



PLDA Questions to NBU Board of Trustees on June 25, 2026

Answers Provided by Mark Steelman, NBU COO on July 24, 2026

1. What is the status of the NBU's investigation on the spill since the last public communication on May 29th?

NBU has identified the root causes of the spill and has begun implementing corrective actions and safeguards to minimize the risk of further spills.

2. What is the status and/or results of TCEQ's investigation?

TCEQ has closed their investigation and issued a Notice of Violation on July 14, 2026, for 'Failure to prevent the unauthorized discharge of wastewater into or adjacent to water in the state.' The corrective actions taken by NBU and documentation provided to TCEQ has satisfied all requirements. TCEQ considers the investigation resolved.

3. What Corrective and Preventative Actions (CAPA) have already been put into place, and what actions are still outstanding? What are the completion timelines for the outstanding actions?

Two new UPS systems have been installed and set up is complete on the one connected to SCADA. Alarms have been tested and confirmed to be fully functional.

Outstanding action items:

- Severe weather staffing procedure– July 31, 2026
- Operational Procedure Review - July 31, 2026
- Alarm verification – September 4, 2026
- SCADA communications assessment – January 15, 2027

4. What is this Board prepared to do to ensure all issues identified in those investigations are made public with urgent remediation timelines?

While I cannot speak on behalf of our Board of Trustees, I can say we reported the incident when it occurred, updated them at the Board meeting, and will continue updating them as we work to complete our action items. Further, and as you might imagine our Board and NBU's leadership takes this matter very seriously and will implement any solutions to prevent recurrence.

5. How many previous leaks and/or overflows have occurred at this particular facility?

There has been one other spill at the Rio Bar Screen property in the past 10 years: On February 16, 2021 - Rio Lift lost power causing the main to back up during the ERCOT power outages. A bypass contractor, who was on site for a CIP, reported the spill to NBU.

6. Does NBU have any other wastewater facilities in the Comal River or Guadalupe River Watersheds with similar risks as those of the Rio Bar Screen Facility?

NBU has several lift stations which are close to the rivers but due to location, the Rio Bar Screen Facility would probably be considered the most likely to spill due to its lower elevation.

7. Please help the citizens and community understand why there was no onsite independent backup power supply for that lift station.

The lift station is served by two independent electrical circuits, a TCEQ-approved design that provides redundant power without relying on an onsite generator. This approach is generally preferred because it provides continuous redundancy while avoiding the maintenance, testing, and fuel requirements associated with permanent generators.

8. Please help the citizens and community understand why NBU didn't immediately alert the residents and businesses directly nearby and downstream of the spillage? *Instead they were included in the email blast that went out to the whole city ~12 hours afterwards*

We understand why some community members expected to hear from us sooner. The overflow occurred in the early morning during a significant storm event, and our first priority was stopping the overflow and assessing the situation at the Rio substation.

Our goal is to provide information that is both timely and accurate so customers receive facts they can act on. Based on the information available during our initial assessment, there was no indication that customers needed to take immediate protective action before additional information could be confirmed. Once we had a clearer understanding of the incident, we shared updates through a news release to media, direct customer emails, on all NBU social media platforms, the NBU website and by contacting nearby water providers and regulatory agencies.

We also identified opportunities to improve our internal communication process. Going forward, we will continue to strengthen those processes and expand the use of customer text notifications when an incident requires immediate public action. We also encourage NBU customers to keep their contact information up to date. Non-NBU customers can stay informed by subscribing to NBU's newsletter, following our social media channels and monitoring local news updates.

9. Please explain the “local guidelines” referenced in your FAQ. NBU’s FAQ on the spill included a question of whether recreational river use it was safe in Lake Dunlap, and part of NBU’s response was to “...follow local guidelines.”

NBU does not have the authority to determine whether a river, lake, or other natural waterway is safe for recreation or to open or close public waterways. Those decisions, if necessary, are made by the agencies responsible for public health and the management of those waterways or bodies of water.

By "local guidelines," NBU was referring to any advisories, closures or public health guidance issued by the agencies responsible for managing public waterways and protecting public health.

It’s also important to recognize that natural waterways are untreated and always carry some level of inherent risk. After heavy rainfall, stormwater introduces a significant presence of E. coli, bacteria, debris and other contaminants into rivers and lakes, so extra caution is always recommended.

If no advisory or closure has been issued, individuals should remain aware of current conditions and exercise caution when deciding whether to recreate in natural waterways, particularly following significant rainfall.

10. Can NBU provide a map of all the NBU wastewater facilities (including lift stations) in the Watershed of both the Comal and Guadalupe Rivers, as well as documentation of the most recent risk analysis each of them for potential leakage/spillage risk into public drains and waterways?

Included as separate attachments. See Attachments A & B below.

11. What will NBU do to remedy the communication gap with either the Lake Dunlap WCID and/or Preserve Lake Dunlap Association (the “neighboring agency”)?

We value our relationships with community partners and recognize they play an important role in sharing information with their members. Following this incident, representatives from both organizations attended an NBU Board of Trustees meeting to discuss our notification process, communication channels and the information that was shared during the event.

During that discussion, representatives from both organizations confirmed they had received email notifications from both NBU and GBRA. While NBU is committed to providing timely and accurate information, community partners and residents also play an important role in monitoring those communication channels and sharing verified information within their communities.

We will continue to work with community partners to ensure they understand how NBU communicates during operational incidents and encourage residents to sign up for NBU's direct communication channels, including customer emails and newsletters, so they can receive updates as quickly as possible.

Additional PLDA Questions Emailed to NBU Executive Team on June 25, 2026

Answers Provided by Mark Steelman, NBU COO on July 24, 2026

12. Who made the decision to schedule backup power maintenance ahead of a storm, and what approval process was followed?

The maintenance outage was planned by our Electrical Engineering team and executed through our Control Center using established switching procedures. At the time the work was scheduled, forecasts did not indicate the level of severe weather that ultimately occurred. Following this event, we have strengthened our process. Planned electrical outages that could affect critical facilities will now include final operational review by both Water Operations and Electric System Operations with final approval by leadership before implementation. This additional coordination will further reduce risk during planned outages.

13. Can you confirm that *E. coli* levels reached 21,212 MPN on May 27th — which is 90 times EPA standards and 168 times Texas standards? And why wasn't this data included in public communications?

The sample at the spill site was 21,212 MPN/100 mL shortly after the time of the spill on the 27th. It should be noted that the neither the upstream nor downstream sample was significantly different at 19,863 MPN/100 mL and 21,043 MPN/mL respectively. *E. coli* levels are normally extremely high during heavy rain events due to stormwater runoff. Samples taken on the 28th were significantly lower at each sample point (Upstream: 1733 MPN/100 mL, Spill Site: 1553 MPN/100 mL, Downstream #1: 1553 MPN/100 mL, Downstream #2: 1733 MPN/100 mL). There was no significant difference between those samples either.

14. The Rio Bar Screen is 5 miles upstream from CRWA's intake that provides thousands of their customers with drinking water. Did CRWA need to take emergency actions? Is there a notification protocol in place for future incidents?

CRWA was notified of the spill on the morning of the 27th. NBU has no knowledge of CRWA's actions taken as a result. It is standard practice for NBU to notify CRWA of spills that enter waterways.

15. During the May 27th storm, since the spill wasn't discovered through your alarm system will you designate specific on-call staff to monitor critical facilities Live In Real-Time during severe weather warnings?

The Control Center was actively monitoring the utility system throughout the event with two experienced system operators on duty. Following this incident, NBU has initiated several improvements to further strengthen situational awareness during severe weather.

These enhancements include:

- Finalizing procedures to activate additional Control Center operators during significant weather events.
- Reviewing criteria for proactively notifying and staging on-call field crews ahead of forecasted severe weather. Refining operational monitoring and coordination procedures during high-impact events.
- Refining operational monitoring and coordination procedures during high-impact events.

Central Texas experiences frequent severe weather, and NBU's systems perform reliably during the vast majority of these events. Our goal is to maintain that high level of reliability while continuously improving our readiness for the most extreme conditions.

16. Has NBU considered whether relocation of the Rio Bar Screen facility further downstream (away from CRWA's intake) might be a better long-term solution than trying to make this inherently risky location safer? What is the cost-benefit analysis?

The Rio Bar Screen and Rio Lift Station sit at the natural low point of the collection system. CRWA's intake is several miles downstream. Moving the bar screen downstream would require rebuilding miles of sewer main, adding major lift stations, and reconfiguring how that portion of the NBU sewer system drains. It simply wouldn't be practical and potentially create more exposure to sewer overflow situations.

17. What violations or citations has TCEQ already issued? What additional citations do you expect? What is your estimate of potential penalties and required corrective actions?

This was asked and answered above.

18. Has NBU contracted with an independent engineering firm to conduct a third-party review of the incident and provide recommendations for system improvements?

NBU has not engaged in these conversations.

19. In the May 29th communication, it was stated that samples were 'at or below upstream levels' referencing May 28 data (1,553 MPN). But May 27 showed 21,212 MPN—vastly above. Was the May 27 severity intentionally omitted from public communication?

E. coli laboratory analysis requires approximately 18–24 hours to complete, so those results were not available on the day samples were collected. When the May 27 results became available, they showed elevated E. coli concentrations at the spill site (21,212 MPN/100 mL); however, upstream (19,863 MPN/100 mL) and downstream (21,043 MPN/100 mL) samples were at comparable levels. This indicates that E. coli levels throughout the river were already significantly elevated due to stormwater runoff associated with the heavy rainfall event, rather than the overflow alone. The May 29 communication referenced the May 28 sampling because it reflected the most current verified data available and demonstrated that E. coli concentrations at the spill site were at or below upstream levels.

20. Will NBU provide PLDA and/or the public with quarterly written status reports on: (1) TCEQ enforcement status, (2) Corrective/Preventative action implementations until closure, and (3) Effectiveness testing results?

There will be no periodic reporting on the status of TCEQ enforcement status as the matter is already considered closed by TCEQ. NBU will continue to update our Board of Trustees as we complete the corrective steps that have been laid out. These are public meetings that anyone may attend. NBU will also be happy to respond to any inquiries we receive on a case-by-case basis.

21. Moving forward the PLDA wishes to be a part of any stakeholder advisory group specific to the Lake Dunlap community along with CRWA representatives.

While there are not currently any advisory or stakeholder groups specifically dedicated to these concerns, there are several existing public forums where your input is welcomed and valued. We encourage your continued participation in the public process by attending and providing comments during meetings of the Community Advisory Panel (CAP), the NBU Board of Trustees, and the Impact Fee Advisory Committee (IFAC), all of which provide opportunities for public input.

Additionally, your current participation on Guadalupe-Blanco River Authority's Guadalupe Basin Coalition (GBC) is a valuable forum for representing the interests and perspectives of the Preserve Lake Dunlap Association (PLDA), particularly on matters affecting the watershed and regional water resources.

Appendix A – Answer Reference for Question #10

Legend

Water Plants and Tanks

Avery Park, ELEV (M-8)

Bretzke EST, ELEV (K-5)

Comal County, GND (G-6)

ComalTown, ELEV (K-7)

Conrads, ELEV (L-5)

Copper Ridge, ELEV (F-5)

Country Hills GST, ELEV (L-4)

County Line Rd, SP (K-9)

FM 1044, ELEV (J-9)

Grandview, GND (J-7)

Green Valley, GND (K-9)

Gruene Rd, ELEV (K-7)

Hoffmann Lane, SP (K-4)

Kerlick, ELEV (I-7)

Kohlenberg Rd, SP (M-6)

Landa Park, GND (J-7)

Loop 337, GND (I-7)

Mission Hills Ranch, ELEV (H-6)

Mission Valley Rd, ELEV (H-6)

Morningside, ELEV (I-9)

Oakbrook EST, ELEV (I-7)

Old FM 306, GND (K-6)

River Chase, ELEV (K-3)

SURFACE WATER TRTMT, GND (K-7)

Seguin Rd, ELEV (L-7)

Solms, GND (H-9)

Surface Water, GND (K-7)

Trinity GST 1, GND (I-7)

Trinity GST 2, GND (I-7)

Trinity Water TP, GND (I-7)

Veramendi EST, ELEV (J-6)

Voss Farms, ELEV (J-9)

Water Plant Headwaters, GND (J-6)

Weltner Road, ELEV (M-8)

Westpointe, ELEV (I-7)

Wastewater Treatment Plants

TP GRUENE WRF (K-6)

TP NORTH_KUEHLER (K-8)

TP SAM_MCKENZIE WRF (M-9)

TP SOUTH_KUEHLER (K-8)

