COUNTY ROAD 3604
COUNTY ROAD 3606
COUNTY ROAD 2364
COUNTY ROAD 3605
COUNTY ROAD 3630
COUNTY ROAD 3614
COUNTY ROAD 3618
COUNTY ROAD 3619
COUNTY ROAD 3620
COUNTY ROAD 3621
COUNTY ROAD 3622
COUNTY ROAD 3623
COUNTY ROAD 3602
W STATE HIGHWAY 276
S STATE HIGHWAY 34
W MAIN ST
W 2ND ST
3RD ST
N EDWARD ST
N 1ST ST
OLD HWY 81
E KIRBY ST
E LAURA AVE
W MEYERS ST
E QUINLAN PKWY
FRONTIER DR
BEVERLY
CURTIS LN
CAROL DR
N KLOCKENDAHL
PANTHER PATH
DRIVEWAY
OLE WAGON RD
DEER PARK
FM 751
INDIAN TRL
NORTH SHORE RD
WHISKERS RD
PRIVATE ROAD 3625
KATHERINE ST
CHRISTEL ST
KAY ST
MARIA ST
DOGWOOD TRL
SHAWNEE CIR
EVELYN ST
DELTON AVE
LADD ST
MORRIS DR
TUT ST
ROSS RD
LYNDA LN
LEA
JEFFRIES
DONNA DR
GEORGIA ST
RED BIRD CIR
HOLIDAY
SHORT WAY
CHEROKEE DR
PINEWOOD DR
GRADY RD
OAK RD
NELL ST
TAMMY ST
LAKE DR
FAYE ST
SILVEY ST
JANET ST
NADA ST
Jones Creek
Bois D'Arc Creek
Indian Creek
S FM 36

0 900 1,800
SCALE IN FEET

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FIGURE 4-2
CITY OF QUINLAN
GEOCODED BILLING METERS

LEGEND

Road
Stream
Lake
City Limits
Other City Limit

Water CCN Boundary
City of Quinlan
Aqua Texas Inc.
Cash SUD
Combined Consumers SUD
Combined Consumer/ Quinlan CCN

AVERAGE MONTHY CONSUMPTION (2018)

Commercial Meters
Less than 20,000 gal
20,000 to 100,000 gal
Greater than 100,000 gal

Residential Meters
Less than 20,000 gal
20,000 to 100,000 gal
Greater than 100,000 gal

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0 700 1,400
SCALE IN FEET

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B. Peaking Factors

Typical residential and commercial diurnal patterns were developed for residential and commercial water users based on the American Water Works Association's (AWWA) *Manual 32: "Computer Modeling of Water Distribution Systems"*. **Figure 4-3** and **Figure 4-4** present the typical residential and commercial diurnal patterns for the City of Quinlan, respectively.

Figure 4-3: Residential Demand Pattern

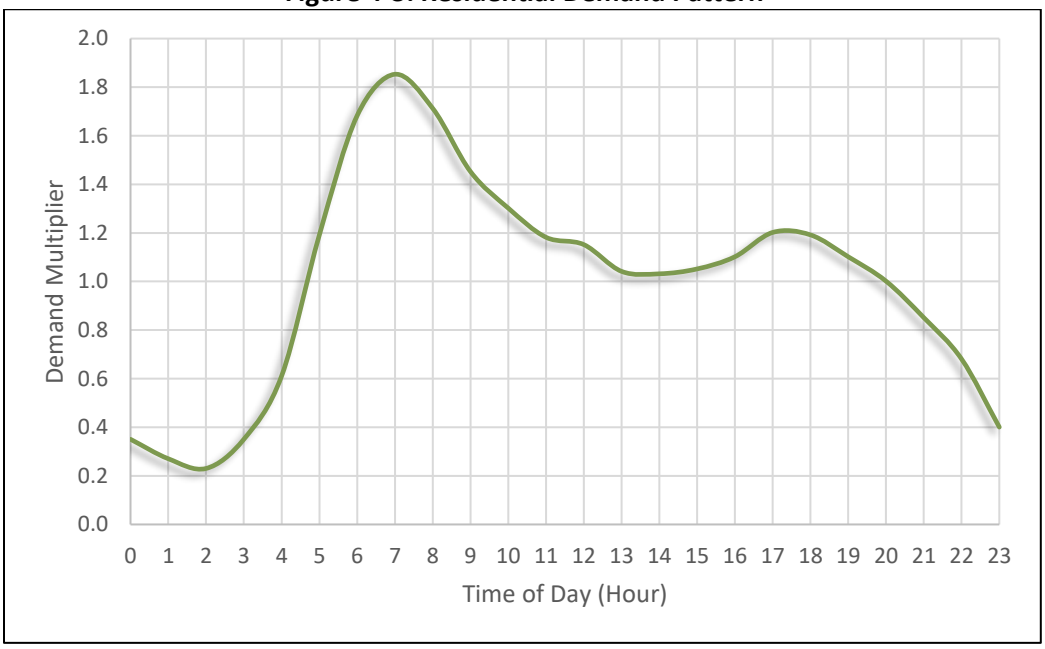
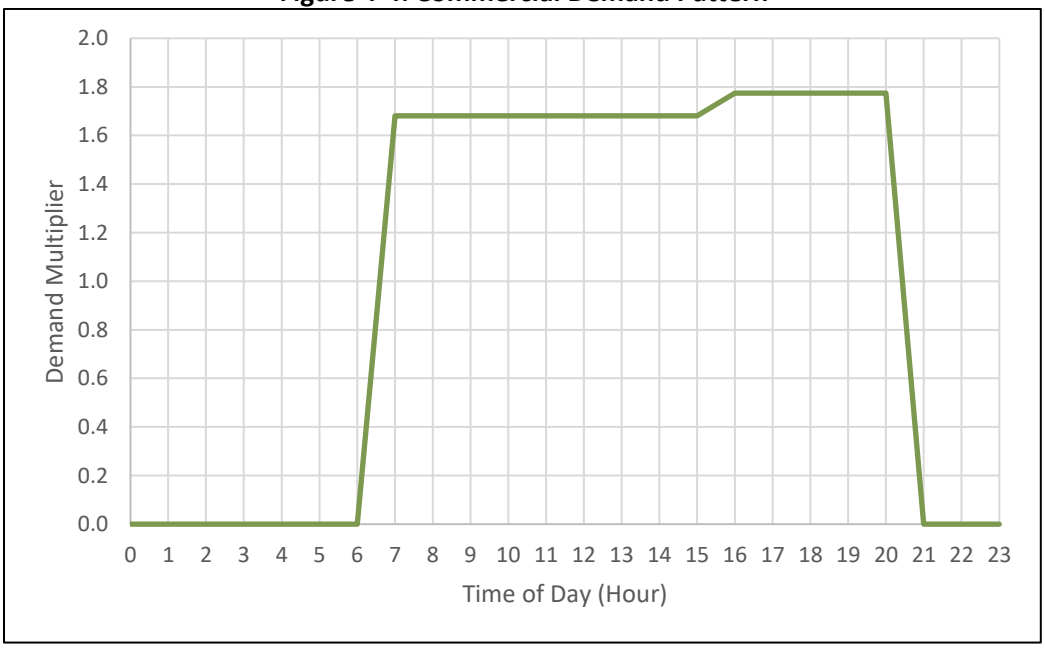


Figure 4-4: Commercial Demand Pattern



C. Modifications and Results

During the EPS calibration, adjustments were made to the model in order to match the known conditions of May 4, 2019 through May 10, 2019. Adjustments to pump run times were made to better match the SCADA data. The SCADA data showed that the levels in the Gin and Main ground storage tanks fluctuate rapidly throughout the day. These tanks are small and are filled by 2-inch transmission mains from the Cash SUD. It is easy to drain the GSTs when the pumps are running. The City is aware of this and has modified operations accordingly.

4.3 TCEQ REQUIREMENTS

As a public water utility, the City of Quinlan must comply with the rules and regulations for public water systems set forth by the Texas Commission on Environmental Quality (TCEQ) in Chapter 290, Public Drinking Water. The City is required to meet the TCEQ minimum elevated storage capacity requirement of 100 gallons per connection, and the total storage (elevated and ground) requirement of 200 gallons per connection. The TCEQ requirements for pumping capacity are summarized in **Table 4-1**. The amount of elevated storage affects the minimum required TCEQ pumping capacity. Elevated storage capacity equal to or greater than 200 gallons per connection decreases the amount of required pumping to 0.6 gpm per connection.

Table 4-1: TCEQ Service Pumping Requirements

Condition	Service Pumping Capacity Requirement*
≥ 200 gallons per connection of elevated storage	Two service pumps with a minimum combined capacity of 0.6 gpm per connection at each pressure plane.
< 200 gallons per connection of elevated storage	The lesser of (a) or (b):
	(a) Total pumping capacity of 2.0 gpm per connection
	(b) Total capacity of at least 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service

*Capacity requirement from TAC §290.45(b)(2)(F)

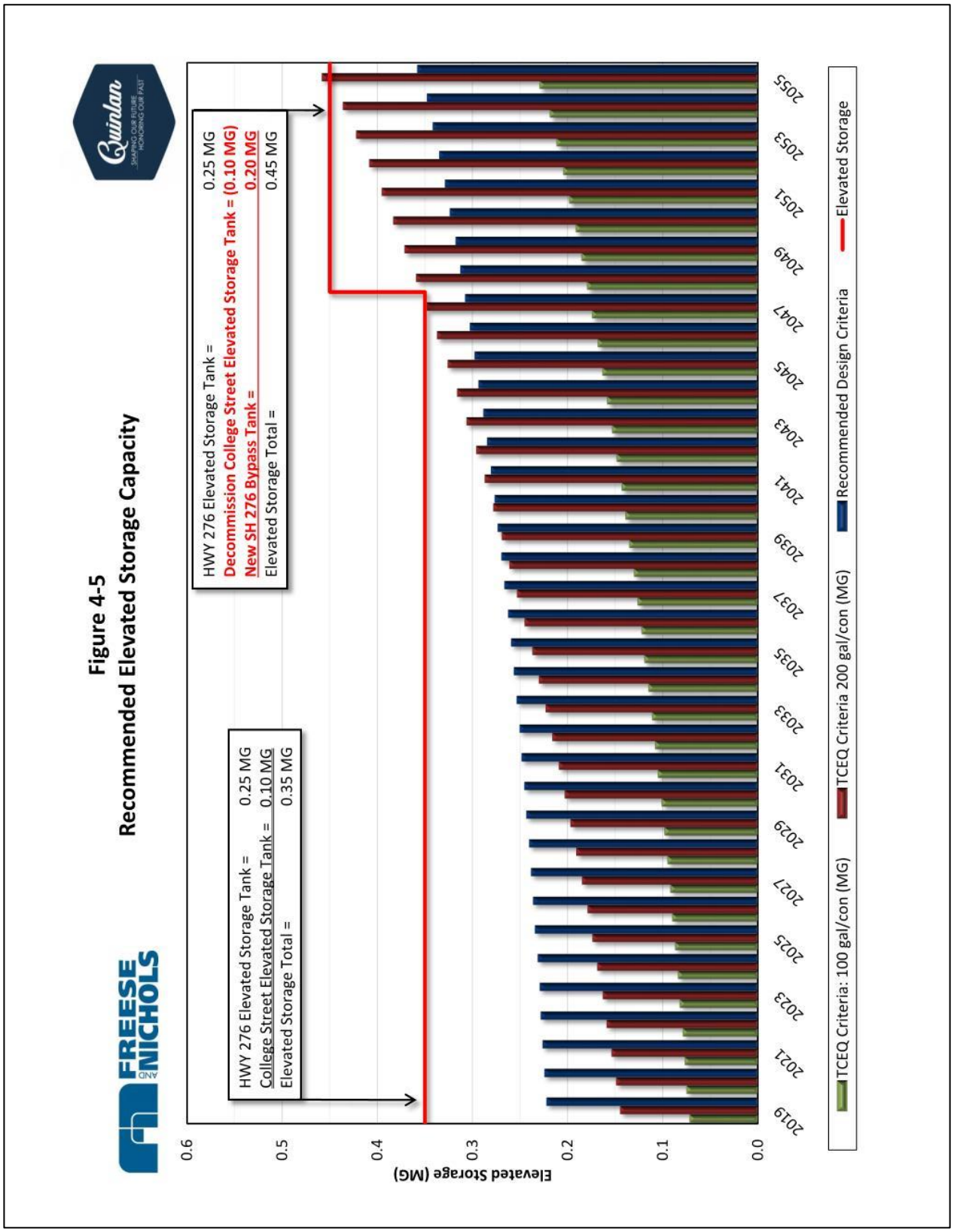
If the City provides less than 200 gallons per connection of elevated storage in the future, the TCEQ pumping requirements would increase. The billing meter data indicates that there are 721 active connections as of December 2018. Existing and future storage and pumping capacities were evaluated and the existing storage and pumping capacities are summarized in **Figures 4-5** through **4-7**. **The City is currently meeting all TCEQ requirements for storage and pumping**. Based on the population projections, the City's existing facilities will continue to be TCEQ compliant through the year 2046.

4.4 STORAGE AND PUMPING RECOMMENDATIONS

4.4.1 Recommended Elevated Storage

This section summarizes the evaluation of the storage and pumping capacity for the City based on criteria developed by FNI. These criteria are typically more stringent than the TCEQ requirements and take into consideration additional factors including operational flexibility, fire suppression, system redundancy, and energy efficiency. The design criteria used to analyze elevated storage tank capacity is the volume required to provide adequate equalization storage for peak hour demands plus emergency storage for fire protection. It is typically assumed that half of the elevated storage tank capacity is used to meet peak hourly demands in excess of the maximum day rate (equalization volume), while the other half of the tank is used for fire protection and emergency conditions (fire/emergency volume). This evaluation assumes that pumping will meet 125% of maximum day demands and elevated storage will meet 40% of peak hour demands for 4 hours plus fire flow demand (1,500 gpm) for 2 hours. If TCEQ's requirement exceeded FNI's recommendation, the more stringent criteria were utilized to size improvements. **Figure 4-5** shows the recommended elevated storage. Additional elevated storage capacity is required by 2048 to accommodate projected future growth.

