

# new braunfels utilities

## WATER & WASTEWATER IMPACT FEE REPORT



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# Water & Wastewater Impact Fee Report

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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>1.0 BACKGROUND.....</b>	<b>1-1</b>
<b>2.0 LAND USE ASSUMPTIONS.....</b>	<b>2-1</b>
2.1 Service Areas .....	2-1
2.2 Growth Projections .....	2-4
<b>3.0 WATER AND WASTEWATER CAPITAL IMPROVEMENTS PLAN .....</b>	<b>3-1</b>
3.1 Existing Water and Wastewater Systems .....	3-1
3.2 Water Model Update .....	3-4
3.3 Wastewater Model Update.....	3-4
3.4 Water Demand and Wastewater Load Projections .....	3-4
3.5 Impact Fee Eligible Projects .....	3-7
<b>4.0 IMPACT FEE ANALYSIS.....</b>	<b>4-1</b>
4.1 Service Units.....	4-1
4.2 Impact Fee Calculations .....	4-6



## LIST OF TABLES

Table ES-1	Maximum Water Impact Fee Calculation .....	ES-1
Table ES-2	Maximum Wastewater Impact Fee Calculation .....	ES-2
Table ES-3	Maximum Allowable Impact Fee by Meter Size .....	ES-2
Table 1-1	List of Abbreviations .....	1-2
Table 2-1	Connections by Land Use Type .....	2-5
Table 2-2	Water and Wastewater Growth Projections .....	2-5
Table 3-1	Historical Water Demands .....	3-5
Table 3-2	Historical Wastewater Flows .....	3-6
Table 3-3	Projected Water Demands.....	3-6
Table 3-4	Projected Wastewater Flows.....	3-6
<b>Table 3-5</b>	<b>Water System Impact Fee Eligible Projects.....</b>	<b>3-11</b>
Table 3-6	Wastewater System Impact Fee Eligible Projects.....	3-13
Table 4-1	Service Unit Equivalents .....	4-2
Table 4-2	2018 Service Units – Water .....	4-3
Table 4-3	2028 Service Units – Water .....	4-3
Table 4-4	2018-2028 Growth in Service Units – Water .....	4-4
Table 4-5	2018 Service Units – Wastewater.....	4-4
Table 4-6	2028 Service Units – Wastewater.....	4-5
Table 4-7	2018-2028 Growth in Service Units – Wastewater .....	4-5
Table 4-8	Financing Cost Calculations – Water .....	4-8
Table 4-9	Financing Cost Calculations – Wastewater.....	4-9
Table 4-10	Maximum Water Impact Fee Calculation .....	4-9
Table 4-11	Maximum Wastewater Impact Fee Calculation .....	4-10
Table 4-12	Maximum Allowable Impact Fee by Meter Size .....	4-10

## LIST OF FIGURES

Figure 2-1	Water Service Area .....	2-2
Figure 2-2	Wastewater Service Area.....	2-3
Figure 2-3	Undeveloped Parcels – Water .....	2-6
Figure 2-4	Undeveloped Parcels – Wastewater.....	2-7
Figure 3-1	Existing Water Distribution System .....	3-2
Figure 3-2	Existing Wastewater Collection System.....	3-3
Figure 3-3	Water System Impact Fee Capital Improvements.....	3-14
Figure 3-4	Wastewater System Impact Fee Capital Improvements .....	3-15



## **APPENDICES**

- Appendix A    Hydraulic Analysis Summary
- Appendix B    Water System Project Cost Estimates
- Appendix C    Wastewater System Project Cost Estimates



## EXECUTIVE SUMMARY

In 2017, New Braunfels Utilities (NBU), authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the water and wastewater systems. The purpose of this report is to summarize the methodology used in the development and calculation of water and wastewater impact fees for NBU. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment and update of water and wastewater impact fees.

As part of this study, updated land use assumptions were incorporated with water and wastewater loading criteria based on historical data to develop load projections for both the water and wastewater systems. Capital improvements plans (CIP) were developed for both systems to serve projected growth through 2028. The hydraulic models of the water and wastewater systems, along with pumping and storage planning criteria developed by FNI, were employed to determine the capacity and timing of proposed improvements, as well as calculate the percentage of each project's capacity projected to be utilized in the 10-year planning period (2018-2028). A summation of each project's estimated cost, including financing costs less credits for existing projects partially funded through rate increases, multiplied by the percentage of that project being utilized in the 10-year planning period was used to calculate a total impact fee eligible CIP cost for both water and wastewater. These costs were divided by the projected growth in service unit equivalents for water and wastewater, respectively, to determine the maximum allowable impact fees. **Table ES-1** and **Table ES-2** summarize the maximum allowable impact fee calculations for water and wastewater, respectively. **Table ES-3** shows the maximum allowable impact fee for each meter size distributed by NBU.

**Table ES-1      Maximum Water Impact Fee Calculation**

Water Impact Fee	
Total Eligible Capital Improvement Costs	\$200,308,576
Total Eligible Financing Costs	\$48,236,388
Total Eligible Impact Fee Costs	\$248,544,964
Growth in Service Units	31,110
Maximum Water Impact Fee per Service Unit	\$7,989
Impact Fee Credit per Service Unit	\$0.02
Maximum Allowable Water Impact Fee	\$7,989

**Table ES-2 Maximum Wastewater Impact Fee Calculation**

<b>Wastewater Impact Fee</b>	
Total Eligible Capital Improvement Costs	\$78,217,505
Total Eligible Financing Costs	\$10,769,154
Total Eligible Impact Fee Costs	\$88,986,659
Growth in Service Units	23,815
Maximum Wastewater Impact Fee per Service Unit	\$3,737
Impact Fee Credit per Service Unit	\$486
<b>Maximum Allowable Wastewater Impact Fee</b>	<b>\$3,251</b>

**Table ES-3 Maximum Allowable Impact Fee by Meter Size**

<b>Meter Size</b>	<b>Safe Maximum Operating Capacity (gpm)</b>	<b>Service Unit Equivalent</b>	<b>Maximum Allowable Water</b>	<b>Maximum Allowable Wastewater</b>	<b>Maximum Allowable Total</b>
5/8"	10	1.0	\$7,989	\$3,251	\$11,240
1"	25	2.5	\$19,972	\$8,127	\$28,099
1 1/2"	50	5.0	\$39,945	\$16,254	\$56,199
2"	80	8.0	\$63,912	\$26,007	\$89,919
3"	160	16.0	\$127,823	\$52,014	\$179,837
4"	250	25.0	\$199,724	\$81,272	\$280,996
6"	500	50.0	\$399,448	\$162,543	\$561,991
8"	800	80.0	\$ 639,116	\$260,069	\$ 899,185
10"	1,150	115.00	\$918,729	\$373,849	\$1,292,578



## **1.0 BACKGROUND**

Chapter 395 of the Texas Local Government Code requires an impact fee analysis before impact fees can be created and assessed. Chapter 395 defines an impact fee as “a charge or assessment imposed by a political subdivision against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development.” In September 2001, Senate Bill 243 amended Chapter 395 thus creating the current procedure for implementing impact fees. Chapter 395 identifies the following items as impact fee eligible costs:

- Construction contract price
- Surveying and engineering fees
- Land acquisition costs
- Fees paid to the consultant preparing or updating the capital improvements plan (CIP)
- Projected interest charges and other finance costs for projects identified in the CIP

Chapter 395 also identifies items that impact fees cannot be used to pay for, such as:

- Construction, acquisition, or expansion of public facilities or assets other than those identified on the capital improvements plan
- Repair, operation, or maintenance of existing or new capital improvements
- Upgrading, updating, expanding, or replacing existing capital improvements to serve existing development in order to meet stricter safety, efficiency, environmental, or regulatory standards
- Upgrading, updating, expanding, or replacing existing capital improvements to provide better service to existing development
- Administrative and operating costs of the political subdivision
- Principal payments and interest or other finance charges on bonds or other indebtedness, except as allowed above

In 2017, New Braunfels Utilities (NBU) authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the water and wastewater systems. The purpose of this report is to summarize the

methodology used in the development and calculation of water and wastewater impact fees for NBU. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment and update of water and wastewater impact fees. **Table 1-1** provides a list of abbreviations used in this report.

**Table 1-1 List of Abbreviations**

Abbreviation	Full Nomenclature
AWWA	American Water Works Association
CIP	Capital Improvements Plan
EPS	Extended Period Simulation
EST	Elevated Storage Tank
ETJ	Extra-territorial Jurisdiction
FNI	Freeze and Nichols, Inc.
GBRA	Guadalupe-Blanco River Authority
gpm	gallons per minute
GST	Ground Storage Tank
HGL	Hydraulic Grade Line
LS	Lift Station
MG	Million Gallons
mgd	million gallons per day
PRV	Pressure Reducing Valve
PS	Pump Station
psi	pounds per square inch
PZ	Pressure Zone
TCEQ	Texas Commission on Environmental Quality
WWTP	Wastewater Treatment Plant



## **2.0 LAND USE ASSUMPTIONS**

Population and land use are important elements in the analysis of water and wastewater systems. Water demands and wastewater flows depend on the customers served by the systems and determines the sizing and location of system infrastructure. A thorough analysis of service area and land use provides the basis for projecting future water demands and wastewater flows.

### **2.1 Service Areas**

The service areas for NBU's water and wastewater systems differ slightly in terms of extent. The Water Service Area contains much of the area within the New Braunfels city limits, and extends past the extra-territorial jurisdiction (ETJ) in one area. The southernmost portion of the area within the New Braunfels city limits is served by other utilities. The Wastewater Service Area is smaller than the Water Service Area, but still includes most of the area within the city limits, as well as a few areas outside the city limits. **Figures 2-1** and **2-2** illustrate the water and wastewater service areas, respectively.











## 2.2 Growth Projections

Growth projections were developed through collaboration between FNI, NBU, and the City of New Braunfels. The process for developing growth projections included:

1. **Selecting anticipated average annual growth rate** – An overall annual growth rate in water connections of 6% was selected for the next 10-year time period and 3% for the 10- to 20-year time period. These growth rates are consistent with growth projections developed by Arcadis as part of the recently completed *Phase 2 Water Resources Report* prepared for NBU and the City's ongoing Comprehensive Plan. Both of those planning studies utilized historical growth information and trends of nearby communities to determine the anticipated growth rate for New Braunfels.
2. **Determining where growth will likely occur** – Undeveloped parcels within the NBU Water and Wastewater Service Areas were identified. An estimated number of connections per acre were assigned to each undeveloped parcel based on future land use data provided by the City of New Braunfels. Based on the acreage and land use type of each undeveloped parcel, a total number of connections per parcel was calculated using the values contained in **Table 2-1**. NBU staff and FNI collaborated to identify the projected growth timeline of each undeveloped parcel as either a 5-year, 10-year, 20-year, or phased development (i.e. a development that would begin developing in the 5-year time frame but would not be completely built out until the 20-year time frame), such that the resulting total annual growth in connections was 6% for the 2018 to 2028 planning period and 3% for the 2028 to 2038 planning period. The timing of the developments was based on recent requests for service, development information provided to NBU by developers, and proximity to existing infrastructure.
3. **Identifying growth outside of the Wastewater Service Area** – Because NBU's Wastewater Service Area is smaller than the Water Service Area, not all of the growth identified in the first two steps would impact the wastewater system. It is assumed that the undeveloped parcels that fall outside of the Wastewater Service Area will only be served water, and, therefore, connections related to those parcels were not included in the wastewater system projections. This results in a slightly lower annual growth rate. All growth projected in areas that are located within both service areas are exactly the same for both systems.

**Table 2-1 Connections by Land Use Type**

Land Use Type	Number of Connections per Acre
Low Density Residential	4.0
Medium to High Density Residential	12.0
Commercial/Industrial	2.0

Using the process described above, projected connection counts were developed for 2018, 2028, and 2038. **Table 2-2** presents the growth projections for the NBU Water and Wastewater Service Areas. **Figure 2-3** and **Figure 2-4** show the parcels identified to develop for water and wastewater, respectively. These growth projections were input into the hydraulic models of the water and wastewater systems (discussed in more detail in **Section 3.0**) to simulate future demands, which helped develop the location, capacity, and phasing of the proposed system improvements.

**Table 2-2 Water and Wastewater Growth Projections**

Year	Water Connections	Annual Growth Rate	Wastewater Connections	Annual Growth Rate
2018	30,822	-	27,283	-
2028	55,198	6.0%	45,793	5.2%
2038	74,181	3.0%	58,352	2.5%



FIGURE 2-3  
NEW BRAUNFELS UTILITIES  
UNDEVELOPED PARCELS - WATER

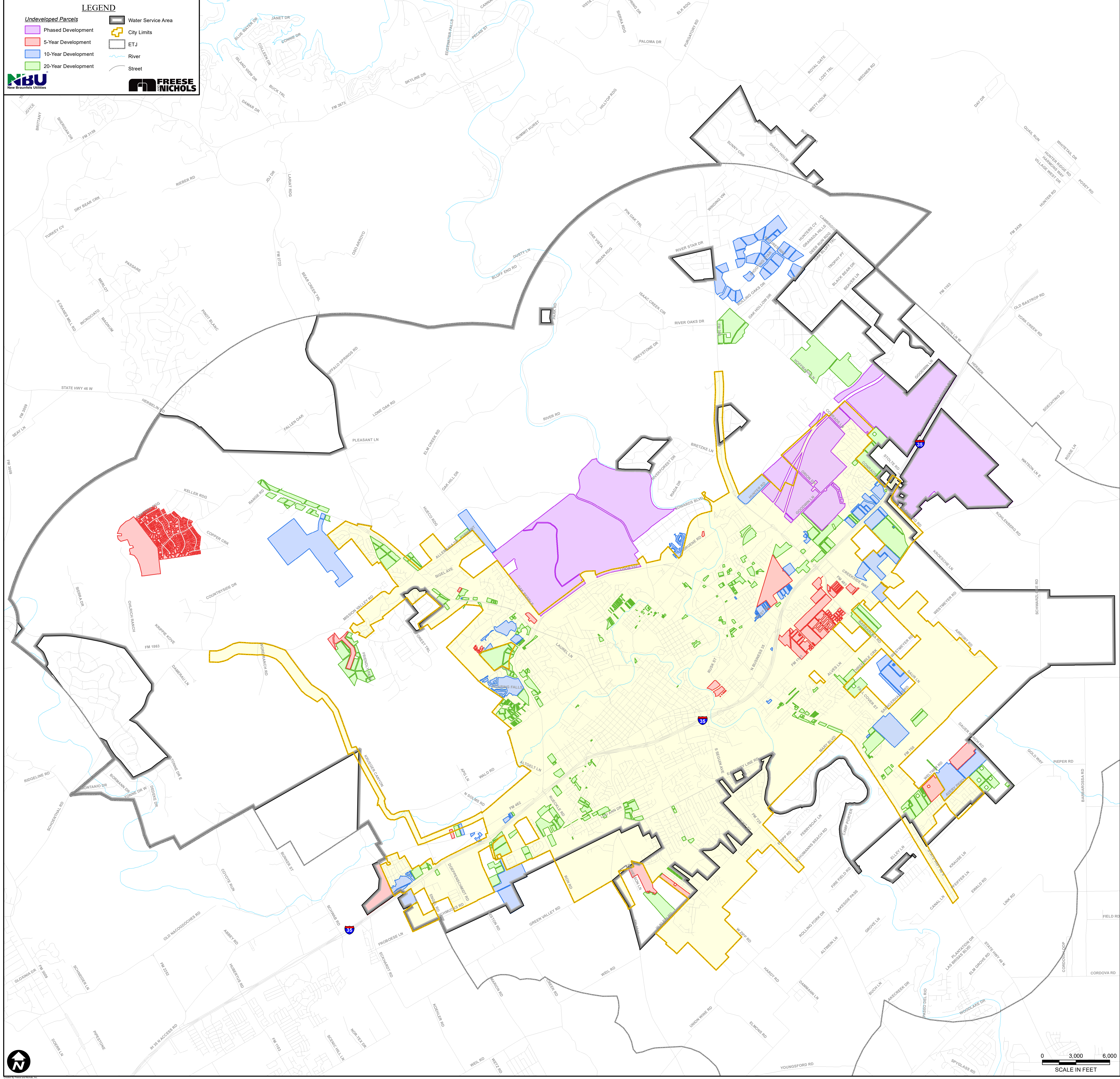




FIGURE 2-4  
NEW BRAUNFELS UTILITIES  
UNDEVELOPED PARCELS - WASTEWATER

LEGEND

Undeveloped Parcels

Phased Development

5-Year Development

10-Year Development

20-Year Development



Wastewater Service Area

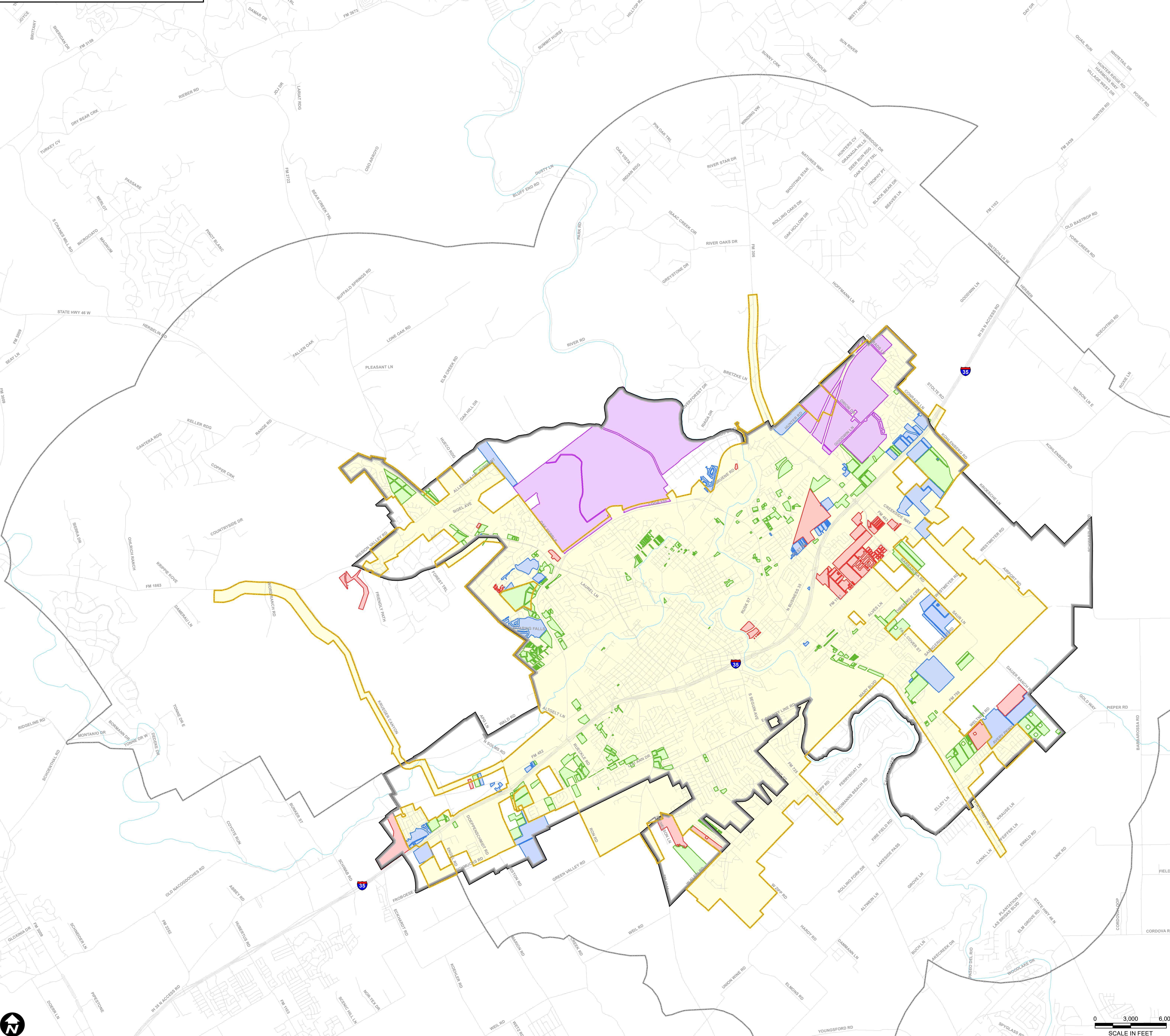
City Limits

ETJ

River

Street







### **3.0 WATER AND WASTEWATER CAPITAL IMPROVEMENTS PLAN**

The impact fee capital improvements plan (CIP) developed for NBU is based on the land use assumptions presented in the previous section. The CIPs were developed using hydraulic models of both the water and wastewater systems. The recommended improvements will provide the required capacity to meet projected water demands and wastewater flows through year 2028.