Water Service

WATER SERVICE BOUNDARY

WASTEWATER SERVICE BOUNDARY

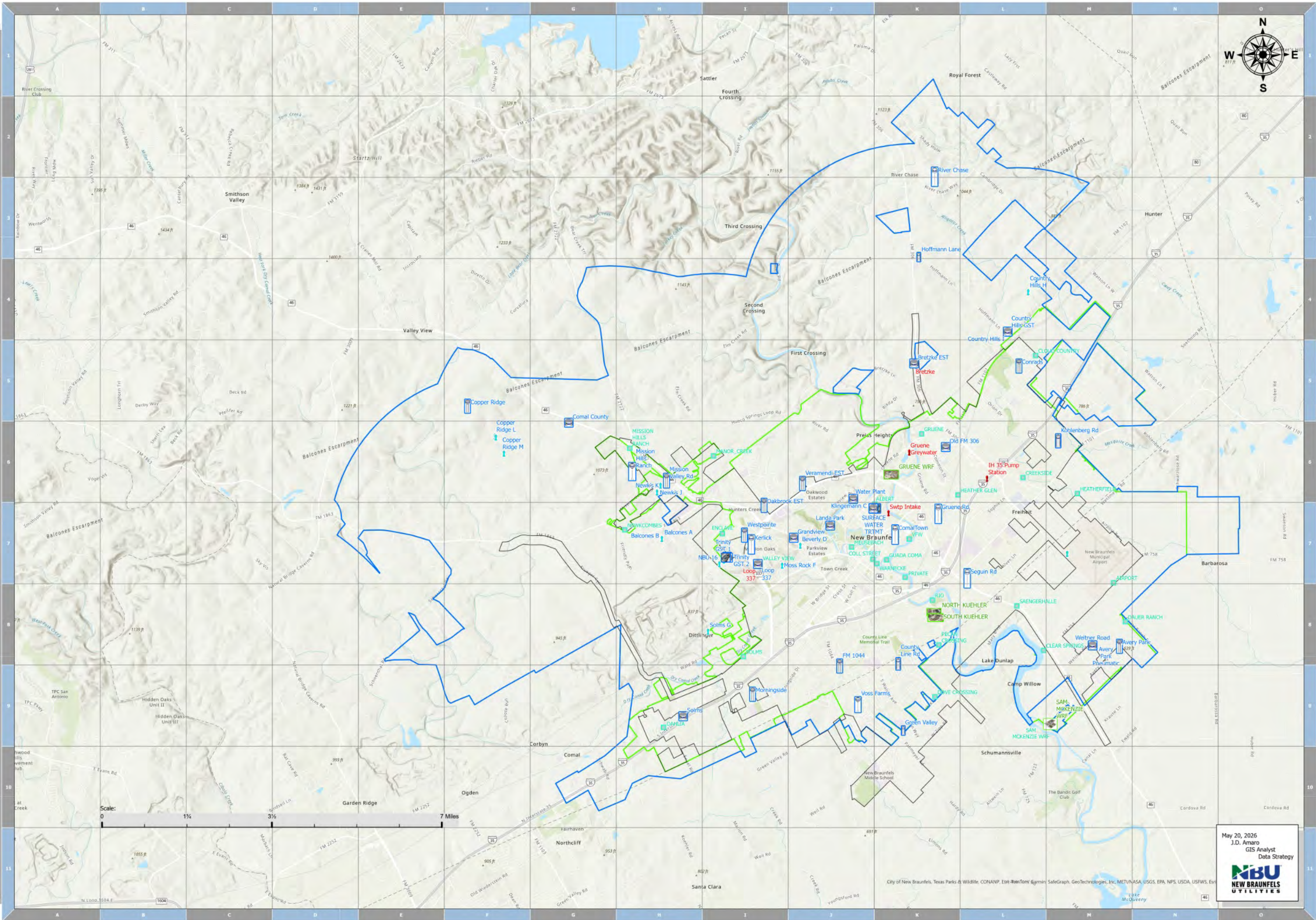
New Braunfels

City Limits

Wastewater Lift_Station

Water Production_Well

Water Pump_Station

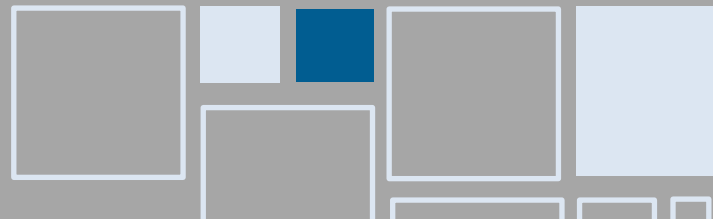


Appendix B – Answer Reference for Question #10



new braunfels utilities

WASTEWATER
VULNERABILITY STUDY



2 0 2 0

PREPARED BY:

Freese and Nichols, Inc.
10431 Morado Circle, Suite 300
Austin, Texas 78759
512-617-3100



WASTEWATER VULNERABILITY STUDY

Prepared for:

New Braunfels Utilities



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

NEW BRAUNFELS UTILITIES

263 E. Main Plaza
New Braunfels, TX 78130

FREESE AND NICHOLS, INC.
10431 Morado Circle, Suite 300
Austin, Texas 78759
(512) 617-3100

FNI Project Number: NBU19347

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1-1
1.1	Scope of Work.....	1-2
1.2	Acronyms	1-2
1.3	Key Definitions.....	1-3
2.0	WASTEWATER COLLECTION SYSTEM.....	2-1
3.0	CONDITION ASSESSMENT.....	3-1
3.1	Lift Station Field Assessments	3-1
3.2	Historical CCTV Inspections.....	3-4
3.3	Gravity Main Condition Parameters	3-6
3.4	Force Main Condition Parameters.....	3-6
3.5	Condition Assessment Results	3-8
4.0	CRITICALITY ASSESSMENT.....	4-1
4.1	Lift Station Criticality Parameters	4-1
4.2	Gravity and Force Main Criticality Parameters	4-2
4.3	Criticality Assessment Results	4-2
5.0	RISK BASED ASSESSMENT	5-1
5.1	Lift Station Risk Assessment.....	5-1
5.2	Gravity Main Risk Assessment.....	5-2
5.3	Force Main Risk assessment.....	5-3
5.4	Wastewater System Risk Summary	5-4
6.0	RENEWAL CIP AND RECOMMENDATIONS.....	6-1
6.1	Renewal Improvement Projects.....	6-3
6.1.1	Project 1 – Gruene Interceptor Inspection.....	6-4
6.1.2	Project 2 – Various Gravity Main Point Inspection and Repair.....	6-4
6.1.3	Project 3 – South Kuehler Interceptor Inspection	6-5
6.1.4	Project 4 – Gruene Lift Station Rehabilitation	6-5
6.1.5	Project 5 – Solms Interceptor Rehabilitation.....	6-5
6.1.6	Project 6 – North Kuehler Interceptor Rehabilitation.....	6-6
6.1.7	Project 7 – Warnecke Lift Station Rehabilitation	6-6
6.2	Recommended Renewal Methodologies.....	6-7
6.3	Future Inspection Recommendations.....	6-8

List of Figures

Figure 1: Existing Wastewater Collection System.....	2-3
Figure 2: CCTV Inspection Results.....	3-5
Figure 3: Condition Assessment Results.....	3-9
Figure 4: Criticality Assessment Results.....	4-4
Figure 5: Lift Station Risk Assessment Matrix.....	5-2
Figure 6: Gravity Main Risk Assessment Matrix	5-3
Figure 7: Force Main Risk Assessment Matrix	5-3
Figure 8: Risk Based Assessment Results.....	5-5
Figure 9: Renewal CIP	6-2

List of Tables

Table 1: Acronyms.....	1-2
Table 2: Wastewater Collection System Lines.....	2-1
Table 3: Wastewater Treatment Plants and Lift Stations.....	2-2
Table 4: Lift Station Condition Scoring Parameters.....	3-2
Table 5: Lift Station Condition Scoring Guidelines	3-2
Table 6: Lift Station Field Assessment Summary.....	3-3
Table 7: Gravity Main Condition Scoring Parameters.....	3-6
Table 8: Force Main Condition Scoring Parameters	3-7
Table 9: Gravity Main Condition Scores.....	3-8
Table 10: Force Main Condition Scores	3-8
Table 11: Lift Station Condition Scores.....	3-8
Table 12: Lift Station Criticality Parameters	4-1
Table 13: Gravity Main and Force Main Criticality Parameters.....	4-2
Table 14: Lift Station Criticality Results	4-3
Table 15: Gravity Main Criticality Results.....	4-3
Table 16: Force Main Criticality Results.....	4-3
Table 17: Lift Station Risk Assessment Summary	5-1
Table 18: Gravity Main Risk Assessment Summary.....	5-2
Table 19: Force Main Risk Assessment Summary.....	5-3
Table 20: Renewal Project Cost Summary.....	6-3

APPENDICES

- Appendix A: Lift Station Field Inspection Sheets
- Appendix B: Renewal CIP Project Cost Sheets

1.0 INTRODUCTION

In January 2019, New Braunfels Utilities (NBU) contracted with Freese & Nichols, Inc. (FNI) to perform a study to evaluate the vulnerability of NBU's wastewater collection system using a risk based assessment (RBA). This study includes analysis of historical closed-circuit television (CCTV) inspection data, field inspection of 17 lift stations, and renewal capital improvement plan (CIP) recommendations including estimated project costs. This report details the methodology and results of the RBA and renewal CIP.

Effective asset rehabilitation and renewal planning requires an understanding of the current and expected future condition of system assets as those assets age and deteriorate over time. Categorizing the installed assets according to their likelihood of failure (a function of the asset condition) and the potential consequence of failure (a function of the size, type of asset, and location in the system) forms the basis of a risk-based prioritization of asset renewal needs. Asset condition assessment, consequence of failure assessment, and renewal risk rating all serve a critical purpose in rehabilitation and inspection program prioritization efforts and overall asset management planning.

Renewal risk is quantified as the combination of the likelihood of structural asset failure and the consequence of the expected impact of that asset failure. The highest risks to the wastewater collection system are associated with assets where the chances of structural asset failure occurring are relatively high (e.g., an old asset with a history of structural failures) and where such a failure would be expected to have major impacts (e.g., widespread interruptions of service to customers and businesses, or large discharges of wastewater to sensitive water bodies).

Industry standards recommend rehabilitation or renewal of approximately 2% of the wastewater infrastructure each year, resulting in the complete rehabilitation of the wastewater collection system every 50 years which corresponds to the typical design life expectancy of new wastewater pipe when properly installed. Effective rehabilitation programs may significantly reduce frequency and volume of sanitary sewer overflows and are more cost effective than emergency response when an asset fails. According to the Environmental Protection Agency (EPA), "proactive rehabilitation and replacement planning provides the best opportunity for capital cost savings. By rehabilitating or replacing sewers and other components before they fail, the utility automatically avoids costs such as emergency contractor fees, staff overtime, unplanned repairs, and sanitary sewer overflow (SSO) cleanup costs. Proactive planning also allows the utility to assess the relative economic costs and benefits of rehabilitation vs. replacement."

1.1 SCOPE OF WORK

The scope of work for the Wastewater Vulnerability Study consists of the major tasks detailed below.

- Condition Assessment Data – collection and analysis of historical CCTV inspection data and field condition assessment of wastewater lift stations.
- Criticality Determination – evaluation of the service area and other parameters to determine the significance of wastewater collection infrastructure.
- Risk Based Assessment – develop and assign condition and criticality parameters to assess the risk of wastewater collection lines, lift stations, and force mains.
- Renewal CIP – develop recommended renewal improvements and estimated project costs.

1.2 ACRONYMS

Table 1 presents a list of acronyms that appear throughout the report.

Table 1: Acronyms

Acronym	Definition
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
EPA	Environmental Protection Agency
FNI	Freese and Nichols, Inc.
fps	Feet per Second
ft.	Foot/Feet
GIS	Geographic Information System
HGL	Hydraulic Grade Line
LF	Linear Feet
LS	Lift Station
mi.	Mile
MGD	Million Gallons per Day
NASSCO	National Association of Sewer Service Companies
OPCC	Opinion of Probable Construction Cost
PACP	Pipeline Assessment Certification Program
RBA	Risk Based Assessment
SSO	Sanitary Sewer Overflow
TCEQ	Texas Commission on Environmental Quality
WRF	Water Reclamation Facility
WWTP	Wastewater Treatment Plant

1.3 KEY DEFINITIONS

The following is a list of key definitions utilized in the Report.

- Firm Pumping Capacity – the pumping capacity of a lift station with the largest pump offline and all other pumps running, based off the best efficiency point or nominal capacity of each pump.
- Risk Based Assessment (RBA) – analysis used to evaluate physical assets and prioritize renewal improvements. A function of asset condition (likelihood of failure) and criticality (consequence of failure).
- Sanitary Sewer Overflow (SSO) – a type of unauthorized discharge of untreated or partially treated wastewater from a collection system or its components (e.g., a manhole, lift station, or cleanout) before reaching a treatment facility. (See also Texas Water Code 26.049(e)(4).)
- Surcharging – when the hydraulic grade line (HGL) is greater than the top of pipe, often due to a capacity restriction downstream or within the pipe itself. Can lead to SSOs.