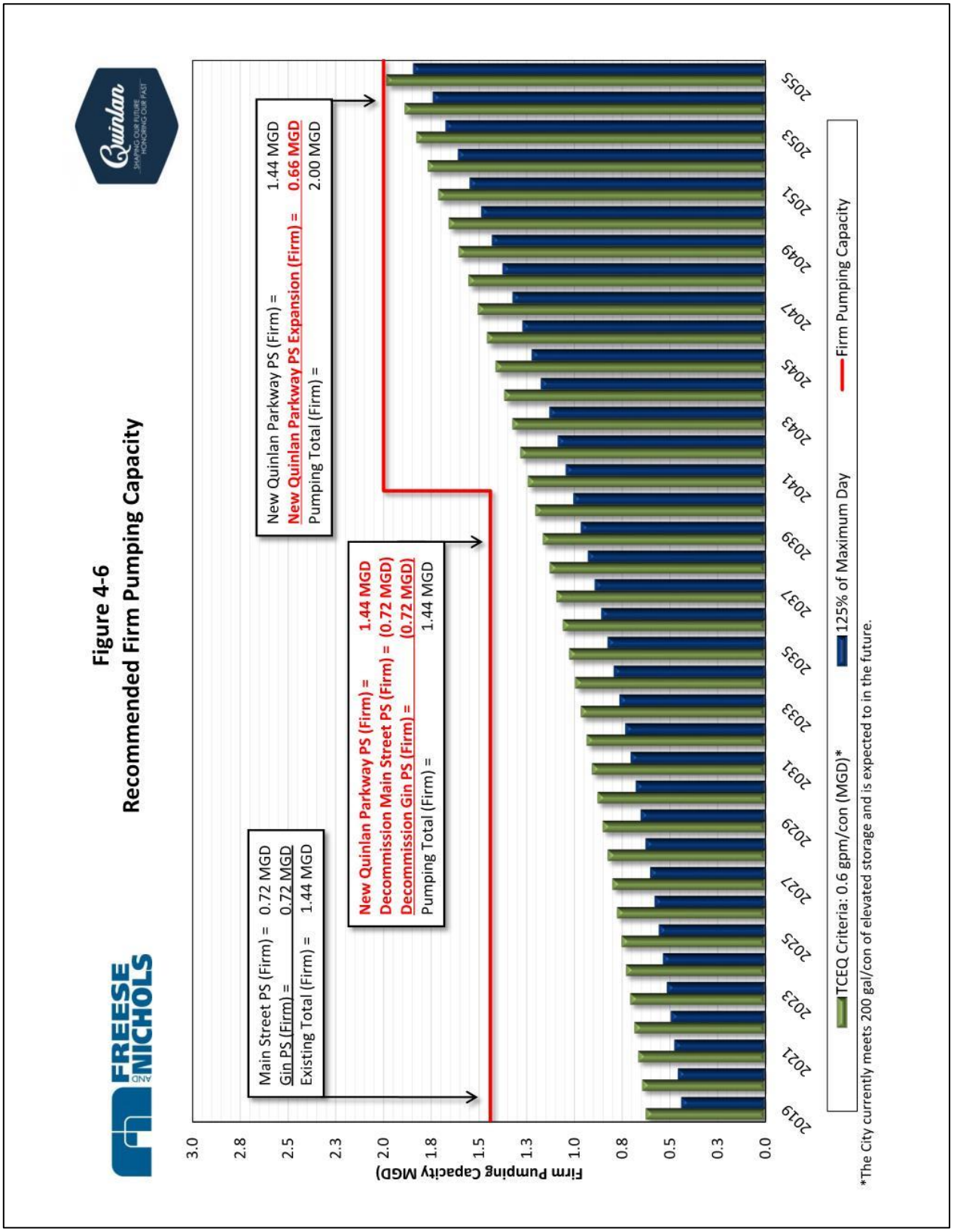
Figure 4-5: Recommended Elevated Storage Capacity



4.4.2 Recommended Pumping

The recommended firm pumping capacity was calculated based on meeting TCEQ pumping requirements of 0.6 gpm per connection and at least 125% of the maximum day demands. Firm pumping capacity is defined as the total available pumping capacity at with the largest pump at each pump station out of service. **Figure 4-6** presents the recommended firm pumping capacity. Additional pumping capacity is recommended as part of the construction of the new Quinlan Parkway PS and GST but is not required until 2046.

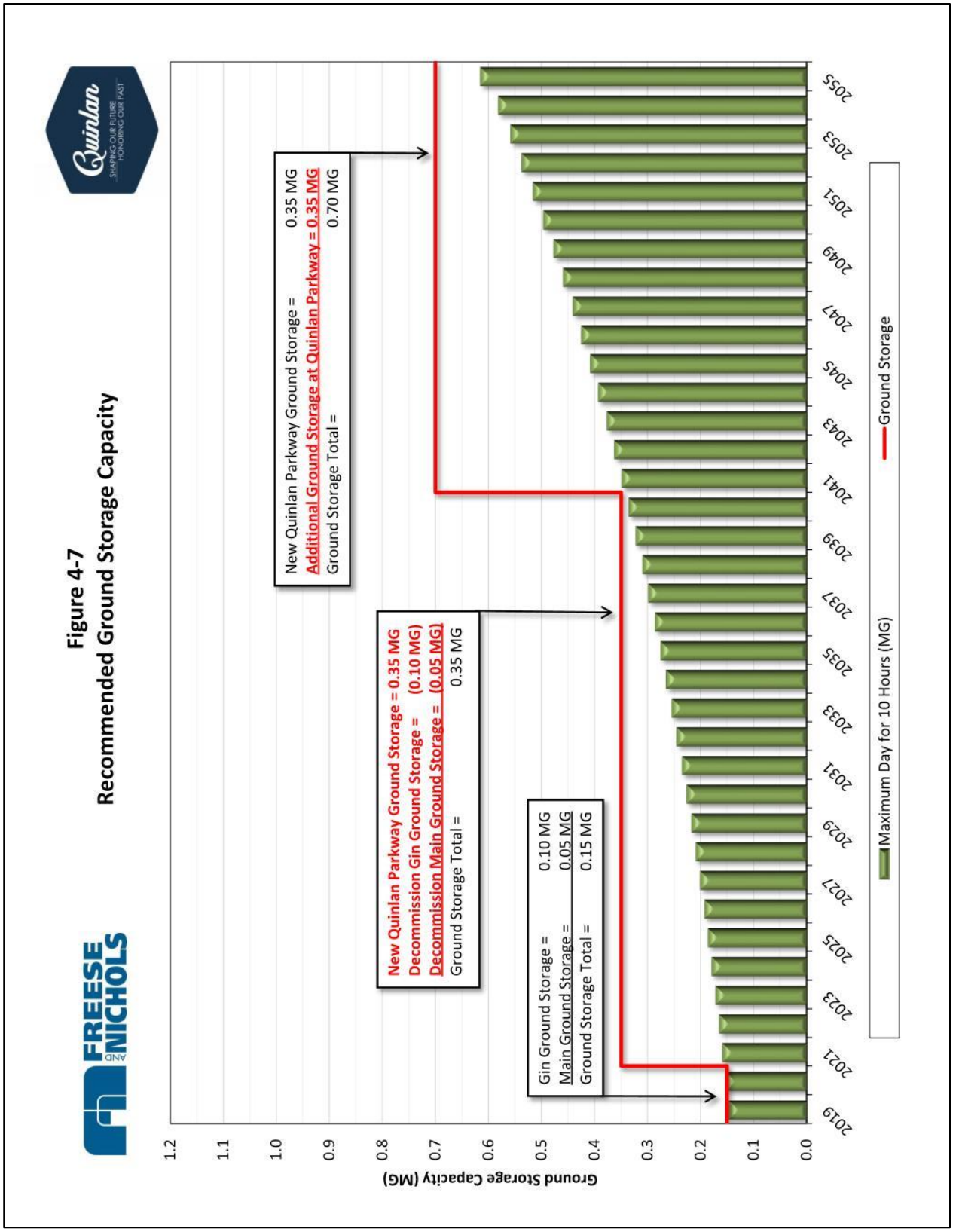
Figure 4-6: Recommended Firm Pumping Capacity



4.4.3 Recommended Ground Storage

Recommended ground storage capacity was calculated based on providing storage equivalent to 10 hours of maximum day demand. Additional ground storage is recommended at the proposed Quinlan Parkway PS. It is also recommended that the Cash SUD provide larger fill lines to fill the ground storage tanks.

Figure 4-7: Recommended Ground Storage Capacity



4.5 WATER DISTRIBUTION SYSTEM ANALYSIS

4.5.1 Existing System Analysis

A hydraulic analysis was performed under existing demand conditions to evaluate system operations and residual pressures throughout the distribution system. A 24-hour Extended Period Simulation (EPS) analysis was performed with 2019 maximum day demands. EPS modeling provides a means to evaluate the system over time to assess response to hourly changes in demand, pump cycling, and tanks filling or draining. During a maximum day EPS analysis, the peak hour demand condition is also simulated by setting the highest hourly peaking factor in the diurnal demand pattern equal to the peak hour to maximum day peaking factor. Peak hour demand represents the single hour of the year with the highest system demand. Peak hour simulations are used to assess the ability of the distribution system to maintain residual pressures because the highest demand period typically induces the lowest pressure due to increased head loss throughout the system. **Figure 4-8 s**hows the minimum pressures observed in the model under existing demand conditions. This map helped identify potential problem areas in the system and was used as a tool to assure that reasonable pressure ranges were maintained throughout the system. The TCEQ minimum required pressure within a distribution system is 35 pounds per square inch (psi) under normal demand conditions. As seen in **Figure 4-8**, the system is largely able to meet that requirement, but a small area west of downtown that is served by 2-inch water lines has modeled pressures below 35 psi.

To evaluate the fire suppression capabilities of the system, a fire flow analysis was conducted under existing maximum day demand conditions. TCEQ requires a minimum residual pressure of 20 psi be maintained while delivering the fire flow demand. For this analysis, a steady-state model run was utilized to calculate the available fire flow at each node in the system with a residual pressure of 20 psi. **Figure 4-9** shows the results of the fire flow simulation. It should be noted that some areas of the City were determined to have available fire flows less than 1,000 gpm while maintaining a residual pressure of 20 psi or greater. Available fire flows below 1,000 gpm are due to small diameter lines in residential neighborhoods and a lack of 10” or larger lines looping throughout the city. Upsizing of smaller lines and looping are two methods to improve low fire flow. Available fire flow for commercial, multi-family, and industrial land uses should be evaluated on a case by case basis.


FIGURE 4-8
CITY OF QUINLAN
EXISTING WATER SYSTEM
PEAK HOUR PRESSURE
LEGEND
Connection Point
Pump Station
Well Pressure Tank
Elevated Storage Tank
Ground Storage Tank
Water Main
Road
Stream
Lake
City Limit
Other City Limit
Water CCN Boundary
City of Quinlan
Aqua Texas Inc.
Cash SUD
Combined Consumers SUD
Combined Consumer/ Quinlan CCN
MODELED PRESSURES
Under 35 psi
35 - 50 psi
Over 50 psi
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FREESE AND NICHOLS
Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST
Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST
Cash SUD
Connection Point
0.1 MG College St
Elevated Storage Tank
0.25 MG Hwy 276
Elevated Storage Tank
CCWS
Pump Station
Well Pressure Tanks
8,800 gal GST
Well Pressure Tanks
6,000 gal GST
Lake Tawakoni
Hawk Cove
W STATE HIGHWAY 276
COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 3604
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 3606
COUNTY ROAD 3630
NORTH SHORE RD
0
900
1,800
SCALE IN FEET


FIGURE 4-9
CITY OF QUINLAN
EXISTING WATER SYSTEM
AVAILABLE FIRE FLOW
LEGEND
Connection Point
Pump Station
Well Pressure Tank
Elevated Storage Tank
Ground Storage Tank
Water Main
Road
Stream
Lake
City Limit
Other City Limit
Water CCN Boundary
City of Quinlan
Aqua Texas Inc.
Cash SUD
Combined Consumers SUD
Combined Consumer/ Quinlan CCN
AVAILABLE FIRE FLOW
Less than 500 gpm
500 - 1,000 gpm
1,000 - 1,500 gpm
More than 1,500 gpm
Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST
Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST
Cash SUD
Connection Point
Cash SUD
Connection Point
0.1 MG College St
Elevated Storage Tank
0.25 MG Hwy 276
Elevated Storage Tank
CCWS
Pump Station
Well Pressure Tanks
8,800 gal GST
Well Pressure Tanks
6,000 gal GST
Lake Tawakoni
Hawk Cove
COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2276
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 3604
COUNTY ROAD 3606
COUNTY ROAD 3630
COUNTY ROAD 2304
W STATE HIGHWAY 276
E QUINLAN PKWY
S STATE HIGHWAY 34
NORTH SHORE RD
0 900 1,800
SCALE IN FEET
Quinlan
FREESE AND NICHOLS

4.5.2 Future System Analysis

Using the recommended criteria outlined in **Section 4.4**, water system improvements were developed to accommodate the anticipated residential and non-residential growth over the next 35 years. Challenges facing the water system include improving areas of low pressure and available fire flow and providing service to areas of future growth where little or no infrastructure currently exists. The following key observations and recommendations result from modeling and evaluating the distribution system.

A. Transmission Capacity

The City of Quinlan currently uses surface water from the Cash SUD that is delivered into the Gin and Main Ground Storage Tanks through 2-inch water lines. In order to provide water to the growing City, it is recommended that the wholesaler increase the transmission capacity to at least a 6-inch supply line.

B. Pumping and Storage

The pumping and storage evaluation were based on the assumption that pumps would be responsible for meeting 125% of the maximum day demands and the elevated storage tanks would be responsible for meeting 40% of peak hour demand. The following describes the findings and recommendations of the evaluation:

- Gin and Main Pump Station – The pumps have adequate capacity to meet the demands of the system, but due to the size of the ground storage tanks, pumping has to be alternated between stations to prevent pump lock out when the water level in the tank gets too low.
- Hwy 276 EST – Due to the location of the EST and the minimal water demand in the surrounding area, the tank does not hydraulically float well with College Street EST. The water in the tank does not turnover well, therefore water quality may be impacted during hot summer months and low water demand periods.

C. Growth

New distribution mains are required to provide service to new developments in the water service area. Lines were sized based on the demands of each specific area served and a 6-inch minimum diameter in most locations.

Once these improvements were added to the existing water system, hydraulic analyses were performed under buildout maximum day demand conditions. Any areas of high head loss, high velocity, or low pressure were adjusted accordingly to ensure appropriate sizing of system improvements. The improvements were phased by planning year depending on when the areas being served were projected to develop. To ensure the improvements would operate correctly as phased, a 24-hour EPS model run was performed under maximum day demand conditions for the buildout planning period.

Figure 4-10 shows minimum pressures during buildout maximum day demand conditions. Minimum pressures shown on the map represent the lowest value of the pressures experienced during the 24-hour simulation, usually occurring during the peak hour demand. **Figure 4-11** shows available fire flows during buildout maximum day demand conditions. Areas of low fire flow were due to small pipe diameter and lack of looping.