#### **3.1 Existing Water and Wastewater Systems**

The existing water distribution system consists of a network of lines ranging in size from 0.75 inches to 36 inches in diameter, 16 pump stations (PS), 9 ground storage tanks (GST), and 18 elevated storage tanks (EST). NBU has seven Edwards Aquifer groundwater wells and six Trinity Aquifer groundwater wells that supply the distribution system, as well as a surface water supply at the Surface Water Treatment Plant (WTP). NBU operates 12 pressure zones (PZ): River Chase, Hoffmann, Kohlenberg, Downtown, Morningside, Loop, Texas, Kerlick, Mission, Westpointe, Copper Ridge, and Balcones. A map of the existing water distribution system is shown on **Figure 3-1**.

The existing wastewater system has 24 lift stations, a network of lines ranging from 4 inches to 48 inches in diameter, and four wastewater treatment plants (WWTP): Gruene, North Kuehler, South Kuehler, and McKenzie. **Figure 3-2** displays a map of the existing wastewater collection system.



FIGURE 3-1  
NEW BRAUNFELS  
UTILITIES  
EXISTING WATER SYSTEM

**LEGEND**

*Existing Water System*

- Pressure Plane Valve
- Well
- Standpipe
- Pump Station
- Ground Storage Tank
- Elevated Storage Tank
- 10" and Smaller Water Line
- 12" and Larger Water Line

Road

Stream

Lake

Parcel

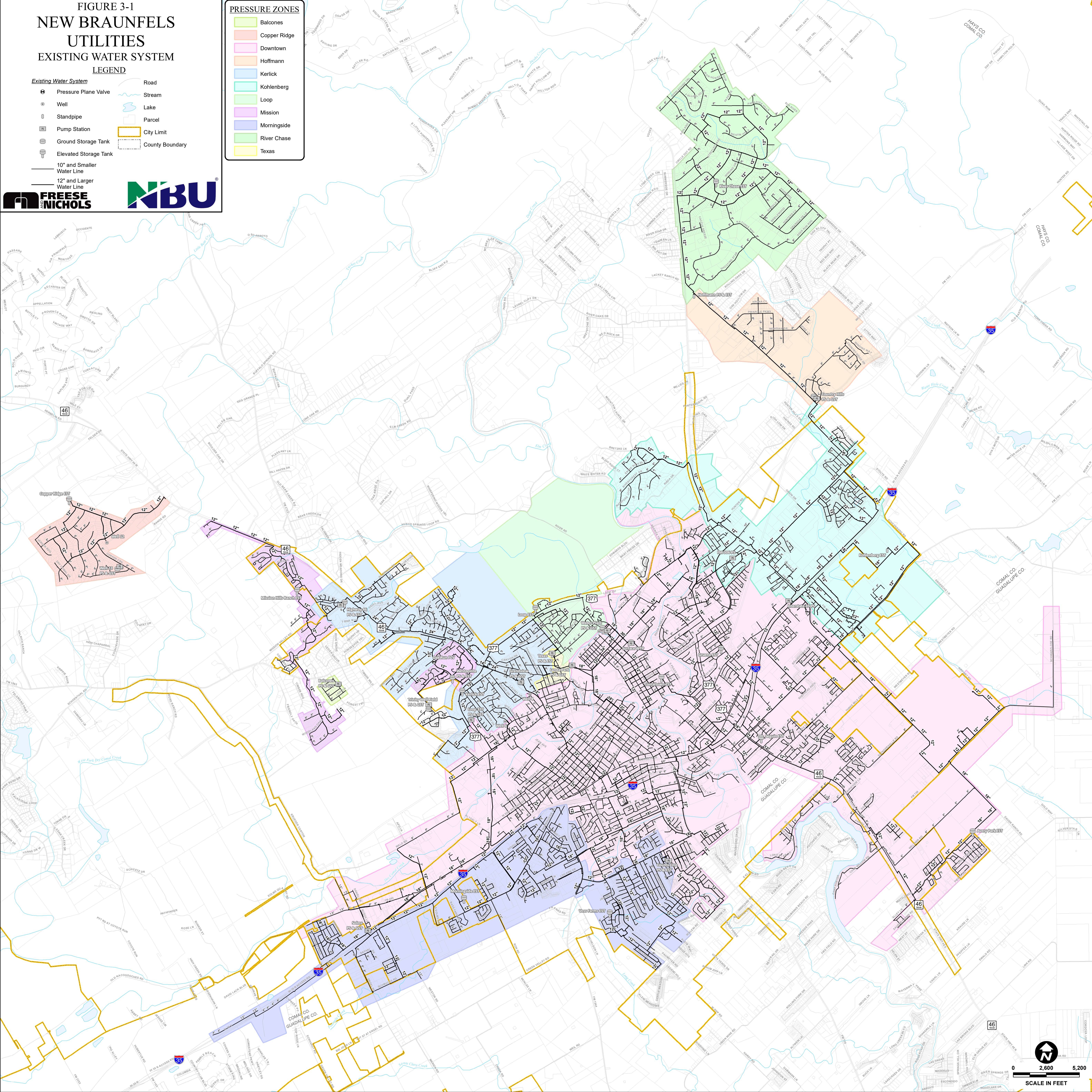
City Limit

County Boundary

**FREESE & NICHOLS**

**NBU**

PRESSURE ZONES	
Balcones	
Copper Ridge	
Downtown	
Hoffmann	
Kerlick	
Kohlenberg	
Loop	
Mission	
Morningside	
River Chase	
Texas	





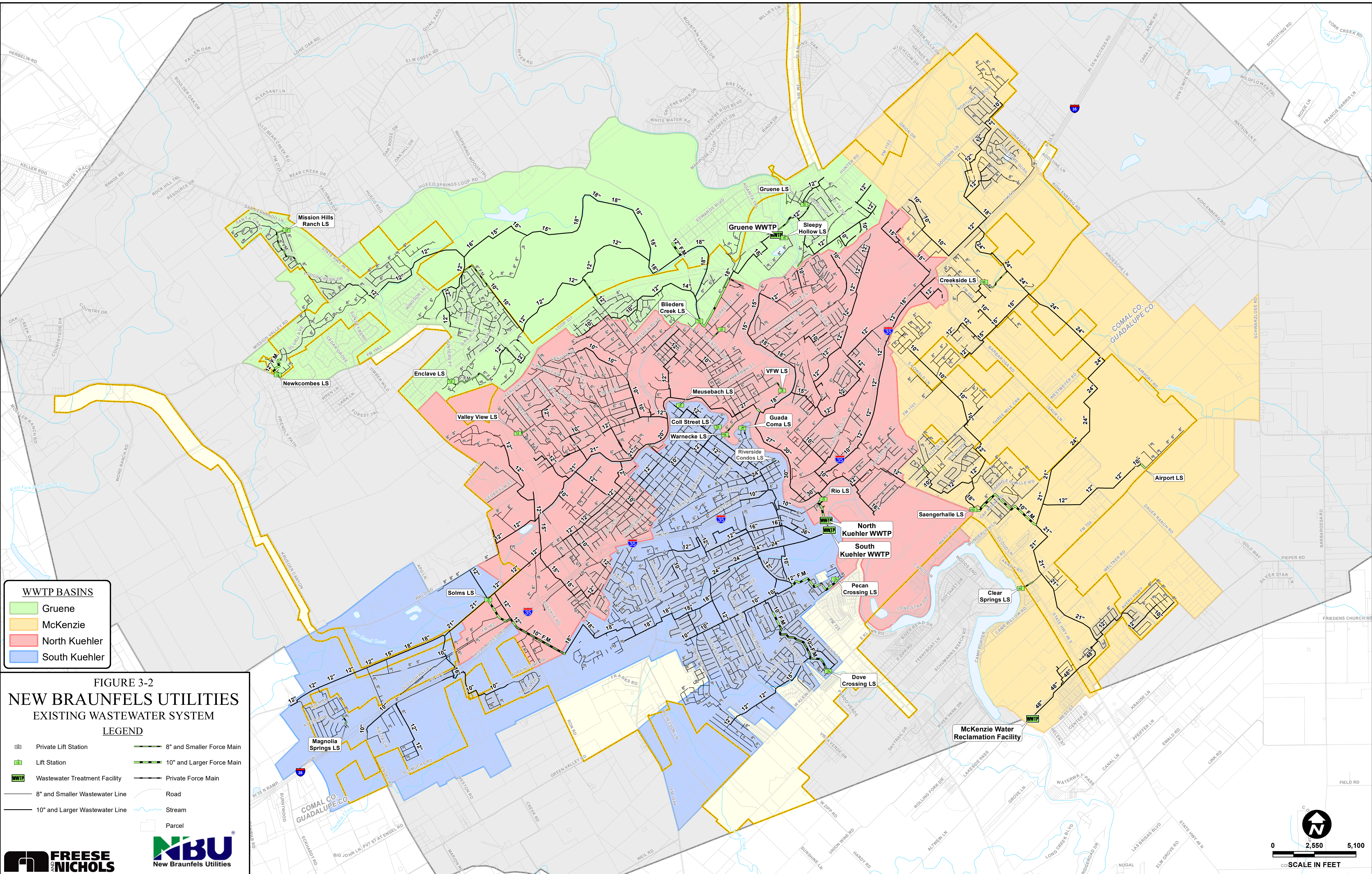


FIGURE 3-2  
NEW BRAUNFELS UTILITIES  
EXISTING WASTEWATER SYSTEM

- LEGEND**
- Private Lift Station
  - Lift Station
  - Wastewater Treatment Facility
  - 8" and Smaller Wastewater Line
  - 10" and Larger Wastewater Line
  - 8" and Smaller Force Main
  - 10" and Larger Force Main
  - Private Force Main
  - Road
  - Stream
  - Parcel



### **3.2 Water Model Update**

The water system model was built in Innovyze’s InfoWater® software. FNI updated the water model, adding recently constructed water lines and facilities, and updated the existing system demand allocation using geocoded billing data. A 24-hour extended period simulation (EPS) analysis was performed by FNI with 2018, 2028, and 2038 projected 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. FNI utilized the hydraulic model to develop the 10-year water CIP. **Appendix A** contains a detailed discussion of the hydraulic modeling conducted as part of this study.

### **3.3 Wastewater Model Update**

The wastewater collection system model was built in Innovyze’s InfoSWMM® software. FNI updated the model to include newly constructed lines and facilities and updated the existing system flow allocation using geocoded billing data. The design storm developed as part of the Wastewater Master Plan was utilized to simulate wet weather conditions. The updated model was used to evaluate the capacity of the system during peak wet weather conditions for 2018, 2028, and 2038, and to develop a 10-year wastewater CIP. **Appendix A** contains a detailed discussion of the hydraulic modeling conducted as part of this study.

### **3.4 Water Demand and Wastewater Load Projections**

The land use data, historical water demands, and historical wastewater flows were used to develop future water demands and wastewater flows. For water, projected average day and maximum day demands were developed for 2018, 2028, and 2038 using per connection demands and peaking factors. The planning criteria used to project demands were selected based on historical water demand trends.

For wastewater, projected average daily flows were developed by WWTP basin using a per connection flow based on historical wastewater flow trends. Because the McKenzie Water Reclamation Facility was not in service until early 2017, historical data was not available. However, because the flows that are now treated at McKenzie were previously pumped and treated at the North Kuehler WWTP, this did not affect the calculation of historical per-connection flows. The design storm developed as part of the Wastewater Master Plan was applied in the hydraulic model to determine peak wet weather flows by WWTP basin. These projections served as a basis for determining the location and magnitude of the CIP projects. **Table 3-1** and **3-2** show historical water demands and wastewater flows in millions of gallons per day (mgd),

respectively. For water, the historical average day per connection usage rate ranged from 382.88 gallons per day to 522.39 gallons per day. Based on the downward trend observed over the past 6 years, a design per connection usage of 425 gallons per day was selected. Conversely, a slight upward trend in historical maximum day to average day peaking factors led to the selection of a design peaking factor of 1.90. The peak hour to maximum day peaking factor of 1.70 was selected based on historical data collected during the Water Master Plan. For wastewater, the historical average daily flow per connection ranged from 226.89 gallons per day to 284.51 gallons per day. Because no obvious trend was observed in the historical data, a conservative per connection flow rate of 260 gallons per day, which is slightly above the historical average of 243.59 gallons per day, was selected. **Table 3-4** presents the projected water demands and **Table 3-5** presents the projected wastewater flows in mgd for NBU.

**Table 3-1 Historical Water Demands**

Year	Water Connections	Average Day Demand (mgd)	Average Day Demand (gallons per connection per day)	Maximum Day Demand (mgd)	Maximum Day to Average Day Peaking Factor
2008	21,302	11.13	522.39	20.00	1.80
2009	21,811	10.72	491.46	18.04	1.68
2010	22,325	10.17	455.33	18.29	1.80
2011	22,942	11.58	504.77	19.69	1.70
2012	23,751	10.74	452.38	17.15	1.60
2013	24,925	10.20	409.05	16.77	1.64
2014	26,210	10.54	402.00	19.84	1.88
2015	27,507	10.98	399.26	20.69	1.88
2016	28,731	11.00	382.88	20.54	1.87
<b>Average</b>	-	-	<b>446.61</b>	-	<b>1.76</b>
<b>Maximum</b>	-	<b>11.58</b>	<b>522.39</b>	<b>20.69</b>	<b>1.88</b>



**Table 3-2 Historical Wastewater Flows**

Year	Connections	North Kuehler Average Daily Flow (mgd)	South Kuehler Average Daily Flow (mgd)	Gruene Average Daily Flow (mgd)	Total Average Daily Flow (mgd)	Average Per Connection Flow (gpCd)
2006	17,818	1.58	2.05	0.41	4.04	226.89
2007	18,585	2.05	2.78	0.45	5.29	284.51
2008	19,139	1.75	2.25	0.37	4.38	228.74
2009	19,631	1.77	2.28	0.44	4.49	228.48
2010	20,109	1.98	2.80	0.47	5.26	261.58
2011	20,652	1.98	2.39	0.51	4.87	235.80
2012	21,337	2.05	2.71	0.51	5.26	246.53
2013	22,304	1.99	2.65	0.53	5.17	231.91
2014	23,435	1.91	2.71	0.58	5.20	221.91
2015	24,498	2.84	2.55	0.66	6.05	246.75
2016	25,530	2.45	3.70	0.65	6.80	266.35
<b>Average</b>	-	-	-	-	-	<b>243.59</b>
<b>Maximum</b>	-	<b>2.84</b>	<b>3.70</b>	<b>0.66</b>	<b>6.80</b>	<b>284.51</b>

**Table 3-3 Projected Water Demands**

Year	Connections	Design Gallons Per Connection Per Day	Average Day Demand (mgd)	Design MD:AD Peaking Factor	Maximum Day Demand (mgd)	Design MH:MD Peaking Factor	Maximum Hour Demand (mgd)
2018	30,822	425	13.10	1.90	24.89	1.70	42.31
2028	55,198	425	23.46	1.90	44.57	1.70	75.77
2038	74,181	425	31.53	1.90	59.90	1.70	101.83

**Table 3-4 Projected Wastewater Flows**

WWTP Basin	2018		2028		2038	
	Average Daily Flow (mgd)	Peak Wet Weather Flow (mgd)	Average Daily Flow (mgd)	Peak Wet Weather Flow (mgd)	Average Daily Flow (mgd)	Peak Wet Weather Flow (mgd)
Gruene	0.79	1.85	2.27	8.60	3.46	10.09
N. Kuehler	2.82	11.70	3.36	16.11	4.11	16.69
S. Kuehler	2.93	10.33	3.43	11.56	3.81	13.43
McKenzie	1.14	6.44	3.44	11.26	4.41	12.48
<b>Total</b>	<b>7.69</b>	<b>30.33</b>	<b>12.50</b>	<b>47.54</b>	<b>15.80</b>	<b>52.68</b>

### 3.5 Impact Fee Eligible Projects

Proposed water and wastewater system improvement projects were developed based on water demand and wastewater flow projections. Hydraulic models of the systems were utilized to determine sizing and phasing of projects. **Appendix A** contains a more detailed documentation of the hydraulic analyses and CIP development conducted as part of this study.

Only system improvements that serve future growth are eligible for impact fee collection. Therefore, projects or portions of projects that resolve existing system deficiencies are not eligible and cannot be included in the impact fee CIP. Additionally, existing projects that have excess capacity to serve future growth can be included in the impact fee calculations. However, projects serving growth beyond the 10-year time period are not eligible for impact fee cost recovery. A 10-year impact fee capital improvements plan (CIP) was developed based on the magnitude and location of the projected growth occurring in the next 10 years. The recommended improvements will provide NBU with the required capacity to meet projected water demands and wastewater flows through the year 2028. The proposed 10-year water system projects are shown on **Figure 3-3** and the proposed wastewater projects are shown on **Figure 3-4**.

The hydraulic model was used as a tool to determine the portion of the pipeline projects that is impact fee eligible. For the recently constructed projects, the 2018 percent utilized was calculated by dividing the average flow observed in the existing system model runs by the ultimate capacity of the pipe. The ultimate capacity of a pipe used for these calculations was the maximum flow observed in the 2038 model runs. The 2018 utilization for proposed projects indicates the portion of the project that will be used to address deficiencies in the existing system or improvements that serve existing customers. The 2028 utilization percentages were calculated by dividing the average flow observed in the 10-year model runs by the ultimate capacity of the pipe.

Utilization percentages for water and wastewater system facilities (i.e. water/wastewater treatment plants, pump/lift stations, storage tanks) were calculated based on the recommended capacities developed for the existing and projected demands. The 2018 percentages account for existing system deficiencies or projects needed to serve existing customers while the 2028 percentages indicate the portion of the capacity that will be utilized within the 10-year timeframe.