2.0 WASTEWATER COLLECTION SYSTEM

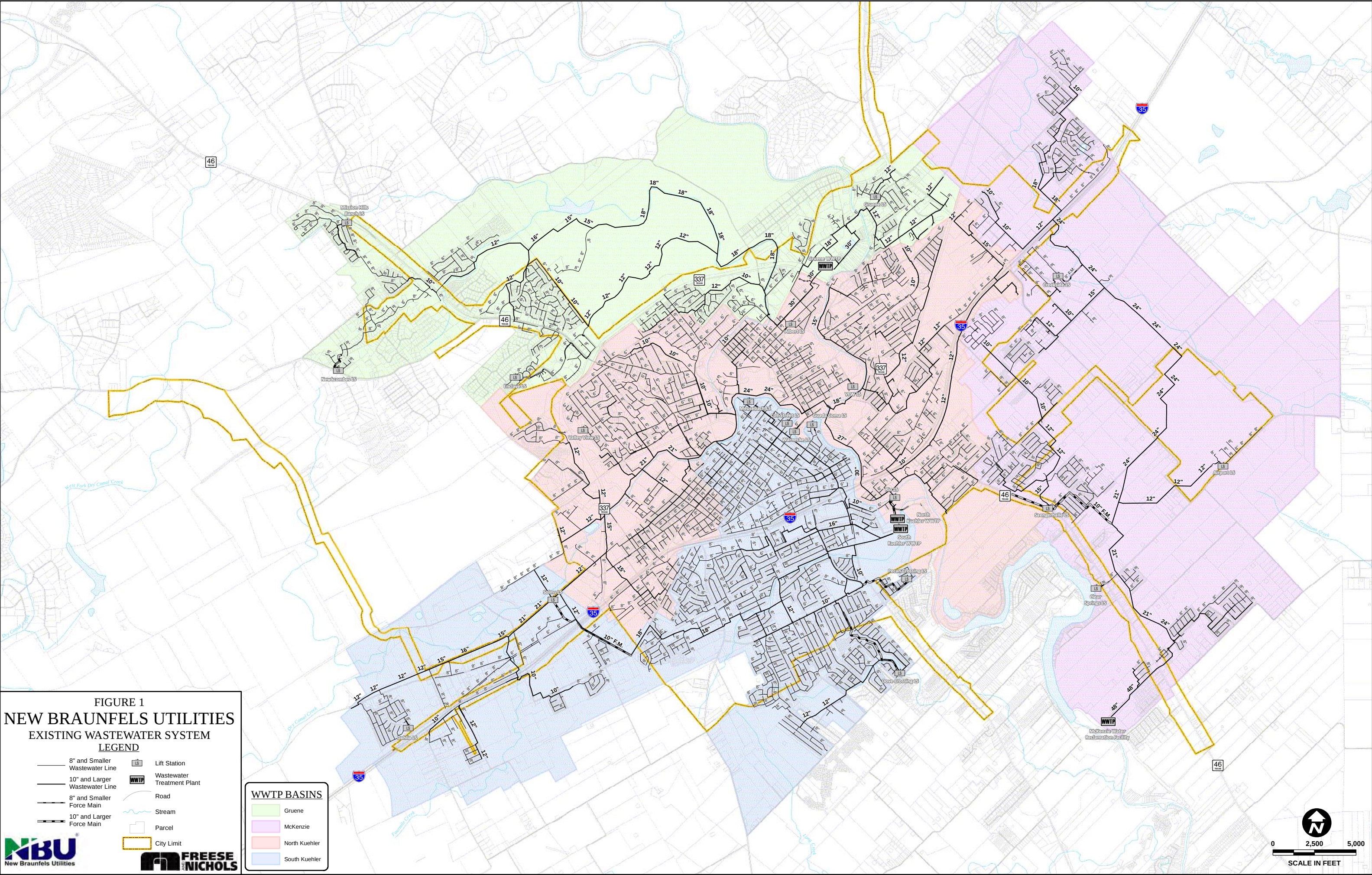
New Braunfels Utilities is a water, wastewater, and electricity provider serving the City of New Braunfels and surrounding areas. New Braunfels is a growing city located in central Texas, with portions in both Comal and Guadalupe counties. NBU currently provides wastewater service to just over 27,000 connections with a collection system approximately 2.1 million linear feet (lf) in length and 21 lift stations (LSs) that convey wastewater flow to four wastewater treatment plants (WWTPs). The wastewater collection lines range from 4-inches to 48-inches with some installed as early as 1947. The existing wastewater collection system is shown on **Figure 1** and a summary of the wastewater collection lines by diameter is shown in **Table 2**. The wastewater treatment plants and collection system lift stations are listed in **Table 3**.

Table 2: Wastewater Collection System Lines

Diameter	GIS Length (ft)	GIS Length (mi)	Percent of System
4	1,718	0.3	0.1%
6	568,291	107.6	26.4%
8	1,057,948	200.4	49.2%
10	102,698	19.5	4.8%
12	212,894	40.3	9.9%
14	2,558	0.5	0.1%
15	48,149	9.1	2.2%
16	5,483	1.0	0.3%
18	59,383	11.2	2.8%
20	311	0.1	0.0%
21	28,345	5.4	1.3%
24	36,048	6.8	1.7%
27	7,968	1.5	0.4%
30	5,810	1.1	0.3%
33	2,091	0.4	0.1%
36	5,721	1.1	0.3%
42	109	0.0	0.0%
48	6,406	1.2	0.3%
Total	2,151,931	407.6	100.0%

Table 3: Wastewater Treatment Plants and Lift Stations

Facility Name	Facility Type
Airport	Lift Station
Albert	Lift Station
Clear Springs	Lift Station
Coll Street	Lift Station
Creekside	Lift Station
Dahlia	Lift Station
Dove Crossing	Lift Station
Enclave	Lift Station
Gruene	Lift Station
Guada Coma	Lift Station
Meusebach	Lift Station
Mission Hills Ranch	Lift Station
Newkcombes	Lift Station
Pecan Crossing	Lift Station
Rio	Lift Station
Saenerhalle	Lift Station
Sleepy Hollow	Lift Station
Solms	Lift Station
Valley View	Lift Station
VFW	Lift Station
Warnecke	Lift Station
Gruene	WWTP
North Kuehler	WWTP
Sam Mckenzie	WWTP
South Kuehler	WWTP



**FIGURE 1
NEW BRAUNFELS UTILITIES
EXISTING WASTEWATER SYSTEM
LEGEND**

8" and Smaller Wastewater Line	LS Lift Station
10" and Larger Wastewater Line	WWTP Wastewater Treatment Plant
8" and Smaller Force Main	Road
10" and Larger Force Main	Stream
	Parcel
	City Limit

**FREESE
NICHOLS**

WWTP BASINS

- Gruene
- McKenzie
- North Kuehler
- South Kuehler

Created by Freese and Nichols, Inc.
 File No. 180100001
 Location: 1150 W. W. PLANNING, DELIVERABLES001_FINAL_REPORT(Figure 1)-Existing_Wastewater_Collection_System.mxd
 Updated: Friday, December 4, 2020 2:55:38 PM

0 2,500 5,000

SCALE IN FEET

3.0 CONDITION ASSESSMENT

In an RBA, asset condition is considered to represent the likelihood of failure. Condition parameters and scoring are based on a combination of physical data (e.g., material, age, field condition assessment, etc.), and operational data (maintenance history, history of SSOs, CCTV and multi-sensor inspections), which are used to develop an estimate of the assumed condition of each asset. Gravity mains, force mains, and lift stations use different condition parameters since they have different potential failure modes.

3.1 LIFT STATION FIELD ASSESSMENTS

In September 2019, FNI and NBU staff conducted field assessments of 17 select lift stations in NBU's wastewater collection system. These 17 lift stations were selected with the help of NBU staff to identify lift stations that do not have ongoing or planned improvements. Condition scores were not determined for the other 9 lift stations. The assessment included site visits and visual inspection of the lift stations to determine the overall condition of the station and specific condition of major components including pumps and motors, electrical equipment, instrumentation, piping and valves, structure, and site. Detailed condition scoring parameters are shown in **Table 4**. Notes and photographs were taken for each inspection site to develop a condition score for all major components on a 1 to 5 scale as shown in **Table 5**. A score of 1 is considered "very good" condition with no steps recommended to maintain condition, while a score of 5 is considered "very poor" condition and the asset has probable or eminent failure unless rehabilitation steps are taken. General facility information was also noted as well as known existing concerns or issues by NBU staff. The results of the field assessments were compiled, and the major component scores were weighted to generate an overall condition score for each lift station. A summary of the inspection results is shown in **Table 6** and all lift station assessment sheets can be found in **Appendix A**.

Table 4: Lift Station Condition Scoring Parameters

Parameter	Details	Weighting	Point Range
Pumps and Motors	Pumps, motors, and general components, includes pumping capacity.	20%	1 - 5
Major Electrical Equipment	Major electrical equipment including service, disconnect, starters, and control panels.	10%	1 - 5
Power	Back-up power or dual power feed, transfer switch, generator or portable generator connection.	10%	1 - 5
Miscellaneous Electrical	Miscellaneous electrical components such as cables, conduit, grounding, panels, and lighting.	5%	1 - 5
Instrumentation	Instrumentation including floats, levels, SCADA, and alarms.	15%	1 - 5
Structure	Station structure including wet well, hatches, corrosion, cracks, ventilation, and odor control.	20%	1 - 5
Piping and Valves	Piping and valves including risers, force main, check valves, and bypass pumping connections.	15%	1 - 5
Site	General site condition including drainage, access, security, fencing, and cover.	5%	1 - 5

Table 5: Lift Station Condition Scoring Guidelines

Score	Guidelines
1	Very good condition, no improvements recommended to maintain function
2	Good condition, minor improvements recommended to enhance performance
3	Fair condition, improvements recommended to improve performance or efficiency
4	Poor condition, improvements recommended to maintain reliability
5	Very poor condition, rehabilitation or replacement required

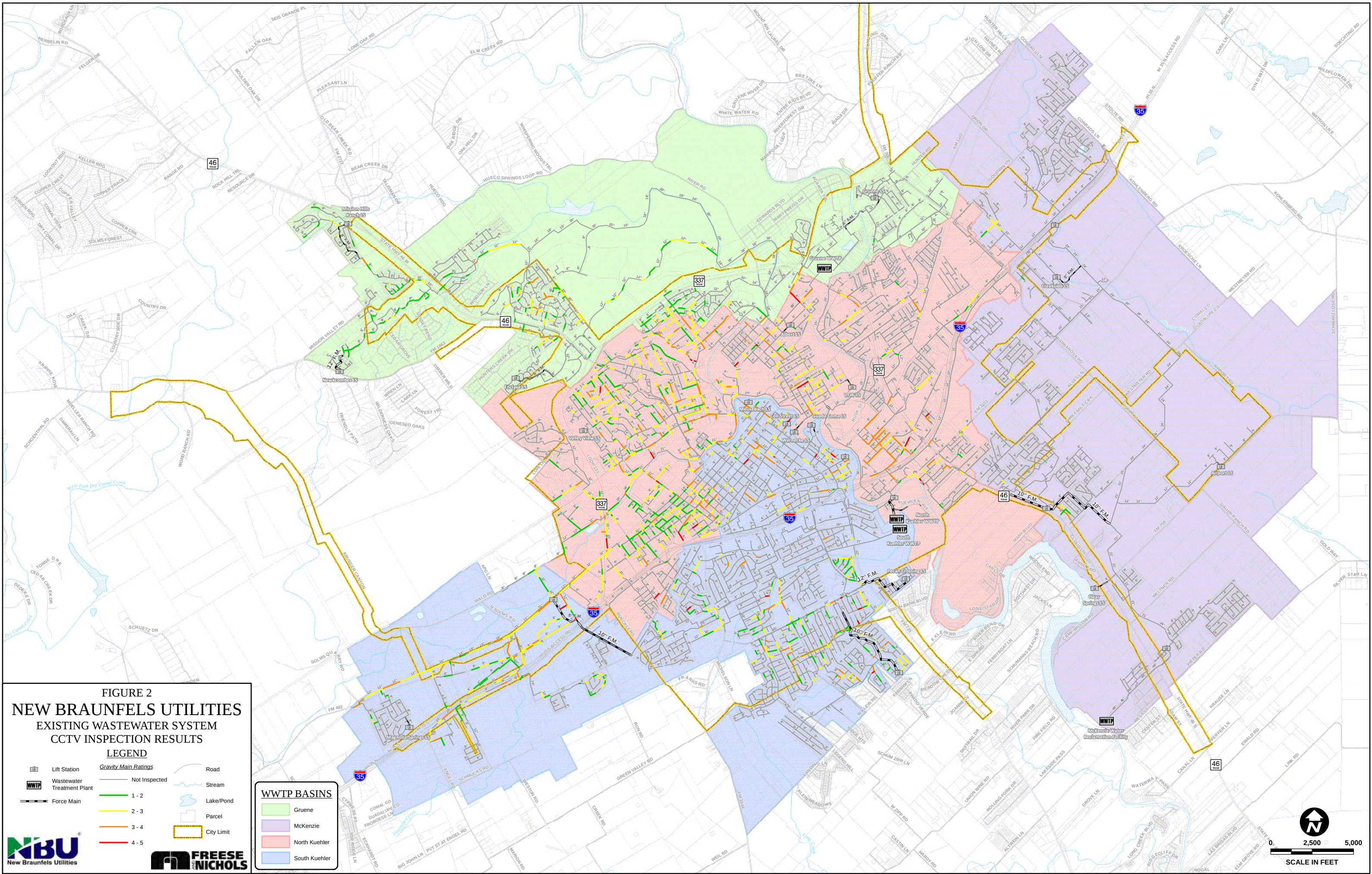
Table 6: Lift Station Field Assessment Summary