FIGURE 4-10
CITY OF QUINLAN
BUILDOUT WATER SYSTEM
PEAK HOUR PRESSURE

Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST

Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST

Cash SUD
Connection Point

Cash SUD
Connection Point

0.1 MG College St
Elevated Storage Tank

0.25 MG Hwy 276
Elevated Storage Tank

CCWS
Pump Station

Well Pressure Tanks
8,800 gal GST

Well Pressure Tanks
6,000 gal GST

Lake Tawakoni

Hawk Cove

COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2276
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 3604
COUNTY ROAD 3630
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 2304
COUNTY ROAD 2306
COUNTY ROAD 3606
COUNTY ROAD 3622
COUNTY ROAD 3623
COUNTY ROAD 3619
COUNTY ROAD 3620
COUNTY ROAD 3621
COUNTY ROAD 3614
COUNTY ROAD 3618
COUNTY ROAD 3626
S FM 36
W STATE HIGHWAY 276
S STATE HIGHWAY 34
N STATE HIGHWAY 34
W MAIN ST
W 2ND ST
3RD ST
W MEYERS ST
E KIRBY ST
E LAURA AVE
E QUINLAN PKWY
N KUYKENDALL
N EDWARD ST
N 1ST ST
OLD HWY 67
CURTIS LN
CAROL DR
PANTHER PATH
COUNTY RD 3602
FRANKLIN DR
BEVERLY
OLE WAGON RD
DRIVEWAY
DEER PARK
INDIAN TRL
NORTH SHORE RD
WHISKERS RD
FM 751
KATHERINE ST
CHRISTEL ST
KAY ST
MARIA ST
DOGWOOD TRL
SHAWNEE CIR
EVELYN ST
DELTON AVE
LADD ST
MORRIS DR
TUFT ST
ROSS RD
LYNDA LN
LEA
JEFFRIES
DONNA DR
GEORGIA ST
RED BIRD CIR
HOLDEN
SHORT WAY
CHEROKEE DR
PINEWOOD DR
GRADY RD
OAK RD
NELL ST
TAMMY ST
LAKE DR
FAYE ST
SILVEY ST
JANET ST
NADA ST
Bois D'arc Creek
Jones Creek

MODELED PRESSURES
- Under 35 psi
- 35 - 50 psi
- Over 50 psi

LEGEND
- Connection Point
- Pump Station
- Well Pressure Tank
- Elevated Storage Tank
- Ground Storage Tank
- Water Main
- Road
- Stream
- Lake
- City Limit
- Other City Limit
- Water/Wastewater Service Area

Water CCN Boundary
- City of Quinlan
- Aqua Texas Inc.
- Cash SUD
- Combined Consumers SUD
- Combined Consumer/ Quinlan CCN

Quinlan — SHAPING OUR FUTURE HONORING OUR PAST

FREESE AND NICHOLS

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FIGURE 4-11
CITY OF QUINLAN
BUILDOUT WATER SYSTEM
AVAILABLE FIRE FLOW

Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST

Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST

Cash WSD
Connection Point

Cash SUD
Connection Point

0.1 MG College St
Elevated Storage Tank

0.25 MG Hwy 276
Elevated Storage Tank

CCWS
Pump Station

Well Pressure Tanks
8,800 gal GST

Well Pressure Tanks
6,000 gal GST

Lake Tawakoni

Hawk Cove

W STATE HIGHWAY 276

S STATE HIGHWAY 34

COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2276
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 2304
COUNTY ROAD 3604
COUNTY ROAD 3606
COUNTY ROAD 3630
COUNTY ROAD 3614
COUNTY ROAD 3618
COUNTY ROAD 3619
COUNTY ROAD 3620
COUNTY ROAD 3621
COUNTY ROAD 3622
COUNTY ROAD 3623
PRIVATE ROAD 3626

AVAILABLE FIRE FLOW

- Less than 500 gpm
- 500 - 1,000 gpm
- 1,000 - 1,500 gpm
- More than 1,500 gpm

LEGEND

- Connection Point
- Pump Station
- Well Pressure Tank
- Elevated Storage Tank
- Ground Storage Tank
- Water Main
- Road
- Stream
- Lake
- City Limit
- Other City Limit
- Water/Wastewater Service Area

Water CCN Boundary

- City of Quinlan
- Aqua Texas Inc.
- Cash SUD
- Combined Consumers SUD
- Combined Consumer/ Quinlan CCN

0 900 1,800
SCALE IN FEET

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5.0 WATER SYSTEM CAPITAL IMPROVEMENTS PLAN

A CIP was developed for the City of Quinlan based on hydraulic modeling results. The recommended improvements will provide the required capacity and reliability to meet projected water demands through buildout conditions. The recommended projects are presented on **Figure 5-1**. Locations shown for new mains and other recommended improvements were generalized for hydraulic analysis. Specific alignments and sites will be determined as part of the design process. It is recommended that these projects be constructed generally in the order listed. However, development patterns may make it necessary to construct some projects sooner or later than anticipated.

Planning level cost estimates were calculated for the recommended renewal projects. The costs are provided as estimates based on previous similar engineering experience in 2019 dollars and include an allowance for engineering, surveying, and contingencies. The project cost estimates do not include an allowance for land or right of way acquisition. These costs are for planning and budgeting purposes only and are not to be considered as a detailed opinion of probable construction cost. **Table 5-1** is a summary of the estimated costs for each of the proposed water system CIP projects. Detailed and itemized descriptions of all the renewal projects and associated costs are shown in **Appendix A**.

Table 5-1: Water System CIP Cost Estimates

Project Number	Project Name	Cost
Short Term Projects		
1	New Quinlan Parkway 1.44 MGD Pump Station, 0.35 MG Ground Storage Tank Construction, and 12-inch Water Line Replacement	$ 6,865,100
2	Decommission Gin and Main Pump Stations	$ 216,800
3	New 8-inch Water Line along Laura Extension	$ 595,100
4	New 12-inch Water Line along State Highway 276 Bypass Extension	$ 3,554,400
5	8-inch Water Line to Replace Existing 2-inch Water Line from State Highway 276 Bypass Extension to East Laura Avenue	$ 252,700
6	New 8-inch Water Line from East Main Street to East Quinlan Parkway	$ 1,107,600
7	New 12-inch Water Line near Highway 276 Elevated Storage Tank	$ 538,200
	Short Term Total	**$ 13,129,900**
Long Term Projects		
8	12-inch Water Line to Replace Existing 8-inch Water Line from TX-34 to Church Street	$ 856,700
9	New 6-inch Water Line in Northeast Area of City	$ 1,707,100
10	Pump Station Expansion and New Ground Storage Tank	$ 897,000
11	New 6-inch Water Line in Northwest Area of City	$ 235,600
12	6-inch Water Line to Replace 2-inch Water Line along 5th Street East Expansion	$ 679,600
13	New 6-inch Water Line in Southeast Area of the City	$ 1,339,300
14	Decommission College Street Elevated Storage Tank and New 0.20 MG Elevated Storage Tank	$ 1,121,300
15	New 8-inch Water Line in South Area of the City	$ 1,221,500
16	New 6-inch Water Line in Southeast Area of the City	$ 683,600
	Long Term Total	**$ 8,741,700**
	CIP Total	**$ 21,871,600**

Project 1: New Quinlan Parkway 1.44 MGD Pump Station, 0.35 MG Ground Storage Tank Construction, and 12-inch Water Line Replacement

New 1.44 MGD pump station and 0.35 MG ground storage tank east of TX-34 and north of East Quinlan Parkway. Proposed 12-inch water line from East Quinlan Parkway that parallels TX-34 until terminating at East Main Street. The proposed line will replace the existing 8-inch line. The proposed pump station and ground storage tank will provide additional pumping capacity and storage to the existing system. The pump station and ground storage tank will replace the pumps

and ground storage tanks at Gin Pump Station and Main Pump Station. The proposed 12-inch water line along TX-34 increases capacity and reduces headloss in the system.

Project 2: Decommission Gin and Main Pump Stations

Decommission Gin Pump Station located at East Main Street and TX-34 and decommission Main Pump Station located at East Main Street and Church Street. Pumping in the system will come from proposed Quinlan Parkway Pump Station.

Project 3: New 8-inch Water Line along Laura Extension

Proposed 8-inch line beginning at East Laura Avenue and TX-34 and proceeding southeast before terminating at East Quinlan Parkway. The proposed 8-inch water line will provide additional looping and transmission capacity to the City's system.

Project 4: New 12-inch Water Line along State Highway 276 Bypass Extension

Proposed 12-inch water line beginning at West State Highway 276 and progressing southeast to East Quinlan Parkway and TX-34. The proposed 12-inch line will provide looping in the City's system between the west and east areas of the City. It will also provide capacity to serve potential new large developments on the westside of the city.

Project 5: 8-inch Water Line to Replace Existing 2-inch Water Line from State Highway 276 Bypass Extension to East Laura Avenue

The proposed 8-inch water line begins at East Laura Avenue and progresses south, replacing an existing 2-inch line, and connecting into the proposed 8-inch line that expands from West State Highway 276 to TX-34. The proposed 8-inch line will provide additional connectivity and capacity to the system.

Project 6: New 8-inch Water Line from East Main Street to East Quinlan Parkway

The proposed 8-inch water line begins at East Main Street and proceeds southeast until terminating at East Quinlan Parkway northwest of the Highway 276 elevated storage tank. The proposed 8-inch provides additional capacity from Highway 276 EST to the rest of the system.

Project 7: New 12-inch Water Line near Highway 276 Elevated Storage Tank

The proposed 12-inch water line will replace the existing 8-inch water line from Highway 276 EST, north to East Quinlan Parkway, and west to the proposed 8-inch line. The proposed 12-inch provides additional capacity from Highway 276 EST to the rest of the system.

Project 8: 12-inch Water Line to Replace Existing 8-inch Water Line from TX-34 to Church Street

Proposed 12-inch water line from TX-34 to Church Street along East Main Street. The proposed 12-inch water line provides additional capacity to the water system and replaces the existing 8-inch line.

Project 9: New 6-inch Water Line in Northeast Area of City

The proposed 6-inch water line begins in the north area along TX-34, proceeds north to County Road 3601, and then proceeds southwest to the proposed 8-inch line (Project 6). The proposed 8-inch water line will serve development in the northeast area of the system along TX-34 and County Road 3601.

Project 10: Pump Station Expansion and New Ground Storage Tank

This project consists of adding a 0.56 MGD pump to the open slot of the new pump station to increase the Firm Pumping capacity to 2.00 MGD. This project also consists of construction of an additional 0.35 MG ground storage tank at proposed pump station site. The proposed pump station expansion and ground storage tank will increase pumping and storage capacity to accommodate future growth in the City.

Project 11: New 6-inch Water Line in Northwest Area of City

The proposed 6-inch water line begins at North 5th Street and proceeds south to West Main Street along the northwest boundary of the City. The proposed 6-inch line provides additional connectivity and capacity in the northwest area of the City.

Project 12: 6-inch Water Line to Replace 2-inch Water Line along 5th Street East Expansion

The proposed 6-inch water line begins at North 5th Street and County Road 2276, proceeds east along North 5th Street, and terminates at North Kuykendall Street. The proposed 6-inch line provides additional connectivity and capacity in the northwest area of the City.

Project 13: New 6-inch Water Line in Southeast Area of the City

The proposed 12-inch water line begins just west of Frontier Drive north of Highway 276 Elevated Storage Tank, proceeds east along East Quinlan Parkway, turns south along FM 751, west at the City's boundary, and north along Taylor Drive until terminating at East Quinlan Parkway. The proposed 6-inch water line provides looping and additional capacity in the southeast area of the City**.**

Project 14: Decommission College Street Elevated Storage Tank and New 0.20 MG Elevated Storage Tank

Decommission College Street Elevated Storage Tank west of TX-34 and construct new elevated storage tank near the intersection of West State Highway 276 and proposed SH 276 Bypass Extension. The replacement proposed tank will increase storage capacity to accommodate future growth in the City.

Project 15: New 8-inch Water Line in South Area of the City

The proposed 8-inch water line replaces the existing 2-inch water line beginning south of Church Street and paralleling South State Highway 34 Business to the south. The proposed 8-inch water line provides additional transmission capacity in the south area of the City.

Project 16: New 6-inch Water Line in Southeast Area of the City

The proposed 6-inch water line begins at Taylor Drive and proceeds west until terminating at TX-34. The proposed 6-inch water line provides looping and additional capacity in the northwest area of the City.


FIGURE 5-1
CITY OF QUINLAN
WATER SYSTEM
CAPITAL IMPROVEMENTS PLAN
LEGEND
Proposed 10-Year Improvements
Pump Station
Ground Storage Tank
Water Line
Proposed Buildout Improvements
Water Line
Ground Storage Tank
Elevated Storage Tank
Existing Water System
Pump Station
Well Pressure Tank
Elevated Storage Tank
Ground Storage Tank
Water Main
Road
Stream
Lake
City Limit
Other City Limit
Water/Wastewater Service Area
Water CCN Boundary
City of Quinlan
Aqua Texas Inc.
Cash SUD
Combined Consumers SUD
Combined Consumer/ Quinlan CCN
R1 Small Diameter Water Line Replacement Program
The utility alignments shown on this figure are for illustration purposes only and do not set the alignment. The alignment will be determined at the time of engineering design of the utility.
Gin Pump Station
Firm Capacity: 500 gpm
77,000 gal GST
Decommission
Main Pump Station
Firm Capacity: 500 gpm
50,000 gal GST
Decommission
Proposed 200,000 gal Elevated Storage Tank
0.1 MG College St Elevated Storage Tank
Decommission
Proposed Quinlan Parkway Pump Station and Ground Storage Tank
Firm Capacity: 1.44 MGD
350,000 gal GST
Pump Station Expansion and New Ground Storage Tank
Firm Capacity: 2.00 MGD
Additional 350,000 gal GST
0.25 MG Hwy 276 Elevated Storage Tank
CCWS Pump Station
Well Pressure Tanks
8,800 gal GST
Well Pressure Tanks
6,000 gal GST
Lake Tawakoni
Hawk Cove
W STATE HIGHWAY 276
E QUINLAN PKWY
COUNTY ROAD 2278
COUNTY ROAD 2292
COUNTY ROAD 2290
COUNTY ROAD 2546
COUNTY ROAD 2300
COUNTY ROAD 2314
COUNTY ROAD 3601
COUNTY ROAD 3603
COUNTY ROAD 3604
COUNTY ROAD 3606
COUNTY ROAD 3630
COUNTY ROAD 3619
COUNTY ROAD 3620
COUNTY ROAD 3623
NORTH SHORE RD
0 900 1,800
SCALE IN FEET
FREESE AND NICHOLS
Quinlan

6.0 WASTEWATER FLOWS

To determine where future wastewater system improvements are necessary, existing and future wastewater load projections were developed using historical wastewater treatment plant (WWTP) data and existing and future population projections.

6.1 HISTORICAL WASTEWATER FLOWS

Historical WWTP flow data provided by the City was analyzed from 2014 to 2016. The historical data provided average daily flows and is summarized in **Table 6-1**.

Table 6-1: Historical Wastewater Flows

Year	Population	Average Day Flow (MGD)	Total Per Capita Demand (gpcd)	Peak Wet Weather Flow (MGD)	Average Day to Peak Wet Weather Peaking Factor
2012	1,350	0.18	135	-	-
2013	1,394	0.16	117	-	-
2014	1,402	0.11	78	0.87	7.94
2015	1,400	0.30	212	2.03	6.83
2016	1,419	0.19	133	1.60	8.46
2017	1,430	0.20	138	-	-
2018	1,440	0.16	114	-	-
Average	**-**	**0.19**	**132**	**1.50**	**7.74**

Based on the review of this data FNI utilized a citywide overall per capita of 125 gpcd for existing and future flows (100 gpcd is recommended by TCEQ). The average daily to peak wet weather peaking factor was 7.74. FNI utilized a citywide peaking factor of 5.0 for existing and future flows based on the understanding that the City has made an effort to rehabilitate much of the existing infrastructure that was determined to be in poor condition. **Table 6-2** summarizes the design criteria used to project wastewater flows.

Table 6-2: Wastewater Flow Design Criteria

Per Capita (gpcd)	Average Day to Peak Wet Weather Peaking Factor
125	5.0

6.2 PROJECTED WASTEWATER FLOWS

Wastewater flows were projected for 2019 through buildout (2055) conditions using the design criteria presented in **Table 6-2**. **Table 6-3** summarizes the projected wastewater flows for the City of Quinlan.

Table 6-3: Projected Wastewater Flows

Year	Population	Average Daily Flow (MGD)	Peak Wet Weather Flow (MGD)
2019	1,469	0.18	0.92
2025	1,528	0.19	0.95
2030	2,261	0.28	1.41
2040	3,348	0.42	2.09
2050	4,955	0.62	3.10
2055	6,137	0.77	3.84

7.0 WASTEWATER COLLECTION SYSTEM ANALYSES

7.1 EXISTING WASTEWATER COLLECTION SYSTEM

The City of Quinlan's existing wastewater service area covers approximately 1.5 square miles. Within the service area, there are approximately 12.5 miles of sewer lines ranging from 6-to 15-inches in diameter. Quinlan owns and operates a WWTP located in the western corner of the City with an existing average day permitted capacity of 300,000 gpd. The wastewater collection system is primarily a gravity flow system that follows the major drainage features of the service area. There are currently seven lift stations in the wastewater collection system which convey wastewater flow into gravity sewers. These lift stations are required because of local topographic constraints. The existing wastewater collection system is shown on **Figure 7-1**.