The following provides example calculations for each type of project:

- Pipeline Project

Existing Flow = 5 mgd

10-Year Flow = 10 mgd

Ultimate Flow = 20 mgd

$$\text{2018 \% Utilization} = \frac{\text{Existing Flow}}{\text{Ultimate Flow}} = \frac{5 \text{ mgd}}{20 \text{ mgd}} = 0.25 = 25\%$$

$$\text{2028 \% Utilization} = \frac{\text{10-Year Flow}}{\text{Ultimate Flow}} = \frac{10 \text{ mgd}}{20 \text{ mgd}} = 0.50 = 50\%$$

$$\text{Eligible \%} = \text{2028 \% Utilization} - \text{2018 \% Utilization} = 50\% - 25\% = \mathbf{25\%}$$

- Water Production Facility Expansion

Existing Production Capacity = 10.0 mgd

Expanded Production Capacity = 20.0 mgd

2018 Production Requirement = 15.0 mgd

2028 Production Requirement = 25.0 mgd

$$\text{2018 \% Utilization} = \frac{\text{2018 Production Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{15.0 \text{ mgd} - 10.0 \text{ mgd}}{20.0 \text{ mgd} - 10.0 \text{ mgd}} = 0.5 = 50\%$$

$$\text{2028 \% Utilization} = \frac{\text{2028 Production Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{25.0 \text{ mgd} - 10.0 \text{ mgd}}{20.0 \text{ mgd} - 10.0 \text{ mgd}} = 1.5 = 100\%$$

$$\text{Eligible \%} = \text{2028 \% Utilization} - \text{2018 \% Utilization} = 100\% - 50\% = \mathbf{50\%}$$

- Wastewater Treatment Plant Expansion

Existing Treatment Capacity = 5.0 mgd

Expanded Treatment Capacity = 10.0 mgd

2018 Average Daily Flow = 4.0 mgd

2028 Average Daily Flow = 8.0 mgd

$$\text{2018 \% Utilization} = \frac{2018 \text{ ADF} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{4.0 \text{ mgd} - 5.0 \text{ mgd}}{10.0 \text{ mgd} - 5.0 \text{ mgd}} = -0.2 = 0\%$$

$$\text{2028 \% Utilization} = \frac{2028 \text{ ADF} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{8.0 \text{ mgd} - 5.0 \text{ mgd}}{10.0 \text{ mgd} - 5.0 \text{ mgd}} = 0.6 = 60\%$$

$$\text{Eligible \%} = 2028 \% \text{ Utilization} - 2018 \% \text{ Utilization} = 60\% - 0\% = \mathbf{60\%}$$

- New Water Pump Station (Located in Pressure Zone A)

Existing Pumping Capacity = 0.0 mgd

New Pumping Capacity = 5.0 mgd

2018 Pumping Requirement for Pressure Zone B = 1.0 mgd

2028 Pumping Requirement for Pressure Zone B = 4.0 mgd

$$\text{2018 \% Utilization} = \frac{2018 \text{ Pumping Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{1.0 \text{ mgd} - 0.0 \text{ mgd}}{5.0 \text{ mgd} - 0.0 \text{ mgd}} = 0.2 = 20\%$$

$$\text{2028 \% Utilization} = \frac{2028 \text{ Pumping Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{4.0 \text{ mgd} - 0.0 \text{ mgd}}{5.0 \text{ mgd} - 0.0 \text{ mgd}} = 0.8 = 80\%$$

$$\text{Eligible \%} = 2028 \% \text{ Utilization} - 2018 \% \text{ Utilization} = 80\% - 20\% = \mathbf{60\%}$$

- Wastewater Lift Station Expansion

Existing Pumping Capacity = 2.0 mgd

Expanded Pumping Capacity = 6.0 mgd

2018 Peak Wet Weather Flow = 2.0 mgd

2028 Peak Wet Weather Flow = 4.0 mgd

$$\text{2018 \% Utilization} = \frac{2018 \text{ PWWF} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{2.0 \text{ mgd} - 2.0 \text{ mgd}}{6.0 \text{ mgd} - 2.0 \text{ mgd}} = 0.0 = 0\%$$

$$\text{2028 \% Utilization} = \frac{2028 \text{ PWWF} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{4.0 \text{ mgd} - 2.0 \text{ mgd}}{6.0 \text{ mgd} - 2.0 \text{ mgd}} = 0.5 = 50\%$$

$$\text{Eligible \%} = 2028 \% \text{ Utilization} - 2018 \% \text{ Utilization} = 50\% - 0\% = \mathbf{50\%}$$

- Elevated Storage Tank (Located in Pressure Zone B)

Existing Elevated Storage Capacity in Pressure Zone B = 1.0 MG

Additional Elevated Storage Capacity in Pressure Zone B = 3.0 MG

2018 Elevated Storage Requirement Pressure Zone B = 1.5 MG

2028 Elevated Storage Requirement Pressure Zone B = 2.5 MG

$$\text{2018 \% Utilization} = \frac{2018 \text{ EST Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{1.5 \text{ MG} - 1.0 \text{ MG}}{3.0 \text{ MG} - 1.0 \text{ MG}} = 0.25 = 25\%$$

$$\text{2028 \% Utilization} = \frac{2028 \text{ EST Req.} - \text{Existing Cap.}}{\text{Expanded Cap.} - \text{Existing Cap.}} = \frac{2.5 \text{ MG} - 1.0 \text{ MG}}{3.0 \text{ MG} - 1.0 \text{ MG}} = 0.75 = 75\%$$

$$\text{Eligible \%} = 2028 \% \text{ Utilization} - 2018 \% \text{ Utilization} = 75\% - 25\% = \mathbf{50\%}$$

These calculations were conducted for each project recommended in the impact fee CIP using the design criteria and hydraulic models to determine the portion of the project that is impact fee eligible. **Table 3-5** and **Table 3-6** show the 2018 and 2028 percent utilizations along with the total and impact fee eligible costs for each project on the water and wastewater CIP, respectively. Costs listed for the existing projects are based on actual design and construction costs provided by NBU. Detailed cost estimates for the proposed water and wastewater system projects are included in **Appendix B** and **Appendix C**,



respectively. The costs are in 2018 dollars and include an allowance for engineering, surveying, and contingencies, with the exception of several projects that are already in the process of design. For these projects, cost estimates provided to NBU by the design engineer were used with no added allowances.

**Table 3-5 Water System Impact Fee Eligible Projects**

No.	Project Description	Percent Utilization			Cost Allocation			
		2018 <sup>(1)</sup>	2028	2018 to 2028	Total Project Cost	Existing Customers	10-Year	Beyond 2028
EXISTING ELIGIBLE								
A	Highway 46 Expansion	35%	77%	42%	\$10,950,000	\$3,832,500	\$4,599,000	\$2,518,500
B	16-inch MSR Water Line	43%	87%	44%	\$3,619,602	\$1,556,429	\$1,592,625	\$470,548
C	12-inch Live Oak Ave Water Line	0%	71%	71%	\$860,956	\$0	\$611,279	\$249,677
D	12-inch West San Antonio St Water Line	13%	66%	53%	\$1,534,281	\$199,457	\$813,169	\$521,655
E	2.5 MG FM 306 GST	27%	54%	27%	\$3,428,361	\$925,658	\$925,658	\$1,577,045
F	8-inch Alves Lane Water Line	23%	73%	50%	\$1,302,948	\$299,678	\$651,474	\$351,796
G	Impact Fee Study	0%	100%	100%	\$43,550	\$0	\$43,550	\$0
PROPOSED ELIGIBLE								
1	30/24-inch Weltner Rd/Hwy 46 WL	0%	53%	53%	\$10,695,677	\$0	\$5,668,709	\$5,026,968
2	10.0 MGD Weltner PS & 1.50 MG GST	0%	100%	100%	\$11,320,400	\$0	\$11,320,400	\$0
3	GBRA Mid-Basin Infrastructure	0%	100%	100%	\$84,105,000	\$0	\$84,105,000	\$0
4	30/24-inch Surface WTP Discharge Line	35%	78%	43%	\$5,444,100	\$1,905,435	\$2,340,963	\$1,197,702
5	8.0 MGD Expansion at Surface WTP	0%	100%	100%	\$30,187,500	\$0	\$30,187,500	\$0
6	24/30-inch FM 306 PS Discharge Line	15%	57%	42%	\$2,038,200	\$305,730	\$856,044	\$876,426
7	24-inch FM1102 Water Line	0%	61%	61%	\$4,191,800	\$0	\$2,556,998	\$1,634,802
8	3.5 MGD Expansion at FM 306 PS	0%	100%	100%	\$1,725,000	\$0	\$1,725,000	\$0
9	2.0 MG Goodwin EST	25%	100%	75%	\$7,187,500	\$1,796,875	\$5,390,625	\$0
10	24-inch Bretzke Water Line	8%	82%	74%	\$3,260,300	\$260,824	\$2,412,622	\$586,854
11	2.5 MG Bretzke EST	95%	100%	5%	\$3,593,800	\$3,414,110	\$179,690	\$0
12	1.5 MG Loop 337 EST	21%	39%	18%	\$6,468,800	\$1,358,448	\$1,164,384	\$3,945,968
13	12/16-inch Mission/Westpointe WL	0%	71%	71%	\$3,539,700	\$0	\$2,513,187	\$1,026,513
14	16-inch Eastern Connection Water Line	0%	43%	43%	\$6,947,500	\$0	\$2,987,425	\$3,960,075
15	16/24-inch Trinity PS Kerlick WL and FCV	12%	69%	57%	\$3,909,800	\$469,176	\$2,228,586	\$1,212,038
16	10.0 MGD Trinity PS & 3.5 MG GST	0%	63%	63%	\$19,190,700	\$0	\$12,090,141	\$7,100,559
17	24-inch N. Castell Ave Parallel WL	0%	51%	51%	\$3,105,000	\$0	\$1,583,550	\$1,521,450
18	24-inch McQueeney Rd Parallel WL	0%	56%	56%	\$3,105,000	\$0	\$1,738,800	\$1,366,200

No.	Project Description	Percent Utilization			Cost Allocation			
		2018 <sup>(1)</sup>	2028	2018 to 2028	Total Project Cost	Existing Customers	10-Year	Beyond 2028
19	16-inch I-35 Water Line	38%	74%	36%	\$4,485,000	\$1,704,300	\$1,614,600	\$1,166,100
20	24-inch I-35 Water Line	30%	75%	45%	\$2,328,800	\$698,640	\$1,047,960	\$582,200
21	Downtown to Morningside PZ Convert	75%	92%	17%	\$4,089,400	\$3,067,050	\$695,198	\$327,152
22	24-inch Highway 46 Water Line	0%	64%	64%	\$1,304,100	\$0	\$834,624	\$469,476
23	0.85 MGD Expansion at County Yard PS	0%	26%	26%	\$287,500	\$0	\$74,750	\$212,750
24	1.0 MG Solms GST	55%	74%	19%	\$2,875,000	\$1,581,250	\$546,250	\$747,500
25	24-inch Solms PS Discharge Line	21%	76%	55%	\$2,725,500	\$572,355	\$1,499,025	\$654,120
26	24-inch Well 4 Discharge Line	24%	72%	48%	\$621,000	\$149,040	\$298,080	\$173,880
27	24-inch Saur Ln Water Line	17%	47%	30%	\$2,421,900	\$411,723	\$726,570	\$1,283,607
28	24-inch FM 1101 Water Line	12%	45%	33%	\$3,105,000	\$372,600	\$1,024,650	\$1,707,750
29	24-inch FM 1101 PS Discharge Lines	10%	67%	57%	\$3,967,500	\$396,750	\$2,261,475	\$1,309,275
30	6.0 MGD FM 1101 PS & 1.50 MG GST	0%	77%	77%	\$5,570,400	\$0	\$4,289,208	\$1,281,192
31	1.0 MG FM 1044 EST	0%	31%	31%	\$5,031,300	\$0	\$1,559,703	\$3,471,597
32	16/24-inch Oak Brook EST Water Line	0%	49%	49%	\$2,525,400	\$0	\$1,237,446	\$1,287,954
33	0.75 MG Oak Brook EST	0%	32%	32%	\$4,671,900	\$0	\$1,495,008	\$3,176,892
34	12-inch FM 758 Water Line	9%	39%	30%	\$1,552,500	\$139,725	\$465,750	\$947,025
35	12-inch Three Mile Creek Water Line	0%	34%	34%	\$1,035,000	\$0	\$351,900	\$683,100
<b>Total Capital Improvements Cost – Water</b>					<b>\$280,352,675</b>	<b>\$25,417,753</b>	<b>\$200,308,576</b>	<b>\$54,626,346</b>

<sup>(1)</sup> Utilization in 2018 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.

**Table 3-6 Wastewater System Impact Fee Eligible Projects**

No.	Project Description	Percent Utilization			Cost Allocation			
		2018 <sup>(1)</sup>	2028	2018 to 2028	Total Project Cost	Existing Customers	10-Year	Beyond 2028
EXISTING ELIGIBLE								
A	Gruene WWTP Relocation & Expansion	44%	91%	47%	\$59,078,369	\$25,994,482	\$27,766,833	\$5,317,054
B	2.5 MGD McKenzie WRF	46%	100%	54%	\$38,156,067	\$17,551,791	\$20,604,276	\$0
C	Impact Fee Study	0%	100%	100%	\$43,550	\$0	\$43,550	\$0
PROPOSED ELIGIBLE								
1	42-inch Interceptor (North Kuehler)	69%	82%	13%	\$7,594,737	\$5,240,369	\$987,316	\$1,367,052
2	33-inch Interceptor (North Kuehler)	73%	83%	10%	\$4,666,100	\$3,406,253	\$466,610	\$793,237
3	30-inch Interceptor (North Kuehler)	73%	83%	10%	\$3,049,000	\$2,225,770	\$304,900	\$518,330
4	15/18/21/24-inch Interceptor (South Kuehler)	45%	79%	34%	\$3,192,800	\$1,436,760	\$1,085,552	\$670,488
5	2.50 MGD McKenzie WRF Expansion (McKenzie)	0%	38%	38%	\$35,000,000	\$0	\$13,300,000	\$21,700,000
6	5.38 MGD Rio LS Expansion (North Kuehler)	0%	88%	88%	\$2,443,800	\$0	\$2,150,544	\$293,256
7	0.48 MGD Saengerhalle LS Expansion and 10-inch Force Main (McKenzie)	0%	67%	67%	\$1,940,700	\$0	\$1,300,269	\$640,431
8	15-inch Interceptor (McKenzie)	22%	85%	63%	\$1,761,000	\$387,420	\$1,109,430	\$264,150
9	30-inch Southern Interceptor (McKenzie)	56%	88%	32%	\$4,799,900	\$2,687,944	\$1,535,968	\$575,988
10	30-inch Northern Interceptor (McKenzie)	24%	73%	49%	\$10,056,800	\$2,413,632	\$4,927,832	\$2,715,336
11	15/18/21/24-inch Interceptor (North Kuehler)	61%	80%	19%	\$2,200,200	\$1,342,122	\$418,038	\$440,040
12	21-inch I35 Crossing (McKenzie)	30%	75%	45%	\$1,164,400	\$349,320	\$523,980	\$291,100
13	15-inch Interceptor (McKenzie)	50%	75%	25%	\$811,600	\$405,800	\$202,900	\$202,900
14	33/36-inch Interceptor (South Kuehler)	65%	78%	13%	\$3,532,000	\$2,295,800	\$459,160	\$777,040
15	0.91 MGD Solms LS Expansion (South Kuehler)	16%	64%	48%	\$1,006,300	\$161,008	\$483,024	\$362,268
16	12-inch Interceptor (Gruene)	27%	85%	58%	\$771,000	\$208,170	\$447,180	\$115,650
17	24-inch Interceptor (North Kuehler)	66%	75%	9%	\$1,112,700	\$734,382	\$100,143	\$278,175
Total Capital Improvements Cost – Wastewater					\$182,381,023	\$66,841,023	\$78,217,505	\$37,322,495

<sup>(1)</sup> Utilization in 2018 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.



FIGURE 3-3  
NEW BRAUNFELS  
UTILITIES  
WATER SYSTEM  
PROPOSED IMPACT FEE ELIGIBLE PROJECTS

LEGEND

Under Design/Construction Water Improvements

- Valve
- ASR Well Site
- Pump Station
- Ground Storage Tank
- Water Line
- Valve
- Pump Station
- Ground Storage Tank
- Elevated Storage Tank
- Water Treatment Plant
- Water Line

Existing Water System

- Pressure Plane Valve
- Well
- Standpipe
- Pump Station
- Ground Storage Tank
- Elevated Storage Tank
- 10" and Smaller Water Line
- 12" and Larger Water Line
- Road
- Stream
- Lake
- Parcel
- City Limit
- County Boundary

PRESSURE ZONES

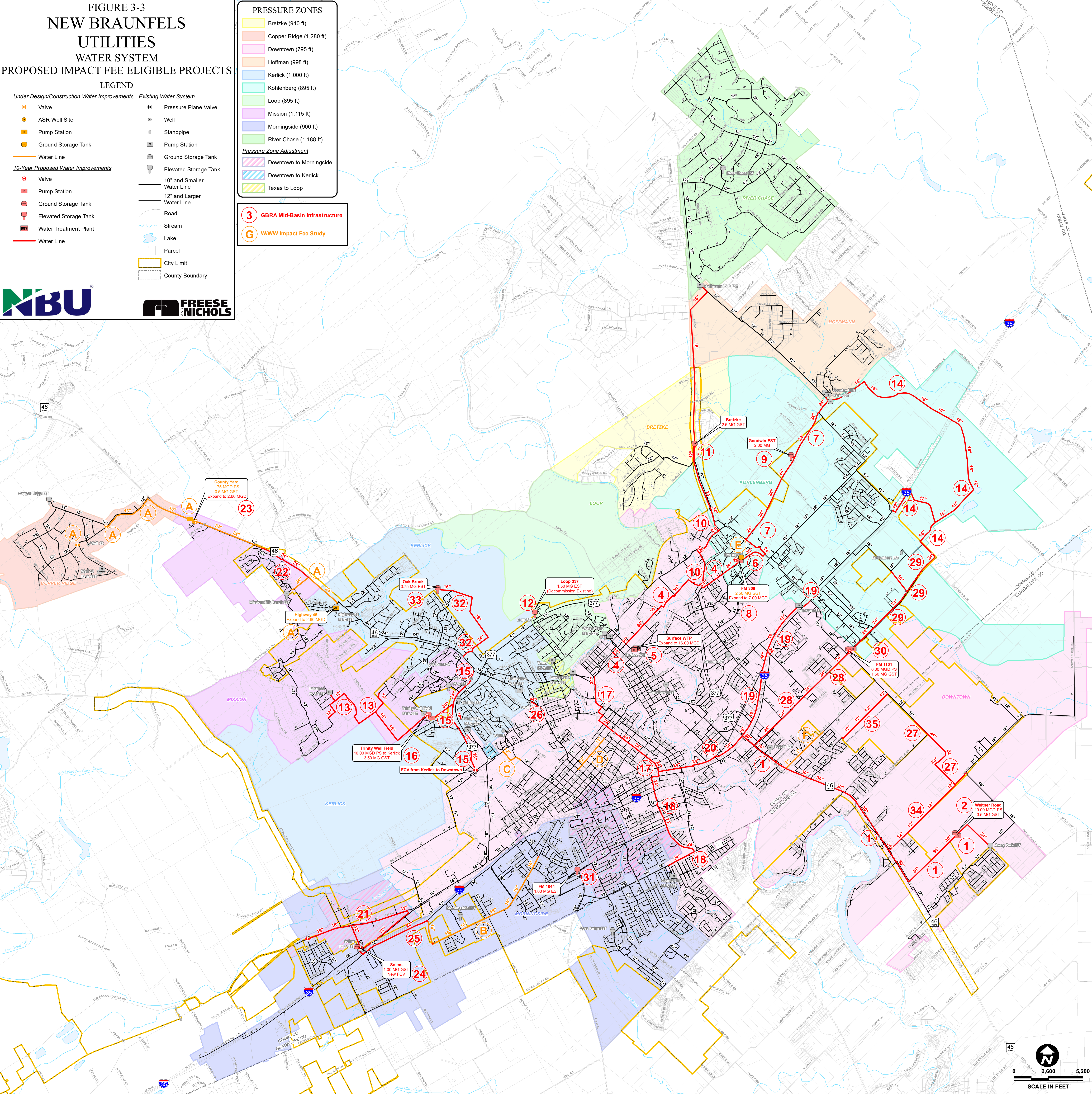
- Bretzke (940 ft)
- Copper Ridge (1,280 ft)
- Downtown (795 ft)
- Hoffman (998 ft)
- Kerlick (1,000 ft)
- Kohlenberg (895 ft)
- Loop (895 ft)
- Mission (1,115 ft)
- Morningside (900 ft)
- River Chase (1,188 ft)