Lift Station Name	Pumps and Motors	Major Electrical Equipment	Power	Misc. Electrical	Instrumentation	Structure	Piping and Valves	Site	Condition Rating	Condition Category
Airport	3	1	3	1	3	3	1	2	2.35	Fair
Albert	3	4	5	3	2	3	3	1	3.05	Poor
Clear Springs	2	2	5	3	2	2	2	2	2.35	Fair
Coll Springs	2	1	5	3	2	1	2	3	2.10	Fair
Creekside	1	1	3	3	1	3	1	1	1.70	Good
Enclave	2	1	1	2	2	1	2	1	1.55	Good
Gruene	3	4	5	3	3	4	3	4	3.55	Poor
Guada Coma	2	1	5	3	2	1	2	3	2.10	Fair
Magnolia Springs	1	1	3	1	2	1	1	1	1.35	Good
Mission Hills Ranch	2	2	5	1	2	1	2	2	2.05	Fair
Meusebach	2	1	5	3	2	1	2	1	2.00	Good
Newkcombes	3	1	5	2	1	2	1	1	2.05	Fair
Pecan Crossing	1	2	1	2	2	3	1	2	1.75	Good
Sleepy Hollow	2	3	5	3	2	2	2	1	2.40	Fair
Valley View	1	2	5	3	2	2	1	2	2.00	Good
VFW	2	1	5	1	2	1	3	3	2.15	Fair
Warnecke	3	3	5	3	2	4	2	3	3.10	Poor
Weight	20%	10%	10%	5%	15%	20%	15%	5%	100%	-
Average	2.06	1.82	4.18	2.35	2.00	2.06	1.82	1.94	2.21	-

The majority of inspected lift stations were found to be in “good” or “fair” condition with scores in the range of 1.35 to 2.40. Three lift stations were found to be in “poor” condition with scores greater than 3.00 but less than 4.00, Albert, Gruene, and Warnecke. These lift stations were determined to be in “poor” condition primarily due to electrical issues, lack of back-up power, and general issues with the pumps, motors, and structure. Sleepy Hollow lift station at the old Gruene WWTP site was included in the field inspection but has since been decommissioned when the new Gruene WWTP was brought online. Sleepy Hollow Lift Station was not included in further analysis.

3.2 HISTORICAL CCTV INSPECTIONS

NBU staff performs CCTV inspection and cleaning of the wastewater gravity lines annually as part of the management and maintenance of the collection system. Since 2009, NBU has performed 6,375 individual inspections totaling over 900,000 lf in length, an average of 83,000 lf, or 4% of the total system, per year. The historical inspection data is stored in PipeTech® View, a third-party pipeline inspection software that compiles and stores the CCTV video and inspection results. NBU provided the PipeTech database and software license to FNI to analyze. The inspection database was exported from the PipeTech software and imported into Innovyze® InfoAsset Planner software in order to generate pipeline assessment certification program (PACP) scores. PACP is the standard for pipeline defect identification and assessment set by the Nation Association of Sewer Service Companies (NASSCO). However, PACP requires the data to be in a specific format in order to generate scores. Attributes such as upstream and downstream manhole ID, inspection date, surveyed length, and pipeline ID must be populated and formatted properly. Due to inconsistencies in the inspection data, multiple inspections were not able to be exported, imported, or scored and were lost in the analysis process. After processing the historical inspection data, 1,330 inspections with PACP scores were included in the condition assessment totaling 410,000 lf, or 45% of all historical inspections. The available historical inspections and the determined PACP scores are shown on **Figure 2**. The inspected pipes are symbolized by the PACP Overall Ratings Index which is determined by factoring the combined severity of each defect observed by the total number of occurrences for each inspection and is normalized on a 1 to 5 scale with 1 being low severity and 5 being high severity defects.



3.3 GRAVITY MAIN CONDITION PARAMETERS

The gravity main condition assessment consists of a combination of the analyzed historical inspection data and a desktop condition assessment. The desktop condition assessment results from a combination of pipeline age and material. However, the desktop condition score was only generated for pipelines where both age and material data were available. Additionally, the PACP inspection scores supersede the desktop analysis where inspection data is available. Detailed gravity main condition scoring parameters are shown in **Table 7**. PACP inspection scores were determined for approximately 45% of the system. Combined with the desktop condition assessment, condition scores were determined for 53% of the total wastewater collection system.

Table 7: Gravity Main Condition Scoring Parameters

Parameter	Weight	Criteria	Score
Material	50%	HDPE, PVC, or other synthetic	1
		Cast Iron, Ductile Iron, other metal and CIPP	2
		Concrete	4
		VCT	5
		Unknown	0
Age	50%	Less than 10 years	1
		Between 10 to 30 years	2
		Between 30 to 50 years	4
		Older than 50 years	5
		Unknown	0
Inspection Results	100% (Supersedes Desktop Score where data is available)	PACP Overall Ratings Index Score (as scored 1 - 5)	1
			2
			3
			4
			5

3.4 FORCE MAIN CONDITION PARAMETERS

The force main condition assessment consists solely of a desktop analysis of the asset age and material combined with a hydraulic assessment of the projected minimum and maximum velocity. However, the desktop condition score was only generated for force mains where at least two of the three parameters of age, material, and velocity data were available. The projected force main velocity was determined using the wastewater hydraulic model developed as part of the ongoing the *Water and Wastewater Master Plan Update*. The hydraulic model actively models 20 of the 26 collection system lift stations including 14

of the 17 field assessment lift stations. Included in the wastewater hydraulic model are the force main and pump data for each modeled lift stations. To determine projected velocities for each force main, model simulations were run with fixed pump settings at each lift station. For the minimum projected velocity, only the smallest pump at each lift station was turned on. The firm capacity for each lift station was utilized to determine the maximum projected velocity. The firm capacity of a lift station is defined as the pumping capacity with the largest available pump out of service. The pump curves, nominal capacities, and wet well levels were determined based on available as-built data and information from NBU staff. The results of the velocity assessment are idealized, and the actual velocities experienced in each force main may vary. For the purposes of this condition assessment, minimum velocities under 3 feet per second (fps) and maximum velocities over 10 fps were considered to result in poor condition. The velocity scoring parameters are based on recommendations from the Texas Commission on Environmental Quality (TCEQ) as outlined in *Chapter 217: Design Criteria for Domestic Wastewater Systems, Subchapter C: Conventional Collection Systems*. Although minimum and maximum velocities may not directly impact the condition of a force main, this parameter is meant to identify force mains that may be operating outside of regulatory guidelines which could potentially cause maintenance issues or shorten the expected useful life. Detailed force main condition scoring parameters are shown in **Table 8**.

Table 8: Force Main Condition Scoring Parameters

Parameter	Weight	Criteria	Score
Material	25%	HDPE, PVC, or other synthetic	1
		Cast Iron, Ductile Iron, other metal, or CIPP	2
		Concrete	4
		VCT	5
		Unknown	0
Age	25%	Less than 10 years	1
		Between 10 to 20 years	2
		Between 20 to 50 years	4
		Older than 50 years	5
		Unknown	0
Modeled Velocity	50%	Minimum velocity less than 3 fps (one pump)	4
		Minimum velocity greater than 3 fps and maximum velocity less than 10 fps	1
		Maximum velocity greater than 10 fps (firm pumps)	5

3.5 CONDITION ASSESSMENT RESULTS

Condition scores are calculated for each asset by multiplying individual parameter scores by a weighting factor and totaling the weighted scores for each parameter. Condition scores are then grouped into ranges, and qualitative scores of “Good” to “Severe” condition are assigned. Parameters and scoring criteria for each asset type are described in the previous sections. Results of the condition assessment for all asset types are shown on **Figure 3**. Detailed condition scoring results for gravity mains and force mains are shown in **Tables 9, 10, and 11**.

Table 9: Gravity Main Condition Scores

Score	Category	Length	Percent
4 - 5	Severe	14,643.1	0.7%
3 - 4	Poor	86,587.1	3.9%
2 - 3	Fair	193,939.7	8.8%
1 - 2	Good	837,637.6	38.2%
-	None	1,060,884.3	48.4%
Total		2,193,691.9	100.0%

Table 10: Force Main Condition Scores

Score	Category	Length (lf)	Percent
4 - 5	Severe	0.0	0.0%
3 - 4	Poor	10.7	0.0%
2 - 3	Fair	7,777.7	11.2%
1 - 2	Good	37,942.8	54.8%
-	None	23,531.8	34.0%
Total		69,263.1	100.0%

Table 11: Lift Station Condition Scores

Score	Category	Count	Percent
4 - 5	Severe	0	0.0%
3 - 4	Poor	3	17.6%
2 - 3	Fair	8	47.1%
1 - 2	Good	6	35.3%
Total		17	100.0%

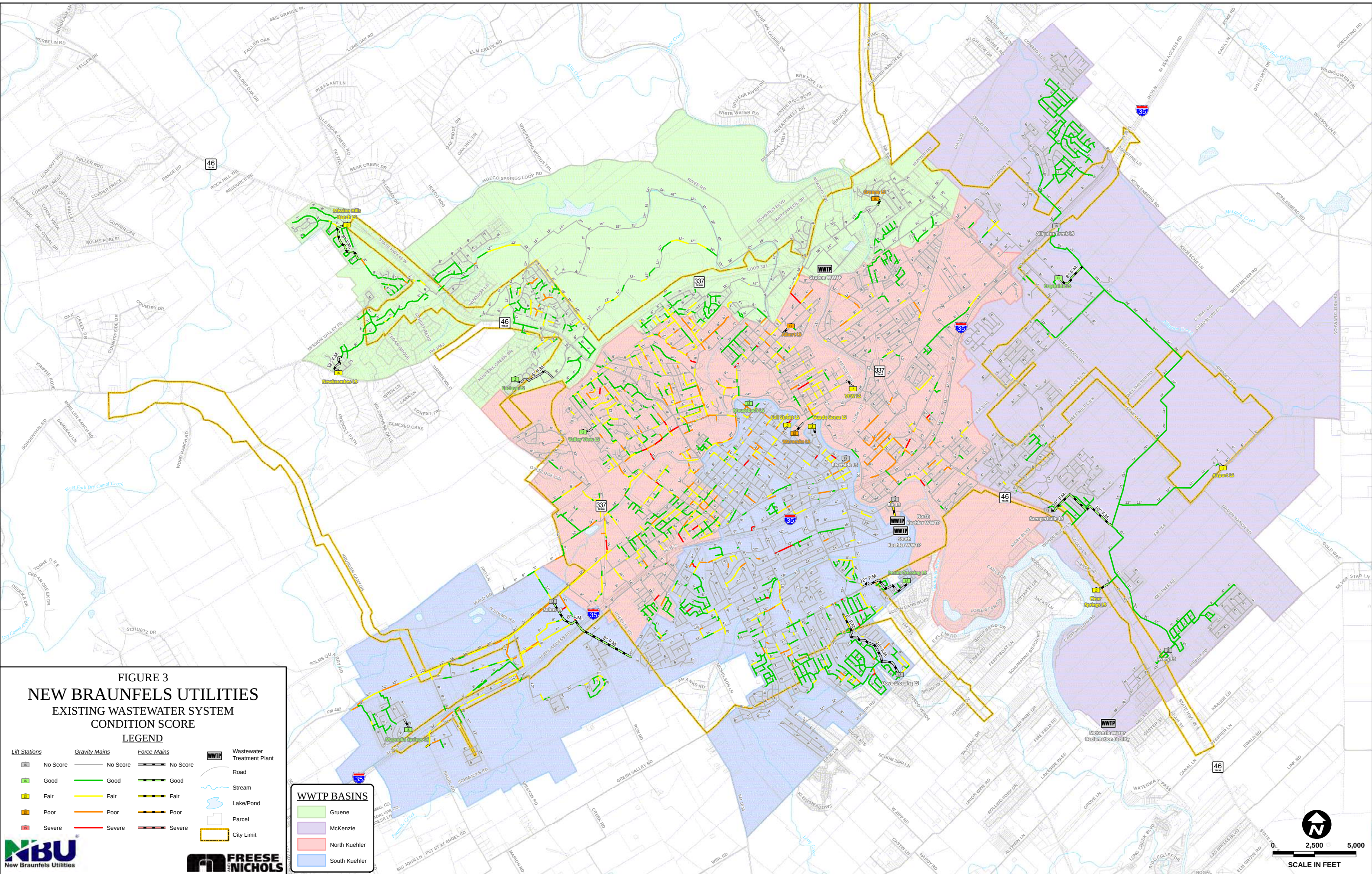


FIGURE 3
NEW BRAUNFELS UTILITIES
EXISTING WASTEWATER SYSTEM
CONDITION SCORE

LEGEND

Lift Stations	Gravity Mains	Force Mains	WWTP	Wastewater Treatment Plant
No Score	No Score	No Score	Road	Stream
Good	Good	Good	Lake/Pond	Parcel
Fair	Fair	Fair	City Limit	
Poor	Poor	Poor		
Severe	Severe	Severe		