7.2 EXISTING SYSTEM EVALUATION

FNI reviewed the *2018 Wastewater Collection System Rehabilitation* report that was provided by the City. The report identifies large infiltration and inflow (I/I) responses during moderate or major rainfall events. The large amounts of I/I are taxing the wastewater collection system as well as the wastewater treatment plant. City staff indicated that the Kamora Lift Station is often inundated with wastewater flow even though the station serves very little development. The City has inspected the wastewater line upstream and has not been able to identify the source of the I/I. The Rehabilitation report identified wastewater line and manhole rehabilitation throughout the collection system to restore the intended capacity of the system. The recommendations in the report for wastewater line segments were sized to serve existing customers and future growth. The growth identified in the Comprehensive Plan is more aggressive than the growth presented in the rehabilitation report, therefore the required pipe diameters to convey future growth may be larger than originally proposed.

Panther Path Lift Station
Dairy Queen Lift Station
Private Lift Station
Assembly Of God Lift Station Abandoned
Quinlan Wastewater Treatment Plant ADF Permitted Capacity = 0.3 MGD
Carol Street Lift Station
Skating Rink Lift Station
Young Lift Station
Taylor Street Lift Station Abandoned
Kamora Lift Station
W STATE HIGHWAY 276
COUNTY ROAD 2276
COUNTY ROAD 3603
COUNTY ROAD 3602
COUNTY ROAD 2300
COUNTY ROAD 2304
COUNTY ROAD 2314
COUNTY ROAD 3604
COUNTY ROAD 3605
COUNTY ROAD 3606
COUNTY ROAD 3614
S STATE HIGHWAY 34
S STATE HIGHWAY 34 BUS
E QUINLAN PKWY
NORTH SHORE RD
FM 751
PANTHER PATH
VAUGHN LN
CAGLE ST
SEAY LN
W 2ND ST
E 2ND ST
W 1ST ST
E 1ST ST
W MAIN ST
E MAIN ST
W RICHMOND AVE
E RICHMOND AVE
W KIRBY ST
E KIRBY ST
E LAURA AVE
CLARDY DR
CANAL ST
SAWYERS DR
BEVERLY
LAKE ST
CURTIS LN
CAROL DR
N 5TH ST
3RD ST
10" F.M.
15"
12"
0 600 1,200
SCALE IN FEET

FIGURE 7-1
CITY OF QUINLAN
EXISTING WASTEWATER SYSTEM

LEGEND

- Manhole
- Lift Station
- Wastewater Treatment Plant
- 10" and Smaller Wastewater Line
- 12" and Larger Wastewater Line
- Force Main
- Road
- Contour (10 ft)
- Stream
- Lake
- City Limit

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7.3 FUTURE SYSTEM EVALUATION

A high-level hydraulic evaluation of the wastewater collection system was then performed to identify projected deficiencies in the wastewater collection system and to establish a CIP to reinforce the existing system and convey projected wastewater flows. Various combinations of improvements and modifications were investigated to determine the most appropriate approach for conveying projected flows. The City provided information on the wastewater collection system, but no information was available regarding the pipe inverts or the slope of the pipes. Therefore, all pipes were assumed at minimum slope as specified by TCEQ in **Chapter 217.53(l) Table C.1**. Future wastewater flows were distributed based on future land use. Wastewater basins were delineated within the existing vacant land uses to identify where future wastewater flows would flow by gravity. The wastewater flow projections for each future land use parcel were assigned to the nearest manhole within the proposed alignment to evaluate the required pipe diameter to convey future flows. Additional capacity is recommended where wastewater flow projections exceed the full pipe capacity of the existing line assuming minimum slope. **Table 7-1** presents the full pipe capacity of various wastewater pipe sizes based on TCEQ minimum slope.

Table 7-1: Full Pipe Capacity

Diameter (inch)	Minimum Slope	Full Pipe Capacity (MGD)
6	0.50%	0.26
8	0.33%	0.45
10	0.25%	0.71
12	0.20%	1.03
15	0.15%	1.62
18	0.11%	2.25
21	0.09%	3.07
24	0.08%	4.14

7.4 WASTEWATER TREATMENT PLANT EVALUATION

A major component of a wastewater system is the treatment of wastewater flow. FNI evaluated the City's WWTP capacity to determine the timing of recommended capacity improvements. The WWTP has a permitted average daily flow capacity of 300,000 gpd (0.3 MGD). The basis for the capacity evaluation is the TCEQ "75/90" rule. If the average daily flow to the WWTP exceeds 75% of the permitted capacity for three consecutive months, the utility must begin planning improvements to the WWTP. The utility should

be constructing improvements to the WWTP when average daily flows reach 90% of the permitted capacity. **Figure 7-4** illustrates the required treatment plant capacity through the buildout planning period. FNI recommends a phased approach for expansions. The first phase would include the construction of a new 0.5 MGD WWTP south of the existing plant by the year 2032. The second phase would expand the new plant from 0.5 MGD to 0.8 MGD by 2045. The timing of the expansions is driven by future growth and may be expedited or delayed based on growth in the City.

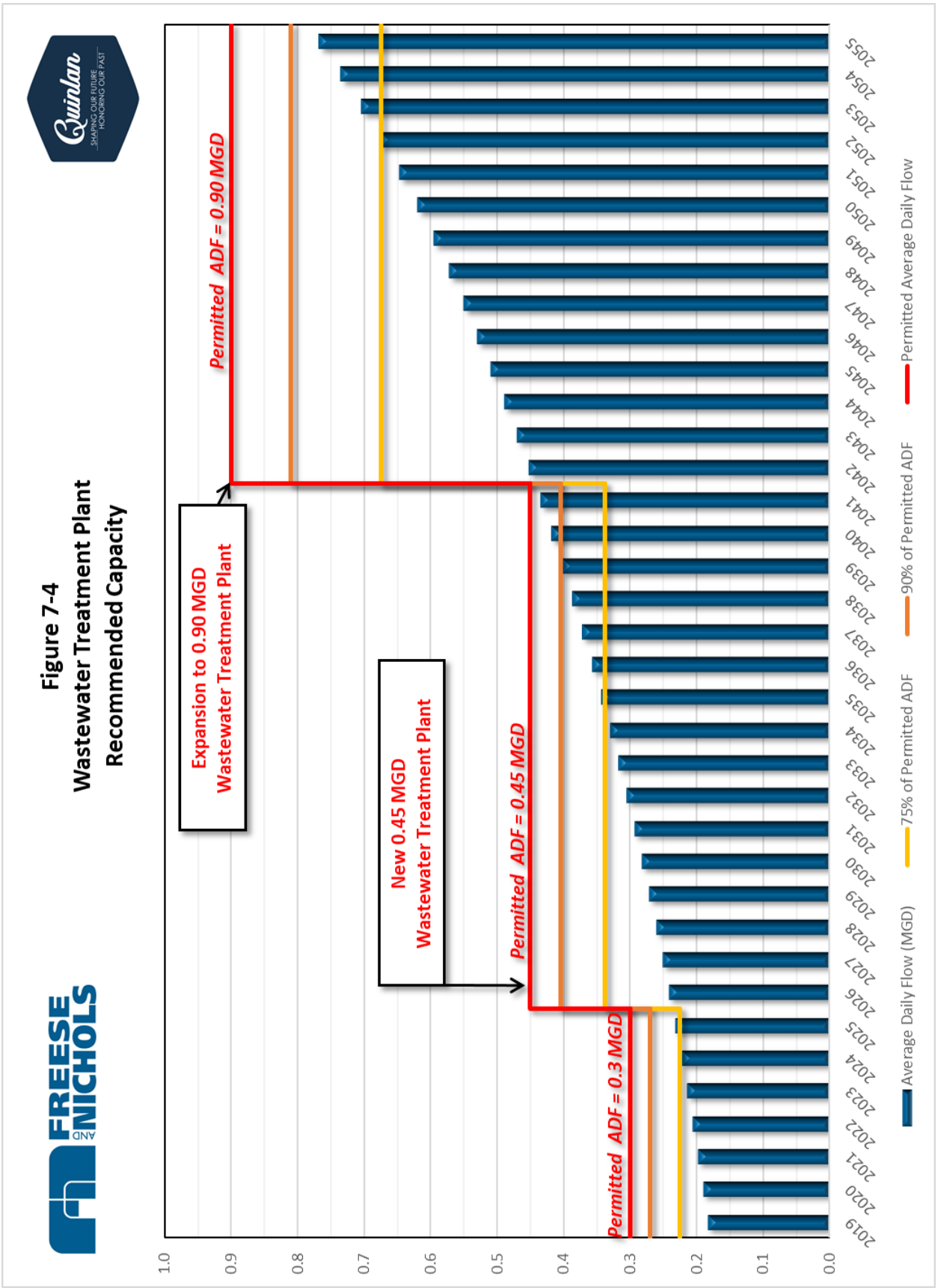
Figure 7-4
Wastewater Treatment Plant
Recommended Capacity
Expansion to 0.90 MGD
Wastewater Treatment Plant
New 0.45 MGD
Wastewater Treatment Plant
Permitted ADF = 0.90 MGD
Permitted ADF = 0.45 MGD
Permitted ADF = 0.3 MGD
Average Daily Flow (MGD)
75% of Permitted ADF
90% of Permitted ADF
Permitted Average Daily Flow
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2019
2020
2021
2022
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2031
2032
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2055

8.0 WASTEWATER CAPITAL IMPROVEMENT PLAN

The wastewater CIP was developed to address existing deficiencies in the system, as well as provide capacity for future flows in the wastewater collection system. The recommended improvements will provide the required capacity to meet projected wastewater flows through buildout. The recommended projects for the wastewater system are presented on **Figure 8-1**. Locations shown for new wastewater lines and other recommended improvements were generalized for hydraulic analyses. Specific alignments and sites will be determined as part of the design process.

Planning level cost estimates were calculated for the recommended renewal projects. The renewal planning costs are estimated based on full replacement of the wastewater line. The costs are provided as estimates based on previous similar engineering experience in 2019 dollars and include an allowance for engineering, surveying, and contingencies. The project cost estimates do not include an allowance for land or right of way acquisition. These costs are for planning and budgeting purposes only and are not to be considered as a detailed opinion of probable construction cost. **Table 8-1** is a summary of the estimated costs for each of the proposed water system CIP projects. Detailed and itemized descriptions of all the renewal projects and associated costs are shown in **Appendix B**.

Table 8-1: Wastewater System CIP Cost Estimates

Project Number	Project Name	Cost
Short Term Projects		
1	18-inch Wastewater Line	$ 793,900
2	10-inch Wastewater Line	$ 336,400
3	New Wastewater Treatment Plant	$ 10,091,300
4	Decommission Existing Quinlan Wastewater Treatment Plant and Construct New 24-inch Wastewater Line from Existing Treatment Plant to Proposed Treatment Plant	$ 3,169,400
5	2.25 MGD Lift Station and 10-inch Force Main	$ 4,578,500
6	18-inch Wastewater Line and Decommission Young Lift Station	$ 1,118,300
	Short Term Total	**$ 20,087,800**
Long Term Projects		
7	15-inch Wastewater Line	$ 1,951,000
8	15-inch Wastewater Line	$ 773,800
9	8-inch and 10-inch Wastewater Lines	$ 1,723,200
10	15-inch Wastewater Line	$ 1,045,700
11	6-inch Wastewater Line	$ 253,000
12	6-inch Wastewater Line	$ 242,200
13	10-inch and 12-inch Wastewater Line	$ 583,100
14	8-inch Wastewater Lines	$ 1,193,100
15	Wastewater Treatment Plant Expansion	$ 8,073,000
16	New 0.25 MGD Lift Station and 8-inch Force Main	$ 598,000
17	6-inch Wastewater Line	$ 403,700
18	6-inch Wastewater Line	$ 201,900
19	6-inch Wastewater Line	$ 215,300
20	6-inch Wastewater Line	$ 400,100
21	6-inch Wastewater Line	$ 457,500
22	Decommission Carol Street Lift Station and New 8-inch Wastewater Line	$ 306,500
23	Two 6-inch Wastewater Lines	$ 363,300
24	6-inch Wastewater Line	$ 121,100
	Long Term Total	**$ 18,905,500**
	CIP Total	**$ 38,993,300**

Project 1: 18-inch Wastewater Line

Proposed 18-inch wastewater line upstream of existing Young Lift Station. The proposed line will provide increased capacity to the east area of the City to serve future development.

Project 2: 10-inch Wastewater Line

Proposed 10-inch wastewater line in the southeast area of the City upstream of the proposed 18-inch wastewater line. The proposed line will provide increased capacity to the east area of the City to serve future development.

Project 3: New Wastewater Treatment Plant

The proposed wastewater treatment plant (WWTP) is located in the southwest area of the City, outside of existing City Limits, and has an average day permitted capacity of 0.45 MGD. The proposed WWTP will replace the existing WWTP and provide capacity for future growth in the southeast area of the City.

Project 4: Decommission Existing Quinlan Wastewater Treatment Plant and Construct New 24-inch Wastewater Line from Existing Treatment Plant to Proposed Treatment Plant

Decommissioning of existing WWTP and construction of new 24-inch wastewater line beginning at existing WWTP and proceeding southeast until terminating at proposed WWTP. The existing WWTP will be replaced by the proposed WWTP and the new 24-inch line provides transmission capacity from the west area of the City to the proposed WWTP.

Project 5: 2.25 MGD Lift Station and 10-inch Force Main

The proposed 2.25 MGD Lift Station in the south area of the City will capture flow from existing and projected growth. The proposed 10-inch force main will force flow from the lift station to the treatment plant located in the southwest area of the City. The proposed lift station and force main will capture flow from the southeast area of the system and send it to the proposed WWTP.

Project 6: 18-inch Wastewater Line and Decommission Young Lift Station

Proposed 18-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station and decommissioning of existing Young Lift Station. The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City. The decommissioning of existing Young Lift Station will send flows in the south area of the system to proposed 2.25 MGD Lift Station.

Project 7: 15-inch Wastewater Line

Proposed 15-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station. The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City.

Project 8: 15-inch Wastewater Line

Proposed 15-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station. The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City.

Project 9: 8-inch and 10-inch Wastewater Lines

Proposed wastewater lines along SH 276 Bypass Extension. The proposed 8-inch wastewater line begins in the southwest area of the system and terminates at County Road 2300. The proposed 10-inch begins at proposed 8-inch, follows CR 2300 south, continues southeast, and terminates at the proposed WWTP. The proposed wastewater lines will provide transmission capacity to projected development along the SH 276 Bypass Extension.

Project 10: 15-inch Wastewater Line

Proposed 15-inch wastewater line in the east part of the system outside of existing City Limits. Proposed 15-inch wastewater line in the east part of the system to serve projected development in the northeast area of the City and outside of the existing City Limits.

Project 11: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the east part of the system outside of existing City Limits. Proposed 6-inch wastewater line in the east part of the system to serve projected development in the northeast area of the City and outside of the existing City Limits.

Project 12: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the east part of the system outside existing City Limits. The proposed wastewater line will assist in serving projected development in the northeast area of the City and outside of the existing City Limits.

Project 13: 10-inch and 12-inch Wastewater Line

The proposed 10- and 12-inch wastewater lines are located in the west area of the City. The 10-inch line begins at West Main Street and South Edward Street and proceeds south to West Richmond Avenue where the 12-inch proposed line begins. The 12-inch line turns west at West Richmond Avenue, turns south, then terminates at Meyers Avenue. This project parallels the existing 6-inch wastewater line. The proposed wastewater lines provide increased capacity in the west area of the City to serve proposed development.