Pressure Zone Adjustment

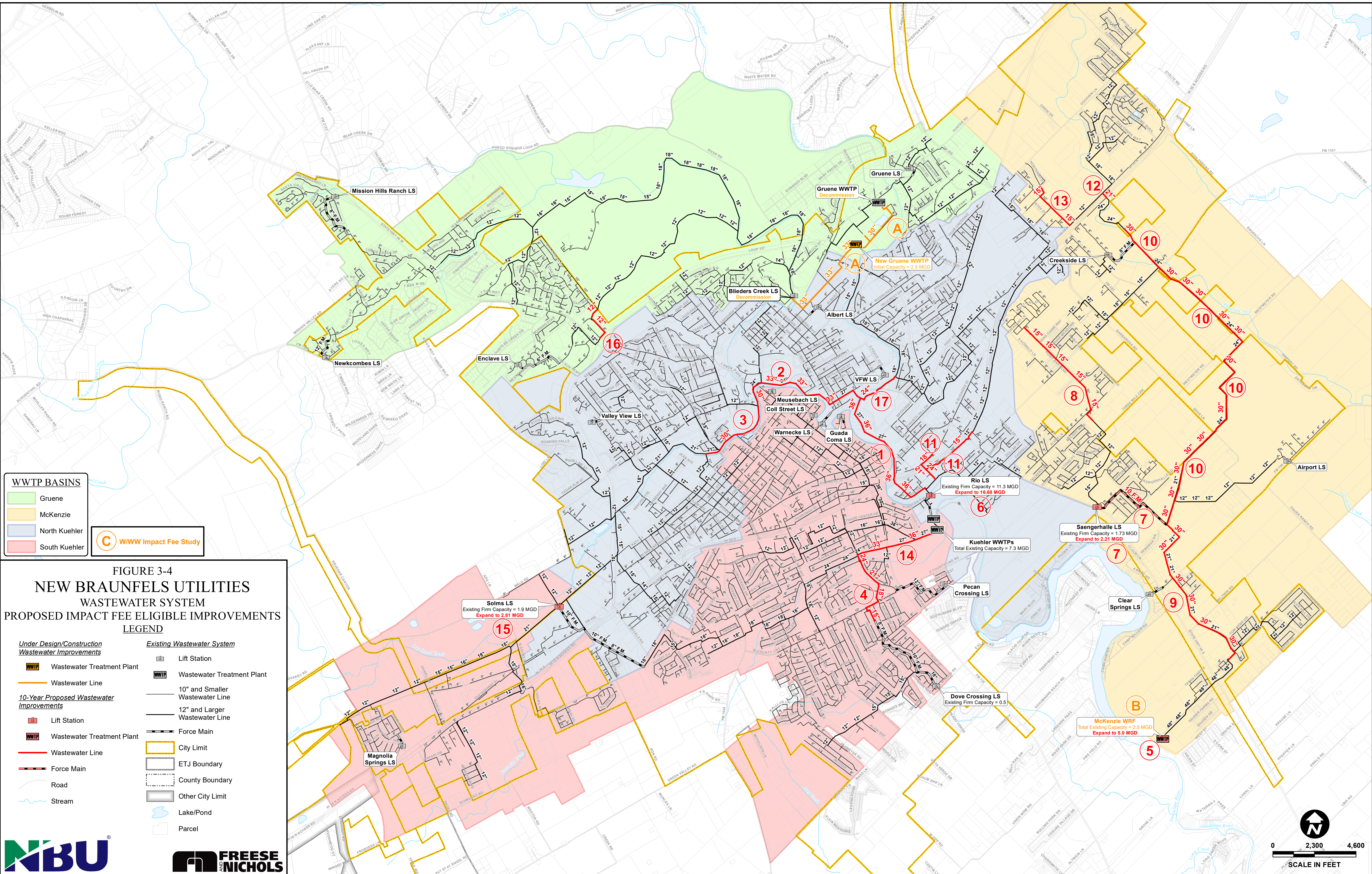
- Downtown to Morningside
- Downtown to Kerlick
- Texas to Loop

3 GBRA Mid-Basin Infrastructure

G WWW Impact Fee Study







WWTP BASINS

Gruene

McKenzie

North Kuehler

South Kuehler

C

WWW Impact Fee Study

FIGURE 3-4  
NEW BRAUNFELS UTILITIES  
WASTEWATER SYSTEM  
PROPOSED IMPACT FEE ELIGIBLE IMPROVEMENTS  
LEGEND

- Under Design/Construction Wastewater Improvements

WWTP

Wastewater Treatment Plant

—

Wastewater Line

10-Year Proposed Wastewater Improvements

LS

Lift Station

WWTP

Wastewater Treatment Plant

—

Wastewater Line

—

Force Main

—

Road

—

Stream

Existing Wastewater System

LS

Lift Station

WWTP

Wastewater Treatment Plant

—

10" and Smaller Wastewater Line

—

12" and Larger Wastewater Line

—

Force Main

—

City Limit

—

ETJ Boundary

—

County Boundary

—

Other City Limit

—

Lake/Pond

—

Parcel

NBU

FREESE AND NICHOLS

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Job No. 18010001  
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SCALE IN FEET



## **4.0 IMPACT FEE ANALYSIS**

The impact fee analysis involves determining the cost of projects associated with 10-year growth and the number of service units projected within the 10-year period. Capacity serving existing development and development projected for more than 10 years in the future cannot be charged to impact fees. Additionally, impact fees cannot be charged for capital costs that will also be included in a customer's water and sewer rates.

### **4.1 Service Units**

According to Chapter 395 of the Texas Local Government Code, the maximum impact fee may not exceed the amount determined by dividing the cost of capital improvements required by the total number of service units attributed to new development during the 10-year impact fee eligibility period. A water service unit is defined as service equivalent to a water connection for a single-family residence. NBU does not directly meter wastewater flows and bills for wastewater services based on the customer's water consumption. Therefore, a wastewater service unit is defined as the wastewater service provided to a customer with a water connection for a single-family residence.

The service associated with larger water meters is converted into service units based on the capacity of the meter used to provide service. The number of service units required to represent each meter size is determined by the safe maximum operating capacity as defined by the American Water Works Association (AWWA) standards C700 (Cold Water Meters – Displacement Type, Bronze Main Case) and C702 (Cold Water Meters – Compound Type). The service unit equivalent for each meter size used by NBU is listed in **Table 4-1**.

**Table 4-1 Service Unit Equivalents**

Meter Size	Safe Maximum Operating Capacity (gpm)	Service Unit Equivalent
5/8"	10	1.0
1"	25	2.5
1 1/2"	50	5.0
2"	80	8.0
3"	160	16.0
4"	250	25.0
6"	500	50.0
8"	800	80.0
10"	1,150	115.00

Typically, single-family residences are served with 5/8-inch water meters. Larger meters represent mostly commercial and industrial water use. Service units for these types of uses were determined based on the meter equivalencies. Service units for multi-family master meters were calculated using 0.5 service units per dwelling unit from NBU's Design Criteria. The number of dwelling units for each multi-family meter was calculated using the median unit count provided in NBU water meter billing data. To determine the breakdown of meter sizes for 2028, it was assumed that the relative meter count for each size would remain consistent into the future, so a 6% annual growth rate was applied to the existing meter count for each size. The existing service units and the projected 2028 service units for water are shown in **Table 4-2** and **Table 4-3**, respectively. **Table 4-4** summarizes the growth in service units for the 10-year impact fee eligible period. For wastewater, the 2028 meter counts for each meter were calculated in the same way as the water meter counts. The existing service units and the projected 2028 service units for wastewater are shown in **Table 4-5** and **Table 4-6**, respectively. **Table 4-7** summarizes the growth in wastewater service units for the 10-year impact fee eligible period.



**Table 4-2 2018 Service Units – Water**

Meter Size	Single-Family and Non-Residential			Multi-Family			Total 2018 Service Units
	Number of Meters <sup>(1)</sup>	Service Unit Equivalent <sup>(2)</sup>	Service Units	Number of Meters	Dwelling Units <sup>(3)</sup>	Service Units <sup>(4)</sup>	
5/8"	29,081	1.0	29,081	187	639	320	<b>29,401</b>
1"	636	2.5	1,590	36	168	84	<b>1,674</b>
1 1/2"	254	5.0	1,270	56	754	377	<b>1,647</b>
2"	384	8.0	3,072	96	2,755	1,378	<b>4,450</b>
3"	37	16.0	592	23	924	462	<b>1,054</b>
4"	18	25.0	450	8	632	316	<b>766</b>
6"	4	50.0	200	1	63	32	<b>232</b>
10"	1	115.0	115	0	0	0	<b>115</b>
<b>Total</b>	<b>30,415</b>	<b>-</b>	<b>36,370</b>	<b>407</b>	<b>5,935</b>	<b>2,968</b>	<b>39,338</b>

(1) 2018 number of meters from water meter billing data (excludes irrigation meters).

(2) Based on AWWA C700 and C702 Maximum Safe Operating Flow.

(3) Number of dwelling units for multi-family calculated using the median unit count provided in NBU water meter billing data.

(4) Service units for multi-family calculated using 0.5 service units per dwelling unit.

**Table 4-3 2028 Service Units – Water**

Meter Size	Single-Family and Non-Residential			Multi-Family			Total 2028 Service Units
	Number of Meters <sup>(1)</sup>	Service Unit Equivalent <sup>(2)</sup>	Service Units	Number of Meters	Dwelling Units <sup>(3)</sup>	Service Units <sup>(4)</sup>	
5/8"	52,080	1.0	52,080	335	1,144	572	<b>52,652</b>
1"	1,139	2.5	2,847	64	301	150	<b>2,998</b>
1 1/2"	455	5.0	2,274	100	1,350	675	<b>2,950</b>
2"	688	8.0	5,502	172	4,934	2,467	<b>7,968</b>
3"	66	16.0	1,060	41	1,655	827	<b>1,888</b>
4"	32	25.0	806	14	1,132	566	<b>1,372</b>
6"	7	50.0	358	2	113	56	<b>415</b>
10"	2	115.0	206	0	0	0	<b>206</b>
<b>Total</b>	<b>54,469</b>	<b>-</b>	<b>65,134</b>	<b>729</b>	<b>10,629</b>	<b>5,314</b>	<b>70,448</b>

(1) 2028 number of meters calculated based on 2018 meter counts, assuming 6% annual growth for each meter size.

(2) Based on AWWA C700 and C702 Maximum Safe Operating Flow.

(3) Number of dwelling units for multi-family calculated using the median unit count provided in NBU water meter billing data.

(4) Service units for multi-family calculated using 0.5 service units per dwelling unit.

**Table 4-4 2018-2028 Growth in Service Units – Water**

Meter Size	2018 Total Service Units	2028 Total Service Units	2018-2028 Growth in Service Units
5/8"	29,401	52,652	<b>23,251</b>
1"	1,674	2,998	<b>1,324</b>
1 1/2"	1,647	2,950	<b>1,303</b>
2"	4,450	7,968	<b>3,518</b>
3"	1,054	1,888	<b>834</b>
4"	766	1,372	<b>606</b>
6"	232	415	<b>183</b>
10"	115	206	<b>91</b>
<b>Total</b>	<b>39,338</b>	<b>70,448</b>	<b>31,110</b>

**Table 4-5 2018 Service Units – Wastewater**

Meter Size	Single-Family and Non-Residential			Multi-Family			Total 2018 Service Units
	Number of Meters <sup>(1)</sup>	Service Unit Equivalent <sup>(2)</sup>	Service Units	Number of Meters	Dwelling Units <sup>(3)</sup>	Service Units <sup>(4)</sup>	
5/8"	25,789	1.0	25,789	151	527	264	<b>26,053</b>
1"	487	2.5	1,218	35	165	83	<b>1,300</b>
1 1/2"	239	5.0	1,195	52	742	371	<b>1,566</b>
2"	353	8.0	2,824	93	2,681	1,341	<b>4,165</b>
3"	31	16.0	496	23	924	462	<b>958</b>
4"	16	25.0	400	8	632	316	<b>716</b>
6"	4	50.0	200	1	63	32	<b>232</b>
10"	1	115.0	115	0	0	0	<b>115</b>
<b>Total</b>	<b>26,920</b>	<b>-</b>	<b>32,237</b>	<b>363</b>	<b>5,734</b>	<b>2,867</b>	<b>35,104</b>

(1) 2018 number of meters from water meter billing data (excludes irrigation meters).

(2) Based on AWWA C700 and C702 Maximum Safe Operating Flow.

(3) Number of dwelling units for multi-family calculated using the median unit count provided in NBU water meter billing data.

(4) Service units for multi-family calculated using 0.5 service units per dwelling unit.

**Table 4-6 2028 Service Units – Wastewater**

Meter Size	Single-Family and Non-Residential			Multi-Family			Total 2028 Service Units
	Number of Meters <sup>(1)</sup>	Service Unit Equivalent <sup>(2)</sup>	Service Units	Number of Meters	Dwelling Units <sup>(3)</sup>	Service Units <sup>(4)</sup>	
5/8"	43,285	1.0	43,285	253	885	442	<b>43,728</b>
1"	817	2.5	2,044	59	277	138	<b>2,182</b>
1 1/2"	401	5.0	2,006	87	1,245	623	<b>2,628</b>
2"	592	8.0	4,740	156	4,500	2,250	<b>6,990</b>
3"	52	16.0	833	39	1,551	775	<b>1,608</b>
4"	27	25.0	671	13	1,061	530	<b>1,202</b>
6"	7	50.0	336	2	106	53	<b>389</b>
10"	2	115.0	193	0	0	0	<b>193</b>
<b>Total</b>	<b>45,184</b>	<b>-</b>	<b>54,107</b>	<b>609</b>	<b>9,624</b>	<b>4,812</b>	<b>58,919</b>

(1) 2028 number of meters calculated based on 2018 meter counts, assuming 5.2% annual growth for each meter size.

(2) Based on AWWA C700 and C702 Maximum Safe Operating Flow.

(3) Number of dwelling units for multi-family calculated using the median unit count provided in NBU water meter billing data.

(4) Service units for multi-family calculated using 0.5 service units per dwelling unit.

**Table 4-7 2018-2028 Growth in Service Units – Wastewater**

Meter Size	2018 Total Service Units	2028 Total Service Units	2018-2028 Growth in Service Units
5/8"	26,053	43,728	17,675
1"	1,300	2,182	882
1 1/2"	1,566	2,628	1,062
2"	4,165	6,990	2,825
3"	958	1,608	650
4"	716	1,202	486
6"	232	389	157
10"	115	193	78
<b>Total</b>	<b>35,104</b>	<b>58,919</b>	<b>23,815</b>



## **4.2 Impact Fee Calculations**

Texas Government Code Chapter 395 outlines the procedures and requirements for calculating maximum allowable impact fees to recover costs associated with capital improvement projects needed due to growth over a 10-year period.

To calculate the maximum allowable impact fees, the capital costs associated with providing capacity to new customers from both existing and new projects were considered, as well as any interest and financing costs associated with meeting the infrastructure needs to serve growth in the water and wastewater systems. For existing projects, only those projects with available capacity to serve needs associated with new customers have been considered. Credits to the impact fees were also considered, where applicable.

### **Credit Analysis**

Chapter 395 also requires a plan that addresses possible duplication of payments for capital improvements. This plan can either provide a credit for the portion of utility service revenues generated by new development that is used for the payment of eligible improvements, including payment of debt, or reduce the total eligible project costs by 50 percent. NBU has selected to provide a credit for the portion of utility service revenues generated by new development that is used for the payment of eligible improvements to determine the maximum allowable impact fees.

The list of impact fee eligible water projects includes several existing projects in the NBU system that have capacity available to serve new customers, which have a total cost of \$21,739,698, with \$9,236,755 of that total cost projected to serve growth in the 10-year planning period. Of the existing eligible water projects, only two have been funded and continue to be funded through debt issuance: the 12-inch Live Oak Avenue Water Line (Project C) and the 8-inch Alves Lane Water Line (Project F). On these two projects, \$13,647 of the total cost has been covered through past debt funding, with the rest funded using impact fees. Therefore, because available capacity from these two projects will be used to serve new customers, and because there is debt associated with these two projects that is being recovered through rate revenues, a credit must be calculated to ensure that new customers joining the system will not be providing for any costs of their service through rates and also through impact fees. In this case, collectively, only \$0.13 per new customer will be paid by new development through utility rates for eligible facilities.

There are two existing wastewater projects that have available capacity to serve new growth in the system: the Gruene WWTP Relocation & Expansion (Project A) and the 2.5 MGD McKenzie Water Reclamation Facility (Project B). The debt associated with these two projects is \$25,233,606. As shown in Table 3-6 in the previous section, the portions of these projects that serve new growth are 56% and 54%, respectively. Using a similar method, a credit was calculated for the amount that new customers will pay towards eligible facility costs through the rates.

For new capital projects, which will serve primarily future growth, NBU intends to use bond funding, as detailed in the next section. However, the portion of the capital costs attributable to new development during the 10-year period, including interest, will not be incorporated into the rate base. Instead, the entire cost of this portion of the debt, principal and interest, will be paid through collection of water and wastewater impact fees. As a result, no credit will accrue for new projects.

### **Financing Costs**

Along with the credit for any existing debt for current customers, the associated financing costs for acquiring funds for the proposed projects have also been included. Only financing costs associated with the capacity of each project being utilized in the 10-year planning period from 2018-2028 have been included. Any portion of the projects' costs associated with meeting existing deficiencies or providing capacity for growth outside the 10-year period were not included. This was done under the assumption that all of the project costs for the 10-year period will be recovered through the collection of impact fees, which will place the burden of providing additional capacity on the new customers and not the existing customers. Also, for the purposes of this study it is assumed that the proposed projects will be funded through a series of bond issuances throughout the 10-year planning period, and that all of the needed capital costs will be collected and paid against the associated debt issue within the 10-year period. As such, the interest from each debt issue was calculated starting at the time of each individual debt issue and stopping at the end of the 10-year period, because it was assumed that all of the funds will have been recovered by the end of the 10-year period. Along with the interest expenses, the cost of acquiring each of the debt issues has also been included in the impact fee calculation per Section 395.012 of Chapter 395 of the Texas Local Government Code. **Table 4-8** and **Table 4-9** summarize the financing cost calculations that were included in the maximum allowable impact fee for water and wastewater, respectively.

The interest and funding fee expenses were addressed in the same way for both water and wastewater. However, there is an additional cost that had to be addressed in providing water service for NBU's new



customers, the cost associated with the Guadalupe-Blanco River Authority (GBRA) Mid-Basin Infrastructure (Project 3). The capital cost associated with this project is \$84,105,000, which is passed along to NBU from GBRA. The full cost of this project is included as an allowable impact fee capital component because the entire capacity of the project is needed to serve new customers in the 2018-2028 planning period. GBRA also passes through to NBU their financing costs, which include interest expenses and additional coverage requirements. As shown in **Table 4-8**, there are also “adjustments” made to the annual amounts due GBRA by NBU as a result of the Texas Water Development Board funding programs which allow deferment of costs until construction has been completed. In the earlier years, all interest payments have been offset by these adjustments because the project will not yet be online and, therefore, NBU will not be receiving any water. The adjustments then gradually decrease, escalating the GBRA debt expenses until, in years outside of the range shown in **Table 4-8**, no adjustments are required because NBU will be paying the full debt burden for the water supply. These specific expenses have been provided by GBRA, and the expenses recognized in the 10-year planning period are included in the maximum allowable water impact fee calculation.

**Table 4-8 Financing Cost Calculations – Water**

Year	Interest Rate	Total Debt Issue	Incurred Interest	Funding Fee at 2.25%	Guadalupe-Blanco River Authority			
					Interest	Adjustments	Coverage	Total
2019	4.75%	\$52,930,614	\$21,144,850	\$1,190,939	\$501,672	(\$501,672)	-	-
2020	5.00%	-	-	-	\$668,896	(\$668,896)	-	-
2021	5.25%	\$7,115,625	\$2,645,931	\$160,102	\$1,683,610	(\$1,683,610)	-	-
2022	5.50%	-	-	-	\$2,737,937	(\$2,630,896)	-	\$107,041
2023	5.75%	\$25,159,585	\$8,025,607	\$566,091	\$2,976,633	(\$2,299,062)	\$105,757	\$783,328
2024	6.00%	-	-	-	\$3,182,366	(\$2,026,825)	\$173,054	\$1,328,595
2025	6.25%	-	-	-	\$3,169,156	(\$1,817,841)	\$194,631	\$1,545,946
2026	6.50%	\$21,760,997	\$4,131,732	\$489,622	\$3,154,977	(\$1,628,203)	\$212,677	\$1,739,451
2027	6.75%	-	-	-	\$3,140,216	(\$1,360,832)	\$239,938	\$2,019,322
2028	7.00%	-	-	-	\$3,124,539	(\$1,038,783)	\$272,076	\$2,357,832
<b>Total</b>	-	<b>\$106,966,821</b>	<b>\$35,948,120</b>	<b>\$2,406,753</b>	<b>\$24,340,002</b>	<b>(\$15,656,620)</b>	<b>\$1,198,133</b>	<b>\$9,881,515</b>



**Table 4-9 Financing Cost Calculations – Wastewater**

Year	Interest Rate	Total Debt Issue	Incurred Interest	Funding Fee at 2.25%
2019	4.75%	\$2,844,378	\$1,136,279	\$63,999
2020	5.00%	-	-	-
2021	5.25%	\$13,300,000	\$4,945,578	\$299,250
2022	5.50%	-	-	-
2023	5.75%	\$11,024,043	\$3,516,538	\$248,041
2024	6.00%	-	-	-
2025	6.25%	-	-	-
2026	6.50%	\$2,634,425	\$500,195	\$59,275
2027	6.75%	-	-	-
2028	7.00%	-	-	-
<b>Total</b>	-	<b>\$29,802,846</b>	<b>\$10,098,590</b>	<b>\$670,564</b>

### **Maximum Allowable Impact Fees**

Chapter 395 of the Texas Local Government Code states that the maximum impact fee may not exceed the amount determined by dividing the cost of capital improvements required by the total number of service units attributed to new development during the impact fee eligibility period less the credit to account for water and wastewater revenues used to fund capital improvement plans. **Table 4-10** and **Table 4-11** display a summary of the maximum allowable impact fee calculations for water and wastewater, respectively.