WWTP BASINS

Gruene
McKenzie
North Kuehler
South Kuehler

NBU
New Braunfels Utilities

FREES & NICHOLS

Created by Freese and Nichols, Inc.
File No. 18010001
Location: 1100 W. PLANNING, CALVERLEY, TEXAS
Updated: Friday, December 4, 2020 10:28 AM

0 2,500 5,000
SCALE IN FEET

4.0 CRITICALITY ASSESSMENT

In an RBA, asset criticality is generally defined as the measure of the consequence of an asset failure through loss of service, damage, regulatory impact, and/or public impact. Accordingly, social, environmental, and economic parameters should all be used to judge the consequence of asset failure. Gravity mains, force mains, and lift stations use different criticality parameters since they serve different roles in the wastewater collection system.

4.1 LIFT STATION CRITICALITY PARAMETERS

The criticality of collection system lift stations is assessed based on potential service and environmental impacts. Service impact is determined by the upstream connections served by each lift station (i.e. lift stations that serve a larger amount of connections are assigned a higher criticality score). Environmental impact is broken into two parameters, High Impact Area and Edwards Aquifer Recharge Zone. High impact areas are defined as critical infrastructure such as schools and government buildings as well as sensitive environmental areas like waterbodies. Lift stations located within 250' of a high impact area are assigned a high criticality score. The Edwards Aquifer is a high impact environmental area as it provides ground water to a significant part of Central Texas. Approximately half of the NBU wastewater service area resides in the recharge zone for the Edwards Aquifer to the northeast. Due to the importance of this area, the Edwards Aquifer Recharge Zone was set as an individual parameter and lift stations within the artesian and recharge zones are assigned a high criticality. Weighting, criteria, and scoring for each parameter used in the lift station criticality assessment are presented in **Table 12**.

Table 12: Lift Station Criticality Parameters

Parameter	Weight	Criteria	Score
Connections Served	55%	Less than 100	1
		100 to 250	2
		251 to 500	3
		501 to 1,000	4
		Greater than 1,000	5
High Impact Area	20%	Further than 500'	1
		Between 250' and 500'	4
		Within 250'	5
Edwards Aquifer Recharge Zone	25%	None	1
		Within the Artesian Zone	4
		Within the Recharge Zone	5

4.2 GRAVITY AND FORCE MAIN CRITICALITY PARAMETERS

The criticality of collection system gravity mains and force mains is assessed based on potential service and environmental impacts. Service impact is determined by the existing service connections upstream of each line. Environmental impact is determined by proximity to High Impact Areas and Edward Aquifer Recharge Zone. High impact areas are defined as critical infrastructure such as schools and government buildings as well as sensitive environmental areas like waterbodies. Due to the importance of the Edwards Aquifer Recharge Zone, this area was set as an individual parameter and assets within the artesian and recharge zones are assigned a high criticality. Weighting, criteria, and scoring for each parameter used in the gravity and force main criticality assessment are presented in **Table 13**.

Table 13: Gravity Main and Force Main Criticality Parameters

Parameter	Weight	Criteria	Score
Diameter	25%	8" and less	1
		10" to 18"	3
		21" and greater	5
Connections Served	25%	Less than 100	1
		100 to 250	2
		251 to 500	3
		501 to 1,000	4
		Greater than 1,000	5
High Impact Area	20%	Further than 500'	1
		Between 250' to 500'	4
		Within 250'	5
Edwards Aquifer Recharge Zone	30%	None	1
		Within the Artesian Zone	4
		Within the Recharge Zone	5

4.3 CRITICALITY ASSESSMENT RESULTS

Criticality scores are calculated for each asset by multiplying individual parameter scores by a weighting factor and totaling the weighted scores for each parameter. Criticality scores are then grouped into ranges, and qualitative scores of "Low" to "Extreme" criticality are assigned. Parameters and scoring criteria for each asset type are described in the previous sections. Results of the criticality assessment for all asset types are shown on **Figure 4**. Detailed criticality scoring results for lift stations, gravity mains, and force mains are shown in **Tables 14, 15, and 16**.

Table 14: Lift Station Criticality Results

Lift Station Name	Connections Served Score	High Impact Area Score	Edwards Aquifer Score	Criticality Score	Criticality Category
Airport	1	5	1	1.80	Low
Albert	3	1	4	2.85	Moderate
Clear Springs	2	4	1	2.15	Moderate
Coll Springs	2	5	1	2.35	Moderate
Creekside	3	1	1	2.10	Moderate
Enclave	3	1	5	3.10	High
Gruene	3	1	4	2.85	Moderate
Guada Coma	1	5	1	1.80	Low
Magnolia Springs	2	1	1	1.55	Low
Mission Hills Ranch	3	4	5	3.70	High
Meusebach	1	5	1	1.80	Low
Newkcombes	1	1	5	2.00	Low
Pecan Crossing	2	1	1	1.55	Low
Valley View	1	1	5	2.00	Low
VFW	1	4	1	1.60	Low
Warnecke	2	5	1	2.35	Moderate
Weight	55%	20%	25%	100%	-
Average	1.94	2.81	2.38	2.22	-

Table 15: Gravity Main Criticality Results

Score	Category	Length (lf)	Percent
4 - 5	Extreme	37,491.3	1.7%
3 - 4	High	173,139.7	7.9%
2 - 3	Moderate	602,083.0	27.4%
1 - 2	Low	1,380,977.9	63.0%
Total		2,193,691.9	100.0%

Table 16: Force Main Criticality Results

Score	Category	Length (lf)	Percent
4 - 5	Extreme	0.0	0.0%
3 - 4	High	11,358.5	16.4%
2 - 3	Moderate	37,258.3	53.8%
1 - 2	Low	20,646.2	29.8%
Total		69,263.1	100.0%

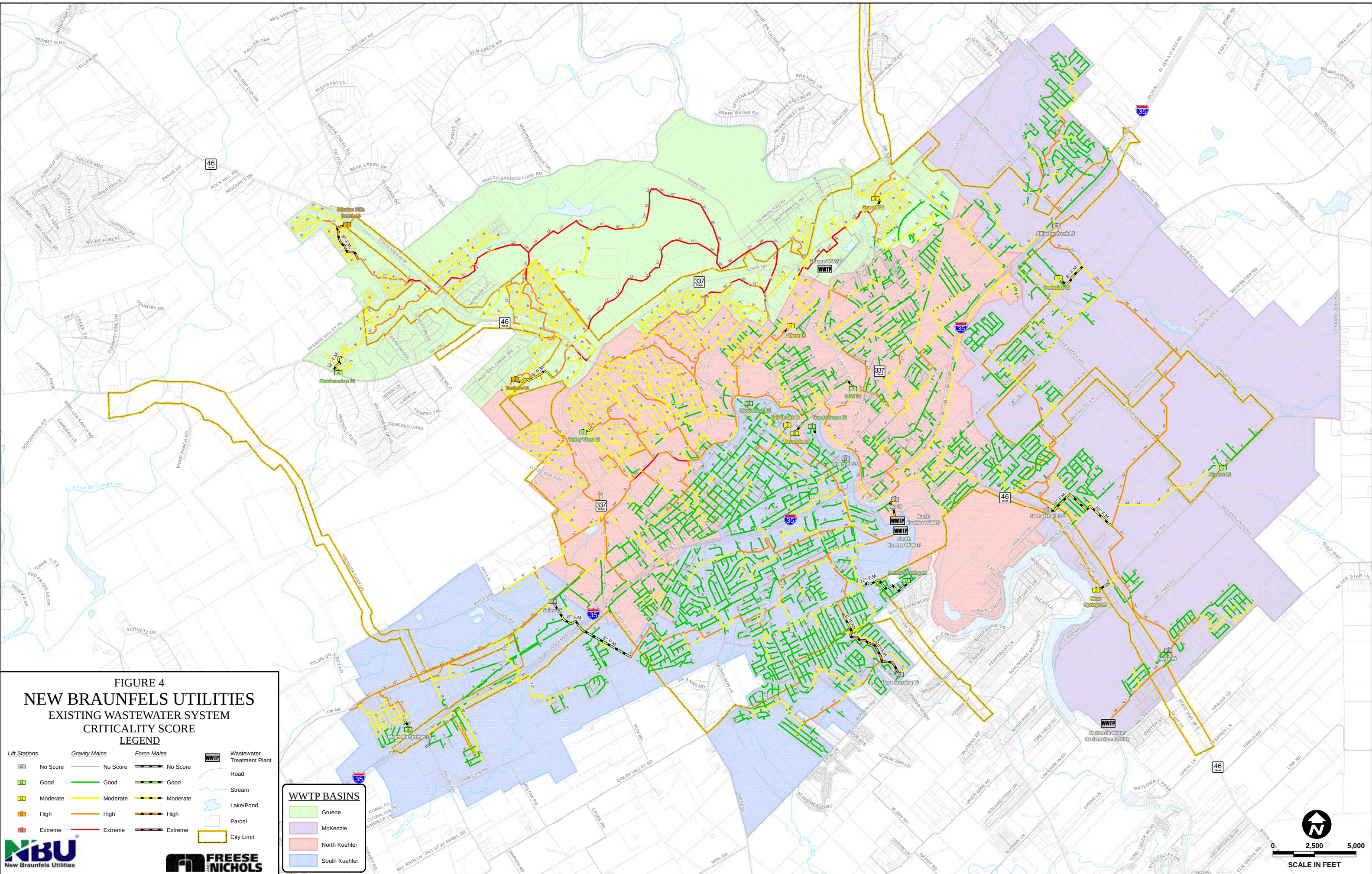


FIGURE 4
NEW BRAUNFELS UTILITIES
EXISTING WASTEWATER SYSTEM
CRITICALITY SCORE
LEGEND

No Score

Good

Moderate

High

Extreme

No Score

Good

Moderate

High

Extreme

No Score

Good

Moderate

High

Extreme

Wastewater Treatment Plant

Road

Stream

Lake/Pond

Parcel

City Limit

Gruene

McKenzie

North Kuehler

South Kuehler

NBU
New Braunfels Utilities

FREES & NICHOLS

Created by Freese and Nichols, Inc.
File No. 18010001
Location: 1100 W. PLACEROS, DEL VALLE, TEXAS
Updated: Friday, December 4, 2020 2:25:20 PM

0 2,500 5,000
SCALE IN FEET

5.0 RISK BASED ASSESSMENT

The condition and criticality scores calculated in the previous sections were combined to determine total risk for each asset type. Risk category is a function of asset condition and criticality and is determined by utilizing a risk matrix where condition categories make up the matrix columns and criticality categories define the matrix rows. The risk matrix is shifted slightly to prioritize asset condition as the likelihood of failure was determined to be more indicative of the overall asset risk. Generally, assets in the lower right-hand portion of the risk matrix represent extreme risk while assets in the upper left-hand portion of the risk matrix represent minimal risk. Risk scores are a function of condition and criticality scores, but do not necessarily correlate to a risk category as the ultimate risk category is determined by the risk matrix. For example, as shown in **Table 17**, Warnecke has a combined risk score of 5.45, but is assigned a risk category of “High” due to a condition category of “Poor”. The following sections detail the risk based assessment for each asset type.

5.1 LIFT STATION RISK ASSESSMENT

The lift station risk based assessment is summarized in **Table 17** and on **Figure 5**.