Project 14: 8-inch Wastewater Lines

Two proposed 8-inch wastewater lines in the northwest area of the system. The first 8-inch line begins at North Edward Street and North 5th Street, proceeds south along North Edward Street and terminates at West Main Street. The second 8-inch line begins just south of West 2nd Street between Easement Street and North Epperson Street, proceeds south, turns west at West Main Street and terminates at North Edward Street. The proposed replacement project provides increased capacity to the wastewater system to serve projected growth in the northwest area of the City.

Project 15: Wastewater Treatment Plant Expansion

Increase average day permitted capacity of proposed lift station from 0.45 MGD to 0.90 MGD. The proposed WWTP expansion provides increased capacity to serve projected growth in the City.

Project 16: New 0.25 MGD Lift Station and 8-inch Force Main

New lift station in the northwest area of the City just west of existing Panther Path Lift Station. The proposed lift station will serve projected growth in the northwest area of the City.

Project 17: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the northwest area of the City flowing to proposed 0.25 MGD lift station (Project 16). The proposed wastewater line will serve projected growth in the northwest area of the City.

Project 18: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the northwest area of the City flowing to proposed 0.25 MGD lift station (Project 16). The proposed wastewater line will serve projected growth in the northwest area of the City.

Project 19: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the west area of the City. The proposed wastewater line will serve projected growth in the west area of the City.

Project 20: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the northeast area of the City east of TX-34. The proposed wastewater line will serve projected growth in the northeast area of the City.

Project 21: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the northeast area of the City south of County Road 3601 and east of TX-34. The proposed wastewater line will serve projected growth in the northeast area of the City.

Project 22: Decommission Carol Street Lift Station and New 8-inch Wastewater Line

Decommission existing Carol Street Lift Station in the west area of the City and construct new 8-inch wastewater line. The decommissioning of the Carol Street Lift Station and addition of new wastewater line will send existing flow in the west area of the City to the proposed WWTP to the south.

Project 23: Two 6-inch Wastewater Lines

Proposed 6-inch wastewater line in the east area of the City and proposed 6-inch wastewater line in the west area of the City. The 6-inch line in the west area of the system flows to the proposed 24-inch and on to the proposed WWTP. The proposed wastewater line will serve projected growth in the City.

Project 24: 6-inch Wastewater Line

Proposed 6-inch wastewater line in the north area of the City to flow into existing Panther Path Lift Station. The proposed wastewater line will serve projected growth in the north area of the City.

FIGURE 8-1
CITY OF QUINLAN
WASTEWATER SYSTEM
CAPITAL IMPROVEMENTS PLAN

LEGEND

Proposed 10-Year Improvements

- Lift Station
- Wastewater Treatment Plant
- Wastewater Line
- Force Main

Proposed Buildout Improvements

- Lift Station
- Wastewater Line
- Force Main

- Lift Station
- Wastewater Treatment Plant
- 10" and Smaller Wastewater Line
- 12" and Larger Wastewater Line
- Force Main
- Road
- Contour (10 ft)
- Stream
- Lake
- City Limit
- Water/Wastewater Service Area

Quinlan — SHAPING OUR FUTURE "HONORING OUR PAST"

FREESE AND NICHOLS

The utility alignment shown on this figure are for illustration purposes only and do not set the alignment. The alignment will be determined at the time of engineering design of the utility.

16 Proposed Lift Station
0.25 MGD Firm Capacity

Panther Path
Lift Station

Dairy Queen
Lift Station

Quinlan
Wastewater Treatment Plant
Decommission

Carol Street
Lift Station
Decommission

Private
Lift Station

Assembly Of God
Lift Station
(Abandoned by City)

Skating Rink
Lift Station

Young
Lift Station
Decommission

Kamora
Lift Station

Taylor Street
Lift Station
(Abandoned by City)

New Wastewater Treatment Plant
Average Day Permitted Capacity = 0.45 MGD
Wastewater Treatement Plant Expansion
Average Day Permitted Capacity = 0.90 MGD

Proposed South Quinan Lift Station
2.25 MGD Firm Capacity

W STATE HIGHWAY 276 · COUNTY ROAD 3601 · COUNTY ROAD 3603 · COUNTY ROAD 3602 · COUNTY ROAD 2276 · COUNTY ROAD 2300 · COUNTY ROAD 2304 · COUNTY ROAD 2314 · COUNTY ROAD 3604 · COUNTY ROAD 3605 · COUNTY ROAD 3606 · S STATE HIGHWAY 34 BUS · S STATE HIGHWAY 34 · FM 751 · E QUINLAN PKWY · N 5TH ST · 3RD ST · W 2ND ST · W 1ST ST · W MAIN ST · E MAIN ST · E 1ST ST · E 2ND ST · E RICHMOND AVE · E KIRBY ST · W KIRBY ST · CLARDY DR · NORTHSIDE DR · VAUGHN LN · SEAY LN · N EASEMENT ST · N CHURCH ST · N EDWARD ST · N KUYKENDALL · S KUYKENDALL · N PICADILLY ST · S PICADILLY ST · N MARTIN ST · N GREENWAY ST · N F.M. ST · CANNON ST · S ASHBY ST · S EPPERSON ST · BRISTOL ST · CURTIS LN · E CAROL DR · TURNER DR · WAMPOLL RD · PANTHER PARK · FRONTIER DR · TAYLOR DR · BEVERLY · NORTH SHORE RD · DRIVEWAY · Bois d'arc Creek

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SCALE IN FEET

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Date Created: Wednesday, October 28, 2020 9:06:46 AM
User Name: GSW89

APPENDIX A
DETAILED WATER SYSTEM CIP COST ESTIMATES

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 1 — **Phase: Short Term**

Project Name: New Quinlan Parkway 1.44 MGD Pump Station, 0.35 MG Ground Storage Tank Construction, and 12-inch Water Line Replacement

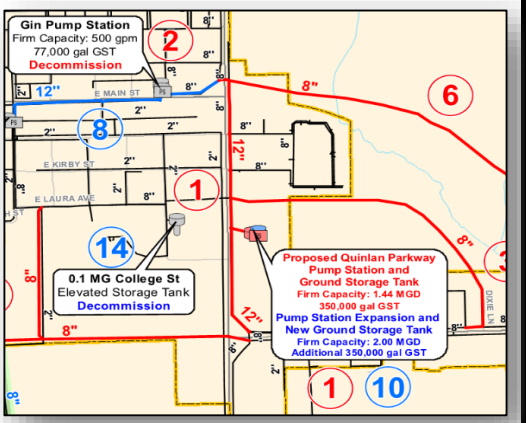
Project Description:

New 1.44 MGD pump station and 0.35 MG ground storage tank east of TX-34 and north of East Quinlan Parkway. Proposed 12-inch water line from East Quinlan Parkway that parallels TX-34 until terminating at East Main Street. The proposed line will replace the existing 8-inch line.

Project Drivers:

The proposed pump station and ground storage tank will provide additional pumping capacity and storage to the existing system. The pump station and ground storage tank will replace the pumps and ground storage tanks at Gin Pump Station and Main Pump Station. The proposed 12-inch water line along TX-34 increases capacity and reduces headloss in the system.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - New 1.44 MGD	1	LS	$ 3,500,000	$ 3,500,000
2	0.35 MG Ground Storage Tank	1	LS	$ 300,000	$ 300,000
3	12" WL & Appurtenances	3,300	LF	$ 150	$ 495,000
4	Concrete Pavement Repair	3,300	LF	$ 90	$ 297,000
				SUBTOTAL:	**$ 4,592,000**
		CONTINGENCY		30%	$ 1,377,600
				SUBTOTAL:	**$ 5,969,600**
		ENG/SURVEY		15%	$ 895,500
				SUBTOTAL:	**$ 6,865,100**
				Estimated Project Total:	**$ 6,865,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 2 — **Phase: Short Term**

Project Name: Decommission Gin and Main Pump Stations

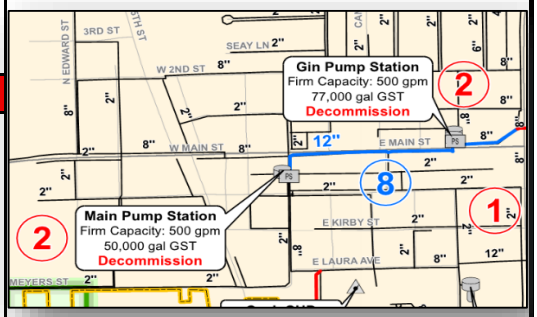
Project Description:

Decommission Gin Pump Station located at East Main Street and TX-34, and decommission Main Pump Station located at East Main Street and Church Street.

Project Drivers:

Pumping in the system will come from proposed Quinlan Parkway Pump Station.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Decommission Pump Station	2	LS	$ 35,000	$ 70,000
2	Decommission Ground Storage Tank	3	LS	$ 25,000	$ 75,000
				SUBTOTAL:	**$ 145,000**
		CONTINGENCY		30%	$ 43,500
				SUBTOTAL:	**$ 188,500**
		ENG/SURVEY		15%	$ 28,300
				SUBTOTAL:	**$ 216,800**
				Estimated Project Total:	**$ 216,800**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 3 — **Phase: Short Term**

Project Name: New 8-inch Water Line along Laura Extension

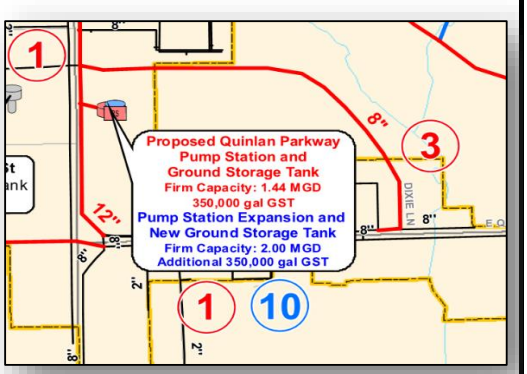
Project Description:

Proposed 8-inch line beginning at East Laura Avenue and TX-34 and proceeding southeast before terminating at East Quinlan Parkway.

Project Drivers:

The proposed 8-inch water line will provide additional looping and transmission capacity to the City's system.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" WL & Appurtenances	3,800	LF	$ 100	$ 380,000
2	Concrete Pavement Repair	200	LF	$ 90	$ 18,000
				SUBTOTAL:	**$ 398,000**
		CONTINGENCY		30%	$ 119,400
				SUBTOTAL:	**$ 517,400**
		ENG/SURVEY		15%	$ 77,700
				SUBTOTAL:	**$ 595,100**
				Estimated Project Total:	**$ 595,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 4 — **Phase: Short Term**

Project Name: New 12-inch Water Line along State Highway 276 Bypass Extension

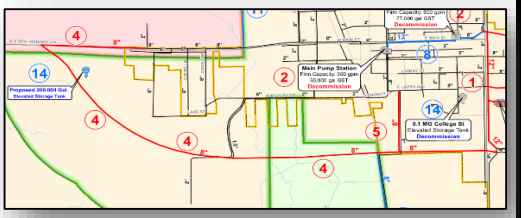
Project Description:

Proposed 12-inch water line beginning at West State Highway 276 and progressing southeast to East Quinlan Parkway and TX-34.

Project Drivers:

The proposed 12-inch line will provide looping in the City's system between the west and east areas of the City. It will also provide capacity to serve potential new large developments on the westside of the city.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	13,700	LF	$ 150	$ 2,055,000
2	Concrete Pavement Repair	2,800	LF	$ 90	$ 252,000
3	16" Boring and Casing	200	LF	$ 352	$ 70,400
				SUBTOTAL:	**$ 2,377,400**
		CONTINGENCY		30%	$ 713,300
				SUBTOTAL:	**$ 3,090,700**
		ENG/SURVEY		15%	$ 463,700
				SUBTOTAL:	**$ 3,554,400**
				Estimated Project Total:	**$ 3,554,400**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 5 — **Phase: Short Term**

Project Name: 8-inch Water Line to Replace Existing 2-inch Water Line from State Highway 276 Bypass Extension to East Laura Avenue

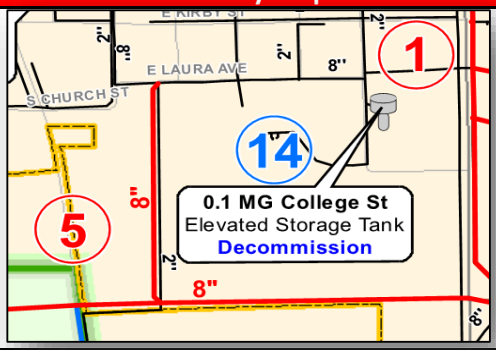
Project Description:

The proposed 8-inch water line begins at East Laura Avenue and progresses south, replacing an existing 2-inch line, and connecting into the proposed 8-inch line that expands from West State Highway 276 to TX-34.

Project Drivers:

The proposed 8-inch line will provide additional connectivity and capacity to the system.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" WL & Appurtenances	1,600	LF	$ 100	$ 160,000
2	Concrete Pavement Repair	100	LF	$ 90	$ 9,000
				SUBTOTAL:	**$ 169,000**
			CONTINGENCY	30%	$ 50,700
				SUBTOTAL:	**$ 219,700**
			ENG/SURVEY	15%	$ 33,000
				SUBTOTAL:	**$ 252,700**
				Estimated Project Total:	**$ 252,700**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 6 — **Phase: Short Term**

Project Name: New 8-inch Water Line from East Main Street to East Quinlan Parkway

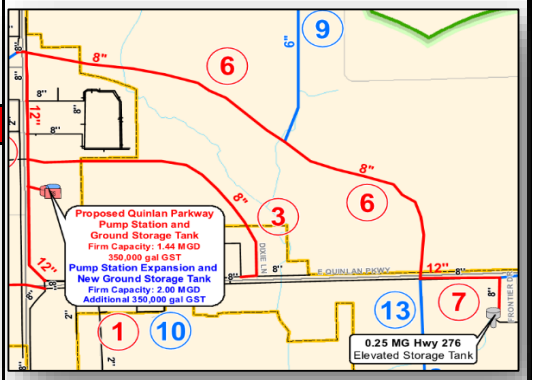
Project Description:

The proposed 8-inch water line begins at East Main Street and proceeds southeast until terminating at East Quinlan Parkway northwest of the Highway 276 elevated storage tank.

Project Drivers:

The proposed 8-inch provides additional capacity from Highway 276 EST to the rest of the system.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" WL & Appurtenances	6,000	LF	$ 100	$ 600,000
2	16" Boring and Casing	400	LF	$ 352	$ 140,800
				SUBTOTAL:	**$ 740,800**
		CONTINGENCY		30%	$ 222,300
				SUBTOTAL:	**$ 963,100**
		ENG/SURVEY		15%	$ 144,500
				SUBTOTAL:	**$ 1,107,600**
				Estimated Project Total:	**$ 1,107,600**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 7 — **Phase: Short Term**

Project Name: New 12-inch Water Line near Highway 276 Elevated Storage Tank

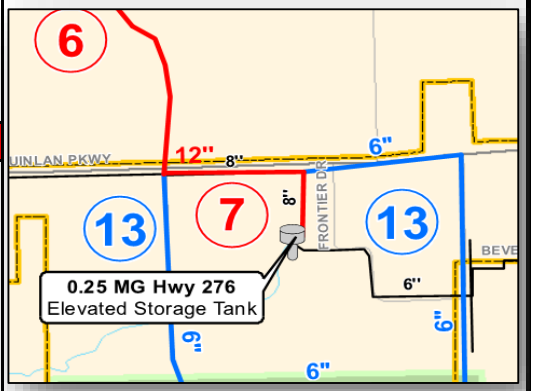
Project Description:

The proposed 12-inch water line will replace the existing 8-inch water line from Highway 276 EST, north to East Quinlan Parkway, and west to the proposed 8-inch line.