**Table 4-10 Maximum Water Impact Fee Calculation**

Water Impact Fee	
Total Eligible Capital Improvement Costs	\$200,308,576
Total Eligible Financing Costs	\$48,236,388
Total Eligible Impact Fee Costs	\$248,544,964
Growth in Service Units	31,110
Maximum Water Impact Fee per Service Unit	\$7,989
Impact Fee Credit per Service Unit	\$0.02
<b>Maximum Allowable Water Impact Fee</b>	<b>\$7,989</b>



**Table 4-11 Maximum Wastewater Impact Fee Calculation**

Wastewater Impact Fee	
Total Eligible Capital Improvement Costs	\$78,217,505
Total Eligible Financing Costs	\$10,769,154
Total Eligible Impact Fee Costs	\$88,986,659
Growth in Service Units	23,815
Maximum Wastewater Impact Fee per Service Unit	\$3,737
Impact Fee Credit per Service Unit	\$486
<b>Maximum Allowable Wastewater Impact Fee</b>	<b>\$3,251</b>

**Table 4-12** presents the maximum allowable impact fee by meter size based on the service unit equivalent associated with each meter size. The combined maximum allowable impact fees calculated for this study are \$1,837 higher than the current impacts fees being assessed. The water impact fee increased mainly due to additional capital costs associated with new water supplies while the wastewater impact fee slightly decreased due to the increased service units that are projected.

**Table 4-12 Maximum Allowable Impact Fee by Meter Size**

Meter Size	Safe Maximum Operating Capacity (gpm)	Service Unit Equivalent	Maximum Allowable Water	Maximum Allowable Wastewater	Maximum Allowable Total
5/8"	10	1.0	\$7,989	\$3,251	\$11,240
1"	25	2.5	\$19,972	\$8,127	\$28,099
1 1/2"	50	5.0	\$39,945	\$16,254	\$56,199
2"	80	8.0	\$63,912	\$26,007	\$89,919
3"	160	16.0	\$127,823	\$52,014	\$179,837
4"	250	25.0	\$199,724	\$81,272	\$280,996
6"	500	50.0	\$399,448	\$162,543	\$561,991
8"	800	80.0	\$ 639,116	\$260,069	\$ 899,185
10"	1,150	115.00	\$918,729	\$373,849	\$1,292,578



# **Appendix A**

## **Hydraulic Analysis Summary**



**TO:** New Braunfels Utilities

**FROM:** Stephanie Neises, P.E., Freese and Nichols, Inc.  
Dave Christiansen, P.E., Freese and Nichols, Inc.

**SUBJECT:** Water and Wastewater Hydraulic Analysis

**DATE:** June 6, 2018

## 1.0 INTRODUCTION

As part of the Water and Wastewater Impact Fee Update, Freese and Nichols, Inc. (FNI) performed hydraulic analyses on the water distribution system and the wastewater collection system. The analyses included a capacity evaluation of the pumping and storage facilities in the water system, a capacity evaluation of the lift stations and treatment facilities in the wastewater system, and an analysis of the overall operations of each system. The following sections document the findings of the hydraulic analyses performed.

## 2.0 WATER STORAGE AND PUMPING RECOMMENDATIONS

This section summarizes an evaluation of the storage and pumping capacity for NBU 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. Demands by planning year were calculated as described in **Section 3.4**. Pumping and storage capacity recommendations were evaluated by pressure zone, with the exception of production pumping capacity, which FNI recommends should meet 125% of maximum day demands system-wide. For service pumping capacity, FNI recommended that each pressure zone has firm capacity (i.e. capacity with the largest pump at each pump station out of service) to meet at least 125% of maximum day demands for all downstream pressure zones. A downstream pressure zone is defined as a zone which is fed directly by another zone via a booster pump station (e.g. the River Chase zone and the Hoffman zone are both downstream of the Kohlenberg zone, and all three are downstream of the Downtown zone). The planning criterion for recommended production capacity of 125% of maximum day demand was selected to help ensure NBU will have enough production capacity to meet maximum day demands, even if all production facilities are not able to run at full capacity due to emergency outages or maintenance.



The design criteria used to evaluate and make recommendations for 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 hour demands in excess of the maximum day demand rate (equalization volume), while the other half of the tank is used for fire protection and emergency conditions. For each pressure zone, an elevated storage capacity recommendation was developed based on the greater of:

$$4 \text{ hours of (PH Demand – MD Demand)} + 3 \text{ hours of 2,000 gpm Fire Flow Demand}$$

~ or ~

$$4 \text{ hours of (PH Demand – MD Demand)} \times 2$$

For ground storage capacity, FNI recommends that NBU be able to store four hours of firm pumping capacity at each pump station. This provides a storage buffer at each pump station in case the supply to the pump station is interrupted. **Table A-1**, **Table A-2**, and **Table A-3** show a summary of the 2018, 2028, and 2038 recommended production capacity, distribution pumping capacity, and elevated storage capacity for each pressure zone, respectively. These recommendations were utilized to identify the timing and capacity of future pumping and storage system improvements.

**Table A-1 FNI Recommended Production Capacity by Planning Year**

Pressure Zones	Existing Production Capacity (mgd)	Recommended Production Capacity <sup>(1)</sup> (mgd)		
		2018	2028	2038
River Chase	29.98	30.01	55.72	74.89
Hoffman				
Kohlenberg				
Downtown				
Morningside				
Loop				
Texas				
Kerlick				
Westpointe				
Mission				
Copper Ridge	0.66	1.13		
Balcones	0.29	0.06		

(1) Capacity values are color-coded as follows:

Green: recommended capacity is less than 85% of existing capacity.

Yellow: recommended capacity is between 85% and 100% of existing capacity.

Red: recommended capacity is greater than 100% of existing capacity.



**Table A-2 Recommended Pumping Capacity by Planning Year**

Pressure Zones	Existing Distribution Pumping		Recommended Firm Pumping Capacity <sup>(1)</sup> (mgd)		
	Firm Capacity (mgd)	Total Capacity (mgd)	2018	2028	2038
River Chase	1.44	2.16	1.22	1.24	1.24
Hoffman	1.44	2.16	1.71	1.73	3.46
Kohlenberg	4.61	8.14	4.23	13.79	21.27
Downtown	15.98	23.92	30.01	55.72	74.89
Morningside	8.64	14.40	3.96	7.03	9.53
Loop	1.44	2.88	1.03	3.91	7.00
Texas	1.87	3.74	0.10		
Kerlick	3.96	7.92	5.73	11.28	14.69
Westpointe	3.74	5.53	0.48	5.46	6.86
Mission	0.86	1.73	0.80		
Balcones	0.14	0.29	0.06		
Copper Ridge	0.50	1.15	1.13	2.61	2.82

(1) Capacity values are color-coded as follows:

Green: recommended capacity is less than 85% of existing capacity.

Yellow: recommended capacity is between 85% and 100% of existing capacity.

Red: recommended capacity is greater than 100% of existing capacity.

**Table A-3 Recommended Elevated Storage Capacity by Planning Year**

Pressure Zones	Existing Elevated Storage Capacity (MG)	Recommended Elevated Storage Capacity <sup>(1)</sup> (MG)		
		2018	2028	2038
River Chase	0.15	0.47	0.48	0.48
Hoffman	0.25	0.41	0.41	0.57
Kohlenberg	0.10	0.59	2.25	3.33
Downtown	0.42	2.79	3.68	4.18
Morningside	1.00	0.74	1.31	1.78
Loop	0.14	0.46	0.73	1.31
Texas	0.10	0.37		
Kerlick	0.85	0.83	1.09	1.46
Westpointe	0.75	0.40	0.63	0.75
Mission	0.47	0.43		
Balcones	-	0.37		
Copper Ridge	0.50	0.47	0.60	0.62

(1) Capacity values are color-coded as follows:

Green: recommended capacity is less than 85% of existing capacity.

Yellow: recommended capacity is between 85% and 100% of existing capacity.

Red: recommended capacity is greater than 100% of existing capacity.



### 3.0 WATER DISTRIBUTION SYSTEM ANALYSIS

The hydraulic models of the water distribution system and the wastewater collection system were utilized to conduct existing and future system analyses. The analysis of the water distribution system evaluated current and future operations under 2018, 2028, and 2038 maximum day demand conditions. The hydraulic model helped to further refine the timing and capacity of the proposed pumping and storage improvements, as well as identify any pipeline improvements needed. For water pipeline improvements, new pipelines were sized so that velocity did not exceed 5 feet per second at any point during the 24-hour model simulation period. **Figure A-1** shows the proposed improvements that were developed using the pumping and storage criteria and the hydraulic model. The results of the analysis are summarized below:

- Downtown Elevated Storage Tanks: The elevated storage tanks in the Downtown Pressure Zone do not currently operate well together, due to the fact that some of the ESTs are much closer to the production sources than others. The ESTs nearest to the production facilities: Comaltown, Gruene, and Seguin, are constantly full because the HGL of the distribution system must rise above the overflow level of these tanks to fill the ESTs that are farther away from the production facilities. This can lead to water quality issues in the closest tanks. Conversely, the Avery Park EST is currently unable to maintain appropriate water levels during periods of high demand, because it is much farther away from the production facilities than the other ESTs in the pressure zone. In the 2015 Water Master Plan, it was suggested to decommission the three ESTs closest to the production facilities and build additional elevated storage farther out in the system. However, the addition of the Weltner Road Pump Station in the southeastern part of the pressure zone mostly alleviates this issue by placing a production facility closer to the Avery Park EST, allowing the existing tanks to operate more cohesively. Due to growth in the zone, additional elevated storage is needed, even though FNI is now recommending that all the existing ESTs remain in service. The proposed Bretzke EST and Altgelt EST provide the Downtown Pressure Zone with adequate elevated storage to meet project growth through 2038.
- Areas of Low Pressure: There are currently several areas in the Kohlenberg and Downtown Pressure Zones in which the model showed pressure below 35 psi during peak hour demand conditions. These areas also prevent the majority of the existing elevated storage volume in both zones from being counted as true elevated storage, based on the TCEQ definition of elevated storage as the volume of water at least 80 feet above the highest service elevation. Although projects to fix these issues are not impact fee eligible, FNI has developed solutions to serve these areas at higher HGLs, thus increasing the pressure and allowing more of the existing elevated



storage to be counted as true elevated storage per TCEQ rules. For the areas in the Downtown Pressure Zone, they will be served through pressure reducing valves from the Morningside Pressure Zone. The area in the Kohlenberg Pressure Zone will be isolated and served by the proposed Bretzke Pump Station.

- Additional Production Capacity: As shown in **Table A-1**, the current production capacity of the water system is slightly below what is recommended for 2018, and well below the future production requirements. There are three proposed locations for this additional production capacity to enter the system: the existing Surface Water Treatment Plant, the existing Trinity Wellfield, and the proposed Weltner Road Pump Station. The first project anticipated to be constructed is the Weltner Road Pump Station. This facility will utilize 8,000 ac-ft (7.14 mgd) of wholesale water from Guadalupe-Blanco River Authority (GBRA). Based on the demand projections, all of the GBRA water supply will be utilized within the next 10 years, therefore, an expansion of NBU's Surface Water Treatment and Trinity Wellfield was also identified. The planned expansions to production capacity at these three locations will provide NBU with adequate capacity to meet projected growth through 2038. However, it should be noted that NBU has not yet identified all of the water sources that will supply these production facilities.
- Additional Elevated Storage: Based on the water demand projections and the recommended planning criteria, all pressure zones except for the Mission Pressure Zone will need additional elevated storage capacity. After discussions with NBU staff, it was decided that additional elevated storage would not be identified in the River Chase, Hoffmann, and Copper Ridge pressure zones due to the lack of available land and the relatively small storage deficiency identified. Instead, additional pumping capacity is proposed in these zones so that a portion of the peak hour demand would be met through pumping and not equalization storage.
- Additional Pumping Capacity: By 2038, all pressure zones will need additional pumping capacity to serve future growth. It should be noted that a significant amount of the planned increase in production capacity is entering the distribution system in the Kerlick Pressure Zone, which operates at a higher hydraulic grade, with the capability of conveying flow from Kerlick to lower zones (i.e. Loop and Downtown) via the proposed flow control valve shown.

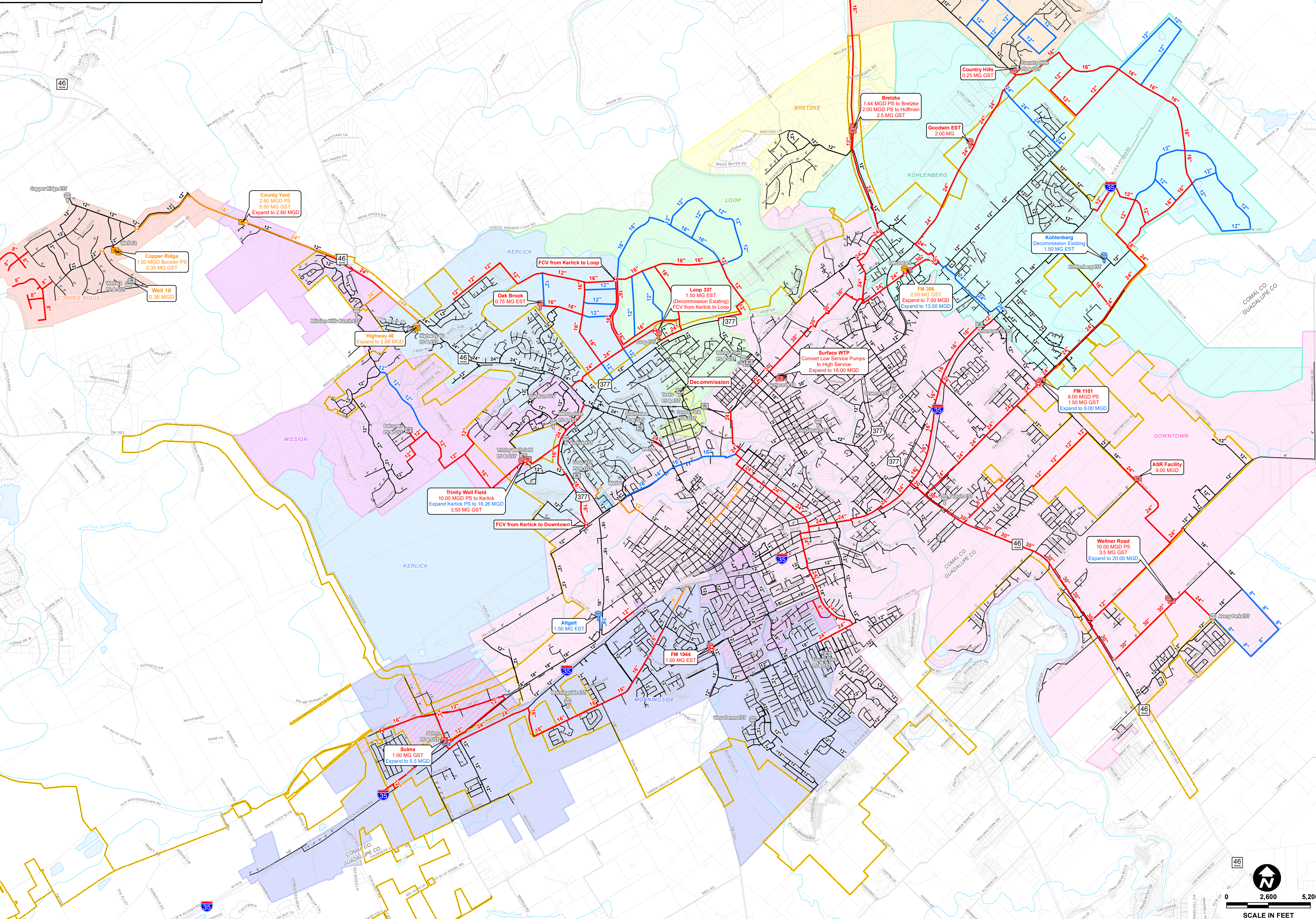


FIGURE A-1  
NEW BRAUNFELS  
UTILITIES  
WATER SYSTEM  
PROPOSED IMPROVEMENTS  
LEGEND

Under Design/Construction Water Improvements Existing Water System

- |                                     |                            |
|-------------------------------------|----------------------------|
| Valve                               | Pressure Plane Valve       |
| ASR Well Site                       | Well                       |
| Pump Station                        | Standpipe                  |
| Ground Storage Tank                 | Pump Station               |
| Water Line                          | Ground Storage Tank        |
| 0                                   | Elevated Storage Tank      |
| 10-Year Proposed Water Improvements | 10" and Smaller Water Line |
| Valve                               | 12" and Larger Water Line  |
| ASR Well Site                       | Road                       |
| Pump Station                        | Stream                     |
| Elevated Storage Tank               | Lake                       |
| Ground Storage Tank                 | Parcel                     |
| Water Treatment Plant               | City Limit                 |
| Water Line                          | County Boundary            |
| 20-Year Proposed Water Improvements |                            |
| Pump Station                        |                            |
| Elevated Storage Tank               |                            |
| Water Line                          |                            |

FREESE NICHOLS NBU



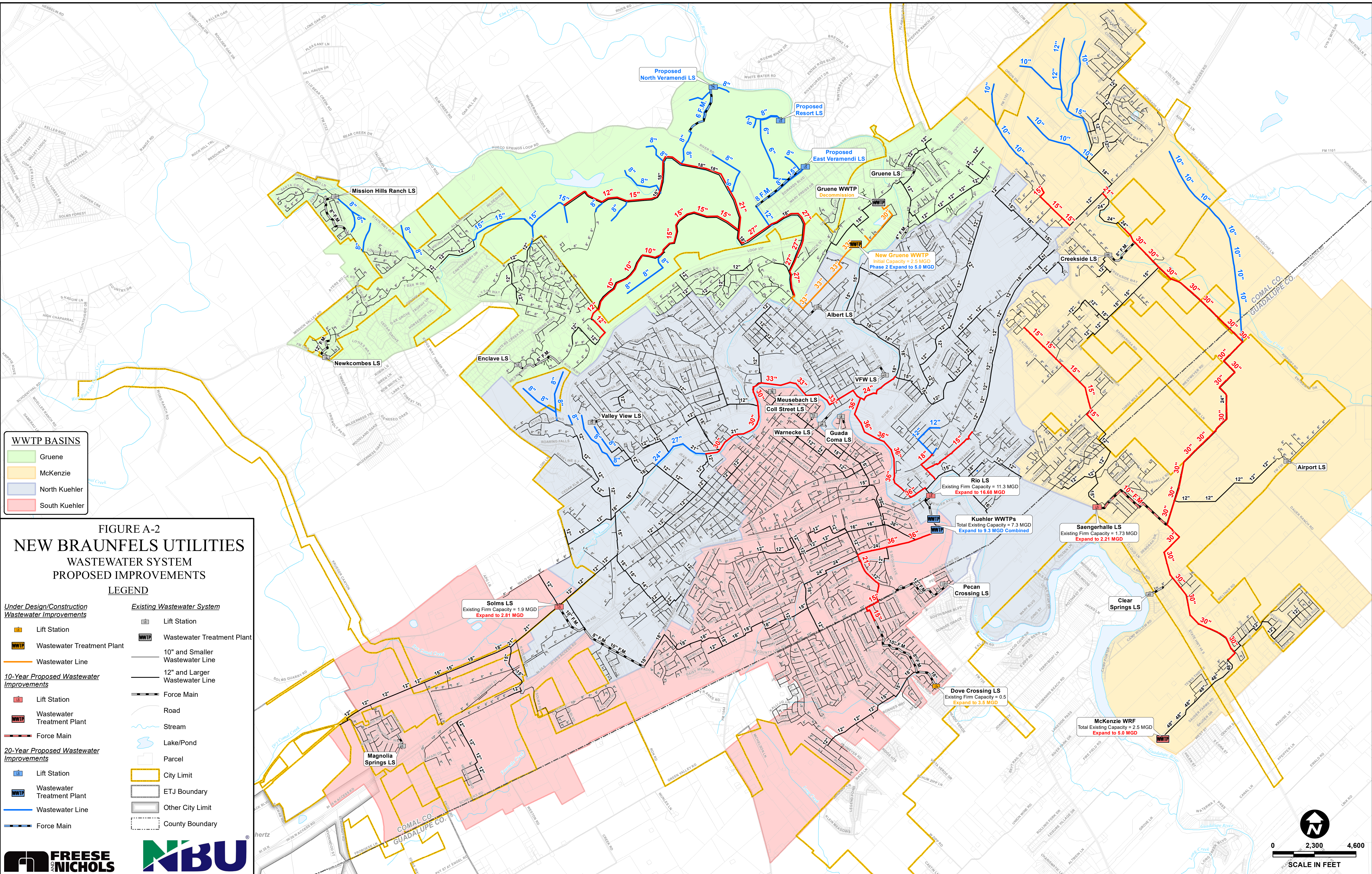


## 4.0 WASTEWATER COLLECTION SYSTEM ANALYSIS

The analysis of the wastewater collection system evaluated current and future operations under 2018, 2028, and 2038 average daily and peak wet weather flow conditions. The hydraulic model helped to identify any pipeline improvements needed. For wastewater pipelines, surcharging in existing gravity mains was allowed as long as the water level did not reach within 3 feet of the manhole rim. If the water level did rise to within 3 feet of the manhole rim, the gravity main was identified for replacement. Proposed gravity mains were sized such that no surcharging occurred, even during peak wet weather flows. **Figure A-2** shows the proposed improvements that were developed using the hydraulic model. The results of the analysis are summarized below:

- **Lift Station Expansions:** It is recommended that each lift station in the wastewater collection system has adequate pumping capacity to convey peak wet weather flow with the largest pump out of service. New force mains were recommended if the modeled velocity exceeded 8 feet per second at any point during the model simulation. Although expansions are recommended at four lift stations: Dove Crossing, Rio, Saengerhalle, and Solms, a new force main is only recommended at the Saengerhalle Lift Station.
- **Wastewater Treatment Plant Expansions:** FNI recommends that each wastewater treatment plant be sized to treat annual average daily flow. By 2038, it is projected that all three treatment facilities will need expansions. **Figure A-3**, **Figure A-4**, and **Figure A-5** present charts comparing projected average daily flows with permitted treatment capacity at each facility. The 75%, 90%, and 100% capacity lines indicate the following actions by NBU as required by TCEQ Chapter 305.126:
  - When flow reaches 75% of the permitted capacity for three consecutive months, NBU must begin planning for expansion.
  - When flow reaches 90% of the permitted capacity for three consecutive months, NBU must obtain authorization from TCEQ to begin construction on the planned expansion.
  - Before the projected flow exceeds the permitted capacity, the expansion must be operational.
- **Interceptor Replacement:** Several of the large-diameter interceptors in the collection system will need to be replaced with larger lines by 2038. These lines must be upsized to convey the additional flow entering the system due to projected growth. Improvements were triggered when the water level in a given pipe surcharged to within 3 feet of the manhole rim during peak wet weather flow. Improvements were sized such that no surcharging occurred in the new pipe, even during peak wet weather flow conditions.





**WWTP BASINS**

- Gruene
- McKenzie
- North Kuehler
- South Kuehler

**FIGURE A-2**  
**NEW BRAUNFELS UTILITIES**  
**WASTEWATER SYSTEM**  
**PROPOSED IMPROVEMENTS**

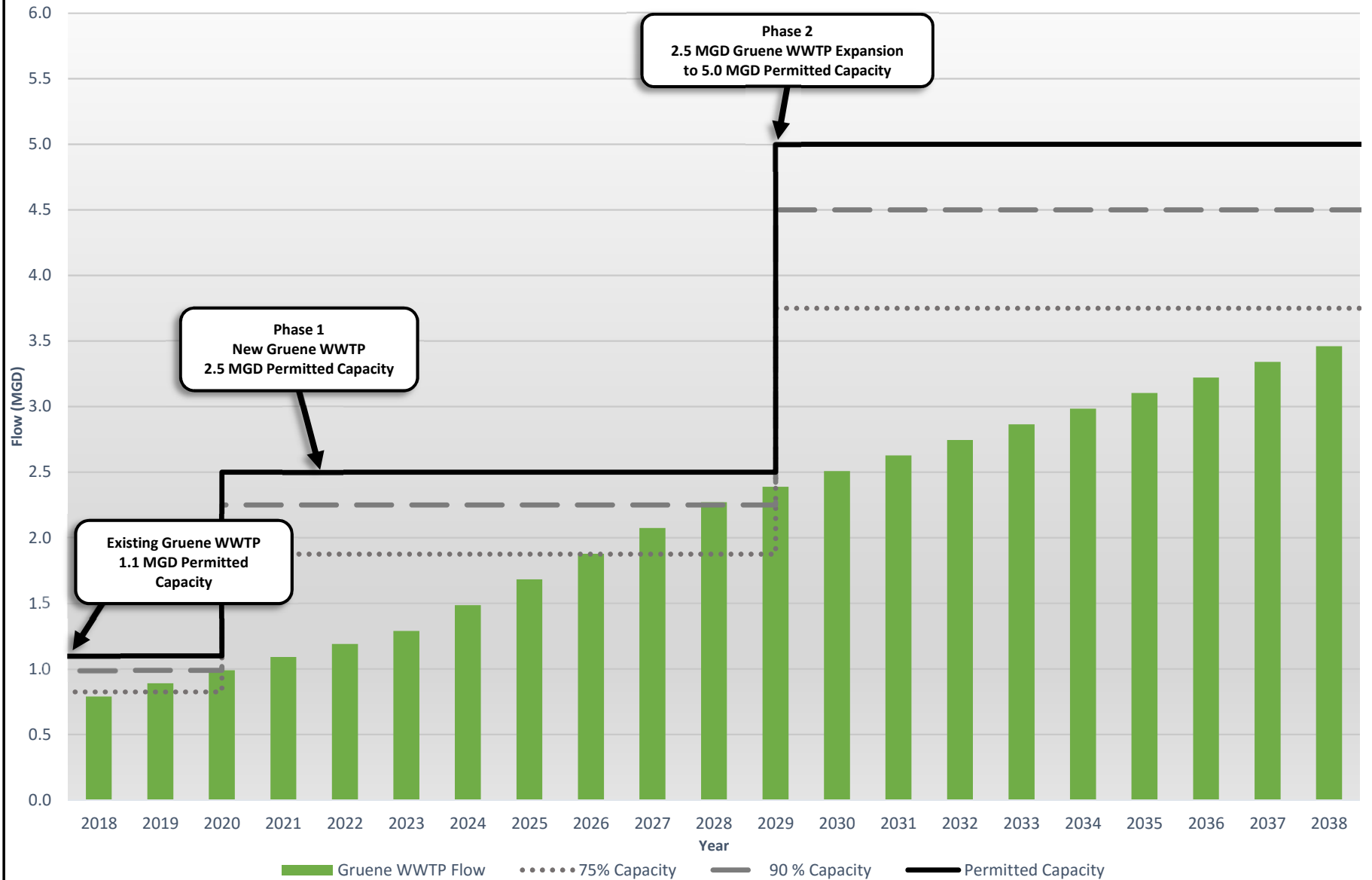
**LEGEND**

<b>Under Design/Construction Wastewater Improvements</b>	<b>Existing Wastewater System</b>
Lift Station	Lift Station
Wastewater Treatment Plant	Wastewater Treatment Plant
Wastewater Line	10" and Smaller Wastewater Line
10-Year Proposed Wastewater Improvements	12" and Larger Wastewater Line
Lift Station	Force Main
Wastewater Treatment Plant	Road
Force Main	Stream
20-Year Proposed Wastewater Improvements	Lake/Pond
Lift Station	Parcel
Wastewater Treatment Plant	City Limit
Wastewater Line	ETJ Boundary
Force Main	Other City Limit
	County Boundary

**Freese & Nichols** **NBU**

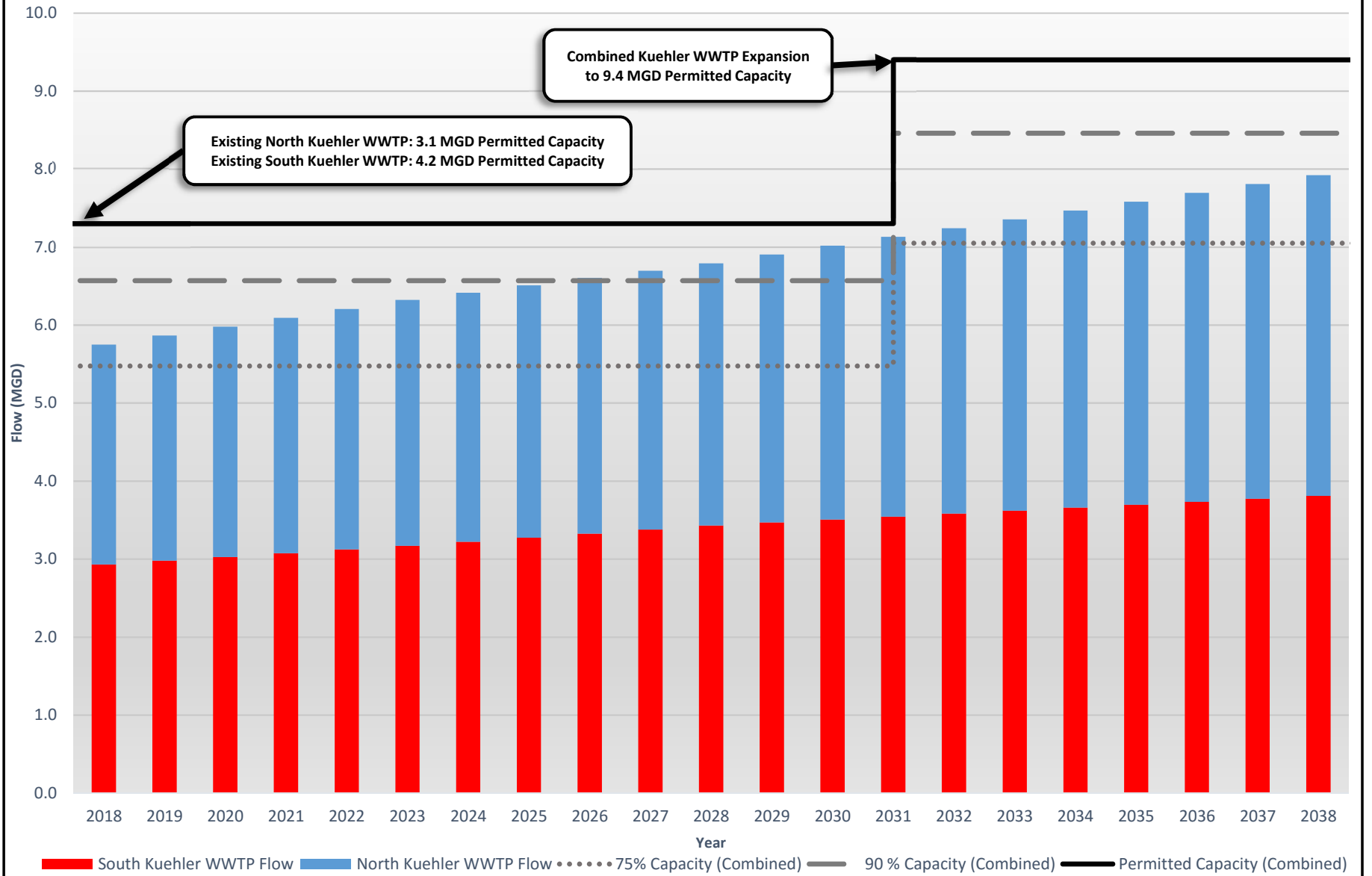


**Figure A-3: Gruene Wastewater Treatment Plant  
Projected Average Annual Daily Flow and Treatment Capacity**



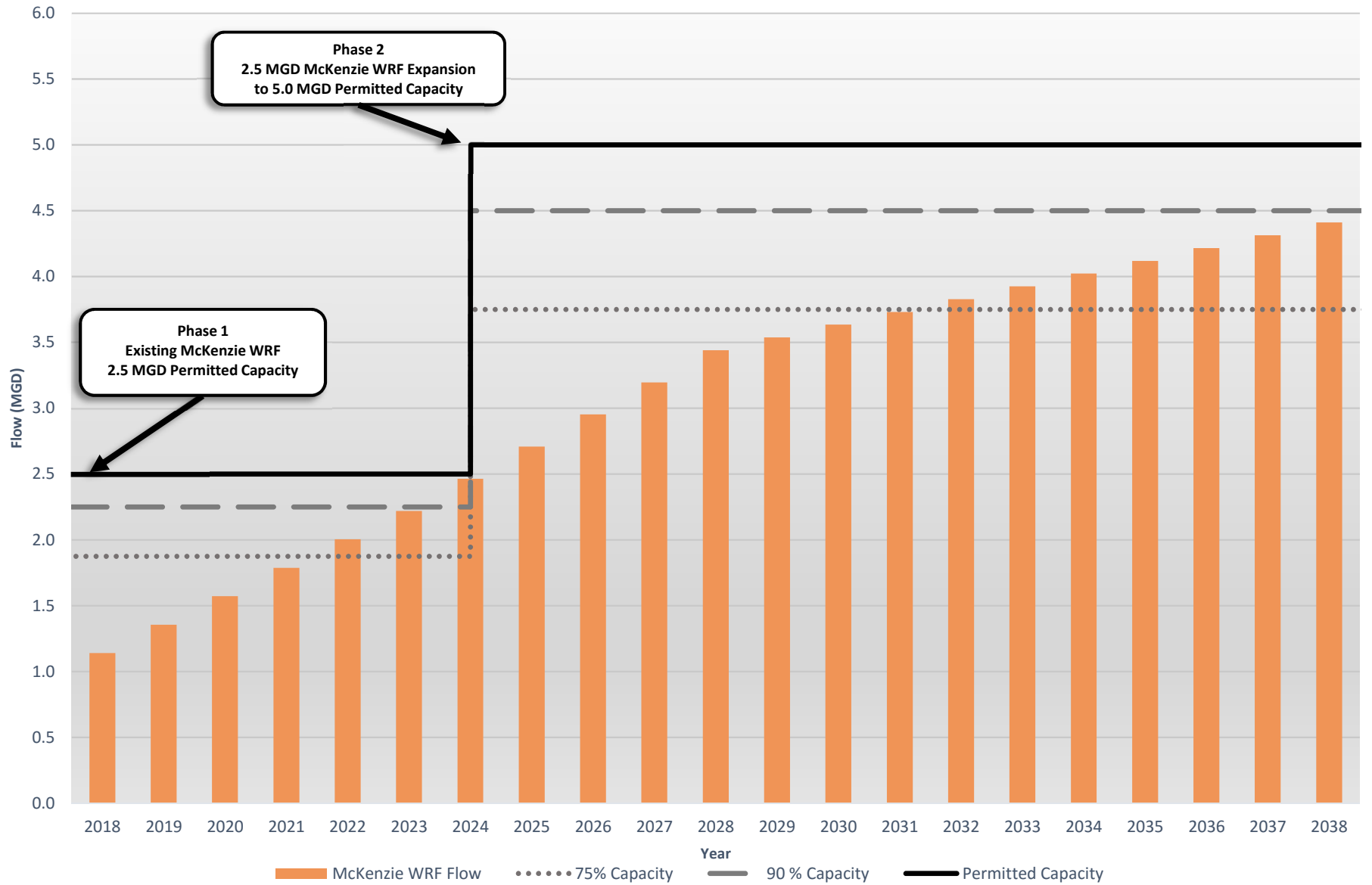


**Figure A-4: Combined Kuehler Wastewater Treatment Plants  
Projected Average Annual Daily Flow and Treatment Capacity**





**Figure A-5: McKenzie Water Reclamation Facility  
Projected Average Annual Daily Flow and Treatment Capacity**





## **Appendix B**

# **Water System Project Cost Estimates**



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 1

Phase: 2028

Project Name: **30/24-inch Weltner Road/Highway 46 Water Lines (Downtown)**

## Project Description:

A new 30-inch water line along Highway 46 and Weltner Road from I-35 to the proposed Weltner Road Pump Station. A new 24-inch water line connecting the proposed Weltner Road Pump Station to the existing 18-inch water line along Avery Parkway.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Cost from Urban Civil PER	1	LS	\$ 10,695,677	\$ 10,695,677
				<b>SUBTOTAL:</b>	<b>\$ 10,695,677</b>
				CONTINGENCY	0%
					\$ -
				<b>SUBTOTAL:</b>	<b>\$ 10,695,677</b>
				ENG/SURVEY	0%
					\$ -
				<b>SUBTOTAL:</b>	<b>\$ 10,695,677</b>
<b>Estimated Project Total:</b>					<b>\$ 10,695,677</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 2

Phase: 2028

Project Name: **10.0 MGD Weltner Road Pump Station & 1.5 MG GST (Downtown)**

## Project Description:

A new 10.00 MGD pump station on Weltner Road serving the Downtown Pressure Zone. The proposed 1.5 MG GST will receive supply from the GBRA Mid-Basin project and the City of Seguin. Project 1 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional production capacity in the Downtown Pressure Zone to address a small existing deficit and serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - New 10.0 MGD	1	LS	\$ 6,000,000	\$ 6,000,000
2	1.50 MG Ground Storage Tank	1	LS	\$ 1,875,000	\$ 1,875,000
				<b>SUBTOTAL:</b>	<b>\$ 7,875,000</b>
				CONTINGENCY	25%
					\$ 1,968,800
				<b>SUBTOTAL:</b>	<b>\$ 9,843,800</b>
				ENG/SURVEY	15%
					\$ 1,476,600
				<b>SUBTOTAL:</b>	<b>\$ 11,320,400</b>
<b>Estimated Project Total:</b>					<b>\$ 11,320,400</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 3

Phase: 2028

Project Name: **GBRA Mid-Basin Infrastructure (Downtown)**

## Project Description:

This project includes NBU's share of the cost of the infrastructure built by GBRA to convey Mid-Basin supply to NBU.

## Project Drivers:

This project will provide additional supply capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	GBRA Mid-Basin Infrastructure - NBU Cost	1	LS	\$ 84,105,000	\$ 84,105,000
				<b>SUBTOTAL:</b>	<b>\$ 84,105,000</b>
				CONTINGENCY	0%
					\$ -
				<b>SUBTOTAL:</b>	<b>\$ 84,105,000</b>
				ENG/SURVEY	0%
					\$ -
				<b>SUBTOTAL:</b>	<b>\$ 84,105,000</b>
<b>Estimated Project Total:</b>					<b>\$ 84,105,000</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 4

Phase: 2028

Project Name: **30/24-inch Surface WTP Discharge Line (Downtown)**

## Project Description:

A new 24-inch water line along North Houston Avenue connecting the existing 24-inch Low Service water line to the existing 12 and 18-inch water lines at the intersection of North Houston Avenue and East Torrey Street. A new 24/30-inch water line replacing the existing 18-inch water line from the intersection of East Torrey Street and Lakeview Boulevard along East Torrey Street, Sleepy Hollow Lane, Gruene Road, and Water Way connecting to the FM 306 Pump Station.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" WL & Appurtenances	8,400	LF	\$ 270	\$ 2,268,000
2	24" WL & Appurtenances	3,700	LF	\$ 216	\$ 799,200
3	48" Boring and Casing	500	LF	\$ 840	\$ 420,000
4	38" Boring and Casing	500	LF	\$ 600	\$ 300,000
<b>SUBTOTAL:</b>					<b>\$ 3,787,200</b>
CONTINGENCY				25%	\$ 946,800
<b>SUBTOTAL:</b>					<b>\$ 4,734,000</b>
ENG/SURVEY				15%	\$ 710,100
<b>SUBTOTAL:</b>					<b>\$ 5,444,100</b>
<b>Estimated Project Total:</b>					<b>\$ 5,444,100</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 5

Phase: 2028

Project Name: **8.00 MGD Expansion at Surface WTP (Downtown)**

## Project Description:

An expansion of 8.00 MGD at the existing Surface Water Treatment Plant. This project includes both an expansion in treatment capacity as well as production capacity.

## Project Drivers:

This project will provide additional supply and production capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8.00 MGD WTP Expansion	1	LS	\$ 21,000,000	\$ 21,000,000
				<b>SUBTOTAL:</b>	<b>\$ 21,000,000</b>
				CONTINGENCY	25%
					\$ 5,250,000
				<b>SUBTOTAL:</b>	<b>\$ 26,250,000</b>
				ENG/SURVEY	15%
					\$ 3,937,500
				<b>SUBTOTAL:</b>	<b>\$ 30,187,500</b>
<b>Estimated Project Total:</b>					<b>\$ 30,187,500</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 6

Phase: 2028

Project Name: **24/30-inch FM 306 PS Discharge Line (Kohlenberg)**

## Project Description:

A new 30-inch water line replacing the existing 18-inch water line from the FM 306 Pump Station along Old FM 306 to the intersection with FM 306. A new 24-inch line replacing the existing 12-inch along FM 306 from Old FM 306 to FM 1102 and the existing 10-inch along FM 1102.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" WL & Appurtenances	2,300	LF	\$ 270	\$ 621,000
2	24" WL & Appurtenances	2,300	LF	\$ 216	\$ 496,800
3	38" Boring and Casing	500	LF	\$ 600	\$ 300,000
<b>SUBTOTAL:</b>					<b>\$ 1,417,800</b>
CONTINGENCY				25%	\$ 354,500
<b>SUBTOTAL:</b>					<b>\$ 1,772,300</b>
ENG/SURVEY				15%	\$ 265,900
<b>SUBTOTAL:</b>					<b>\$ 2,038,200</b>
<b>Estimated Project Total:</b>					<b>\$ 2,038,200</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 7

Phase: 2028

Project Name: **24-inch FM1102 Water Line (Kohlenberg)**

## Project Description:

A new 24-inch water line along FM 1102 from the new 24-inch water line described in Project 6 to the existing 12-inch water line along Conrads Lane.

## Project Drivers:

This project will serve future growth in the Kohlenberg Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	13,500	LF	\$ 216	\$ 2,916,000
		SUBTOTAL:		\$	2,916,000
		CONTINGENCY		25%	\$ 729,000
		SUBTOTAL:		\$	3,645,000
		ENG/SURVEY		15%	\$ 546,800
		SUBTOTAL:		\$	4,191,800
Estimated Project Total:					\$ 4,191,800



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 8

Phase: 2028

Project Name: **3.50 MGD Expansion at FM 306 PS (Kohlenberg)**

## Project Description:

A 3.50 MGD pumping capacity expansion at the existing FM 306 Pump Station.

## Project Drivers:

This project will serve future growth in the Kohlenberg Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - Expans 3.50 MGD	1	LS	\$ 1,200,000	\$ 1,200,000
				<b>SUBTOTAL:</b>	<b>\$ 1,200,000</b>
				CONTINGENCY	25%
					\$ 300,000
				<b>SUBTOTAL:</b>	<b>\$ 1,500,000</b>
				ENG/SURVEY	15%
					\$ 225,000
				<b>SUBTOTAL:</b>	<b>\$ 1,725,000</b>
<b>Estimated Project Total:</b>					<b>\$ 1,725,000</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 9

Phase: 2028

Project Name: **2.00 MG Goodwin EST (Kohlenberg)**

## Project Description:

A new 2.00 MG elevated storage tank on FM 1102. Project 7 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional elevated storage capacity to the Kohlenberg Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.0 MG Elevated Storage Tank	1	LS	\$ 5,000,000	\$ 5,000,000
				<b>SUBTOTAL:</b>	<b>\$ 5,000,000</b>
				CONTINGENCY	25%
					\$ 1,250,000
				<b>SUBTOTAL:</b>	<b>\$ 6,250,000</b>
				ENG/SURVEY	15%
					\$ 937,500
				<b>SUBTOTAL:</b>	<b>\$ 7,187,500</b>
<b>Estimated Project Total:</b>					<b>\$ 7,187,500</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 10

Phase: 2028

Project Name: **24-inch Bretzke Water Line (Downtown)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line along Gruene Road and Hunter Road. A new 24-inch water line along FM 306 from Hunter Road to Bretzke Lane. This project will connect the proposed Bretzke EST described in Project 11 to the distribution system.

## Project Drivers:

This project will provide capacity to serve future growth in the Downtown Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	10,500	LF	\$ 216	\$ 2,268,000
<b>SUBTOTAL:</b>					<b>\$ 2,268,000</b>
CONTINGENCY				25%	\$ 567,000
<b>SUBTOTAL:</b>					<b>\$ 2,835,000</b>
ENG/SURVEY				15%	\$ 425,300
<b>SUBTOTAL:</b>					<b>\$ 3,260,300</b>
<b>Estimated Project Total:</b>					<b>\$ 3,260,300</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 11

Phase: 2028

Project Name: **2.50 MG Bretzke EST (Downtown)**

## Project Description:

A new 2.50 MG ground storage tank serving as elevated storage for the Downtown Pressure Zone near Bretzke Lane and FM 306.

## Project Drivers:

This project will provide additional elevated storage capacity to the Downtown Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.5 MG Ground Storage Tank	1	LS	\$ 2,500,000	\$ 2,500,000
				<b>SUBTOTAL:</b>	<b>\$ 2,500,000</b>
				CONTINGENCY	25%
					\$ 625,000
				<b>SUBTOTAL:</b>	<b>\$ 3,125,000</b>
				ENG/SURVEY	15%
					\$ 468,800
				<b>SUBTOTAL:</b>	<b>\$ 3,593,800</b>
<b>Estimated Project Total:</b>					<b>\$ 3,593,800</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 12

Phase: 2028

Project Name: **1.50 MG Loop 337 EST (Loop)**

## Project Description:

A new 1.5 MG elevated storage tank at the existing Loop EST site. The existing tank will be decommissioned as part of this project.

## Project Drivers:

This project will provide additional elevated storage capacity to the Loop Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	1.5 MG Elevated Storage Tank	1	LS	\$ 4,000,000	\$ 4,000,000
2	Demolition of Existing Tank	1	LS	\$ 500,000	\$ 500,000
		SUBTOTAL:		\$	4,500,000
		CONTINGENCY		25%	\$ 1,125,000
		SUBTOTAL:		\$	5,625,000
		ENG/SURVEY		15%	\$ 843,800
		SUBTOTAL:		\$	6,468,800
Estimated Project Total:					\$ 6,468,800



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 13

Phase: 2028

Project Name: **12/16-inch Mission/Westpointe Connection Water Lines (Mission)**

## Project Description:

A new 12/16-inch water line connecting the Mission and Westpointe Pressure Zones. The new water lines will connect the existing 18-inch water line at the Trinity Well Field, the existing 8-inch water line along Hunters Way, the existing 12-inch water line on Geneseo Oaks, and the existing 8-inch along Chaparral Drive.

## Project Drivers:

This project will provide capacity to serve future growth in the Mission Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	9,100	LF	\$ 144	\$ 1,310,400
2	16" WL & Appurtenances	6,000	LF	\$ 192	\$ 1,152,000
<b>SUBTOTAL:</b>					<b>\$ 2,462,400</b>
CONTINGENCY				25%	\$ 615,600
<b>SUBTOTAL:</b>					<b>\$ 3,078,000</b>
ENG/SURVEY				15%	\$ 461,700
<b>SUBTOTAL:</b>					<b>\$ 3,539,700</b>
<b>Estimated Project Total:</b>					<b>\$ 3,539,700</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 14

Phase: 2028

Project Name: **16-inch Eastern Connection Water Line (Kohlenberg)**

## Project Description:

A new 16-inch water line in the GLO development connecting the existing 16-inch water line along Kohlenberg Road to the existing 16-inch water line on Hunter Road.

## Project Drivers:

This project will serve future growth in the Kohlenberg Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" WL & Appurtenances	24,000	LF	\$ 192	\$ 4,608,000
2	30" Boring and Casing	500	LF	\$ 450	\$ 225,000
<b>SUBTOTAL:</b>					<b>\$ 4,833,000</b>
CONTINGENCY				25%	\$ 1,208,250.00
<b>SUBTOTAL:</b>					<b>\$ 6,041,250</b>
ENG/SURVEY				15%	\$ 906,187.50
<b>SUBTOTAL:</b>					<b>\$ 6,947,438</b>
<b>Estimated Project Total:</b>					<b>\$ 6,947,438</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 15

Phase: 2028

Project Name: **30/24/16-inch Trinity Wellfield Kerlick Discharge Line & FCV (Kerlick)**

## Project Description:

A new 30-inch water line connecting the proposed Trinity Wellfield Kerlick PS described in Project 17 to a new 16/24-inch water line along the western side of Loop 337. This new 24-inch water line will extend northeast along Loop 337 from the new 30-inch water line to the existing 24-inch at North Walnut Avenue, replacing a section of existing 12-inch water line near Oak Run Parkway. A new 16-inch water line will extend south along Loop 337 from the new 30-inch water line to the existing 12-inch water line on Landa Street, replacing the existing 12-inch along Loop 337 near Stone Crossing. A flow control valve on the 16-inch water line will allow NBU to send Trinity supply

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

\*Note: FNI provided cost estimates for the Vista Ridge Supply Integration as part of a previous evaluation. Those estimates included land acquisition, mobilization, preparation of right-of-way, and 2017 escalation factor that are not included in project costs developed for the Water Infrastructure Plan.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" WL & Appurtenances	2,500	LF	\$ 270	\$ 675,000
2	24" WL & Appurtenances	3,100	LF	\$ 216	\$ 669,600
3	16" WL & Appurtenances	5,600	LF	\$ 192	\$ 1,075,200
4	Flow Control Valve with Vault	1	LS	\$ 300,000	\$ 300,000
<b>SUBTOTAL:</b>					<b>\$ 2,719,800</b>
CONTINGENCY				25%	\$ 680,000
<b>SUBTOTAL:</b>					<b>\$ 3,399,800</b>
ENG/SURVEY				15%	\$ 510,000
<b>SUBTOTAL:</b>					<b>\$ 3,909,800</b>
<b>Estimated Project Total:</b>					<b>\$ 3,909,800</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 16

Phase: 2028

Project Name: **10.00 MGD Trinity Wellfield Kerlick Pump Station & 3.50 MG GST (Kerlick)**

## Project Description:

A new 10.00 MGD pump station at the Trinity Wellfield site that will pump directly to the Kerlick Pressure Zone. This project will also require the construction of additional groundwater wells and an expansion of the membrane treatment facility. Project 16 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional production capacity to the distribution system to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - Expans 10 MGD	1	LS	\$ 4,000,000	\$ 4,000,000
2	3.5 MG Ground Storage Tank	1	LS	\$ 3,000,000	\$ 3,000,000
3	Membrane Treatment Facility Expansion	1	LS	\$ 3,350,000	\$ 3,350,000
4	Groundwater Well	4	LS	\$ 750,000	\$ 3,000,000
<b>SUBTOTAL:</b>					<b>\$ 13,350,000</b>
CONTINGENCY				25%	\$ 3,337,500
<b>SUBTOTAL:</b>					<b>\$ 16,687,500</b>
ENG/SURVEY				15%	\$ 2,503,200
<b>SUBTOTAL:</b>					<b>\$ 19,190,700</b>
<b>Estimated Project Total:</b>					<b>\$ 19,190,700</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 17

Phase: 2028

Project Name: **24-inch N. Castell Ave Parallel Water Line (Downtown)**

## Project Description:

A new 24-inch water line paralleling the existing water lines along Elizabeth Avenue, North Market Avenue, Meusebach Street, North Seguin Avenue, West Zink Street, and North Castell Avenue from the existing 24-inch on West Torrey Street to the existing 6-inch on South Castell Avenue near I-35. Project 4 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	10,000	LF	\$ 216	\$ 2,160,000
<b>SUBTOTAL:</b>					<b>\$ 2,160,000</b>
CONTINGENCY				25%	\$ 540,000
<b>SUBTOTAL:</b>					<b>\$ 2,700,000</b>
ENG/SURVEY				15%	\$ 405,000
<b>SUBTOTAL:</b>					<b>\$ 3,105,000</b>
<b>Estimated Project Total:</b>					<b>\$ 3,105,000</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 18

Phase: 2028

Project Name: **24-inch McQueeney Rd Parallel Water Line (Downtown)**

## Project Description:

A new 24-inch water line paralleling the existing water lines along South Castell Avenue, West Merriweather Street, McQueeney Road, and West County Line Road from the proposed 24-inch water line described in Project 18 to the existing 18-inch along West County Line Road.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	10,000	LF	\$ 216	\$ 2,160,000
<b>SUBTOTAL:</b>					<b>\$ 2,160,000</b>
CONTINGENCY				25%	\$ 540,000
<b>SUBTOTAL:</b>					<b>\$ 2,700,000</b>
ENG/SURVEY				15%	\$ 405,000
<b>SUBTOTAL:</b>					<b>\$ 3,105,000</b>
<b>Estimated Project Total:</b>					<b>\$ 3,105,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 19

Phase: 2028

Project Name: **16-inch I-35 Water Line (Downtown)**

## Project Description:

A new 16-inch water line replacing the existing 8 and 12-inch water lines along the north side of I-35 from Highway 46 to the I-35 Pump Station. A new 24-inch water line connecting the proposed 16-inch water line to the existing 12-inch water lines at the intersection of the I-35 Frontage Road and South Kowald Lane.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" WL & Appurtenances	12,000	LF	\$ 192	\$ 2,304,000
2	24" WL & Appurtenances	1,000	LF	\$ 216	\$ 216,000
3	36" Boring and Casing	1,000	LF	\$ 600	\$ 600,000
<b>SUBTOTAL:</b>					<b>\$ 3,120,000</b>
	CONTINGENCY		25%		\$ 780,000
<b>SUBTOTAL:</b>					<b>\$ 3,900,000</b>
	ENG/SURVEY		15%		\$ 585,000
<b>SUBTOTAL:</b>					<b>\$ 4,485,000</b>
<b>Estimated Project Total:</b>					<b>\$ 4,485,000</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 20

Phase: 2028

Project Name: **24-inch I-35 Water Line (Downtown)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line along the north side of I-35 from Highway 46 to South Castell Avenue.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	7,500	LF	\$ 216	\$ 1,620,000
<b>SUBTOTAL:</b>					<b>\$ 1,620,000</b>
CONTINGENCY				25%	\$ 405,000
<b>SUBTOTAL:</b>					<b>\$ 2,025,000</b>
ENG/SURVEY				15%	\$ 303,800
<b>SUBTOTAL:</b>					<b>\$ 2,328,800</b>
<b>Estimated Project Total:</b>					<b>\$ 2,328,800</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 21

Phase: 2028

Project Name: **Western Downtown to Morningside PZ Conversion (Morningside)**

## Project Description:

A new 12-inch water line along Rusch Lane, FM 482, Old Highway 81, and the north side of I-35, replacing the existing 6 and 8-inch water lines and paralleling the existing 18-inch water line along the north side of I-35. A new 16-inch water line along FM 482 replacing the existing 1.5-inch water line from Marigold Way to Rusch Lane. Pressure reducing valves on the proposed 16-inch water line and the proposed 12-inch along Rusch Lane will serve this area from the Morningside Pressure Zone.

## Project Drivers:

This project will address existing pressure issues and provide additional capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" WL & Appurtenances	3,800	LF	\$ 192	\$ 729,600
2	12" WL & Appurtenances	13,300	LF	\$ 144	\$ 1,915,200
3	Pressure Reducing Valve	2	LS	\$ 100,000	\$ 200,000
<b>SUBTOTAL:</b>					<b>\$ 2,844,800</b>
CONTINGENCY				25%	\$ 711,200
<b>SUBTOTAL:</b>					<b>\$ 3,556,000</b>
ENG/SURVEY				15%	\$ 533,400
<b>SUBTOTAL:</b>					<b>\$ 4,089,400</b>
<b>Estimated Project Total:</b>					<b>\$ 4,089,400</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 22

Phase: 2028

Project Name: **24-inch Highway 46 Water Line (Mission)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water along Highway 46 from Walzem Mission Road to Rock Hill Trail.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	4,200	LF	\$ 216	\$ 907,200
<b>SUBTOTAL:</b>					<b>\$ 907,200</b>
CONTINGENCY				25%	\$ 226,800
<b>SUBTOTAL:</b>					<b>\$ 1,134,000</b>
ENG/SURVEY				15%	\$ 170,100
<b>SUBTOTAL:</b>					<b>\$ 1,304,100</b>
<b>Estimated Project Total:</b>					<b>\$ 1,304,100</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 23

Phase: 2028

Project Name: **0.85 MGD Expansion at County Yard Pump Station (Copper Ridge)**

## Project Description:

A 0.85 MGD pumping capacity expansion at the County Yard Pump Station.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - Expans 0.85 MGD	1	LS	\$ 200,000	\$ 200,000
				<b>SUBTOTAL:</b>	<b>\$ 200,000</b>
				CONTINGENCY	25%
					\$ 50,000
				<b>SUBTOTAL:</b>	<b>\$ 250,000</b>
				ENG/SURVEY	15%
					\$ 37,500
				<b>SUBTOTAL:</b>	<b>\$ 287,500</b>
<b>Estimated Project Total:</b>					<b>\$ 287,500</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 24

Phase: 2028

Project Name: **1.00 MG Solms GST (Morningside)**

## Project Description:

A new 1.0 MG ground storage tank at the Solms Pump Station. This project will include decommissioning the existing ground storage tank and a new flow control valve to fill the ground storage tank.

## Project Drivers:

This project will provide additional storage capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	1.0 MG Ground Storage Tank	1	LS	\$ 1,200,000	\$ 1,200,000
2	Flow Control Valve with Vault	1	LS	\$ 300,000	\$ 300,000
3	Demolition of Existing Tank	1	LS	\$ 500,000	\$ 500,000
<b>SUBTOTAL:</b>					<b>\$ 2,000,000</b>
	CONTINGENCY		25%		\$ 500,000
<b>SUBTOTAL:</b>					<b>\$ 2,500,000</b>
	ENG/SURVEY		15%		\$ 375,000
<b>SUBTOTAL:</b>					<b>\$ 2,875,000</b>
<b>Estimated Project Total:</b>					<b>\$ 2,875,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 25

Phase: 2028

Project Name: **24-inch Solms PS Discharge Line (Morningside)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line under and along the south side of I-35 from the Solms Pump Station to South Solms Road.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	6,000	LF	\$ 216	\$ 1,296,000
2	36" Boring and Casing	1,000	LF	\$ 600	\$ 600,000
<b>SUBTOTAL:</b>					<b>\$ 1,896,000</b>
CONTINGENCY				25%	\$ 474,000
<b>SUBTOTAL:</b>					<b>\$ 2,370,000</b>
ENG/SURVEY				15%	\$ 355,500
<b>SUBTOTAL:</b>					<b>\$ 2,725,500</b>
<b>Estimated Project Total:</b>					<b>\$ 2,725,500</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 26

Phase: 2028

Project Name: **24-inch Well 4 Discharge Line (Downtown)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line along North Walnut Avenue from Well 4 to the existing 12-inch lines near Floral Avenue.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	2,000	LF	\$ 216	\$ 432,000
<b>SUBTOTAL:</b>					<b>\$ 432,000</b>
CONTINGENCY				25%	\$ 108,000
<b>SUBTOTAL:</b>					<b>\$ 540,000</b>
ENG/SURVEY				15%	\$ 81,000
<b>SUBTOTAL:</b>					<b>\$ 621,000</b>
<b>Estimated Project Total:</b>					<b>\$ 621,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 27

Phase: 2028

Project Name: **24-inch Saur Lane Discharge Lines (Downtown)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water lines along Saur Lane. This project connects the existing 18-inch water lines along Saur Lane.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	7,800	LF	\$ 216	\$ 1,684,800
<b>SUBTOTAL:</b>					<b>\$ 1,684,800</b>
CONTINGENCY				25%	\$ 421,200
<b>SUBTOTAL:</b>					<b>\$ 2,106,000</b>
ENG/SURVEY				15%	\$ 315,900
<b>SUBTOTAL:</b>					<b>\$ 2,421,900</b>
<b>Estimated Project Total:</b>					<b>\$ 2,421,900</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 28

Phase: 2028

Project Name: **24-inch FM 1101 Water Line (Downtown)**

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line along FM 1101 from Highway 46 to Saur Lane.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	10,000	LF	\$ 216	\$ 2,160,000
<b>SUBTOTAL:</b>					<b>\$ 2,160,000</b>
CONTINGENCY				25%	\$ 540,000
<b>SUBTOTAL:</b>					<b>\$ 2,700,000</b>
ENG/SURVEY				15%	\$ 405,000
<b>SUBTOTAL:</b>					<b>\$ 3,105,000</b>
<b>Estimated Project Total:</b>					<b>\$ 3,105,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 29

Phase: 2028

Project Name: **24-inch FM 1101 PS Discharge Lines (Kohlenberg)**

## Project Description:

A new 24-inch water line replacing the existing 12 and 18-inch water lines along FM 1101 and Kohlenberg Road. A new 16-inch water line connecting the proposed 24-inch water line to the existing 18-inch water line near the Kohlenberg Standpipe.

## Project Drivers:

This project will provide additional transmission capacity to serve future growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	11,000	LF	\$ 216	\$ 2,376,000
2	16" WL & Appurtenances	2,000	LF	\$ 192	\$ 384,000
<b>SUBTOTAL:</b>					<b>\$ 2,760,000</b>
CONTINGENCY				25%	\$ 690,000
<b>SUBTOTAL:</b>					<b>\$ 3,450,000</b>
ENG/SURVEY				15%	\$ 517,500
<b>SUBTOTAL:</b>					<b>\$ 3,967,500</b>
<b>Estimated Project Total:</b>					<b>\$ 3,967,500</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 30

Phase: 2028

Project Name: **6.00 MGD FM 1101 PS & 1.50 MG GST (Kohlenberg)**

## Project Description:

A new 6.00 MGD pump station at the intersection of FM 1101 and Saur Lane. A new 1.50 MG ground storage tank.

## Project Drivers:

This project will serve future growth in the Kohlenberg Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Pump Station - New 6.0 MGD	1	LS	\$ 2,000,000	\$ 2,000,000
2	1.50 MG Ground Storage Tank	1	LS	\$ 1,875,000	\$ 1,875,000
<b>SUBTOTAL:</b>					<b>\$ 3,875,000</b>
CONTINGENCY				25%	\$ 968,800
<b>SUBTOTAL:</b>					<b>\$ 4,843,800</b>
ENG/SURVEY				15%	\$ 726,600
<b>SUBTOTAL:</b>					<b>\$ 5,570,400</b>
<b>Estimated Project Total:</b>					<b>\$ 5,570,400</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 31

Phase: 2028

Project Name: 1.00 MG FM 1044 EST (Morningside)

## Project Description:

A new 1.00 MG elevated storage tank near the intersection of FM 1044 and Tiara Drive.

## Project Drivers:

This project will provide additional elevated storage capacity to the Morningside Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	1.0 MG Elevated Storage Tank	1	LS	\$ 3,500,000	\$ 3,500,000
				<b>SUBTOTAL:</b>	<b>\$ 3,500,000</b>
				CONTINGENCY	25%
					\$ 875,000
				<b>SUBTOTAL:</b>	<b>\$ 4,375,000</b>
				ENG/SURVEY	15%
					\$ 656,300
				<b>SUBTOTAL:</b>	<b>\$ 5,031,300</b>
<b>Estimated Project Total:</b>					<b>\$ 5,031,300</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 32

Phase: 2028

Project Name: 16/24-inch Oak Brook EST Water Line (Kerlick)

## Project Description:

A new 24-inch water line replacing the existing 12-inch water line along Independence Drive. A new 24 and 16-inch water line extending northeast from Independence Drive connecting the proposed 24-inch water line on Independence Drive to the existing 12-inch near Oak Brook. This project will connect the proposed Oak Brook EST described in Project 37 to the distribution system.

## Project Drivers:

This project will serve future growth in the Kerlick Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" WL & Appurtenances	6,000	LF	\$ 192	\$ 1,152,000
2	24" WL & Appurtenances	2,800	LF	\$ 216	\$ 604,800
SUBTOTAL:					\$ 1,756,800
CONTINGENCY				25%	\$ 439,200
SUBTOTAL:					\$ 2,196,000
ENG/SURVEY				15%	\$ 329,400
SUBTOTAL:					\$ 2,525,400
Estimated Project Total:					\$ 2,525,400

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 33

Phase: 2028

Project Name: **0.75 MG Oak Brook EST (Kerlick)**

## Project Description:

A new 0.75 MG elevated storage tank in the Kerlick Pressure Zone near Oak Brook. Project 36 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional elevated storage capacity to the Kerlick Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.75 MG Elevated Storage Tank	1	LS	\$ 3,250,000	\$ 3,250,000
				<b>SUBTOTAL:</b>	<b>\$ 3,250,000</b>
				CONTINGENCY	25%
					\$ 812,500
				<b>SUBTOTAL:</b>	<b>\$ 4,062,500</b>
				ENG/SURVEY	15%
					\$ 609,400
				<b>SUBTOTAL:</b>	<b>\$ 4,671,900</b>
<b>Estimated Project Total:</b>					<b>\$ 4,671,900</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 34

Phase: 2028

Project Name: **12-inch FM 758 Water Line (Downtown)**

## Project Description:

A new 12-inch water line replacing the existing 8-inch water line along FM 758 and connecting the proposed 30-inch water line along Highway 46 to the proposed 24-inch water line along Saur Lane.

## Project Drivers:

This project will serve future growth in the Downtown Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	7,500	LF	\$ 144	\$ 1,080,000
		SUBTOTAL:			\$ 1,080,000
		CONTINGENCY		25%	\$ 270,000
		SUBTOTAL:			\$ 1,350,000
		ENG/SURVEY		15%	\$ 202,500
		SUBTOTAL:			\$ 1,552,500
Estimated Project Total:					\$ 1,552,500

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 35

Phase: 2028

Project Name: **12-inch Three Mile Creek Water Line (Downtown)**

## Project Description:

A new 12-inch water line along Three Mile Creek from the existing 18-inch water line along Saur Lane to the existing 12-inch water line on Stone Gate Drive.

## Project Drivers:

This project will serve future growth in the Downtown Pressure Zone.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	5,000	LF	\$ 144	\$ 720,000
				<b>SUBTOTAL:</b>	<b>\$ 720,000</b>
		CONTINGENCY		25%	\$ 180,000
				<b>SUBTOTAL:</b>	<b>\$ 900,000</b>
		ENG/SURVEY		15%	\$ 135,000
				<b>SUBTOTAL:</b>	<b>\$ 1,035,000</b>
Estimated Project Total:					<b>\$ 1,035,000</b>



## **Appendix C**

# **Wastewater System Project Cost Estimates**

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 1

Phase: 2028

Project Name: **42-inch Interceptor (North Kuehler)**

## Project Description:

A new 42-inch interceptor replacing the existing 27 and 30-inch interceptor conveying flow to the Rio Lift Station.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Cost from Moeller & Associates PER	1	EA	\$ 7,594,737	\$ 7,594,737
		SUBTOTAL:			\$ 7,594,737
		CONTINGENCY		0%	\$ -
		SUBTOTAL:			\$ 7,594,737
		ENG/SURVEY		0%	\$ -
		SUBTOTAL:			\$ 7,594,737
Estimated Project Total:					\$ 7,594,737



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 2

Phase: 2028

Project Name: **33-inch Interceptor (North Kuehler)**

## Project Description:

A new 33-inch interceptor replacing the existing 24 and 27-inch interceptor conveying flow to the Rio Lift Station. Project 1 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	33" Pipe	7,230	LF	\$ 330	\$ 2,385,900
2	50" Boring and Casing	1,000	LF	\$ 725	\$ 725,000
3	72" Diameter Manhole	15	EA	\$ 9,000	\$ 135,000
SUBTOTAL:					\$ 3,245,900
CONTINGENCY				25%	\$ 811,500
SUBTOTAL:					\$ 4,057,400
ENG/SURVEY				15%	\$ 608,700
SUBTOTAL:					\$ 4,666,100
Estimated Project Total:					\$ 4,666,100

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 3

Phase: 2028

Project Name: **30-inch Interceptor (North Kuehler)**

## Project Description:

A new 30-inch interceptor replacing the existing 21 and 24-inch interceptors conveying flow to the Rio Lift Station. Projects 1 and 2 must be completed before this project is completed.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe	6,800	LF	\$ 300	\$ 2,040,000
2	72" Diameter Manhole	9	EA	\$ 9,000	\$ 81,000
SUBTOTAL:					\$ 2,121,000
CONTINGENCY				25%	\$ 530,300
SUBTOTAL:					\$ 2,651,300
ENG/SURVEY				15%	\$ 397,700
SUBTOTAL:					\$ 3,049,000
Estimated Project Total:					\$ 3,049,000



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 4

Phase: 2028

Project Name: **15/18/21/24-inch Interceptor (South Kuehler)**

## Project Description:

A new 18/24-inch interceptor replacing the existing 6/10/12/15-inch interceptor on West County Line Road and McQueeney Road.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	1,000	LF	\$ 160	\$ 160,000
2	18" Pipe	3,000	LF	\$ 190	\$ 570,000
3	21" Pipe	2,800	LF	\$ 210	\$ 588,000
4	24" Pipe	200	LF	\$ 240	\$ 48,000
5	60" Diameter Manhole	14	EA	\$ 7,500	\$ 105,000
6	36" Boring and Casing	500	LF	\$ 600	\$ 300,000
7	Sewer Pavement Repair	6,000	LF	\$ 75	\$ 450,000
<b>SUBTOTAL:</b>					<b>\$ 2,221,000</b>
CONTINGENCY				25%	\$ 555,300
<b>SUBTOTAL:</b>					<b>\$ 2,776,300</b>
ENG/SURVEY				15%	\$ 416,500
<b>SUBTOTAL:</b>					<b>\$ 3,192,800</b>
<b>Estimated Project Total:</b>					<b>\$ 3,192,800</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 5

Phase: 2028

Project Name: **2.50 MGD McKenzie WRF Expansion (McKenzie)**

## Project Description:

A 2.50 MGD expansion in the treatment capacity of the McKenzie Water Reclamation Facility.

## Project Drivers:

This project will provide additional treatment capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.5 MGD WWTP Expansion	1	EA	\$ 24,347,700	\$ 24,347,700
SUBTOTAL:					\$ 24,347,700
CONTINGENCY				25%	\$ 6,087,000
SUBTOTAL:					\$ 30,434,700
ENG/SURVEY				15%	\$ 4,565,300
SUBTOTAL:					\$ 35,000,000
Estimated Project Total:					\$ 35,000,000



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 6

Phase: 2028

Project Name: **5.38 MGD Rio LS Expansion (North Kuehler)**

## Project Description:

A 5.38 MGD pumping capacity expansion at the Rio Lift Station.

## Project Drivers:

This project will provide additional pumping capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	5.38 MGD Lift Station Expansion	1	EA	\$ 1,700,000	\$ 1,700,000
SUBTOTAL:					\$ 1,700,000
CONTINGENCY				25%	\$ 425,000
SUBTOTAL:					\$ 2,125,000
ENG/SURVEY				15%	\$ 318,800
SUBTOTAL:					\$ 2,443,800
Estimated Project Total:					\$ 2,443,800

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 7

Phase: 2028

Project Name: **0.48 MGD Saengerhalle LS Expansion and 10-inch Force Main (McKenzie)**

## Project Description:

A 0.48 MGD pumping capacity expansion at the Saengerhalle Lift Station. A new 10-inch force main to parallel the existing Saengerhalle Lift Station force main that connects to the existing 21-inch interceptor in the McKenzie WRF Basin.

## Project Drivers:

This project will provide additional pumping capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.48 MGD Lift Station Expansion	1	EA	\$ 700,000	\$ 700,000
2	10" Force Main	5,200	LF	\$ 125	\$ 650,000
SUBTOTAL:					\$ 1,350,000
CONTINGENCY				25%	\$ 337,500
SUBTOTAL:					\$ 1,687,500
ENG/SURVEY				15%	\$ 253,200
SUBTOTAL:					\$ 1,940,700
Estimated Project Total:					\$ 1,940,700



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 8

Phase: 2028

Project Name: **15-inch Interceptor (McKenzie)**

## Project Description:

A new 15-inch interceptor replacing the existing 10-inch interceptor that conveys flow to the Saengerhalle Lift Station.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	7,000	LF	\$ 160	\$ 1,120,000
2	60" Diameter Manhole	14	EA	\$ 7,500	\$ 105,000
<b>SUBTOTAL:</b>					<b>\$ 1,225,000</b>
CONTINGENCY				25%	\$ 306,300
<b>SUBTOTAL:</b>					<b>\$ 1,531,300</b>
ENG/SURVEY				15%	\$ 229,700
<b>SUBTOTAL:</b>					<b>\$ 1,761,000</b>
<b>Estimated Project Total:</b>					<b>\$ 1,761,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 9

Phase: 2028

Project Name: **30-inch Southern Interceptor (McKenzie)**

## Project Description:

A new 30-inch interceptor replacing the southern portion of the existing 21 and 24-inch interceptors conveying flow to the McKenzie Water Reclamation Facility.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe	10,500	LF	\$ 300	\$ 3,150,000
2	72" Diameter Manhole	21	EA	\$ 9,000	\$ 189,000
SUBTOTAL:					\$ 3,339,000
CONTINGENCY				25%	\$ 834,800
SUBTOTAL:					\$ 4,173,800
ENG/SURVEY				15%	\$ 626,100
SUBTOTAL:					\$ 4,799,900
Estimated Project Total:					\$ 4,799,900



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 10

Phase: 2028

Project Name: **30-inch Northern Interceptor (McKenzie)**

## Project Description:

A new 30-inch interceptor replacing the northern portion of the existing 21 and 24-inch interceptors conveying flow to the McKenzie Water Reclamation Facility.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe	22,000	LF	\$ 300	\$ 6,600,000
2	72" Diameter Manhole	44	EA	\$ 9,000	\$ 396,000
SUBTOTAL:					\$ 6,996,000
CONTINGENCY				25%	\$ 1,749,000
SUBTOTAL:					\$ 8,745,000
ENG/SURVEY				15%	\$ 1,311,800
SUBTOTAL:					\$ 10,056,800
Estimated Project Total:					\$ 10,056,800

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 11

Phase: 2028

Project Name: 15/18/21/24-inch Interceptor (North Kuehler)

## Project Description:

A new 15/18/21/24-inch interceptor replacing the existing 10/12-inch interceptor conveying flow to the Rio Lift Station.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	3,500	LF	\$ 160	\$ 560,000
2	18" Pipe	1,200	LF	\$ 190	\$ 228,000
3	21" Pipe	500	LF	\$ 210	\$ 105,000
4	24" Pipe	1,000	LF	\$ 240	\$ 240,000
5	60" Diameter Manhole	13	EA	\$ 7,500	\$ 97,500
6	36" Boring and Casing	500	LF	\$ 600	\$ 300,000
SUBTOTAL:					\$ 1,530,500
CONTINGENCY				25%	\$ 382,700
SUBTOTAL:					\$ 1,913,200
ENG/SURVEY				15%	\$ 287,000
SUBTOTAL:					\$ 2,200,200
Estimated Project Total:					\$ 2,200,200



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 12

Phase: 2028

Project Name: **21-inch I-35 Crossing (McKenzie)**

## Project Description:

A new 21-inch interceptor crossing under I-35 to replace the existing 12-inch interceptor near the Creekside Lift Station.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	21" Pipe	1,000	LF	\$ 210	\$ 210,000
2	36" Boring and Casing	1,000	LF	\$ 600	\$ 600,000
SUBTOTAL:					\$ 810,000
CONTINGENCY				25%	\$ 202,500
SUBTOTAL:					\$ 1,012,500
ENG/SURVEY				15%	\$ 151,900
SUBTOTAL:					\$ 1,164,400
Estimated Project Total:					\$ 1,164,400

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 13

Phase: 2028

Project Name: **15-inch Interceptor (McKenzie)**

## Project Description:

A new 15-inch interceptor replacing the existing 10-inch interceptor that conveys flow to the McKenzie Water Reclamation Facility.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	3,200	LF	\$ 160	\$ 512,000
2	60" Diameter Manhole	7	EA	\$ 7,500	\$ 52,500
<b>SUBTOTAL:</b>					<b>\$ 564,500</b>
CONTINGENCY				25%	\$ 141,200
<b>SUBTOTAL:</b>					<b>\$ 705,700</b>
ENG/SURVEY				15%	\$ 105,900
<b>SUBTOTAL:</b>					<b>\$ 811,600</b>
<b>Estimated Project Total:</b>					<b>\$ 811,600</b>



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 14

Phase: 2028

Project Name: **33/36-inch Interceptor (South Kuehler)**

## Project Description:

A new 33/36-inch interceptor to replace the existing 24/27-inch interceptors conveying flow to the South Kuehler Wastewater Treatment Plant.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	33" Pipe	2,500	LF	\$ 330	\$ 825,000
2	36" Pipe	4,000	LF	\$ 360	\$ 1,440,000
3	72" Diameter Manhole	13	EA	\$ 9,000	\$ 117,000
4	Sewer Pavement Repair	1,000	LF	\$ 75	\$ 75,000
<b>SUBTOTAL:</b>					<b>\$ 2,457,000</b>
CONTINGENCY				25%	\$ 614,300
<b>SUBTOTAL:</b>					<b>\$ 3,071,300</b>
ENG/SURVEY				15%	\$ 460,700
<b>SUBTOTAL:</b>					<b>\$ 3,532,000</b>
<b>Estimated Project Total:</b>					<b>\$ 3,532,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 15

Phase: 2028

Project Name: **0.91 MGD Solms LS Expansion (South Kuehler)**

## Project Description:

A 0.91 MGD pumping capacity expansion at the Solms Lift Station.

## Project Drivers:

This project will provide additional pumping capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.91 MGD Lift Station Expansion	1	EA	\$ 700,000	\$ 700,000
		SUBTOTAL:			\$ 700,000
		CONTINGENCY		25%	\$ 175,000
		SUBTOTAL:			\$ 875,000
		ENG/SURVEY		15%	\$ 131,300
		SUBTOTAL:			\$ 1,006,300
Estimated Project Total:					\$ 1,006,300



# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 16

Phase: 2028

Project Name: **12-inch Interceptor (Gruene)**

## Project Description:

A new 12-inch interceptor replacing the existing 8-inch interceptor near Independence Drive.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	2,250	LF	\$ 150	\$ 337,500
2	48" Diameter Manhole	6	EA	\$ 5,000	\$ 30,000
3	Sewer Pavement Repair	2,250	LF	\$ 75	\$ 168,750
<b>SUBTOTAL:</b>					<b>\$ 536,300</b>
CONTINGENCY				25%	\$ 134,100
<b>SUBTOTAL:</b>					<b>\$ 670,400</b>
ENG/SURVEY				15%	\$ 100,600
<b>SUBTOTAL:</b>					<b>\$ 771,000</b>
<b>Estimated Project Total:</b>					<b>\$ 771,000</b>

# New Braunfels Utilities



Capital Improvement Cost Estimate

April 2018

Construction Project Number: 17

Phase: 2028

Project Name: **24-inch Interceptor (North Kuehler)**

## Project Description:

A new 24-inch interceptor to replace the existing 18-inch interceptor conveying flow to the proposed 36-inch interceptor described in Project 1. Project 1 must be completed before this project can be completed.

## Project Drivers:

This project will provide additional capacity to serve new growth.

## Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	3,000	LF	\$ 240	\$ 720,000
2	72" Diameter Manhole	6	EA	\$ 9,000	\$ 54,000
		SUBTOTAL:			\$ 774,000
		CONTINGENCY		25%	\$ 193,500
		SUBTOTAL:			\$ 967,500
		ENG/SURVEY		15%	\$ 145,200
		SUBTOTAL:			\$ 1,112,700
Estimated Project Total:					\$ 1,112,700