Table 17: Lift Station Risk Assessment Summary

Lift Station Name	Condition Score	Condition Category	Criticality Score	Criticality Category	Risk Score	Risk Category
Airport	2.35	Fair	1.80	Low	4.15	Low
Albert	3.05	Poor	2.85	Moderate	5.90	High
Clear Springs	2.35	Fair	2.15	Moderate	4.50	Moderate
Coll Springs	2.10	Fair	2.35	Moderate	4.45	Moderate
Creekside	1.70	Good	2.10	Moderate	3.80	Low
Enclave	1.55	Good	3.10	High	4.65	Moderate
Gruene	3.55	Poor	2.85	Moderate	6.40	High
Guada Coma	2.10	Fair	1.80	Low	3.90	Low
Magnolia Springs	1.35	Good	1.55	Low	2.90	Low
Mission Hills Ranch	2.05	Fair	3.70	High	5.75	Moderate
Meusebach	2.00	Good	1.80	Low	3.80	Low
Newkcombes	2.05	Fair	2.00	Low	4.05	Low
Pecan Crossing	1.75	Good	1.55	Low	3.30	Low
Valley View	2.00	Good	2.00	Low	4.00	Low
VFW	2.15	Fair	1.60	Low	3.75	Low
Warnecke	3.10	Poor	2.35	Moderate	5.45	High
Average	2.20	-	2.22	-	4.42	-

Figure 5: Lift Station Risk Assessment Matrix

Risk = Condition + Criticality		Condition			
		Good	Fair	Poor	Severe
Criticality	Low	Magnolia Springs Meusebach Pecan Crossing Valley View	Airport Guada Coma Newkcombes VFW		
	Moderate	Creekside	Clear Springs Coll Springs	Albert Gruene Warnecke	
	High	Enclave	Mission Hills Ranch		
	Extreme				

5.2 GRAVITY MAIN RISK ASSESSMENT

The gravity main risk based assessment is summarized in **Table 18** and on **Figure 6**. The numbers presented on **Figure 6** illustrate the total number (segment count) of assets and total length of those assets in linear feet for each matrix cell.

Table 18: Gravity Main Risk Assessment Summary

Score	Category	Length (lf)	Percent
8 - 10	Extreme	2,289.2	0.1%
6 - 8	High	26,875.4	1.2%
4 - 6	Moderate	206,146.4	9.4%
2 - 4	Low	897,496.5	40.9%
-	None	1,060,884.3	48.4%
Total		2,193,691.9	100.0%

Figure 6: Gravity Main Risk Assessment Matrix

Risk = Condition + Criticality		Condition			
		Good	Fair	Poor	Severe
Criticality	Low	2,440 539,397.4	333 101,339.5	146 48,331.4	28 8,551.0
	Moderate	1,191 256,759.7	214 63,806.7	95 27,395.2	15 4,092.7
	High	138 36,795.4	72 25,132.6	30 10,570.8	6 1,999.4
	Extreme	15 4,685.2	8 3,660.9	2 289.8	0 0.0

5.3 FORCE MAIN RISK ASSESSMENT

The force main risk based assessment is summarized in **Table 19** and on **Figure 7**. The numbers presented on **Figure 7** illustrate the total number (segment count) of assets and total length of those assets in linear feet for each matrix cell.

Table 19: Force Main Risk Assessment Summary

Score	Category	Length (lf)	Percent
8 - 10	Extreme	0.0	0.0%
6 - 8	High	0.0	0.0%
4 - 6	Moderate	16,073.6	23.2%
2 - 4	Low	29,657.7	42.8%
-	None	23,531.8	34.0%
Total		69,263.1	100.0%

Figure 7: Force Main Risk Assessment Matrix

Risk = Condition + Criticality		Condition			
		Good	Fair	Poor	Severe
Criticality	Low	24 10,131.5	5 367.6	1 10.7	0 0.0
	Moderate	51 19,158.6	10 5,714.5	0 0.0	0 0.0
	High	10 8,652.7	12 1,695.6	0 0.0	0 0.0
	Extreme	0 0.0	0 0.0	0 0.0	0 0.0

5.4 WASTEWATER SYSTEM RISK SUMMARY

Results of the wastewater collection system RBA are shown on **Figure 8**. The symbology on **Figure 8** corresponds to the risk levels presented in the risk matrices. The results of the risk based assessment indicate that the majority of the evaluated system is in good or fair condition with just over 1% of the linear assets identified to be high or extreme risk. Generally, the newer areas of the system have less risk, with no high or extreme assets in the McKenzie WWTP basin. The majority of assets identified to have high or extreme risk are within the North and South Kuehler WWTP basins and inside of the State Highway 337 Loop. The results of the risk based assessment facilitated the development of the prioritized renewal CIP discussed in the following section.

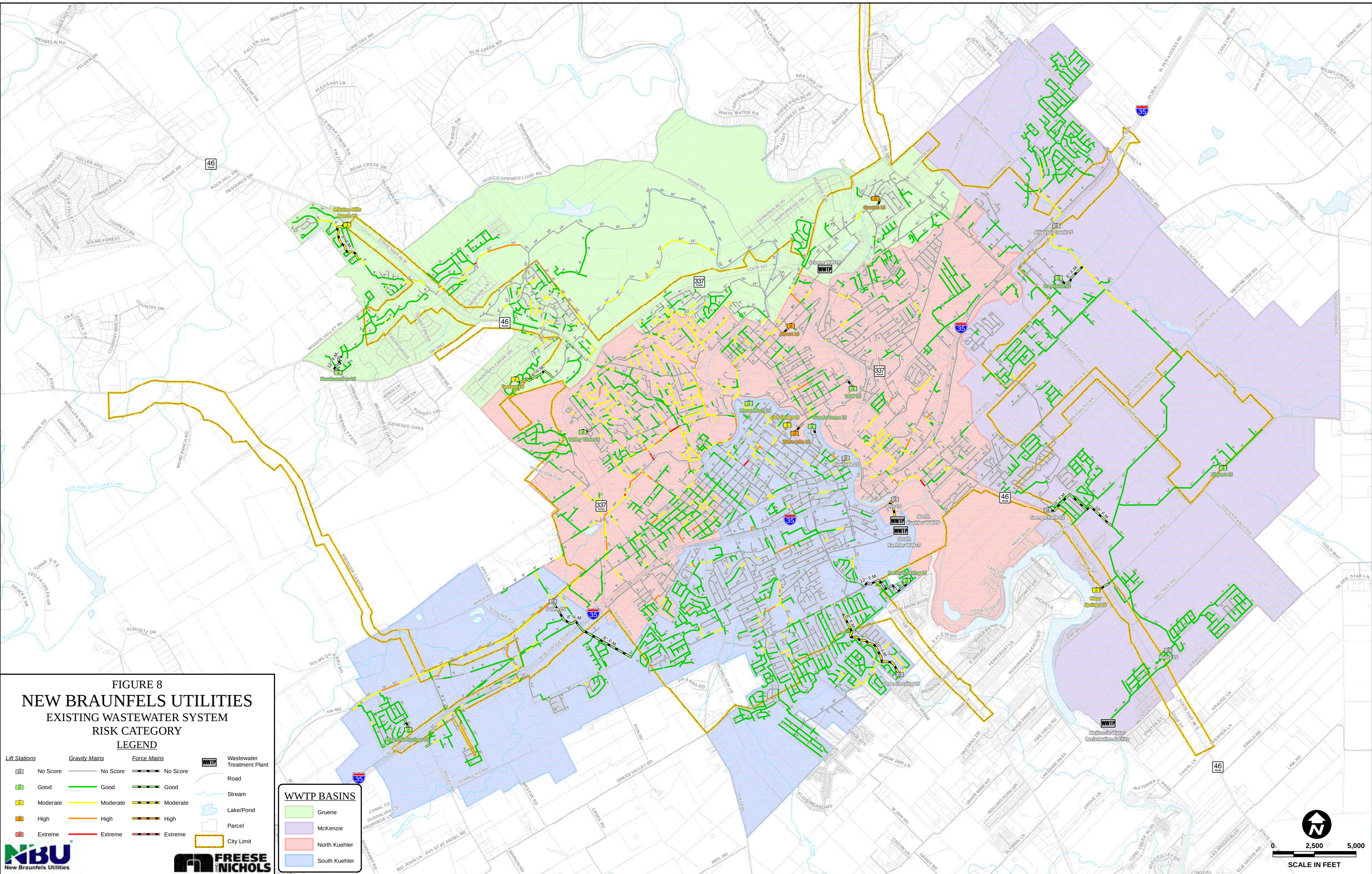


FIGURE 8
NEW BRAUNFELS UTILITIES
EXISTING WASTEWATER SYSTEM
RISK CATEGORY
LEGEND

Lift Stations

	No Score
	Good
	Moderate
	High
	Extreme

Gravity Mains

	No Score
	Good
	Moderate
	High
	Extreme

Force Mains

	No Score
	Good
	Moderate
	High
	Extreme

WWTP

	Wastewater Treatment Plant
--	----------------------------

Other Symbols

	Road
	Stream
	Lake/Pond
	Parcel
	City Limit

WWTP BASINS

	Gruene
	McKenzie
	North Kuehler
	South Kuehler

NBU
New Braunfels Utilities

FREESE & NICHOLS

Created by Freese and Nichols, Inc.
File No. 18010001
Location: H:\NBU_PLANS\GIS\DELIVERABLES\FINAL_REPORT\Figure_8_Risk_Assessment_Results.mxd
Updated: Friday, December 4, 2020 2:28:28 PM

0 2,500 5,000

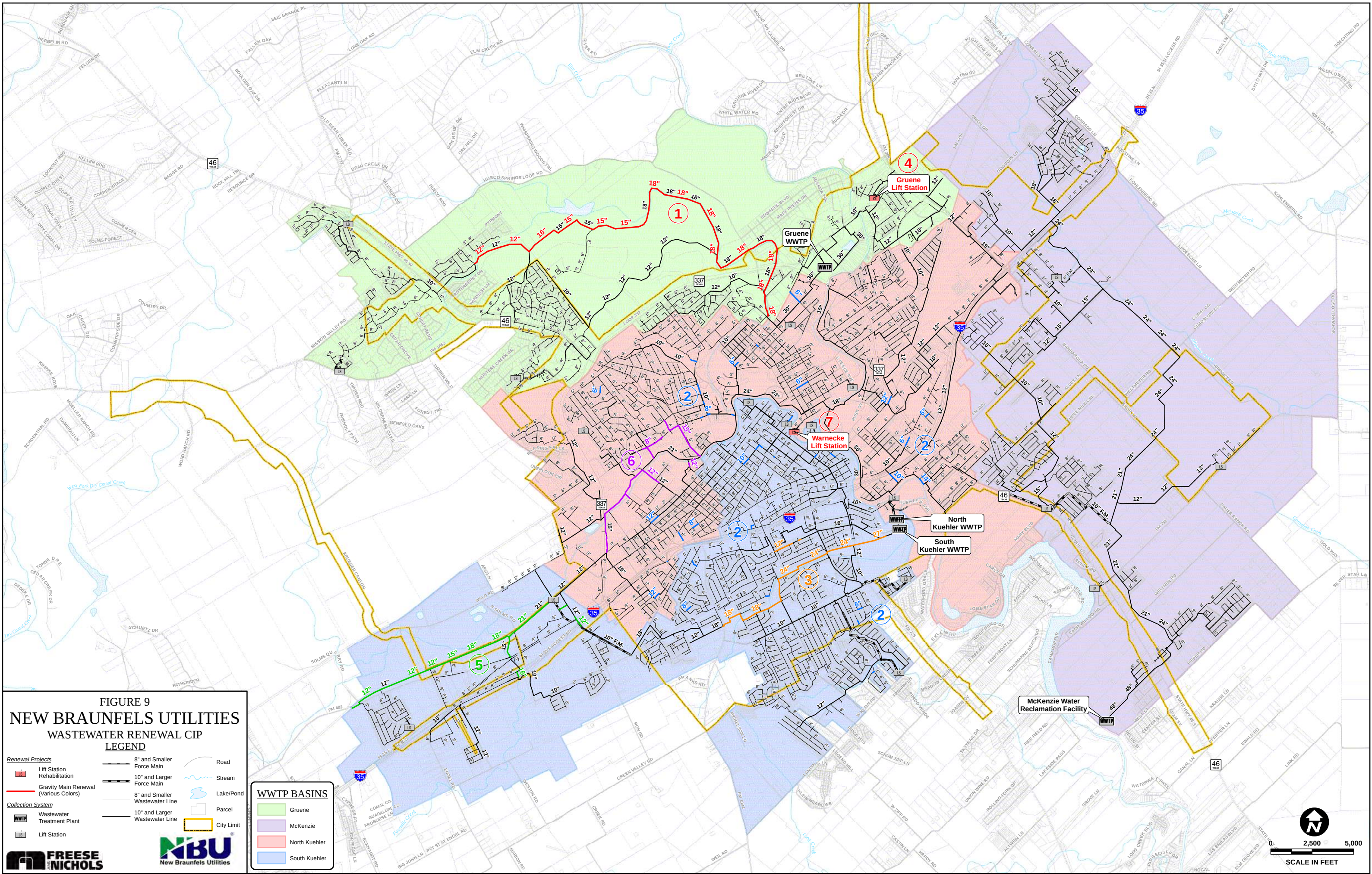
SCALE IN FEET

6.0 RENEWAL CIP AND RECOMMENDATIONS

A renewal CIP was developed to recommend improvements that help mitigate the risk of asset failure and proactively manage system degradation. All assets identified to have high or extreme risk were recommended for renewal. The renewal CIP identifies approximately 4.5% of the wastewater collection system for renewal. An emerging industry trend recommends that a utility rehabilitate approximately 2% of the wastewater infrastructure each year resulting in a complete rehabilitation of the system every 50 years, which corresponds to the typical design life expectancy of a wastewater pipe when properly installed. The renewal CIP is presented in the following sections based on asset and renewal type. All recommended renewal CIP projects are shown on **Figure 9**.

The conveyance capacity of the wastewater assets was not evaluated as part of this study but will be assessed as part of the ongoing *Water and Wastewater Master Plan Update*. A hydraulic model will be developed as part of the master plan project for use in evaluating the hydraulic capacity of the wastewater collection system and corresponding assets. Assets that are determined to lack adequate capacity to convey projected future wastewater flows will be identified as part of the master plan update and incorporated into a wastewater capacity CIP. The results and recommendations of this study will be included in and superseded by the integrated wastewater CIP recommended in the *Wastewater Master Plan Update*. Per TCEQ Chapter 217, wastewater system improvements should not be constructed to surcharge during projected peak flows. In accordance with TCEQ regulations, no renewal improvements should be implemented if the resulting asset lacks adequate capacity to convey projected peak flows.

Planning level cost estimates were calculated for the recommended renewal projects. The renewal planning costs are estimated based on recommended renewal method of the wastewater asset, but additional analysis may indicate that an alternative renewal method is more prudent. The presented costs are provided as estimates based on previous similar engineering experience in 2020 dollars and include an allowance for engineering, surveying, and contingencies. The project cost estimates do not include an allowance for land or right-of-way acquisition. These costs are for planning and budgeting purposes only and are not to be considered as a detailed opinion of probable construction cost (OPCC).



6.1 RENEWAL IMPROVEMENT PROJECTS

All assets identified as high or extreme risk are recommended for renewal. The projects are generally prioritized by the average risk score but may be completed in any order. A summary of the recommended renewal projects and the estimated costs are shown in **Table 20**. Detailed and itemized descriptions of the recommended renewal projects and associated costs are included in **Appendix B**.

Table 20: Renewal Project Cost Summary

Project Number	Project Name	Renewal Cost
1	Gruene Interceptor Inspection	\$212,800
2	Various Gravity Main Point Inspection and Repair	\$4,606,600
3	South Kuehler Interceptor Inspection	\$130,500
4	Gruene Lift Station Improvements	\$692,693
5	Solms Interceptor Rehabilitation	\$7,821,300
6	North Kuehler Interceptor Rehabilitation	\$6,079,600
7	Warnecke Lift Station Rehabilitation	\$102,200
Renewal CIP Total		\$19,645,693

The results of the lift station field condition assessments help drive the recommended improvements for each lift station. Three lift stations were identified as high risk: Gruene, Albert, and Warnecke. Renewal projects are recommended for Gruene and Warnecke Lift Stations. Albert Lift Station, however, has already been identified for rehabilitation as part of the on-going improvements at the Surface Water Treatment Plant and was not evaluated further.

All wastewater gravity lines identified as high or extreme risk are recommended for renewal. However, inspection data was only available for a portion of the identified lines. Only gravity mains identified to have high or extreme risk as a result of historical CCTV inspection are recommended for rehabilitation or replacement. This corresponds to approximately 26,000 lf of the 29,000 lf (88%) of high or extreme risk gravity mains. Contiguous lines with high or extreme risk were combined with adjacent moderate risk lines to generate renewal projects.

For gravity mains not included in the historical CCTV inspections, the determined risk is a result of the desktop condition assessment. While the desktop analysis is sufficient for pipeline prioritization, it is likely not accurate enough to recommend large scale capital improvements. Rather, these lines are recommended for CCTV inspection to verify the results of the desktop analysis. Should the CCTV inspection confirm the results of the desktop condition assessment, further renewal improvements are

then warranted. Contiguous lines with high or extreme risk without inspection data were combined with adjacent moderate risk lines to generate inspection projects. Additionally, adjacent lines of similar size without a determined condition were also included for inspection as it was assumed that the characteristics of these lines would be similar to the lines scored by the desktop analysis.

Several high or extreme risk gravity mains (approximately 14,000 lf) were isolated throughout the collection system and not adjacent to any lines of similar risk. These lines were compiled into a singular project and recommended for “point inspection and repair” or specific, targeted renewal of short pipe lengths.

6.1.1 Project 1 – Gruene Interceptor Inspection

This project includes CCTV inspection of approximately 33,000 lf of the Gruene Interceptor from SH 46 to the now decommissioned Blieders Creek LS. CCTV inspection data and desktop RBA indicate that the Gruene Interceptor is high risk. Limited CCTV inspection results detail some sections of the line in poor or moderate condition. However, the majority of the line was not inspected, and desktop analysis was not able to be completed. This line is identified as extreme criticality. If CCTV inspection results indicate that this line is in poor condition, rehabilitation is recommended, but rehabilitation costs are not included in this estimate.

6.1.2 Project 2 – Various Gravity Main Point Inspection and Repair

This project includes point inspection and repair of approximately 14,000 lf of various small diameter gravity lines in the North and South Kuehler WWTP basins. CCTV inspection data and desktop RBA indicate that these lines are high risk. The majority of the lines identified in this project are shown to be in poor or severe condition from CCTV inspection results, with select severe condition lines solely identified via desktop analysis. Pipeline criticality varies from low to high. These lines should be individually cleaned and inspected prior to rehabilitation to verify the results of the RBA.

6.1.3 Project 3 – South Kuehler Interceptor Inspection

This project includes CCTV inspection of approximately 16,000 lf of the South Kuehler Interceptor from FM 1044 to the South Kuehler WWTP. CCTV inspection data and desktop RBA indicate that the South Kuehler Interceptor is high risk. Limited CCTV inspection results detail some sections of the line in poor or moderate condition. Additionally, portions of this line result in severe condition due to desktop analysis of the line age and material. However, the majority of the line was not inspected, and desktop analysis was not able to be completed. This line is identified as high criticality. If CCTV inspection results indicate that this line is in poor condition, rehabilitation is recommended, but rehabilitation costs are not included in this estimate.

6.1.4 Project 4 – Gruene Lift Station Rehabilitation

This project includes rehabilitation and replacement of the lift station electrical equipment and wet well structure. Field inspection and desktop RBA indicate that the lift station is high risk. Field inspection results detail poor or very poor condition electrical equipment and poor site and structural conditions. After evaluating the results of the field inspections, the Gruene lift station was identified for a more in-depth rehabilitation assessment. A detailed OPCC for the rehabilitation of this lift station was developed through a separate study. This OPCC is included in **Appendix B** for Project 4 instead of the high-level cost estimate generated for the other recommended projects.

6.1.5 Project 5 – Solms Interceptor Rehabilitation

This project includes CIPP or slipline rehabilitation of approximately 18,000 lf of the Solms Interceptor along the railroad from Solms Quarry Road to Solms Lift Station. CCTV inspection data and desktop RBA indicates that the Solms Interceptor is high risk. CCTV inspection results detail significant sections of the line in poor or severe condition. This line is identified as high criticality. Slipline rehabilitation is recommended for this project, but additional investigation may indicate that other rehabilitation methods are more prudent. Pipeline capacity was not evaluated for this project. Per TCEQ, rehabilitation improvements should not be implemented if the line is projected to surcharge. This project may be superseded by recommendations from the Wastewater Master Plan Update.

6.1.6 Project 6 – North Kuehler Interceptor Rehabilitation

This project includes CIPP or slipline rehabilitation of the North Kuehler Interceptor along Dry Comal Creek from the railroad to Live Oak Avenue. CCTV inspection data and desktop RBA indicate that the North Kuehler Interceptor is high risk. CCTV inspection results detail some sections of the line in poor or severe condition. Additionally, portions of this line result in poor condition due to desktop analysis of the line age and material. This line is identified as high criticality. Slipline rehabilitation is recommended for this project, but additional investigation may indicate that other rehabilitation methods are more prudent. Pipeline capacity was not evaluated for this project. Per TCEQ, rehabilitation improvements should not be implemented if the line is projected to surcharge. This project may be superseded by recommendations from the Wastewater Master Plan Update.

6.1.7 Project 7 – Warnecke Lift Station Rehabilitation

This project includes rehabilitation and replacement of the lift station electrical equipment and site structure. Field inspection and desktop RBA indicate that the lift station is high risk. Field inspection results detail no electrical redundancy and poor structural conditions. NBU staff noted maintenance issues and limited availability of parts. General electrical wiring and service disconnect are identified for replacement. The interior of the lift station should be cleaned, coated, and sealed to prevent further rust and corrosion. Quick connect for generator back-up power is recommended to be installed.

6.2 RECOMMENDED RENEWAL METHODOLOGIES

FNI recommends that each pipeline identified for improvement be evaluated for the appropriate renewal method. While investigation during the design phase will aide in selecting the most appropriate method, the following methodologies are recommended as potential remedies for pipes found to be in poor condition:

- Cured-in-Place Pipe
 - This method reduces I/I from a pipe with defects and requires cleaning before the pipe can be repaired. Thermosetting resins enter the pipe through manhole access and line the pipe before being cured with hot water, steam, or ultraviolet light. The lining structurally restores the pipe with a minimal diameter reduction. The process is trenchless and requires bypass pumping to redirect flow during installation, as well as manhole access for every 1,000 feet of pipe.
- Pipe Bursting
 - Pipe bursting allows for replacement of damaged pipe at the same diameter or at one additional size. The process involves breaking the pipe in place followed by the installation of new material. Pipe bursting requires access to a manhole along the pipe at least every 1,500 feet as well as bypass pumping to redirect flow during installation.
- Sliplining
 - Sliplining relieves I/I and restores structural stability to pipe. The process may require insertion and receiving trenches for installation. The liner reduces the capacity of the pipe. Access is required every 1,500 feet and bypass pumping is necessary to redirect flow.
- Conventional Point Repairs
 - Conventional point repairs are identified by CCTV. The defect does not affect the entire line. When the defect is located, an access trench must be excavated to access the defect for repair and bypass pumping may be required to redirect flow.

- Trenchless Point Repairs
 - Trenchless point repairs use a robotic device to locate point defects in-situ and install a sleeve to correct the defect. These defects do not affect the entire pipe, but otherwise may cause I/I. The repair can take place with flow present and does not require resin or cure time.

6.3 FUTURE INSPECTION RECOMMENDATIONS

New Braunfels Utilities invests in ongoing CCTV inspection of the wastewater collection system. Historically, NBU has utilized both contractors and in-house crews to perform the inspections. In order to better utilize the inspections moving forward, FNI recommends all inspection crews (external and internal) log the inspection results in the standard PACP format. This includes inputting the complete upstream and downstream manhole IDs, wastewater pipe ID, and inspection date in the proper format during each inspection. As discussed in **Section 3.2**, several historical inspections were unable to be converted to the standard PACP format and were not included in the condition assessment. Updating the format of these inspections is difficult and time consuming and may result in errors in the database. FNI recommends adjusting the future inspection reporting in order to better utilize the inspection results for future condition assessment. It is also recommended that NBU require all external CCTV inspection deliverables to include the following:

- CCTV Inspection Report (hard copy and digital copy)
- All media files, including images and videos
- A Standard PACP Database of the inspected infrastructure

APPENDIX A

Lift Station Field Inspection Sheets

Inspection Date:

Facility Information	
Address: 2317 FM 758	
Year in Service:	
Wet Well Size:	4' Diameter
Number of Pumps:	1
Design Point:	50 gpm
Horsepower:	2.0 HP
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	3	20%	0.60	Plan to replace grinder pumps
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	The pump control panel is stainless steel, but other panels are all steel. Enclosures appear to be in good condition and not currently showing signs of corrosion.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	3	10%	0.30	Site includes a double throw switch but does not include a quick connection for use with a portable generator. To connect a portable unit would require an operator to open the disconnect switch and land the cables in the disconnect enclosure.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	1	5%	0.05	
Instrumentation - SCADA, alarms	3	15%	0.45	There have been issues with the cellular Telog system.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Slab cracking, wet well codition unknown
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	2	5%	0.10	Could use minor re-grading
Condition Rating	-	100%	2.35	

Existing Concerns

I/I issues

Inspection Date:

Facility Information

Address: NBU Surface Water Treatment Plant, Gruene Road

Year in Service: 26

Wet Well Size: 3'x8', 13' Depth

Number of Pumps: 2

Design Point: 150 gpm @ 50 TDH

Horsepower: 7.5 HP/each

Monitoring:

Generator:

Scoring Guidelines

- | | |
|----------|--|
| 1 | Very good condition; no improvements recommended to maintain function |
| 2 | Good condition; minor improvements recommended to maintain function |
| 3 | Fair condition; improvements recommended to improve performance or efficiency |
| 4 | Poor condition; improvements recommended to maintain reliability |
| 5 | Very Poor condition; rehabilitation or replacement required |

CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	3	20%	0.60	Newer pumps, general wear on pumps and motors, minor rust/corrosion.
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	4	10%	0.40	New pumps. Most power equipment and cables are original. There are openings in the front cover where pilot devices used to be.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	
Instrumentation - SCADA, alarms	2	15%	0.30	Instrumentation/Telog installed in the last 2 years.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Decent rust/corrosion Not able to see wet well
Piping and Valves	3	15%	0.45	Partially exposed PVC suction stingers
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	
Condition Rating	-	100%	3.05	

Existing Concerns

Replace or repurpose with WTP expansion.

Recent increase in flow, likely a leak or growth upstream.

Lift station noted by NBU staff to have maintenance issues and limited availability of parts.

Inspection Date:

Facility Information	
Address: 1702 HWY 46	
Year in Service:	15
Wet Well Size:	10' Diameter, 19' Depth
Number of Pumps:	2
Design Point:	150 gpm @50 TDH
Horsepower:	7.5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Not inspected.
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	2	10%	0.20	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	Minor signs of corrosion on pump control panel exterior.
Instrumentation - SCADA, alarms	2	15%	0.30	Float controls.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Odor issues, enclosure had to be removed.
Piping and Valves	2	15%	0.30	Not inspected.
Site - Drainage, Access Drive, Security, Fencing	2	5%	0.10	Access drive rutting Site needed grading
Condition Rating	-	100%	2.35	

Existing Concerns

Low flow.
Grease issues.

Inspection Date:

Facility Information	
Address: 353-431 E Coll St; Near S Market Ave	
Year in Service:	21
Wet Well Size:	8'x7', 12' Depth
Number of Pumps:	2
Design Point:	200 gpm @ 28 TDH
Horsepower:	5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Recently replaced the pumps
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	Recently replaced electrical
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	The conduit for the service cable to lift station panel is sheared
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	Wet well not inspected.
Piping and Valves	2	15%	0.30	Minor corrosion on piping. Recently replaced check valves.
Site - Drainage, Access Drive, Security, Fencing	3	5%	0.15	No fence
Condition Rating	-	100%	2.10	

Existing Concerns

Inspection Date:

Facility Information	
Address: Creekside Market Place Near Dick's Sporting Goods	
Year in Service:	11
Wet Well Size:	10' Diameter
Number of Pumps:	2
Design Point:	
Horsepower:	25 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	1	20%	0.20	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	Relatively new
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	3	10%	0.30	Includes a quick connect receptacle for use with a portable generator. But the existing portable generator is approx. 40 years old and at the end of its expected life. In addition the portable generator may only be able to provide power for 1 pump.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	Signs of corrosion on some of the mounting hardware and conduit covers and conduit threads.
Instrumentation - SCADA, alarms	1	15%	0.15	SCADA cabinet was installed in the last 2-3 years. The site previously included cellular communications. Site includes pressure type level sensor with backup floats.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Hatch and wet well in good condition. Wet well and dry well seating.
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	
Condition Rating		100%	1.70	

Existing Concerns

Inspection Date:

Facility Information
Address: 500-554 Mission Hill Run
Year in Service:
Wet Well Size:
Number of Pumps:
Design Point:
Horsepower:
Monitoring:
Generator:

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Minor Corrosion.
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	1	10%	0.10	
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	2	5%	0.10	Two of the conduits are sheared/cut off at the wet well. These conduits appear to be associated with the level instrumentation.
Instrumentation - SCADA, alarms	2	15%	0.30	Level sensor with back-up floats
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	Wet well not inspected.
Piping and Valves	2	15%	0.30	Air valves stick. Minor corrosion.
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	
Condition Rating	-	100%	1.55	

Existing Concerns

Inspection Date:

Facility Information	
Address: 76-92 Guada Coma Dr	
Year in Service:	21
Wet Well Size:	6' Diameter, 14' Depth
Number of Pumps:	2
Design Point:	165 gpm @ 45 TDH
Horsepower:	5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	No issues
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	Was flooded so NBU has gutted and replaced the items in the pump control panel.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	Wet well not inspected.
Piping and Valves	2	15%	0.30	
Site - Drainage, Access Drive, Security, Fencing	3	5%	0.15	No fence
Condition Rating	-	100%	2.10	

Existing Concerns

Indications of high water in wet well is evident
Lift station floods

Inspection Date:

Facility Information	
Address: 1714-1736 Hunter Rd	
Year in Service:	43
Wet Well Size:	8'10"x10'9", 18'6" Depth
Number of Pumps:	2
Design Point:	350 gpm @ 70 TDH
Horsepower:	7.5 HP/each
Monitoring:	
Generator:	no

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	3	20%	0.60	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	4	10%	0.40	Pump Control Panel expected to be original. Replacement recommended due to age of panel.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No connections to generator
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	Rust on meter and junction box.
Instrumentation - SCADA, alarms	3	15%	0.45	Site includes mercoird level/bubbler level.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	4	20%	0.80	Exposed fiberglass structure. Cracks in concrete foundation.
Piping and Valves	3	15%	0.45	PVC riser
Site - Drainage, Access Drive, Security, Fencing	4	5%	0.20	No fence or sign Gate broken
Condition Rating	-	100%	3.55	

Existing Concerns
Electrical equipment in the dry well, safety issue.

Inspection Date:

Facility Information
Address: 2425-2457 Kookaburra Dr
Year in Service:
Wet Well Size:
Number of Pumps:
Design Point:
Horsepower:
Monitoring:
Generator:

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	3	20%	0.60	Backup pump motor has seized up
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up generator provided, but the site does include a back-up diesel pump.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	2	5%	0.10	Panels are steel and showing minor signs of corrosion
Instrumentation - SCADA, alarms	1	15%	0.15	When on site they were in the process of installing a base for an antenna to switch to SCADA.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Minor odor. Wet will not inspected. Hatch is out of service
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	
Condition Rating	-	100%	2.05	

Existing Concerns

--

Inspection Date:

Facility Information	
Address: Magnolia Springs: Marigold Way near Dahlia	
Year in Service:	Since 2014
Wet Well Size:	
Number of Pumps:	1 or 2
Design Point:	200 gpm @ 70 TDH
Horsepower:	15.0
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	1	20%	0.20	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	3	10%	0.30	The site includes a manual transfer switch and a generator connection cabinet, but the type of cable connections in the cabinet are not compatible with NBU's portable generator.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	1	5%	0.05	Cabinets are stainless steel.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	
Condition Rating	-	100%	1.35	

Existing Concerns

Inspection Date:

Facility Information	
Address: River Run Resort Condominiums: Meusebach St between N Market Ave and Comal River	
Year in Service:	14
Wet Well Size:	4' Diameter, 11' Depth
Number of Pumps:	2
Design Point:	200 gpm
Horsepower:	2 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Pumps require more maintenance than typical.
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	Can't open pump control panel door the full 90 degrees as required by the National Electrical Code. Door opens about 3/4 of the way.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	Wet well not inspected.
Piping and Valves	2	15%	0.30	
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	Minor corrosion on piping.
Condition Rating	-	100%	2.00	

Existing Concerns

Low flows

Inspection Date:

Facility Information	
Address: 3128 San Miguel	
Year in Service:	15
Wet Well Size:	11' Diameter, 17' Depth
Number of Pumps:	2
Design Point:	325 gpm @ 96 TDH
Horsepower:	25 HP/each
Monitoring:	
Generator:	no

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Good condition Minor corrosion
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	2	10%	0.20	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	1	5%	0.05	
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	
Piping and Valves	2	15%	0.30	Minor corrosion
Site - Drainage, Access Drive, Security, Fencing	2	5%	0.10	Room under gate
Condition Rating	-	100%	2.05	

Existing Concerns

Inspection Date:

Facility Information	
Address: 2224 Pecan Tree	
Year in Service:	
Wet Well Size:	12' Diameter, 19' Depth
Number of Pumps:	
Design Point:	
Horsepower:	
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	1	20%	0.20	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	2	10%	0.20	Control panels are located in dry well.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	1	10%	0.10	There have been multiple outages at this site so the generator has been in use.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	2	5%	0.10	All the enclosures are steel with the exception of the auto dialer which is stainless steel. There are signs of corrosion on conduit threads and around the edges of the enclosure for the automatic transfer switch.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Bolt for the pump has detached. Decent rust on non-stainless portions of structure.
Piping and Valves	1	15%	0.15	Recently repaired force main.
Site - Drainage, Access Drive, Security, Fencing	2	5%	0.10	
Condition Rating	-	100%	1.75	

Existing Concerns

Developer built lift station.
 NBU has repaired the influent line.
 Lift station noted by NBU staff to have maintenance issues and limited availability of parts.

Inspection Date:

Facility Information	
Address: Gruene WWTP	
Year in Service:	19
Wet Well Size:	8' Diameter, 17' Depth
Number of Pumps:	2
Design Point:	100 gpm @ 40 TDH
Horsepower:	5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	3	10%	0.30	Misc. items in pump control panel have been replaced due to flooding
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	Lift station fed from plant, but neither the plant or the lift station include a generator. There are also no provisions for back-up power at the lift station site.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	No odor issues. Wet wll not inspected.
Piping and Valves	2	15%	0.30	
Site - Drainage, Access Drive, Security, Fencing	1	5%	0.05	WWTP fencing
Condition Rating	-	100%	2.40	

Existing Concerns

Flooding issues. Small service area.

Inspection Date:

Facility Information	
Address: Valley View Ln near Mission Trail	
Year in Service:	16
Wet Well Size:	11' Diameter, 13 Depth
Number of Pumps:	2
Design Point:	
Horsepower:	10 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	1	20%	0.20	
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	2	10%	0.20	
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	PVC conduit showing signs of age.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	2	5%	0.10	Shell cracked and can not fully open.
Condition Rating	-	100%	2.00	

Existing Concerns

--

Inspection Date:

Facility Information	
Address: Peace Ave behind Veterans of Foreign Wars	
Year in Service:	31
Wet Well Size:	4' Diameter, 16' Depth
Number of Pumps:	2
Design Point:	100 gpm @ 48 TDH
Horsepower:	5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	2	20%	0.40	Newer Pumps, general wear on pumps and motors
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	1	10%	0.10	Recently gutted and replaced electrical components due to flooding.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	1	5%	0.05	
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	Minor wet well corrosion, wet well performs well.
Piping and Valves	3	15%	0.45	Corrosion on piping
Site - Drainage, Access Drive, Security, Fencing	3	5%	0.15	No fence, enclosed structure.
Condition Rating	-	100%	2.15	

Existing Concerns

Very low floor.
Lift station noted by NBU staff to have maintenance issues and limited availability of parts.

Inspection Date:

Facility Information	
Address: 499-401 W Lincoln St; Near the Comal River	
Year in Service:	27
Wet Well Size:	4'x8', 12' Depth
Number of Pumps:	2
Design Point:	150 gpm @ 40 TDH
Horsepower:	5 HP/each
Monitoring:	
Generator:	

Scoring Guidelines	
1	Very good condition; no improvements recommended to maintain function
2	Good condition; minor improvements recommended to maintain function
3	Fair condition; improvements recommended to improve performance or efficiency
4	Poor condition; improvements recommended to maintain reliability
5	Very Poor condition; rehabilitation or replacement required

CONDITION ASSESSMENT				
Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Pumps and Motors	3	20%	0.60	New pumps, motors appear old with slight rust/corrosion
Major Electrical Equipment - Service Disconnect, Motor Starters, etc.	3	10%	0.30	Pump control panel more recently installed. Disconnect appears to be older.
Back-up Power or Dual Power Feed - Transfer Switch, Connection for Portable Generator, Generator, etc.	5	10%	0.50	No generator or provisions for back-up power provided.
Misc. Electrical - Cable, Conduit, Grounding, Panels, Lighting, etc.	3	5%	0.15	Some exposed PVC conduit. General internal wiring in poor condition.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	4	20%	0.80	Decent rust/corrosion inside structure.
Piping and Valves	2	15%	0.30	
Site - Drainage, Access Drive, Security, Fencing	3	5%	0.15	No Fence, no protection from traffic, enclosed structure.
Condition Rating	-	100%	3.10	

Existing Concerns

Lift station noted by NBU staff to have maintenance issues and limited availability of parts.

APPENDIX B
Renewal CIP Project Cost Sheets