Project Drivers:

The proposed 12-inch provides additional capacity from Highway 276 EST to the rest of the system.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	1,500	LF	$ 150	$ 225,000
2	Concrete Pavement Repair	1,500	LF	$ 90	$ 135,000
				SUBTOTAL:	**$ 360,000**
			CONTINGENCY	30%	$ 108,000
				SUBTOTAL:	**$ 468,000**
			ENG/SURVEY	15%	$ 70,200
				SUBTOTAL:	**$ 538,200**
				Estimated Project Total:	**$ 538,200**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 8 — **Phase: Long Term**

Project Name: 12-inch Water Line to Replace Existing 8-inch Water Line from TX-34 to Church Street

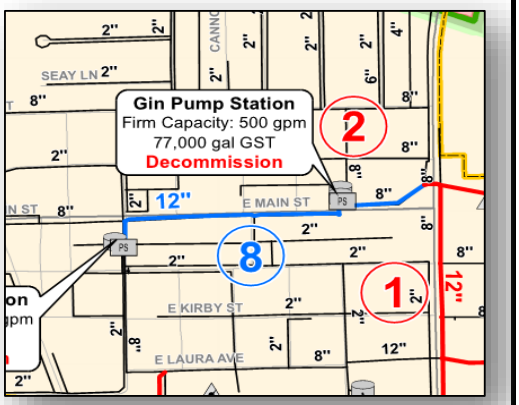
Project Description:

Proposed 12-inch water line from TX-34 to Church Street along East Main Street.

Project Drivers:

The proposed 12-inch water line provides additional capacity to the water system and replaces the existing 8-inch line.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	2,500	LF	$ 150	$ 375,000
2	Concrete Pavement Repair	2,200	LF	$ 90	$ 198,000
				SUBTOTAL:	**$ 573,000**
				CONTINGENCY 30%	$ 171,900
				SUBTOTAL:	**$ 744,900**
				ENG/SURVEY 15%	$ 111,800
				SUBTOTAL:	**$ 856,700**
				Estimated Project Total:	**$ 856,700**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 9 — **Phase: Long Term**

Project Name: New 6-inch Water Line in Northeast Area of City

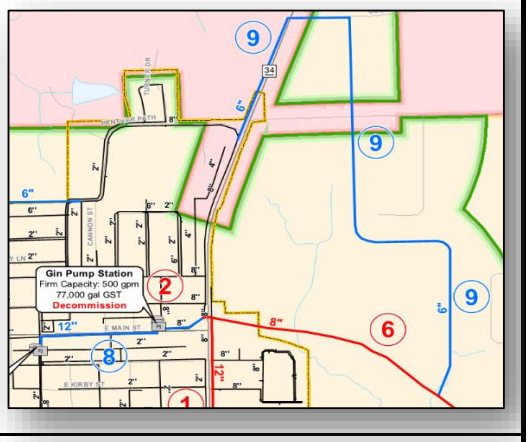
Project Description:

The proposed 6-inch water line begins in the north area along TX-34, proceeds north to County Road 3601, and then proceeds southwest to the proposed 8-inch line (Project 6).

Project Drivers:

The proposed 8-inch water line will serve development in the northeast area of the system along TX-34 and County Road 3601.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" WL & Appurtenances	9,400	LF	$ 75	$ 705,000
2	Concrete Pavement Repair	2,800	LF	$ 90	$ 252,000
3	12" Boring and Casing	700	LF	$ 264	$ 184,800
				SUBTOTAL:	**$ 1,141,800**
		CONTINGENCY		30%	$ 342,600
				SUBTOTAL:	**$ 1,484,400**
		ENG/SURVEY		15%	$ 222,700
				SUBTOTAL:	**$ 1,707,100**
				Estimated Project Total:	**$ 1,707,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 10 — **Phase: Long Term**

Project Name: Pump Station Expansion and New Ground Storage Tank

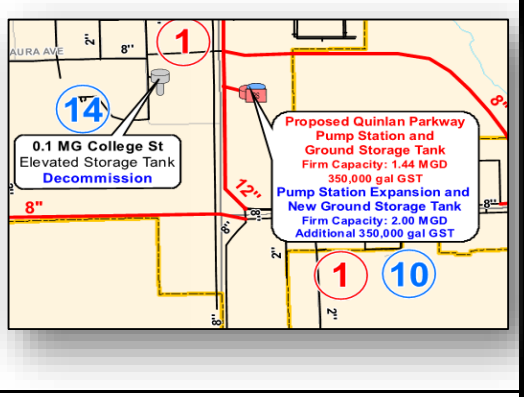
Project Description:

This project consists of adding a 0.56 MGD pump to the open slot of the new pump station to increase the Firm Pumping capacity to 2.00 MGD. Construct additional 0.35 MG ground storage tank at proposed pump station site.

Project Drivers:

Increase pumping and storage capacity to accommodate future growth in the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.56 MGD Pump	1	EA	$ 300,000	$ 300,000
2	0.35 MG Ground Storage Tank	1	LS	$ 300,000	$ 300,000
				SUBTOTAL:	**$ 600,000**
		CONTINGENCY		30%	$ 180,000
				SUBTOTAL:	**$ 780,000**
		ENG/SURVEY		15%	$ 117,000
				SUBTOTAL:	**$ 897,000**
				Estimated Project Total:	**$ 897,000**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 11 — **Phase: Long Term**

Project Name: New 6-inch Water Line in Northwest Area of City

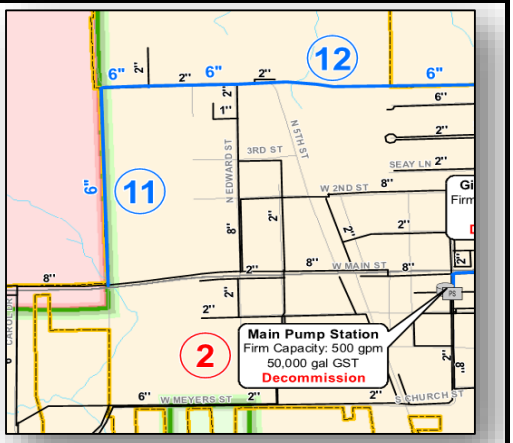
Project Description:

The proposed 6-inch water line begins at North 5th Street and proceeds south to West Main Street along the northwest boundary of the City.

Project Drivers:

The proposed 6-inch line provides additional connectivity and capacity in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" WL & Appurtenances	2,100	LF	$ 75	$ 157,500
				SUBTOTAL:	**$ 157,500**
				CONTINGENCY 30%	$ 47,300
				SUBTOTAL:	**$ 204,800**
				ENG/SURVEY 15%	$ 30,800
				SUBTOTAL:	**$ 235,600**
				Estimated Project Total:	**$ 235,600**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 12 — **Phase: Long Term**

Project Name: 6-inch Water Line to Replace 2-inch Water Line along 5th Street East Expansion

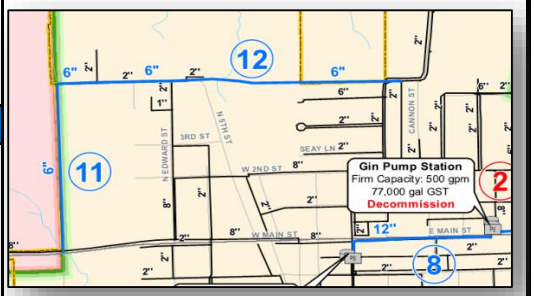
Project Description:

The proposed 6-inch water line begins at North 5th Street and County Road 2276, proceeds east along North 5th Street, and terminates at North Kuykendall Street.

Project Drivers:

The proposed 6-inch line provides additional connectivity and capacity in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" WL & Appurtenances	3,900	LF	$ 75	$ 292,500
2	Concrete Pavement Repair	1,800	LF	$ 90	$ 162,000
				SUBTOTAL:	**$ 454,500**
			CONTINGENCY	30%	$ 136,400
				SUBTOTAL:	**$ 590,900**
			ENG/SURVEY	15%	$ 88,700
				SUBTOTAL:	**$ 679,600**
				Estimated Project Total:	**$ 679,600**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 13 — **Phase: Long Term**

Project Name: New 6-inch Water Line in Southeast Area of the City

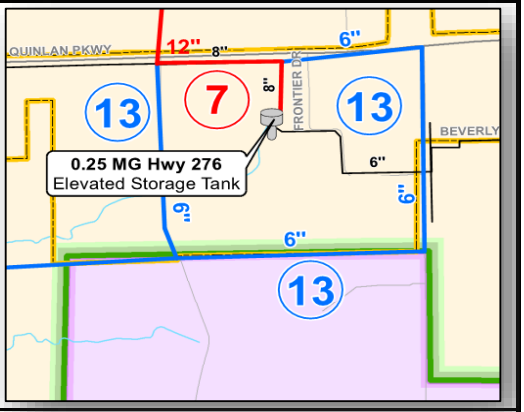
Project Description:

The proposed 12-inch water line begins just west of Frontier Drive north of Highway 276 Elevated Storage Tank, proceeds east along East Quinlan Parkway, turns south along FM 751, west at the City's boundary, and north along Taylor Drive until terminating at East Quinlan Parkway.

Project Drivers:

The proposed 6-inch water line provides looping and additional capacity in the southeast area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" WL & Appurtenances	6,200	LF	$ 75	$ 465,000
2	Concrete Pavement Repair	4,200	LF	$ 90	$ 378,000
3	12" Boring and Casing	200	LF	$ 264	$ 52,800
				SUBTOTAL:	**$ 895,800**
		CONTINGENCY		30%	$ 268,800
				SUBTOTAL:	**$ 1,164,600**
		ENG/SURVEY		15%	$ 174,700
				SUBTOTAL:	**$ 1,339,300**
				Estimated Project Total:	**$ 1,339,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 14 — **Phase: Long Term**

Project Name: Decommission College Street Elevated Storage Tank and New 0.20 MG Elevated Storage Tank

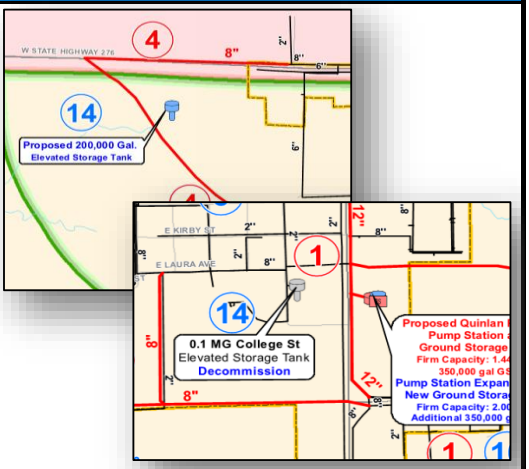
Project Description:

Decommission College Street Elevated Storage Tank west of TX-34 and construct new elevated storage tank near the intersection of West State Highway 276 and proposed SH 276 Bypass Extension.

Project Drivers:

The replacement proposed tank will increase storage capacity to accommodate future growth in the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Decommission Elevated Storage Tank	1	LS	$ 50,000	$ 50,000
2	0.2 MG Elevated Storage Tank	1	LS	$ 700,000	$ 700,000
				SUBTOTAL:	**$ 750,000**
		CONTINGENCY		30%	$ 225,000
				SUBTOTAL:	**$ 975,000**
		ENG/SURVEY		15%	$ 146,300
				SUBTOTAL:	**$ 1,121,300**
				Estimated Project Total:	**$ 1,121,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 15 — **Phase: Long Term**

Project Name: New 8-inch Water Line in South Area of the City

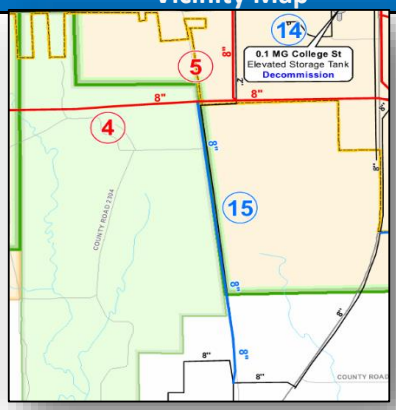
Project Description:

The proposed 8-inch water line replaces the existing 2-inch water line beginning south of Church Street and paralleling South State Highway 34 Business to the south.

Project Drivers:

The proposed 8-inch water line provides additional transmission capacity in the south area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" WL & Appurtenances	4,300	LF	$ 100	$ 430,000
2	Concrete Pavement Repair	4,300	LF	$ 90	$ 387,000
				SUBTOTAL:	**$ 817,000**
		CONTINGENCY		30%	$ 245,100
				SUBTOTAL:	**$ 1,062,100**
		ENG/SURVEY		15%	$ 159,400
				SUBTOTAL:	**$ 1,221,500**
				Estimated Project Total:	**$ 1,221,500**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 16 — **Phase: Long Term**

Project Name: New 6-inch Water Line in Southeast Area of the City

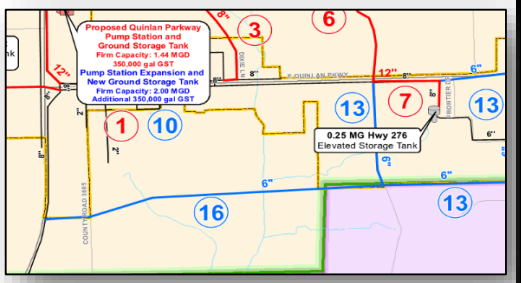
Project Description:

The proposed 6-inch water line begins at Taylor Drive and proceeds west until terminating at TX-34.

Project Drivers:

The proposed 6-inch water line provides looping and additional capacity in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" WL & Appurtenances	4,800	LF	$ 75	$ 360,000
2	Concrete Pavement Repair	200	LF	$ 90	$ 18,000
3	12" Boring and Casing	300	LF	$ 264	$ 79,200
				SUBTOTAL:	**$ 457,200**
		CONTINGENCY		30%	$ 137,200
				SUBTOTAL:	**$ 594,400**
		ENG/SURVEY		15%	$ 89,200
				SUBTOTAL:	**$ 683,600**
				Estimated Project Total:	**$ 683,600**

Comments:

APPENDIX B
DETAILED WASTEWATER SYSTEM CIP COST ESTIMATES

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 1 — **Phase: Short Term**

Project Name: 18-inch Wastewater Line

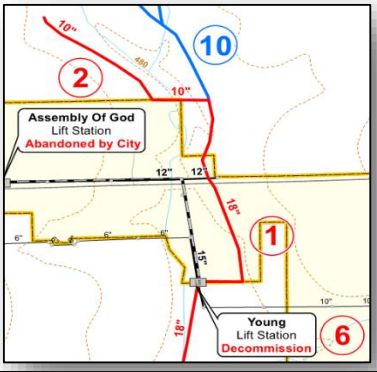
Project Description:

Proposed 18-inch wastewater line upstream of existing Young Lift Station.

Project Drivers:

The proposed line will provide increased capacity to the east area of the City to serve future development.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe 8- 16 feet deep	1,900	LF	$ 270	$ 513,000
2	Concrete Pavement Repair	200	LF	$ 90	$ 18,000
				SUBTOTAL:	**$ 531,000**
		CONTINGENCY		30%	$ 159,300
				SUBTOTAL:	**$ 690,300**
		ENG/SURVEY		15%	$ 103,600
				SUBTOTAL:	**$ 793,900**
				Estimated Project Total:	**$ 793,900**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 2 — **Phase: Short Term**

Project Name: 10-inch Wastewater Line

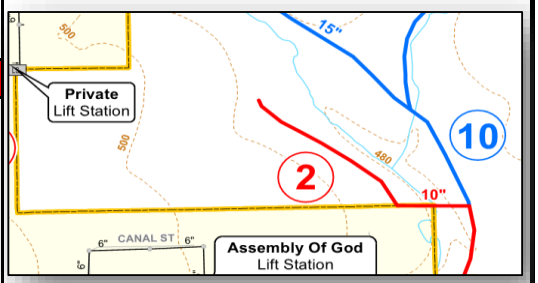
Project Description:

Proposed 10-inch wastewater line in the southeast area of the City upstream of the proposed 18-inch wastewater line.

Project Drivers:

The proposed line will provide increased capacity to the east area of the City to serve future development.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	10" Pipe 8- 16 feet deep	1,500	LF	$ 150	$ 225,000
				SUBTOTAL:	**$ 225,000**
		CONTINGENCY		30%	$ 67,500
				SUBTOTAL:	**$ 292,500**
		ENG/SURVEY		15%	$ 43,900
				SUBTOTAL:	**$ 336,400**
				Estimated Project Total:	**$ 336,400**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 3 — **Phase: Short Term**

Project Name: New Wastewater Treatment Plant

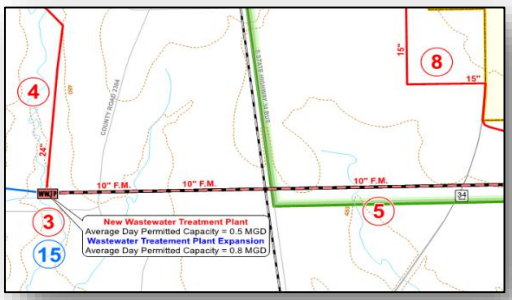
Project Description:

The proposed wastewater treatment plant (WWTP) is located in the southwest area of the City, outside of existing City Limits, and has an average day permitted capacity of 0.45 MGD.

Project Drivers:

The proposed WWTP will replace the existing WWTP and provide capacity for future growth in the southeast area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Wastewater Treatment Plant	1	LS	$ 6,750,000	$ 6,750,000
				SUBTOTAL:	**$ 6,750,000**
		CONTINGENCY		30%	$ 2,025,000
				SUBTOTAL:	**$ 8,775,000**
		ENG/SURVEY		15%	$ 1,316,300
				SUBTOTAL:	**$ 10,091,300**
				Estimated Project Total:	**$ 10,091,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 4 — **Phase: Short Term**

Project Name: Decommission Existing Quinlan Wastewater Treatment Plant and Construct New 24-inch Wastewater Line from Existing Treatment Plant to Proposed Treatment Plant

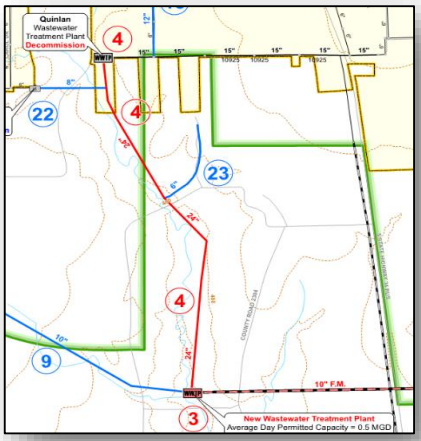
Project Description:

Decommissioning of existing WWTP and construction of new 24-inch wastewater line beginning at existing WWTP and proceeding southeast until terminating at proposed WWTP.

Project Drivers:

The existing WWTP will be replaced by the proposed WWTP and the new 24-inch line provides transmission capacity from the west area of the City to the proposed WWTP.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe 8- 16 feet deep	4,500	LF	$ 360	$ 1,620,000
2	Decommission Wastewater Treatment Plant	1	LS	$ 500,000	$ 500,000
				SUBTOTAL:	**$ 2,120,000**
		CONTINGENCY		30%	$ 636,000
				SUBTOTAL:	**$ 2,756,000**
		ENG/SURVEY		15%	$ 413,400
				SUBTOTAL:	**$ 3,169,400**
				Estimated Project Total:	**$ 3,169,400**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 5 — **Phase: Short Term**

Project Name: 2.25 MGD Lift Station and 10-inch Force Main

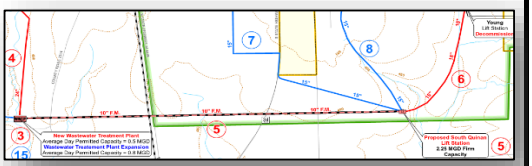
Project Description:

The proposed 2.25 MGD Lift Station in the south area of the City will capture flow from existing and projected growth. The proposed 10-inch force main will force flow from the lift station to the treatment plant located in the southwest area of the City.

Project Drivers:

The proposed lift station and force main will capture flow from the southeast area of the system and send it to the proposed WWTP.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.25 MGD Lift Station	1	EA	$ 2,250,000	$ 2,250,000
2	10" Force Main < 8 feet deep	6,500	LF	$ 125	$ 812,500
				SUBTOTAL:	**$ 3,062,500**
		CONTINGENCY		30%	$ 918,800
				SUBTOTAL:	**$ 3,981,300**
		ENG/SURVEY		15%	$ 597,200
				SUBTOTAL:	**$ 4,578,500**
				Estimated Project Total:	**$ 4,578,500**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 6 — **Phase: Short Term**

Project Name: 18-inch Wastewater Line and Decommission Young Lift Station

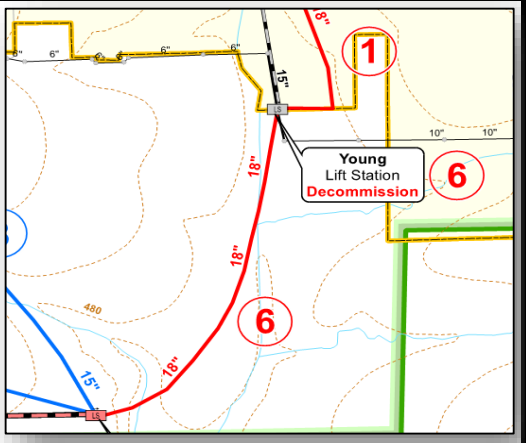
Project Description:

Proposed 18-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station and decommissioning of existing Young Lift Station.

Project Drivers:

The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City. The decommissioning of existing Young Lift Station will send flows in the south area of the system to proposed 2.25 MGD Lift Station.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe 8- 16 feet deep	2,400	LF	$ 270	$ 648,000
2	Decommission Lift Station	1	LS	$ 100,000	$ 100,000
				SUBTOTAL:	**$ 748,000**
		CONTINGENCY		30%	$ 224,400
				SUBTOTAL:	**$ 972,400**
		ENG/SURVEY		15%	$ 145,900
				SUBTOTAL:	**$ 1,118,300**
				Estimated Project Total:	**$ 1,118,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 7 — **Phase: Long Term**

Project Name: 15-inch Wastewater Line

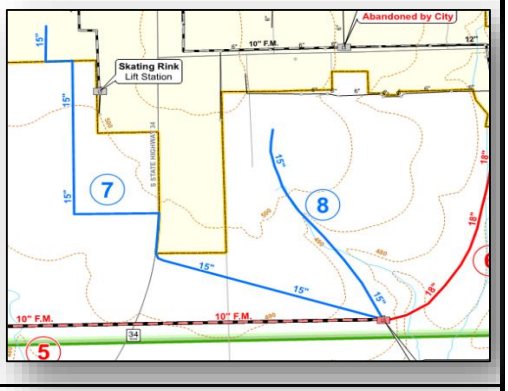
Project Description:

Proposed 15-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station.

Project Drivers:

The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe 8- 16 feet deep	5,600	LF	$ 225	$ 1,260,000
2	Concrete Pavement Repair	500	LF	$ 90	$ 45,000
				SUBTOTAL:	**$ 1,305,000**
		CONTINGENCY		30%	$ 391,500
				SUBTOTAL:	**$ 1,696,500**
		ENG/SURVEY		15%	$ 254,500
				SUBTOTAL:	**$ 1,951,000**
				Estimated Project Total:	**$ 1,951,000**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 8 — **Phase: Long Term**

Project Name: 15-inch Wastewater Line

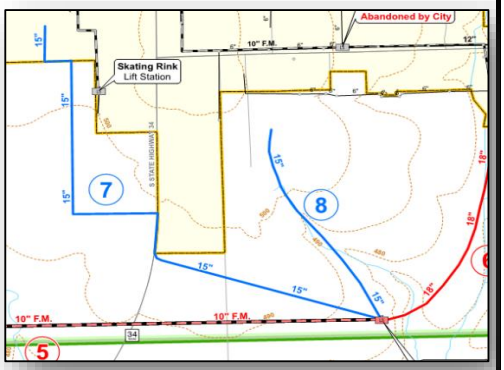
Project Description:

Proposed 15-inch wastewater line in the south area of the City upstream of proposed 2.25 MGD Lift Station.

Project Drivers:

The proposed wastewater line will provide transmission capacity to serve projected development in the south area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe 8- 16 feet deep	2,300	LF	$ 225	$ 517,500
				SUBTOTAL:	**$ 517,500**
				CONTINGENCY 30%	$ 155,300
				SUBTOTAL:	**$ 672,800**
				ENG/SURVEY 15%	$ 101,000
				SUBTOTAL:	**$ 773,800**
				Estimated Project Total:	**$ 773,800**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 9 — **Phase: Long Term**

Project Name: 8-inch and 10-inch Wastewater Lines

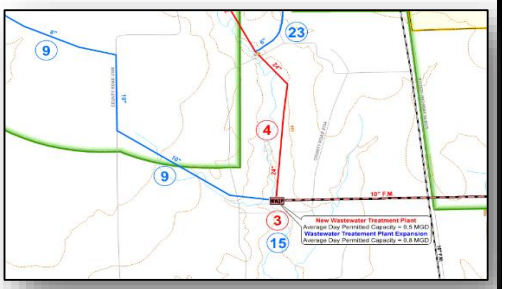
Project Description:

Proposed wastewater lines along SH 276 Bypass Extension. The proposed 8-inch wastewater line begins in the southwest area of the system and terminates at County Road 2300. The proposed 10-inch begins at proposed 8-inch, follows CR 2300 south, continues southeast, and terminates at the proposed WWTP.

Project Drivers:

The proposed wastewater lines will provide transmission capacity to projected development along the SH 276 Bypass Extension.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe 8- 16 feet deep	1,900	LF	$ 120	$ 228,000
2	10" Pipe 8- 16 feet deep	3,800	LF	$ 150	$ 570,000
3	Concrete Pavement Repair	1,300	LF	$ 90	$ 117,000
4	18" Boring and Casing	600	LF	$ 396	$ 237,600
				SUBTOTAL:	**$ 1,152,600**
				CONTINGENCY 30%	$ 345,800
				SUBTOTAL:	**$ 1,498,400**
				ENG/SURVEY 15%	$ 224,800
				SUBTOTAL:	**$ 1,723,200**
				Estimated Project Total:	**$ 1,723,200**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 10 — **Phase: Long Term**

Project Name: 15-inch Wastewater Line

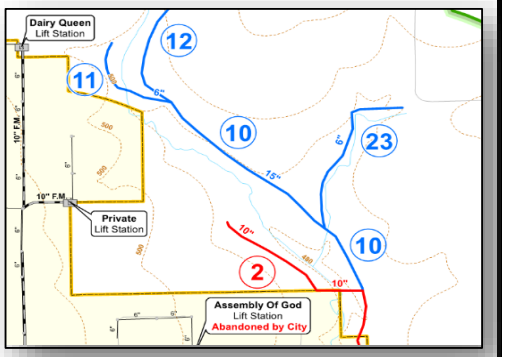
Project Description:

Proposed 15-inch wastewater line in the east part of the system outside of existing City Limits.

Project Drivers:

Proposed 15-inch wastewater line in the east part of the system to serve projected development in the northeast area of the City and outside of the existing City Limits.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe 8- 16 feet deep	2,600	LF	$ 225	$ 585,000
2	26" Boring and Casing	200	LF	$ 572	$ 114,400
				SUBTOTAL:	**$ 699,400**
			CONTINGENCY	30%	$ 209,900
				SUBTOTAL:	**$ 909,300**
			ENG/SURVEY	15%	$ 136,400
				SUBTOTAL:	**$ 1,045,700**
				Estimated Project Total:	**$ 1,045,700**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 11 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

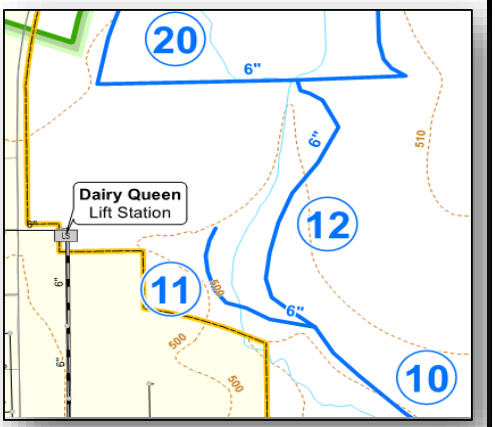
Project Description:

Proposed 6-inch wastewater line in the east part of the system outside of existing City Limits.

Project Drivers:

Proposed 6-inch wastewater line in the east part of the system to serve projected development in the northeast area of the City and outside of the existing City Limits.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	1,000	LF	$ 90	$ 90,000
2	12" Boring and Casing	300	LF	$ 264	$ 79,200
				SUBTOTAL:	**$ 169,200**
			CONTINGENCY	30%	$ 50,800
				SUBTOTAL:	**$ 220,000**
			ENG/SURVEY	15%	$ 33,000
				SUBTOTAL:	**$ 253,000**
				Estimated Project Total:	**$ 253,000**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 12 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

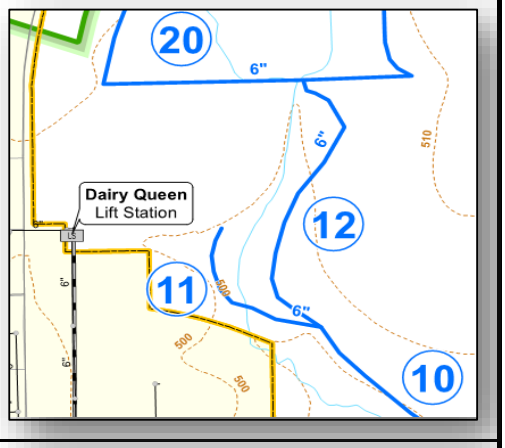
Project Description:

Proposed 6-inch wastewater line in the east part of the system outside existing City Limits.

Project Drivers:

Proposed 6-inch wastewater line in the east part of the system to serve projected development in the northeast area of the City and outside of the existing City Limits.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	1,800	LF	$ 90	$ 162,000
				SUBTOTAL:	**$ 162,000**
		CONTINGENCY		30%	$ 48,600
				SUBTOTAL:	**$ 210,600**
		ENG/SURVEY		15%	$ 31,600
				SUBTOTAL:	**$ 242,200**
				Estimated Project Total:	**$ 242,200**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 13 — **Phase: Long Term**

Project Name: 10-inch and 12-inch Wastewater Line

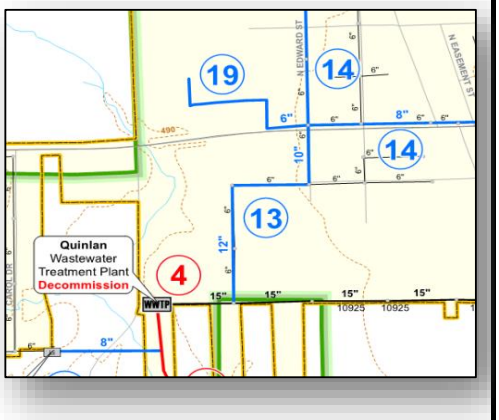
Project Description:

The proposed 10- and 12-inch wastewater lines are located in the west area of the City. The 10-inch line begins at West Main Street and South Edward Street and proceeds south to West Richmond Avenue where the 12-inch proposed line begins. The 12-inch line turns west at West Richmond Avenue, turns south, then terminates at Meyers Avenue. This project parallels the existing 6-inch wastewater line.

Project Drivers:

The proposed wastewater lines provide increased capacity in the west area of the City to serve proposed development.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	10" Pipe 8- 16 feet deep	500	LF	$ 150	$ 75,000
2	12" Pipe 8- 16 feet deep	1,500	LF	$ 180	$ 270,000
3	Concrete Pavement Repair	500	LF	$ 90	$ 45,000
				SUBTOTAL:	**$ 390,000**
				CONTINGENCY 30%	$ 117,000
				SUBTOTAL:	**$ 507,000**
				ENG/SURVEY 15%	$ 76,100
				SUBTOTAL:	**$ 583,100**
				Estimated Project Total:	**$ 583,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 14 — **Phase: Long Term**

Project Name: 8-inch Wastewater Lines

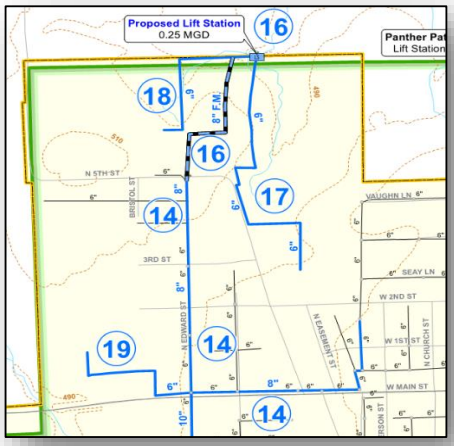
Project Description:

Two proposed 8-inch wastewater lines in the northwest area of the system. The first 8-inch line begins at North Edward Street and North 5th Street, proceeds south along North Edward Street and terminates at West Main Street. The second 8-inch line begins just south of West 2nd Street between Easement Street and North Epperson Street, proceeds south, turns west at West Main Street and terminates at North Edward Street.

Project Drivers:

The proposed replacement project provides increased capacity to the wastewater system to serve projected growth in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe 8- 16 feet deep	4,100	LF	$ 120	$ 492,000
2	Concrete Pavement Repair	3,400	LF	$ 90	$ 306,000
				SUBTOTAL:	**$ 798,000**
		CONTINGENCY		30%	$ 239,400
				SUBTOTAL:	**$ 1,037,400**
		ENG/SURVEY		15%	$ 155,700
				SUBTOTAL:	**$ 1,193,100**
				Estimated Project Total:	**$ 1,193,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 15 — **Phase: Long Term**

Project Name: Wastewater Treatment Plant Expansion

Project Description:

This project consists of the construction of an additional 0.45 MGD treatment train to Increase average day permitted capacity to 0.90 MGD.

Project Drivers:

The proposed WWTP expansion provides increased capacity to serve projected growth in the City.

Vicinity Map

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Wastewater Treatment Plant Expansion	1	LS	$ 5,400,000	$ 5,400,000
				SUBTOTAL:	**$ 5,400,000**
				CONTINGENCY 30%	$ 1,620,000
				SUBTOTAL:	**$ 7,020,000**
				ENG/SURVEY 15%	$ 1,053,000
				SUBTOTAL:	**$ 8,073,000**
				Estimated Project Total:	**$ 8,073,000**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 16 — **Phase: Long Term**

Project Name: New 0.25 MGD Lift Station and 8-inch Force Main

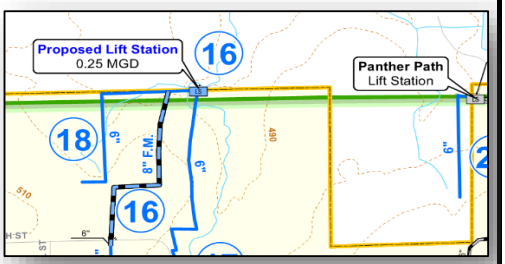
Project Description:

New lift station in the northwest area of the City just west of existing Panther Path Lift Station.

Project Drivers:

The proposed lift station will serve projected growth in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.25 MGD Lift Station	1	EA	$ 250,000	$ 250,000
2	8" Force Main < 8 feet deep	1,500	LF	$ 100	$ 150,000
				SUBTOTAL:	**$ 400,000**
			CONTINGENCY	30%	$ 120,000
				SUBTOTAL:	**$ 520,000**
			ENG/SURVEY	15%	$ 78,000
				SUBTOTAL:	**$ 598,000**
				Estimated Project Total:	**$ 598,000**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 17 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

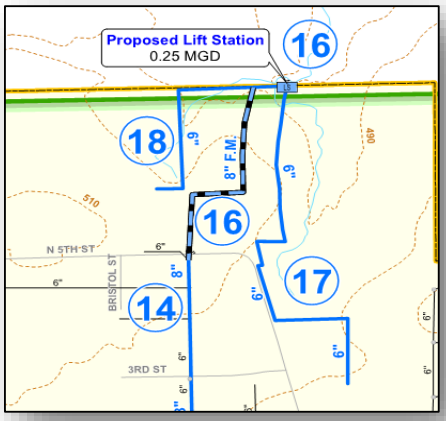
Project Description:

Proposed 6-inch wastewater line in the northwest area of the City flowing to proposed 0.25 MGD lift station (Project 16).

Project Drivers:

The proposed wastewater line will serve projected growth in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	2,600	LF	$ 90	$ 234,000
2	Concrete Pavement Repair	400	LF	$ 90	$ 36,000
				SUBTOTAL:	**$ 270,000**
			CONTINGENCY	30%	$ 81,000
				SUBTOTAL:	**$ 351,000**
			ENG/SURVEY	15%	$ 52,700
				SUBTOTAL:	**$ 403,700**
				Estimated Project Total:	**$ 403,700**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 18 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

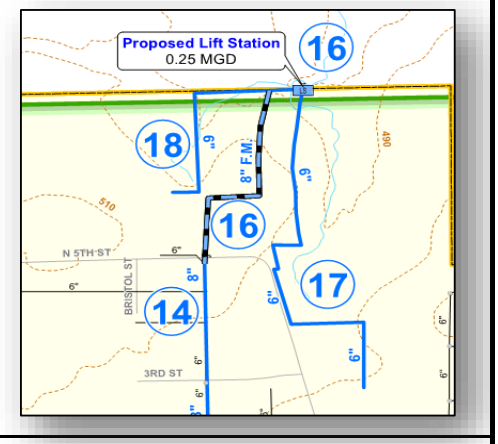
Project Description:

Proposed 6-inch wastewater line in the northwest area of the City flowing to proposed 0.25 MGD lift station (Project 16).

Project Drivers:

The proposed wastewater line will serve projected growth in the northwest area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	1,500	LF	$ 90	$ 135,000
				SUBTOTAL:	**$ 135,000**
				CONTINGENCY 30%	$ 40,500
				SUBTOTAL:	**$ 175,500**
				ENG/SURVEY 15%	$ 26,400
				SUBTOTAL:	**$ 201,900**
				Estimated Project Total:	**$ 201,900**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 19 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

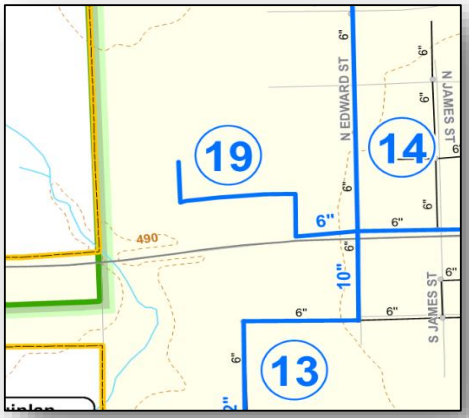
Project Description:

Proposed 6-inch wastewater line in the west area of the City.

Project Drivers:

The proposed wastewater line will serve projected growth in the west area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	1,300	LF	$ 90	$ 117,000
2	Concrete Pavement Repair	300	LF	$ 90	$ 27,000
				SUBTOTAL:	**$ 144,000**
			CONTINGENCY	30%	$ 43,200
				SUBTOTAL:	**$ 187,200**
			ENG/SURVEY	15%	$ 28,100
				SUBTOTAL:	**$ 215,300**
				Estimated Project Total:	**$ 215,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 20 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

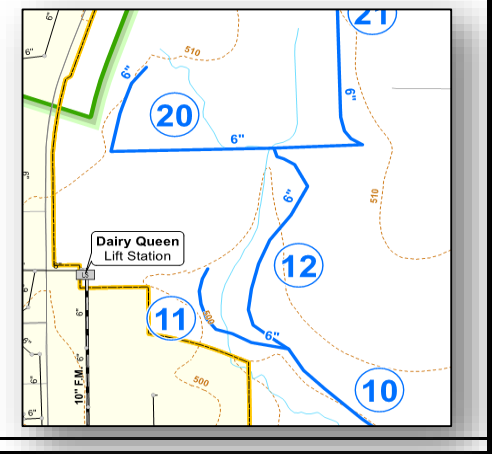
Project Description:

Proposed 6-inch wastewater line in the northeast area of the City.

Project Drivers:

The proposed wastewater line will serve projected growth in the northeast area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	1,800	LF	$ 90	$ 162,000
2	12" Boring and Casing	400	LF	$ 264	$ 105,600
				SUBTOTAL:	**$ 267,600**
			CONTINGENCY	30%	$ 80,300
				SUBTOTAL:	**$ 347,900**
			ENG/SURVEY	15%	$ 52,200
				SUBTOTAL:	**$ 400,100**
				Estimated Project Total:	**$ 400,100**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 21 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

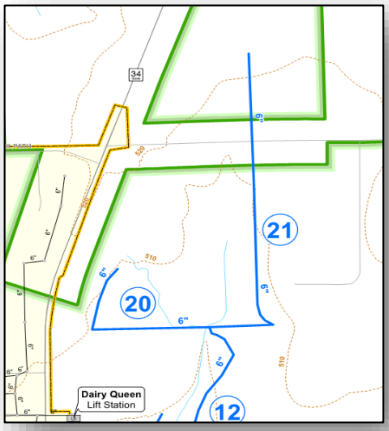
Project Description:

Proposed 6-inch wastewater line in the northeast area of the City south of County Road 3601 and east of TX-34.

Project Drivers:

The proposed wastewater line will serve projected growth in the northeast area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	3,400	LF	$ 90	$ 306,000
				SUBTOTAL:	**$ 306,000**
				CONTINGENCY 30%	$ 91,800
				SUBTOTAL:	**$ 397,800**
				ENG/SURVEY 15%	$ 59,700
				SUBTOTAL:	**$ 457,500**
				Estimated Project Total:	**$ 457,500**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 22 — **Phase: Long Term**

Project Name: Decommission Carol Street Lift Station and New 8-inch Wastewater Line

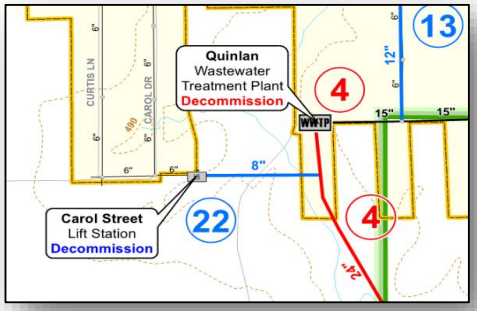
Project Description:

Decommission existing Carol Street Lift Station in the west area of the City and construct new 8-inch wastewater line.

Project Drivers:

The decommissioning of the Carol Street Lift Station and addition of new wastewater line will send existing flow in the west area of the City to the proposed WWTP to the south.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Decommission Lift Station	1	LS	$ 100,000	$ 100,000
2	8" Pipe 8- 16 feet deep	800	LF	$ 120	$ 96,000
3	Concrete Pavement Repair	100	LF	$ 90	$ 9,000
				SUBTOTAL:	**$ 205,000**
		CONTINGENCY		30%	$ 61,500
				SUBTOTAL:	**$ 266,500**
		ENG/SURVEY		15%	$ 40,000
				SUBTOTAL:	**$ 306,500**
				Estimated Project Total:	**$ 306,500**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 23 — **Phase: Long Term**

Project Name: Two 6-inch Wastewater Lines

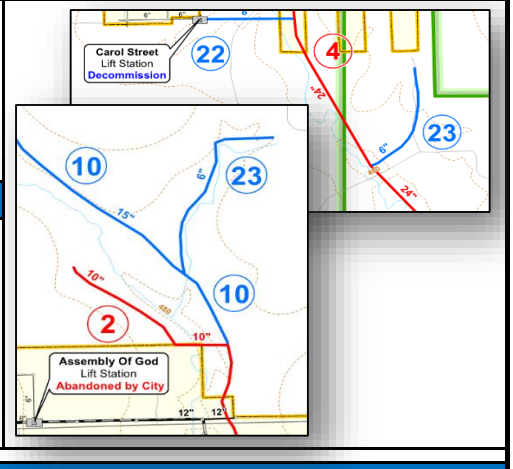
Project Description:

Proposed 6-inch wastewater line in the east area of the City and proposed 6-inch wastewater line in the west area of the City. The 6-inch line in the west area of the system flows to the proposed 24-inch and on to the proposed WWTP.

Project Drivers:

The proposed wastewater line will serve projected growth in the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	2,700	LF	$ 90	$ 243,000
				SUBTOTAL:	**$ 243,000**
				CONTINGENCY 30%	$ 72,900
				SUBTOTAL:	**$ 315,900**
				ENG/SURVEY 15%	$ 47,400
				SUBTOTAL:	**$ 363,300**
				Estimated Project Total:	**$ 363,300**

Comments:

City of Quinlan

Capital Improvement Cost Estimate — **Date: October 27, 2020**

Construction Project Number: 24 — **Phase: Long Term**

Project Name: 6-inch Wastewater Line

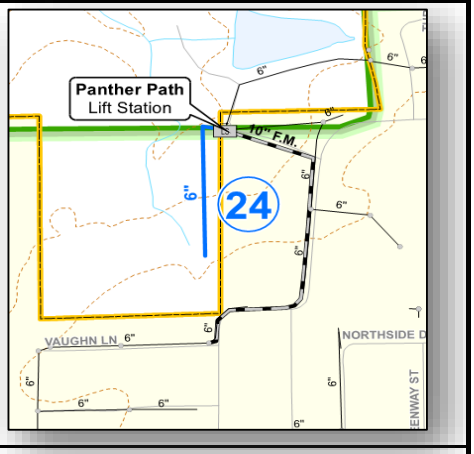
Project Description:

Proposed 6-inch wastewater line in the north area of the City to flow into existing Panther Path Lift Station.

Project Drivers:

The proposed wastewater line will serve projected growth in the north area of the City.

Vicinity Map



Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe < 10 feet deep	900	LF	$ 90	$ 81,000
				SUBTOTAL:	**$ 81,000**
				CONTINGENCY 30%	$ 24,300
				SUBTOTAL:	**$ 105,300**
				ENG/SURVEY 15%	$ 15,800
				SUBTOTAL:	**$ 121,100**
				Estimated Project Total:	**$ 121,100**

Comments: