WATER/WASTEWATER MASTER PLAN

AUGUST 2024

Prepared For:

City of Lockhart, Texas

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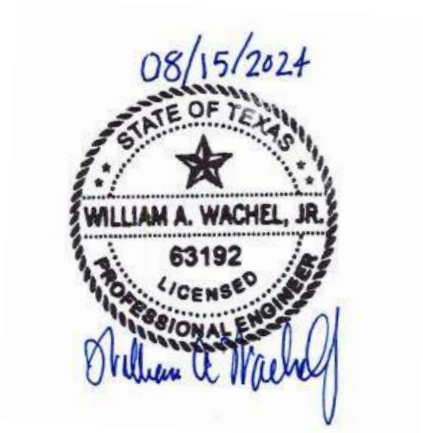

FINAL REPORT

This report is not intended for construction, bidding, or permit purposes.

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EXECUTIVE SUMMARY

A comprehensive Water/Wastewater (W/WW) System Master Plan was developed to ensure that the City of Lockhart (City) distribution and collection systems are actively engaged in planning for growth and ensure the systems maintain compliance with local and state regulations. This W/WW Master Plan will provide a planning tool for system improvements and capacity assurance for the next 20 years of anticipated growth. Flow projections and recommended system improvements were grouped into the following planning horizons for capital improvement planning: near-term (2023-2028), intermediate (2029-2033), and long-term (2034-2043).

Key W/WW Master Plan Takeaways

The following tasks were completed for the development of the W/WW Master Plan:

- Population and W/WW Flow Projections
- Water Distribution System Evaluation
- Wastewater Distribution System Evaluation
- Wells, Water Treatment, and Wastewater Treatment Facilities Evaluation
- Capital Improvement Planning

Population and W/WW Flow Projections

Figure ES-1 summarizes the historical population and Table ES-1 summarizes the flow projections used for the evaluations in this W/WW Master Plan. A combination of known developments demands and a population growth rate of 4.25% as determined in developed in the City's 2023 Roadway Impact Fee Program Update was used to develop population projections.

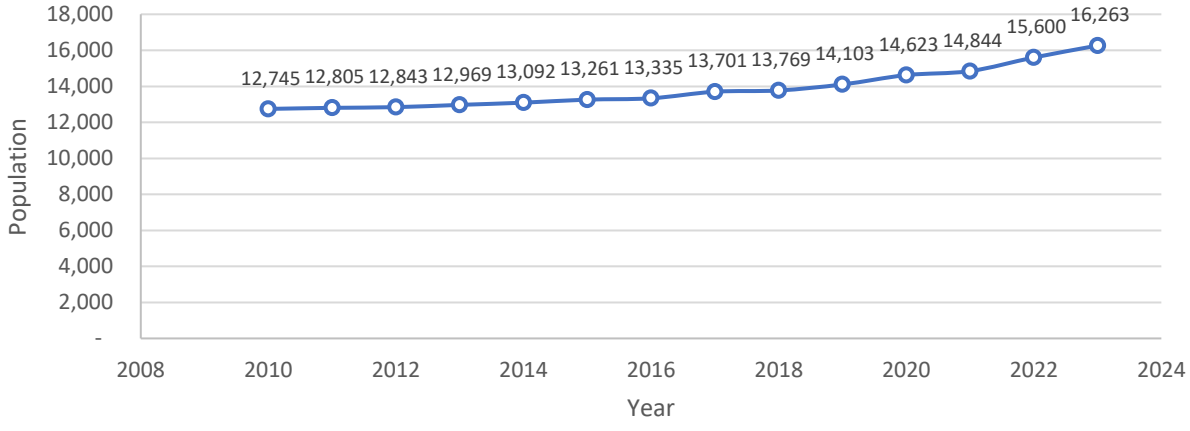

Figure ES- 1: Historical Population for the City of Lockhart

Table ES- 1: Population and Flow Projections by Planning Horizon

Planning Horizon	Year	Population	Water Service Connections	Average Water Demand Projections (MGD)*	Average Wastewater Flow Projections (MGD)
Existing	2023	16,263	5,333	2.77	1.08
Near-Term	2028	20,026	6,911	3.41	1.52
Intermediate-Term	2033	24,659	8,513	4.20	1.87
Long-Term	2043	37,388	12,913	6.36	2.84

*MGD – Million Gallons per Day

Water Distribution System Evaluation

The City had an existing water distribution model in WaterCAD. The distribution model infrastructure was updated per available survey and record drawings. The model and future demand scenarios represent anticipated development through the long-term (2043) planning horizon. To fully evaluate the system, it was necessary to analyze various demand conditions that would stress the distribution system under each planning horizon. These scenarios include the following:

- Peak demands – Equivalent to peak daily demand spread over a standard mix land-use diurnal.
- Peak demands with fire flow – Utilizing the peak day with fire flow conditions applied.

To best accomplish these evaluations, the model was populated with AWWA diurnal patterns applied to demands within an extended period simulation (EPS). Peak day and fire flow analyses were conducted on 96-hour diurnal EPS. The evaluation criteria for identifying areas of limited capacity were defined as watermains that were unable to maintain a minimum of 35 psi and meet current/projected demands under peak conditions and watermains that were unable to maintain a minimum of 20 psi and meet current/projected demands under peak demands with fire flow conditions. The Texas Administrative Code (TAC) states minimum acceptable parameters are 250 gpm for 2 hours with a minimum pressure of 20 psi. Areas of limited capacity were identified for recommended improvements to accommodate the anticipated growth in the City.

Wastewater Distribution System Evaluation

The collection system evaluation included a flow monitoring program that deployed 10 sewer flow monitors and 3 rain gages from late-August 2023 to late-December 2023. The flow monitoring data was also used to develop and calibrate a hydraulic model to be used for the analysis of the collection system. The flow monitoring records were used to disaggregate system flows and calibrate the model. Using the hydraulic model and flow projections, the collection system's capacity was evaluated for increasing flows in the future planning horizons. The evaluation criteria for identifying areas of limited capacity were defined as sewer mains that were over 50% full depth in dry weather conditions or over 80% full depth during wet-weather conditions, during a (1-year,

24-hour design event. Areas of limited capacity were identified for recommended improvements to accommodate the anticipated growth in the City.

Wells, Water Treatment, and Wastewater Treatment Facilities Evaluation

The wells and treatment facilities were evaluated to ensure they could meet demand/provide capacity within the requirements of the demand/flow projections and TCEQ's 75/90 rule. Per 30 TAC Subsection 305.126(a), the treatment facility design is to be when the plant reached 75% of design capacity and construction is to begin by 90%.

Capital Improvement Planning

Capital improvement recommendations were developed for the distribution system, collection system, wells, water treatment plant, and wastewater treatment plant as a result of the evaluations. The various triggers for the improvements were identified as part of the project development. As previously mentioned, some of the recommendations are condition or safety related that will not depend on the timing of the flow projections; however, flow-projection-dependent project triggers can be used for validation or prioritization of system improvements. For example, if the influent flow to the Larremore plant is approaching the project trigger for a gravity main project before its hypothetical 2033 recommended capacity improvement; this project can be reprioritized to occur before its original planning horizon.

Several projects were identified for each respective system to ensure the systems remain in compliance with regulations and provide adequate capacity for continued growth. Figure ES-2 and ES-3 show an overview capital improvement projects for water distribution system and wastewater collection system, respectively, over the next 20 years.

Figure ES- 2: Water Distribution System Capital Improvements Overview

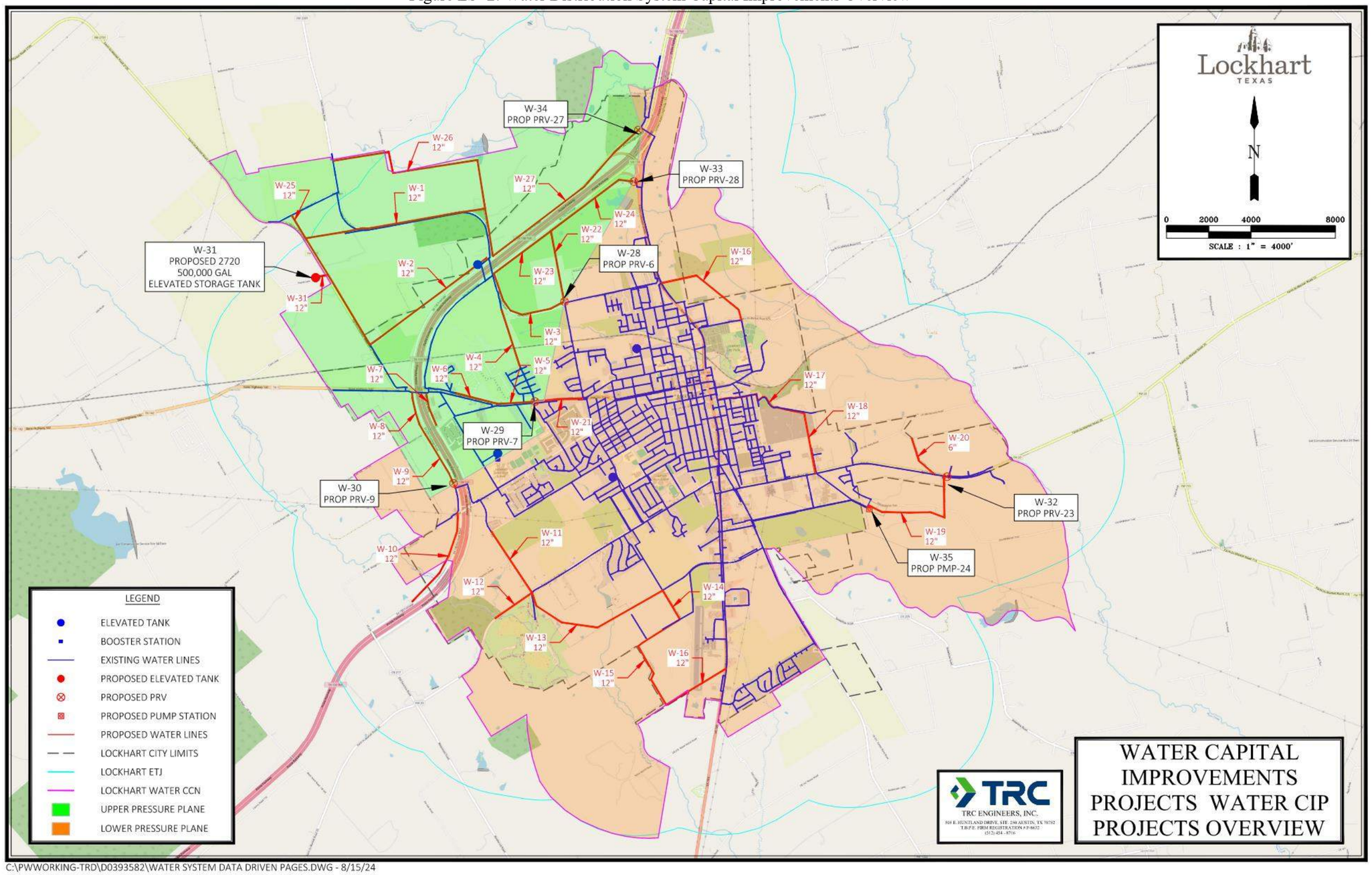

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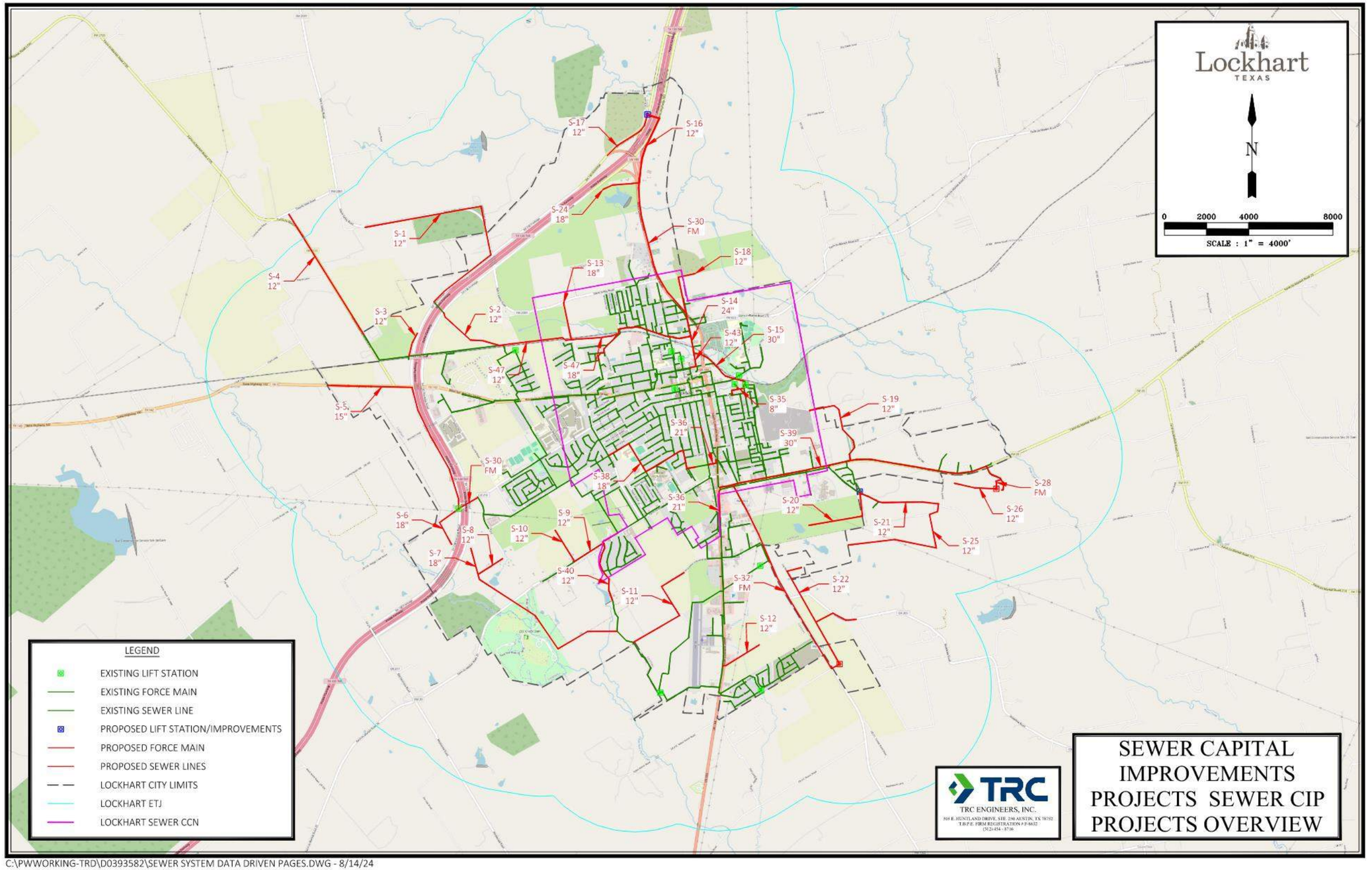
Figure ES- 3: Sewer Collection System Capital Improvements Overview



Opinions of probable construction costs (OPCCs) were developed for the recommended capital improvements for the distribution system, collection system, wells, water treatment plant, and wastewater treatment plant. Approximately $170 million in system improvements were identified for this master plan through the 2043 planning horizon. If cost is spread evenly over the planning horizons, this cost ranges from approximately $7 to $15 million/year.

Table ES- 2: Capital Improvement Cost* by Planning Horizon

Planning Horizon	Water CIP Estimated Cost	Wastewater CIP Estimated Cost	W/WW Facility CIP Estimated Cost	Total Cost
2028	$10,977,000	$32,384,000	$2,657,000	$46,018,000
2033	$19,786,000	$17,380,000	$23,612,400	$60,778,400
2043	$36,557,000	$4,010,000	$22,559,000	$63,123,000
Total	**$67,320,000**	**$53,774,000**	**$48,825,400**	**$169,919,400**

*Costs are a Class 4 Opinion of Probable Construction Costs in 2024 Dollars and include contingency, engineering, and admin.

1.0 INTRODUCTION

The City of Lockhart (City) and TRC have developed a comprehensive Water/Wastewater (W/WW) Master Plan to ensure that the City's systems are staying ahead of their service life and placing the City on its forefoot for maintenance and expansion needs. This W/WW Master Plan will serve as a planning tool for capacity assurance for the next 20 years of anticipated growth.

The goal of master planning is to:

1) Identify the potential limitations in the existing water distribution system, wastewater collection system, and their associate facilities.

2) Evaluate potential alternatives to alleviate these potential limitations.

3) Recommend an optimal solution that provides additional capacity to its respective system, minimize the needs for emergency repairs, address the City's developmental and budgetary needs.

As a planning tool, three planning horizons and their anticipated growths were considered. The three planning horizons are:

- Near Term (2028)
- Intermediate Term (2033)
- Long-Term (2043)

Near Term (2028) and Intermediate Term (2033) project growth rates and the associated system recommendations should be considered more accurate than the Long Term (2043) projections/recommendations. As this is intended to be a "Living" document, it is recommended that the City of Lockhart review/update this plan periodically (every 5 to 10 years or as significant developments occur) to compare actual growth rates against this study to refine growth rates, locations, etc. By periodically review capital improvement projects, the City can better project financial needs and plan to address those needs through updated impact fees, grant options, and bond options.

It is important to note that critical data and figures are shown repeatedly within the document. As this is a large document covering multiple utility systems and facilities, data/figures are relisted as necessary to provide context to relevant sections.

1.1 SCOPE

1.1.1 Task 1 – Project Coordination

One of the most important tasks for a successful project is starting the project coordination task from the start and maintaining continuous coordination between the City and TRC ensured the

project stayed on schedule, within budget, and in-line with the City's goals. Specific project coordination tasks included:

- Kickoff Meeting – After collecting an initial batch of sewer system data from the City, the project team conducted a kickoff meeting to review the project management plan, our proposed approach for handling data gaps, project schedule, and anticipated project deliverables. The kickoff meeting was also used as an opportunity to confirm the City's expectations and goals for successful project delivery.

- Internal Coordination Meetings – The TRC project team conducted weekly internal coordination meetings to make sure the parallel tasks, deliverables, and schedule remained in-line with the project management plan.

- Progress Reports – Monthly progress reports were submitted with invoices to summarize the ongoing project tasks, schedule, budget, outstanding issues, and status of deliverables.

- External Coordination – TRC conducted progress coordination with City staff.

1.1.2 Task 2 – Water Distribution Modeling and Evaluation of Potable Water System

The evaluation of the water distribution system used system demand, fire flow testing, SCADA data, and an existing hydraulic model that was improved/expanded through the use of as-builts and existing GIS data. The water model incorporated historic water demand, meter data (size and location), and SCADA data to represent real-world conditions, so it can confidently be used as a decision-support tool. A hydraulic model was used to evaluate the capacity of the system for existing and proposed demands, prioritize improvements using a systematic approach, and plan for long-term system sustainability. Specific tasks involved in the collection system evaluation include:

1.1.2.1 Infrastructure Data Collection and Analysis

In order to update the existing and ensure a functioning water distribution system model, several types of data were required, such as:

- Infrastructure data such as GIS files, as-builts, and survey data to develop the distribution network including locations, watermain depth, watermain diameter, etc.

- Operational data such as billing records, elevated storage tank levels, and historical treatment and fire flow data to ensure that the model results matches the field operation.

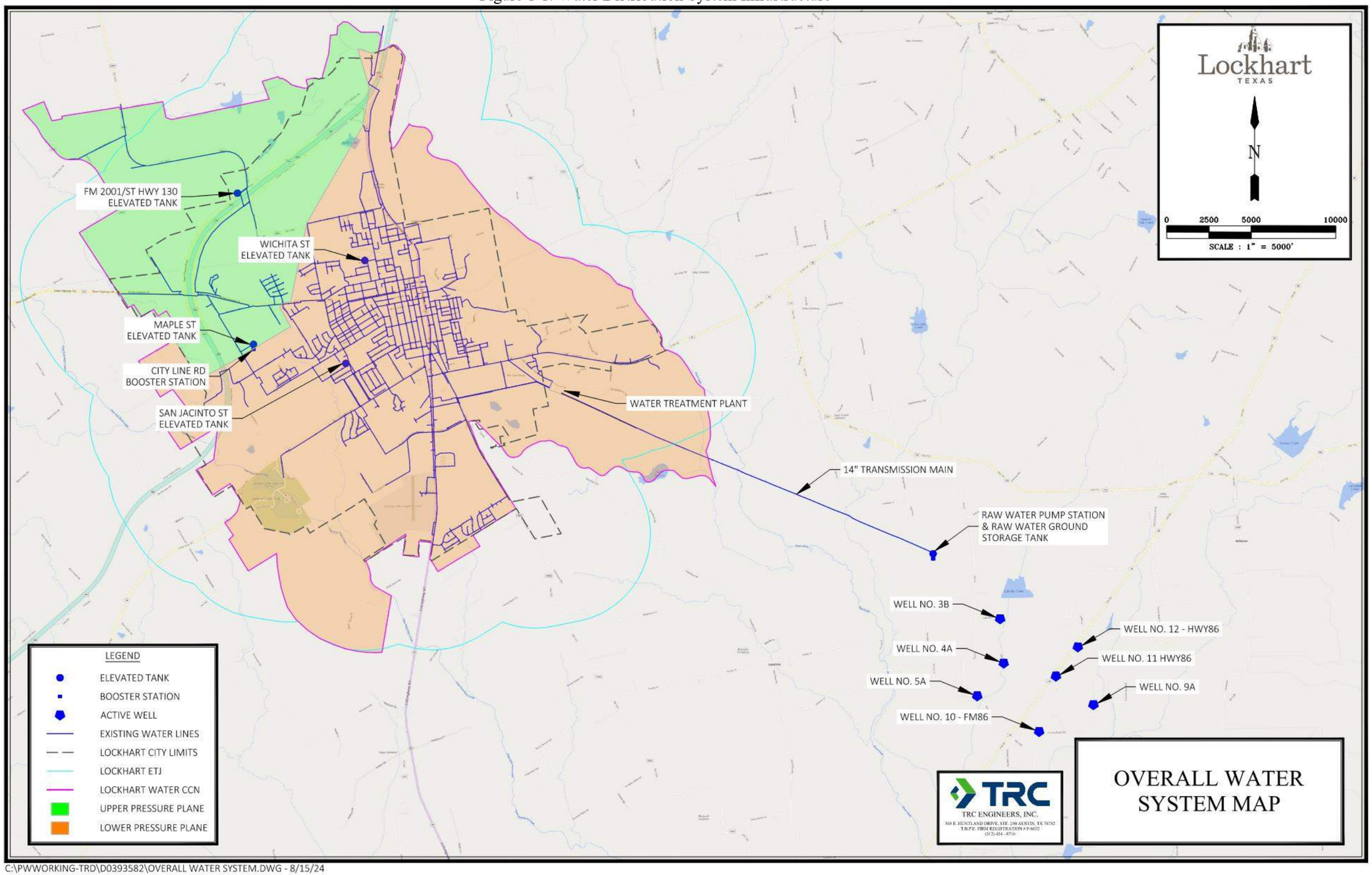
- Anecdotal data including knowledge of system issues such as high/low pressures, watermain burst, customer complaints, etc.

The TRC project team worked with City staff to obtain and review the readily attainable data to be used in developing, calibrating, and validating the hydraulic model. The remaining data gaps were identified and prioritized. Critical booster pump and elevated storage tank data was

incorporated using record drawings; minor neighborhood areas with missing infrastructure data were not included in the model and modeled as a point demand into the water mains.

See Figure 1-1 for water distribution system infrastructure and well locations.

Figure 1-1: Water Distribution System Infrastructure



1.1.2.2 Flow Projections

The development and placement of anticipated population growth and water demand due to that growth was an essential part in analyzing how the system performs under these changing demand conditions. Annual population growth was approximated to 4.25%, as proposed in the 2023 Roadway Impact Fee Program Update and approved by the City's Impact Fee Advisory Committee. The population projections were translated in LUE/capita and water demand (gpm) per living unit equivalents (LUEs). The City at the time of this master plan report has 5,295 active meters. See Table 1-1 for a breakdown of meters and LUEs for the City. The future water demands were defined by the three planning horizons: near-term (2023-2028), intermediate (2029-2033), and long-term (2034-2043).

Table 1-1: LUE Summary

Meter Size	Number Of Meters	LUEs Per Meter(S)	Number Of LUEs
3/4"	4,951	1.000	4,950
1"	157	1.667	262
1-1/2"	20	3.333	67
2"	131	5.333	699
3"	26	11.667	303
4"	10	20.000	200
TOTAL	5,295		6,481
Population			16,263
Population/LUE			2.51

1.1.2.3 Model Improvements, Calibration, and Validation

An existing, dynamic hydraulic model was developed previous by TRC for the City. This hydraulic model was updated using specialized modeling software (WaterCAD). As-builts, GIS data, survey data, and anecdotal data were collected and used to update infrastructure of the hydraulic model.

The water distribution model was calibrated and validated by adjusting to match historical daily peak flow records from the Water Treatment Plant High Service Pump Station (HSPS) and fire flow test results.

1.1.2.4 System Evaluation

The calibrated and validated model was used to evaluate the system performance under existing and future demand conditions for each planning horizon to develop capital improvement recommendations with the following tasks:

- Review of existing capital improvement projects

- The underperforming assets of the distribution system that result from the system evaluation were reviewed to develop capital improvement projects.
- Alternative improvements were reviewed for applicable underperforming assets.
- Opinion of probable construction costs and project triggers were developed for the recommended improvements.

1.1.3 Task 3 – Wastewater Collection System Modeling and Evaluation of Wastewater System

The evaluation of the wastewater collection system used flow monitoring and a hydraulic model developed by review as-builts, existing GIS data, and survey data. The City had not had a collection system hydraulic model developed prior to this study. The model incorporated flow monitoring results for both dry- and wet-weather conditions to accurately represent real-world conditions, so it can confidently be used as a decision-support tool. A hydraulic model was used to evaluate the capacity of the system for existing and proposed inflows, prioritize improvements, and plan for long-term system capacity assurance. Specific tasks involved in the collection system evaluation include:

1.1.3.1 Infrastructure Data Collection and Analysis

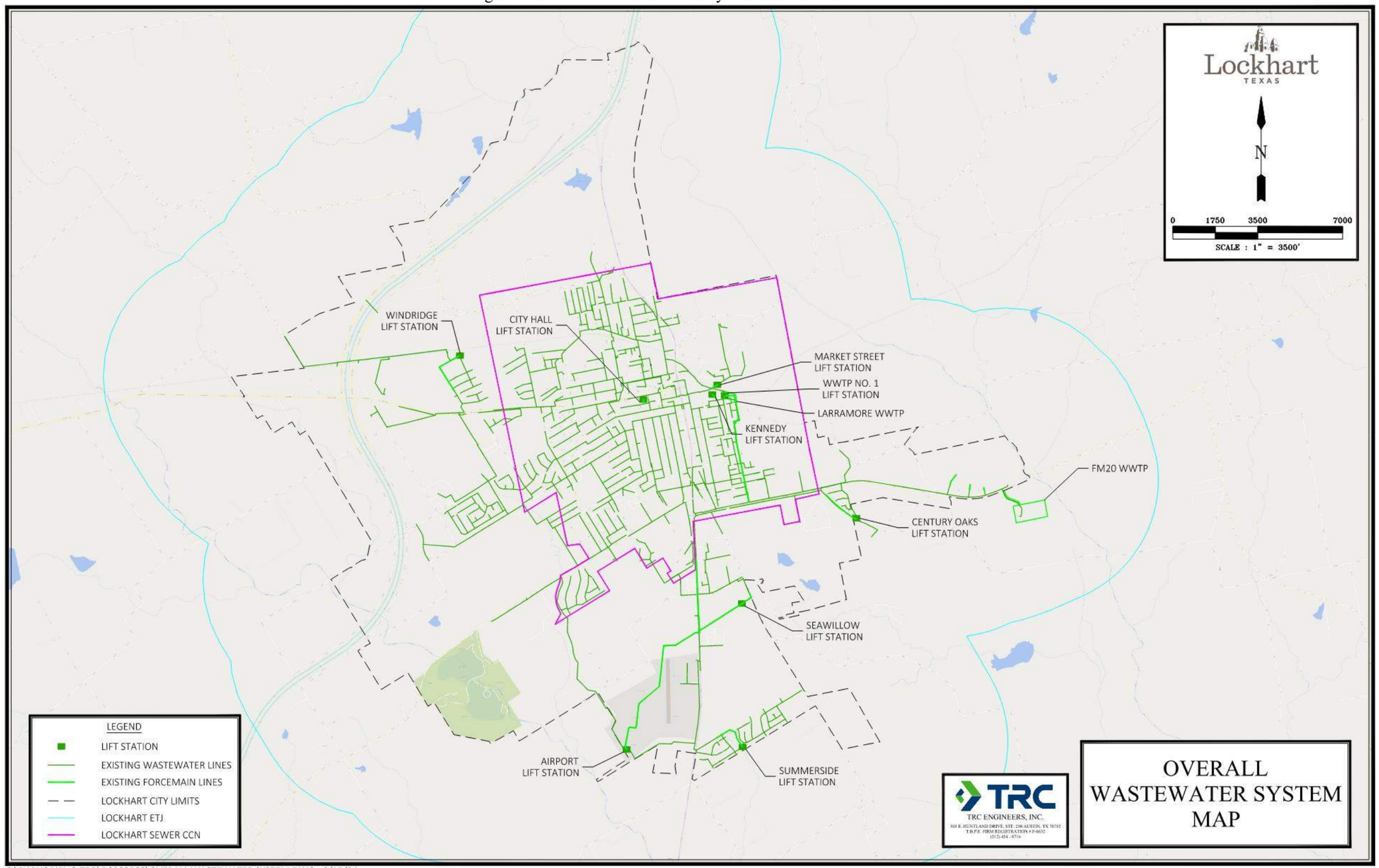
In order to develop a functioning and useful Wastewater Collection System Model, several types of data were required, namely:

- Infrastructure data such as GIS files, as-builts, and survey data to develop the sewer network including locations, inverts and dimensions for manholes, sewers, lift stations, and force main.
- Operational data such as flow monitoring results, billing records, SCADA data, treatment and collection data to ensure that the model response matches the field operation.
- Anecdotal data including knowledge of system issues such as surcharging manholes, sites experiencing frequent blockages, customer complaints, etc.

The TRC project team worked with City staff to obtain and review the readily attainable data to be used in developing, calibrating, and validating the hydraulic model. The remaining data gaps were identified and prioritized. Critical trunk main data was incorporated using record drawings; minor neighborhood areas with missing infrastructure data were not included in the model and modeled as a point flow into the trunk mains.

See Figure 1-2 for the City's wastewater collection system infrastructure.

Figure 1-2: Wastewater Collection System Infrastructure



1.1.3.2 Flow Monitoring/Flow Projections

The flow monitoring program included 10 monitors and 3 rain gauges for 4 months from late August through early December. Due to some flow monitor calibration issues, select monitors were redeployed through later December. Data was collected and sent to TRC on a hard drive. Depth, velocity, flow, and rainfall were recorded by the flow monitors during their deployments. The flow monitoring data analysis included:

- Identifying dry-weather periods
- Development of diurnal flow patterns for flow monitoring locations
- Identifying rainfall events for further analysis.
    - Optimally, the rainfall events were isolated (with at least 72-hours preceding dry conditions), large enough to show a system response and wide-spread so that all flow monitors and rain gauges experienced a response.
- Developed initial wet-weather system response hydrographs gpm that will be used as input to the hydraulic model.

The development and placement of anticipated population growth, and wastewater flows due to that growth was an essential part in analyzing how the system performs under these changing demand conditions. As noted in the water section, annual population growth is approximated to 4.25% as proposed in the 2023 Roadway Impact Fee Program Update and approved by the City's Impact Fee Advisory Committee. The wastewater flows were calculated as total flow (gpd)/capita, and projections were assumed to maintain this per capita relationship.

The future wastewater flows were defined by the three planning horizons:

- Near-term (2023-2028)
- Intermediate (2029-2033)
- Long Term (2034-2043)

1.1.3.3 Model Development, Calibration, and Validation

A dynamic hydraulic model of the collection system was developed using specialized modeling software (InfoWorks ICM). As-builts, GIS data, survey data, and anecdotal data were collected and used to build infrastructure of the hydraulic model.

Once infrastructure was inputted into the hydraulic model, the wastewater flows were equally distributed to all junctions (manholes) in each flow monitoring basin for dry-weather flows. Following initial calibration, wet-weather flows were then equally distributed to terminal (most upstream) nodes in each flow monitoring basin.

It is important during the calibration process to match not only flow but also velocity and depth. The calibration and validation process were performed as follows:

- Calibration
    - Diurnal Development and Dry Weather Calibration – Multiple dry-weather flow monitoring periods were selected. The dry-weather periods were preceded by 72 hours without rainfall. At each flow monitoring location, flow was averaged for every 15-min interval to create weekday/weekend diurnal patterns. Outliers of flow data were removed using the quartile method with a standard multiplier of 1.5. The modeled flows at flow monitoring locations were compared to the developed diurnals for agreement on flow volume and peak flow.
    - Wet Weather Calibration – Multiple rainfall events were selected from the flow monitoring period to use for model calibration. Wet weather events were ideally proceeded by 72 hours of dry-weather conditions. The modeled wet-weather flows at the monitoring sites were compared to the actual flow monitoring data for comparison of flow volumes, flow peaks, times of peak, and flow velocities and depths.
        - The initial RTK parameters that were developed in flow monitoring analysis were adjusted to bring the model into a better agreement with the average response displayed by the selected events.
- Validation
    - Independent dry-weather and wet-weather periods were identified that were not used for calibration. The resulting modeled flows were compared to the flow monitoring data to validate that the calibrated model reasonably replicates the measured system flow characteristics.

1.1.3.4 System Evaluation

The calibrated and validated model was used to evaluate the system performance under existing and future flow conditions for each planning horizon to develop capital improvement recommendations with the following tasks:

- Review of existing capital improvement projects
- Development of a design rainfall event was proposed and approved by City for the system evaluation and master planning.
- The underperforming assets of the collection system that result from the system evaluation were reviewed to develop capital improvement projects.
- Alternative improvements were reviewed for applicable underperforming assets.
- Opinion of probable construction costs and project triggers were developed for the recommended improvements.

1.1.4 Task 4 – W/WW Facilities Evaluation

The evaluation of the City's wells, Water Treatment Plant, and Wastewater Treatment Plants was conducted through series of site visits, as-built reviews, flow diagrams, and discussion with the City staff and plant operators. Flow/Demand projections that were developed previously were utilized in this section. The collected data and flow projections were used to evaluate the capacity of these facilities and plan for long-term system capacity assurance.

1.1.5 Task 5 – Capital Improvements Plan

A comprehensive W/WW Master Plan report consolidates the final version of the technical sections. The sections include information showing the methods and assumptions for the evaluations, summaries of the analyses with results, conclusions, and recommendations. This report documents the existing systems' ability to meet the performance objectives as well as the impact of future growth and the required improvements to maintain a high standard of service.

A project trigger approach is included to provide an alternative to flow projection-based project implementation. Project triggers involve the monitoring of system parameters such as HSPS demand, pump runtimes, dry weather flow, wet well depths, or similar and comparing them to predetermined targets for initiation of projects.

2.0 POPULATION AND FLOW PROJECTIONS

This section presents the background, methodology, and results of the population and water/wastewater flow projections.

2.1 POPULATION PROJECTIONS

Annual population growth is approximately 4.25% as proposed in the 2023 Roadway Impact Fee Program Update and approved by the City's Impact Fee Advisory Committee. Between 2000 and 2010 the average annual growth rate was approximately 0.74%, and between 2010 and 2023 the average annual growth rate was approximately 1.70%. While significantly higher than historical growth, anticipated/approved development and city growth projections show that a 4.25% percent growth rate should be feasible and reasonable for planning purposes within this study. See Figure 2-1 for historical population growth and projections.

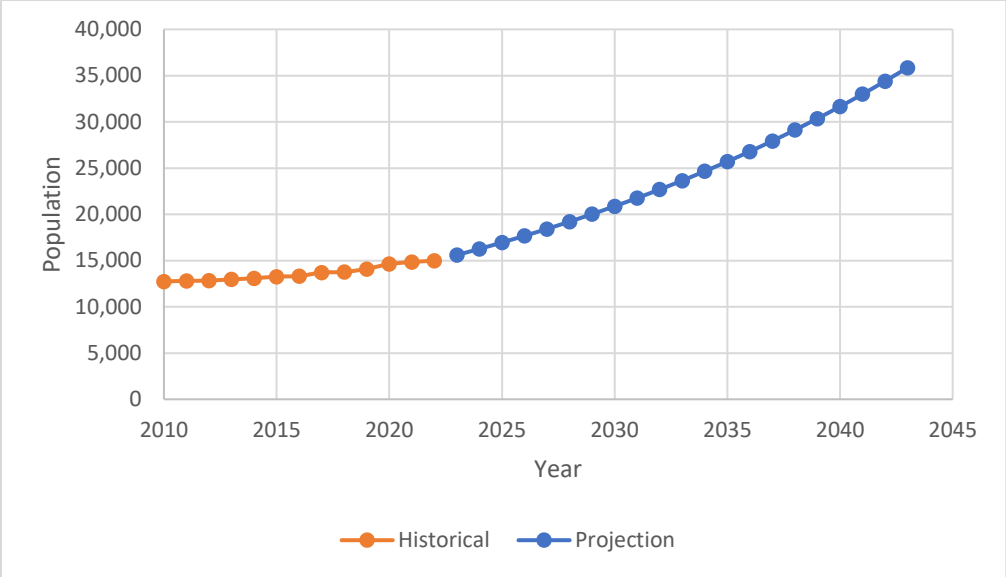


Figure 2-1: Population Projections

Planned residential developments that are to be developed in the next five (5) years were reviewed to ensure compliance with the 4.25% growth rate. To assess residential developments, the developments impact on the City's total Equivalents (LUEs) count was reviewed. LUEs are the unit for the standardization for the typical water/wastewater flow produced by a single-family residence. Water meter sizes can be used as a basis for LUE calculations and are commonly accepted in impact fee calculations as performed in the 2023 W/WW Impact Fee Analysis. Table 2-1 shows the current number of meters and LUE estimations based on meter size.

Table 2-1: Current Meter Count and LUE Estimate

Meter Size	Number Of Meters	LUEs Per Meter(S)	Number Of LUEs
3/4"	4,951	1.000	4,951
1"	157	1.667	262
1-1/2"	20	3.333	67
2"	131	5.333	699
3"	26	11.667	303
4"	10	20.000	200
TOTAL	5,295		6,481
Population			16,263
Population/LUE			2.51

The City provided data for residential developments in January 2024 along with their associated unit counts and type (single-family residential, multi-family residential, commercial, industrial.) Figure 2.2 shows development locations. Based on these unit types and counts, LUE estimates were calculated and shown in Table 2-2. These development LUEs are in line with the City's growth projections over the next five years. As discussed in Sections 2.2 and 2.3, point demands/flows were generated based on LUE counts for each development and applied within the hydraulic models to review current system capacity and necessary capital improvements to handle system-wide demand/flows.

At the time of this master plan submission to the City, a large-scale development has just been approved on Seawillow Rd. This development will contribute ~2,676 LUEs or have a total water demand of ~1.9MGD and a total sewer demand of ~0.45MGD by 2034. If the development is construction along in current phasing plan and LUE count, then projects W-31, S-22, S-31, S-32, and S-39 will be impacted. Sizing of the associated W/WW assets and schedule for capital improvement projects may change because of this development, if fully developed along current proposed phasing. As construction progress, the City can utilize the Project Rationale/Trigger sections of the respective capital improvement projects to assess when the correct time for each project is. As noted in Section 1.15, the project trigger approach was included to provide criteria for monitoring, such that the City doesn't depend on the planning horizon year for capital improvement project implementation, rather the City can determine when projects are needed based on ever-changing real-world conditions. Should any other developments be approved, or other system changes occurs, the project triggers will remain applicable.

As the City reviews other developments to assess potential impacts on the W/WW systems, it is recommended to reference the Master Plan and capital improvement projects and their associated project triggers.

Figure 2-2: Approved Developments

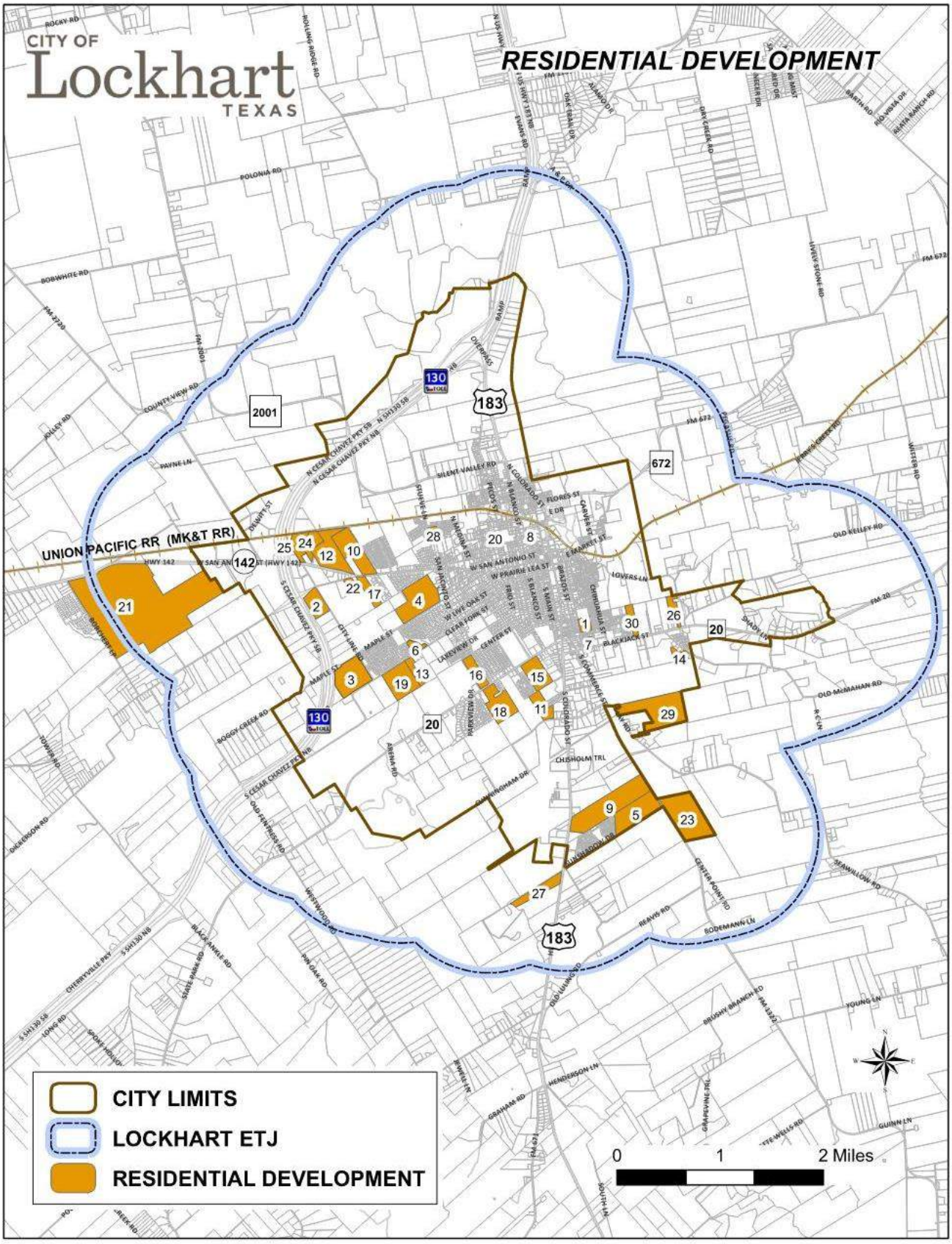


Table 2-2: Approved Developments Summary

MAP KEY	SUBDIVISION NAME	NUMBER OF LUE'S
1	Jesco Subdivision	33
2	CenterPoint Meadows	121
3	Maple Park Section 3A	57
4	Vintage Springs Subdivision PDD Section 1A	53
4	Vintage Springs Subdivision PDD Section 1B	26
4	Vintage Springs Subdivision PDD Section Two	110
4	Vintage Springs Subdivision PDD Section Three	70
5	Summerside Subdivision Section 3-A	85
5	Summerside Subdivision Section 3-B	77
5	Summerside Section 4	109
8	Main Springs PDD	9
9	Summerside Section 5	27
9	Summerside Section 6	117
10	Hansford Subdivision Phase 1	114
10	Hansford Subdivision Phase 2	99
12	Lockhart Farms Addition Phase 1	1
12	Lockhart Farms Addition Phase 2	146
14	Alta One Subdivision	30
17	Kelley Villas PDD	320
25	Lockhart Gateway Addition Replat, Lot 2, Block 1	172
	Total	1,775

2.2 WATER DEMAND PROJECTIONS

The monthly and yearly water flow from the high service pump station for the City over the past six (6) years are shown in Table 2-3. The average and peak demands over the previous 5 years are 1.49 MGD and 2.90 MGD or 96.47 gallons per day (gpd) per capita and 154.94 gpd per capita, respectively.

Table 2-3: Historic HSPS Flows

2018		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.45	1.63
February	1.36	1.50
March	1.43	1.79
April	1.45	1.59
May	1.61	1.89
June	1.80	2.07
July	1.85	2.21
August	2.04	2.26
September	1.47	2.04
October	1.35	1.49
November	1.34	1.41
December	1.32	1.44
Average	**1.54**	
Maximum		**2.26**

2019		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.36	1.50
February	1.34	1.41
March	1.40	1.55
April	1.39	1.51
May	1.40	1.58
June	1.43	1.67
July	1.65	1.98
August	1.85	2.14
September	1.70	1.94
October	1.55	1.90
November	1.40	1.63
December	1.39	1.50
Average	**1.49**	
Maximum		**2.14**

2020		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.35	1.49
February	1.35	1.53
March	1.39	1.50
April	1.43	1.73
May	1.51	1.68
June	1.55	1.82
July	1.86	2.20
August	1.92	2.12
September	1.41	1.87
October	1.53	1.89
November	1.51	1.73
December	1.38	1.56
Average	**1.52**	
Maximum		**2.20**

2021		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.34	1.46
February	1.70	2.52
March	1.29	1.54
April	1.46	2.55
May	1.14	1.63
June	1.29	1.56
July	1.18	1.36
August	1.26	1.50
September	1.42	1.63
October	1.18	1.34
November	1.19	1.32
December	1.17	1.31
Average	**1.30**	
Maximum		**2.55**

2022		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.25	1.51
February	1.36	1.71
March	1.38	1.62
April	1.44	1.67
May	1.39	1.62
June	1.59	1.91
July	1.84	2.13
August	1.73	2.00
September	1.57	2.06
October	1.52	1.71
November	1.39	1.54
December	1.43	2.17
Average	**1.49**	
Maximum		**2.17**

2023		
Month	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)
January	1.35	1.61
February	1.32	1.47
March	1.43	1.73
April	1.33	1.73
May	1.29	1.44
June	1.59	2.67
July	1.93	2.17
August	2.20	2.45
September	2.12	2.90
October	1.65	2.01
November	1.48	1.66
December	1.49	1.62
Average	**1.60**	
Maximum		**2.90**

Per Capita demands were used to translate the growth projections discussed in Section 2.1 into water demand and can be viewed in Table 2-4.

Table 2-4: Water Demand Projections

Planning Horizon	Year	Population	Water Service Connections	Average Water Demand Projections (MGD)	Peak Water Demand Projections (MGD)
Existing	2023	16,263	5,333	2.77	3.16
Near-Term	2028	20,026	6,911	3.41	3.89
Intermediate-Term	2033	24,659	8,513	4.20	4.79
Long-Term	2043	37,388	12,913	6.36	7.26

2.3 WASTEWATER FLOW PROJECTIONS

From August 2023 till early December 2023 and late December 2023, for select flow monitors, ten flow monitors and three rain gauges were installed within City's wastewater collection system, see Figure 4-1 for monitor and rain gauge locations. Flow monitoring results were analyzed and reviewed against influent flows to the City's two wastewater treatment plants, Larremore and FM20 plants. Historical wastewater flow records to each wastewater treatment plant are shown in Table 2-5.

Table 2-5: Historic Wastewater Flow

Average Daily Demands (MGD)															
Year	Demands For Each Plant	January	February	March	April	May	June	July	August	September	October	November	December	Average ADF	Maximum ADF
2018	Larremore	0.30	0.30	0.38	0.31	0.34	0.35	0.35	0.42	0.39	0.41	0.32	0.44	0.36	0.44
	FM 20	0.69	0.73	0.81	0.75	0.75	0.71	0.70	0.63	0.68	0.63	0.45	0.55	0.67	0.81
	Total	**0.99**	**1.02**	**1.19**	**1.06**	**1.10**	**1.06**	**1.05**	**1.05**	**1.07**	**1.04**	**0.76**	**0.99**	**1.03**	**1.19**
2019	Larremore	0.42	0.33	0.34	0.38	0.44	0.45	0.37	0.38	0.37	0.36	0.33	0.33	0.37	0.45
	FM 20	0.52	0.52	0.56	0.67	0.69	0.76	0.67	0.70	0.66	0.65	0.60	0.59	0.63	0.76
	Total	**0.94**	**0.85**	**0.90**	**1.06**	**1.13**	**1.21**	**1.03**	**1.07**	**1.04**	**1.01**	**0.93**	**0.91**	**1.01**	**1.21**
2020	Larremore	0.33	0.30	0.37	0.37	0.43	0.38	0.41	0.37	0.39	0.34	0.34	0.35	0.36	0.43
	FM 20	0.62	0.61	0.68	0.72	0.78	0.65	0.64	0.62	0.72	0.63	0.63	0.63	0.66	0.78
	Total	**0.94**	**0.92**	**1.04**	**1.09**	**1.21**	**1.03**	**1.05**	**0.99**	**1.10**	**0.97**	**0.97**	**0.98**	**1.02**	**1.21**
2021	Larremore	0.33	0.43	0.34	0.39	0.53	0.40	0.47	0.37	0.35	0.41	0.36	0.34	0.39	0.53
	FM 20	0.64	0.67	0.59	0.69	0.93	0.77	0.91	0.67	0.70	0.80	0.66	0.64	0.72	0.93
	Total	**0.97**	**1.10**	**0.93**	**1.08**	**1.45**	**1.17**	**1.38**	**1.04**	**1.05**	**1.21**	**1.02**	**0.98**	**1.11**	**1.45**
2022	Larremore	0.33	0.38	0.41	0.40	0.40	0.42	0.38	0.40	0.41	0.38	0.37	0.42	0.39	0.42
	FM 20	0.67	0.74	0.72	0.61	0.59	0.61	0.61	0.65	0.61	0.60	0.65	0.73	0.65	0.74
	Total	**1.00**	**1.11**	**1.13**	**1.01**	**0.99**	**1.03**	**0.98**	**1.05**	**1.02**	**0.98**	**1.02**	**1.15**	**1.04**	**1.15**
2023	Larremore	0.40	0.42	0.40	0.43	0.46	0.43	0.42	0.42	0.41	0.41	0.37	0.37	0.41	0.46
	FM 20	0.60	0.65	0.65	0.68	0.71	0.66	0.61	0.65	0.66	0.73	0.69	0.68	0.66	0.73
	Total	**1.01**	**1.07**	**1.04**	**1.11**	**1.17**	**1.09**	**1.04**	**1.07**	**1.07**	**1.14**	**1.06**	**1.05**	**1.08**	**1.17**
2024	Larremore	0.49	0.41	0.40	-	-	-	-	-	-	-	-	-	0.43	0.49
	FM 20	0.94	0.94	0.68	-	-	-	-	-	-	-	-	-	0.86	0.94
	Total	**1.43**	**1.36**	**1.08**	-	-	-	-	-	-	-	-	-	**1.29**	**1.43**

Historic wastewater flows were analyzed to produce an average flow distribution (%) between WWTP No. 1 – Larremore and WWTP No. 2 – FM20, 37% and 63% respectively. To generate future projections of wastewater flow, total flow per capita was generated, assumed to remain constant for each planning horizon, and total flow was split according to the average flow distribution. Wastewater projections can be viewed in Table 2-6. Wet-weather responses were assumed to remain a constant response throughout the planning horizons. Wet-weather flow is not provided below as it will vary based on the rainfall event and can be reduced through remedial actions by the City.

Table 2-6: Population and Wastewater Projections

Planning Horizon	Year	Population	WWTP No. 1 - Larremore Dry-Weather Flow (MGD)	WWTP No. 2 - FM20 Dry-Weather Flow (MGD)	Total Dry-Weather Flow (MGD)
Existing	2023	16,263	0.41	0.66	1.08
Near-Term	2028	20,026	0.56	0.96	1.52
Intermediate-Term	2033	24,659	0.69	1.18	1.87
Long-Term	2043	37,388	1.05	1.79	2.84

3.0 WATER DISTRIBUTION SYSTEM EVALUATION

This section presents the background, methodology, and results of the City of Lockhart's water distribution system evaluation. The evaluation addressed system demand/capacity and TCEQ requirements.

The demand/capacity evaluation was performed to identify capital improvements necessary to meet current and/or projected water demands to the City's customers. To evaluate the water distribution system, the City's existing hydraulic model was reviewed and updated using data from as-builts, GIS, and system knowledge provided by the City. HSPS production, fire flow, and SCADA data were collected and used to calibrate/validate the distribution system model. The model was calibrated/validated to this data such that the model accurately depicts real-world conditions and confidently be used as a decision-support tool for planning purposes. Proposed capital improvements are presented in Table 3-1 and Appendix A.

3.1 WATER DISTRIBUTION MODEL

The existing water distribution hydraulic model was developed in the Water CAD software program.

3.1.1 Model Development

The existing model infrastructure was reviewed against available GIS data, as-builts, SCADA data, and pump curves provided by the city. Watermains, elevated storage tanks, and the booster pump station that were not in the existing model were added based on available data.

All watermains were evaluated for connectivity to establish the interconnectivity of the distribution system and its facilities. For areas with data gaps or potentially erroneous data existed, the areas were prioritized by their relative importance for model development and reliability. For example, if there was minimal available information about a small neighborhood with minimal connections, then this area was deactivated or removed from the model. These areas can be reactivated or added back into the model when more information is available and/or required for a separate analysis. If data was missing from a large water main or critical asset, then the area/asset was sent to the City requesting more information. If more information was not available, then survey was utilized.

The City has two pressure zones, an upper and lower zone, that is separated by the Booster Pump Station by the West Elevated Storage Tank and a pressure regulating valve (PRV) on W. San Antinio St., see Figure 1-1. Over the future planning horizons, the boundaries of these zones will change with the addition of water mains and PRVs.

To simulate existing peak flows/demands within the distribution system, a present-day scenario was established in the model. Existing facilities such as the Water Treatment Plant, HSPS, booster station, four elevated storage tanks, and interconnecting lines ranging from 1-inch to 12-inches diameter. Initial operational systems (i.e. pump curves, pump controls, etc..) were obtained by the City and through records from previous TRC projects.

Current system demands were implemented by using spatial water meter data collected by the City and converted into the form of Living Unit Equivalents (LUE's). A standard ¾" meter is equivalent to 1 LUE, or a peak demand of 155gpd per the 2023 W/WW Impact Fee Analysis. Please see Table 1-1: LUE Summary for LUE equivalencies for various types of meters. Each meter was assigned a specific junction, typically closest junction, in the model. For each junction, the number of LUEs were totals and multiplied by the peak demand per LUE (155gpd per LUE).

As water usage rates vary based on season, day of week, and land usage, a diurnal pattern is necessary to account for these temporal changes. In this instance, a diurnal pattern is a pattern that occurs every 24 hours. The AWWA Diurnal Pattern was applied to each of the demand junctions, please see Figure 3-1. The AWWA Diurnal Pattern is a multi-land use demand curve developed based on average day flows within a typical city. To enable the WaterCAD to analysis water usage over a timeframe, the diurnal pattern and demands were modeled through Extended Period Simulation (EPS) of 96 hours.

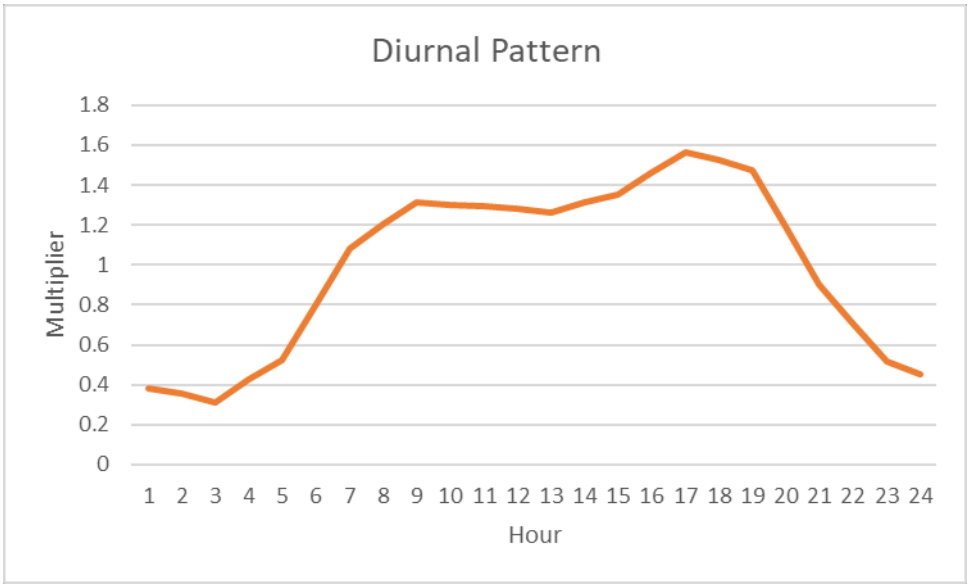


Figure 3-1: AWWA Diurnal Pattern

To calibrate the existing scenario (2023), SCADA data of the elevated storage tanks and fire flow test results were utilized to adjust model operation settings, such as friction coefficient, pump controls, etc. A fire flow test report and elevated storage SCADA data was provided by the City in January 2024. Comparing pressures from the in-field data to the modeling pressures, the operational settings can be adjusted to fine tune the results to closely resemble the field data. See Table 3-1 for examples of fire flow testing calibrations.

Table 3-1: Examples of Fire Flow Testing Calibration for Static Pressures

Hydrant Location	Fire Flow Pressure (psi)	Model Pressure (psi)	Difference (%)
2210 W San Antonio St. at City Line Rd Lockhart, TX 78644	64	67	5
100 N Blanco St. at W San Antonio St. Lockhart, TX 78644	54	59	9
808 N Commerce St. at Flores St. Lockhart, TX 78644	64	64	0
707 N Commerce St. at Reynolds St. Lockhart, TX 78644	64	67	5
1011 Silent Valley Rd at Meadow Ln Lockhart, TX 78644	46	47	2
300 Windridge Dr. at Monte Vista St. Lockhart, TX 78644	68	67	1

As discussed in Section 2.0 – Population and Flow Projections, the distribution system hydraulic model was built with four planning horizons: 2023 (Existing), 2028 (Near-Term), 2033 (Intermediate), & 2043 (Far-Term). In addition, three scenarios were established for each of the planning horizons, Average Day, Peak Day, and Fire Flow. Average Day scenario models the demands in the system during the average demand of a typical day. Peak Day models the system under peak demand, excluding fire flow or irregular events, such as water main breaks. Fire flow scenario models the system to ensure it meets TCEQ requirement 30 TAC Subsection 290.46(x)(4), which states that any fire hydrant connected to any public utility's water system in a residential area must be able to receive at least 250 gallons per minute for a minimum period of two hours while maintaining a minimum pressure of 20 psi during emergencies such as firefighting.

In the 2023 City of Lockhart W/WW Impact Fee Report, Capital Improvement Plan (CIP) projects were recommended to help sustain future development. These projects were added in the model phased at different planning years, as discussed with the City. To project future populations, a growth rate of 4.25% was used to project the population up until 2043. By dividing the population count by number of LUE's in the system, a factor can be developed and applied to the demand according to the planning year. Once demands are inputted, a hydraulic simulation can begin to determine pressures, velocities, status of operations, failures, etc.

An overview of the hydraulic model developed for the City's water system is shown in Figure 3-2.

Figure 3-2: Water Distribution Hydraulic Model Skeleton

3.2 WATER SYSTEM EVALUATION & FINDINGS

Water System evaluations were conducted under the Peak Demand and Fire Flow scenarios for all planning horizons. By evaluating the system conditions under the peak demand conditions, solutions that would be implemented can be assumed to resolve limitations in the average demand scenario as well.

The evaluation criteria for identifying areas of limited capacity were defined as watermains that were unable to maintain a minimum of 35 psi, per 30 TAC Subsection 290.45 (a)(2), and meet current/projected demands under peak conditions and watermains that were unable to maintain a minimum of 20 psi and supply of 250 gpm for a minimum of 2 hours and meet current/projected demands under peak demands with fire flow conditions, per 30 TAC Subsection 290.45 (a)(2).

Beginning with the existing 2023 scenario, the distribution system is able to meet all peak demands and provide sufficient fire flow to meet TCEQ standards.

In the 2028 planning horizon, the system was modeled with a projected total peak demand of 2,702 gpm (3.89 MGD). In 2024, the Water Treatment Plant High Service Pump Station saw the installation of 2 new high service pumps and the removal of one jockey pump. This modification to the pump station was reflected in the 2028 planning phase scenario. In addition to the in-progress installation of the high service pumps, 10 capital improvement projects (CIP) from the 2023 W/WW Impact Fee Analysis that are anticipated to in service by 2028, as indicated by the City, have been included in the water distribution system model. These projects are shown in Appendix A – Water Distribution System CIP Exhibits. The system did see an increase of pressure in the Southeast portion of the system near the Wastewater Treatment Plant with peak pressures reaching as high as 95 psi. The distribution system model was provided stable results and met all TCEQ guidelines with no need for further improvements.

In the 2033 planning horizon, the system was modeled with a projected total peak demand of 3,327 gpm (4.79 MGD). To expand upon the infrastructure of the 2028 planning horizon, 20 CIP from the 2023 W/WW Impact Fee Analysis are anticipated to need installation by 2033, as indicated by the City. After initial review of this infrastructure setup, the Cesar Chavez, San Jacinto, and West elevated storage tanks were not refilling every 24 hours. To enable the tanks to refill properly, pressure reducing valve's operational setting were changed from 50 psi to 40 psi. Of the 20 CIP, majority are dependent on growth of the customer basis into current and new areas; however, the addition of a new elevated storage tank is needed. This additional storage tank need is driven by 30 TAC Subsection 290.45 (b)(1)(D)(iv), which requires 200 gallons per connection of elevated storage if the City desires to maintain its minimum combined capacity of 0.6 gpm per connection at the HSPS. To maintain this standard, the elevated storage tank must be online by the time the City has a total water service connections greater than or equal to 7,750 connections. As discussed, the City must provide a minimum combined capacity of 0.6 gpm per connection. An additional 1,200 gpm high service pump will need to be online by the time the City has a total water service connections greater than or equal to 8,000 connections.

In the 2043 planning horizon, the system was modeled with a projected total peak demand of 5,044 gpm (7.26 MGD). Due to the high demand, the HSPS was unable to meet system demand and

allow the elevated storage tanks to refill every 24 hours. Therefore, an additional 1,200 gpm high service pump will need to be online by the time the City has a total water service connections greater than or equal to 10,000 connections. Once the City has a total water service connections greater than or equal to 12,000, the system would fail to meet 0.6 gpm per connections requiring an additional pump; however, TAC Subsection 290.45 (b)(1)(D)(iii) also states no additional high service pumps are needed if Peak Hourly Demands can be met with the largest pump out of service (also known as Firm Capacity) which is currently being met with the two (2) proposed high service pumps. This will also allow the Elevated Storage capacity to drop to 100 gallons per connection rather than 200 gallons per connection, allowing the City to not require additional tanks as well.

The model's fire flow analysis tested junctions rather at the intersection of every water main rather than hydrants within the model. During the evaluation of all planning horizon, some junctions did fail the fire flow test criteria; however, the junctions were terminal and/or connected to a service line. While these junctions are outside the scope of this study, their failure doesn't impact the City's ability to meet TCEQ requirements to provide adequate fire flow to all regions of the City. Review of available hydrant location data and survey of hydrants was outside the scope of this study. This methodology for fire flow testing is widely utilized, as the resources and time needed to review drawings and complete survey often outweigh the slight increase in accuracy of the fire flow analysis.

While not needed to meet local, state, or federal requirements, it is recommended that the City begin reviewing existing small diameter (6" and less) water main criticality and likelihood of failure to identify critical areas for upsizing to the City of Lockhart's current construction standard of 8". This is a preventative step to enable the City to remain on the forefoot for maintenance purposes. The cost provided for this project assumes all watermains less than 8" are to be replaced. A study examining water main criticality, likelihood of failure, and projected life span would enable the City to prioritize watermains of concern and reduce total scope/cost of watermain replacement. View Figure 3-4: Undersized Water Mains for W-36 to see the extent of water mains that are 8" or less.

All capital improvement projects are shown in Figure 3-3 Water CIP Overview. CIP descriptions, project rationale/trigger, and cost estimates can be viewed in Appendix A – Water Capital Improvement Plan.

3.3 WATER SYSTEM RECOMMENDATIONS

In addition to capital improvements planned in the 2023 W/WW Impact Fee analysis to support planned growth/development in the City, under performing assets within the existing and future model scenarios were identified and improvement alternatives were developed to remediate the issues. The results of the existing and future system evaluations were used to develop a list of distribution system improvements for near-term (2023-2028), intermediate (2029-2033), and long-term (2034-2043) planning horizons in Table 3-2.

A Class IV opinion of probable construction cost (OPCC) was developed for each capital improvement project. A Class IV estimate is for planning/feasibilities studies and meant to be used

for strategic planning purposes. A Class IV 4 cost estimate accuracy range is -30% to +50%. All costs are in 2024 numbers and include cost for contingency and engineering/surveying.

The City has applied for an Alternative Capacity Requirement (ACR) Variance to provide more time to get the City's pumping capacity within TCEQ compliance considering all approved developments. The City received approval of this variance request on July 23rd, 2024. The letter of approval from TCEQ with specifications on new ACR can be viewed in Appendix F.

The approved ACR variance does not have a defined length of the variance period. Based on this undefined length, it is recommended for the City to proceed with all capital improvements as planned and noted in the document. This will allow the City to remain ahead of any compliance needs and provide optimal service for all utility customers.

Figure 3-3: Water Distribution System Projects

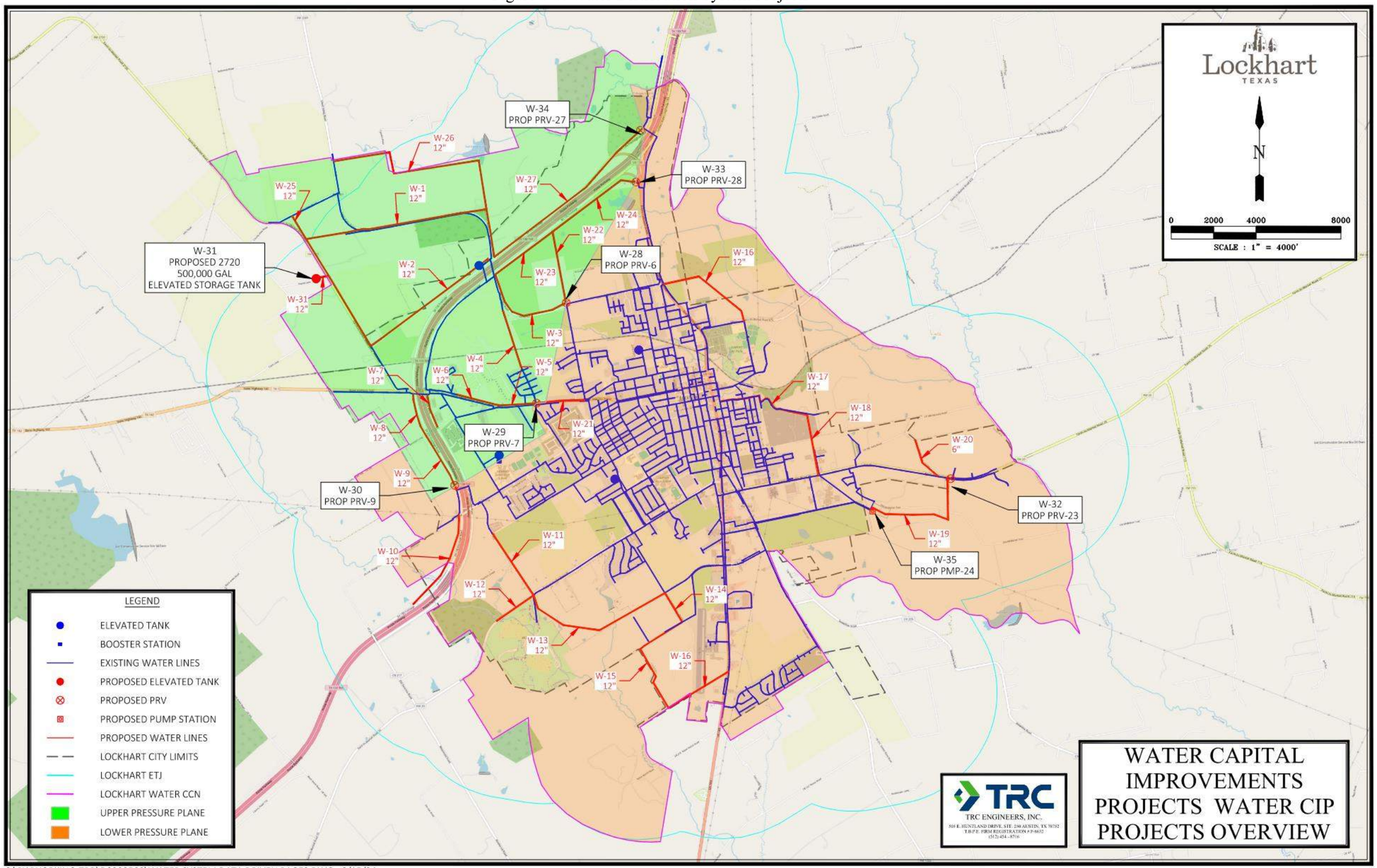


Table 3-2: Recommended Water Distribution System Projects by Planning Horizon

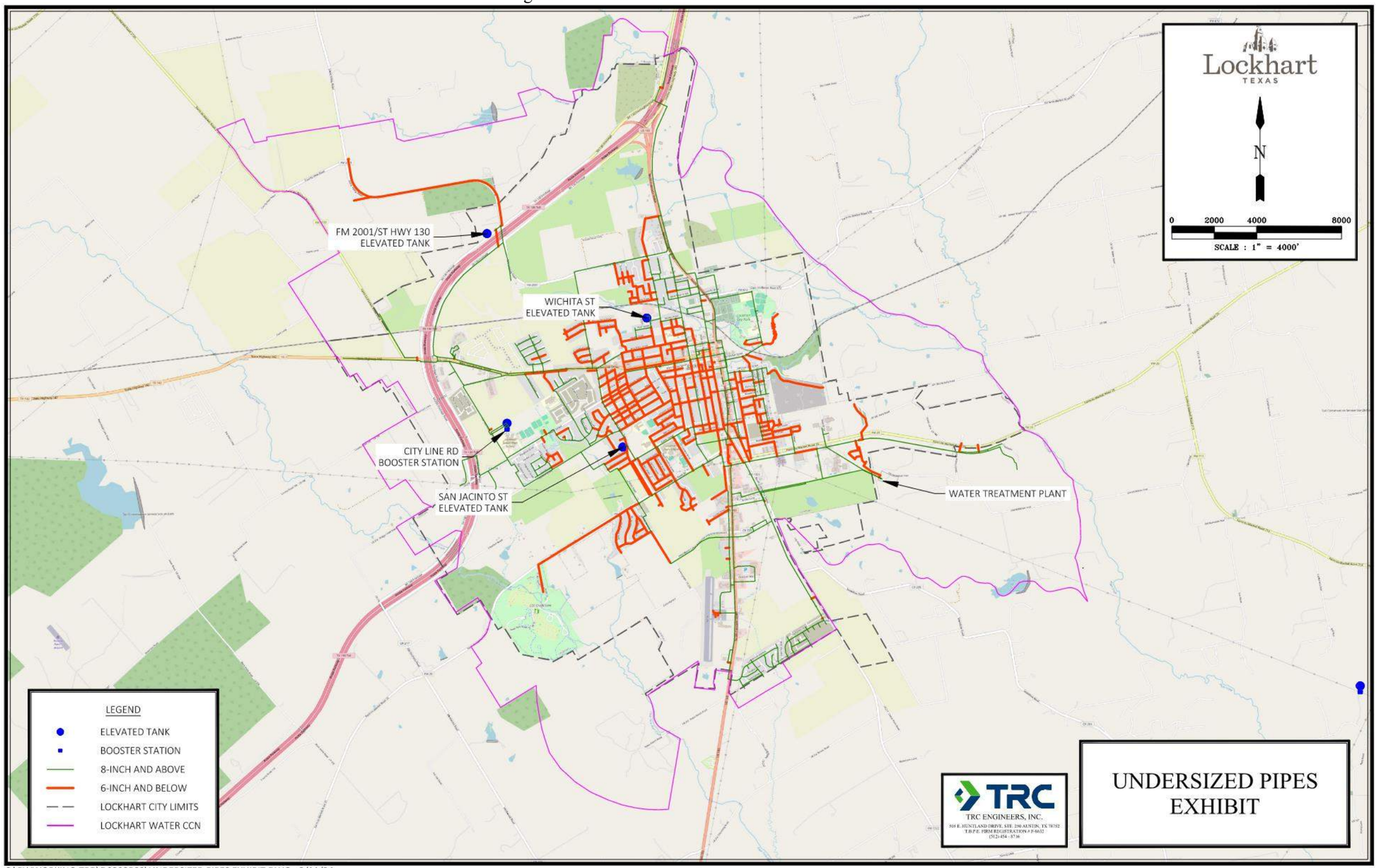
Project ID	Planning Horizon	Description	Cost	Project Trigger
W-1	2028	Install 14,600 Feet of 12" pipe from Hidden Path Road to 2720	$3,307,000	Increased development in the Industrial Park Area or Upper pressure zone or Total Water Connections within Distribution System ≥ 7,750
W-2	2028	Install 6,950 Feet of 12" pipe along the West side of SH 130	$1,506,000	Increased development in West San Antonio St.
W-3	2028	Install 4,700 Feet of 12" pipe along Silent Valley Road from SH 130 to Stueve Lane	$1,029,000	Increased development in upper pressure zone
W-4	2028	Install 2,700 Feet of 12" pipe from Silent Valley Road to N Mockingbird Lane	$646,000	Increased development in upper pressure zone
W-7	2033	Install 1,600 Feet of 12" pipe from W San Antonio Street to Borchert Loop on the E side of SH 130	$369,000	Development on City Line Road and Borchert Drive
W-8	2033	Install 2,100 Feet of 12" pipe from W San Antonio Street to Borchert Drive on the W side of SH 130	$667,000	Increased development in the upper pressure zone on SH 142 and Borchert Loop
W-9	2033	Install 3,000 Feet of 12" pipe from Borchert Drive to Maple Street on the W side of SH 130	$671,000	Increased development in the upper pressure zone on SH 142 and Borchert Loop
W-10	2033	Install 5,000 Feet of 12" pipe S of Maple Street on the W side of SH 130	$1,093,000	Increased development in the lower pressure zone
W-11	2033	Install 3,450 Feet of 12" pipe from City Line Road to State Park Road	$760,000	Increased development in the lower pressure zone and to loop system
W-12	2033	Install 1,950 Feet of 12" pipe along State Park Road	$436,000	Increased development in the lower pressure zone and to loop system
W-13	2033	Install 7,200 Feet of 12" pipe from State Park Road. to W Martin Luther King Jr Industrial Boulevard.	$1,536,000	Increased development in the lower pressure zone and to loop system

Project ID	Planning Horizon	Description	Cost	Project Trigger
W-14	2033	Install 1,700 Feet of 12" pipe along Cunningham	$386,000	Increased development in the lower pressure zone and to loop system
W-15	2033	Install 9,200 Feet of 12" Pipe S. of Cunningham	$1,996,000	Increased development in the lower pressure zone and to loop system
W-16	2033	Install 4,900 Feet of 12" Pipe from N. Colorado to FM 672	$1,057,000	Increased development in the lower pressure zone and to loop system
W-17	2033	Replace 4,600 Feet of 6" and 8" with 12" pipe along Lovers Lane to Brazos Street	$1,310,000	Increased development in lower pressure zone specifically on Blackjack Street
W-18	2033	Replace 2,900 Feet of 8" pipe with 12" pipe from Lovers Lane to Blackjack Street	$790,000	Increased development in lower pressure zone specifically on Blackjack Street
W-19	2033	Install 5,500 Feet of 12" pipe from Water Plant to Blackjack Street	$1,177,000	Increased development in eastern lower pressure zone
W-20	2033	Install 2,100 Feet of 12" pipe along Shady Lane	$467,000	Increased development in eastern lower pressure zone
W-22	2028	Install 3,350 Feet of 12" pipe from Stueve Lane to SH 130	$734,000	Increased development in upper pressure zone
W-23	2028	Install 3,350 Feet of 12" pipe along SH 130 to Horseshoe Road	$731,000	Increased development in upper pressure zone
W-24	2033	Install 4,700 Feet of 12" pipe along SH 130 to N Colorado Street	$1,005,000	Increased development in upper pressure zone
W-25	2028	Install 3,650 Feet of 12" pipe from County View Rd to Payne Lane	$789,000	Increased development in the Industrial Park Area or Upper pressure zone
W-26	2028	Install 9,950 of 12" Pipe along Hidden Path Rd connecting to Cypress Rd	$2,129,000	Increased development in the Industrial Park Area or Upper pressure zone
W-27	2033	Install 9,350 of 12" pipe on N. side of SH 130 E of Hidden Path Road	$1,995,000	Increased development in upper pressure zone
W-28	2028	Install Pressure Reducing Valve	$53,000	The installation of W-3 or W-22
W-30	2033	Install Pressure Reducing Valve	$53,000	The installation of W-9

Project ID	Planning Horizon	Description	Cost	Project Trigger
W-31	2033	Construct 500,000 Elevated Storage Tank	$3,036,000	Total Water Connections within Distribution System ≥ 7,750
W-35	2033	Install 1,200 gpm high service pump	$876,000	Total Water Connections within Distribution System ≥ 8,000
W-32	2028	Install Pressure Reducing Valve	$53,000	High pressures in east area of system
W-33	2033	Install Pressure Reducing Valve	$53,000	Pressure plane separation as a result of W-27
W-34	2033	Install Pressure Reducing Valve	$53,000	Pressure plane separation as a result of W-24
W-36	2043	Upsize ~228,000 of 3", 4", & 6" watermains to 8"	$35,681,000	To bring distribution system in compliance with City Construction Standards
W-37	2043	Install 1,200 gpm high service pump	$876,000	To meet Peak Hourly Demand with HSPS Firm Capacity since Elevated Storage Capacity is below 200 gallons per connection*
TOTAL			**$67,320,000**	

*If the system were to maintain an elevated storage capacity of 200 gpm/connection, two (2) high service pumps with an additional two (2) 0.5 MG Elevated Storage Tanks would be required to meet 0.6 gpm per connection. With the ACR variance of 0.34 gpm per connection for the HSPS, the requirements would be less of only two (2) 0.5 MG Elevated Storage Tanks and no pumps; however, because the system would fall under the 200 gpm/connections standard, a high service pump to meet Peak Hourly Demand is only necessary instead.

Figure 3-4: Undersized Water Mains for W-36



4.0 WASTEWATER COLLECTION SYSTEM EVALUATION

This section presents the background, methodology, and results of the City of Lockhart's wastewater collection system evaluation. The evaluation address system capacity and TCEQ requirements.

The capacity evaluation was performed to identify improvements necessary to meet current and projected wastewater flows to the City's treatment facilities. To evaluate the wastewater collection system, a hydraulic model was developed using data from as-builts, GIS, and system knowledge provided by the City. Wastewater flow and rainfall monitoring data were collected and used to calibrate/validate the collection system model. The model was calibrated/ validated to this data such that the model accurately depicts real-world conditions, such as dry-weather and wet-weather conditions, and confidently be used as a decision-support tool for planning purposes. Proposed capital improvements are presented for the planning horizons of near-term, intermediate, and long-term.

4.1 FLOW MONITORING PROGRAM

The flow monitoring program included 10 monitors and 3 rain gauges for 4 months from August 23, 2024 through December 4, 2024. Due to some flow monitor calibration issues, select monitors were redeployed through December 31, 2024. Locations of flow monitors and rain gauges can be viewed in Figure 4-1.

The flow monitors collected data on wastewater flow, velocity, and depth. The rain gauges were installed to collect rainfall data and identify dry- and wet-weather periods for the study. Schematic flow diagrams were generated for the collection system to demonstrate relative location, facilitate flow balancing, and isolation of rainfall dependent inflow and infiltration (RDII) sources. The schematic can be viewed in Figure 4-2.

Figure 4-1: Flow Meter & Rain Gauge Locations

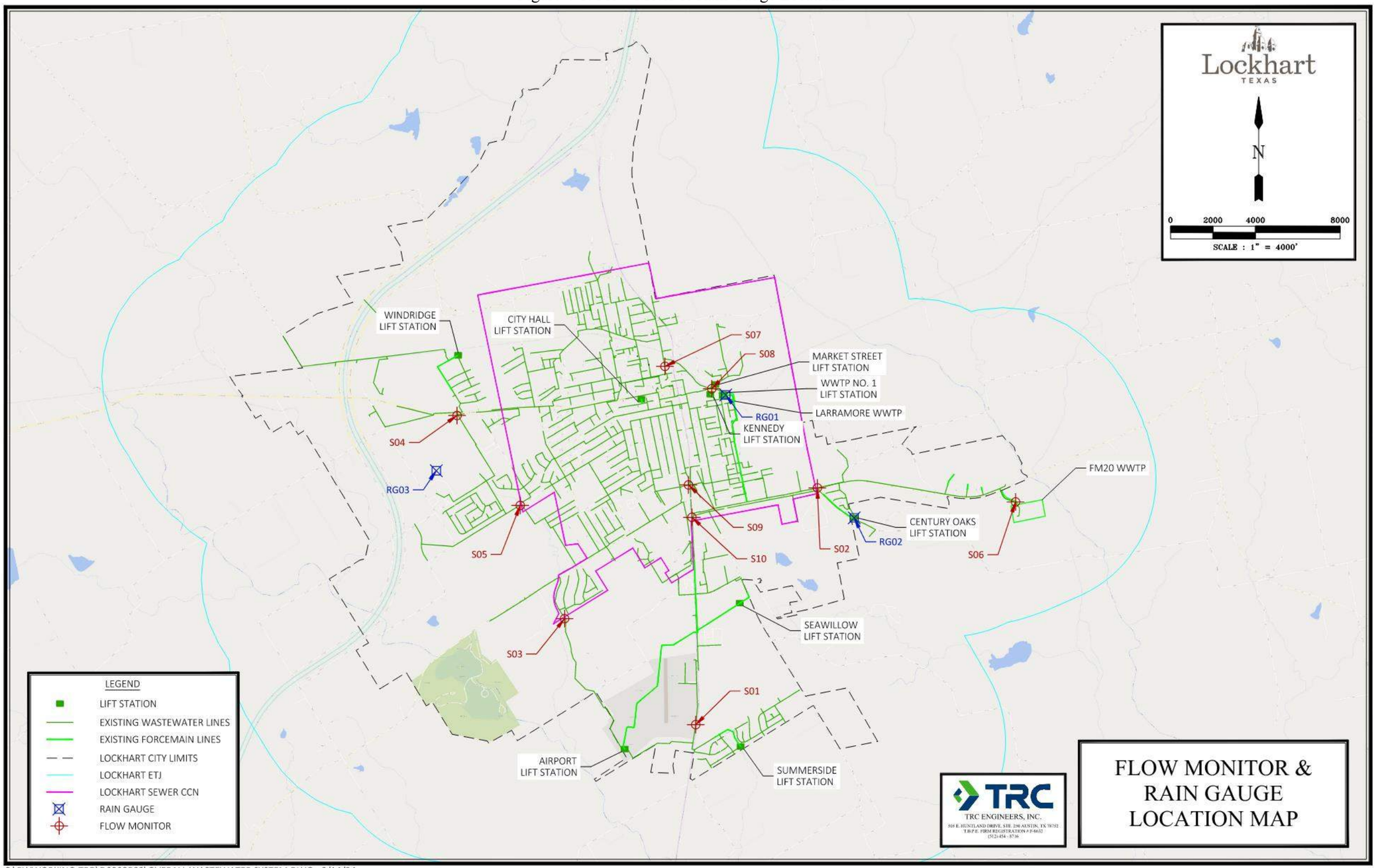
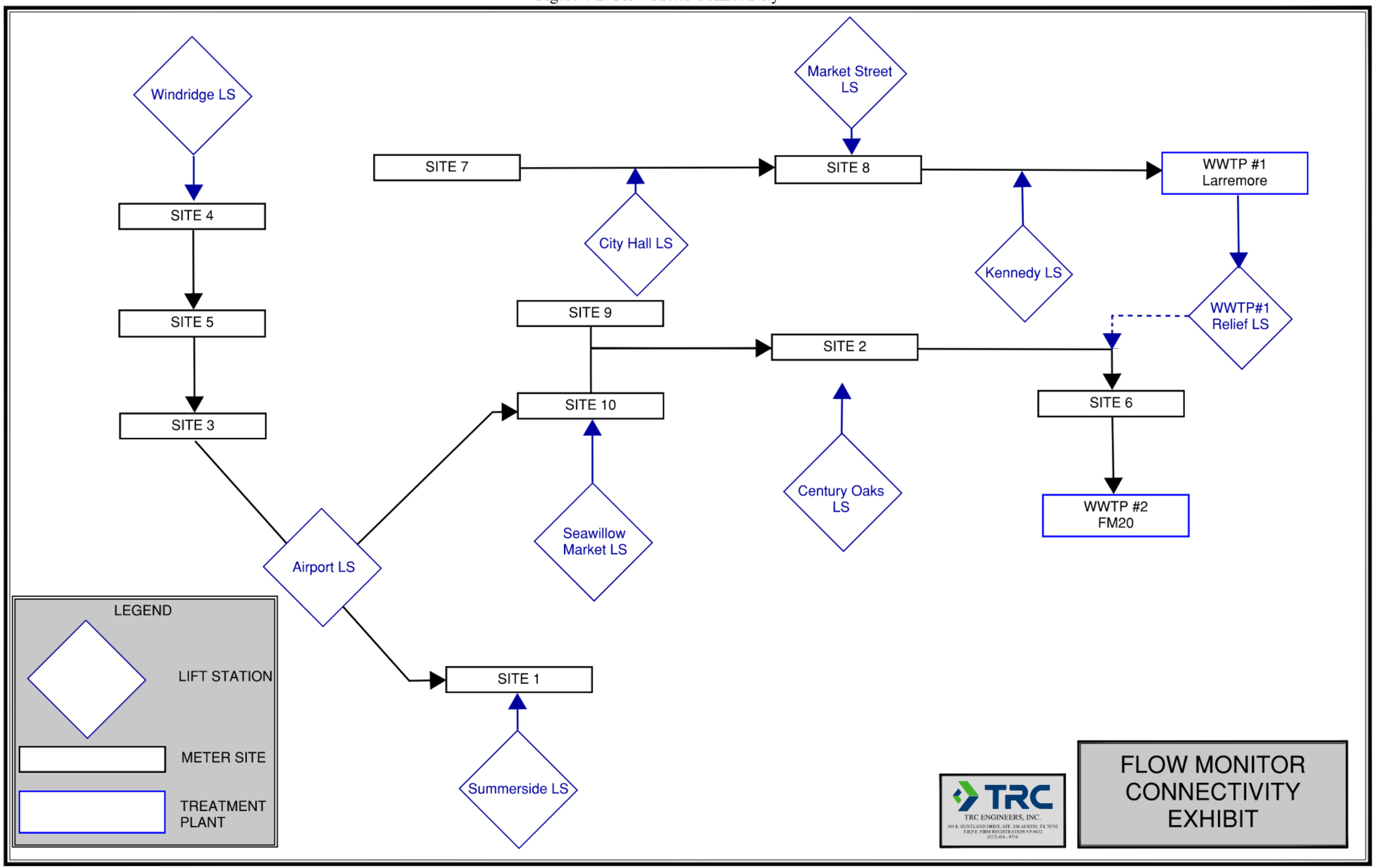


Figure 4-2: Flow Meter Connectivity



4.1.1 Data Collection and Analysis

As stated in prior sections, the flow monitoring data was evaluated for 2 purposes: calibration and validation of the hydraulic model in dry and wet-weather conditions and evaluation of rainfall dependent inflow and infiltration (RDII) across the system. For dry-weather calibration, average flows and diurnals were established. For wet-weather calibration, four rainfall events were selected. Finally, the RDII analysis was conducted to prioritize basins for further investigation or remedial action based on their RDII response.

Flow, velocity, depth, and rain data were collected in 15-minute intervals at each flow monitor. To calibrate the hydraulic model for dry-weather conditions, first rainfall data was analyzed to establish optimal dry-weather conditions based on available flow data for both weekday and weekend patterns. Overall steps for weekday/weekend diurnal generation are listed below:

1. Define "Dry"-Weather conditions.
2. Remove Outliers within data set via quartile method.
3. Average remaining data at each time interval.

To define dry-weather conditions, rainfall data was compiled into daily intervals. Of the 133 days of rainfall data collected, 95 were weekdays and 38 were weekends. Next step was to establish variable thresholds that establish a set of "dry" days were the maximum allowable amount of rainfall and duration of the rainfall event. It is important that these criteria are not so strict that no/little days match the criterion and not so lax that flow rates that are impacted by long-term infiltration are not influencing the number of qualifying days. Total rainfall during the flow monitoring period stayed relatively consistent with average rainfall from the past 10 years, with the exception of total rainfall in October, as shown in Table 4-1. Table 4-2 shows the effect of adjusting the criterion for the number of qualifying days.

Table 4-1: Monthly Rainfall Compared to Average

Month	Rain Gauge (RG) 01	RG02	RG03	NOAA*
	Total Monthly Precipitation (in)	Total Monthly Precipitation (in)	Total Monthly Precipitation (in)	Total Monthly Precipitation (in)
September	1.58	1.29	1.31	2.71
October	5.21	5.54	4.66	2.84
November	1.84	1.66	1.52	1.53
December	1.32	1.44	1.50	1.72

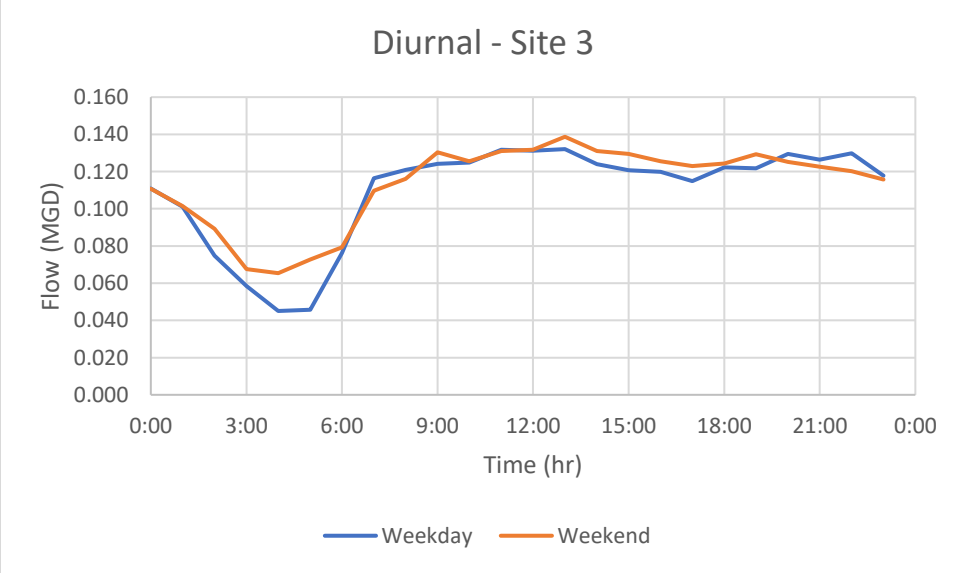
*Monthly average rainfall from NOAA data in the City of Lockhart from 2014 to 2023

Table 4-2: Example Criteria for Dry Day Definition

Inputs		Results	
Rainfall (inches)	Number of Days	Number of Qualifying Weekday	Number of Qualifying Weekend
0.10	7	49	20
0.15	3	71	27
0.15	7	51	20
0.20	3	74	28
0.25	3	76	29

A total rainfall of 0.2-inches over 3 days was chosen as the criteria for establishing the initial set of "dry" days for each meter. This produced 74 eligible weekdays and 28 eligible weekend days. The 15-minute flows for each meter were analyzed for weekdays and weekends, and outliers were removed to obtain representative average dry-weather flow. Outliers were removed using the quartile method with a 1.5 multiplier. Once the 15-minute interval data was filtered, each time interval was averaged together to generate a 24-hour diurnal pattern for weekdays and weekends. An example can be seen in Figure 4-3.

Figure 4-3: Example Dry Weather Diurnals



4.1.2 Calibration/Validation Events

Rainfall data from the flow monitoring period was evaluated to find storms for wet-weather calibration. In general, wet weather events are typically defined as events with greater than 0.5

inches in a 24-hour period and isolated from other storms are preferred for calibration. Rainfall events greater than 0.5 inches in a 24-hour period typically create a measurable RDII response, and an isolated rainfall event is preferred. Four events were chosen from the monitoring period with 72-hour rainfall totals ranging from approximately 0.1 to 0.9 inches and are listed in Table 4-3. While below the 0.5-inch threshold, Storm 4 was selected as it did produce an RDII response.

Table 4-3: Wet-Weather Event Summary

		Weekdays	Rainfall (in)
Storm 1	9/13/2023	9/20/2023	0.667
Storm 2	10/3/2023	10/7/2023	0.907
Storm 3	11/9/2023	11/16/2023	0.707
Storm 4	11/29/2023	12/3/2023	0.103

4.2 Sewer Collection System Model

The wastewater collection system model was developed in InfoWorks ICM software program.

4.2.1 Model Development

Model infrastructure creation began by reviewing against GIS data, as-builts, SCADA data, and pump curves provided by the city. All gravity mains and force mains within GIS were evaluated for connectivity to establish the interconnectivity of the collection system and its facilities. For areas with data gaps or potentially erroneous data existed, the areas were prioritized by their relative importance for model development and reliability. For example, if there was minimal available information about a small neighborhood with minimal connections, then this area was deactivated or removed from the model. These areas can be reactivated or added back into the model when more information is available and/or required for a separate analysis. If data was missing from a large gravity main or critical asset, then the area/asset was sent to the City requesting more information. If more information was not available, then survey was utilized. Survey was performed on a total of 358 manholes to gather information, such as manhole rim and invert elevations or pipe invert and diameter. All as-built and survey data were compiled into shapefile format first, then those shapefiles were used to construct the framework of the wastewater hydraulic model.

For any remaining missing data, assumptions were made. Common assumptions are listed below:

- If invert data was unavailable for gravity mains, then an unknown invert was interpolated between two known inverts, assuming constant slope.
- For pipes with an unknown diameter, upstream and downstream pipes were reviewed. If diameter was determined on both, then it was assumed the pipe of concern was equal to the smaller diameter.

Lift stations required a similar approach. As-builts, pump curves, and other available data was used to build lift stations in the model. If the lift station had limited data or was located in an area

with limited data, then it was evaluated for whether it was required for the development of the model and evaluating the effect of the flow projections on the sanitary sewer system. If the lift station was not anticipated to be impacted by the projections, then it was deactivated/removed from the model. If it was anticipated to be impacted by projections, then the TRC team followed up with the City to get the necessary information. As with the deactivated portions of either hydraulic model, the deactivated/removed lift stations may be activated/added in the future as more information becomes available and is required by separate analyses. Table 4-4 summarizes the modeling status of each lift station.

Table 4-4: Lift Station Status

Lift Station	Status	Rationale
Airport Lift Station	Active	Critical to model development
Blanco Street Lift Station	Not Added	Lift station has been abandoned per City
Century Oaks Lift Station	Active	Critical to model development
Church Street Lift Station	Not Added	Lift station has been abandoned per City
City Hall Lift Station	Not Added	Service area is too small/ area of low criticality for collection system evaluation
Kennedy Lift Station	Active	Critical to model development
Market Street Lift Station	Active	Critical to model development
Seawillow Lift Station	Not Added	Service area is too small/ area of low criticality for collection system evaluation
Summerside Lift Station	Active	Critical to model development
Windridge Lift Station	Active	Critical to model development
WWTP #1 Lift Station	Active	Critical to model development

Profiles of force mains were determined using the available as-builts or topo data. Topo data was retrieved from Google Earth and convert to a digital elevation model layer in GIS, and only starting point, high point, and effluent points were collect and assume to have a minimum depth of cover of 3 feet per Lockhart Construction Standards.

As with all hydraulic models, some assumptions/simplifications are required to ensure a stable model with reliable results. The City's collection system network is moderately sized and consist of many unique assets with a variety of hydraulic conditions present. Common modeling solutions to improve stability were:

- Minimizing the number of gravity mains with a length of less 10 feet
- Deactivating/removing portions of model with little available data or no flow data.

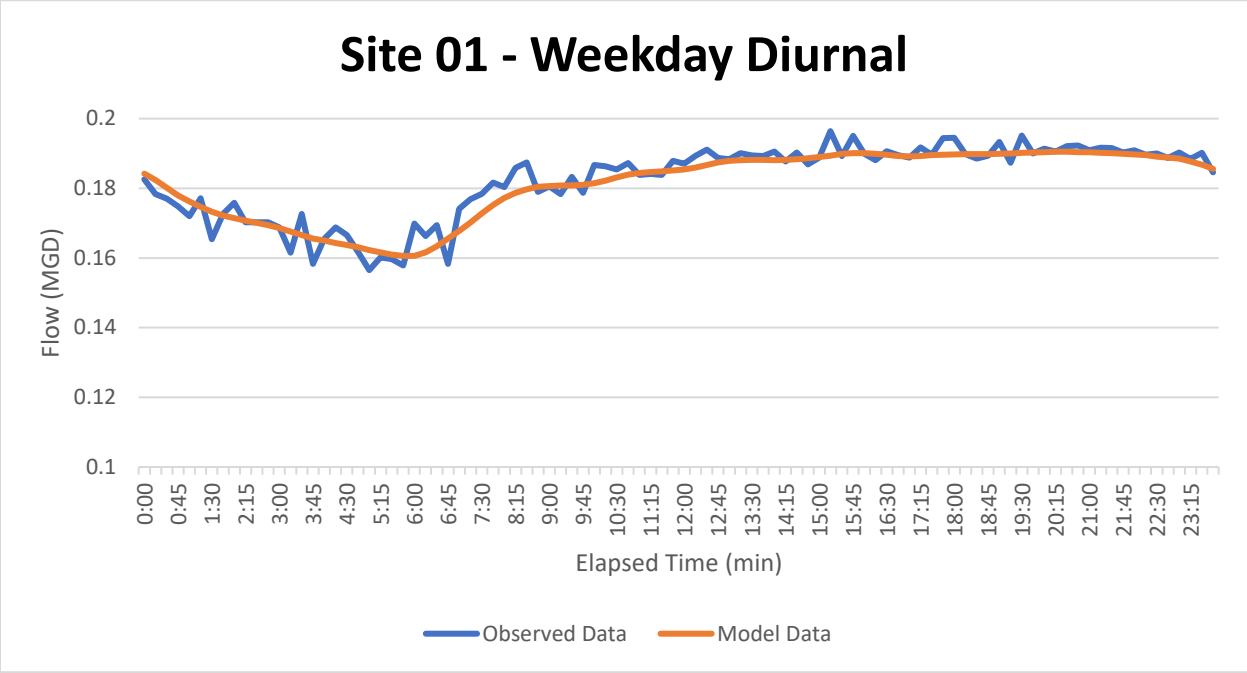
- Using low calculation time steps and computational distances.

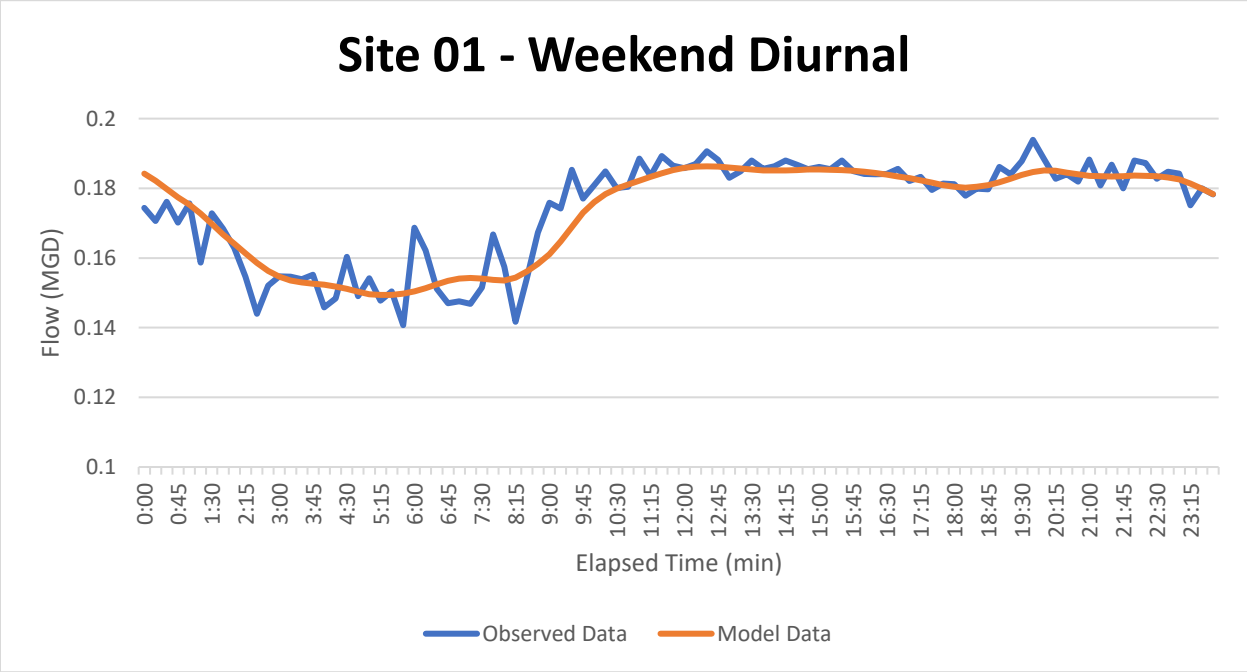
See Figure 4-4 for collection system hydraulic model overview.

Figure 4-4: Sewer Collection System Hydraulic Model Skeleton

To simulate dry-weather flow conditions, each meter was evaluated as stated in Section 4.1 – Flow Monitoring Program. Within InfoWorks ICM, flow is assigned to manholes. For dry-weather flow, every manhole within a flow monitoring basin was assigned an equal portion of total dry-weather flow divided between every manhole. Average modeled flow at each meter was calibrated to be within 5% of the average flow volume over a 24-hour period obtained from the flow monitoring analysis, and the modeled diurnal pattern was calibrated to be in general agreement with the respective pattern from the diurnal analysis. Figure 4-5 shows an example of the results from the dry-weather calibration.

Figure 4-5: Example of Dry Weather Calibration Hydraulic

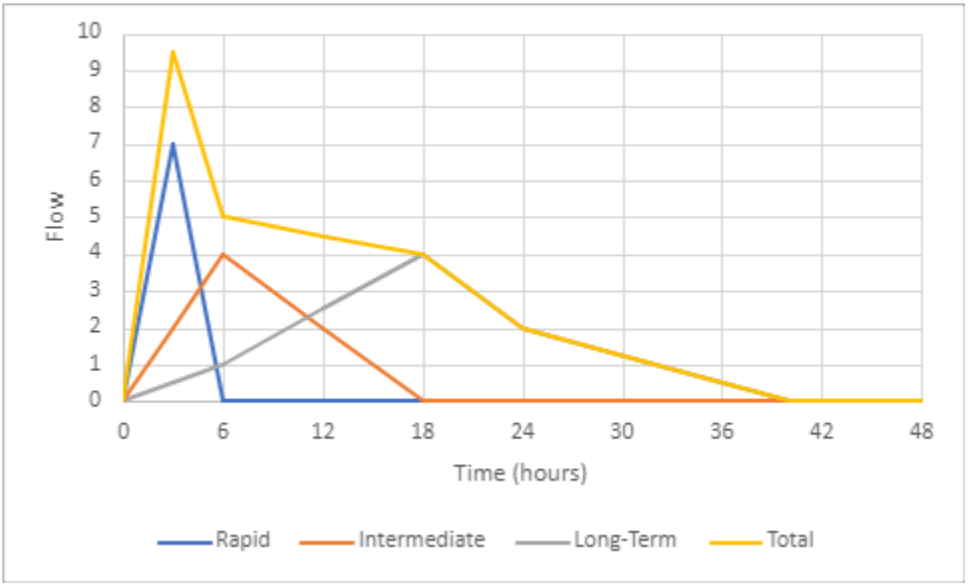




Once dry-weather flow calibrations were complete, the wet-weather calibration was performed. As noted in the dry-weather calibrations, flow is assigned to manholes. This includes wet-weather flow. For wet-weather flow, terminal manholes, or furthest upstream manholes within a flow monitoring basin were assign and equal portion of total wet-weather flow.

To model RDII responses to these rainfall events, the RTK method was utilized. This method uses three separate hydrographs to approximate RDII response magnitude and timing. The three hydrographs represent rapid, intermediate, and long-term responses. In RTK, "R" represents for the percent of total rainfall volume that enters the collection system, also known as the area under the curve. "T" represents the time of peak, or how quickly the curve reaches its peak. "K" represents the time to return, or how quickly the curve returns dry-weather conditions. See Figure 4-6 for the RDII response determined by the RTK method.

Figure 4-6: RDII Response Methodology - RTK Method



To model the RDII response, the area of flow monitoring basin was equally divided between terminal manholes and a unique set of RTK parameters for each flow monitor was assigned. As discussed in Section 4.1.2, four rainfall events were selected. Storms 1, 2, and 4 were used for calibration, while Storm 3 was used to validate model results. To compare model wet-weather responses over the 4 storms to the observed real-world response, flow volumes, peak, time to peak, velocity, and depth were compared using hydrographs and scattergraphs with the goal to model the average observed response at each flow monitor. To create a more conservative model, if an acceptable margin of error could not be reached at a flow monitor for the 3 calibration rainfall events, then the largest RDII response was used for calibration. Example hydrograph and scattergraph used for calibration/validation can be viewed in Figures 4-7 and 4-8, respectively.

Hydrographs enable the review of peak flow and volume for a desired timespan; however, flow is only one parameter. Volumetric Flow (Q) is comprised of two other parameters: velocity (v) and area (A), and area is a function of depth of flow. By breaking flow down into these parameters, distinct patterns can be identified and used to identify areas of blockages, backwater conditions, and surcharges.

Figure 4-7: Example of Wet Weather Calibration Hydrograph

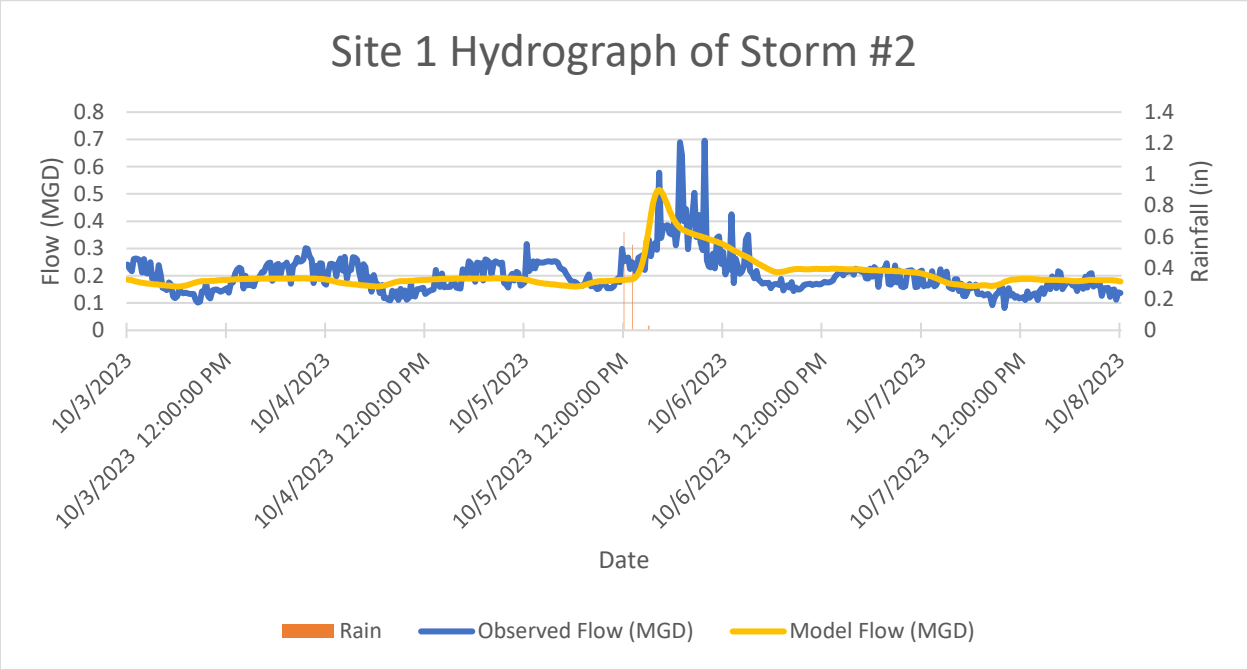
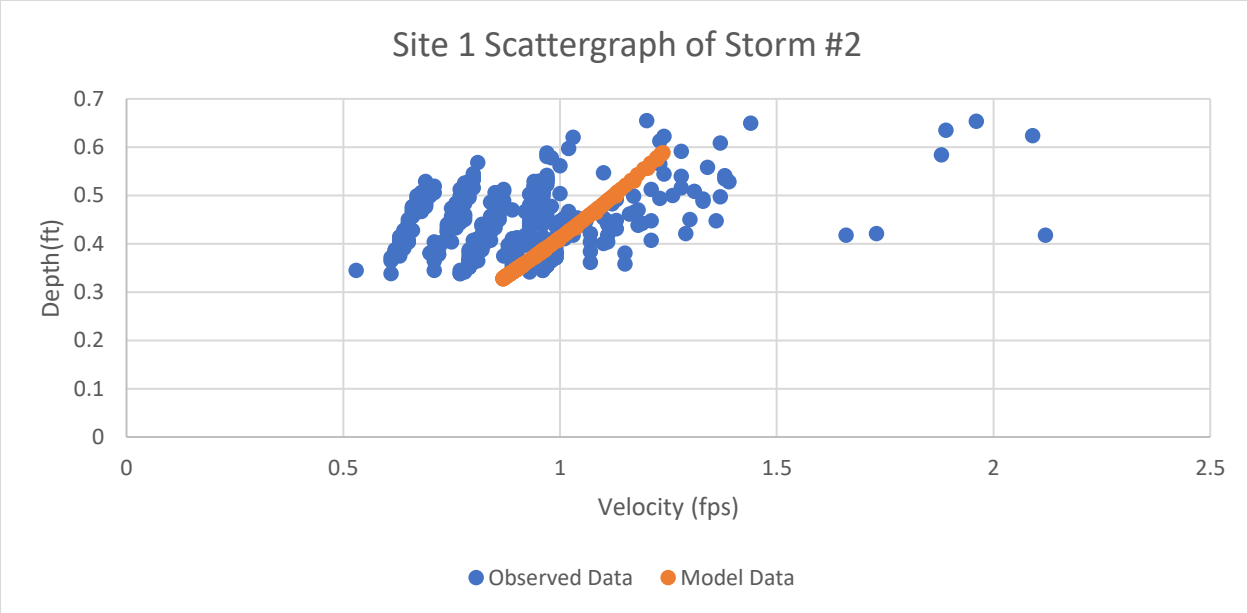


Figure 4-8: Example of Wet Weather Calibration Scattergraph



Storm 3 was used as the validation event to ensure the model reasonably replicates the measured system characteristics, such as flow, velocity, and depth via hydrographs and scattergraphs.

4.3 SEWER COLLECTION SYSTEM EVALUATION & FINDINGS

The calibrated/validated hydraulic model was used to evaluate the system response to and performance under a design rainfall event for existing and future conditions. Model results were used to identify capacity limitations and develop capital improvement projects to alleviate those limitations.

To evaluate a system response, a design event was utilized. After reviewing the last 10 years of rainfall data, a 1-year, 24-hour volume with a Q1 (rapid) rainfall distribution was selected from Atlas 14. This design event generates 2.44 inches of rainfall over a 24-hour period. A Q1 distribution was selected as it typically produces the more conservative (larger) RDII response.

To identify gravity mains with capacity limitations, capacity thresholds need to be defined. For peak dry-weather conditions, a maximum ratio of water depth to pipe diameter (d/D) of 0.5 was defined as the threshold for capacity limitations. For peak wet-weather conditions, a maximum ratio of water depth to pipe diameter (d/D) of 0.8 was defined as the threshold for capacity limitations.

To identify lift stations with capacity limitations, backwater conditions immediately upstream of a lift station were examined. Backwater conditions are defined as flow within a gravity main is less than the maximum flow that pipe can handle; however, water depth is greater than or equal to pipe diameter. Backwater conditions indicate that downstream conditions are slowing flow through the pipe such that the pipe surcharges.

Beginning with the existing 2023 scenario, the collection system was able to handle all peak dry-weather flows (DWF) and wet-weather flows (WWF) per evaluation criteria.

In the 2028 planning horizon, the system was modeled with a total projected dry-weather flow of 1.52 MGD with a flow split of 0.56 MGD and 0.96 MGD to the Larremore WWTP and FM 20 WWTP, respectively. The City currently has a lift station decommissioning and sewer project planned at the Windridge Lift Station. As this project is under design, it is not included in the capital improvement projects but not considered existing conditions. The bid drawings were utilized to model these changes in the 2028, 2033, and 2043 modeling scenarios. Under dry-weather conditions, upsizing of gravity mains along Blackjack St., Sycamore St., and South Colorado St. is needed. Additional upsizing of gravity mains from Clearfork to South Main St. are required due to wet-weather peak flows.

In the 2033 planning horizon, the system was modeled with a total projected dry-weather flow of 1.87 MGD with a flow split of 0.69 MGD and 1.18 MGD to the Larremore WWTP and FM 20 WWTP, respectively. No capital improvement projects are required to handle peak dry-weather flows. Under wet-weather conditions, upsizing another portion of the trunk line along Blackjack St. to the FM 20 WWTP is needed.

In the 2043 planning horizon, the system was modeled with a total projected dry-weather flow of 2.84 MGD with a flow split of 1.05 MGD and 1.79 MGD to the Larremore WWTP and FM 20 WWTP, respectively. Under dry-weather conditions, upsizing of gravity mains along Twin Island

Dr., North Commerce St., and Blackjack St. is required. Under wet-weather conditions, increasing the capacity of the Century Oak lift station and Airport lift station is required.

All capital improvement projects are shown in Figure 4-9 Wastewater CIP Overview. CIP descriptions, project rationale/trigger, and cost estimates can be viewed in Appendix C – Wastewater Collection System CIP Exhibits.

4.4 SEWER SYSTEM RECOMMENDATIONS

In addition to capital improvements planned in the 2023 W/WW Impact Fee analysis to support planned growth/development in the City, under performing assets within the existing and future model scenarios were identified and improvement alternatives were developed to remediate the issues. The results of the existing and future system evaluations were used to develop a list of distribution system improvements for near-term (2023-2028), intermediate (2029-2033), and long-term (2034-2043) planning horizons in Table 4-5.

The upsizing of the trunk line along Blackjack Street is required by multiple planning phases for multiple conditions. While phasing the projects over multiple planning horizons will enable the City to spread project cost over the study period, it is prudent to consider combining these projects into a singular project. This would enable the City to reduce total project cost by reducing engineering/administrative cost, mobilization cost, etc., and enable the City to increase the trunk line capacity to handle either the Larremore WWTP decommissioning or if one or more large developments that were not included per Section 2.0 – Population and Flow Projections are approved by the City and flow to the FM20 WWTP.

A Class IV opinion of probable construction cost (OPCC) was developed for each capital improvement project. A Class IV estimate is for planning/feasibilities studies and meant to be used for strategic planning purposes. A Class IV 4 cost estimate accuracy range is -30% to +50%. All costs are in 2024 numbers and include cost for contingency and engineering/surveying.

Figure 4-9: Wastewater Collection System Projects

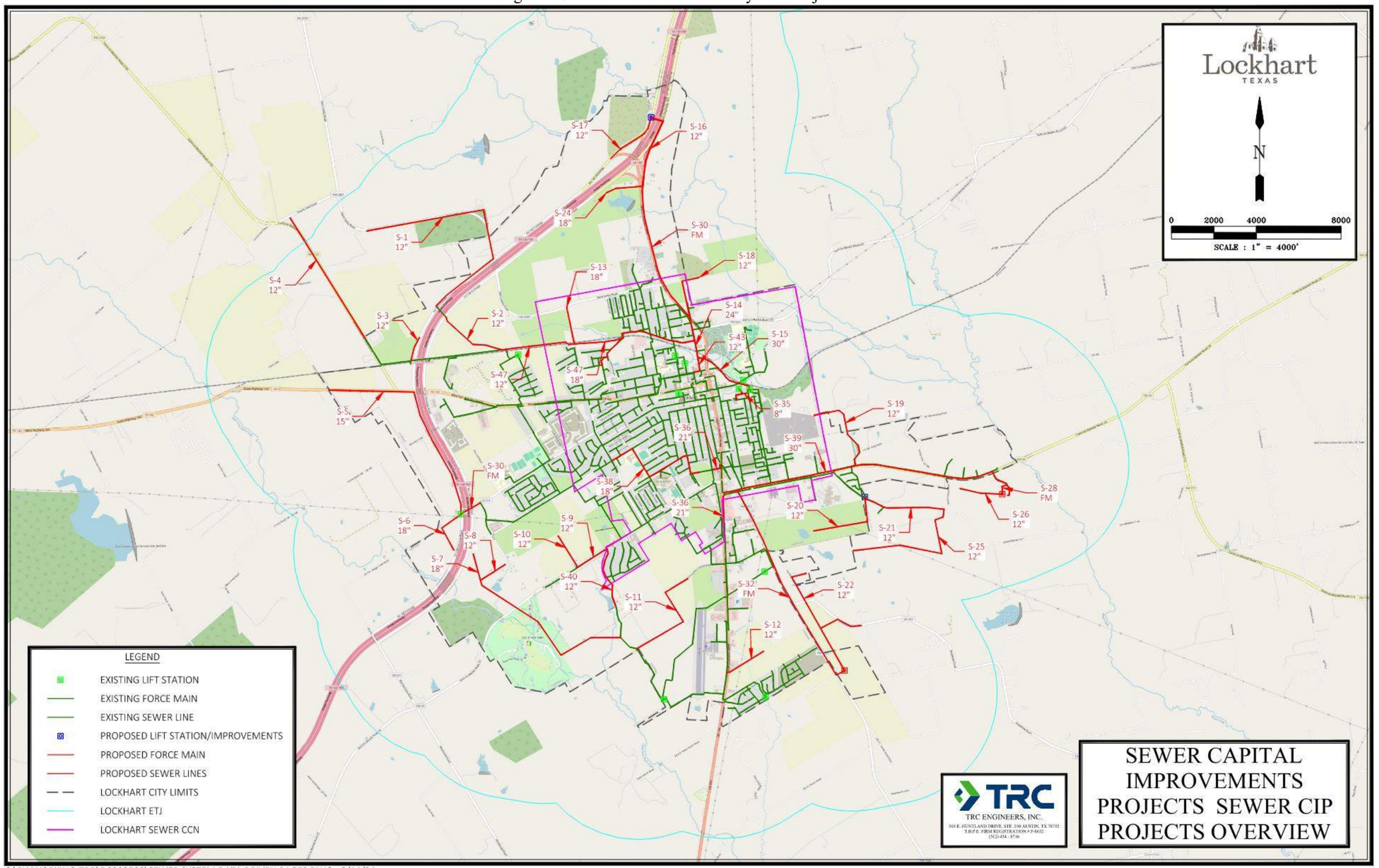


Table 4-5: Recommended Sewer Collection System Projects by Planning Horizon

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-1	2028	Installation of 12,000 LF of 12" pipe extension past SH 130 to Hidden Path Road	$3,181,000	Increased development along Hidden Path Road
S-2	2028	Installation of 2,500 LF of 12" pipe between SH 130 and Windridge	$665,000	Increased development along Hidden Path Road
S-3	2028	Installation of 1,200 LF of 12" W of SH 130 to San Antonio Street	$332,000	Increased development along N. Cesar Chavez PKWY SB
S-4	2028	Installation of 7,200 LF of 12" pipe along County Lane	$1,810,000	Increased development along County Lane
S-5	2028	Installation of 10,200 LF of 18" pipe along SH 130 and San Antonio Street	$2,748,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-6	2033	Installation of 2,300 LF of 18" pipe South of Boggy Lift Station	$623,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-7	2033	Installation of 9,700 LF of 18" pipe from Cunningham Drive to Old Fentress Road.	$2,622,000	Increased development along Old Fentress Rd and/or Cunningham Dr.
S-8	2033	Installation of 1,400 LF of 12" pipe S of Clear Fork	$377,000	Increased development along Old Fentress Rd
S-9	2033	Upsize 1,600 LF to 12" from 8" along State Park Road	$439,000	Increased development along State Park Rd.
S-10	2033	Installation of 1,700 LF of 12" pipe N of State Park Road.	$462,000	Increased development along State Park Rd.
S-11	2033	Installation of 5,500 LF of 12" pipe along Cunningham Road	$1,460,000	Increased development along Cunningham Dr.
S-12	2033	Installation of 2,000 LF of 12" pipe E of 183	$530,000	Increased development East of 183 and North of Summerside Ave.
S-13	2028	Installation of 1,900 LF of 18" pipe along Stueve Lane	$521,000	Increased development along Stueve Lane
S-14	2028	Upsize 4,300 LF to 24" along Tank Street	$1,272,000	Increased development along Stueve Lane or Dry Weather Flow to Larremore exceeds 0.46 MGD

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-15	2028	Upsize 2,900 LF to 30" along railroad	$1,004,000	Increased development along Stueve Lane or Dry Weather Flow to Larremore exceeds 0.46MGD
S-16	2033	Installation of 3,800 LF of 12" pipe under SH 130 to N Colorado Street	$1,015,000	Increased development along N. Colorado St. SB
S-17	2033	Installation of 1,800 LF of 12" pipe S of SH 130 to N Colorado Street	$485,000	Increased development along N. Colorado St.
S-18	2028	Installation of 3,700 LF of 12" pipe E of N Commerce Street	$992,000	Increased development along N. Commerce St.
S-19	2033	Installation of 2,700 LF of 12" pipe and upsizing of 1,600 LF of 8" to 12" along Lovers Lane.	$1,342,000	Increased development along Lover's Ln
S-20	2033	Installation of 3,800 LF of 12" pipe W of Century Oaks Lift Station	$1,015,000	Increased development West of Old McMahan Trail
S-21	2033	Installation of 3,000 LF of 10" pipe E of Century Oaks Lift Station	$723,000	Increased development East of Old McMahan Trail
S-22	2028	Installation of 5,000 LF of 18" pipe along S Commerce Street	$1,596,000	Increased development along S. Commerce St. & Seawillow Rd
S-23	2028	Installation of 2,100 LF of 12" pipe E of S Commerce Street	$574,000	Increased development along S. Commerce St. & Seawillow Rd
S-24	2028	Installation of 1,800 LF of 18" pipe along S Commerce Street	$497,000	Increased development along S. Commerce St. & Seawillow Rd or Installation of S-23 or S-24
S-25	2033	Installation of 7,500 LF of 12" Pipe W of Pecan Branch Lift Station	$1,990,000	Increased development within general area
S-26	2033	Installation of 2,000 LF of 12" pipe W of FM 20 East Lift Station	$530,000	Increased development south of Blackjack St. & East of Sierra Vista Cove

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-27	2028	Boggy Creek Lift Station	$1,605,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-28	2028	Installation of 1,300 LF of Boggy Creek Force Main	$293,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-29	2028	Plum Creek Lift Station	$1,605,000	Increased development along N. Colorado St. & Lover's Lane or installation of S-18 and S-19
S-30	2028	Installation of 14,500 LF of Plum Creek Force Main	$3,263,000	Increased development along N. Colorado St. & Lover's Lane or installation of S-18 and S-19
S-31	2028	South Commerce Lift Station	$1,605,000	Increased development along S. Commerce St. & Seawillow Rd or installation of S-26
S-32	2028	Installation of 10,400 LF of South Commerce Force Main	$2,340,000	Increased development along S. Commerce St. & Seawillow Rd or installation of S-26
S-33	2033	FM 20 East Lift Station	$1,763,000	Increased development within general area
S-34	2033	Upsize 900 LF of pipe from 8" & 12" To 30" along Blackjack Street	$433,000	Increased development within general area
S-35	2033	Upsize 1,000 LF of pipe from 6" to 8" along Sycamore Street & Kennedy Ls Abandonment.	$321,000	Increased development south of Blackjack St. & East of Sierra Vista Cove
S-36	2028	Upsize 1,400 LF of pipe to 21" from 12" along S Colorado Street.	$372,000	Under Peak DWF conditions, d/D is greater than 50%
S-37	2028	Upsize 1,700 LF of pipe from 8" To 15" across railroad and along N Medina Street	$476,000	Under Peak DWF conditions, d/D is greater than 50%

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-38	2028	Upsize 6,000 LF of Pipe From 8", 10", & 12" to 18" From Clearfork Street to S Medina Street	$1,620,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~6,750 or dry weather flow in line exceed 0.46 MGD under DWF conditions.
S-39	2028	Upsize 8,600 LF of pipe from 21" to 30" along Blackjack Street	$2,963,000	Under Design Event, WWF creates backwater conditions. Project Trigger - # of connections with system is greater than ~6,750
S-40	2028	Upsize 3,900 LF pipe from 10", 12", & 15" to 18" along Twin Island Drive	$1,050,000	Under Design Event, WWF creates backwater conditions. Project Trigger - # of connections with system is greater than ~6,750
S-41	2043	Upsize 900 LF of pipe from 8" to 12" along North Commerce Street	$242,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to Larremore WWTP exceed 1 MGD under DWF conditions.
S-42	2043	Upsize 5,100 LF of pipe from 21" & 24" to 30" along Blackjack Street	$1,768,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to FM 20 exceeds 1.75 MGD under DWF conditions.

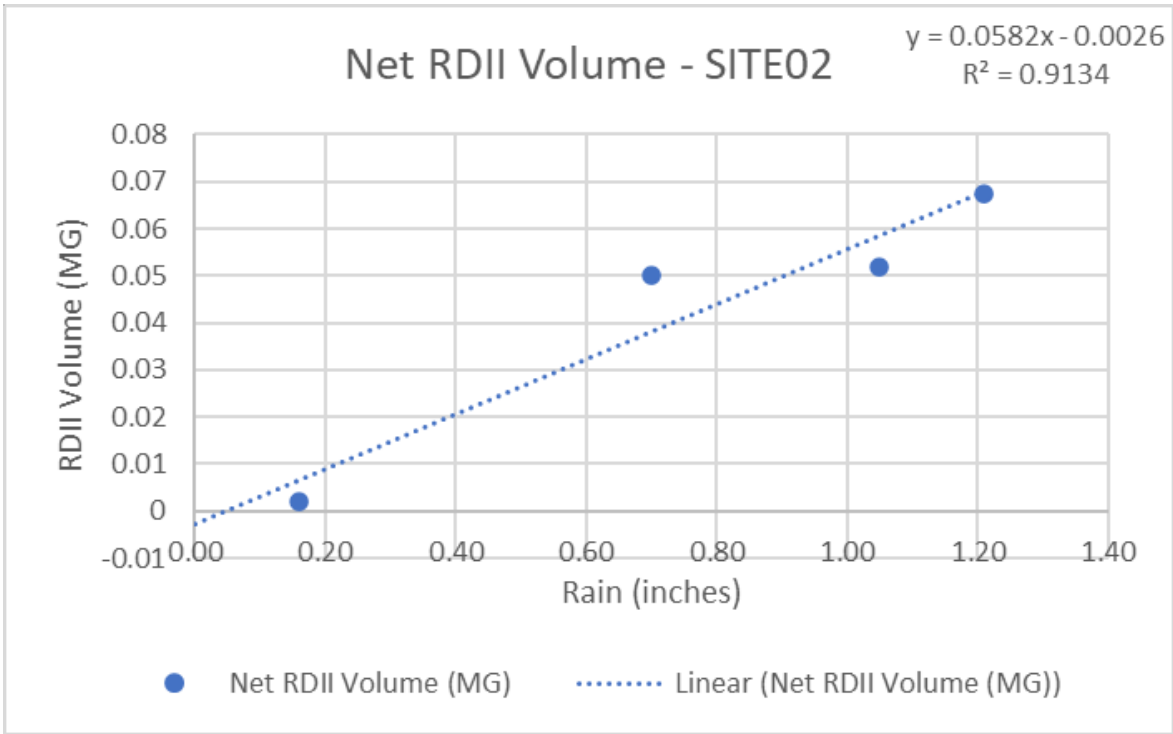
Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-43	2033	Century Oaks LS Improvements - Increase capacity to 0.85 MGD capacity & increase force main diameter to 8"	$1,250,000	Under Design Event, WWF creates backwater conditions. Project Trigger - # of connections with system is greater than ~8,000 or DWF exceeds 1.17 MGD to the FM 20 Plant
S-44	2043	Airport LS Improvements - Increase capacity to 2 MGD & increase force main diameter to 12".	$2,000,000	Under Design Event, WWF creates backwater conditions. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to FM 20 exceeds 1.75 MGD under DWF conditions.
TOTAL			**$53,774,000**	

4.5 RDII Analysis & Recommendations

The goal of the RDII analysis is to develop a quantitative relationship between rainfall and rainfall dependent inflow/infiltration (RDII) volume. This relationship can be used to estimate RDII volume given a wet-weather event.

For each rainfall event considered in this analysis, the total 24-hour volume of RDII was calculated by subtracting the closest dry day average volume from the observed volume in the day of the event. In cases where rainfall occurred at the end of the day, the higher RDII response on the next day was used to calculate the RDII volume associated with the event. The net RDII volumes were plotted against the corresponding rainfall depth, and a linear regression was used to formulate the relationship between rainfall depth and RDII. As an example, Figure 4-10 shows a relationship between the net RDII volume and rainfall depth for Site 02. The regression relationships are used to compare the projected RDII volumes for any given rainfall event that is within the range of the linear relationship and does not produce overflows. These linear RDII relationships can be viewed in Appendix D – RDII Analysis Results.

Figure 4-10: Example RDII Analysis



To compare RDII responses across the system, the 1yr-24hr design event (2.44in) was used as the evaluation event for each flow monitor site and the associate developed linear relationship and the resulting volumes for each monitor are presented in Table 4-6. Net volumes of RDII are presented for each meter. Populations for each basin were determined by conducting a spatial analysis on the existing population distribution. The EPA defines excessive infiltration and inflow are defined to be 275 gallons per person per day (gppd). None of the basins exceeded the excessive infiltration or inflow criteria; however, basins for sites 08, 09, and 01 are close to this threshold and have significantly higher infiltration than other basins. These basins are recommended to undergo inspection and rehabilitation to reduce total RDII.

Figure 4-11 depicts the 10 site boundaries.

Figure 4-11: Flow Monitoring Basins – RDII Priority Basins

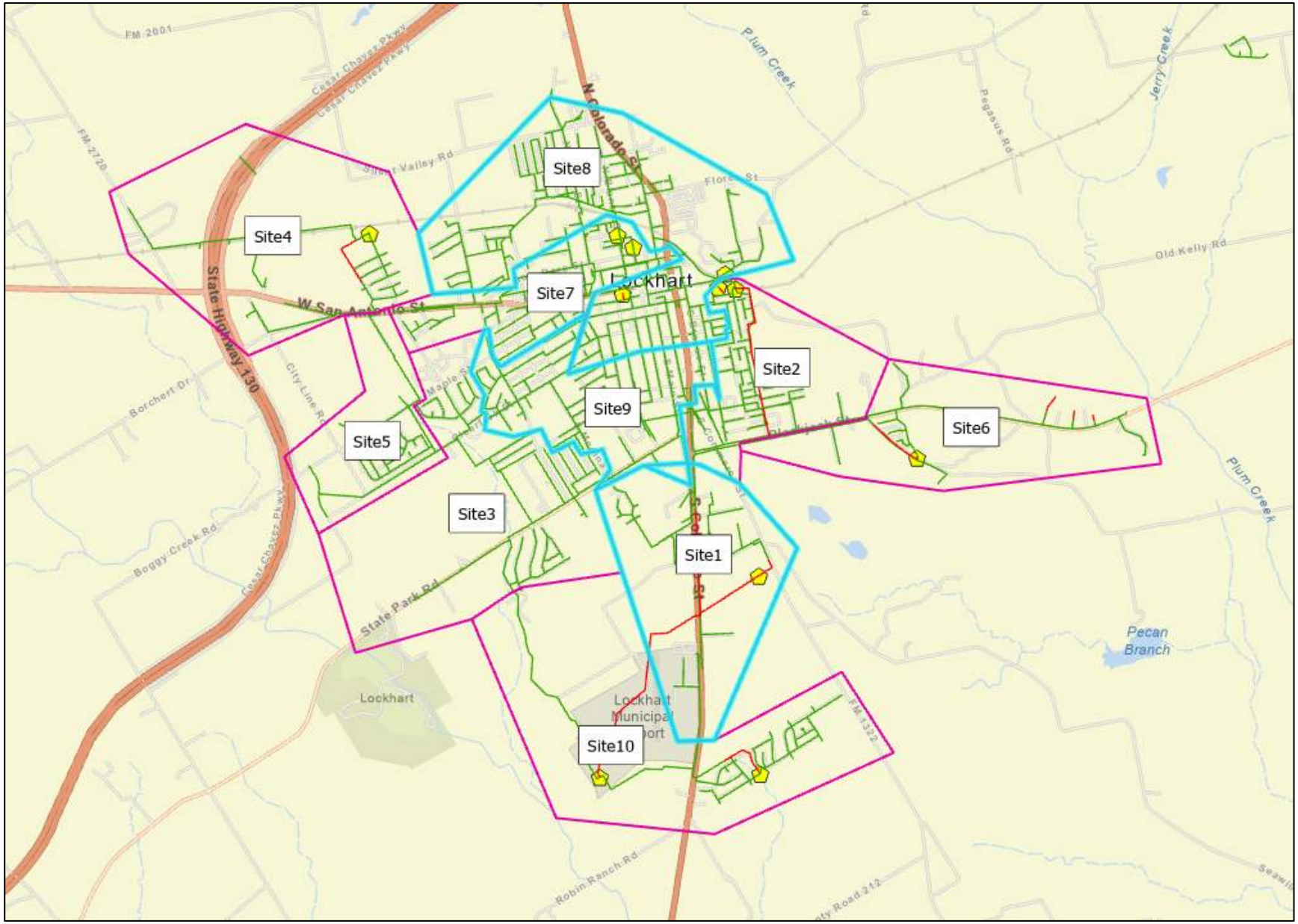


Table 4-6: RDII Response Summary

Rank	Meter	Rain Gauge	Net RDII Volume (MG)	Average Wet Weather Flow (GPPD)
1	SITE08	RG 1	0.556	245.149
2	SITE09	RG 3	0.247	240.398
3	SITE01	RG 3	0.329	217.824
4	SITE02	RG 2	0.139	135.984
5	SITE06	RG 2	0.188	125.351
6	SITE10	RG 3	0.208	84.689
7	SITE03	RG 3	0.114	53.350
8	SITE07	RG 1	0.034	44.884
9	SITE05	RG 3	0.032	41.613
10	SITE04	RG 3	0.069	32.365

Investigations methods can include, but are not limited to: CCTV inspection, smoke testing, and review of sewer maintenance history. Rehabilitation methods can include, but are not limited to injection grouting, cured in place pipe, slip lining, and manhole relining. When considering methods for rehabilitation several factors are to be consider, such as those listed below:

- Sewer & Manhole Locations: Is the assets in public right-of-way, an easement, or private property?
- Soil Conditions, such as soil type, porosity, and groundwater levels.
- Pipe and Manhole Characteristics, such as age, diameter, pipe material and joint types, depth, number of connections.

4.6 Sewer Lift Station Consolidation

The City of Lockhart has 9 active lift stations, see table 4.2-1 for list of all lift stations. This review was to assess the potential for lift station abandonment and flow rerouting to minimize the number of active lift stations within the wastewater collection system and reduce the overall operational and maintenance cost.

Available drawings, pump curves, and topo data (from available survey and Google Earth) were utilized to review the lift stations, their force mains, and potential alternative gravity main alignments. Considerations for lift station abandonment were feasibility, cost to abandon, and O&M cost. For feasibility, factors such as length of gravity sewer required to eliminate station, depth of gravity sewer required to eliminate station, gravity sewer route, capacity of gravity sewer receiving flow were considered.

The City of Lockhart has taken effort to minimize the need for lift stations through proper collection system design. Of the active lift stations, only Kennedy Street Lift station is subject to abandonment. The Kennedy Lift Station is a single 2" ginger pump, 2 HP, and only services about 6 houses and runs approximately 20 minutes a day. Wastewater CIP S-35 details cost of abandonment and alternative alignment. While the project is included for the City's consideration, total cost of the improvement would likely not outweigh any potential savings the City can gain from reduced O&M.

It is recommended that the City perform a Lift Station and Force Main Condition Assessment Study. Conservatively, the service life of a lift station is assumed to be 40 years. Lift stations built prior to the year 2000 should be the focus of the study. The condition assessment would determine the current physical and operational state of each lift station and associated force main and identify any systemic issues that would impact performance.

5.0 WELLS EVALUATION AND RECOMMENDATIONS

5.1 WATER SUPPLY

The City of Lockhart currently has seven (7) producing wells in the southeast well field. The locations of the producing wells are shown in Figure 5-1. These wells pump water from the Wilcox Aquifer through 7.5 mile long parallel 12-inch, 14-inch and 18-inch transmission mains to the raw water pump station. The raw water pump station collects the water from the wells and pumps it to the water plant on the southeast side of the City. The raw water pump station consists of a 300,000-gallon storage reservoir and three (3) pumps rated at 1,800 gpm each. The raw water pipelines are capable of transporting 5 MGD. The reliable capacity of the well field is 4.33 MGD and the firm capacity is 3.43 MGD, which is when the largest well is out of service. Without consideration of additional water supplies, the City's well field capacity is not adequate to handle projected demands through 2043. Capacities for the wells are shown in Table 5-1. and projected water demands for the planning horizons in relation to well capacity is shown in Table 5-2.

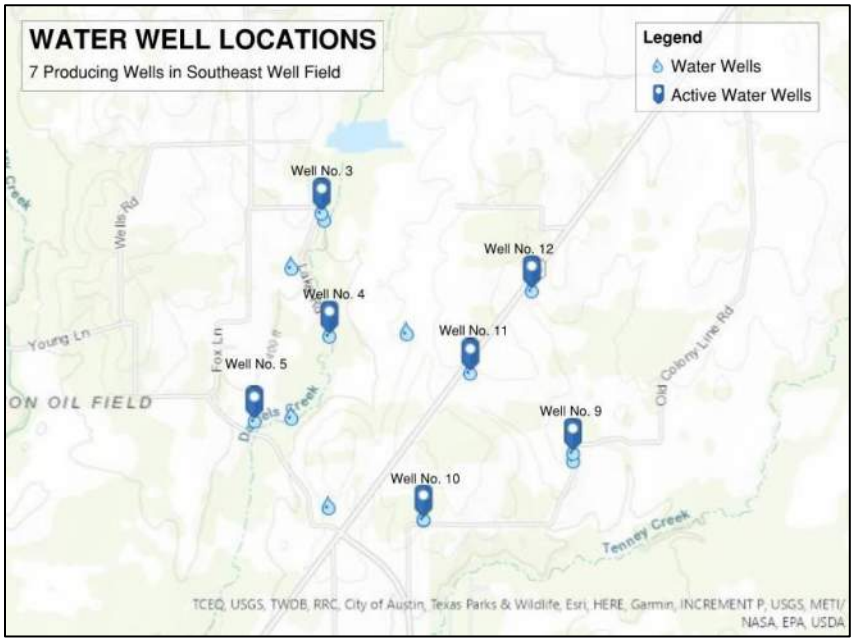


Figure 5-1: Water Well Locations

Table 5-1: Water Well Production

Well No.	Capacity (gpm)	Capacity (MGD)
3	234	0.34
4	340	0.49
5	240	0.35
9	400	0.58
10	550	0.79
11	618	0.89
12	624	0.90
Total	**3006**	**4.33**
Firm	**2382**	**3.43**

Table 5-2: Projected Water Demand – Well Capacity

Planning Horizon	Year	Average Daily Flow (MGD)	Peak Daily Flow (MGD)
EXISTING WATER WELLS CAPACITY			4.33
Existing	2023	2.77	3.16
Near-Term	2028	3.41	3.89
Intermediate-Term	2033	4.20	4.79
Long-Term	2043	6.36	7.26

As shown in Table 5-2, Lockhart's well capacity alone will not be adequate for the intermediate nor long-term planning horizons. The City has the ability to access more water from the Wilcox Aquifer if additional water wells are constructed. The Wilcox Aquifer has been a reliable source of water for Lockhart for the past sixty (60) years. The Ground Water Resources of Caldwell County report prepared by the U.S. Geological Survey indicates that the quantity of water on a perennial basis that can be withdrawn from the Carrizo sand and Wilcox group in Caldwell County without depleting the aquifer is about 20 MGD. At the present time, these formations in Caldwell County are practically untapped with only a small percentage being used for public supply, irrigation, domestic, and stock purposes. Additional sources of water for Lockhart are surface water from the Luling WTP and surface water from the Carrizo Project.

In 2005, the Guadalupe-Blanco River Authority, City of Lockhart and the City of Luling completed the Luling/Lockhart water transmission main (Luling-Lockhart Agreement). This project consisted of a pump station at the Luling surface Water Treatment Plant and a 16-mile 14-inch transmission main to the City of Lockhart Water Treatment Plant. The agreement between the three (3) entities allows for the delivery of one (1) million gallons of treated surface water per day to the Lockhart Water Treatment Plant.

In 2022, the Guadalupe-Blanco River Authority began construction for the Carrizo Groundwater Supply Project (Carrizo Project Agreement), which will provide the City of Lockhart with an additional 3,000-acre feet per year of firm drinking water capacity (2.67 MGD) when complete. Construction was set to be completed by early 2023; however, Lockhart has not begun using water from this project. With the Carrizo Project Agreement the City's access to treated water will increase by an additional 65%.

The additional treated water provided by the Luling-Lockhart Agreement and the Carrizo Project Agreement increases the City's water supply capacity to 8 MGD providing sufficient capacity through the year 2043 in terms of future projected demands. Although the City of Lockhart currently has these two (2) agreements for treated water, delivery of this water to the City is not guaranteed during times of conservation or drought. In times of conservation both agreements state the water will be divided proportionally among all customers according to the amount each contract is entitled to.

It is also important to note that the City currently holds an agreement with GBRA to resell 500-acre feet per year of treated water on a short-term, temporary basis not extending beyond December 31, 2028, from the Carrizo Project water. In addition, the City has not begun utilizing the water

from the Carrizo Project Agreement. All these factors were considered when determining recommended improvements to the City's wells and water supply. The City's water agreements can be viewed in Appendix E.

5.2 WELL EVALUATION

Water wells that are properly designed, constructed, and tested can have an operating life of over 50 years. The conditions of the seven (7) producing wells are shown in Table 5-3 below.

Table 5-3: Water Well Conditions

Well No.	Well Depth (ft)	Drill Year	50-Years
3	419	1996	2046
4	325	1982	2032
5	365	1990	2040
9	614	1997	2047
10	630	1995	2045
11	644	1998	2048
12	640	2002	2052

It is recommended that Well No. 4 and Well No. 5 undergo evaluation by a licensed driller as the producing wells reach the 50-year mark of operation to determine remaining years the wells will be functioning properly. For the purpose of this report, it is assumed that both wells will need to be replaced once the wells reach the 50-year mark. Therefore Well No. 4 will need to be replaced in 2032 and Well No. 5 will need to be replaced in 2040.

As mentioned previously the Wilcox Aquifer has been a reliable source of water for Lockhart with the ability of pulling 20 MGD without depleting the water supply. The capacity of the well field is currently 4.33 MGD which is not adequate for meeting projected demands through the intermediate and long-term planning horizons (2033 and 2043). The current seven (7) producing wells are relatively small when it comes to individual capacity. The average pumping rate of the City's wells is 429 gpm. Small/medium water wells are considered to be between 100 to 500 gpm, while large water wells for municipal and agricultural use commonly have a pumping rate from 500 to 4,000 gpm. Constructing additional wells with larger pumping rates will help Lockhart have sustainable water supply for estimated population growth.

Table 5-4 shown below provides the projected demands the City will experience after using water supplied by the two (2) agreements. Therefore, when determining recommended improvements, it is recommended that the City consider the development of additional local wells once their peak water usage rates begin to approach the 3.43 MGD firm well field capacity after the usage of the two (2) water agreements. Firm capacity is used to provide a safety factor if one of the wells is not functioning properly.

Table 5-4: Projected Demands after use of Contracted Water

PEAK DAILY FLOW (MGD)					
Planning Horizon	Year	Lockhart	Luling-Lockhart Agreement	Carrizo Project Agreement	Both Agreements
Supply (MGD)		3.43	1	2.67	3.67
Existing	2023	3.16	2.16	0.49	(0.51)
Near-Term	2028	3.89	2.89	1.22	0.22
Intermediate-Term	2033	4.79	3.79	2.12	1.12
Long-Term	2043	7.26	6.26	4.59	3.59

Values in parenthesis indicate an excess in water due to water agreement's supply being greater than the demand. As stated previously, the City's total well capacity cannot support demands projected in the intermediate and long-term planning horizons without additional water wells or the assistance from water agreements. When considering the firm capacity of the well field, the capacity cannot support the projected demands for any of the planning horizons without the assistance from water agreements. In addition, the Table 5-4 shows that the projected demand cannot be handled during the long-term planning horizon, 2043, even when both water agreements are being utilized.

Additional wells or water supplies are required for the long-term planning horizon if only one of the water agreements are being used, whether it be the Luling-Lockhart Agreement or the Carrizo Project Agreement. Since delivery of the treated water from the agreements is not guaranteed during times of conservation or drought, it is recommended the City consider adding additional wells to meet projected demands with firm capacity of the well field and without the consideration of the Luling-Lockhart Agreement. If the demand can be met by the City's firm well capacity and the treated water from only the Carrizo Project Agreement, then the water supply is deemed adequate. Water supply from the Luling-Lockhart Agreement is excluded to provide a margin of safety in relation to contracted water. The City receives a total of 3.67 MGD contracted water; with the Luling-Lockhart Agreement accounting for 1 MGD of water which makes up about 27% of the contracted water. Therefore, in times of conservation, if the peak demands can be met by 80% of the City's well capacity (largest well out of service) and 73% of the contracted water from agreements, than it should be a sufficient supply of water for the actual demands the City will receive throughout the planning horizons; even when contracted water is reduced in times of conservation. Recommended well improvements will be proposed in Section 5.3.

5.3 Well Improvements & Water Supply

Based on 30 TAC Subsection 290.45 (b)(1)(D)(iii), for water systems with more than 250 connections, the system must have a combined total well capacity of 0.6 gpm per connection. However, the rule also states where an interconnection is provided with another water system capable of supplying at least 0.35 gpm per connection in the combined system, additional wells will not be required as long as the 0.6 gpm per connection is met for each system. Since Lockhart currently only meets the 0.6 gpm per connection requirement with the additional water received

from the agreements, the total contracted water must continue to provide a 0.35 gpm per connection throughout the projected demands for the planning horizons; while the well field capacity plus the total contracted water must meet 0.6 gpm per connection throughout the projected demands for the planning horizons.

It is recommended the City construct two (2) additional water wells in the current well field to replace Well No. 4 and 5. Well No. 4 and 5 will need to be plugged due to reaching the 50-year lifespan of a well. The two (2) recommended replacement wells (Well No. 4.B and 5.B) are proposed to have a greater individual capacity than Well No. 4 and 5, and therefore, increase capacity of the well field. The first proposed well (Well No. 4.B) is recommended to begin construction in 2032 with a pumping capacity of 764 gpm (1.10 MGD), adding 424 gpm (0.61 MGD) more capacity than Well No. 4 produced. The second proposed well (Well No. 5.B) is recommended to begin construction in 2040 with a pumping capacity of 700 gpm (1.01 MGD), adding 461 gpm (0.66 MGD) more capacity than Well No. 5 produced. The size and year of construction was determined based on the size of wells that could be implemented without requiring expansion to the WTP and the year the existing wells reached the 50-year mark life expectancy. The addition of the two (2) replacement wells will upgrade the field well capacity to 5.6 MGD which is about 28% of Wilcox Aquifer's capacity of pumping 20 MGD without depleting its water supply. Table 5-5 shows existing well capacities along with proposed replacement well capacities.

Table 5-5: Existing and Proposed Well Capacities

Well No.	Drill Year	Capacity (gpm)	Capacity (MGD)
EXISTING WATER WELLS			
3	2046	234	0.34
~~4~~	~~2032~~	~~340~~	~~0.49~~
~~5~~	~~2040~~	~~240~~	~~0.35~~
9	2047	400	0.58
10	2045	550	0.79
11	2048	618	0.89
12	2052	624	0.90
Total Capacity		**3,006**	**4.33**
Total Firm Capacity		**2,382**	**3.43**
PROPOSED WATER WELLS			
4.B	2032	764	1.10
5.B	2040	701	1.01
Total Capacity		**3,891**	**5.60**
Total Firm Capacity		**3,127**	**4.50**

With the well replacement improvements, the City's total well capacity will increase to 5.6 MGD with a firm capacity of 4.5 MGD. After adding these two (2) replacement wells, the total water supply capacity will increase to 9.27 MGD, including both water agreements, and is more than

adequate to meet projected demands through 2043. The total water supply capacity minus the water received from the Luling-Lockhart Agreement will increase to 8.27 MGD which is still capable of supporting the peak demand of 7.26 MGD by 2043. However, when considering the new firm capacity of the well field and only the Carrizo Project Agreement, the water supply capacity is 7.17 MGD which is not adequate through 2043. Therefore, it is recommended that the City secure one (1) additional water agreement by 2043 for 1 MGD to provide more reassurance that the City's demand can always be met even in times of drought. The City has been in discussion with the Guadalupe-Blanco River Authority (GBRA) about an upcoming project called WaterSECURE where GBRA plans to build infrastructure to bring around 90-160 MGD to the surrounding areas by Lockhart. Therefore, GBRA is a good avenue for the additional 1 MGD water agreement and for additional water beyond the planning horizons.

As stated at the beginning of this section, total well capacity is required to meet 0.6 gpm per connection which can only be done when the City's interconnections are considered (water agreements). That means the total contracted water must provide 0.35 MGD per connection throughout the planning horizons. In 2030, the City would no longer meet the 0.35 MGD of contracted water per connection. Even if the City adds the recommended additional water agreement in 2030, the City would only be extending meeting this requirement to 2036. In order to comply with the 0.35 MGD per connection through 2043, a water agreement of 3 MGD would be needed. If the city acquires a water agreement for 3 MGD along with the needed well improvements, the City's water supply capacity would increase to 12.27 MGD. In relation to the City's peak demand by 2043, the supply capacity would be approximately 5 MGD greater than the projected peak demand. Due to that being an excessive amount of water supply for project peak demands, it is recommended that the City request an ACR (Alternative Capacity Requirement) for 30 TAC Subsection 290.45 (b)(1)(D)(iii) asking for a deduction in both the 0.35 per connection for interconnections requirement and for the 0.6 per connection for total well capacity. It is recommended that the City ask for both of these ACRs by 2030.

Therefore, all recommended improvements to the City's well capacity and water supply consist of:

- apply for an ACR for 30 TAC Subsection 290.45 (b)(1)(D)(iii) in relation to well capacity per connection and interconnections capacity per connection (2030),
- replacing 2 old wells for new wells with greater capacity (2032 and 2040), and
- acquire an additional water agreement for 1 MGD by 2043.

Recommended improvements in relation to projected demands can be seen in Table 5-6 below.

Table 5-6: Recommended Well Improvement Projects by Planning Horizon

PEAK DAILY FLOW (MGD)						
Planning Horizon	Lockhart's Projected Demand	Demand - Carrizo Water Supply	Proposed Improvements	Year	Firm Capacity after Proposed Improvements	Demand - Firm Capacity + Additional Water
2023	3.16	0.49	-	-	3.43	(2.94)
2028	3.89	1.22	-	-	3.43	(2.21)
2033	4.79	2.12	ACR Request	2030	3.49	(3.49)
			Add 1.10 MGD Well	2032		
2043	7.26	4.59	Add 1.01 MGD Well	2040	4.5	(0.91)
			Find 1 MGD Water Agreement	2043		

*Luling-Lockhart Agreement excluded to provide margin of safety for contracted water

Table 5-6 shows the year the alternative capacity request is needed, the construction years chosen for the proposed water wells due to the existing wells reaching the 50-year mark, and the year an additional water contract is needed to meet projected demands with the firm capacity of the well field and contracted water received from the Carrizo Project Agreement.

5.4 Cost Estimate

Cost estimates for the proposed water well improvements based on today's cost (2024) including construction and engineering are shown in Table 5-7.

Table 5-7: Proposed Water Well Improvements

Item	Quantity		Description	Unit Price[1]	Cost
1	1	LS	ACR Request to TCEQ	$11,400	$11,400
2	1	LS	764 gpm Raw Water Well	$1,450,000	$1,450,000
3	1	LS	701 gpm Raw Water Well	$1,400,000	$1,400,000
4	20	yr	1 MGD Water Agreement [2]	$56,000	$1,120,000
			TOTAL		**$2,915,400**

(1) Unit Prices include estimated installation costs and estimated engineering costs
(2) Assumed 20-year Agreement

6.0 WATER TREATMENT PLANT EVALUATION AND RECOMMENDATIONS

6.1 WATER TREATMENT PLANT

The Lockhart Water Treatment Plant (WTP), located at 547 Old McMahan Trail, receives and treats groundwater from the City's well field, situated southeast of the City. Each of the wells pump into a 300,000-gallon raw water storage tank, which has booster pumps to pump the water to the WTP. The WTP was upgraded in 2000 to provide a capacity of 5.7 MGD, increased from the previous 2.9 MGD. An overview of the WTP site can be seen in Figure 6-1 below.

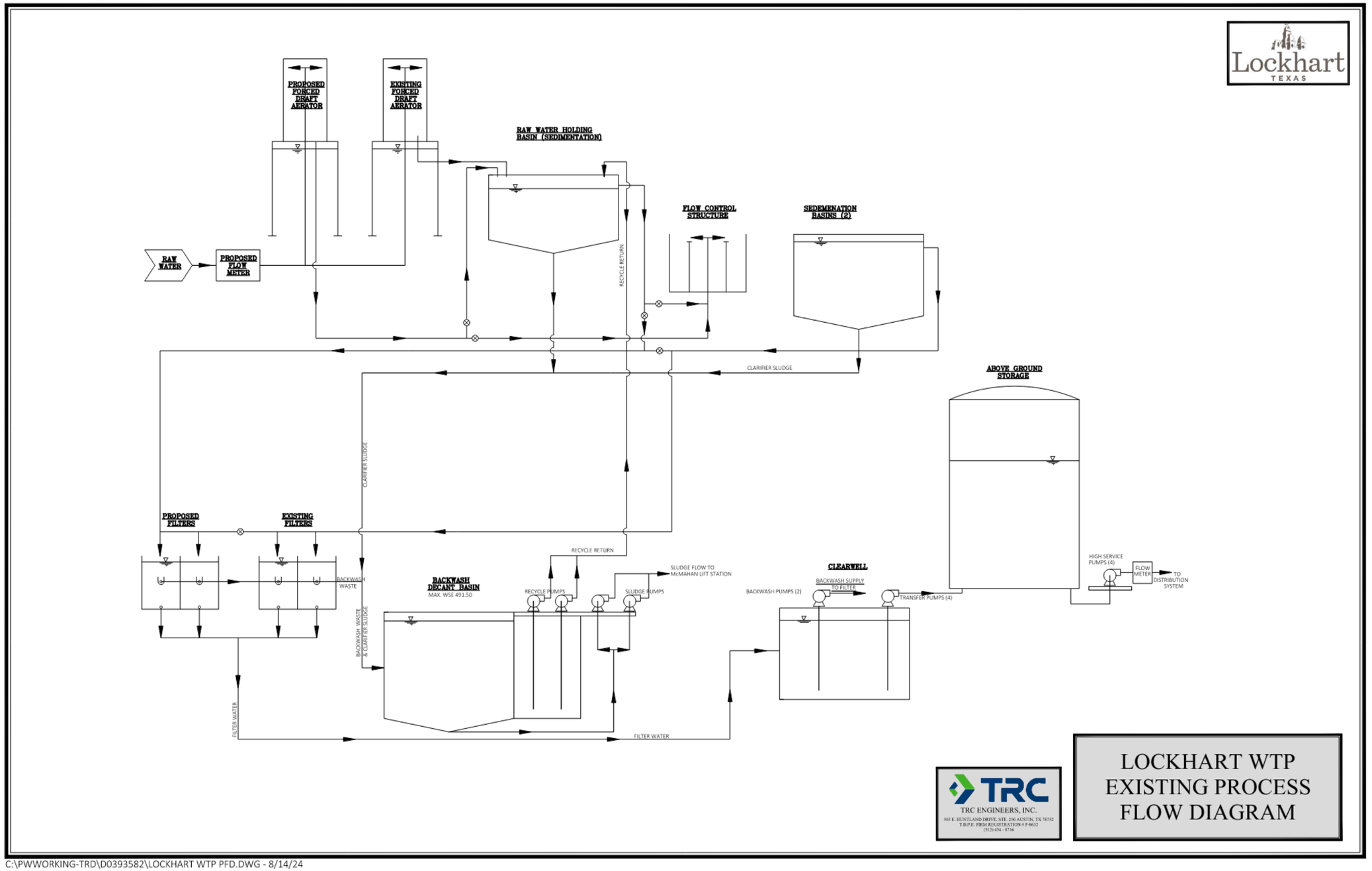
Figure 6-1: Water Treatment Plants Location

6.2 TREATMENT PROCESS

The plant consists of raw water metering, forced draft aeration, clarification, filtration, chemical feed, clearwell, ground storage reservoir, high service pumps, treated water metering and backwash/sludge reclamation basin. The plant upgrade in 2000 included the addition of a second forced draft aerator; two (2) new filter units; rehabilitation of two (2) existing filters; new chemical feed equipment; the backwash/sludge reclamation basin; flow meters; water system Supervisory Control and Data Acquisition (SCADA) system to provide complete automated monitoring and control of the entire water system including the plant, wells, distribution operations, and miscellaneous plant improvements.

Although the facility has always treated ground water exclusively, the treatment processes the WTP uses produces treated water that exceeds the ground water requirements set by TCEQ. This is primarily due to the high content of iron found in the raw groundwater. A process flow diagram of the WTP is shown in Figure 6-2.

Figure 6-2: Process Flow Diagram – Water Treatment Plant



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6.3 Future Water Use

The City's future water use projections shown in Table 6-1 were derived from the future population projections and the per capita water demands shown in Table 2-4. These projections were used for determining recommendations for future improvements to the water system.

Table 6-1: Estimated Water Service Peak Demand

WATER TREATMENT PEAK DEMAND MGD:	Volume			
	2023	2028	2033	2043
Existing Capacity (MGD)	5.70	5.70	5.70	5.70
Estimated Demand	3.16	3.89	4.79	7.26
Estimated Demand minus Luling Supply (a)	2.16	2.89	3.79	6.26
Estimated Demand minus Carrizo Supply (b)	0.49	1.22	2.12	4.59
Estimated Demand minus Luling & Carrizo Supply (c)	-0.51	0.22	1.12	3.59
Excess/(Deficiency)	2.54	1.81	0.91	(1.56)
Excess/(Deficiency) - Luling Supply	3.54	2.81	1.91	(0.56)
Excess/(Deficiency) - Carrizo Supply	5.21	4.48	3.58	1.11
Excess/(Deficiency) - (Luling+Carrizo Supply)	6.21	5.48	4.58	2.11

(a) Luling Supply assumed to be 1 MGD from Luling-Lockhart Agreement.
(b) Carrizo Supply assumed to be 2.67 MGD from Carrizo Project Agreement.
(c) Luling+Carrizo Supply assumed to be 3.67 MGD from both agreements.

6.4 Future Water Treatment Needs

6.4.1 Treatment Capacity

The current treatment capacity of 5.7 MGD will provide adequate water supply for the projected average and maximum daily water usage through the year 2033. When evaluating demands through the long-term planning horizon (2043), the WTP's capacity alone or with the additional water from the Luling-Lockhart Contract is not suitable to handle projected demands. However, with the additional water received from both contracts, the Luling-Lockhart Agreement and the Carrizo Project Agreement, the city's water supply is more than adequate to meet projected demands.

Using the same reasoning as implemented during the Well's evaluation, if the peak demand can be met by the City's WTP capacity and the treated water from the Carrizo Project Agreement, then the water supply is deemed adequate. The reasoning behind demand being met without the consideration of the Luling-Lockhart Agreement was determined to provide a safety factor in relation to contracted water. The City receives a total of 3.67 MGD of contracted water with the Luling-Lockhart Agreement accounting for 1 MGD of water which makes up about 27% of the contracted water. Therefore, in times of conservation, if the peak demands can be met by 73% of the contracted water from the City's agreements it should be a sufficient amount of treated water to meet the actual demands the City will receive throughout the planning horizons even in times of drought. As shown in Table 6-1, the WTP is able to meet projected demands throughout the

planning horizons with the additional water received from the Carrizo Project Agreement. Therefore, no expansion to the WTP is necessary.

6.5 TREATMENT SYSTEM IMPROVEMENTS

The present ground storage capacity at the water treatment plant is 2,300,000 gallons consisting of one (1) underground concrete reservoir with the capacity of 300,000 gallons and one (1) above ground steel reservoir with the capacity of 2,000,000 gallons. Present ground storage capacity is adequate through the Year 2043.

Therefore, the only cost associated with the WTP is the construction of two (2) replacement wells, the ACR request to TCEQ, and one (1) additional water agreement for 1 MGD as proposed in Section 5.3.

6.6 COST ESTIMATE

Cost estimates for all the improvements proposed, based upon today's cost, including construction and engineering are shown in Table 6-2. Each proposed improvement is listed by the planning horizon it must be constructed by (2028, 2033, or 2043).

Table 6-2: Recommended Water Treatment Plant Improvement Projects by Planning Horizon

WATER		
Description	**Cost**	**Project Horizon**
WELLS		
ACR Request to TCEQ	$11,400	2033
Well No. 4.B	$1,450,000	2033
Well No. 5.B	$1,400,000	2043
TOTAL	**$2,861,400**	
WATER AGREEMENTS		
1 MGD of Treated Water (20 year-agreement)	$1,120,000	2043
TOTAL	**$1,120,000**	
TREATMENT		
Miscellaneous	$0	-
TOTAL	**$0**	
TOTAL WATER		**$2,915,400**

7.0 WASTEWATER TREATMENT PLANTS EVALUATION AND RECOMMENDATION

7.1 WASTEWATER TREATMENT PLANTS

The City of Lockhart has two (2) wastewater treatment facilities to receive and treat the raw sewage production from the City residences and businesses. WWTP No. 1 was upgraded in 1986 and WWTP No. 2 was initially placed into operation in February 1999. Both plants are operated by the Guadalupe-Blanco River Authority, who has the responsibility for meeting the effluent requirements imposed by the TCEQ. The combined plant capacity is 2.6 MGD design flow and 8.5 MGD peak flow, which is adequate to meet the City's needs through the year 2033. However, additional treatment capacity is required in order to handle the projected long-term demands through year 2043. An overview of the WWTP sites can be seen in Figure 7-1 below.

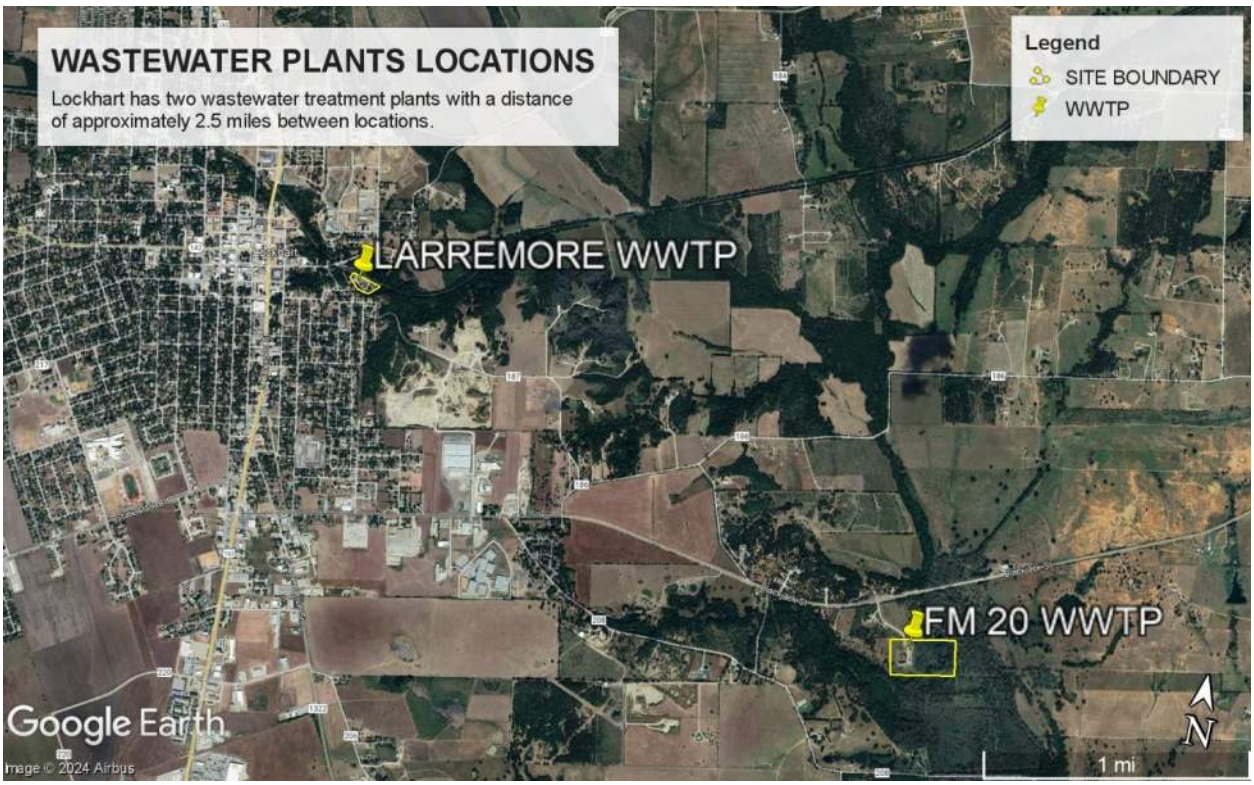


Figure 7-1: Wastewater Treatment Plants Locations

The City's wastewater treatments needs were elevated based on three (3) main criteria:

- The City's projected demands through the planning horizons: near-term (2023-2028), intermediate (2029-2033), and long-term (2034-2043), as discussed in Section 2.3 – Wastewater Flow Projections and shown in Table 2-6;
- Plants' location along with site and equipment conditions; and

- TCEQ 75/90 Rule requirements.

To determine the best suited actions for expanding the City's wastewater treatment capacity, each plant was evaluated individually and then considered as a whole unit.

7.2 LARREMORE (WWTP NO. 1)

Located at 109 Larremore Road east of downtown Lockhart, WWTP No. 1 (Larremore) was the City's only wastewater treatment facility until WWTP No. 2 (FM20) was constructed and placed into service in early 1999. Larremore received major upgrades in 1950 and 1986. The 1986 upgrade included construction of several process basins and replacement of most process equipment within the existing concrete structures. The plant has a design capacity of 1.1 MGD and a peak capacity of 4.0 MGD. The treatment plant is operated in the contact stabilization mode of the activated sludge process. An overview of the Larremore WWTP site can be seen in Figure 7-2 below.

Figure 7-2: Larremore WWTP Site Map

7.2.1 Raw Sewage Influent

Raw sewage drains to the WWTP through a 24-inch gravity sewer, entering the relief lift station on the property's northwest side near the plant site entrance. Originally used to split a portion of the raw sewage influent for treatment at the FM 20 WWTP, the relief lift station now acts as a pass-through structure, allowing all wastewater to flow by gravity to the headworks for treatment. During a power outage at the plant, the two 50-hp Gorman-Rupp self-priming pumps, rated at 1,250 gallons per minute (gpm) each, can transfer incoming wastewater to FM 20. A dedicated 125 kVA Cummins diesel generator provides emergency power to the lift station.

By redirecting the discharge from the plant drain lift station, the relief lift station is also used to regularly transfer waste activated sludge to the FM 20 WWTP.

The pumps were recently replaced and are in excellent condition. The concrete structure and other equipment appear to be in good condition.

Figure 7-3: Generator & Relief Lift Station Pumps

7.2.2 Headworks

Raw sewage drains from the Relief Lift Station through a 15-inch pipe to the headworks structure, consisting of two screening channels followed by a Parshall flume. The primary screening channel is equipped with a chain-driven catenary style mechanically cleaned bar screen, discharging screenings waste into a rolling dumpster adjacent to the channel. The bypass channel is fitted with a manually cleaned bar rack. Each channel has a slide gate at each end, allowing isolation for maintenance. The flume is no longer used for flow measurement. The screening equipment, slide gates, and concrete structure appear to be in fair condition.

7.2.3 Aeration Basins

Figure 7-4: Aeration Basin

Screened sewage drains from the headworks effluent chamber through an 18-inch pipe to the aeration basins. The aeration basin structure is split into two chambers, consisting of the contact aeration zone on the north side and the re-aeration zone on the south side of the structure, separated by a concrete wall. Air is introduced to the basins through an airbridge platform centered on the divider wall with dropdown pipes to each of the eight (8) air headers. The airbridge, headers, and air supply piping is constructed of galvanized steel and appears to be in fair condition, with some surface corrosion visible. Based on observation and input from operating staff, many of the approximately 120 coarse-bubble diffusers appear to be clogged or broken, resulting in poor air flow patterns in the basin.

Figure 7-5: Aeration Basin Pumps

Return activated sludge (RAS) is discharged into the aeration basin from the clarifiers by four (4) airlift pumps on the east end of the structure. The airlift pumps were recently replaced and appear to be in good condition. The concrete structure appears to be in fair condition.

Figure 7-6: Primary Clarifier

7.2.4 Clarification

From the aeration basin effluent chamber, mixed liquor flows by gravity to the clarifiers through an 18-inch pipe. There are two final clarifiers, normally operated in series; mixed liquor drains to the 'primary' clarifier, and its clarified effluent drains through an 18-inch pipe to the smaller 'secondary' clarifier for polishing. A chlorine solution is fed into the effluent launders for algae control. WAS from the primary clarifier is sent to the aerobic digester by airlift pump. RAS from both clarifiers is sent to the aeration basin by airlift pumps. The clarifier equipment was recently upgraded and appears to be in excellent condition. Concrete structures are well maintained and appear to be in good condition.

7.2.5 Chlorine Disinfection

Polished effluent drains from the secondary clarifier through an 18-inch pipe to the chlorine contact chamber. A 1-inch pipe from the chlorination system feeds the chlorine solution through a perforated pipe at the inlet baffle of the chamber. Two (2) 2-inch air drops with a 36" draft tube in the center of the chamber provides mixing and post-aeration. The effluent is dechlorinated prior to release to the outlet box. The outlet box is fitted with a v-notch weir for flow measurement with an ultrasonic level sensor.

Figure 7-7: Secondary Clarifier

A skid-mounted pump at the chlorine contact chamber provides non-potable water for use throughout the plant. The onsite potable water line ends at the operations building, providing water for the laboratory and restroom.

7.2.6 Outfall

The outfall releases treated effluent to the Town Branch tributary to Plum Creek. After leaving the site, the effluent ditch drains through a box culvert crossing to the north under the Union Pacific Railroad track. During heavy rain events, the box culvert can become backed up, restricting the discharge of treated effluent from the site.

Figure 7-8: Outfall Point

7.2.7 Sludge Handling

Waste activated sludge from the clarifiers and the aeration basin is aerated in the aerobic digester and transferred by airlift pump to the sludge holding basin for thickening. The airlift pump and the draft tube mixing equipment were recently replaced and are in good condition. Supernatant from the thickener is returned to the aeration basin by airlift pump.

In the original plant design, thickened sludge was pumped from the sludge holding basin to the sludge drying beds near the headworks for dewatering and disposal. The drying beds are no longer in use. Instead, sludge from the digester and thickener is drained to the plant drain lift station, valves on the pump discharge line are closed, and the sludge is pumped to the relief lift station. The relief lift station transfers the sludge to the FM 20 WWTP for treatment.

7.2.8 Blowers

The blower building is centrally located on the south side of the site and provides air for the aeration process, sludge digestion, basin mixing, and multiple airlift pumps. The air system consists of three 100-hp centrifugal blowers manufactured by Lamson, each capable of producing approximately 8,750 CFM. The blowers are relatively quiet and appear to be in fair condition.

Figure 7-9: Blowers

Figure 7-10: Drain Lift Station Pumps

7.2.9 Plant Drain Lift Station

The plant drain lift station is centrally located on the north side of the site, collecting drainage from each of the process basins and pumping through a 6-inch force main to the headworks structure downstream of the parshall flume. The lift station is equipped with three (3) 7.5-hp Gorman-Rupp self-priming pumps, each rated for approximately 250 gpm. The pumps were replaced in April 2024 and are in new condition.

7.2.10 Electrical System

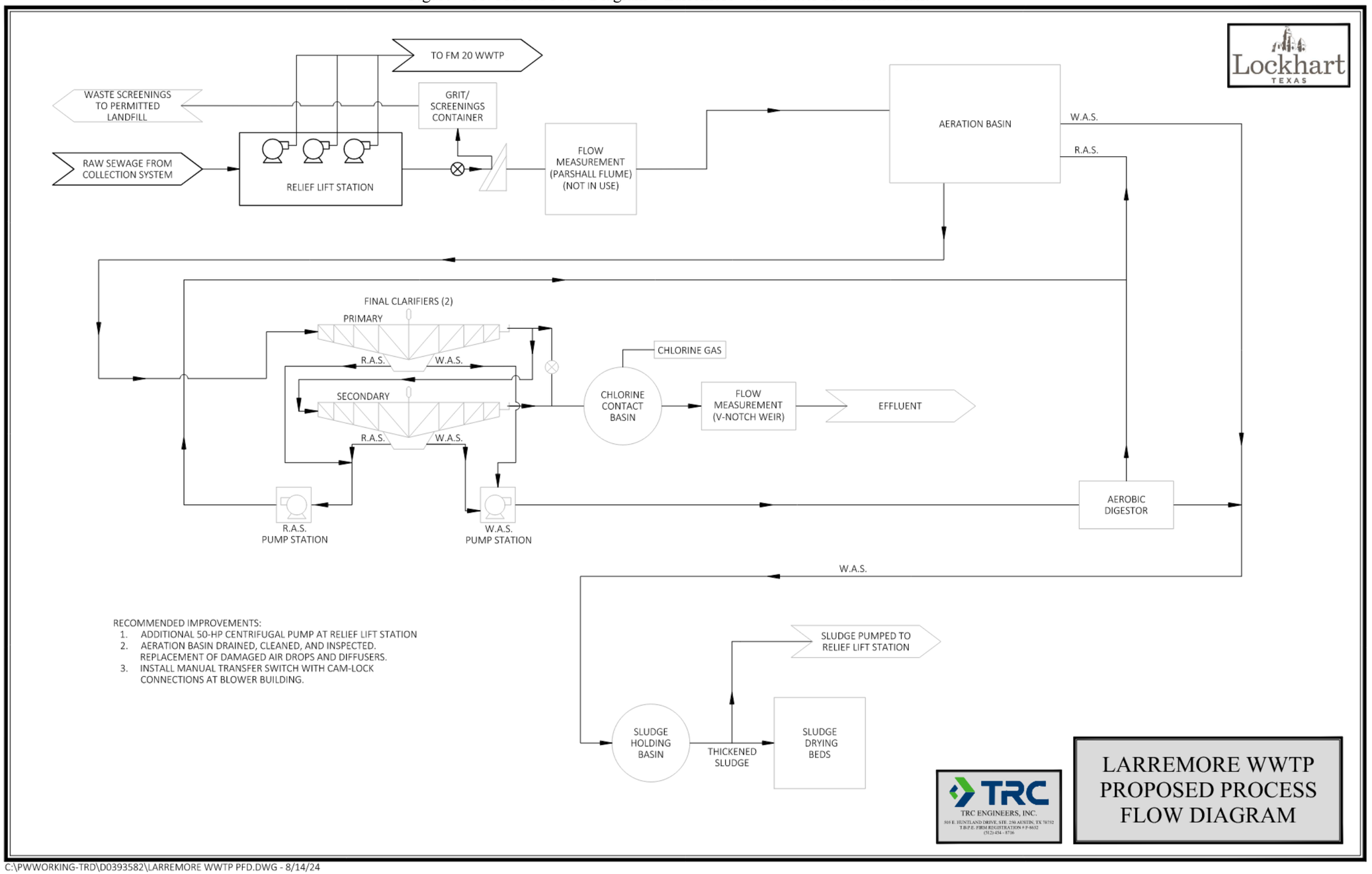
Most of the electrical equipment at the facility was installed before or during the last expansion at the facility in 1985. Based on input from operating staff, replacement components for motor control centers and breaker panels are no longer in production and are difficult to find. Due to the eventual decommissioning of the Larremore WWTP, costly electrical system replacement is not recommended at this time.

The onsite emergency generator is sized to provide power only for the relief lift station during a power outage, allowing transfer of raw sewage for treatment at the FM 20 WWTP. While this would prevent a potential untreated discharge at the Larremore WWTP, an extended outage may result in low oxygen concentration in the aeration basins and cause colony die-off. Extensive colony die-off can disrupt the treatment process and result in an extended re-establishment period.

7.2.11 Treatment Process

A process flow diagram of the Larremore WWTP is shown in Figure 7-11.

Figure 7-11: Process Flow Diagram – Larremore Wastewater Treatment Plant



7.3 LARREMORE RECOMMENDED IMPROVEMENTS

Based on observations from the site visit to WWTP No. 1 and input from treatment plant operational staff and the City, the following improvements/upgrades are recommended. Since this WWTP will eventually be decommissioned and all of the City's wastewater treated at the FM 20 WWTP, extensive or costly improvements to the facility are not recommended. The following sections detail improvements for the remaining life cycle of the Larremore WWTP.

7.3.1 Aeration Basin Improvements

Many of the approximately 120 air drops with coarse-bubble diffusers in the aeration basin appear to be damaged, loose, or missing, resulting in uneven airflow and poor mixing within the basin. Insufficient aeration can create dead spots, resulting in an inefficient treatment process and increasing the likelihood of ammonia spikes. It is recommended that the aeration basin is drained, cleaned, and inspected. Damaged air drops and diffusers should be replaced. The contents of the basin can be drained to the plant drain lift station and transferred to the FM 20 WWTP, similar to the sludge transfer process.

While not an immediate issue, it is recommended that this project is completed within the next 18 months to improve treatment efficiency and reduce the risk of further decline.

Table 7-1: ROM Construction Cost – Aeration Basin

Item	Quantity		Description	Unit Price	Cost
1	1	LS	Drain, Clean, and Inspect Aeration Basin	$40,000	$40,000
2	1	LS	Replace Air Drops and Diffusers(1)	$30,000	$30,000
3	1	LS	Miscellaneous Structure/Equipment Repair(2)	$25,000	$25,000
			TOTAL		**$95,000**

(1) Assumed that 25% of air drops require replacement.
(2) Allowance for unforeseen structural or equipment repairs.

7.3.2 Connection for Temporary Generator

The existing backup generator at the facility is sized only to power the relief lift station pumps to allow transfer of incoming raw sewage for treatment at the FM 20 WWTP. While the lift station would allow incoming raw sewage to be pumped offsite and prevent an overflow, extended outages (more than 12 hours) without the blowers during summer temperatures could result in a die-off of the bacterial colony and severely disrupt the treatment process. To prevent disruption, it is recommended that a manual transfer switch with cam-lock connections is installed at the blower building. This would allow a mobile generator to provide temporary power to the blowers during an extended outage.

Since the relief lift station will allow raw sewage to be diverted away from the Larremore WWTP, this upgrade is not required by TCEQ. However, the ability to continue aeration during an extended

power outage allows operational flexibility between the two treatment plants and improved continuation of treatment once power has been restored.

Table 7-2: ROM Construction Cost – Temporary Generator

Item	Quantity		Description	Unit Price[1]	Cost
1	1	LS	600A Manual Transfer Switch with Cam-lock Connections	$55,000	$55,000
2	1	LS	Safety Disconnect Switch	$15,000	$15,000
3	1	LS	Electrical Equipment	$40,000	$40,000
			TOTAL		**$110,000**

(1) Unit Prices include estimated installation costs.

7.3.3 Relief Lift Station Capacity Expansion

The existing firm pumping capacity of the relief lift station is 1,250 gpm (1.8 MGD). To meet TCEQ requirements for firm pumping capacity meeting or exceeding the peak flow capacity of the WWTP, it is recommended that the lift station capacity is increased to 2,800 gpm (4.0 MGD) with one pump out of service. This could be accomplished by increasing the capacity of each pump to 1,400 gpm and adding a third pump.

Table 7-3: ROM Construction Cost – Relief Lift Station Expansion

Item	Quantity		Description	Unit Price[1]	Cost
1	3	EA	10" Self-Priming Pumps	$85,000	$255,000
2	1	LS	Structural Modifications	$80,000	$80,000
3	1	LS	Electrical System Upgrades	$125,000	$125,000
4	1	LS	Pipe, Valves, and Accessories	$75,000	$75,000
			TOTAL		**$535,000**

(1) Unit Prices include estimated installation costs.

7.4 FM20 (WWTP No.2)

Construction of WWTP No. 2 (FM20) was completed in 1999. The plant has a design capacity of 1.5 MGD and a peak capacity of 4.5 MGD, but the site layout was designed to allow expansion of the facilities to 4.5 MGD design and 13.5 MGD peak. The screenings and grit removal units will handle a capacity of 3.0 MGD design and 9.0 MGD peak. The facility is located on a 20.9-acre site on FM 20, southeast of town. An overview of the FM 20 WWTP site can be seen in Figure 7-12 below.

Figure 7-12: FM 20 WWTP Site Map

7.4.1 Raw Sewage Influent

Raw sewage drains to the plant by gravity through a 24-inch pipe, entering a manhole upstream of the headworks. The manhole is used by hauler trucks to dump septage waste at the facility. Receiving septage waste increases odors and contributes significant solids to the waste stream.

7.4.2 Headworks

Raw sewage enters the screening channels, with the primary screening channel equipped with a mechanically cleaned climber screen and the bypass channel fitted with a manually cleaned bar

rack. Screened solids are discharged into a roll-off dumpster by a belt conveyor. The climber screen was recently rebuilt, with new motor, chains, and gears/wheels and is in good condition.

Screened wastewater flows into the aerated grit chamber, and settled grit slurry is pumped into the grit classifier by an airlift pump. A 36-inch diameter shear tube with two (2) 2-inch air drops provide mixing and aeration for the grit chamber. Structural repairs to failed concrete between the screening channels and grit chamber were performed within the past few years and appears to be in good condition. The grit classifier and airlift feed pump were installed as part of a recent upgrade and are in like-new condition.

7.4.3 Aeration Basin

Screened and de-gritted wastewater flows by gravity from the grit chamber through a 24-inch pipe to the aeration basin. The aeration basin is a carrousel-style oxidation ditch, operated in the complete-mix activated sludge process. The basin is equipped with two (2) vertical surface aerators with 100-hp motors for aeration and mixing. Each of the aerators Mixed liquor flows over an adjustable 12-foot weir to the effluent box, where the flow is split between the two final clarifiers. Return activated sludge is returned to the aeration basin through a 12-inch pipe from the RAS pump station. The aeration basin equipment and concrete structure are well-maintained and appear to be in good condition.

Figure 7-13: Aeration Basin

7.4.4 Clarification

Figure 7-14: Clarifiers

Mixed liquor flows from the aeration basin effluent box through 16-inch pipes to the two (2) final clarifiers, operated in parallel. Return activated sludge drains from each clarifier to the RAS/decant wetwell. The RAS pump station consists of three (3) Gorman-Rupp self-priming centrifugal pumps, connected to a 12-inch force main for return to the aeration basin.

The clarifiers, RAS wetwell, sludge thickener, and sludge holding basin are part of a single concrete structure, using common wall construction. The clarifier equipment and concrete structure appear to be in good condition.

Figure 7-15: RAS Pump Station

7.4.5 UV Disinfection

Figure 7-16: UV Disinfection Channels

Clarified effluent drains by gravity from the clarifier troughs through an 18-inch pipe to the UV disinfection system. The UV disinfection equipment used at the facility was installed in 1999. The system consists of a single concrete channel fitted with five (5) vertical disinfection modules installed in series. Each module contains 40 lamps controlled by 5 ballasts. Each module must be periodically lifted out of the channel by overhead crane and moved to the cleaning basin for scale removal with an acid solution. The system is covered by an open-sided shade structure, protecting the equipment from sun and weather damage. The equipment and structure appear to be in good condition.

7.4.6 Flow Measurement

Downstream of the UV chamber is the post-aeration basin and outlet box, fitted with a v-notch weir for flow measurement. A 15-hp vertical turbine pump pulls water from the basin for non-potable water use throughout the plant. The structure and equipment appear to be in good condition.

Figure 7-17: Post Aeration Basin and Outlet Box

7.4.7 Sludge Handling

Waste activated sludge collected at the bottom of each clarifier sump and scum collected by the scum troughs is sent by airlift pumps to the thickener pre-mix basin on the east side of Clarifier No. 1. From the pre-mix basin, the sludge drains by gravity to the thickener. Thickened sludge at the bottom of the thickener is pumped into the sludge holding basin to the north by airlift pump. Supernatant from the top of the thickener drains by gravity to the RAS wetwell. The sludge holding basin is equipped with coarse bubble diffusers for aeration. A 6-inch pipe at the bottom of the sludge holding basin is connected to the sludge pumps in the equipment building. Sludge basin equipment and concrete structure are well maintained and are in good condition.

Figure 7-18: Sludge Holding Basin

The sludge is pumped by two (2) 10-hp Moyno progressing cavity sludge pumps to the belt filter press. Polymer is injected and mixed with the sludge by an in-line mixer downstream of the sludge pumps. The polymer feed system was recently replaced with a Polyblend skid system with peristaltic pumps and is in new condition.

The belt filter press is a 2.0-meter Klampress Type 85, manufactured by Ashbrook Alfa Laval. It has been in operation since the plant was completed in 1999 and is showing signs of age, including excess wear on rollers and bearings, spot corrosion, and frequent downtime for repair and maintenance. It was recently refurbished and appears to be in fair condition.

Figure 7-19: Sludge Pumps

Figure 7-20: Belt Press

7.4.8 Blowers

Figure 7-21: Blowers

Air is provided to the pre-mix box, sludge holding basin, and airlift pumps by two (2) 40-hp centrifugal blowers manufactured by Gardner Denver. The blowers and piping appear to be in good condition.

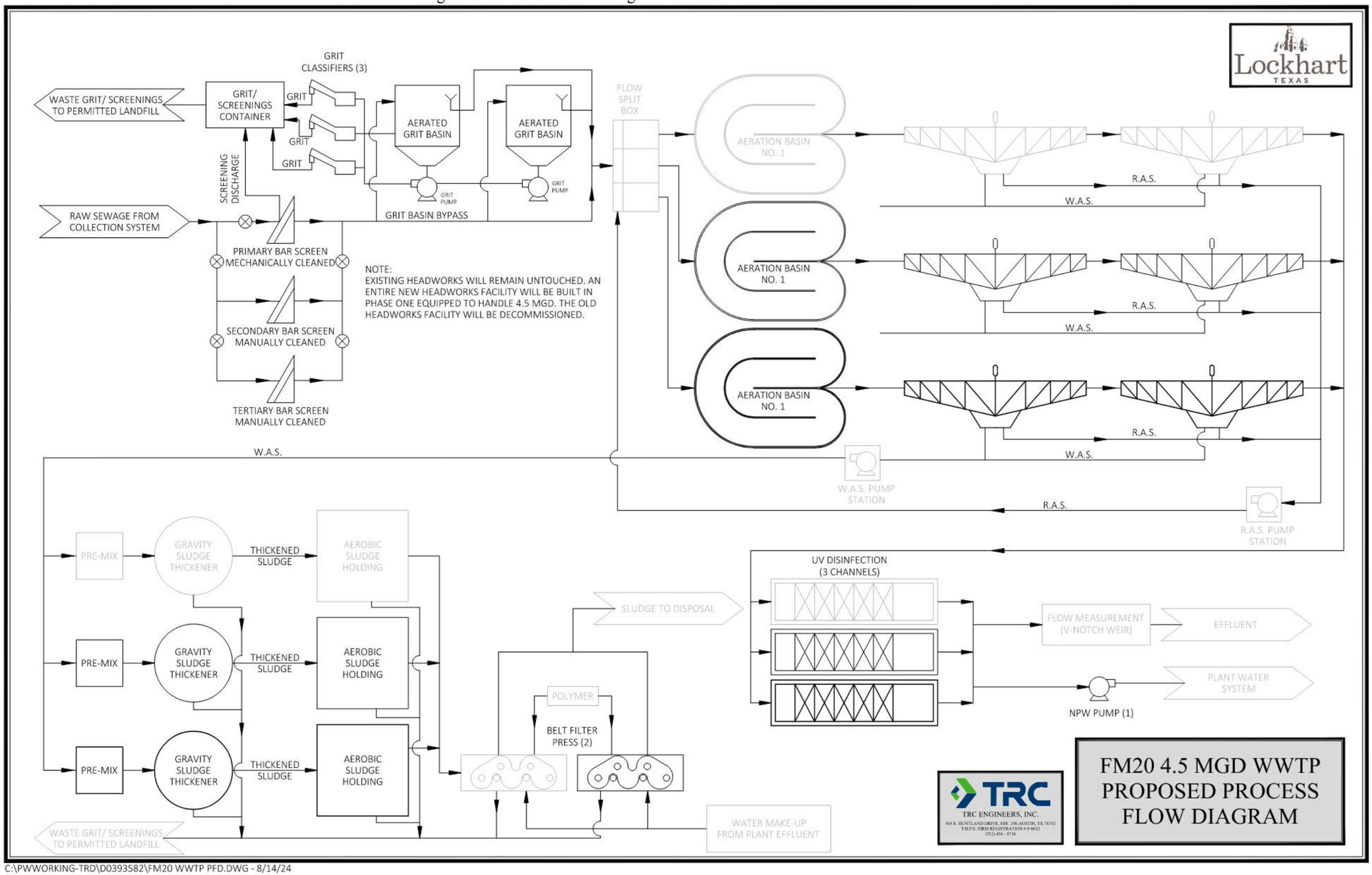
7.4.9 Generator

Emergency power is provided to the facility by a 350kW diesel generator manufactured by Caterpillar. It is sized to provide enough power to run the entire treatment plant during an outage. It is equipped with an all-weather enclosure and appears to be in good condition.

7.4.10 Treatment Process

A process flow diagram of the FM 20 WWTP is shown in Figure 7-22.

Figure 7-22: Process Flow Diagram – FM 20 Wastewater Treatment Plant



7.5 FM20 Recommended Improvements

Based on observations from the site visit to WWTP No. 2 and input from treatment plant operational staff, the following improvements/upgrades are recommended.

7.5.1 Septage Receiving

Figure 7-23: Septage Receiving Unit

The treatment facility receives waste from septage haulers, which is discharged into a manhole directly upstream of the headworks. This septage waste can be up to 80 times more concentrated than municipal wastewater, and commonly contains solid materials including rags, rocks, clothing, grease, plastic, and other trash that can be problematic to the treatment process. Most of this material is captured by the mechanical screen and conveyed to the screening dumpster. However, some of it passes the screen and makes its way to the grit chamber and eventually to the process basins, where it breaks down to form stringy solids. These solids tend to attach to one another, forming long ropy material that will cling to and damage equipment. Aerating rotors, diffusers, gates, pumps, valves, and weirs can become clogged, requiring additional downtime for cleaning and maintenance. To improve operability of the plant, it is recommended that an acceptance or receiving unit specifically designed for handling septage waste is installed upstream of the mechanical screen.

These units are self-contained, providing all necessary screening, washing, compaction, dewatering, and conveyance of solid material to a container for disposal. An optional accessory is an automated billing system, where users are issued a code or keycard for a more streamlined and secure discharge process. Other options include a pH detection feature, shutting down the system if incoming septage falls outside of pre-set ranges.

There is not an immediate need for the addition of this equipment but is a recommended upgrade to protect the facility's treatment equipment from unwanted debris and unauthorized or harmful discharges.

Table 7-4: ROM Construction Cost – Septage Receiving

Item	Quantity		Description	Unit Price[(1)]	Cost
1	1	LS	Septage Receiving Station Equipment	$450,000	$450,000
2	1	LS	Concrete Foundation	$60,000	$60,000
3	1	LS	Electrical Equipment	$125,000	$125,000
4	1	LS	Pipe, Valves, and Accessories	$75,000	$75,000
5	1	LS	Demolition	$15,000	$15,000
6	1	LS	Canopy Structure (Optional)	$50,000	$50,000
			TOTAL		**$785,000**

(1) Unit Prices include estimated installation costs.

7.5.2 UV System Improvements

The UV disinfection equipment currently in use at the facility was installed in 1999. It is first-generation technology and is outdated, with each of the five (5) modules using 40 lamps controlled by 5 ballasts. Each module must be periodically lifted out of the channel by overhead crane and moved to the cleaning basin for scale removal with an acid solution. It is advised that the UV equipment is removed and replaced with modern energy efficient high-intensity UV equipment with fewer lamps and ballasts. Modern equipment is typically self-cleaning with mechanical wipers and motorized to extend lamp banks out of the channel, eliminating the need to manually remove the modules for maintenance. The existing concrete channel structure will likely require modification or extension for installation of new disinfection equipment.

Figure 7-24: Ultraviolet Disinfection Illustration

The control panel can be fully integrated into a system's SCADA system, allowing operators to remotely monitor and control the equipment, receiving the status of lamp banks.

It is recommended that the UV disinfection equipment is upgraded within the next 18-24 months, providing improved reliability and ease of operation.

Table 7-5: ROM Construction Cost – UV System

Item	Quantity		Description	Unit Price[(1)]	Cost
1	1	LS	UV Disinfection Equipment	$480,000	$480,000
2	1	LS	Concrete Channel Extension	$125,000	$125,000
3	1	LS	Level Control Gates	$90,000	$90,000
4	1	LS	Electrical System Upgrades	$72,000	$72,000
5	1	LS	Temporary Bypass Disinfection	$40,000	$40,000
			TOTAL		**$807,000**

(1) Unit Prices include estimated installation costs.

7.5.3 Belt Filter Press

The sludge belt filter press was installed as part of the original plant construction and is showing signs of age, including excess wear on rollers and bearings, spot corrosion, and frequent downtime for repair and maintenance. To provide redundancy for sludge dewatering, it is suggested that a 2nd belt filter press is installed, similar in size and capacity to the existing belt filter press. Additionally, a sludge belt conveyor and an additional sludge dumpster pad are recommended. The polymer feed system was recently upgraded, and it is assumed that additional upgrades will not be necessary for the addition of a 2nd belt press.

Based on input from operational staff, the belt and some roller components of the existing press were recently refurbished and should be reliable for the next 1-2 years. A second belt press will be needed for the next phase of the treatment plant but would be a useful improvement for sludge handling prior to expansion.

Table 7-6: ROM Construction Cost – Belt Filter Press

Item	Quantity		Description	Unit Price[(1)]	Cost
1	1	LS	2.0 Meter Belt Filter Press	$391,000	$391,000
2	1	LS	Concrete Foundation and Walls	$63,000	$63,000
3	1	LS	Belt Conveyor	$100,000	$100,000
4	1	LS	Canopy Extension	$36,000	$36,000
5	1	LS	Pipe, Valves, and Accessories	$75,000	$75,000
6	1	LS	Electrical and Lighting	$150,000	$150,000
7	1	LS	Dumpster Pad Extension	$45,000	$45,000
			TOTAL		**$860,000**

(1) Unit Prices include estimated installation costs.

7.6 Future Wastewater Flows

The future wastewater flows are given in Table 7-7. These flows are based upon an average flow of 71 gallons per capita per day and a peak flow of 259 gallons per capita per day for the projected population.

Table 7-7: Wastewater Flows Projections

Planning Horizon	Year	Population	WWTP No. 1 - Larremore Projected Demand (MGD)	WWTP No. 2 - FM20 Projected Demand (MGD)	Total Projected Demand (MGD)
Existing	2023	16,263	0.41	0.66	1.07
Near-Term	2028	20,876	0.56	0.96	1.52
Intermediate-Term	2033	30,363	0.69	1.18	1.87
Long-Term	2043	37,387	1.05	1.79	2.84

7.7 Future Wastewater Needs

The combined plant capacity is 2.6 MGD design flow and 8.5 MGD peak flow, which is adequate to meet the City's needs through the year 2033. However, TCEQ requires planning for expansion to begin when individual wastewater plants reach 75% capacity and expansion to take place when individual wastewater plants reach 90% capacity; this TCEQ requirement is known as the 75/90 rule. To meet the 75/90 rule expansion will need to take place prior to when the projected total demand exceeds the combined plants capacity of 2.6 MGD, which would be during the long-term planning horizon (2034-2043).

Based on TCEQ "75/90" rule, treatment plants must start expansion planning when existing capacity reaches 75% and must begin construction when capacity is at 90%. Based on the projected demand growth in relation to this rule, it is recommended that FM 20 Wastewater Treatment Plant be expanded in two phases: Phase One to 3.0 MGD and Phase Two to 4.5 MGD. Once the expansion to FM 20 WWTP is complete, it is recommended that Larremore WWTP be decommissioned due to lack of space and capacity. Tables 7.7-1-2 show the year each percentage capacity is reached for the individual plants. The plants were first evaluated based on current capacity as shown in row "Current" and Column "100 Capacity". Phase One and Phase Two show the plants' capacity after recommended expansions. Table 7-8 shows the combined capacity of both plants throughout the phases.

Table 7-8: FM 20 WWTP Expansion Requirements by Planning Horizon

FM 20 Design Capacity							
TCEQ "75/90" rule	100% Capacity	75% Capacity	Year	Projected Capacity	90% Capacity	Year	Projected Capacity
Current	**1.5**	**1.13**	2031	1.08	**1.35**	2036**	1.33
			2032*	1.13		2037	1.39
Phase 1	**3.0**	**2.25**	2048*	2.20	**2.70**	2052**	2.60
			2049	2.29		2053	2.71
Phase 2	**4.5**	**3.38**	2058*	3.33	**4.05**	2062**	3.94
			2059	3.48		2063	4.11

*Year required to start expansion planning
**Year required to start expansion construction

Table 7-9: Larremore WWTP Expansion Requirements by Planning Horizon

Larremore Design Capacity							
TCEQ "75/90" rule	100% Capacity	75% Capacity	Year	Projected Capacity	90% Capacity	Year	Projected Capacity
Current	**1.1**	**0.83**	2037*	0.82	**0.99**	2041**	0.97
			2038	0.85		2042	1.01
Phase 1	**1.1**	**0.83**	2037*	0.82	**0.99**	2041**	0.97
			2038	0.85		2042	1.01
Phase 2	Proposal to demolish Larremore Plant. Proposed demo estimated to begin 2031 when expansion to FM 20 WWTP is required to begin per TCEQ 30 TAC Subsection 305.126 Code requirements.						
NOTE: Larremore's Current and Future 1 are the same capacities until plant is demolished.							

*Year required to start expansion planning
**Year required to start expansion construction

Table 7-10: Combined WWTPs Expansion Requirements by Planning Horizon

Combined Design Capacity							
TCEQ "75/90" rule	100% Capacity	75% Capacity	Year	Projected Capacity	90% Capacity	Year	Projected Capacity
Current	**2.6**	**1.95**	2033	1.87	**2.34**	2038**	2.30
			2034*	1.95		2039	2.40
Phase 1	**4.1**	**3.08**	2044	2.96	**3.69**	2049**	3.64
			2045*	3.08		2050	3.80
Phase 2	**4.5**	**3.38**	2047*	3.35	**4.05**	2051**	3.96
			2048	3.49		2052	4.13

*Year required to start expansion planning
**Year required to start expansion construction

Expansion to the Larremore Plant is required to start in 2041 based on TCEQ "75/90" rule. Due to Larremore's limited site and capacity, it is recommended the Larremore Plant be demolished. To deal with the capacity loss from Larremore, it is recommended the FM 20 Plant be expanded in two phases, from 1.5 MGD to 3 MG and from 3 MGD to 4.5 MGD, before the demolition of Larremore begins. If FM 20 Plant begins expanding the first phase in 2029, the construction is estimated to be completed by 2031, one year before planning is required. The planning for the second phase is not required to start until 2048 with construction beginning in 2052, however it is recommended Phase Two of expansion to FM 20 be completed before Larremore begins demolition. Therefore, if the FM 20 Plant begins the second phase of expansion in 2038 with a completion date in 2040, the FM20 Plant will be fully functioning with capacity of 4.5 MGD one year before Larremore is required to begin construction. The Larremore Plant is recommended to begin demolition in 2041 with an estimated completion time of 6 months. Having a year buffer before the Larremore Plant is abandoned allows the City to ensure the FM 20 Plant can handle all demands without the use of Larremore. This also provides the City with more time to determine future locations for a new plant. With only the FM 20 Plant operating (shown in Table 7-10, Phase 2), plans for further expansion will be required to begin in 2047 with construction starting in 2051.

7.8 Cost Estimate

Cost estimates for all the proposed wastewater system improvements based on today's cost including construction and engineering are shown in Table 7-11. Each proposed improvement is listed by the planning horizon it must be constructed by (2028, 2033, or 2043).

Table 7-11: Recommended Wastewater Treatment Plant Improvements by Planning Horizon

WASTEWATER		
Description	**Cost**	**Project Horizon**
FM 20 WWTP CIP		
Septage Receiving Unit	$785,000	2028
UV System Upgrades	$807,000	2028
Belt Filter Press	$860,000	2028
TOTAL	**$2,452,000**	
LARREMORE WWTP CIP		
Aeration Basin Improvements	$95,000	2028
Temporary Generator Connection	$110,000	2028
Relief Lift Station Expansion	$535,000	2043
TOTAL	**$740,000**	
FM 20 WWTP EXPANSION		
Phase One (3 MGD)	$23,798,000	2033
Phase Two (4.5 MGD)	$16,624,000	2043
TOTAL	**$40,422,000**	
LARREMORE DECOMMISIONING		
Sitework	$133,400	2043
Demolition	$346,060	2043
Misc	$565,860	2043
TOTAL	**$1,045,320**	
TOTAL W/WW Facilities Improvements Cost		**$44,659,320**

8.0 CAPITAL IMPROVEMENT PLAN

This section presents a summary of recommended water and sewer system improvements for the City of Lockhart's capital improvement planning.

Regarding the timing of the projects, the recommended improvements were initially grouped into one of the three planning horizons (near-term (2028), intermediate (2033), and long-term (2043)). To address the inherent uncertainty in system flow projections and economic development trends, project triggers are identified for applicable recommended improvements. These triggers will allow flexibility in implementation timing and should be reviewed periodically based on actual conditions within the system. The project trigger approach is described in further detail in Section 8.2.

8.1 COST ESTIMATE ASSUMPTIONS

After the improvements were reviewed for constructability, Opinion of Probable Construction Costs (OPCCs) were developed for the recommended capital improvements. The costs were developed using a combination of recent (2020-2024) information obtained from bid data, projects currently under construction, and previous constructed projects of similar scope. Where applicable, quantity allowances were made for items at the frequency recommended by The City of Lockhart's Construction Standards.

After an OPCC was determined for each project, a contingency was added. The contingency used was 20%, which was considered sufficient for master planning. These contingencies are intended to account for unknowns that may appear during design development and project timing. This contingency is within the range of the recommended amount for a Class IV OPCC by AACE International.

Engineering/Surveying, permitting, and administration cost is assumed to be 18% of the sum of the OPCC and contingency. The total combined cost makes up the Opinion of Probable Project Cost in 2024 dollars.

8.2 PROJECT TRIGGER CONCEPT

The system flow projections are the initial basis for when a recommended capacity-related system improvement would be required. Project triggers were also developed as an alternative project timing guide to account for uncertainty within the City's growth projections.

As some project triggers are capacity related, total daily demand/capacity needs of the treatment plants should be monitored. For projects that are many years in the future, a trend line can be developed from available data to highlight the schedule for when a capacity upgrade would need to be completed. This is particularly useful for projects requiring significant lead times for material/equipment acquisition and/or easement coordination that require significant lead time.

8.3 CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended system improvements that were detailed in the previous sections are summarized below in Tables 8-1, 2, and 3. Figures 8-1 and 2 display the City's system's layout after all improvements are implemented. Figures 8-3, 4, and 5 break down cost of each category within a planning horizon. Figure 8-6 breaks down total cost for each year within the study period. Cost was assumed to equally distributed through the planning horizons. Detailed project sheets are in Appendix A – Water Distribution System CIP Exhibits and Appendix C – Wastewater Collection System CIP Exhibits.

Figure 8-1: Water Distribution System Projects

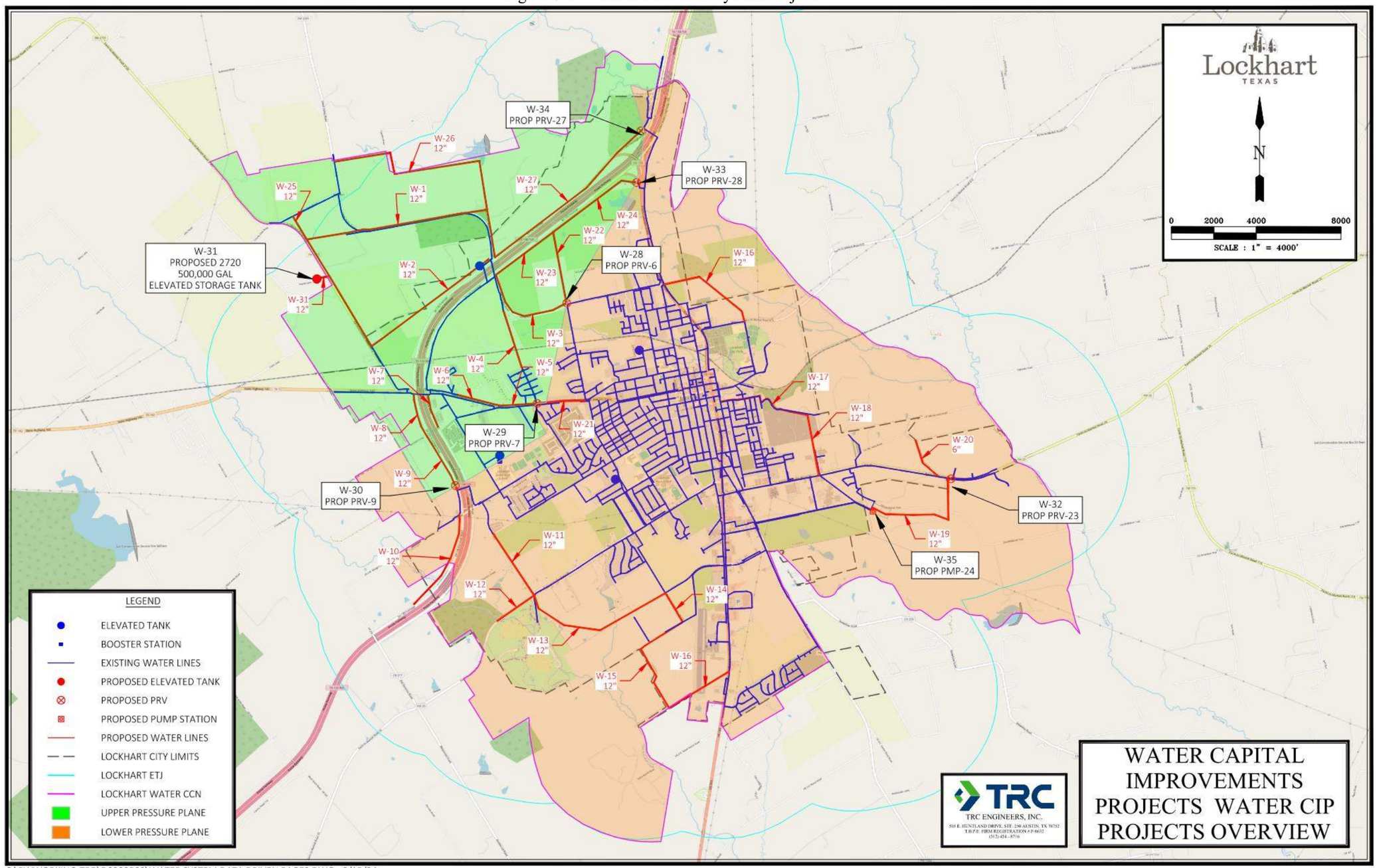


Table 8-1: Water Distribution System Projects Summary

Project ID	Planning Horizon	Description	Cost	Project Trigger
W-1	2028	Install 14,600 Feet of 12" Pipe from Hidden Path Rd. to 2720	$3,307,000	Increased development in the Industrial Park Area or Upper pressure zone or Total Water Connections within Distribution System ≥ 7,750
W-2	2028	Install 6,950 Feet of 12" Pipe along the West side of SH 130	$1,506,000	Increased development in West San Antonio St.
W-3	2028	Install 4,700 Feet of 12" Pipe along Silent Valley Rd. from SH 130 to Stueve Ln.	$1,029,000	Increased development in upper pressure zone
W-4	2028	Install 2,700 Feet of 12" Pipe from Silent Valley Rd to N. Mockingbird Ln.	$646,000	Increased development in upper pressure zone
W-7	2033	Install 1,600 Feet of 12" Pipe from W. San Antonio St. to Borchert Loop on the E. side of SH 130	$369,000	Development on City Line Road and Borchert Drive
W-8	2033	Install 2,100 Feet of 12" Pipe from W. San Antonio St. to Borchert Dr. on the W. side of SH 130	$667,000	Increased development in the upper pressure zone on SH 142 and Borchert Loop
W-9	2033	Install 3,000 Feet of 12" Pipe from Borchert Dr. to Maple St. on the W. side of SH 130	$671,000	Increased development in the upper pressure zone on SH 142 and Borchert Loop
W-10	2033	Install 5,000 Feet of 12" Pipe S. of Maple St. on the W. side of SH 130	$1,093,000	Increased development in the lower pressure zone
W-11	2033	Install 3,450 Feet of 12" Pipe from City Line Rd. to State Park Rd.	$760,000	Increased development in the lower pressure zone and to loop system
W-12	2033	Install 1,950 Feet of 12" Pipe along State Park Rd.	$436,000	Increased development in the lower pressure zone and to loop system
W-13	2033	Install 7,200 Feet of 12" Pipe from State Park Rd. to W. Martin Luther King Jr Industrial Blvd.	$1,536,000	Increased development in the lower pressure zone and to loop system
W-14	2033	Install 1,700 Feet of 12" Pipe along Cunningham	$386,000	Increased development in the lower pressure zone and to loop system

Project ID	Planning Horizon	Description	Cost	Project Trigger
W-15	2033	Install 9,200 Feet of 12" Pipe S. of Cunningham	$1,966,000	Increased development in the lower pressure zone and to loop system
W-16	2033	Install 4,900 Feet of 12" Pipe S. of the Lockhart Municipal Airport	$1,057,000	Increased development in the lower pressure zone and to loop system
W-17	2033	Replace 4,600 Feet of 6" and 8" with 12" Pipe along Lovers Ln. to Brazos St.	$1,310,000	Increased development in lower pressure zone specifically on Blackjack Street
W-18	2033	Replace 2,900 Feet of 8" Pipe with 12" Pipe from Lovers Ln. to Blackjack St.	$790,000	Increased development in lower pressure zone specifically on Blackjack Street
W-19	2033	Install 5,500 Feet of 12" Pipe from Water Plant to Blackjack St.	$1,177,000	Increased development in eastern lower pressure zone
W-20	2033	Install 2,100 Feet of 12" Pipe along Shady Ln.	$467,000	Increased development in eastern lower pressure zone
W-22	2028	Install 3,350 Feet of 12" Pipe from Stueve Ln to SH 130	$734,000	Increased development in upper pressure zone
W-23	2028	Install 3,350 Feet of 12" Pipe along SH 130 to Horseshoe Rd	$731,000	Increased development in upper pressure zone
W-24	2033	Install 4,700 Feet of 12" Pipe along SH 130 to N Colorado St.	$1,005,000	Increased development in upper pressure zone
W-25	2028	Install 3,650 Feet of 12" Pipe from County View Rd to Payne Ln	$789,000	Increased development in the Industrial Park Area or Upper pressure zone
W-26	2028	Install 9,950 of 12" Pipe along Hidden Path Rd connecting to Cypress Rd	$2,129,000	Increased development in the Industrial Park Area or Upper pressure zone
W-27	2033	Install 9,350 of 12" Pipe on N. side of SH 130 E of Hidden Path Rd.	$1,995,000	Increased development in upper pressure zone
W-28	2028	Install Pressure Reducing Valve	$53,000	The installation of W-3 or W-22
W-30	2033	Install Pressure Reducing Valve	$53,000	The installation of W-9
W-31	2033	Construct 500,000 Elevated Storage Tank	$3,036,000	Total Water Connections within Distribution System ≥ 7,750

Project ID	Planning Horizon	Description	Cost	Project Trigger
W-35	2033	Install 1,200 gpm high service pump	$876,000	Total Water Connections within Distribution System ≥ 8,000
W-32	2028	Install Pressure Reducing Valve	$53,000	High pressures in east area of system
W-33	2033	Install Pressure Reducing Valve	$53,000	Pressure plane separation as a result of W-27
W-34	2033	Install Pressure Reducing Valve	$53,000	Pressure plane separation as a result of W-24
W-36	2043	Upsize ~228,000 of 3", 4", & 6" watermains to 8"	$35,681,000	To bring distribution system in compliance with City Construction Standards
W-37	2043	Install 1,200 gpm high service pump	$876,000	To meet Peak Hourly Demand with HSPS Firm Capacity since Elevated Storage Capacity is below 200 gallons per connection*
TOTAL			**$67,320,000**	

*If the system were to maintain an elevated storage capacity of 200 gpm/connection, two (2) high service pumps with an additional two (2) 0.5 MG Elevated Storage Tanks would be required to meet 0.6 gpm per connection. With the ACR variance of 0.34 gpm per connection for the HSPS, the requirements would be less of only two (2) 0.5 MG Elevated Storage Tanks and no pumps; however, because the system would fall under the 200 gpm/connections standard, a high service pump to meet Peak Hourly Demand is only necessary instead.

Figure 8-2: Wastewater Collection System Projects

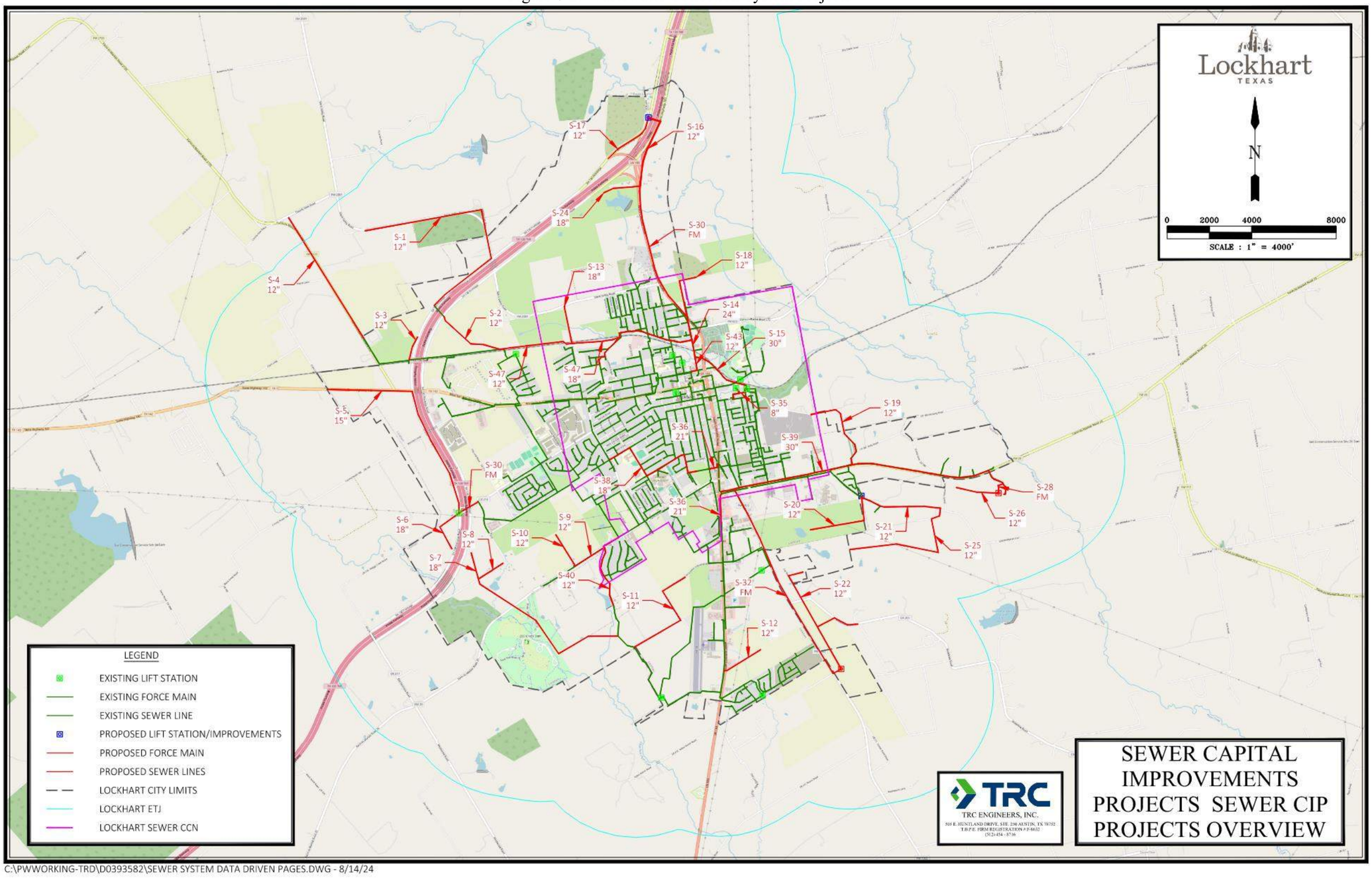


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Table 8-2: Wastewater Collection System Projects Summary

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-1	2028	Installation of 12,000 LF of 12" Pipe extension past SH 130 to Hidden Path Road	$3,181,000	Increased development along Hidden Path Road
S-2	2028	Installation of 2,500 LF of 12" pipe between SH 130 and Windridge	$665,000	Increased development along Hidden Path Road
S-3	2028	Installation of 1,200 LF of 12" W of SH 130 to San Antonio Street	$332,000	Increased development along N. Cesar Chavez PKWY SB
S-4	2028	Installation of 7,200 LF of 12" pipe along County Lane	$1,810,000	Increased development along County Lane
S-5	2028	Installation of 10,200 LF of 18" pipe along SH 130 And San Antonio Street	$2,748,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-6	2033	Installation of 2,300 LF of 18" pipe South of Boggy Lift Station	$623,000	Increased development along W. San Antonio St. and/or S. Cesar Chave Pkwy SB
S-7	2033	Installation of 9,700 LF of 18" pipe from Cunningham Drive to Old Fentress Road.	$2,622,000	Increased development along Old Fentress Rd and/or Cunningham Dr.
S-8	2033	Installation of 1,400 LF of 12" pipe S of Clear Fork	$377,000	Increased development along Old Fentress Rd
S-9	2033	Upsize 1,600 LF to 12" from 8" along State Park Road.	$439,000	Increased development along State Park Rd.
S-10	2033	Installation of 1,700 LF of 12" pipe N of State Park Road.	$462,000	Increased development along State Park Rd.
S-11	2033	Installation of 5,500 LF of 12" pipe along Cunningham Road	$1,460,000	Increased development along Cunningham Dr.
S-12	2033	Installation of 2,000 LF of 12" pipe E of 183	$530,000	Increased development East of 183 and North of Summerside Ave.
S-13	2028	Installation of 1,900 LF of 18" pipe along Stueve Lane.	$521,000	Increased development along Stueve Lane
S-14	2028	Upsize 4,300 LF to 24" along Tank Street	$1,272,000	Increased development along Stueve Lane or Dry Weather Flow to Larremore exceeds 0.46MGD

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-15	2028	Upsize 2,900 LF to 30" along railroad	$1,004,000	Increased development along Stueve Lane or Dry Weather Flow to Larremore exceeds 0.46MGD
S-16	2033	Installation of 3,800 LF of 12" pipe under SH 130 To N Colorado Street	$1,015,000	Increased development along N. Colorado St. SB
S-17	2033	Installation of 1,800 LF of 12" pipe S of SH 130 to N Colorado Street	$485,000	Increased development along N. Colorado St.
S-18	2028	Installation of 3,700 LF of 12" pipe E Of N Commerce Street	$992,000	Increased development along N. Commerce St.
S-19	2033	Installation of 2,700 LF of 12" pipe and upsizing of 1,600 LF of 8" to 12" along Lovers Lane	$1,342,000	Increased development along Lover's Ln
S-20	2033	Installation of 3,800 LF of 12" pipe W of Century Oaks Lift Station	$1,015,000	Increased development West of Old McMahan Trail
S-21	2033	Installation of 3,000 LF of 10" pipe E of Century Oaks Lift Station	$723,000	Increased development East of Old McMahan Trail
S-22	2028	Installation of 5,000 LF of 18" pipe along S Commerce Street	$1,596,000	Increased development along S. Commerce St. & Seawillow Rd
S-23	2028	Installation of 2,100 LF of 12" pipe E of S Commerce Street	$574,000	Increased development along S. Commerce St. & Seawillow Rd
S-24	2028	Installation of 1,800 LF of 18" pipe along S Commerce Street	$497,000	Increased development along S. Commerce St. & Seawillow Rd or Installation of S-23 or S-24
S-25	2033	Installation of 7,500 LF of 12" pipe W of Pecan Branch Lift Station	$1,990,000	Increased development within general area
S-26	2033	Installation of 2,000 LF of 12" Pipe W of FM 20 East Lift Station	$530,000	Increased development south of Blackjack St. & East of Sierra Vista Cove

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-27	2028	Boggy Creek Lift Station	$1,605,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-28	2028	Installation of 1,300 LF of Boggy Creek Force Main	$293,000	Increased development along W. San Antonio St. and/or S. Cesar Chavez Pkwy SB
S-29	2028	Plum Creek Lift Station	$1,605,000	Increased development along N. Colorado St. & Lover's Lane or installation of S-18 and S-19
S-30	2028	Installation of 14,500 LF of Plum Creek Force Main	$3,263,000	Increased development along N. Colorado St. & Lover's Lane or installation of S-18 and S-19
S-31	2028	South Commerce Lift Station	$1,605,000	Increased development along S. Commerce St. & Seawillow Rd or installation of S-26
S-32	2028	Installation of 10,400 LF of South Commerce Force Main	$2,340,000	Increased development along S. Commerce St. & Seawillow Rd or installation of S-26
S-33	2033	FM 20 E Lift Station	$1,763,000	Increased development within general area
S-34	2033	Upsize 900 LF of pipe from 8" & 12" To 30" along Blackjack Street	$433,000	Increased development within general area
S-35	2033	Upsize 1,000 LF of pipe from 6" To 8" along Sycamore Street & Kennedy Ls Abandonment.	$321,000	Increased development south of Blackjack St. & East of Sierra Vista Cove
S-36	2028	Upsize 1,400 LF of pipe to 21" from 12" along S Colorado Street	$372,000	Under Peak DWF conditions, d/D is greater than 50%
S-37	2028	Upsize 1,700 LF of pipe from 8" To 15" across railroad and along N. Medina Street	$476,000	Under Peak DWF conditions, d/D is greater than 50%

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-38	2028	Upsize 6,000 LF of pipe from 8", 10", & 12" to 18" from Clearfork Street to S Medina Street	$1,620,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~6,750 or dry weather flow in line exceed 0.46MGD under DWF conditions.
S-39	2028	Upsize 8,600 LF of pipe from 21" to 30" along Blackjack Street	$2,963,000	Under Design Event, WWF create backwater conditions. Project Trigger - # of connections with system is greater than ~6,750
S-40	2028	Upsize 3,900 LF pipe from 10", 12", & 15" to 18" along Twin Island Drive	$1,050,000	Under Design Event, WWF create backwater conditions. Project Trigger - # of connections with system is greater than ~6,750
S-41	2043	Upsize 900 LF of pipe from 8" to 12" along North Commerce Street	$242,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to Larremore WWTP exceed 1MGD under DWF conditions.
S-42	2043	Upsize 5,100 LF of pipe from 21" & 24" to 30" along Blackjack Street	$1,768,000	Under Peak DWF conditions, d/D is greater than 50%. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to FM20 exceeds 1.75MGD under DWF conditions.

Project ID	Planning Horizon	Description	Cost	Project Rationale/Trigger
S-43	2033	Century Oaks LS Improvements - Increase capacity to 0.85 MGD capacity & increase force main diameter to 8"	$1,250,000	Under Design Event, WWF create backwater conditions. Project Trigger - # of connections with system is greater than ~8,000 or DWF exceeds 1.17MGD to the FM20 Plant
S-44	2043	Airport LS Improvements - Increase capacity to 2 MGD & increase force main diameter to 12"	$2,000,000	Under Design Event, WWF create backwater conditions. Project Trigger - # of connections with system is greater than ~12,000 or dry weather flow to FM20 exceeds 1.75MGD under DWF conditions.
TOTAL			**$53,774,000**	

Table 8-3: W/WW Facilities Projects Summary

Description	Cost	Project Horizon
WELLS		
ACR Request to TCEQ	$11,400	2033
Well No. 4.B	$1,450,000	2033
Well No. 5.B	$1,400,000	2043
TOTAL	**$2,861,400**	
WATER AGREEMENTS		
1 MGD of Treated Water (20 year-agreement)	$1,120,000	2043
TOTAL	**$1,120,000**	
FM 20 WWTP CIP		
Septage Receiving Unit	$785,000	2028
UV System Upgrades	$807,000	2028
Belt Filter Press	$860,000	2028
TOTAL	**$2,452,000**	
LARREMORE WWTP CIP		
Aeration Basin Improvements	$95,000	2028
Temporary Generator Connection	$110,000	2028
Relief Lift Station Expansion	$535,000	2043
TOTAL	**$740,000**	
FM 20 WWTP EXPANSION		
Phase One (3 MGD)	$22,151,000	2033
Phase Two (4.5 MGD)	$19,020,000	2043
TOTAL	**$41,171,000**	
LARREMORE DECOMMISIONING		
Sitework	$134,000	2043
Demolition	$347,000	2043
TOTAL	**$481,000**	
TOTAL W/WW Facilities Improvements Cost		**$47,759,400**

Figure 8-3: 2028 Planning Horizon CIP Breakdown

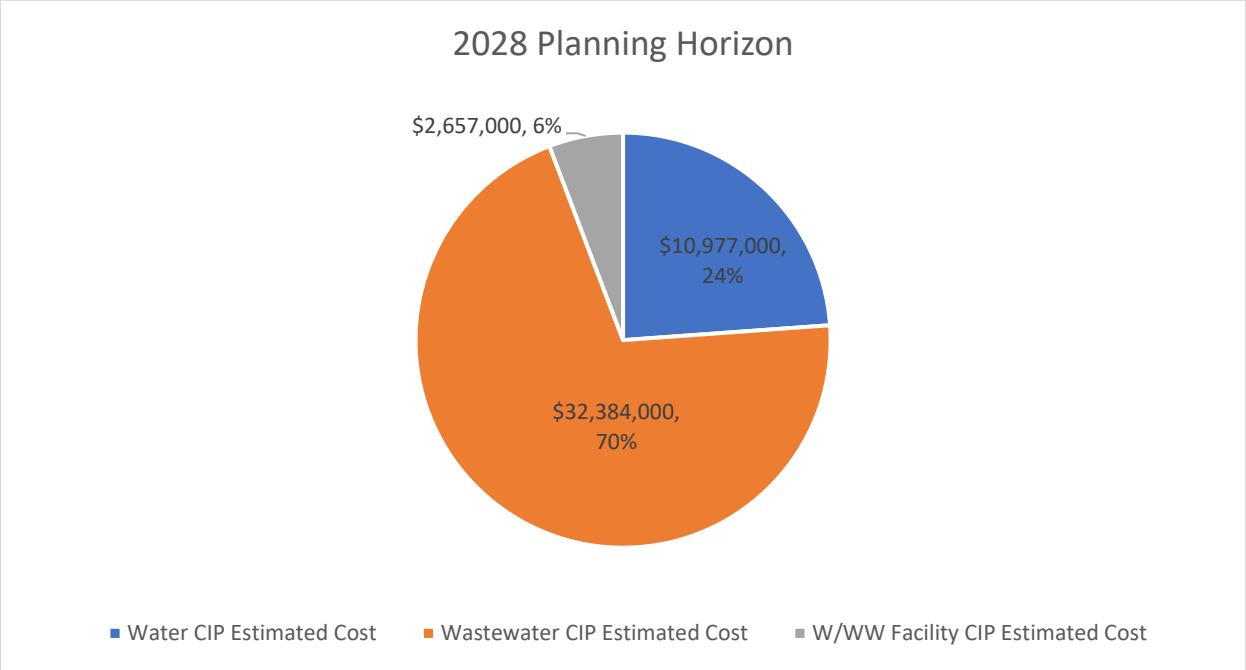


Figure 8-4: 2033 Planning Horizon CIP Breakdown

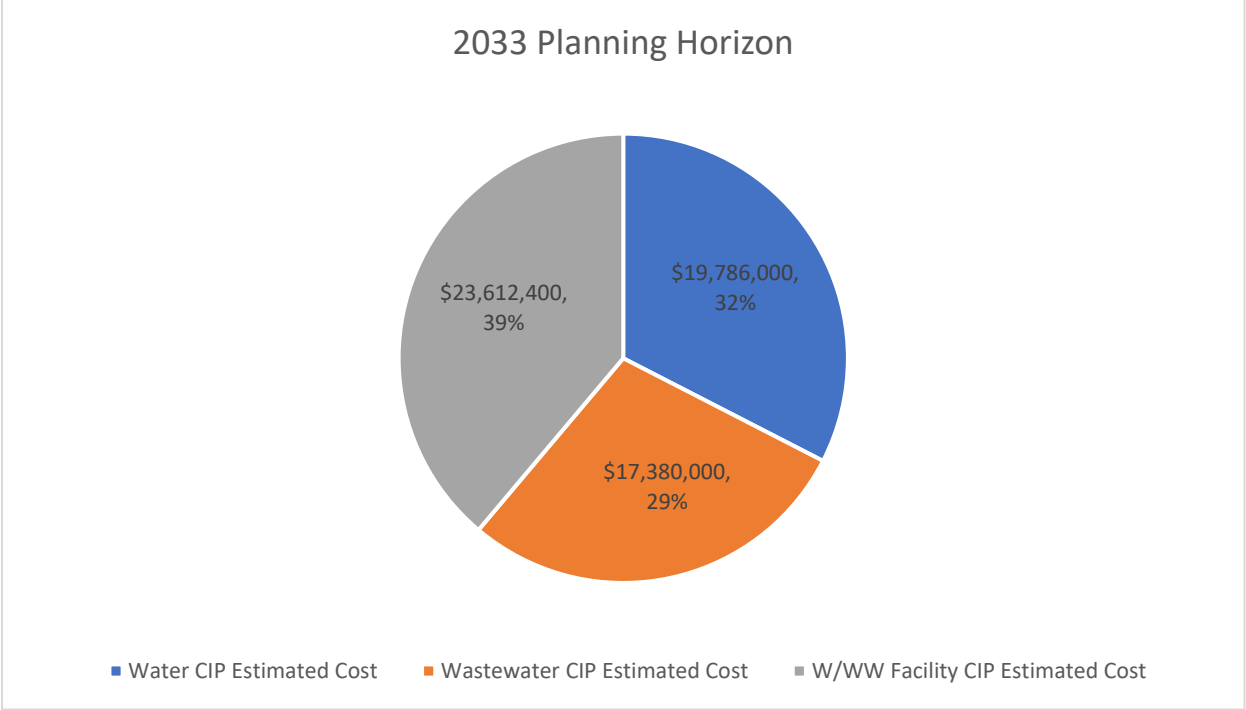


Figure 8-5: 2043 Planning Horizon CIP Breakdown

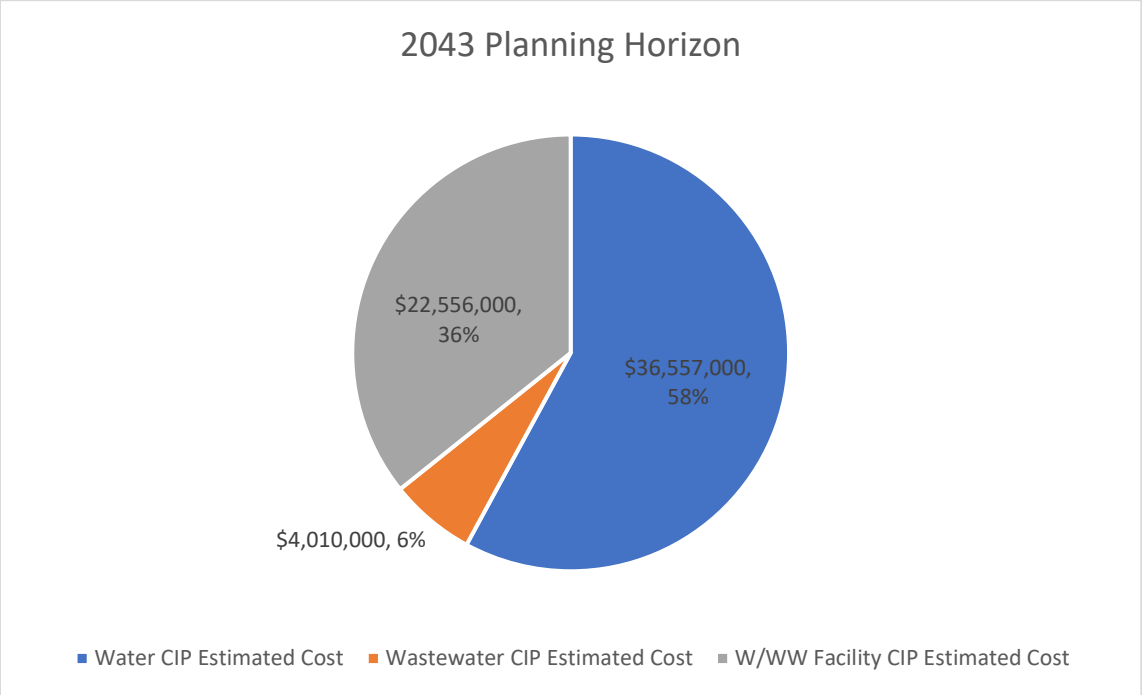
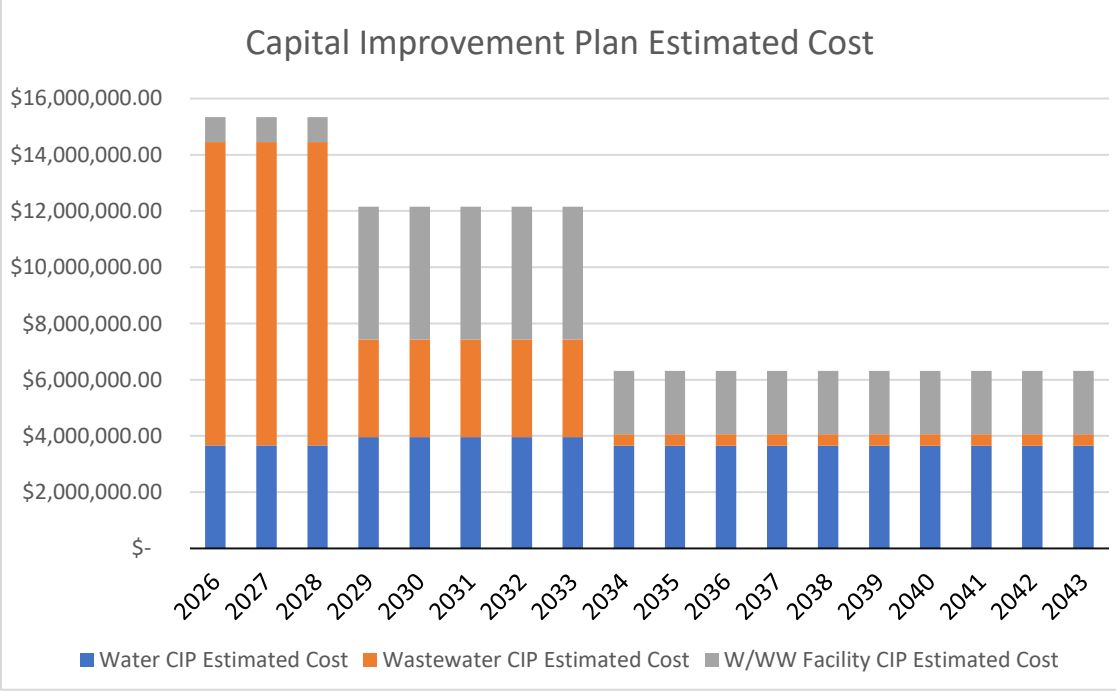
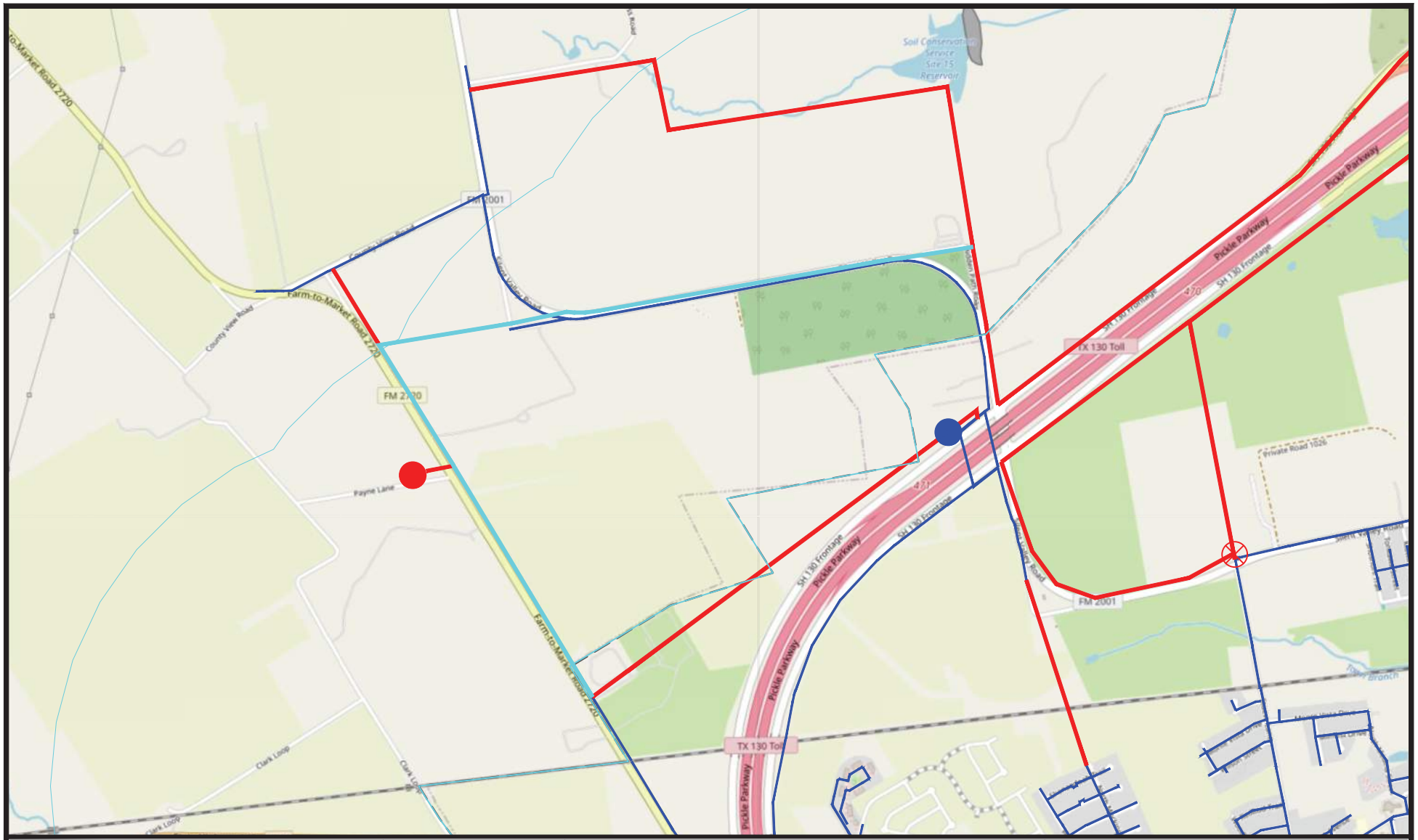


Figure 8-6: Total W/WW CIP Cost by Year



APPENDIX A – WATER DISTRIBUTION SYSTEM CIP EXHIBITS



LEGEND

- PROPOSED PROJECT W-1
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 14,600 FEET OF 12" PIPE FROM HIDDEN PATH RD. TO 2720

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE INDUSTRIAL PARK AREA OR UPPER PRESSURE ZONE
TOTAL WATER CONNECTIONS WITHIN DISTRIBUTION SYSTEM ≥ 7,750

ESTIMATED COST: $3,307,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # W-1
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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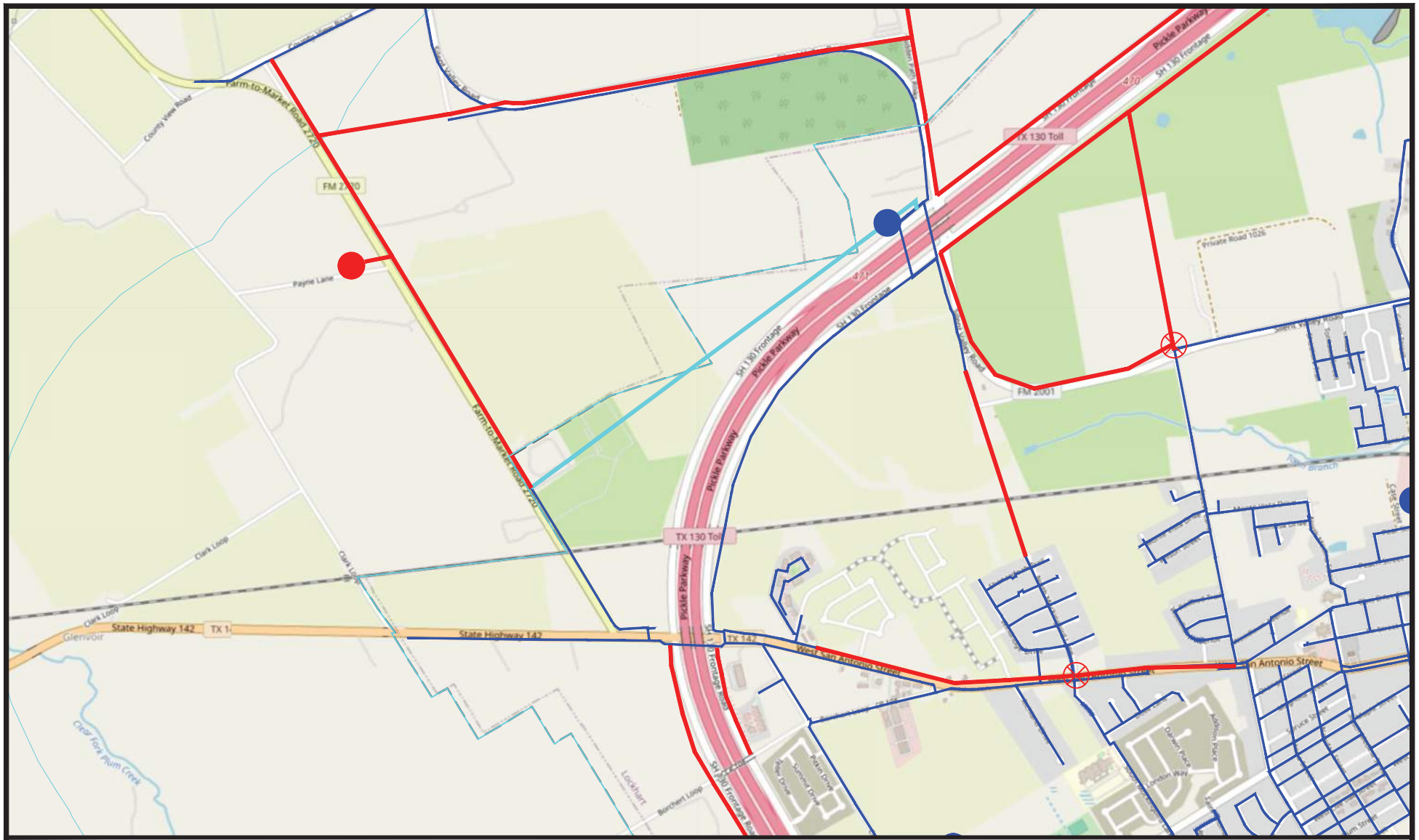

LEGEND

- PROPOSED PROJECT W-2
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 6,950 FEET OF 12" PIPE ALONG THE WEST SIDE OF 130

PROJECT TRIGGER: INCREASED DEVELOPMENT IN WEST SAN ANTONIO ST.

ESTIMATED COST: $1,506,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # W-2
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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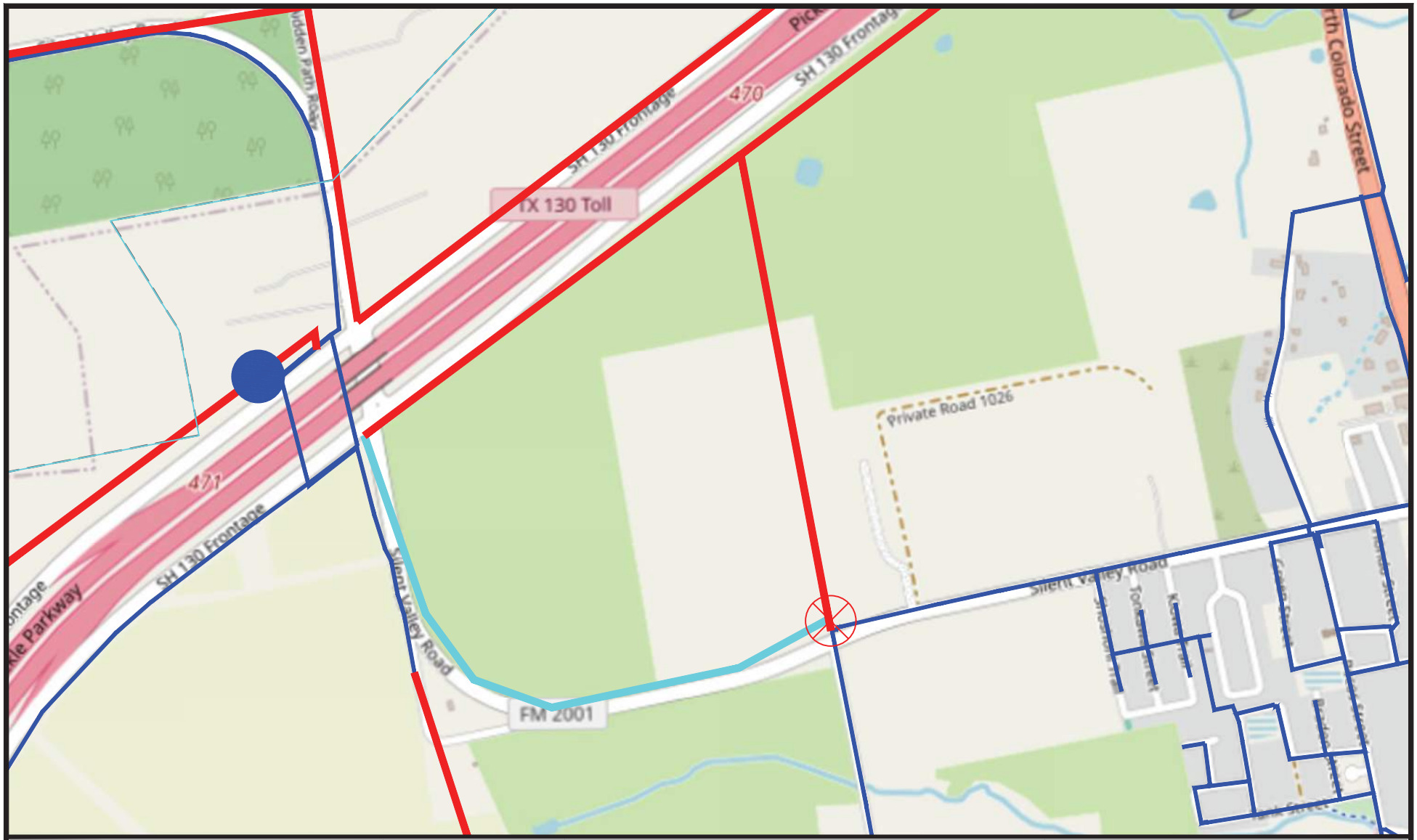

LEGEND

- PROPOSED PROJECT W-3
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 4,700 FEET OF 12" PIPE ALONG SILENT VALLEY RD. FROM SH 130 TO STUEVE LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $1,029,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-3
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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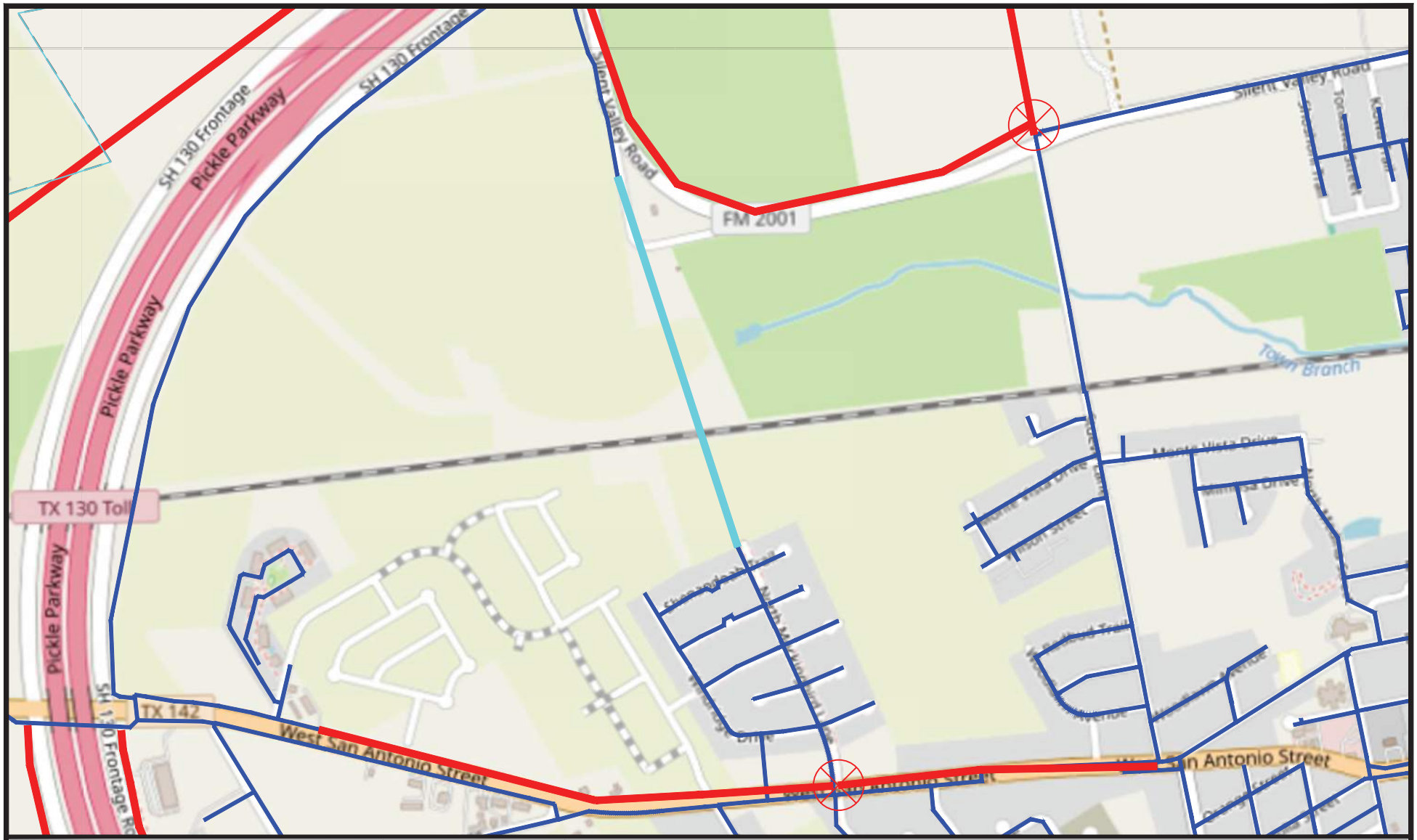

LEGEND

- PROPOSED PROJECT W-4
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 2,700 FEET OF 12" PIPE FROM SILENT VALLEY RD TO N. MOCKINGBIRD LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $646,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-4
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT W-7
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 1,600 FEET OF 12" PIPE FROM W. SAN ANTONIO ST. TO BORCHERT LOOP ON THE E. SIDE OF SH 130

PROJECT TRIGGER: DEVELOPMENT ON CITY LINE ROAD AND BORCHERT DRIVE

ESTIMATED COST: $369,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-7
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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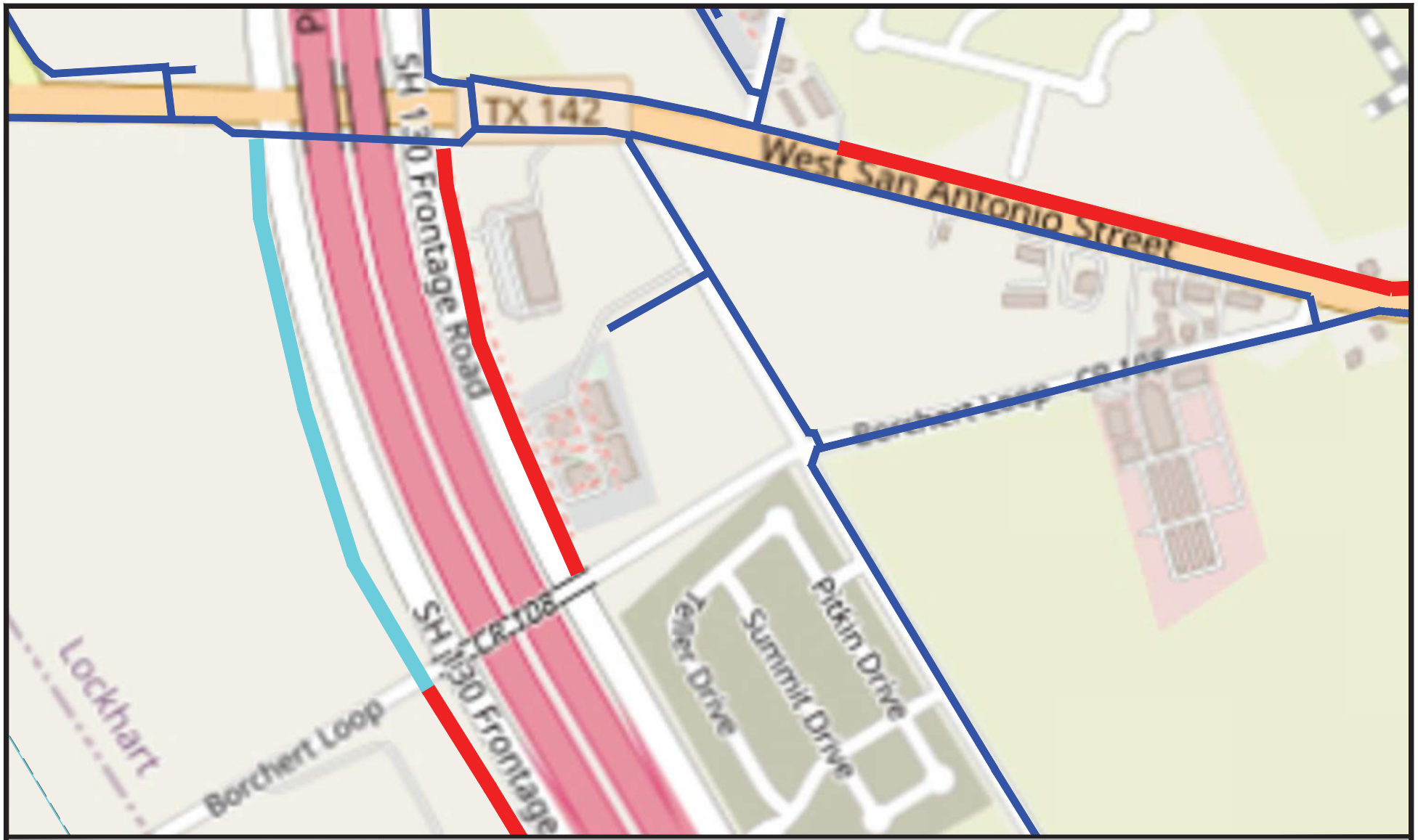

LEGEND

- PROPOSED PROJECT W-8
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 2,100 FEET OF 12" PIPE FROM W. SAN ANTONIO ST. TO BORCHERT DR. ON THE W. SIDE OF SH 130

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE UPPER PRESSURE ZONE ON SH 142 AND BORCHERT LOOP

ESTIMATED COST: $667,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-8	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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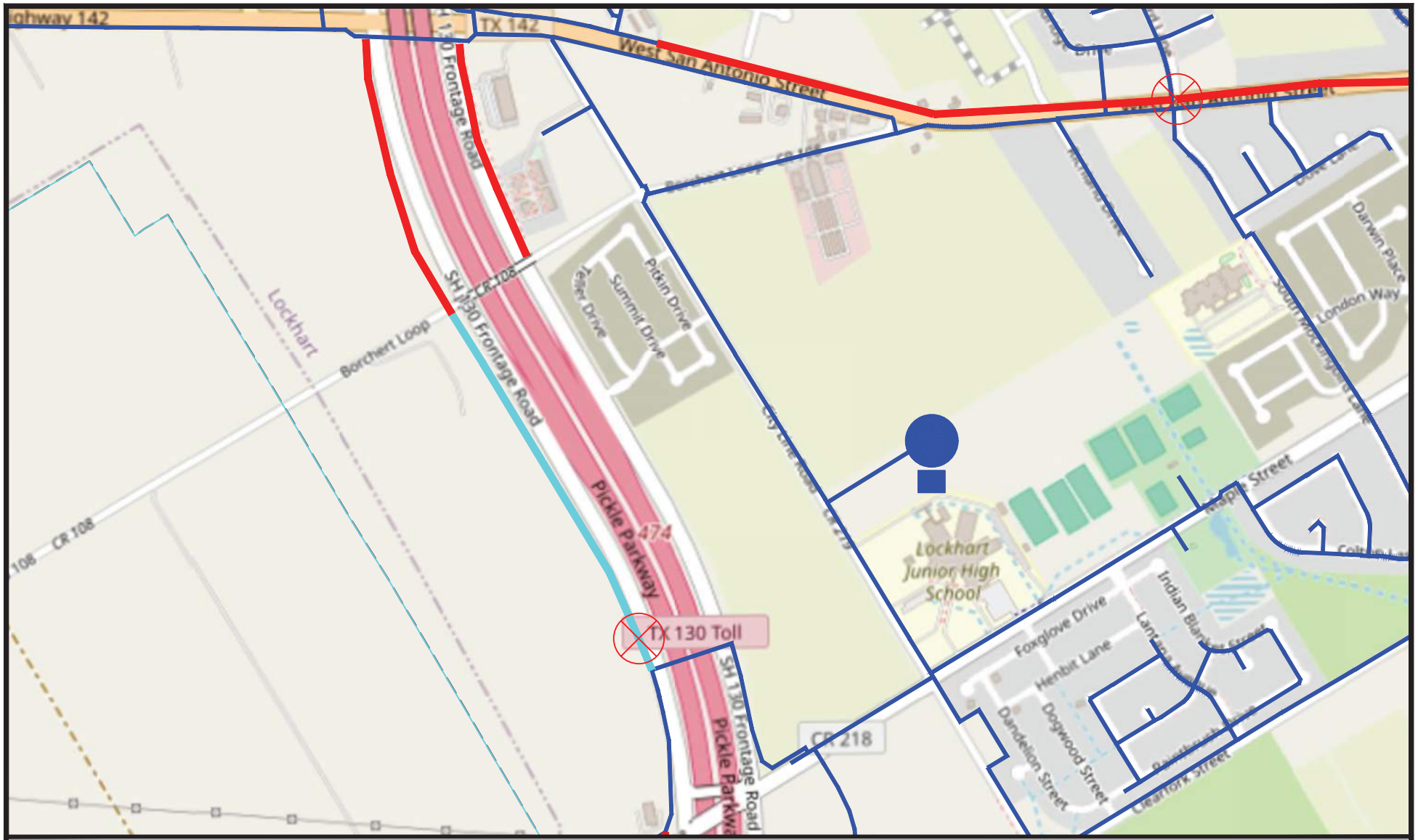

LEGEND

- PROPOSED PROJECT W-9
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 3,000 FEET OF 12" PIPE FROM BORCHERT DR. TO MAPLE ST. ON THE W. SIDE OF SH 130

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE UPPER PRESSURE ZONE ON SH 142 AND BORCHERT LOOP

ESTIMATED COST: $671,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-9
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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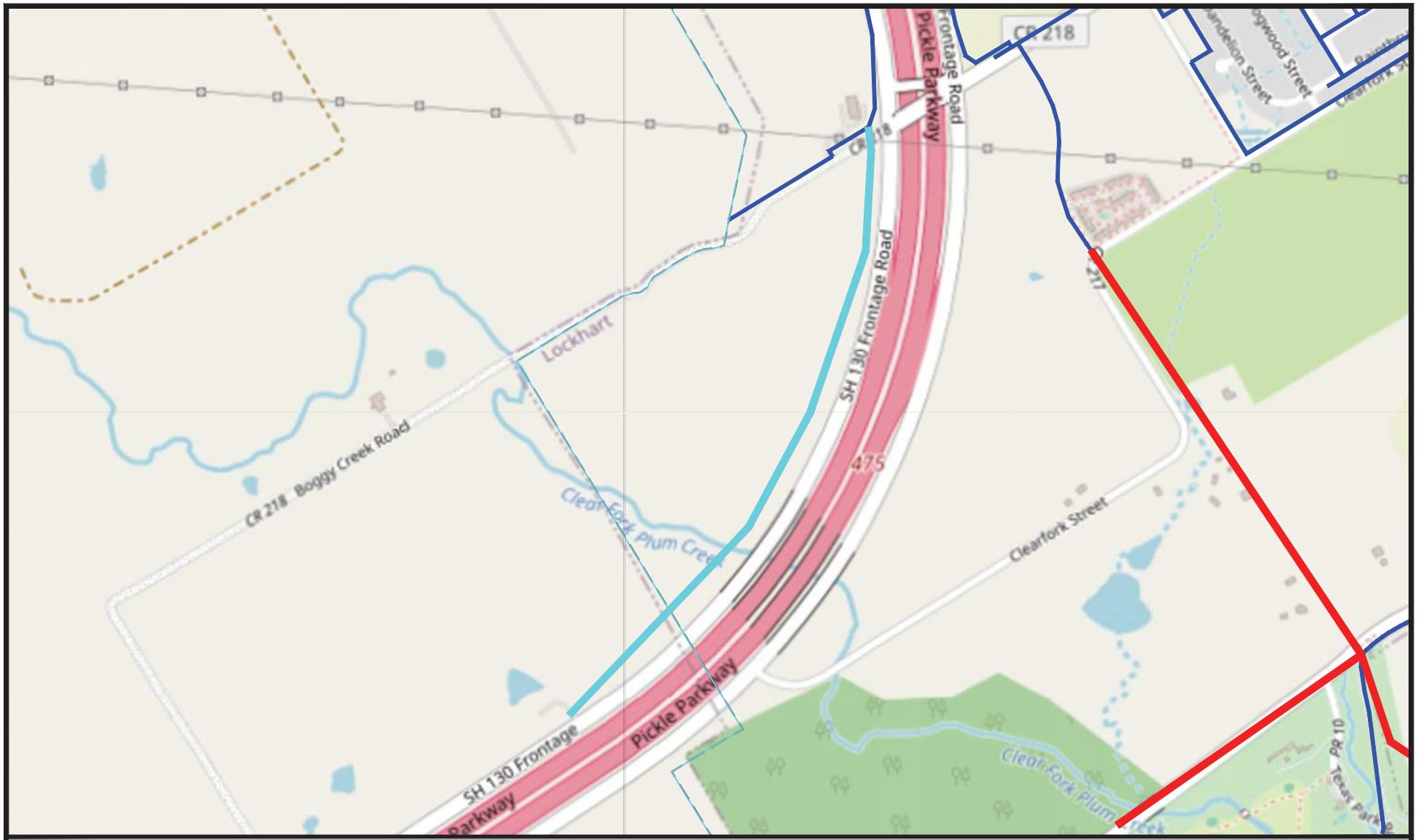

LEGEND

- PROPOSED PROJECT W-10
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 5,000 FEET OF 12" PIPE S. OF MAPLE ST. ON THE W. SIDE OF SH 130

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE

ESTIMATED COST: $1,093,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-10
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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LEGEND

- PROPOSED PROJECT W-11
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 3,450 FEET OF 12" PIPE FROM CITY LINE RD. TO STATE PARK RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $760,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY	FIGURE #	W-11
DATE:	JUNE 2024		

Lockhart TEXAS
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AUSTIN, TX 78750
(512) 329-6080

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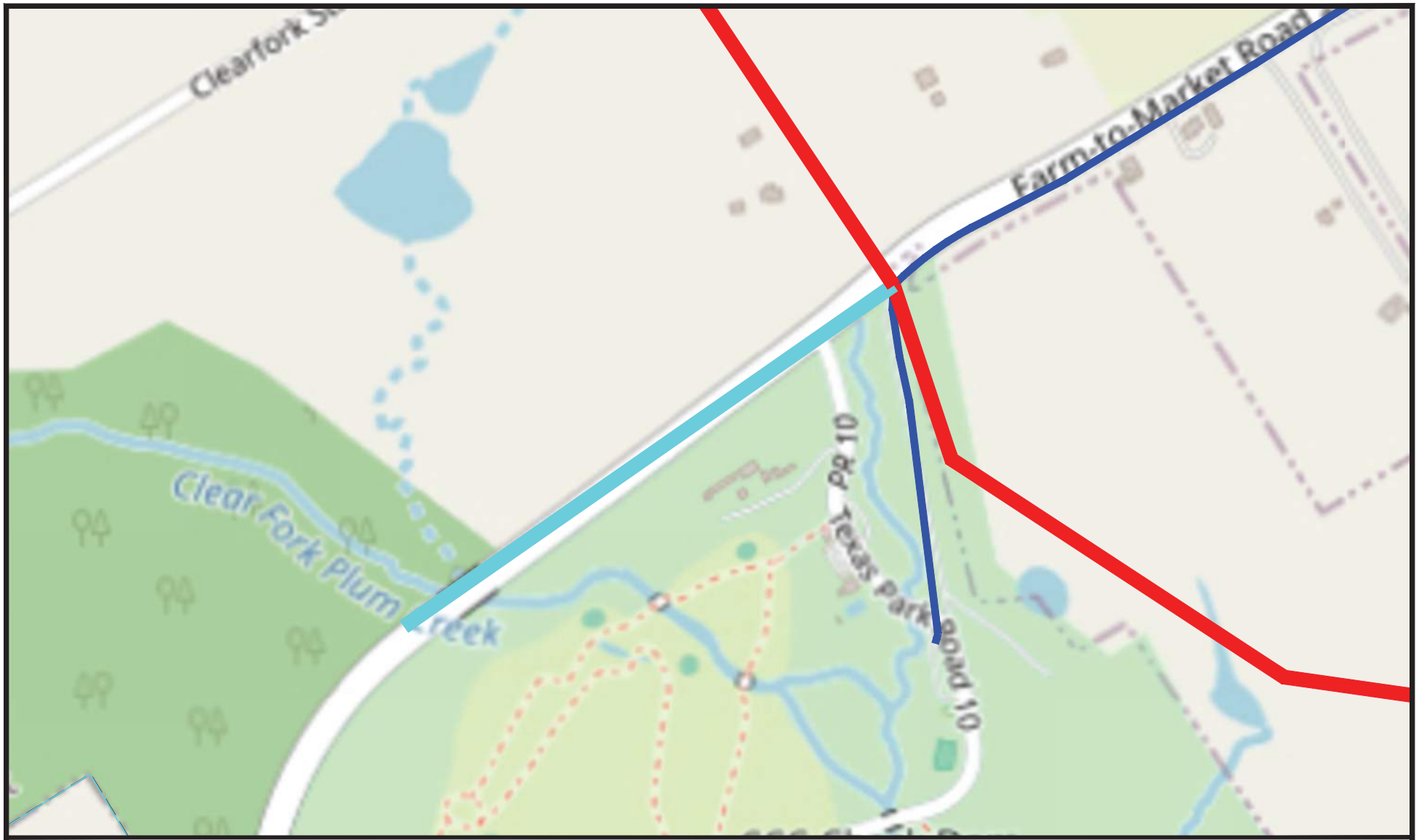

LEGEND

- PROPOSED PROJECT W-12
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 1,950 FEET OF 12" PIPE ALONG STATE PARK RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $436,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-12	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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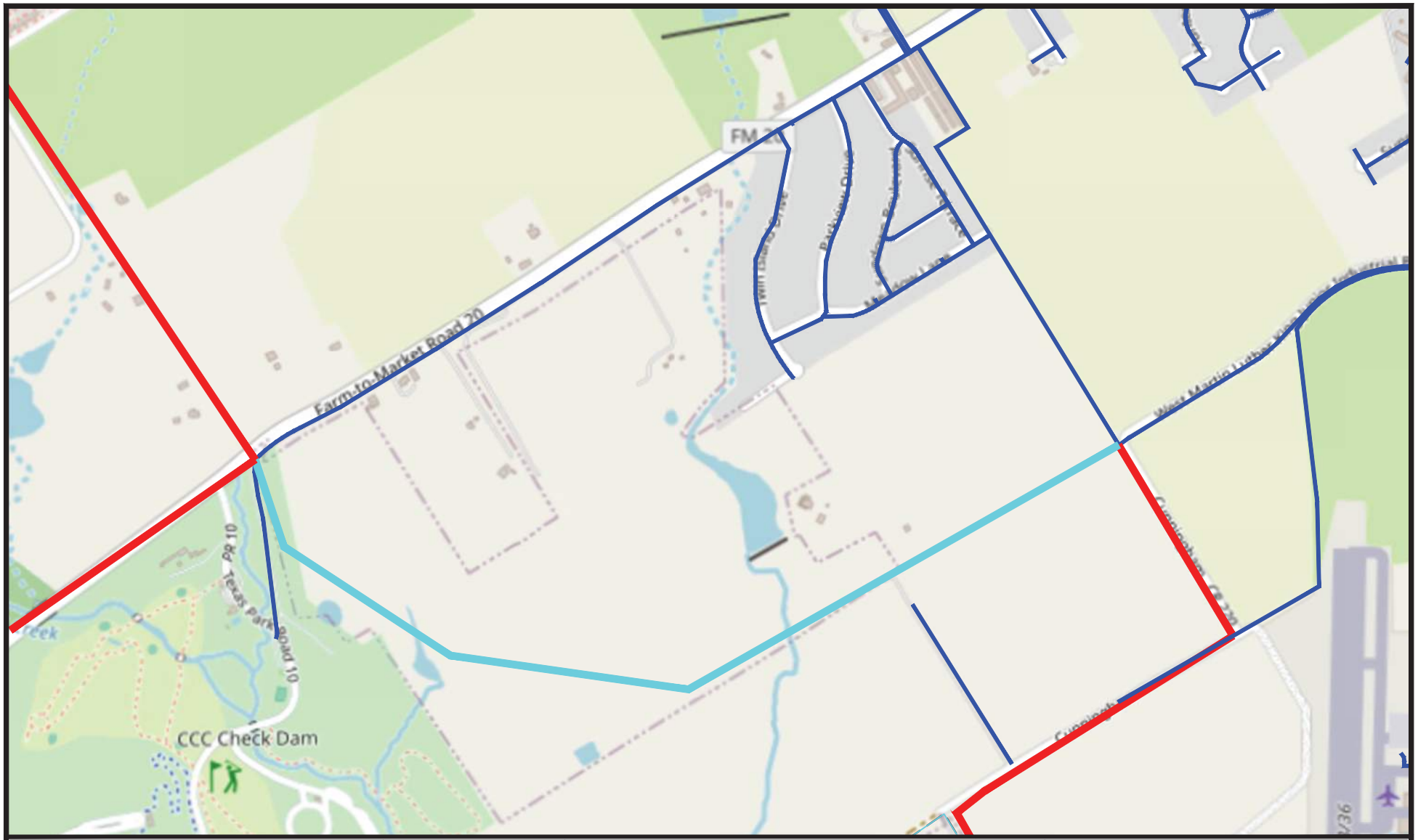

LEGEND

- PROPOSED PROJECT W-13
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 7,200 FEET OF 12" PIPE FROM STATE PARK RD. TO W. MARTIN LUTHER KING JR INDUSTRIAL BLVD.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $1,536,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-13
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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LEGEND

- PROPOSED PROJECT W-14
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 1,700 FEET OF 12" PIPE ALONG CUNNINGHAM

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $386,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-14	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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(512) 329-6080

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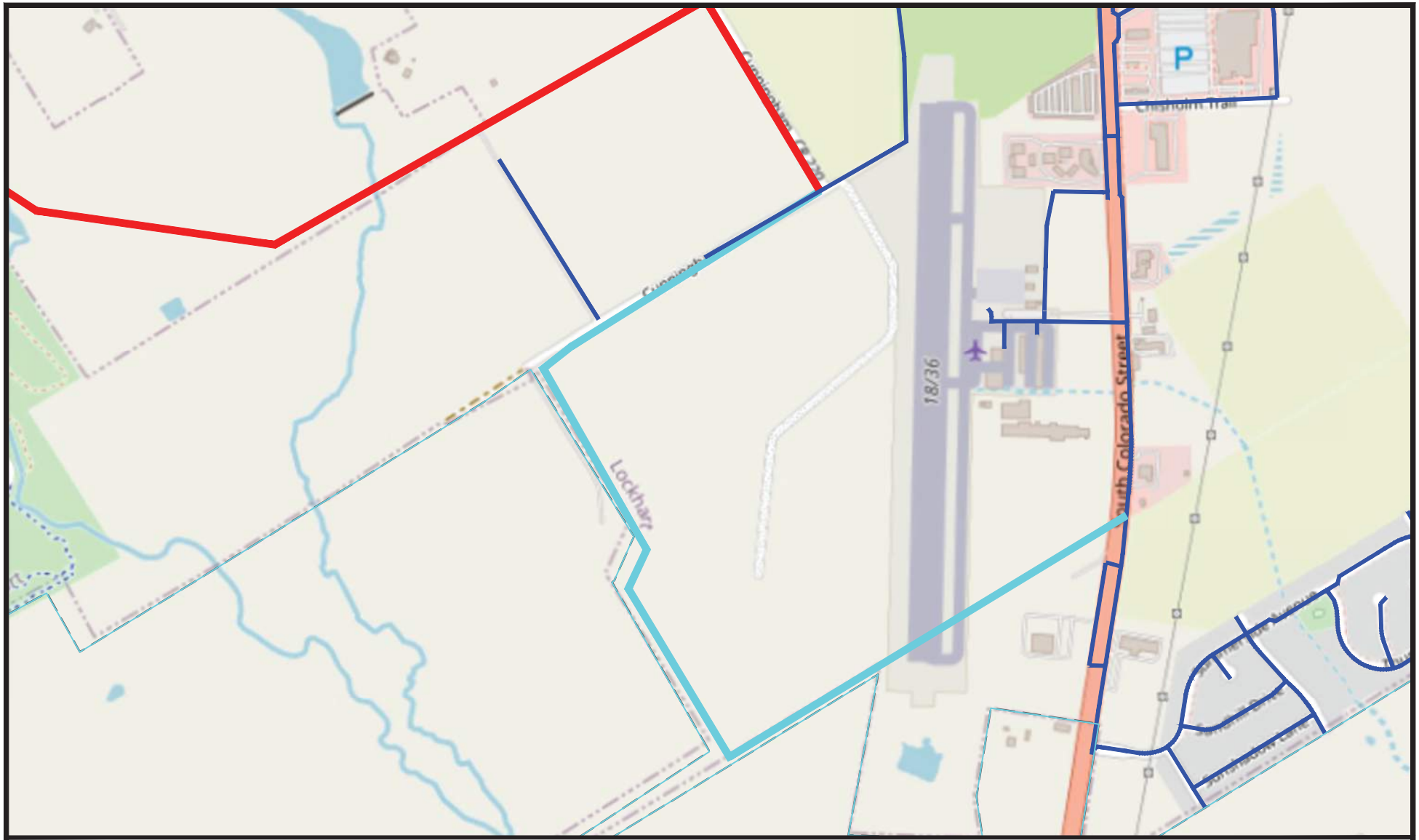

LEGEND

- PROPOSED PROJECT W-15
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 9,200 FEET OF 12" PIPE S. OF CUNNINGHAM. DEMO 1,900 FEET OF EXISTING 2" PIPE.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $1,996,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-15
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS

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(512) 329-6080

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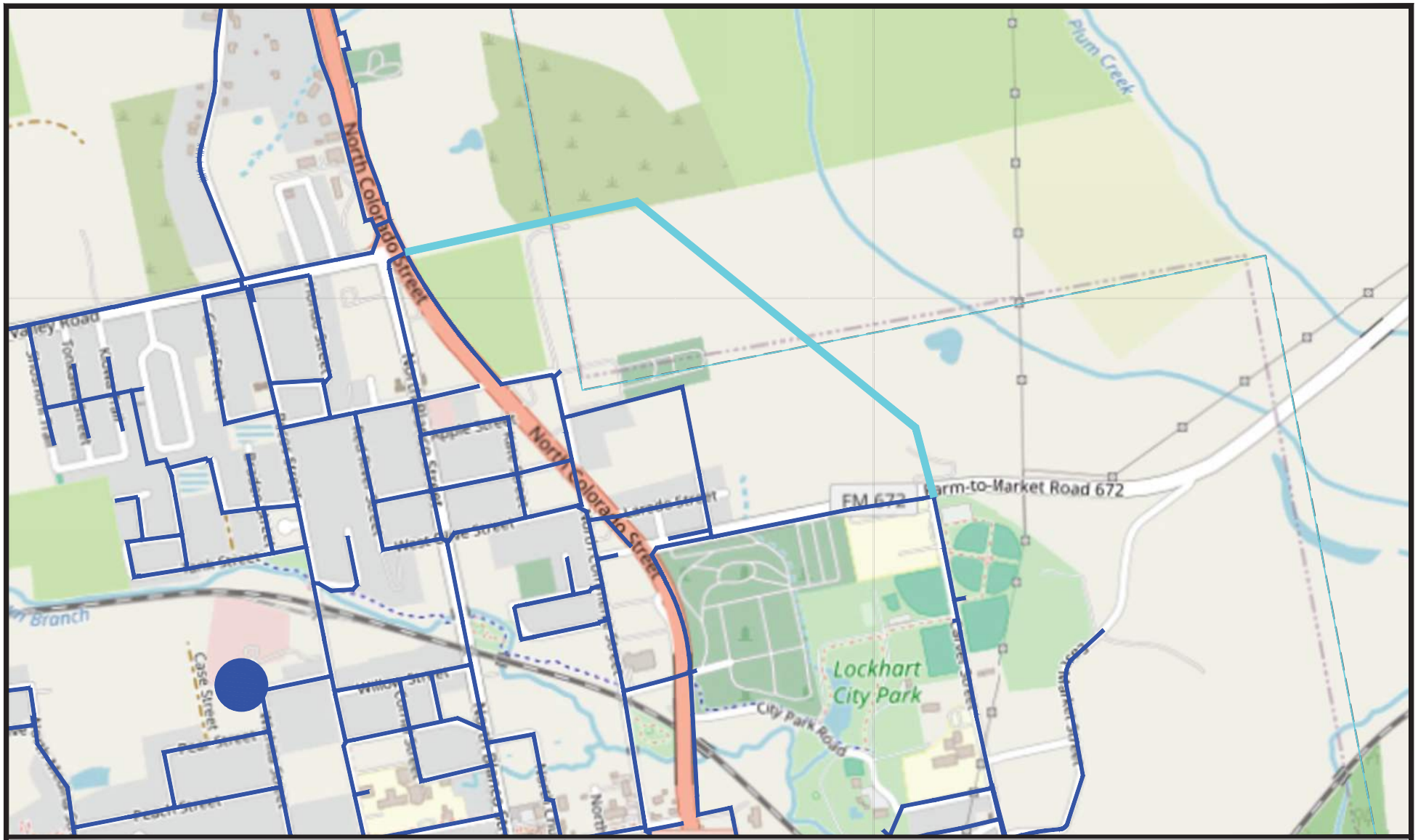

LEGEND

- PROPOSED PROJECT W-16
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 4,900 FEET OF 12" PIPE FROM N. COLORADO TO FM 672

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE LOWER PRESSURE ZONE AND TO LOOP SYSTEM

ESTIMATED COST: $1,057,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-16
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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LEGEND

- PROPOSED PROJECT W-17
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: REPLACE 4,600 FEET OF 6" AND 8" WITH 12" PIPE ALONG LOVERS LN. TO BRAZOS ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN LOWER PRESSURE ZONE SPECIFICALLY ON BLACKJACK STREET

ESTIMATED COST: $1,310,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-17
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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STE 250
AUSTIN, TX 78750
(512) 329-6080

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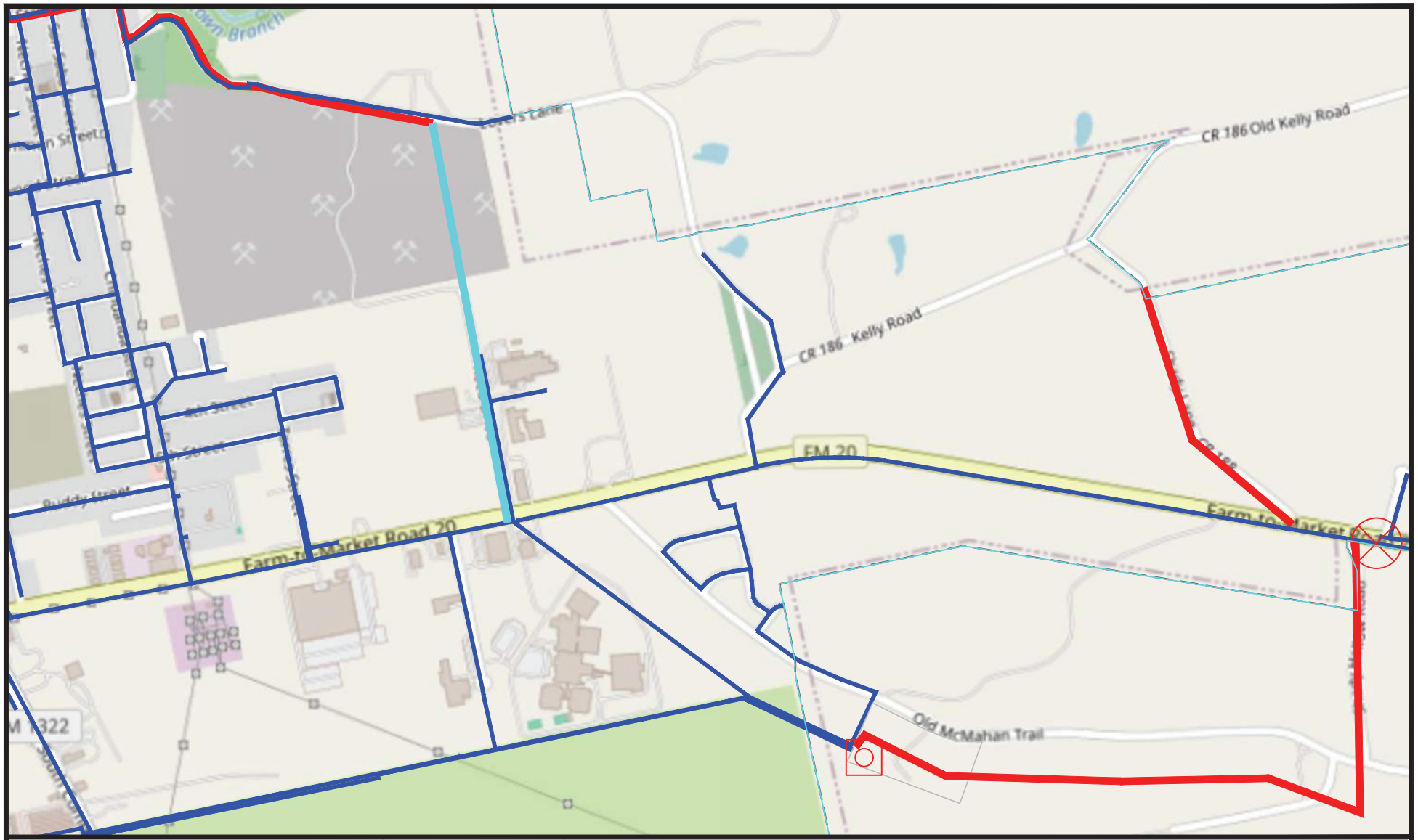

LEGEND

- PROPOSED PROJECT W-18
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: REPLACE 2,900 FEET OF 8" PIPE WITH 12" PIPE FROM LOVERS LN. TO BLACKJACK ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN LOWER PRESSURE ZONE SPECIFICALLY ON BLACKJACK STREET

ESTIMATED COST: $790,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # W-18
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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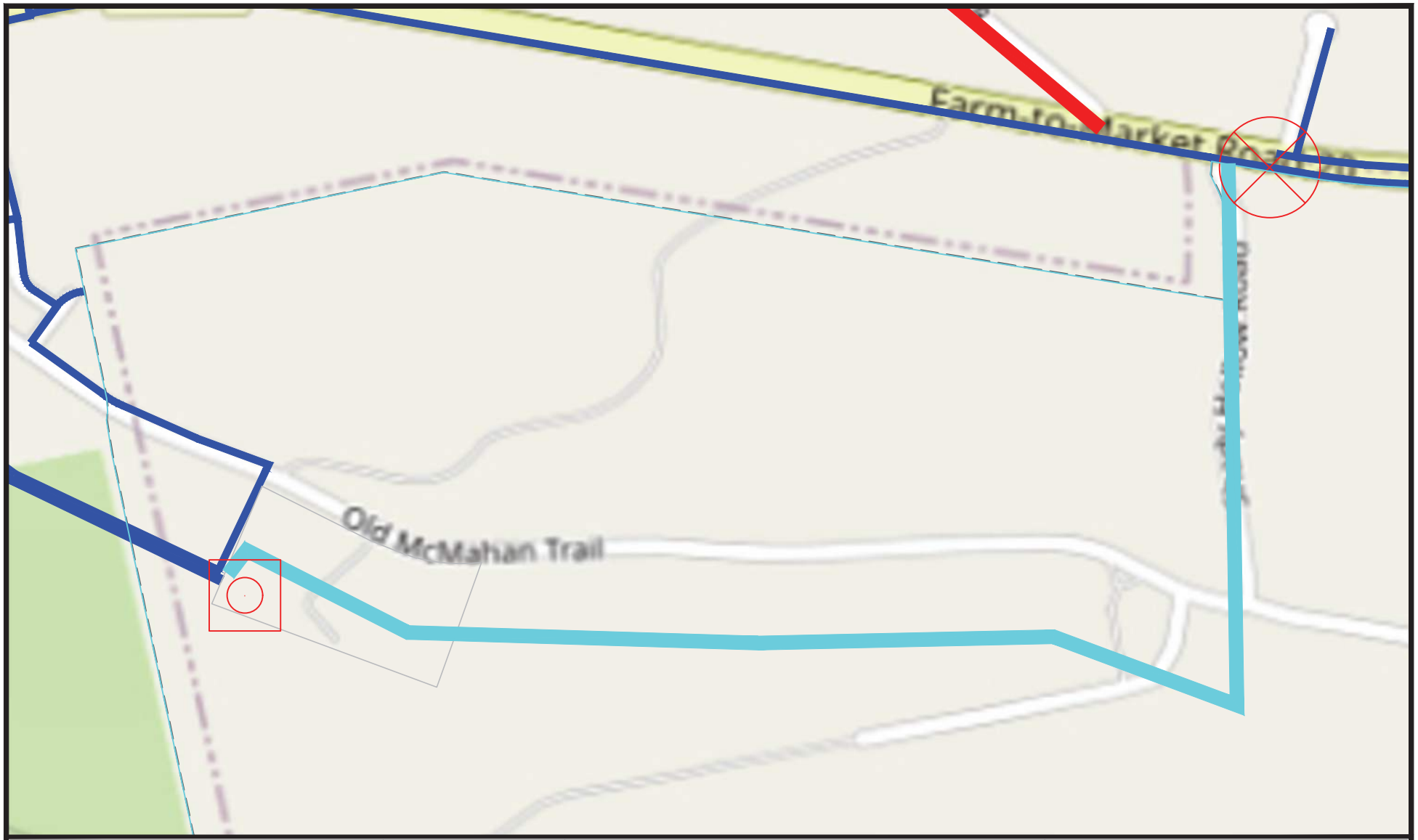

LEGEND

- PROPOSED PROJECT W-19
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 5,500 FEET OF 12" PIPE FROM WATER PLANT TO BLACKJACK ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN EASTERN LOWER PRESSURE ZONE

ESTIMATED COST: $1,177,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # W-19
DATE:	JUNE 2024		

Lockhart TEXAS

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(512) 329-6080

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LEGEND

- PROPOSED PROJECT W-20
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 2,100 FEET OF 12" PIPE ALONG SHADY LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN EASTERN LOWER PRESSURE ZONE

ESTIMATED COST: $467,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # W-20
DATE:	JUNE 2024		

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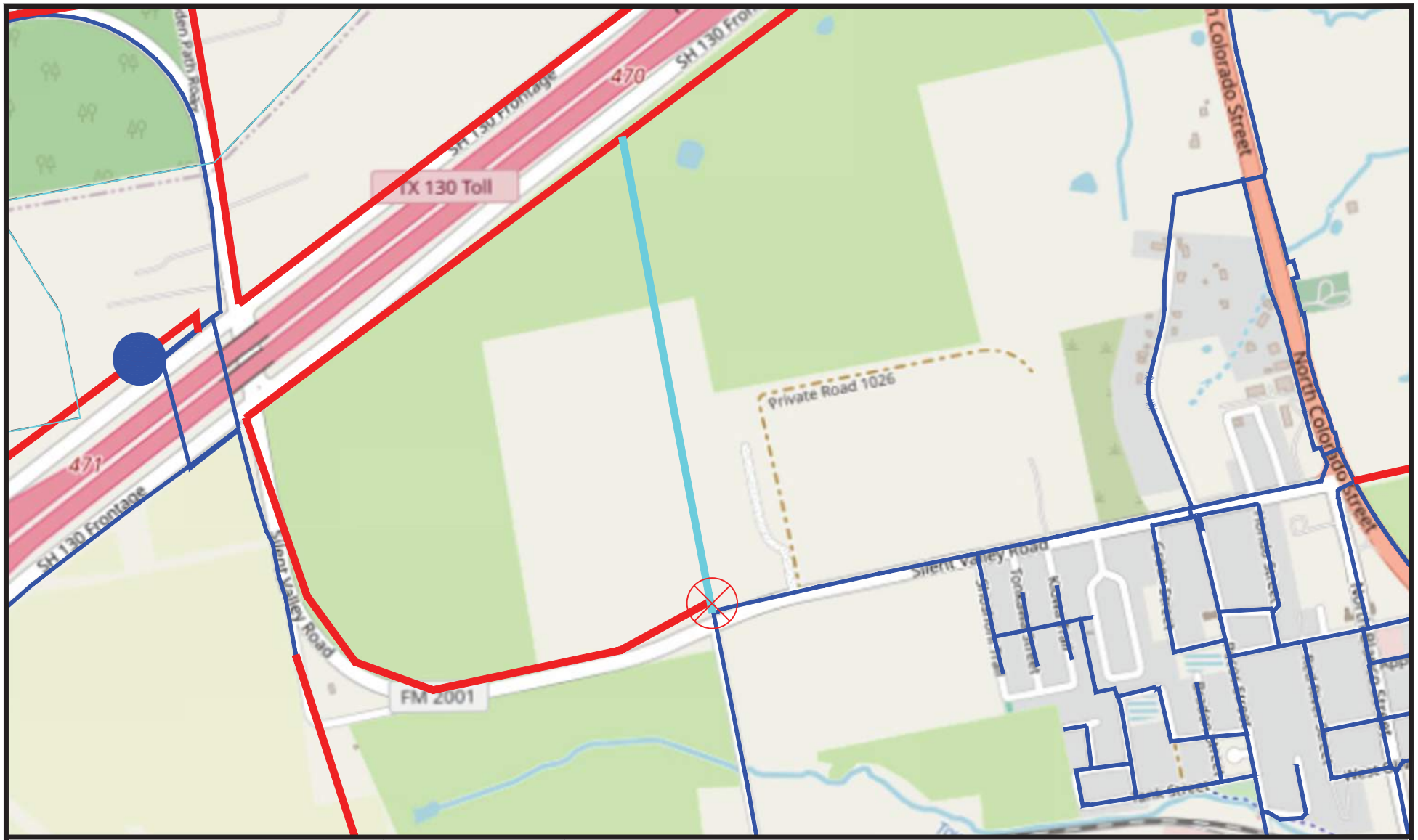

LEGEND

- PROPOSED PROJECT W-22
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 3,350 FEET OF 12" PIPE FROM STUEVE LN TO SH 130

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $734,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-22
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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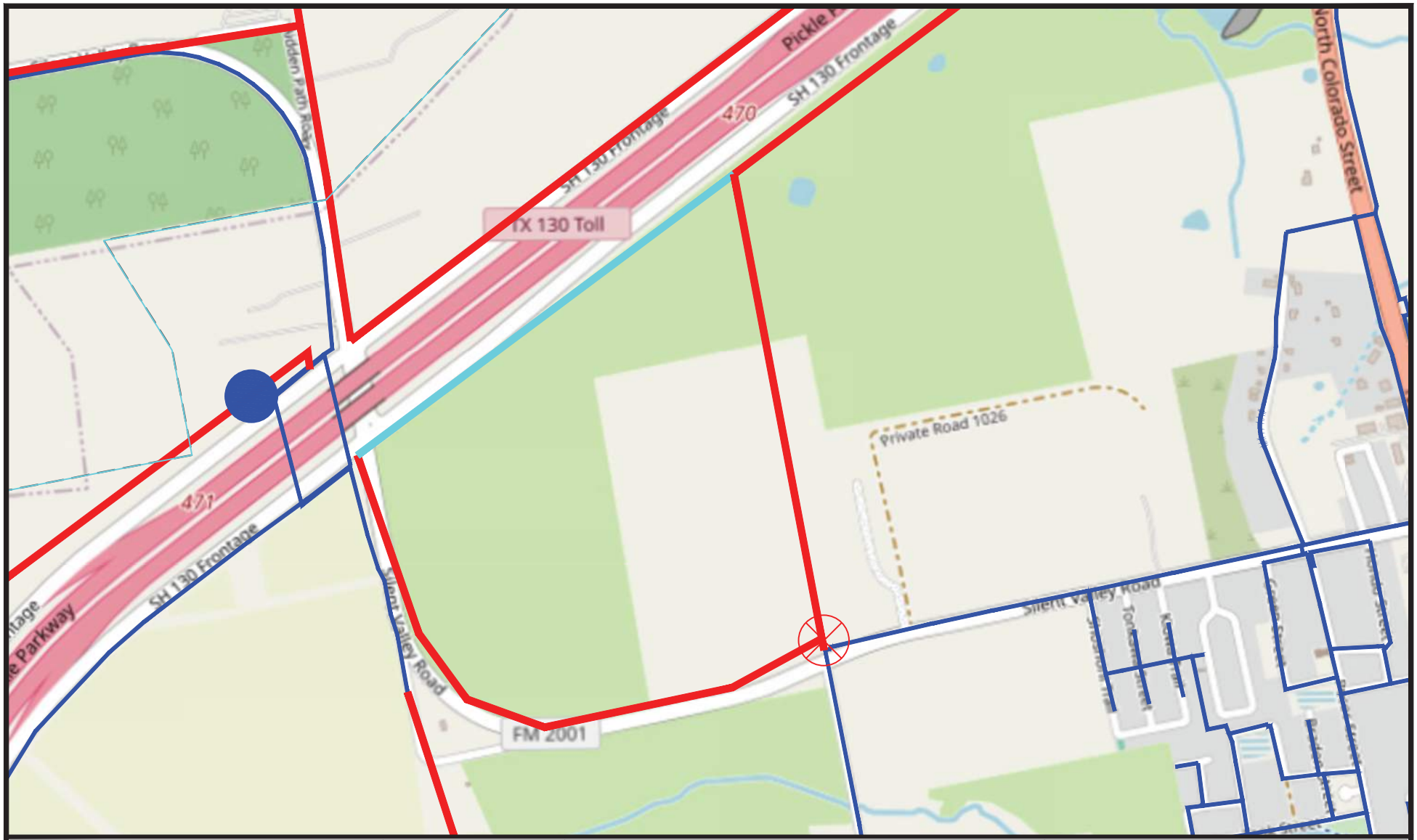

LEGEND

- PROPOSED PROJECT W-23
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 3,350 FEET OF 12" PIPE ALONG SH 130 TO HORSESHOE RD

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $731,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-23	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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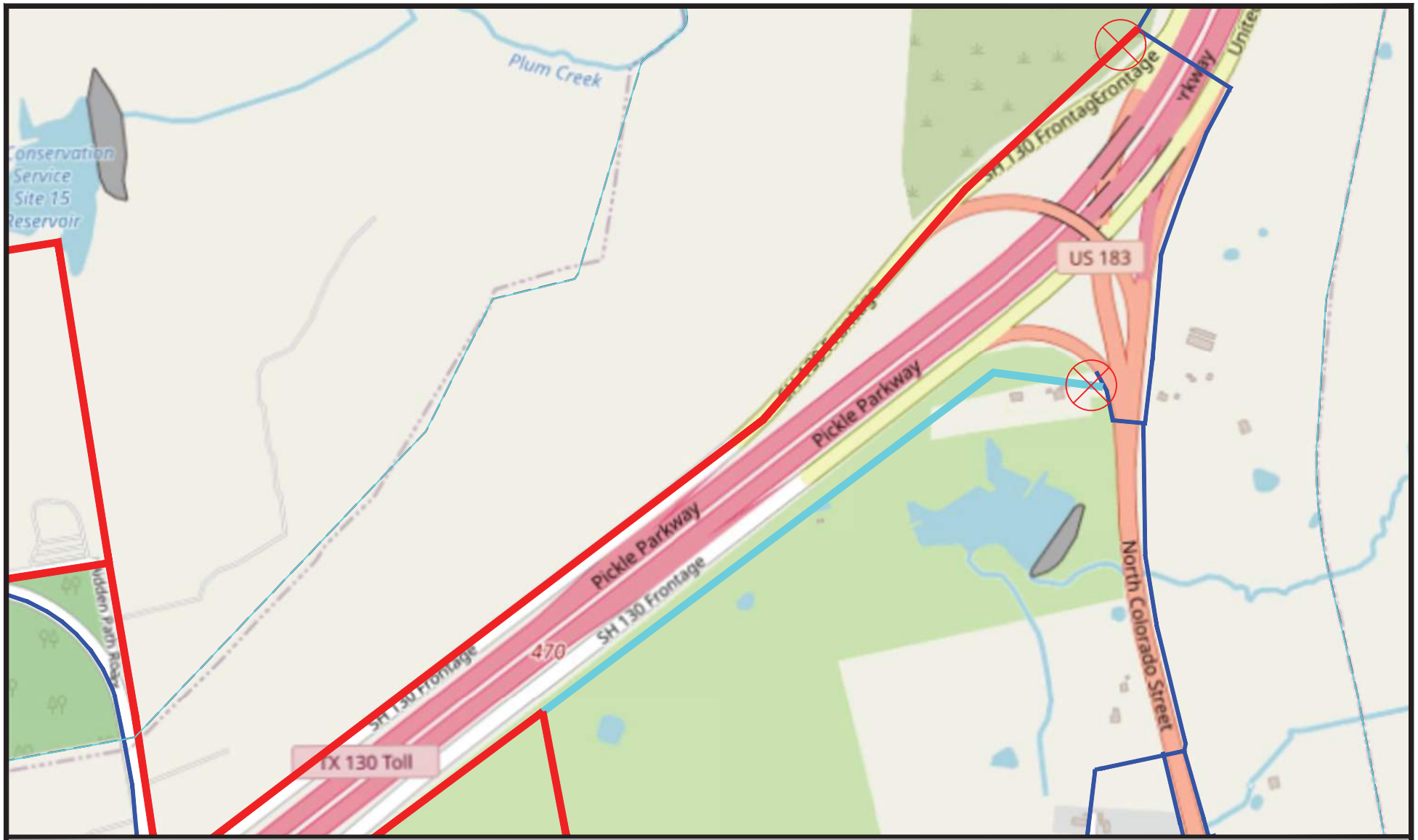

LEGEND

- PROPOSED PROJECT W-24
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 4,700 FEET OF 12" PIPE ALONG SH 130 TO N COLORADO ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $1,005,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-24
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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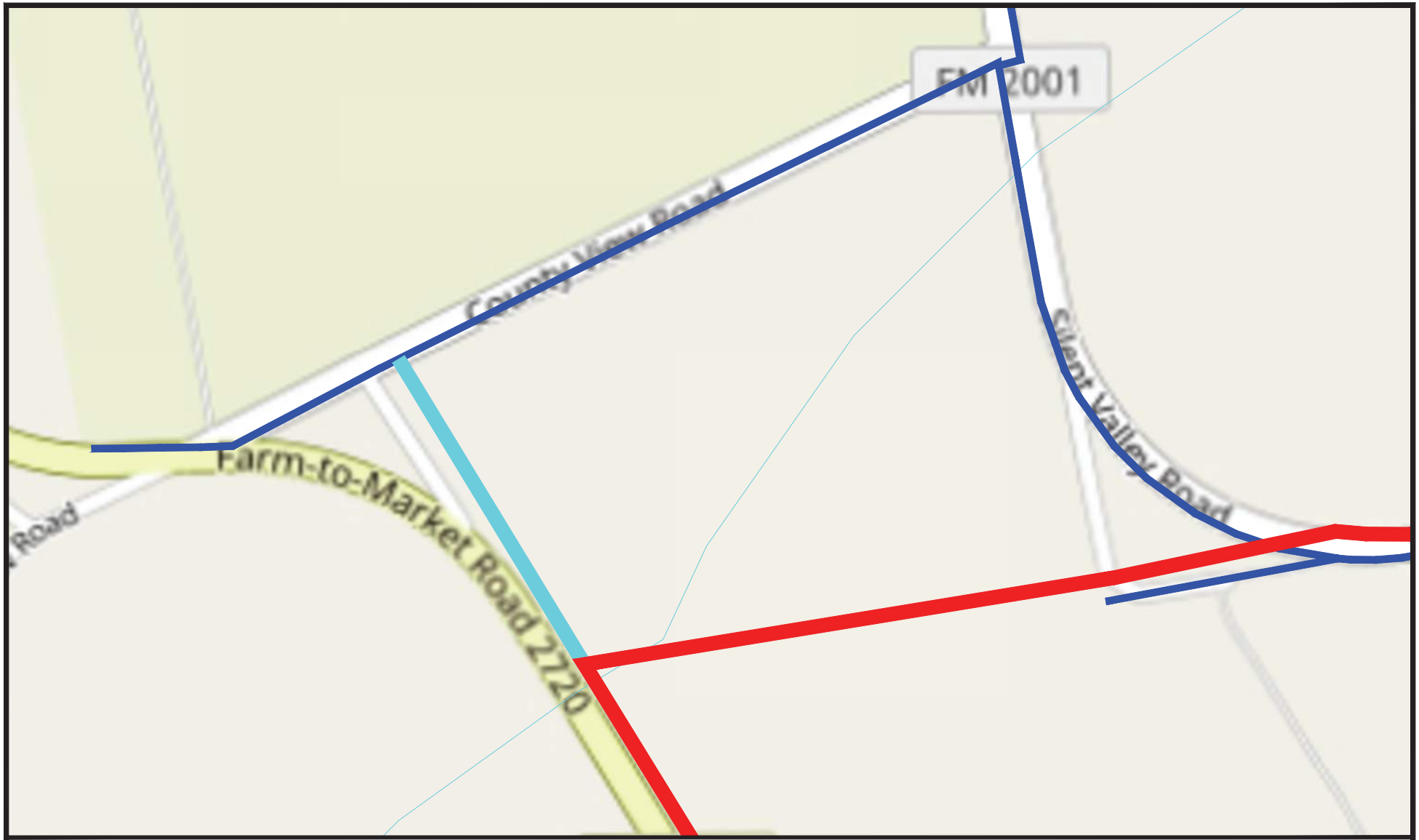

LEGEND

- PROPOSED PROJECT W-25
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 3,650 FEET OF 12" PIPE FROM COUNTY VIEW RD TO PAYNE LN

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE INDUSTRIAL PARK AREA OR UPPER PRESSURE ZONE

ESTIMATED COST: $789,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-25	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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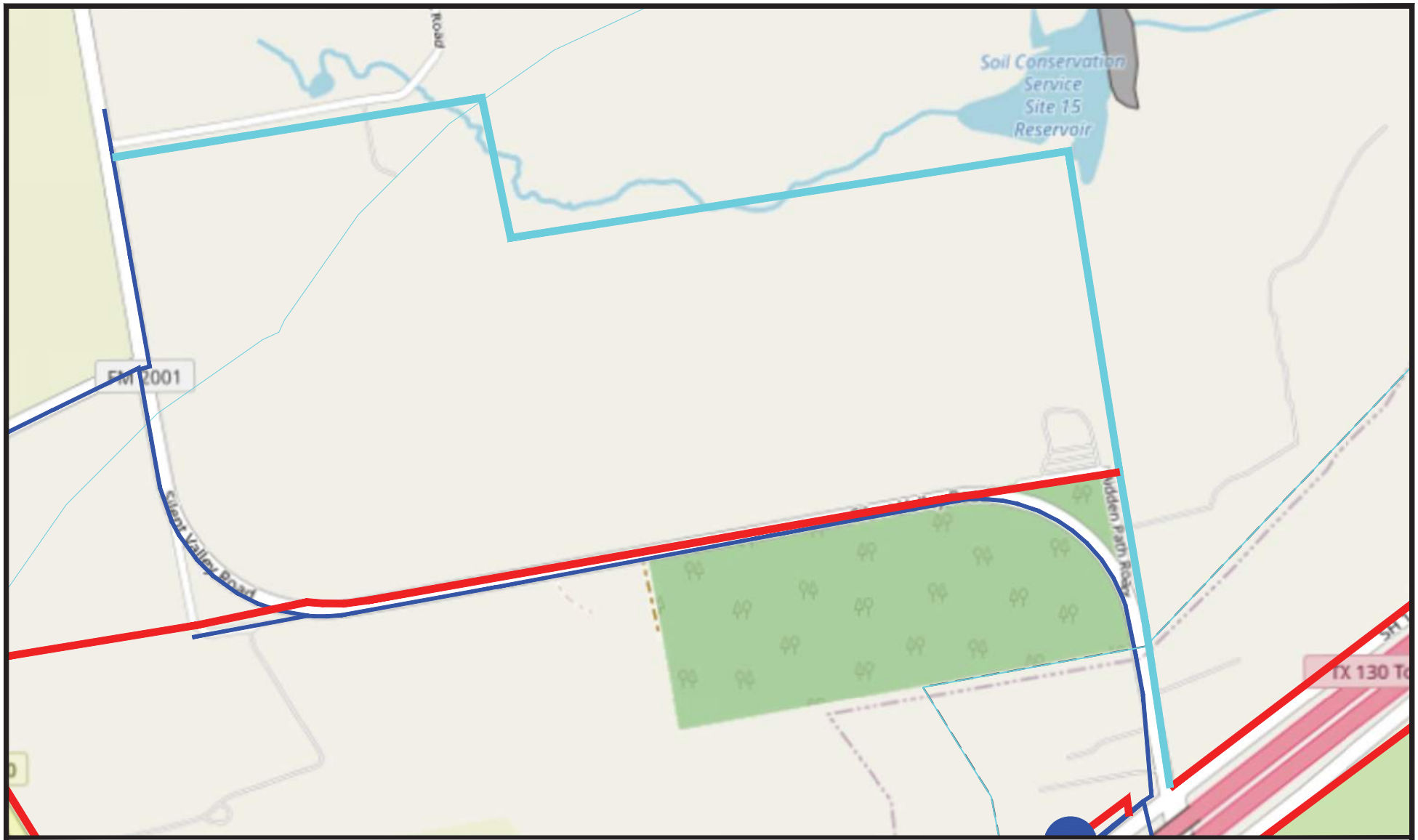

LEGEND

- PROPOSED PROJECT W-26
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL 9,950 OF 12" PIPE ALONG HIDDEN PATH RD CONNECTING TO CYPRESS RD

PROJECT TRIGGER: INCREASED DEVELOPMENT IN THE INDUSTRIAL PARK AREA OR UPPER PRESSURE ZONE

ESTIMATED COST: $2,129,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-26
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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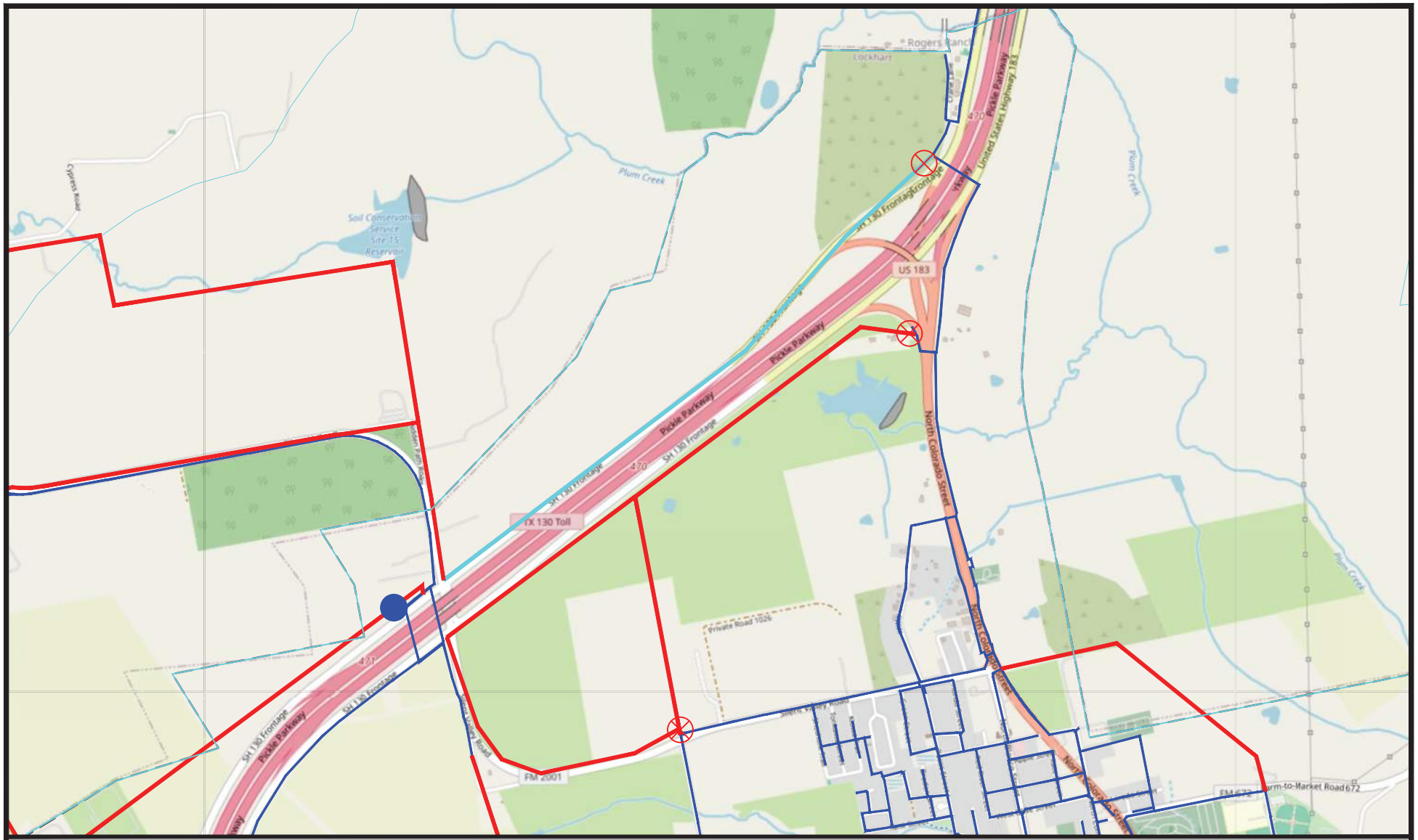

LEGEND

- PROPOSED PROJECT W-27
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 9,350 OF 12" PIPE ON N. SIDE OF SH 130 E OF HIDDEN PATH RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT IN UPPER PRESSURE ZONE

ESTIMATED COST: $1,995,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-27
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV W-28
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL PRESSURE REDUCING VALVE

PROJECT TRIGGER: THE INSTALLATION OF W-3 OR W-22

ESTIMATED COST: $53,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-28
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV W-30
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL PRESSURE REDUCING VALVE

PROJECT TRIGGER: THE INSTALLATION OF W-9

ESTIMATED COST: $53,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-30	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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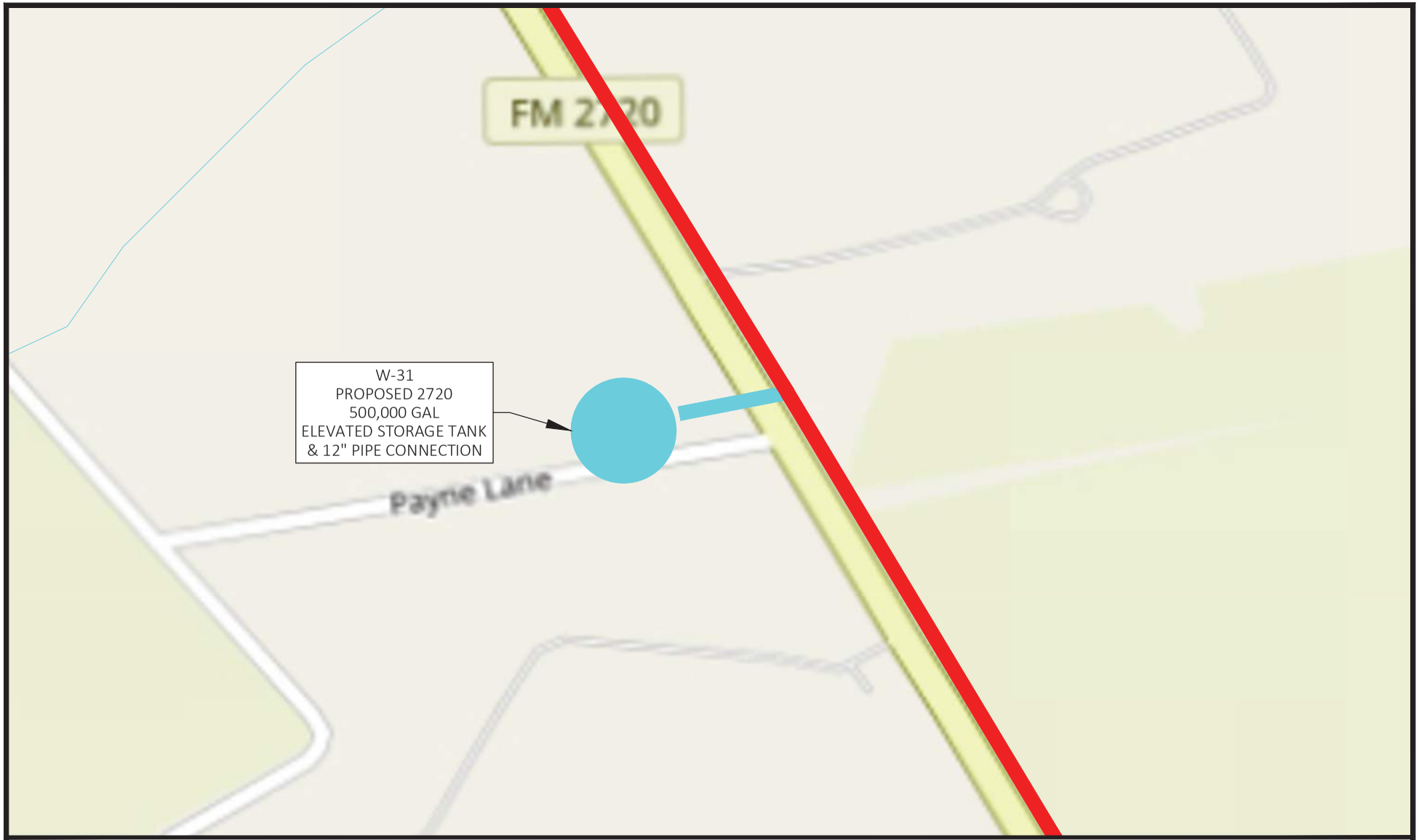

LEGEND

- PROPOSED PROJECT W-31
- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK W-31
- PROPOSED PRV
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: CONSTRUCT 500,000 ELEVATED STORAGE TANK

PROJECT TRIGGER: TOTAL WATER CONNECTIONS WITHIN DISTRIBUTION SYSTEM ≥ 7,750

ESTIMATED COST: $3,036,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-31
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV W-32
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALL PRESSURE REDUCING VALVE

PROJECT TRIGGER: HIGH PRESSURES IN EAST AREA OF SYSTEM

ESTIMATED COST: $53,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # W-32	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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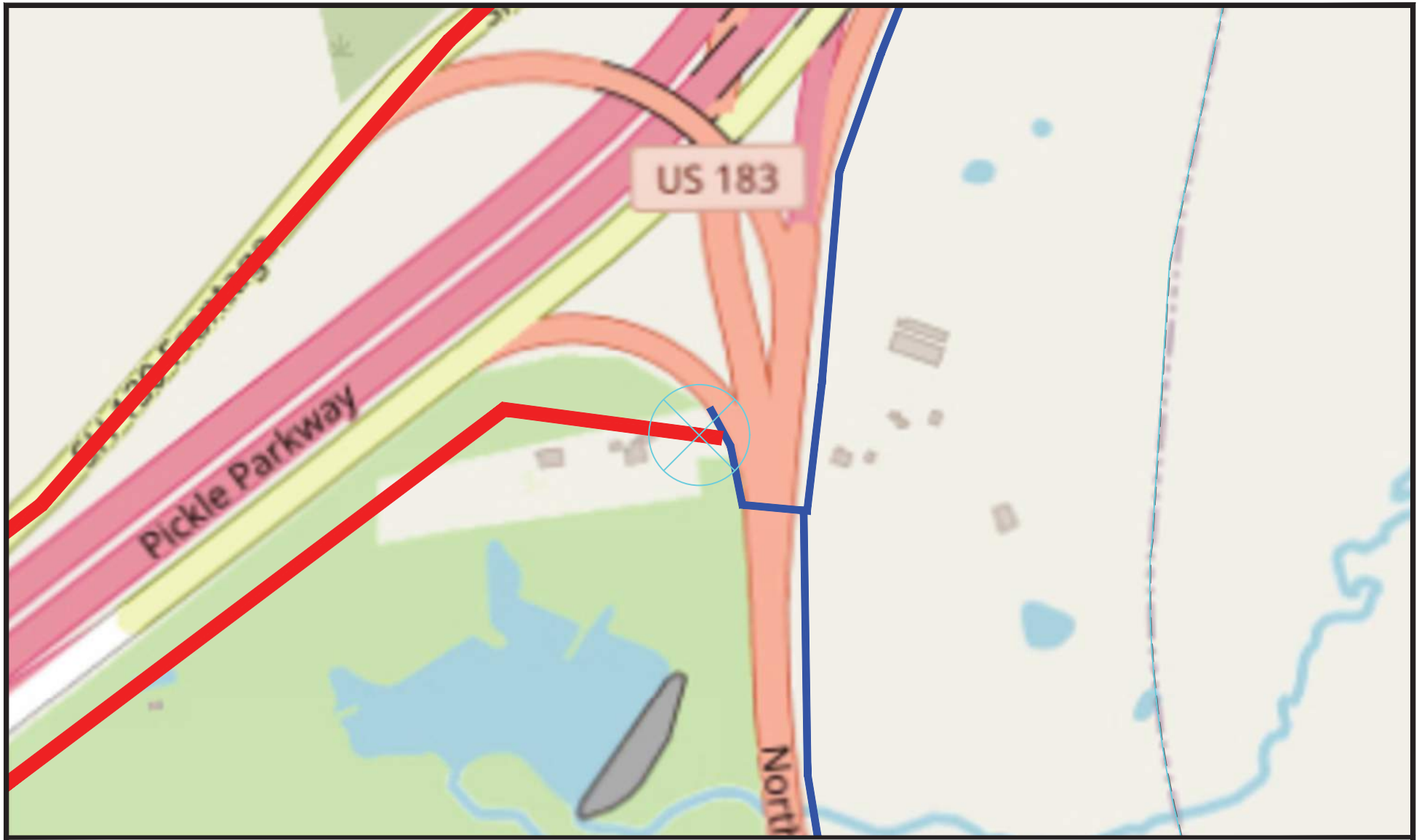

LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV W-33
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL PRESSURE REDUCING VALVE

PROJECT TRIGGER: PRESSURE PLANE SEPARATION AS A RESULT OF W-27

ESTIMATED COST: $53,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-33
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV W-34
- PROPOSED PUMP STATION
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL PRESSURE REDUCING VALVE

PROJECT TRIGGER: PRESSURE PLANE SEPARATION AS A RESULT OF W-24

ESTIMATED COST: $53,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-34
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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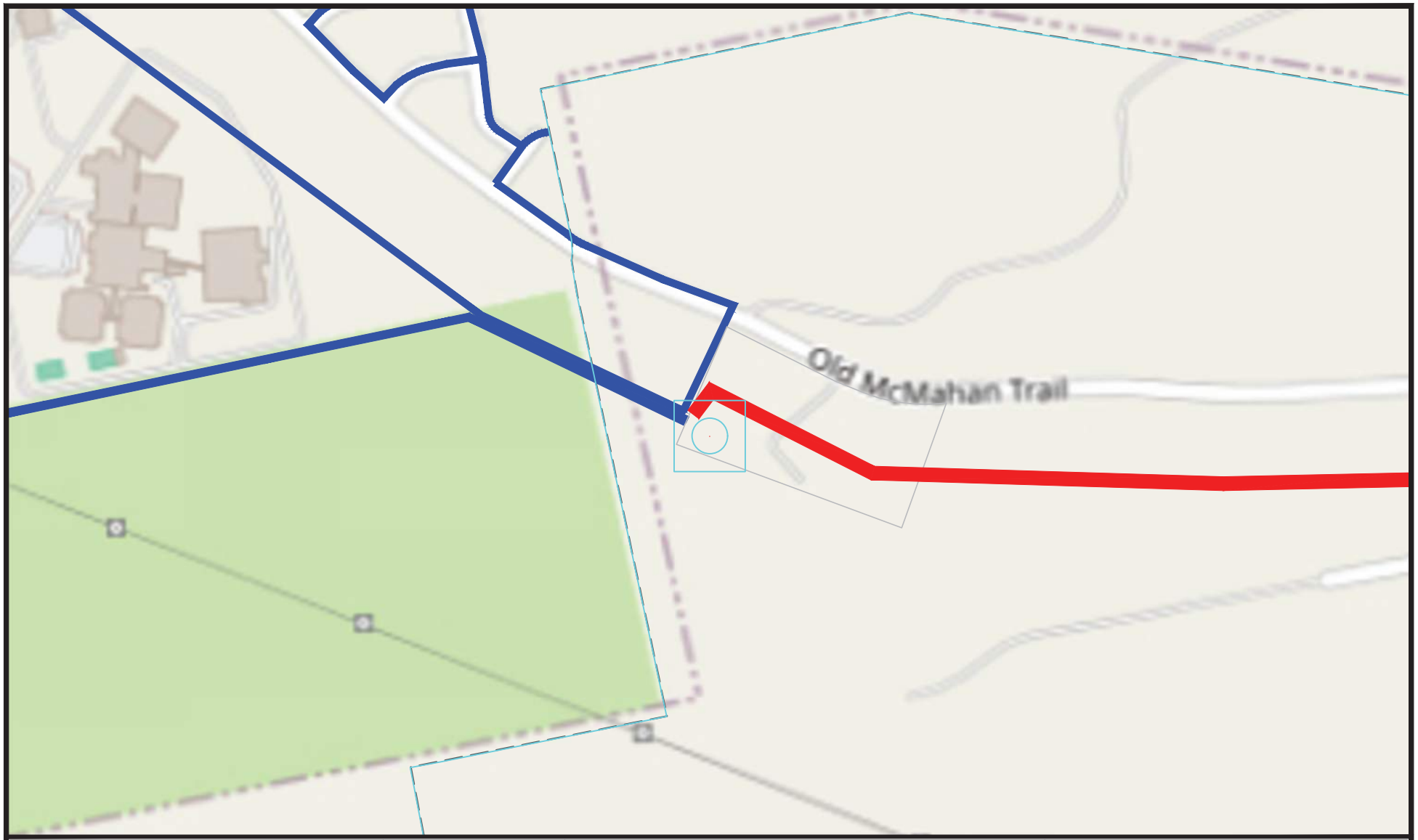

LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION W-35
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 1,200 GPM HIGH SERVICE PUMP

PROJECT TRIGGER: TOTAL WATER CONNECTIONS WITHIN DISTRIBUTION SYSTEM ≥ 8,000

ESTIMATED COST: $876,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-35
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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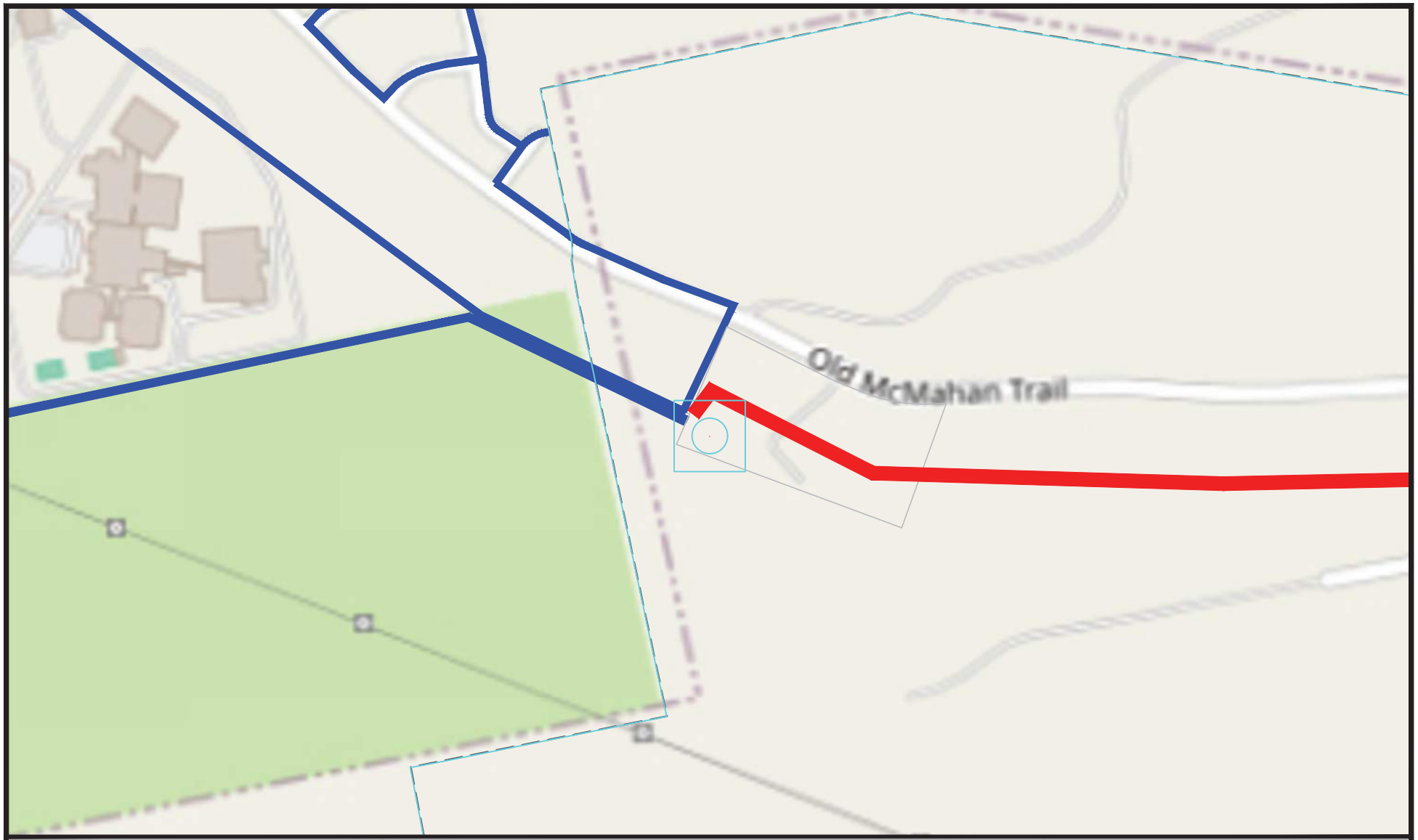

LEGEND

- ELEVATED TANK
- BOOSTER STATION
- EXISTING WATER LINES
- PROPOSED ELEVATED TANK
- PROPOSED PRV
- PROPOSED PUMP STATION W-35
- PROPOSED WATER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2043

PROJECT DESCRIPTION: INSTALL 1,200 GPM HIGH SERVICE PUMP

PROJECT TRIGGER: TO MEET PEAK HOURLY DEMAND WITH HSPS FIRM CAPACITY

ESTIMATED COST: $876,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	W-37
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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APPENDIX B – FLOW MONITORING SITE REPORTS

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S01 Colorado MH 128

MH at ~2301 S. Colorado St
Lockhart, TX 78644
ST0128

Access:
MH in green space, south of address driveway.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/15/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 110"			
MH Coordinates: 29.847192, -97.668425			
Slow to moderate open channel hydraulics with some turbulence due to inflow from lateral.			
Avg Velocity	Avg Measured Level		Multiplier
0.9 fps	5.2"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Drop inlet entering from the east and pipe entering from the north; monitored upstream line to get total flow.			
Traffic Safety			
MH in green area, used cones to delineate work zone.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	148"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Fair
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	38"
Sensor Dist. to Crown	26"
Sensor Direction	Upstream
Flow Heading	South

Meter Site Document

2023.08 S01 Colorado MH 128

MH at ~2301 S. Colorado St

Lockhart, TX 78644

Site

Manhole Before Install

Installation Process

Installed

Downstream

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S02 Blackjack MH 149

MH at ~1501 Blackjack St
Lockhart, TX 78644
ST0149

Access:
MH in green space, next to driveway of address.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/16/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 144"			
MH Coordinates: 29.873559, -97.652172			
Slow to moderate open channel hydraulics with some turbulence due to inflow from lateral.			
Avg Velocity	Avg Measured Level		Multiplier
1.25 fps	4.4"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Pipes entering from west & south; monitored downstream line to get total flow.			
Traffic Safety			
MH in green area, used cones to delineate work zone.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	166"
Monitored Pipe Size	16"
Inner Pipe Size (In/Out)	16"/16"
Pipe Shape	Round
Pipe Condition	Poor
Manhole Material	Concrete
Silt	2"
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	22"
Sensor Dist. to Crown	6"
Sensor Direction	Downstream
Flow Heading	East

Meter Site Document

2023.08 S02 Blackjack MH 149

MH at ~1501 Blackjack St

Lockhart, TX 78644

Site

Manhole Before Install

Installation Process

Installed

Downstream

Upstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

MH at ~1501 Blackjack St
Lockhart, TX 78644
ST0198

2023.08 S03 Island MH 198

Access:
MH on south shoulder of Island View, SW of address.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/16/2023

Map

Sewer Map

Flow Meter		
Meter Depth: 155"		
MH Coordinates: 29.859100, -97.685276		
: Slow to moderate open channel hydraulics with some turbulence due to slight bend in the trough.		
Avg Velocity	Avg Measured Level	Multiplier
1.0 fps	4.0"	1.0

Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.

Traffic Safety
MH in green area, used cones to delineate work zone.

Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	176"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	21"
Sensor Dist. to Crown	9"
Sensor Direction	Upstream
Flow Heading	South

Meter Site Document

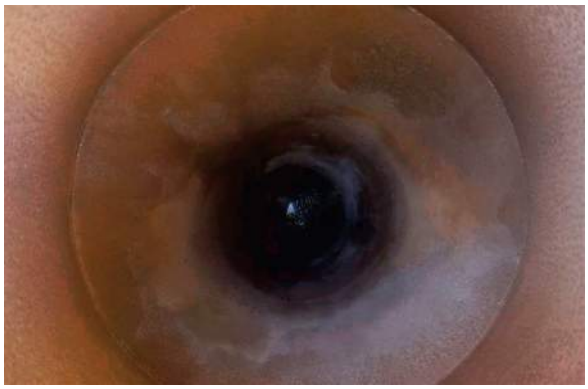
2023.08 S03 Island MH 198

MH at ~1501 Blackjack St

Lockhart, TX 78644

Site

Manhole Before Install



Installation Process

Installed

Downstream

Downstream Pipe Size

Site Report 1/05/2024

Confidential Proprietary Information

TRC Companies

2023.08 S04 San Ant. MH 361

MH at ~103 Richland Dr
Lockhart, TX 78644
ST0361

Access:
MH on sidewalk, used cones to delineate work zone.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/15/2023

Map

Flow Meter
Meter Depth: 112"
MH Coordinates: 29.882332, -97.699080
Slow to moderate open channel hydraulics.

Avg Velocity	Avg Measured Level	Multiplier
2.2 fps	1.1"	1.0

Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.

Traffic Safety
MH on sidewalk, used cones to delineate work zone .

Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	129"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Not passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	17"
Sensor Dist. to Crown	5"
Sensor Direction	Upstream
Flow Heading	South

Sewer Map

Meter Site Document

2023.08 S04 San Ant. MH 361

MH at ~103 Richland Dr

Lockhart, TX 78644

Site

Manhole Before Install

Installation Process

Installed

Upstream

Upstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S05 Clear Fork MH 373

MH at ~1522 Clear Fork St
Lockhart, TX 78644
ST0373

Access:
MH in gutter on south side of road, NE of address.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/15/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 76"			
MH Coordinates: 29.872077, -97.690856			
Slow to moderate open channel hydraulics with some turbulence due to inflow from lateral.			
Avg Velocity	Avg Measured Level		Multiplier
1.6 fps	1.7"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Pipes entering from west & south; monitored the upstream west line as directed.			
Traffic Safety			
Used cones & signs in accord w/site-specific WATCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	94"
Monitored Pipe Size	8"
Inner Pipe Size (In/Out)	8"/8"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	18"
Sensor Dist. to Crown	10"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2023.08 S05 Clear Fork MH 373

MH at ~1522 Clear Fork St

Lockhart, TX 78644

Site

Installation Process

Upstream

Installed

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S06 Creekview MH 552

MH at ~179 Creekview
Lockhart, TX 78644
ST0552

Access:
MH in green area, used cones to delineate work zone.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/15/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 113"			
MH Coordinates: 29.871639, -97.626474			
Slow to moderate open channel hydraulics with some turbulence due to inflow from lateral.			
Avg Velocity	Avg Measured Level		Multiplier
0.6 fps	7.5"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Pipes entering from the north and a drop inlet form the east; monitored upstream north line as directed.			
Traffic Safety			
MH in green area, used cones to delineate work zone.			
Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	141"
Monitored Pipe Size	20"
Inner Pipe Size (In/Out)	20"/20"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	1.5"
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	28"
Sensor Dist. to Crown	8"
Sensor Direction	Upstream
Flow Heading	South

Meter Site Document

2023.08 S06 Creekview MH 552

MH at ~179 Creekview

Lockhart, TX 78644

Site

Installation Process

Downstream

Installed

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

MH at ~400 N. Main St
Lockhart, TX 78644
ST0614

2023.08 S07 Commerce MH614

Access:
MH in SB lane of N. Commerce St, east of address.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/17/2023

Map

Sewer Map

Flow Meter		
Meter Depth: 28"		
MH Coordinates: 29.887526, -97.671999		
Slow to moderate open channel hydraulics with some turbulence due to inflow from lateral.		
Avg Velocity	Avg Measured Level	Multiplier
0.6 fps	5.4"	1.0

Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes
Pipes entering from the south & east; monitored upstream south line as directed.

Traffic Safety
Used cones & signs in accord w/site-specific WATCH requirements.

Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	54"
Monitored Pipe Size	8"
Inner Pipe Size (In/Out)	8"/8"
Pipe Shape	Round
Pipe Condition	Fair
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	26"
Sensor Dist. to Crown	18"
Sensor Direction	Upstream
Flow Heading	North

Meter Site Document

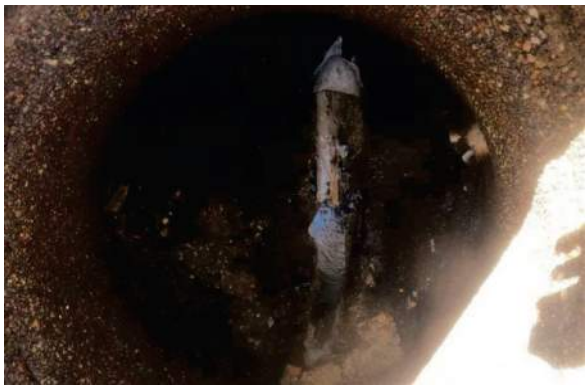
2023.08 S07 Commerce MH614

MH at ~400 N. Main St

Lockhart, TX 78644

Site

Manhole Before Install



Installation Process

Installed

Downstream

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S08 Larremore MH 853

MH at ~708 E. Market St
Lockhart, TX 78644
ST0853

Access:
MH on shoulder, north of Larremore Rd, NE of address.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/16/2023

Map

Sewer Map

Flow Meter
Meter Depth: 23"
MH Coordinates: 29.884950, -97.665816
Slow to moderate open channel hydraulics.

Avg Velocity	Avg Measured Level	Multiplier
1.1 fps	4.8"	1.0

Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes
No laterals; monitored the upstream line as directed.

Traffic Safety
MH in green area, used cones to delineate work zone.

Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	38"
Monitored Pipe Size	18"
Inner Pipe Size (In/Out)	18"/18"
Pipe Shape	Round
Pipe Condition	Fair
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	15"
Sensor Dist. to Crown	3"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2023.08 S08 Larremore MH 853

MH at ~708 E. Market St

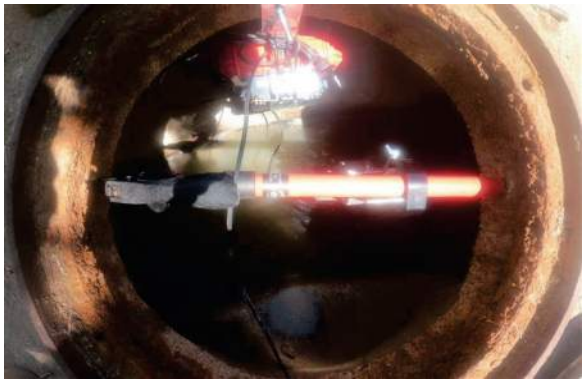
Lockhart, TX 78644

Site

Manhole Before Install

Installation Process

Installed



Downstream

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

MH at ~117 White Oak St

Lockhart, TX 78644

2023.08 S09 Colorado MH 923

Access:

MH on sidewalk in front of address, east side address.

System Type:

Sanitary [X] Storm [ ]

Install Date: 8/17/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 156"			
MH Coordinates: 29.874401, -97.669023			
Slow to moderate open channel hydraulics with some turbulence due to inflow from laterals.			
Avg Velocity	Avg Measured Level		Multiplier
1.1 fps	2.3"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Pipes entering from the north and south with one drop inlet form the west; monitored upstream line to get total flow.			
Traffic Safety			
MH on sidewalk, used cones to delineate the work zone.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	185"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Fair
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	29"
Sensor Dist. to Crown	17"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2023.08 S09 Colorado MH 923

MH at ~117 White Oak St

Lockhart, TX 78644

Site

Installation Process

Installed

Downstream Pipe Size

Site Report 1/04/2024

Confidential Proprietary Information

TRC Companies

2023.08 S10 Colorado MH 934

MH at ~1414 S. Colorado St
Lockhart, TX 78644
ST0934

Access:
MH in green space on SE corner of US-183 and spinnaker St.

System Type:
Sanitary [X] Storm [ ]

Install Date: 8/16/2023

Map

Sewer Map

Flow Meter			
Meter Depth: 71"			
MH Coordinates: 29.866801, -97.668525			
Slow to moderate open channel hydraulics.			
Avg Velocity	Avg Measured Level		Multiplier
0.5 fps	2.4"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line directed.			
Traffic Safety			
MH in green space, used cones to delineate the work zone.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	94"
Monitored Pipe Size	8"
Inner Pipe Size (In/Out)	8"/8"
Pipe Shape	Round
Pipe Condition	Poor
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	23"
Sensor Dist. to Crown	15"
Sensor Direction	Upstream
Flow Heading	North

Meter Site Document

2023.08 S10 Colorado MH 934

MH at ~1414 S. Colorado St

Lockhart, TX 78644

Site

Installation Process

Downstream

Installed

Upstream Pipe Size

APPENDIX C – WASTEWATER COLLECTION SYSTEM CIP EXHIBITS

LEGEND

- PROPOSED PROJECT S-1
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 12,000 LF OF 12" PIPE EXTENSION PAST SH 130 TO HIDDEN PATH RD

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG HIDDEN PATH ROAD

ESTIMATED COST: $3,181,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # S-1
DATE:	JUNE 2024		

Lockhart TEXAS

505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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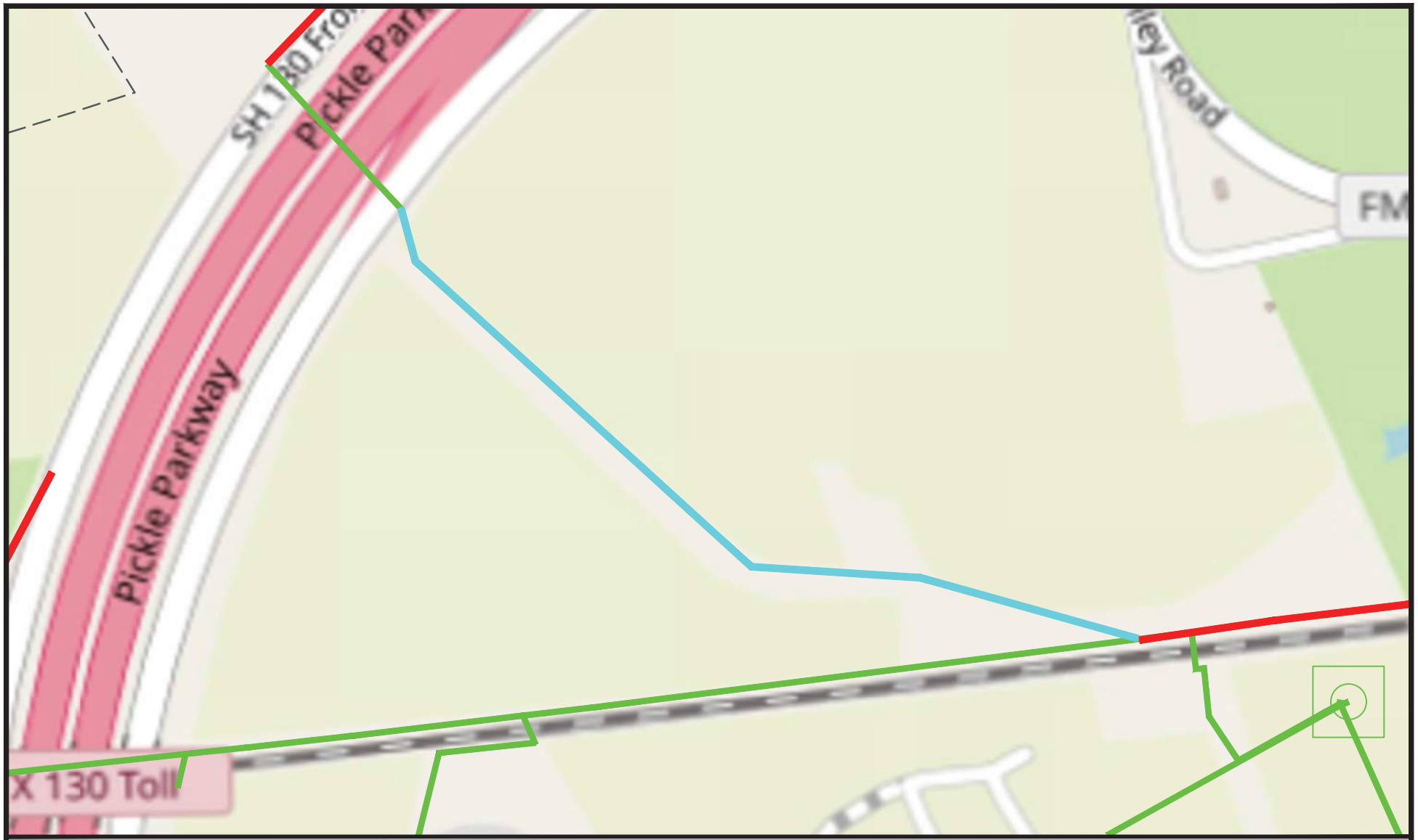

LEGEND

- PROPOSED PROJECT S-2
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 2,500LF OF 12" PIPE BETWEEN SH 130 AND WINDRIDGE

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG HIDDEN PATH ROAD

ESTIMATED COST: $665,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

FIGURE # S-2

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-3
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 1,200LF OF 12" W OF SH 130

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. CESAR CHAVEZ PKWY SB

ESTIMATED COST: $332,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # S-3
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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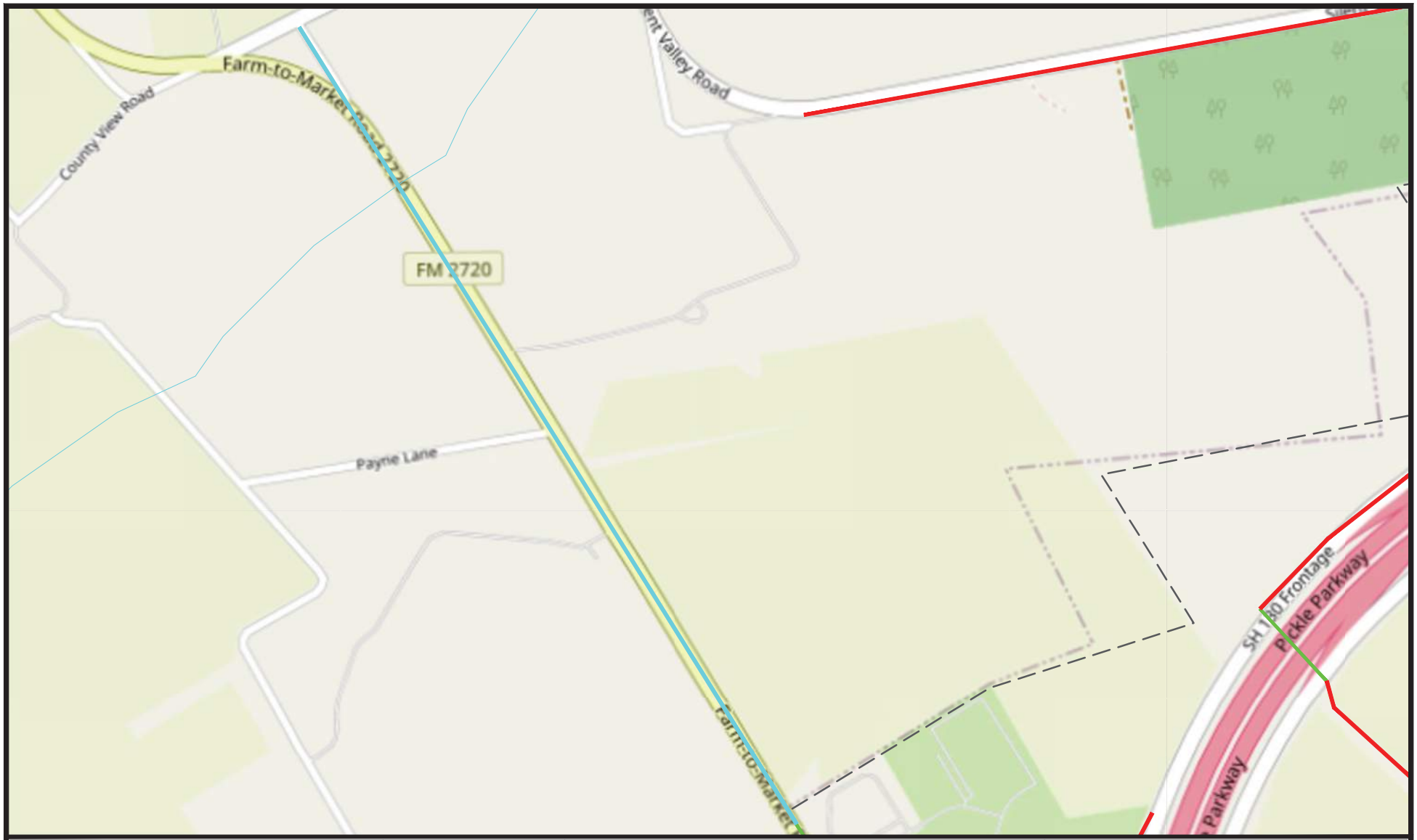

LEGEND

- PROPOSED PROJECT S-4
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 6,800LF OF 12" PIPE ALONG COUNTY LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG COUNTY LANE

ESTIMATED COST: $1,810,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-4
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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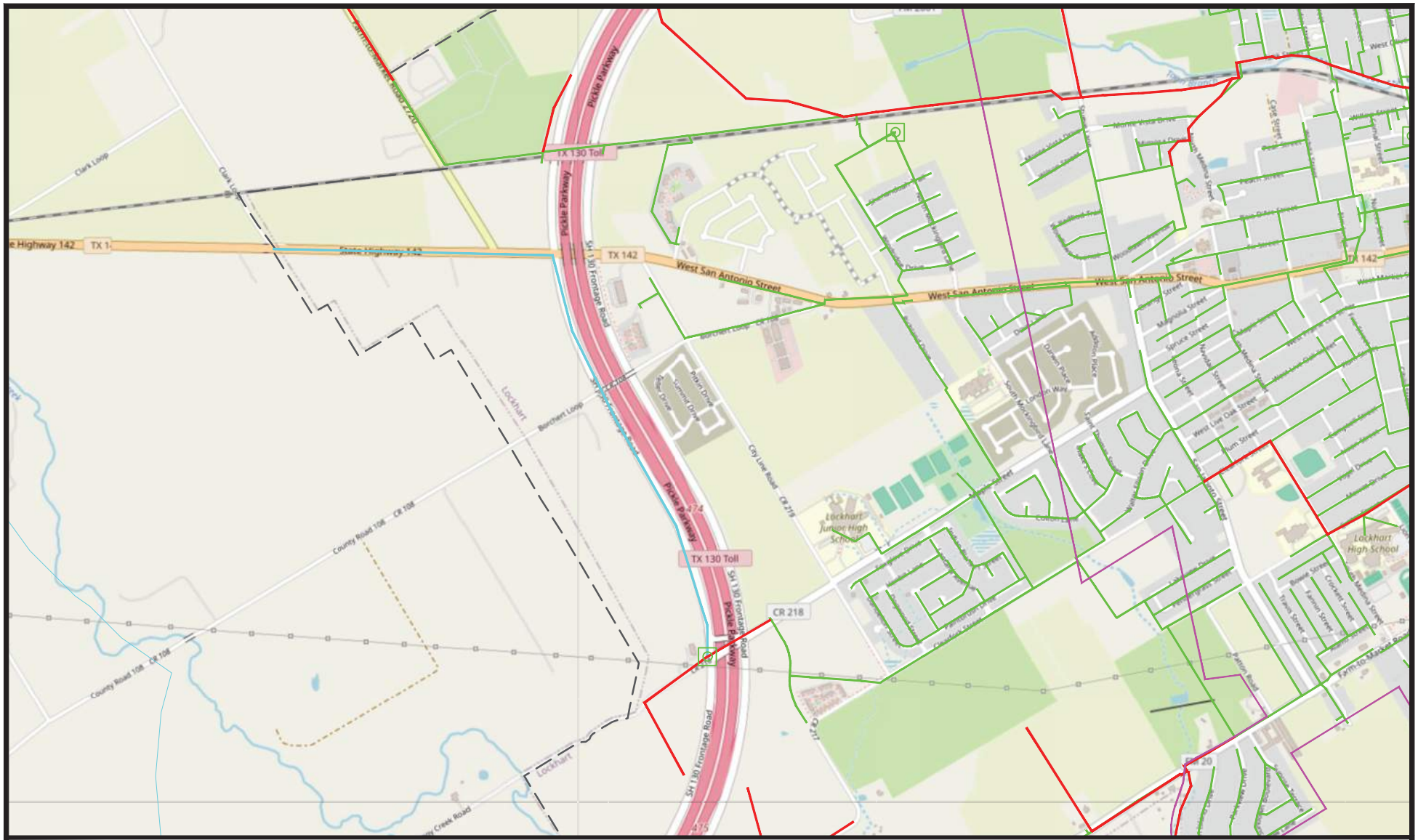

LEGEND

- PROPOSED PROJECT S-5
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 10,200LF OF 18" PIPE ALONG SH 130 AND SAN ANTONIO ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG W. SAN ANTONIO ST AND/OR S. CESAR CHAVEZ PKWY SB

ESTIMATED COST: $2,748,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-5
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-6
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 2,300LF OF 18" PIPE SOUTH OF BOGGY LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG W. SAN ANTONIO ST AND/OR S. CESAR CHAVEZ PKWY SB

ESTIMATED COST: $623,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

WATER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-6	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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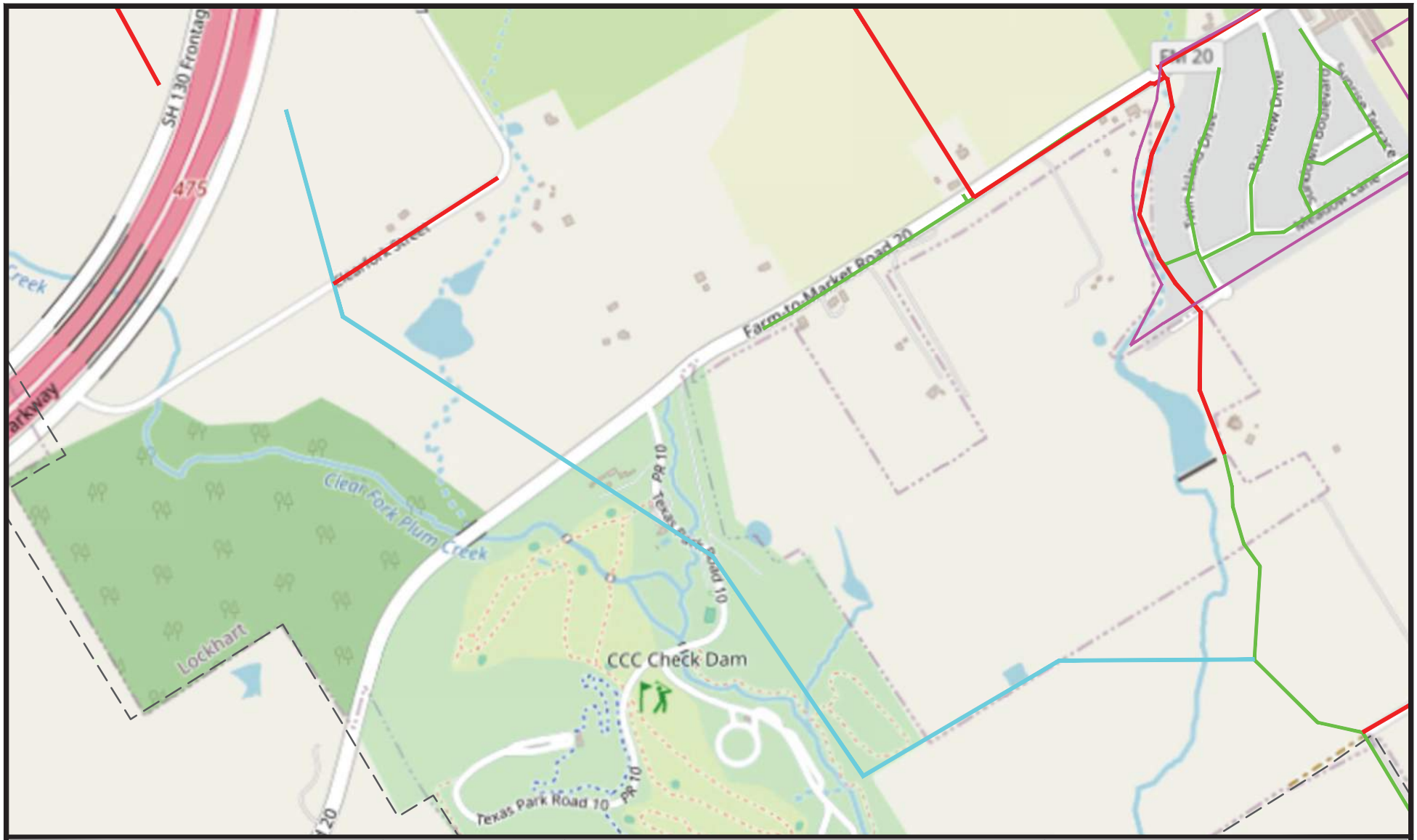

LEGEND

- PROPOSED PROJECT S-7
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 9,700LF OF 18" PIPE FROM CUNNINGHAM DR TO OLD FENTRESS RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG OLD FENTRESS RD AND/OR CUNNINGHAM DR

ESTIMATED COST: $2,622,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-7	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-8
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 1,400LF OF 12" PIPE S OF CLEARFORK ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG CLEARFORK ST

ESTIMATED COST: $377,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-8	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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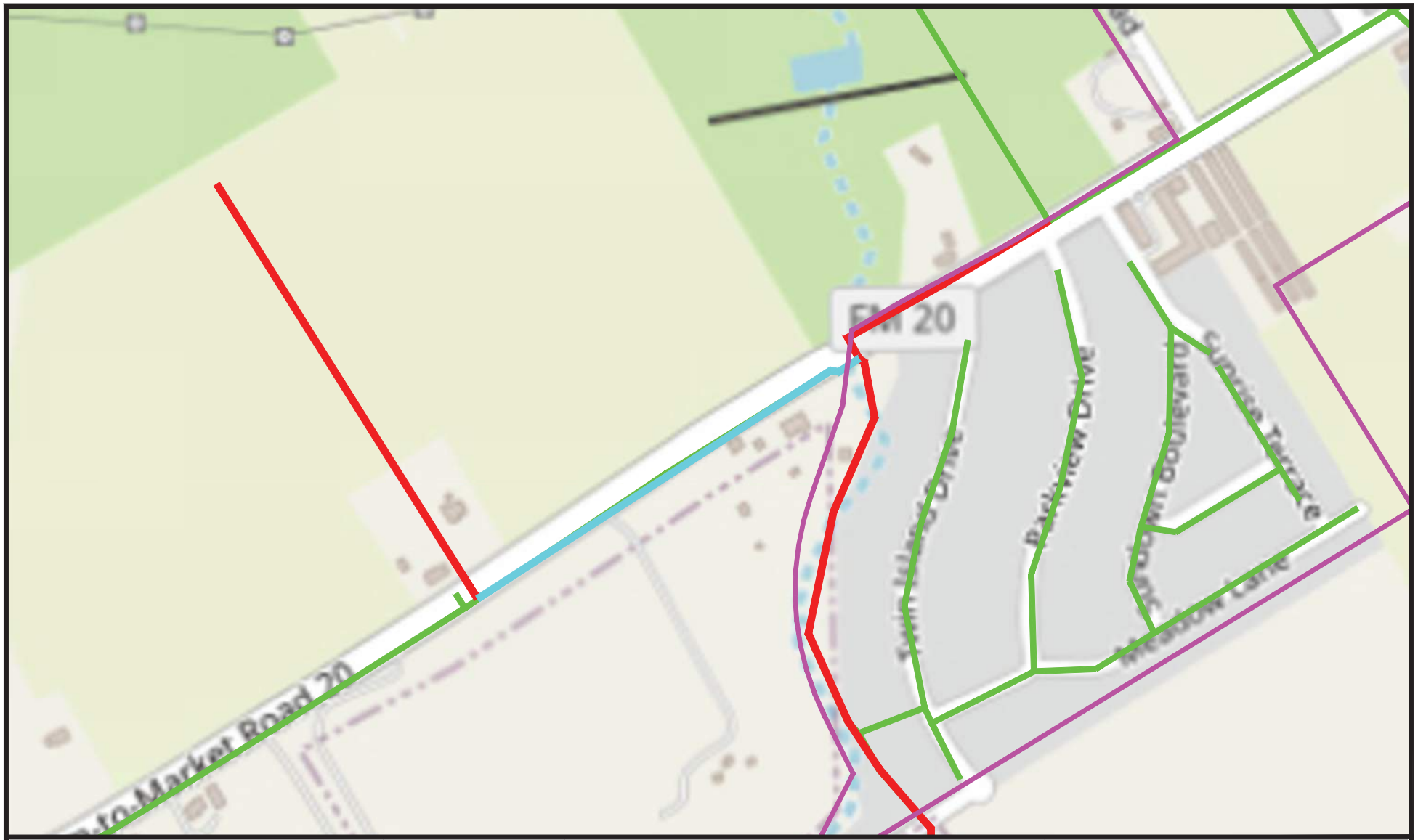

LEGEND

- PROPOSED PROJECT S-9
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: UPSIZE 1,600LF TO 12" FROM 8" ALONG STATE PARK RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG STATE PARK RD.

ESTIMATED COST: $439,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-9	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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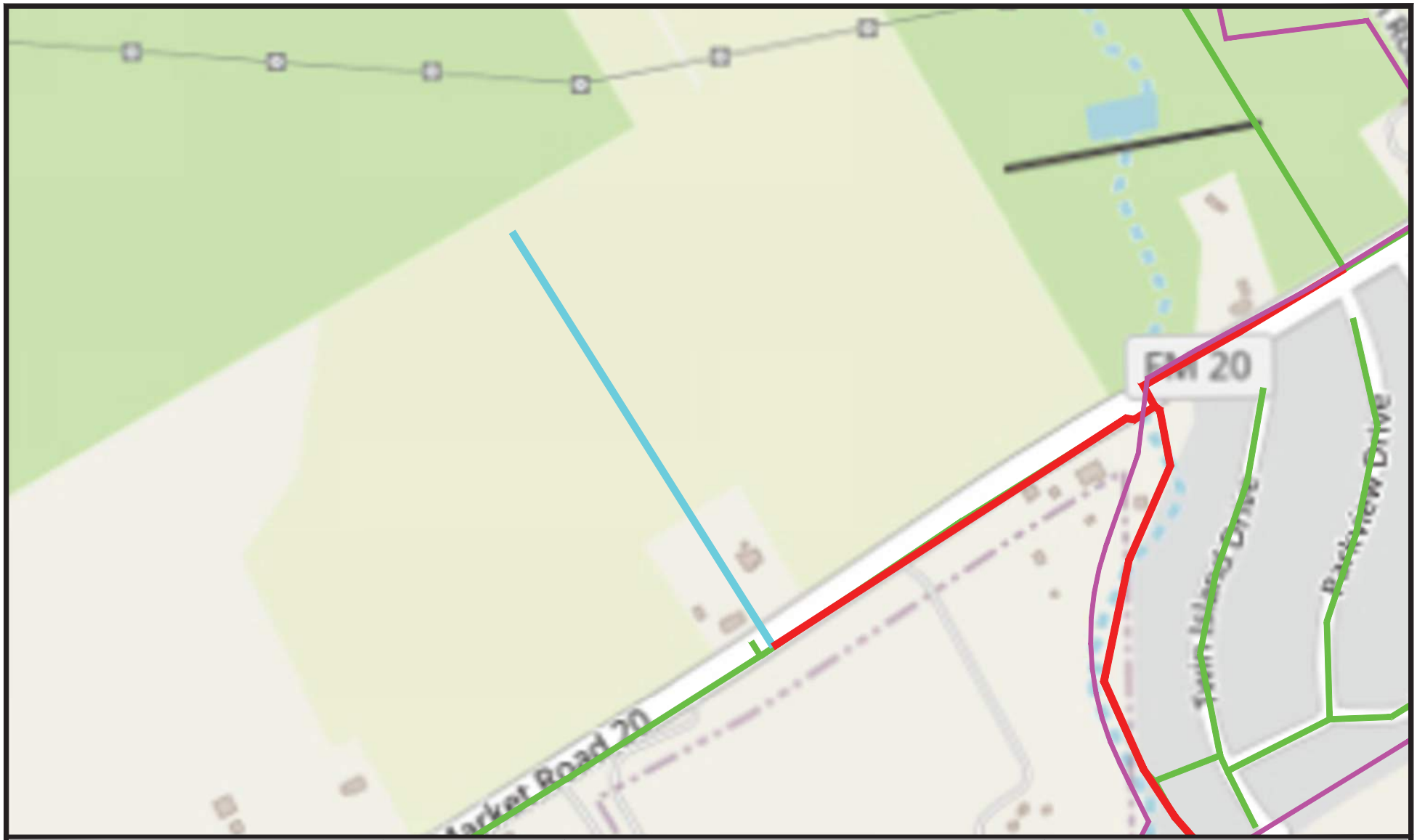

LEGEND

- PROPOSED PROJECT S-10
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 1,700LF OF 12" PIPE N OF STATE PARK RD.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG STATE PARK RD.

ESTIMATED COST: $462,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-10
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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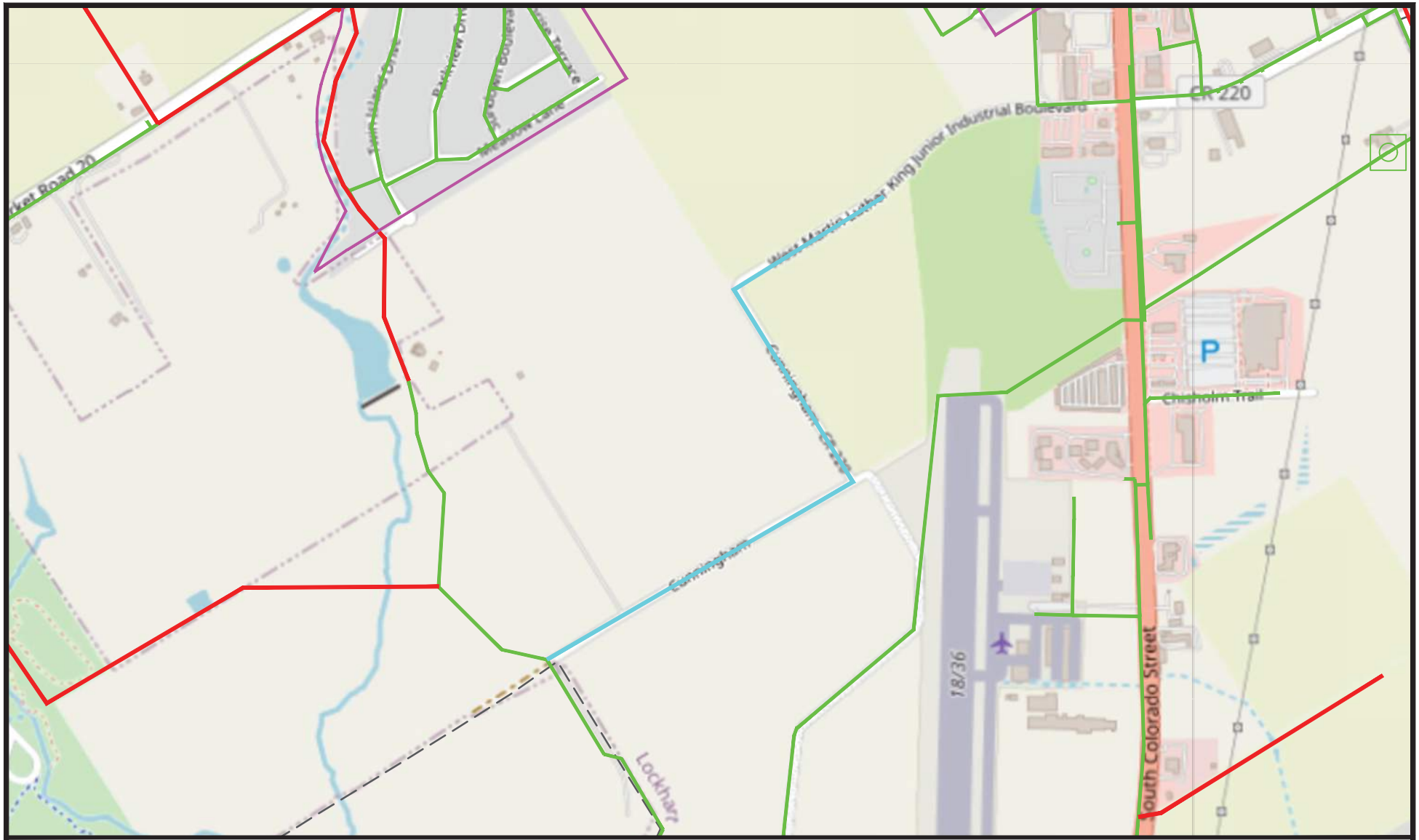

LEGEND

- PROPOSED PROJECT S-11
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 5,500LF OF 12" PIPE ALONG CUNNINGHAM RD

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG CUNNINGHAM DR.

ESTIMATED COST: $1,460,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-11
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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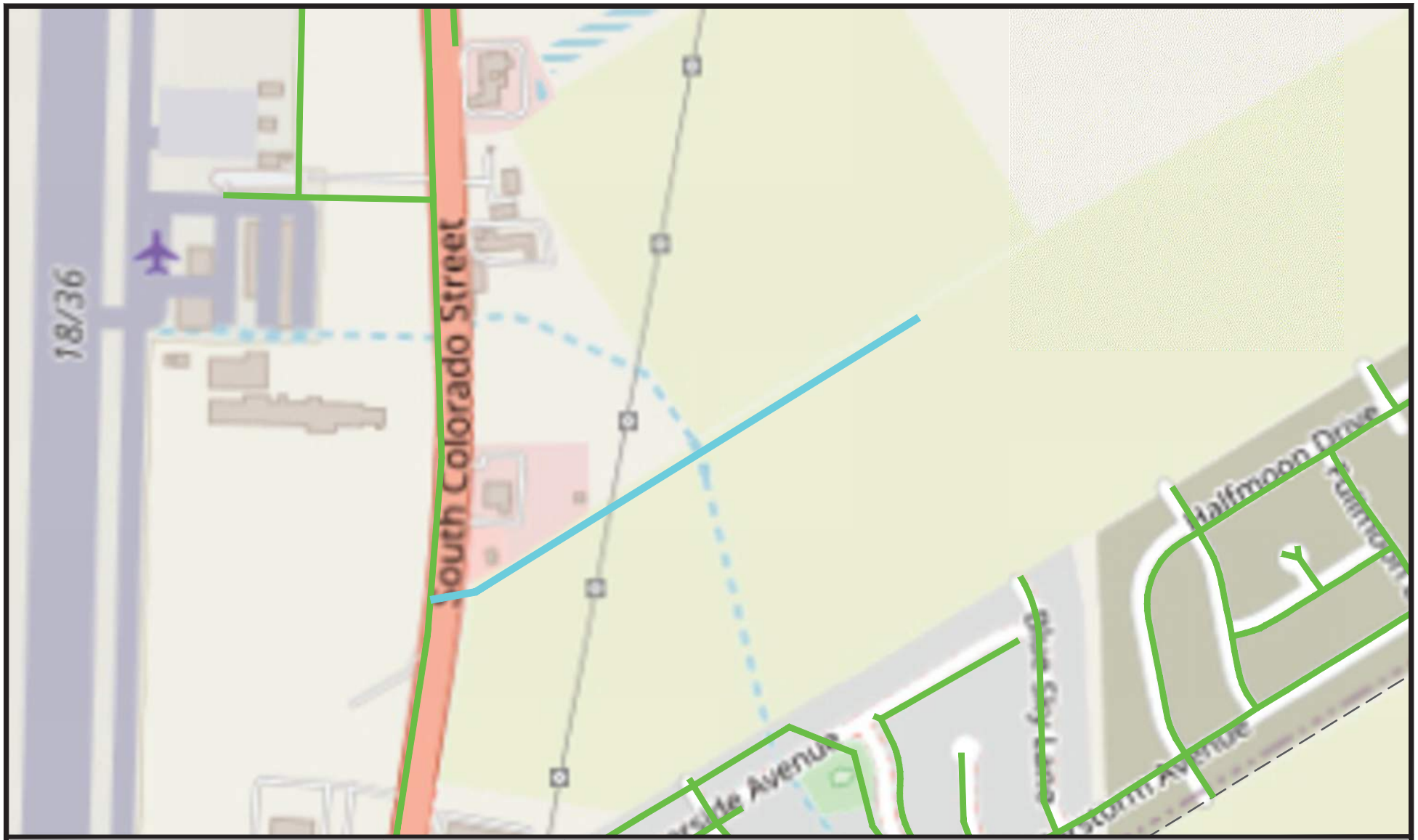

LEGEND

- PROPOSED PROJECT S-12
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALL 2,000 FEET OF 12" PIPE E OF 183

PROJECT TRIGGER: INCREASED DEVELOPMENT EAST OF 183 AND NORTH OF SUMMERSIDE AVE

ESTIMATED COST: $530,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-12
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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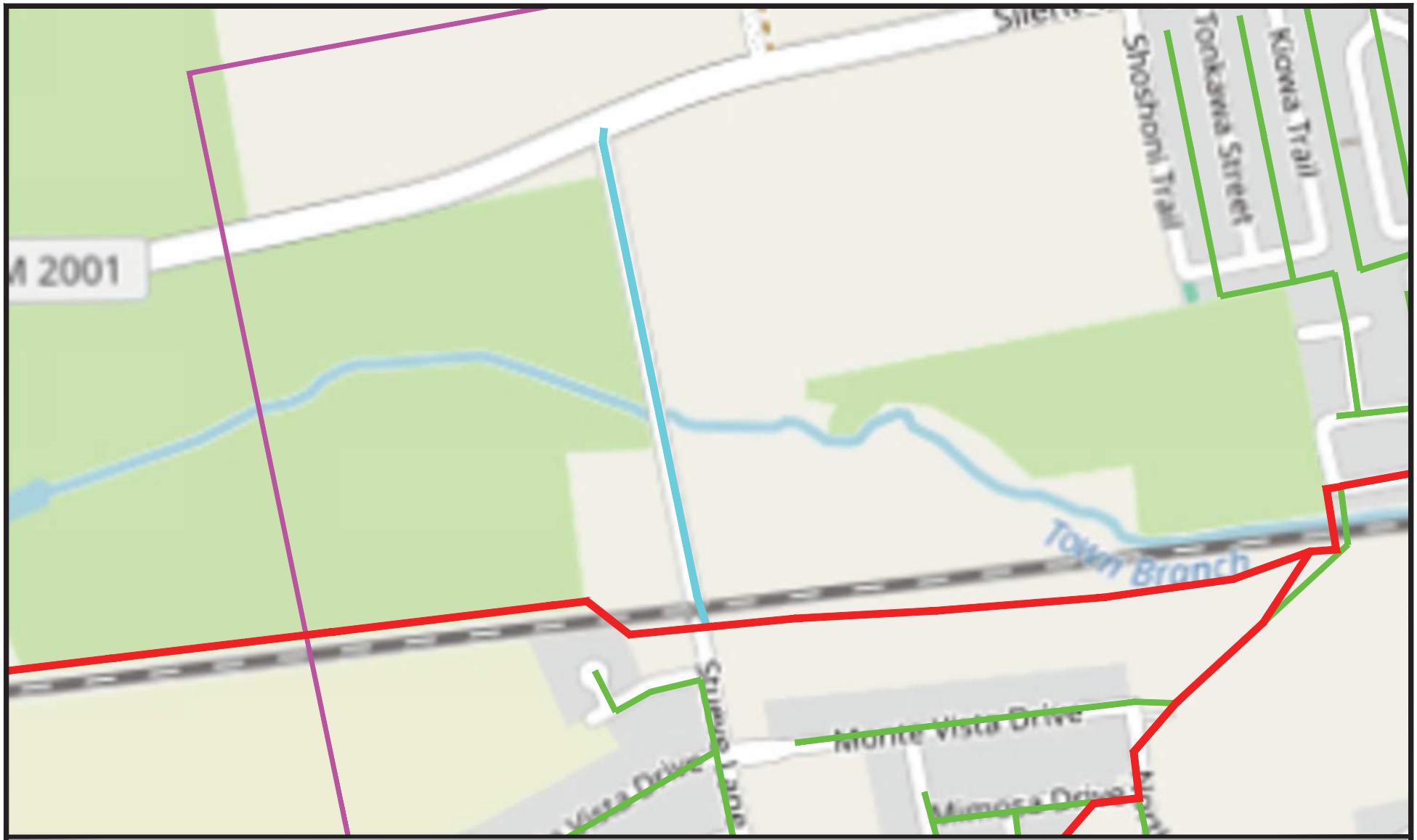

LEGEND

- PROPOSED PROJECT S-13
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 1,900LF OF18" PIPE ALONG STUEVE LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG STUEVE LANE

ESTIMATED COST: $521,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-13	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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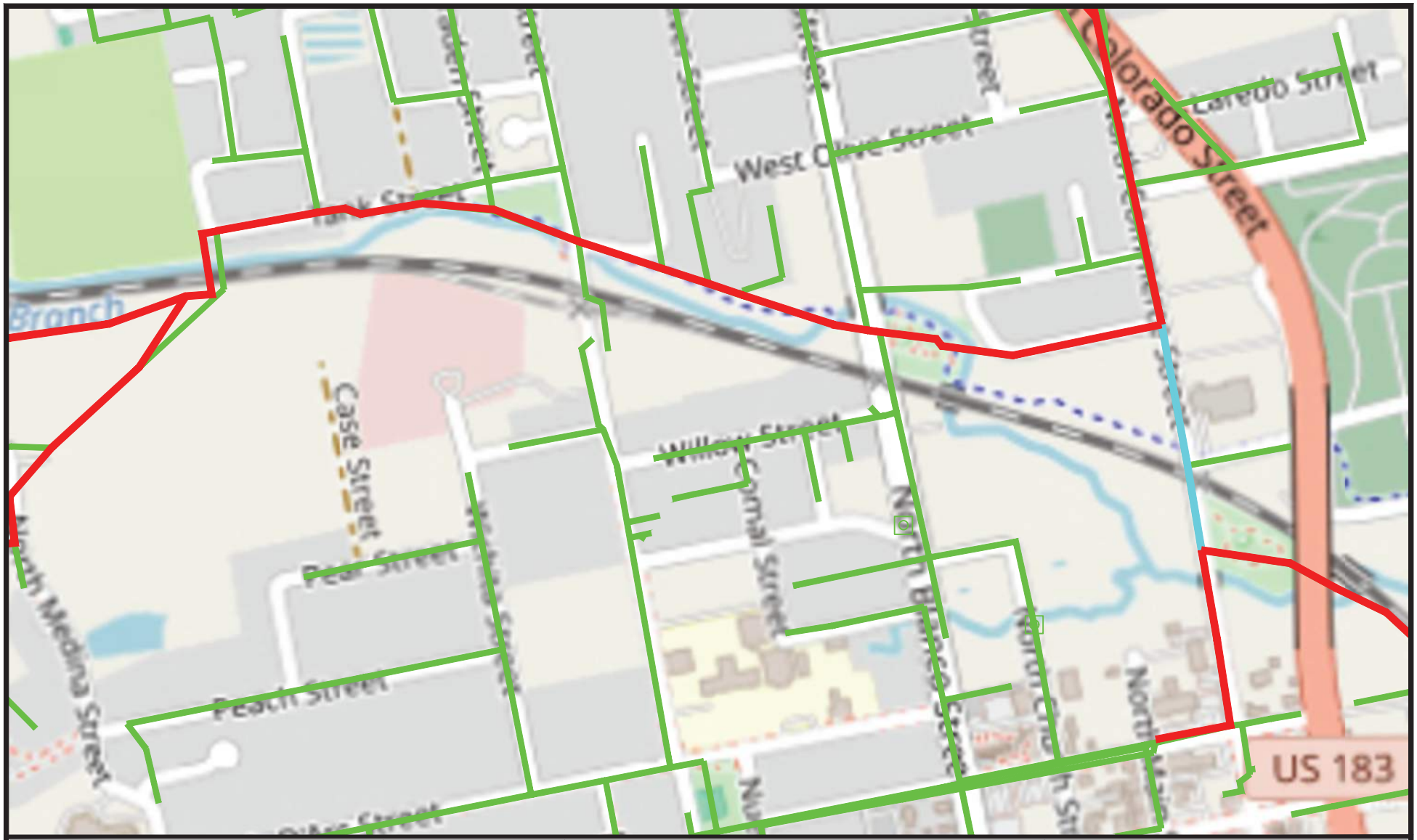

LEGEND

- PROPOSED PROJECT S-14
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 4,300LF TO 24" ALONG TANK ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG STUEVE LANE OR DRY WEATHER FLOW TO LARREMORE EXCEEDS 0.46MGD

ESTIMATED COST: $1,272,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY	FIGURE # S-14	
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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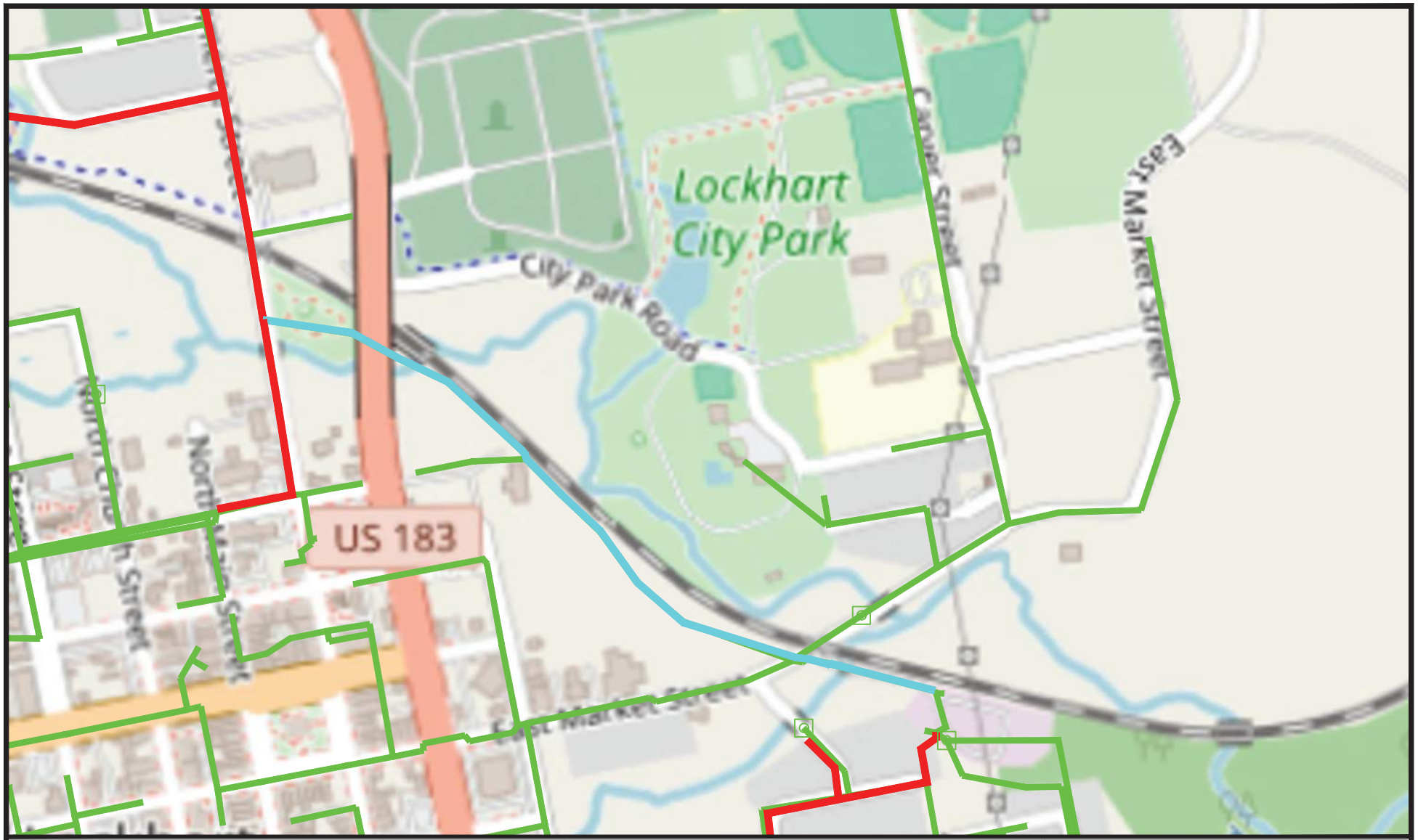

LEGEND

- PROPOSED PROJECT S-15
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 2,900LF TO 30" ALONG RAILROAD

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG STUEVE LANE OR DRY WEATHER FLOW TO LARREMORE EXCEEDS 0.46MGD

ESTIMATED COST: $1,004,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-15
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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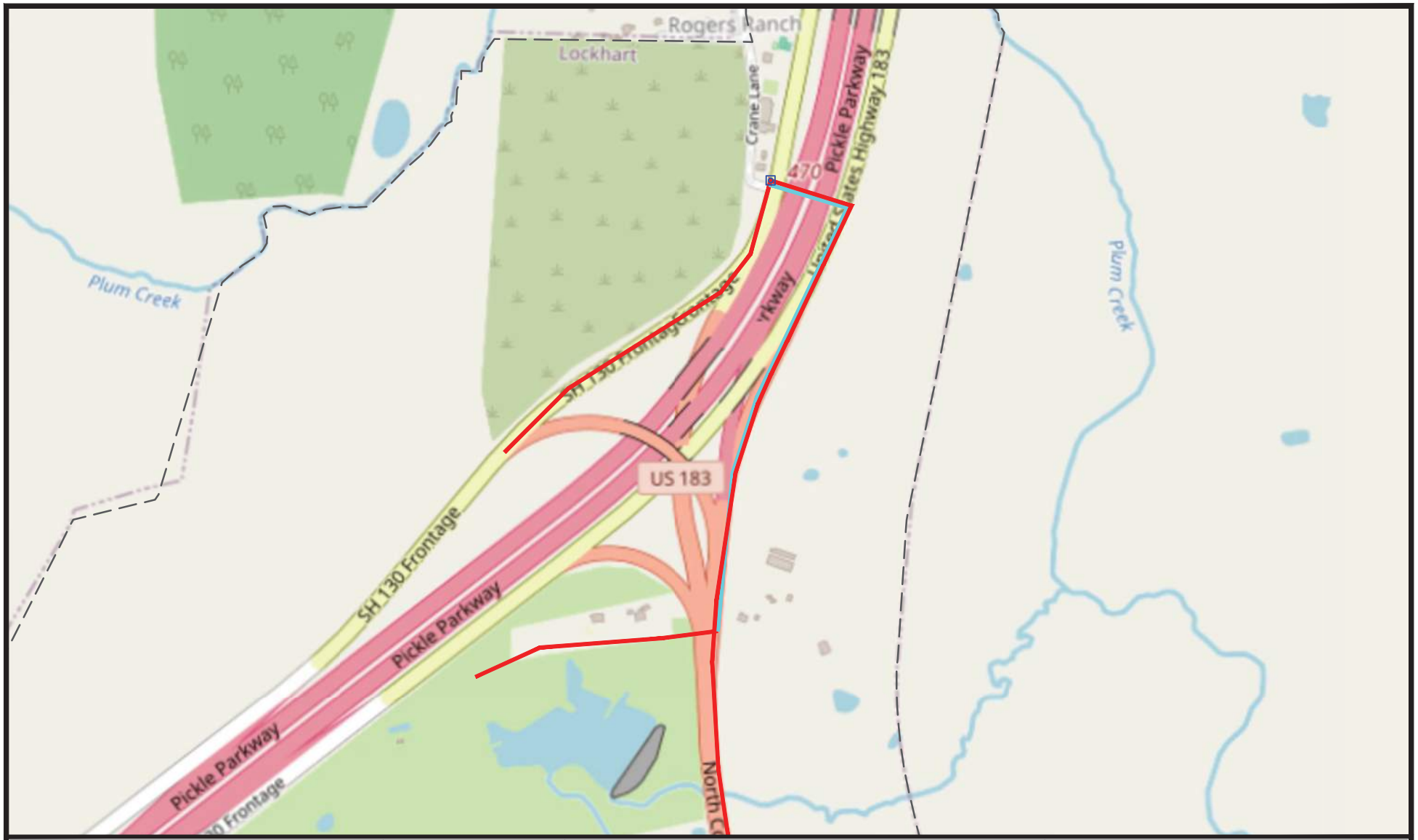

LEGEND

- PROPOSED PROJECT S-16
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 3,800LF OF 12" PIPE UNDER SH 130 TO N COLORADO ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. COLORADO ST

ESTIMATED COST: $1,015,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-16
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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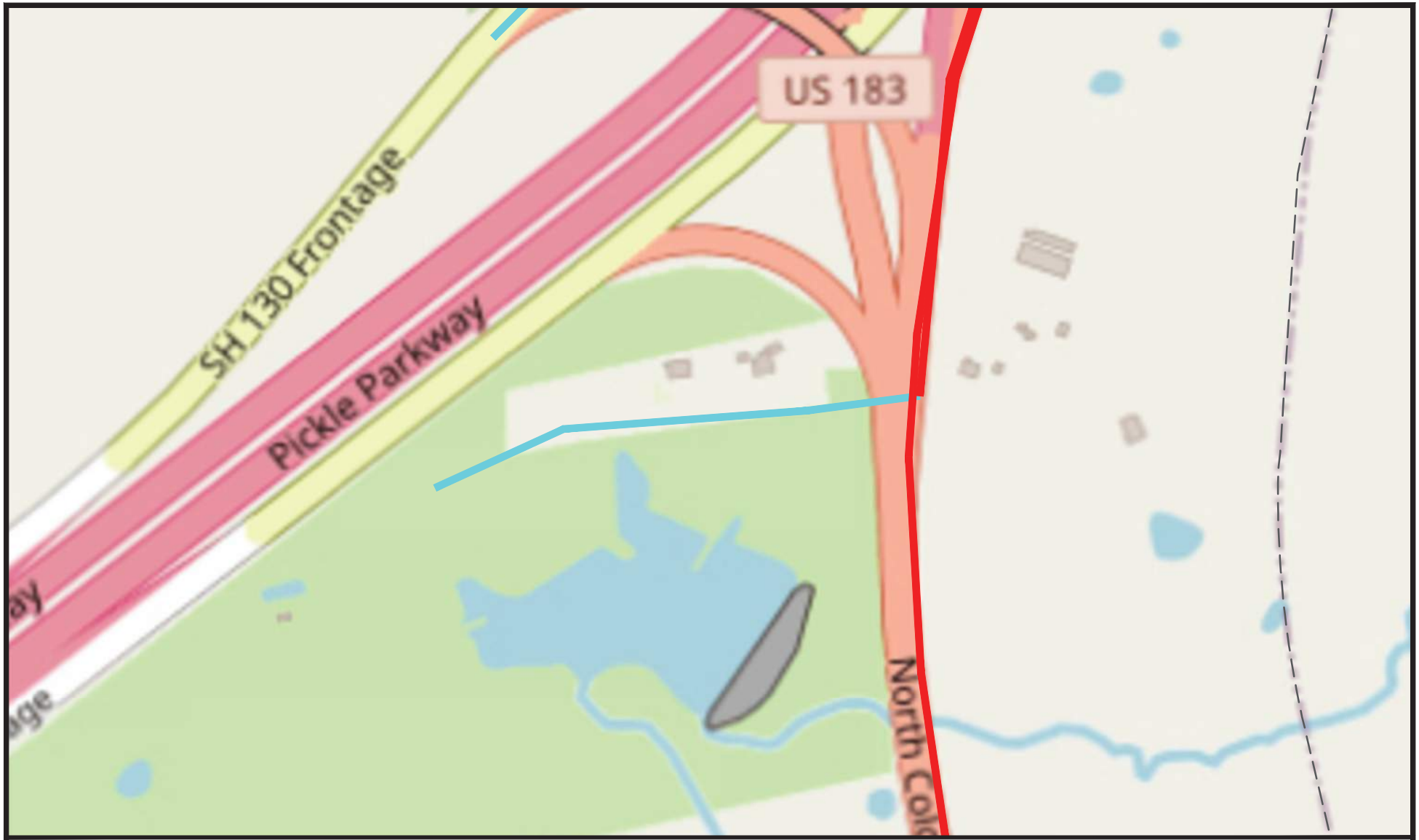

LEGEND

- PROPOSED PROJECT S-17
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 1,800LF OF 12" PIPE S OF SH 130 TO N COLORADO ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. COLORADO ST

ESTIMATED COST: $485,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-17
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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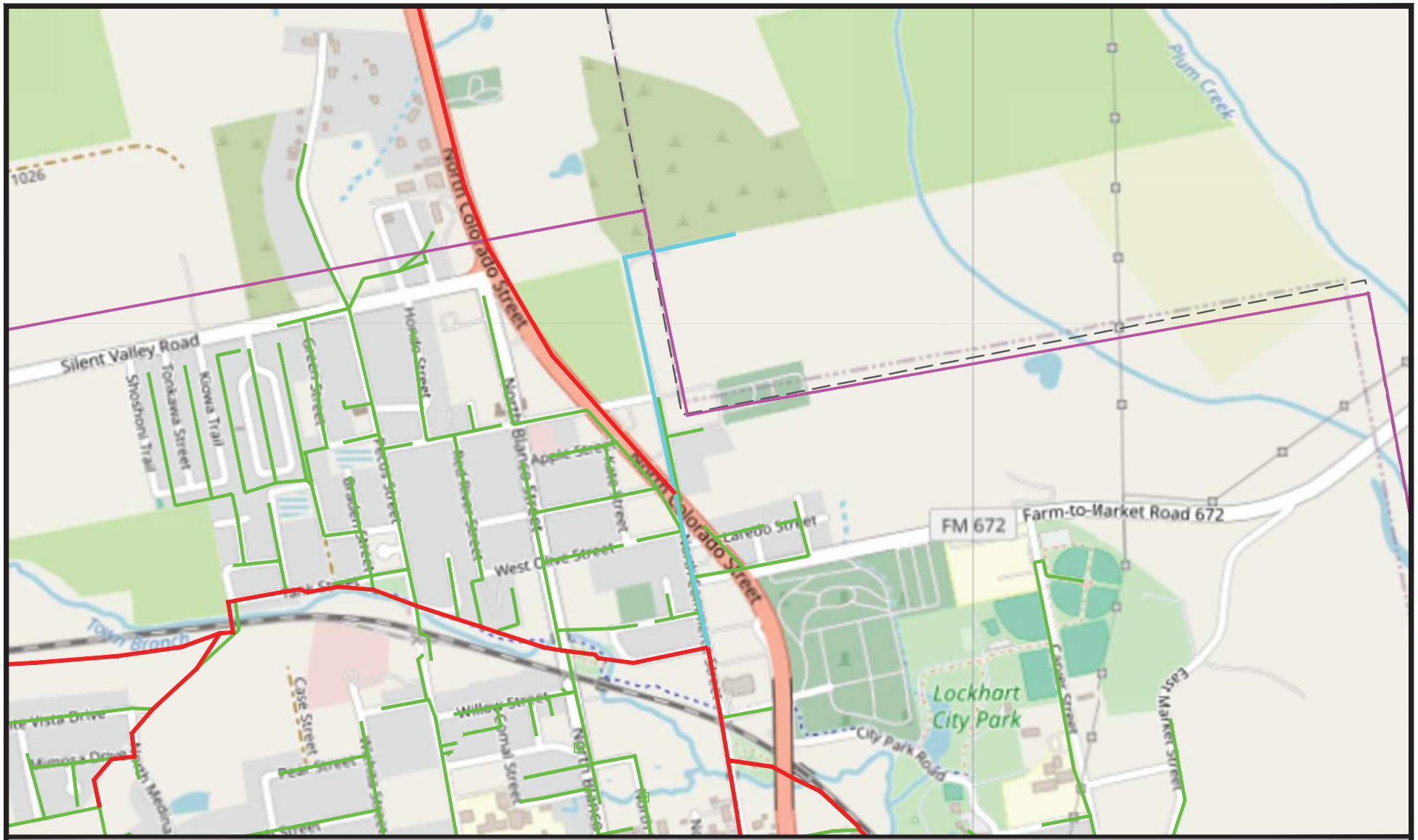

LEGEND

- PROPOSED PROJECT S-18
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 3,700LF OF 12" PIPE E OF N COMMERCE ST

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. COMMERCE ST

ESTIMATED COST: $992,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-18
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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STE 250
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LEGEND

- PROPOSED PROJECT S-19
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 2,700LF OF 12" PIPE AND UPSIZING OF 1,600LF OF 8" TO 12" ALONG LOVERS LN.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG LOVER'S LN

ESTIMATED COST: $1,342,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-19
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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(512) 329-6080

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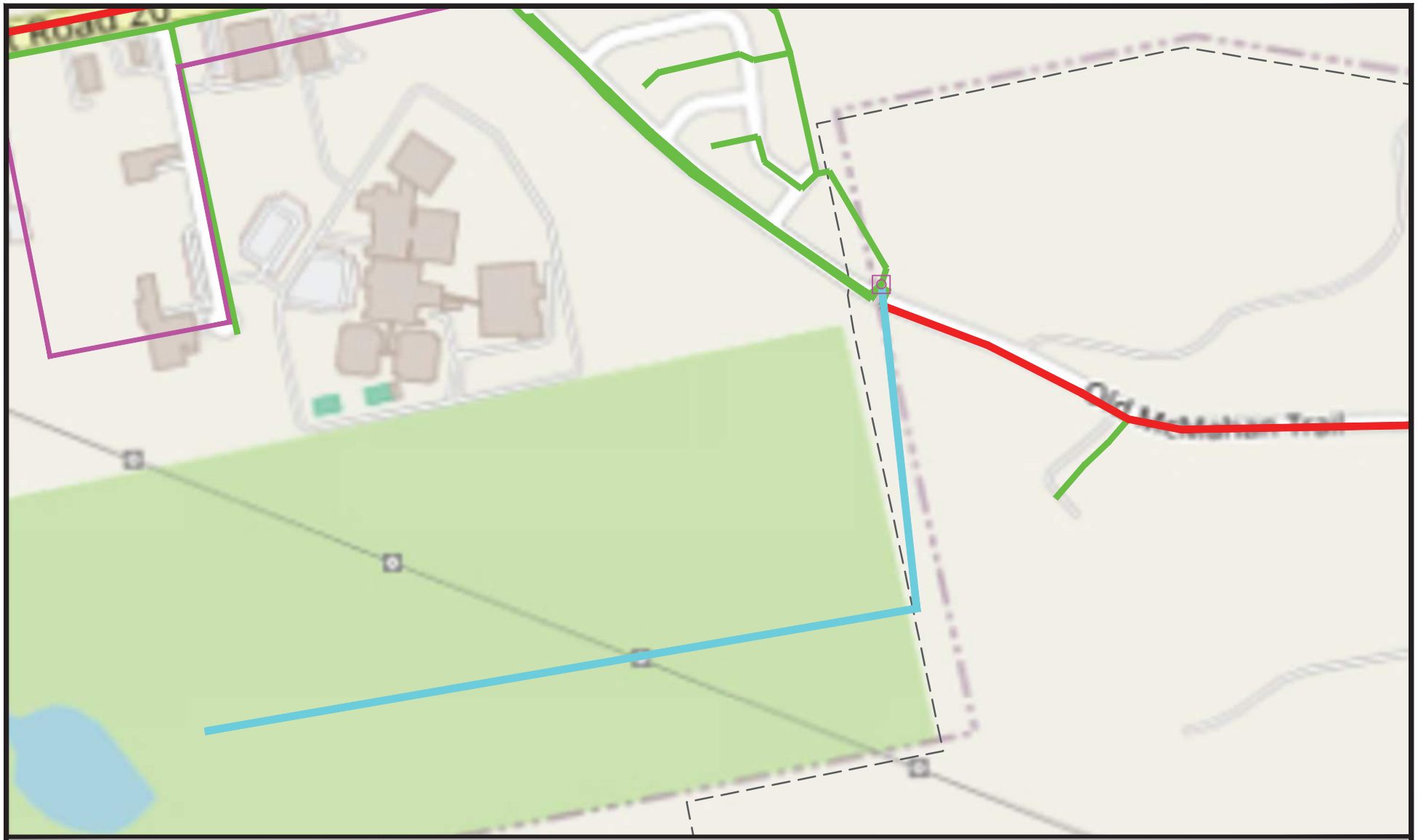

LEGEND

- PROPOSED PROJECT S-20
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 3,800LF OF 12" PIPE W OF CENTURY OAKS LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT WEST OF OLD MCMAHAN TRL

ESTIMATED COST: $1,015,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-20
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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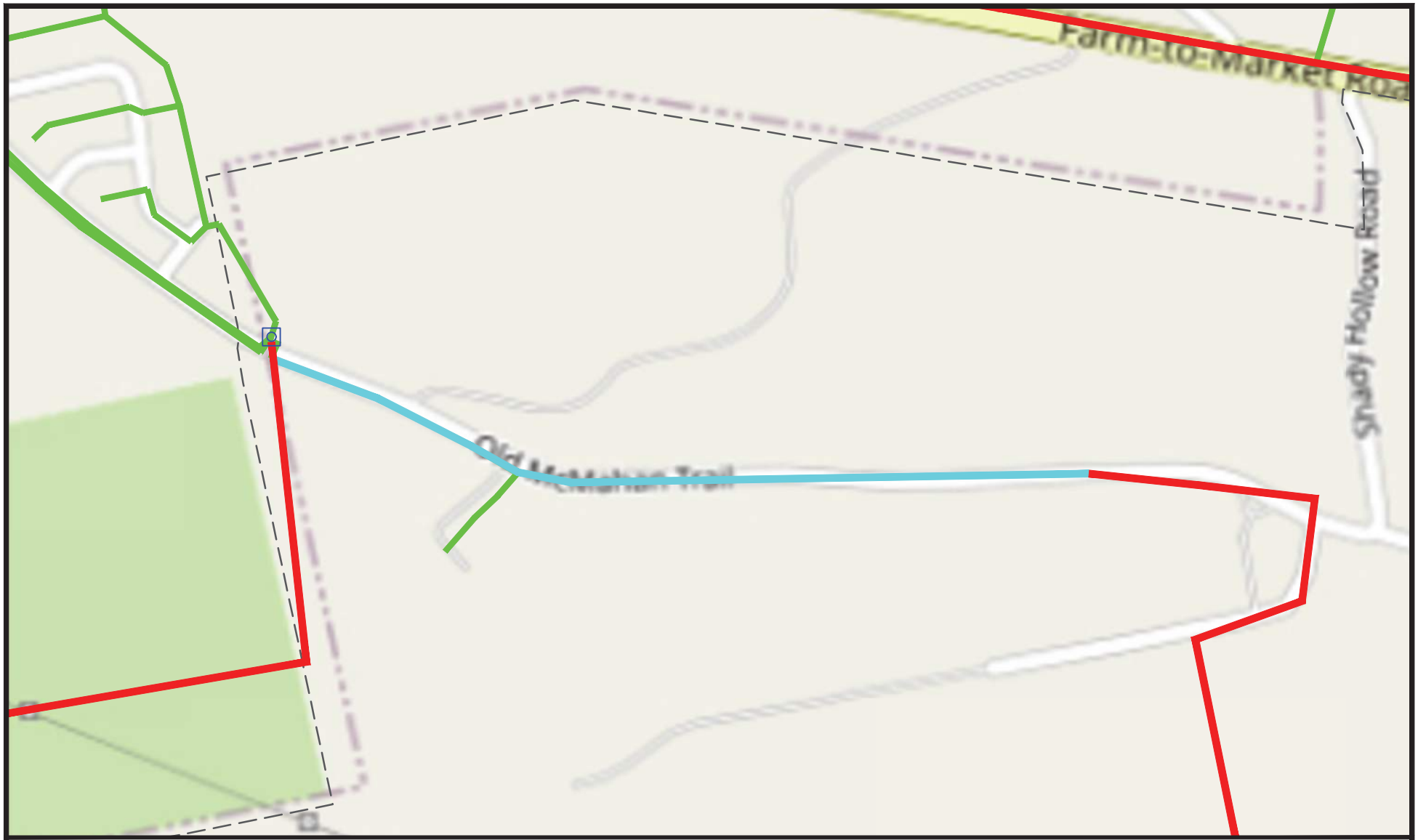

LEGEND

- PROPOSED PROJECT S-21
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 3,000LF OF 10" PIPE E OF CENTURY OAKS LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT EAST OF OLD MCMAHAN TRL

ESTIMATED COST: $723,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-21
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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LEGEND

- PROPOSED PROJECT S-22
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 5,900LF OF 18" PIPE ALONG S COMMERCE ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG S. COMMERCE ST & SEAWILLOW RD

ESTIMATED COST: $1,596,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-22
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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STE 250
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(512) 329-6080

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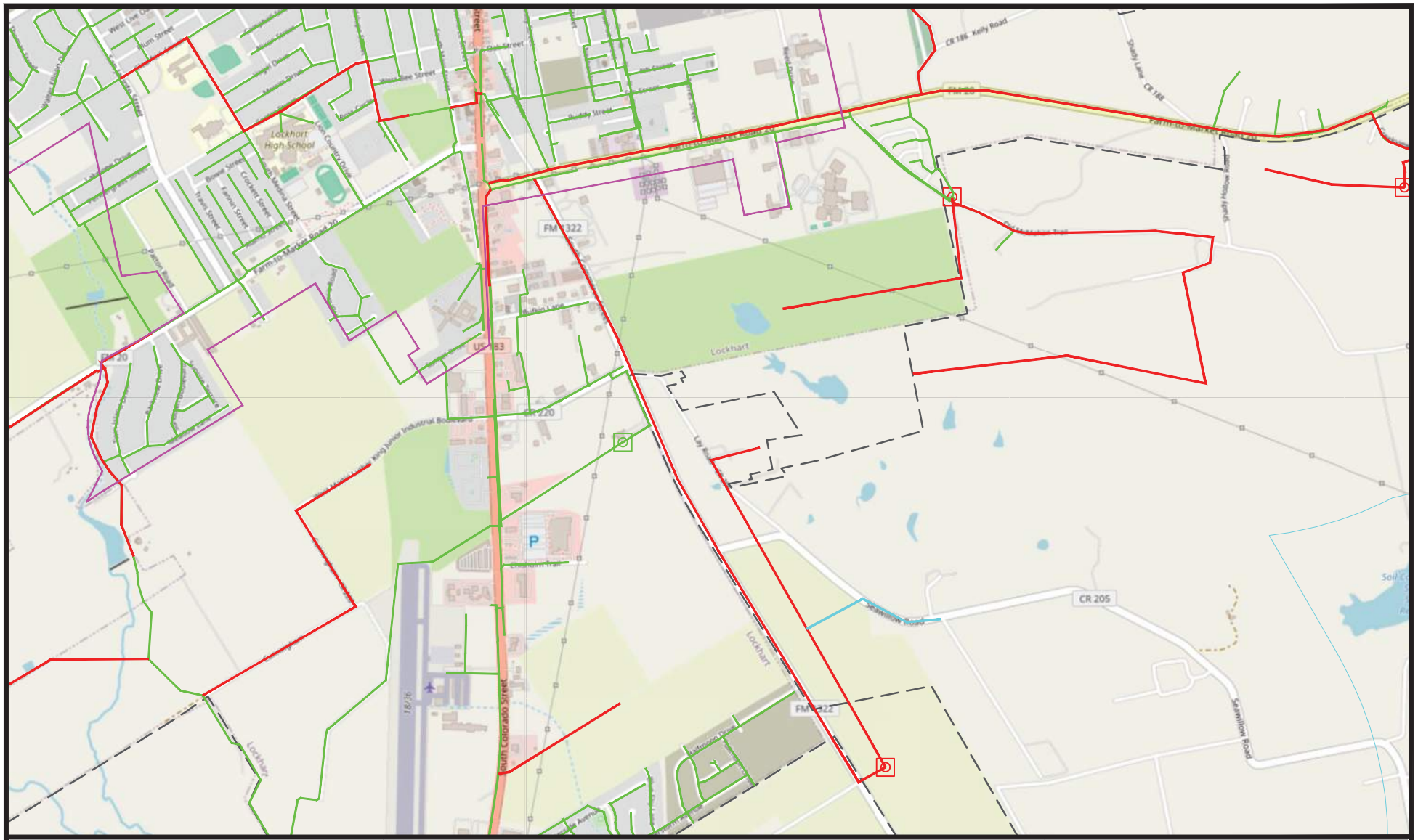

LEGEND

- PROPOSED PROJECT S-23
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 2,100LF OF 12" PIPE E OF S COMMERCE ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG S. COMMERCE ST & SEAWILLOW RD

ESTIMATED COST: $574,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-23
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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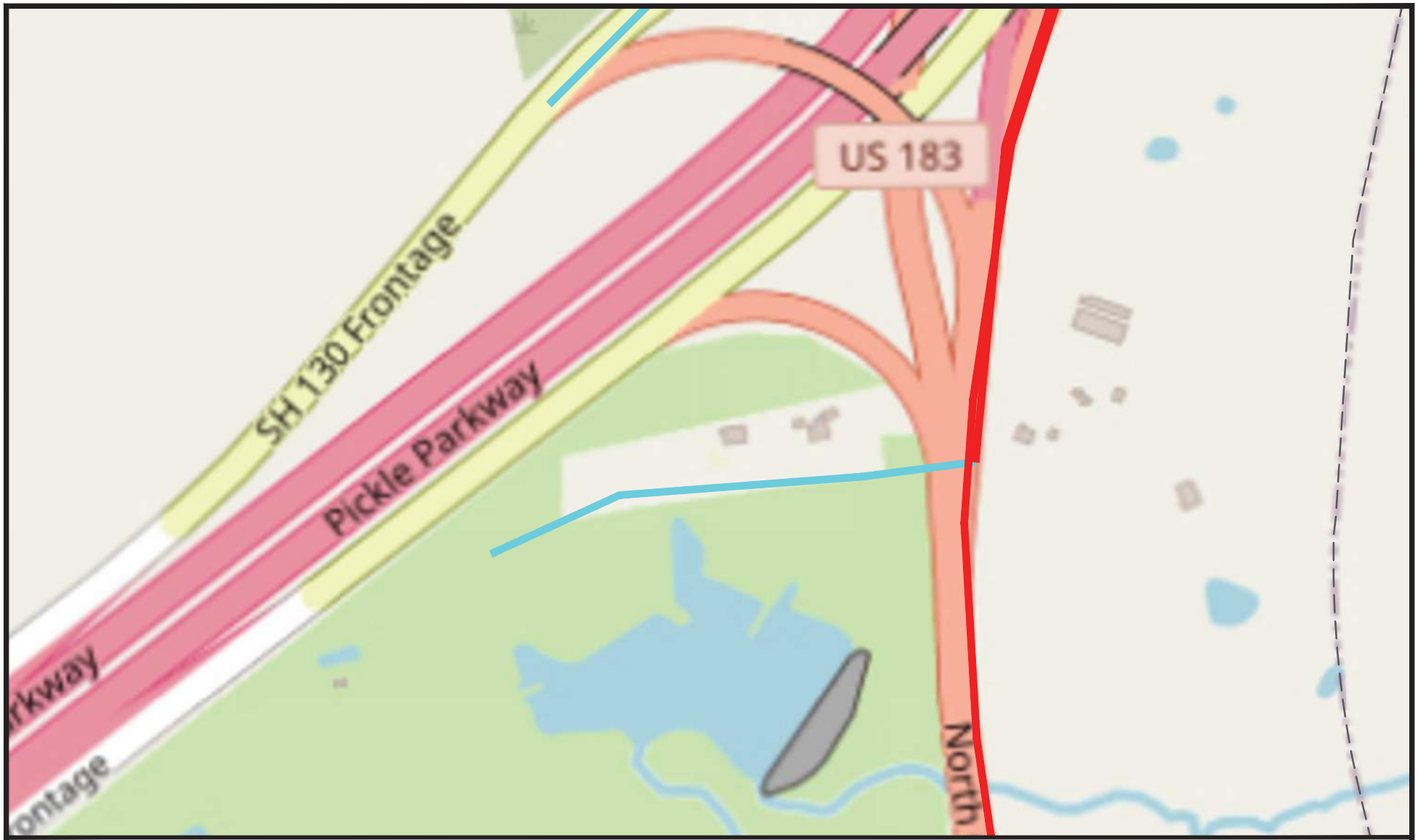

LEGEND

- PROPOSED PROJECT S-24
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 1,800LF OF 18" PIPE ALONG S COMMERCE ST.

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG S. COMMERCE ST & SEAWILLOW RD OR INSTALLATION OF S-23 OR S-24

ESTIMATED COST: $497,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-24
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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(512) 329-6080

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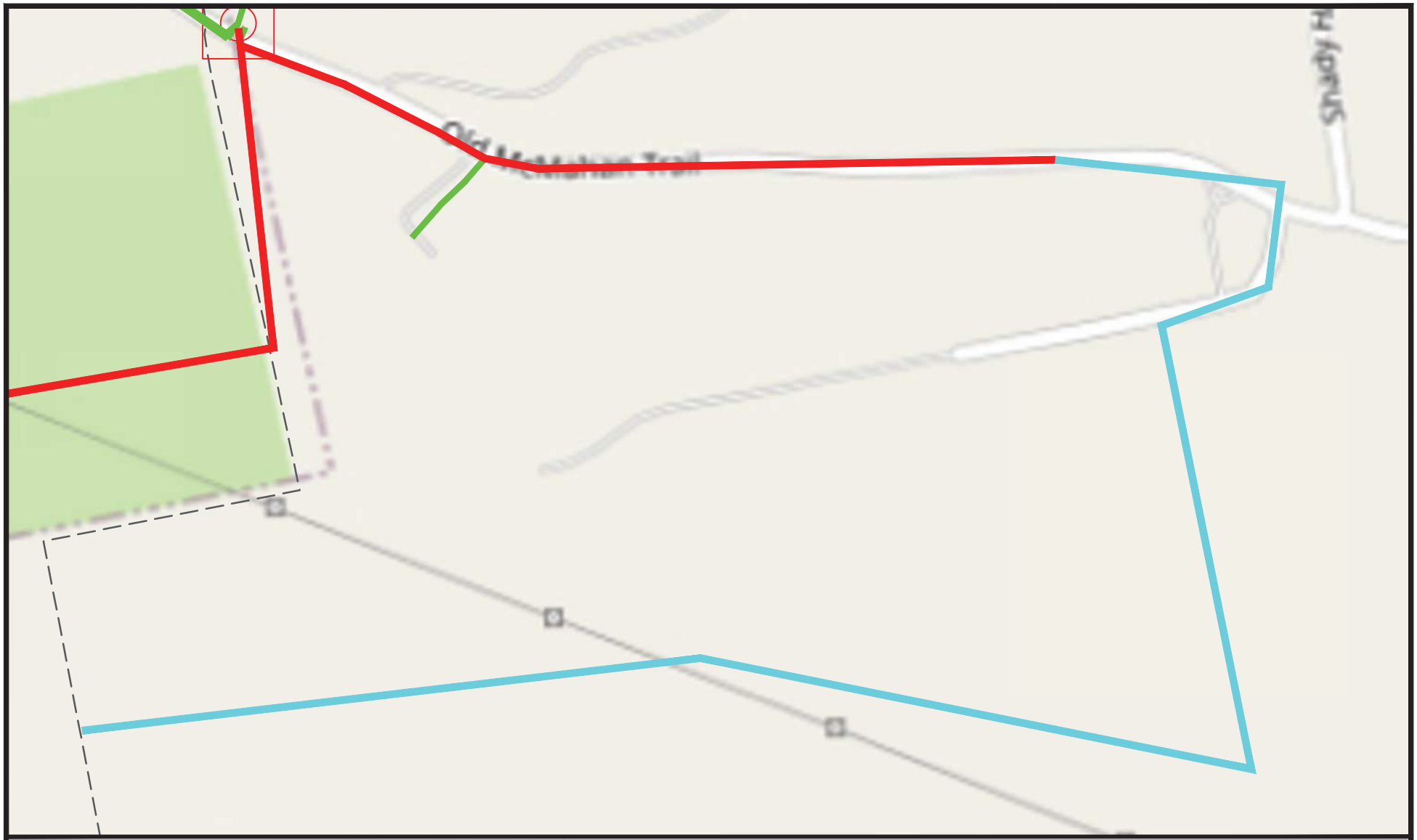

LEGEND

- PROPOSED PROJECT S-25
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 7,500LF OF 12" PIPE

PROJECT TRIGGER: INCREASED DEVELOPMENT WITHIN THE GENERAL AREA

ESTIMATED COST: $1,990,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE # S-25	
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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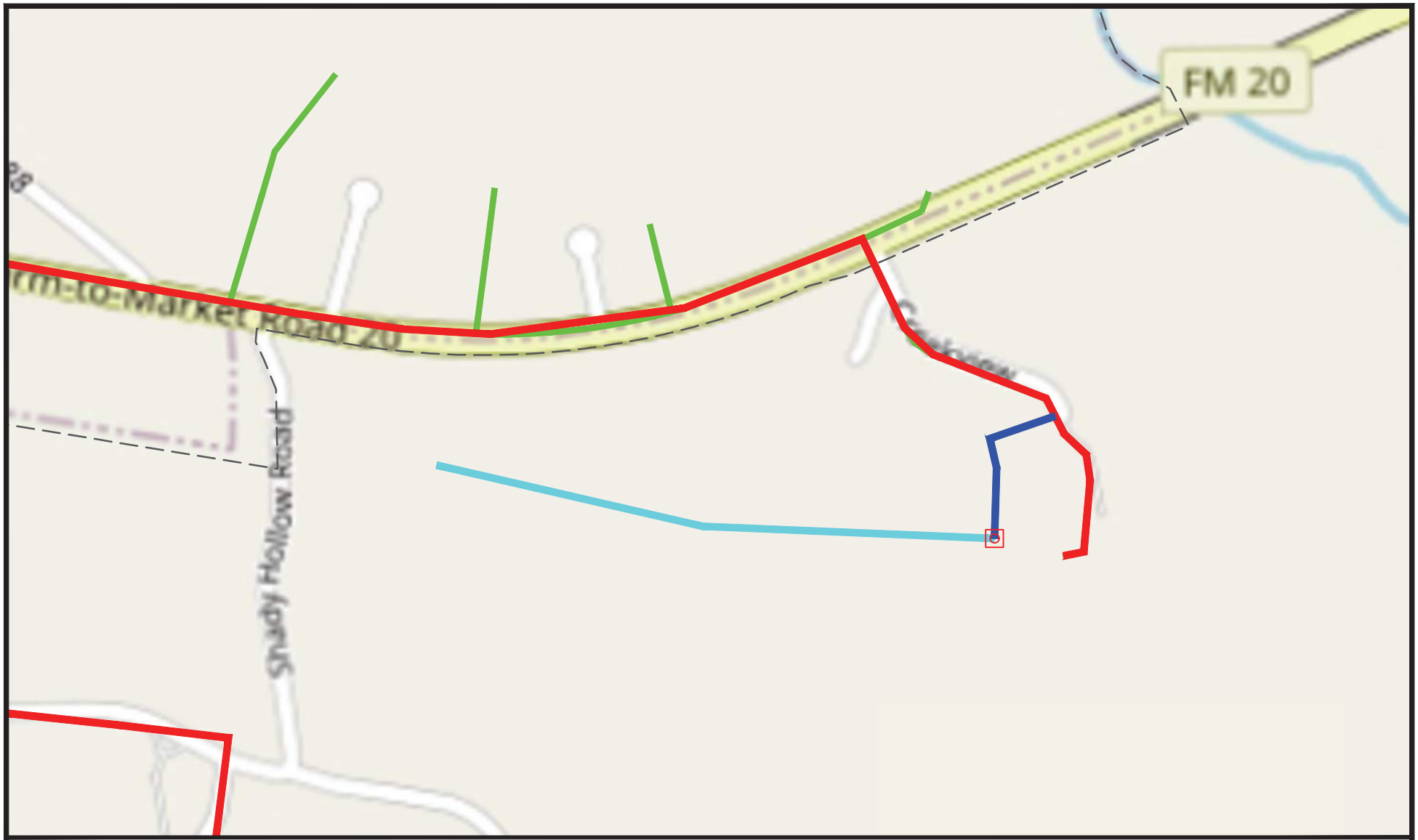

LEGEND

- PROPOSED PROJECT S-26
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: INSTALLATION OF 2,000LF OF 12" PIPE W OF FM 20 EAST LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT SOUTH OF BLACKJACK ST & EAST OF FORREST LN

ESTIMATED COST: $530,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		FIGURE # S-26
DATE:	JUNE 2024		

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(512) 329-6080

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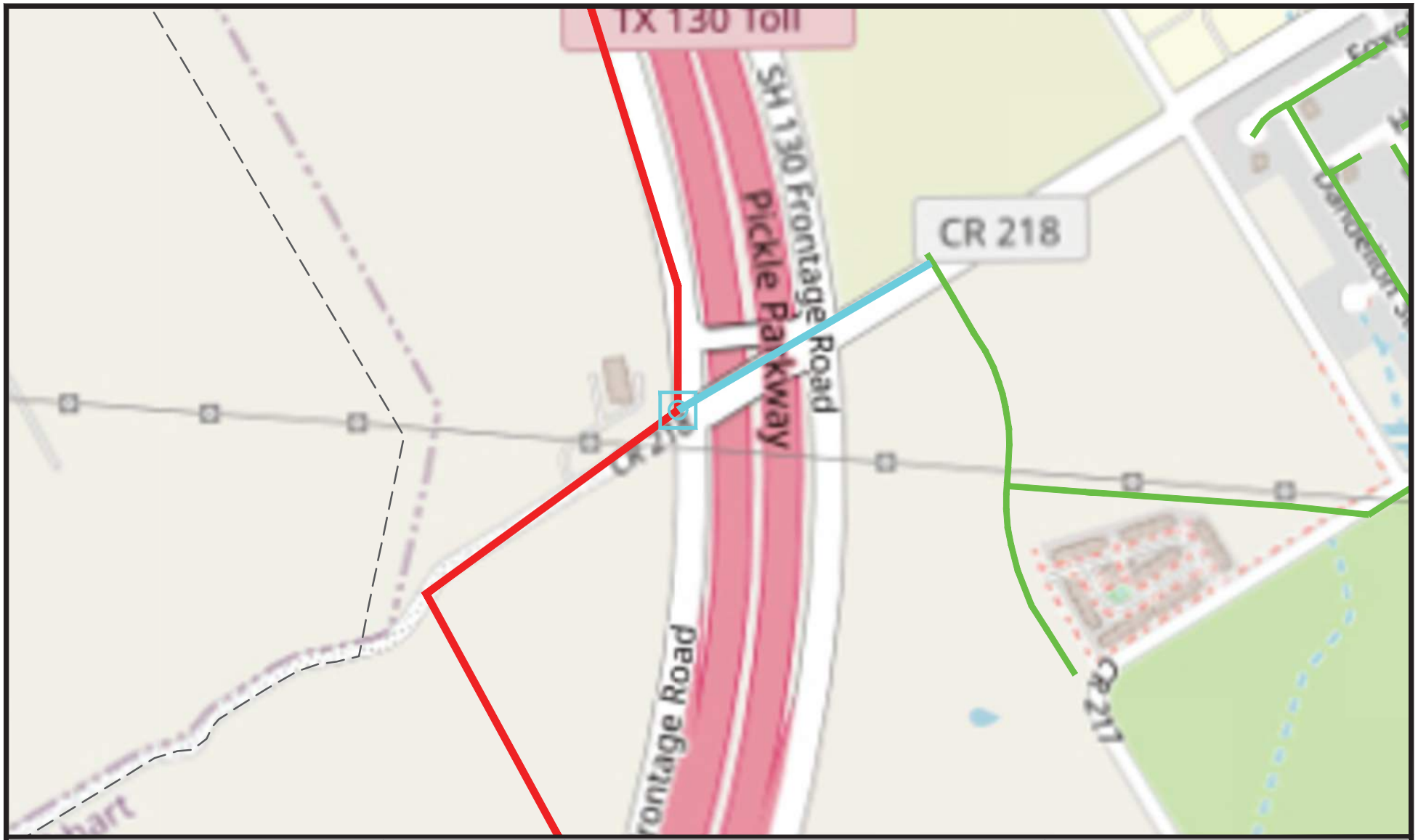

LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-27
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: BOGGY CREEK LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG W. SAN ANTONIO ST AND/OR S. CESAR CHAVEZ PKWY SB

ESTIMATED COST: $1,605,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-27
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

LEGEND

- PROPOSED PROJECT S-28
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 1,300LF OF BOGGY CREEK FORCE MAIN

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG W. SAN ANTONIO ST AND/OR S. CESAR CHAVEX PKWY SB

ESTIMATED COST: $293,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

FIGURE # S-28

Lockhart TEXAS
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STE 250
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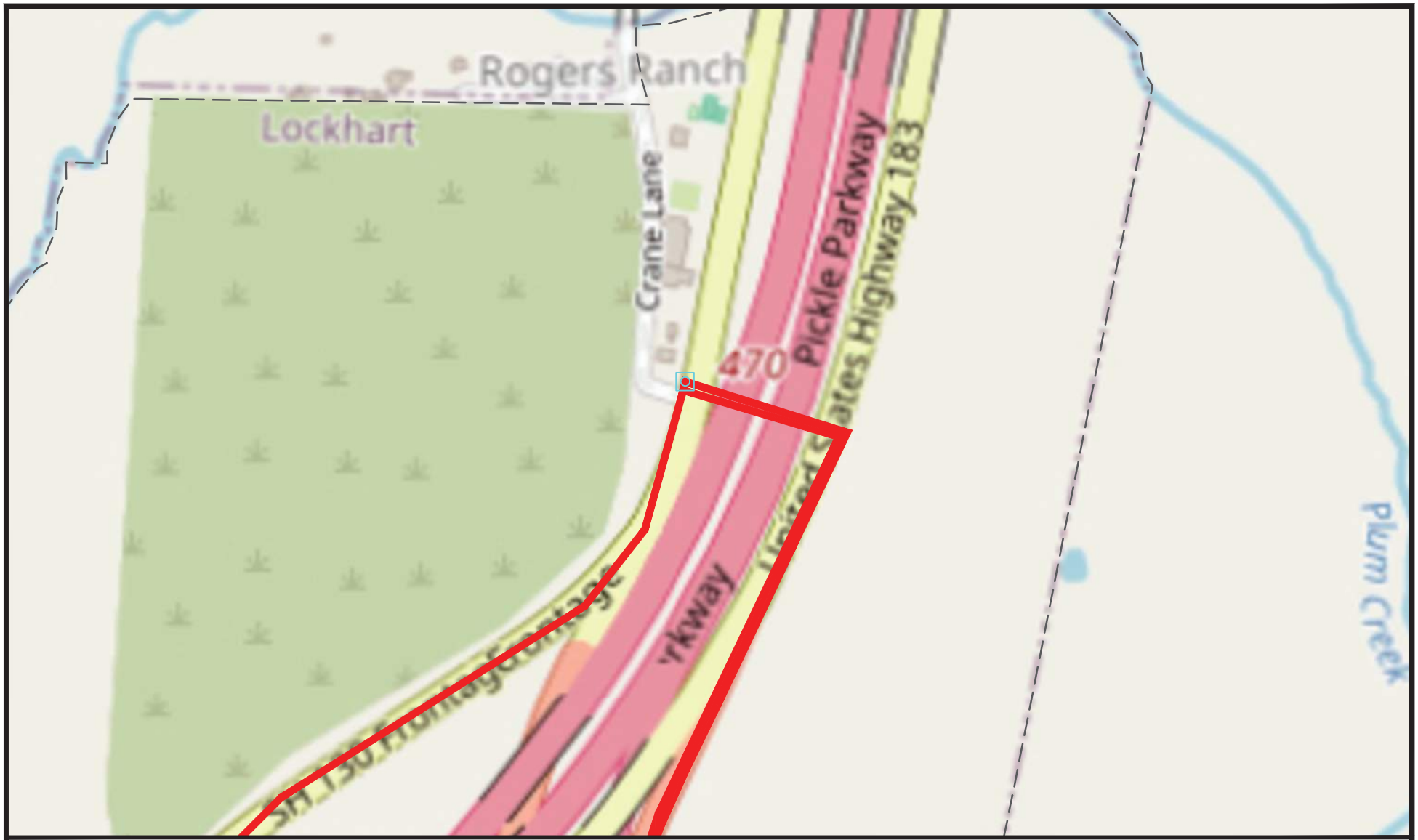

LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-29
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: PLUM CREEK LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. COLORADO ST & LOVER'S LANE OR INSTALLATION OF S-18 AND S-19

ESTIMATED COST: $1,605,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

FIGURE # S-29

Lockhart TEXAS
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STE 250
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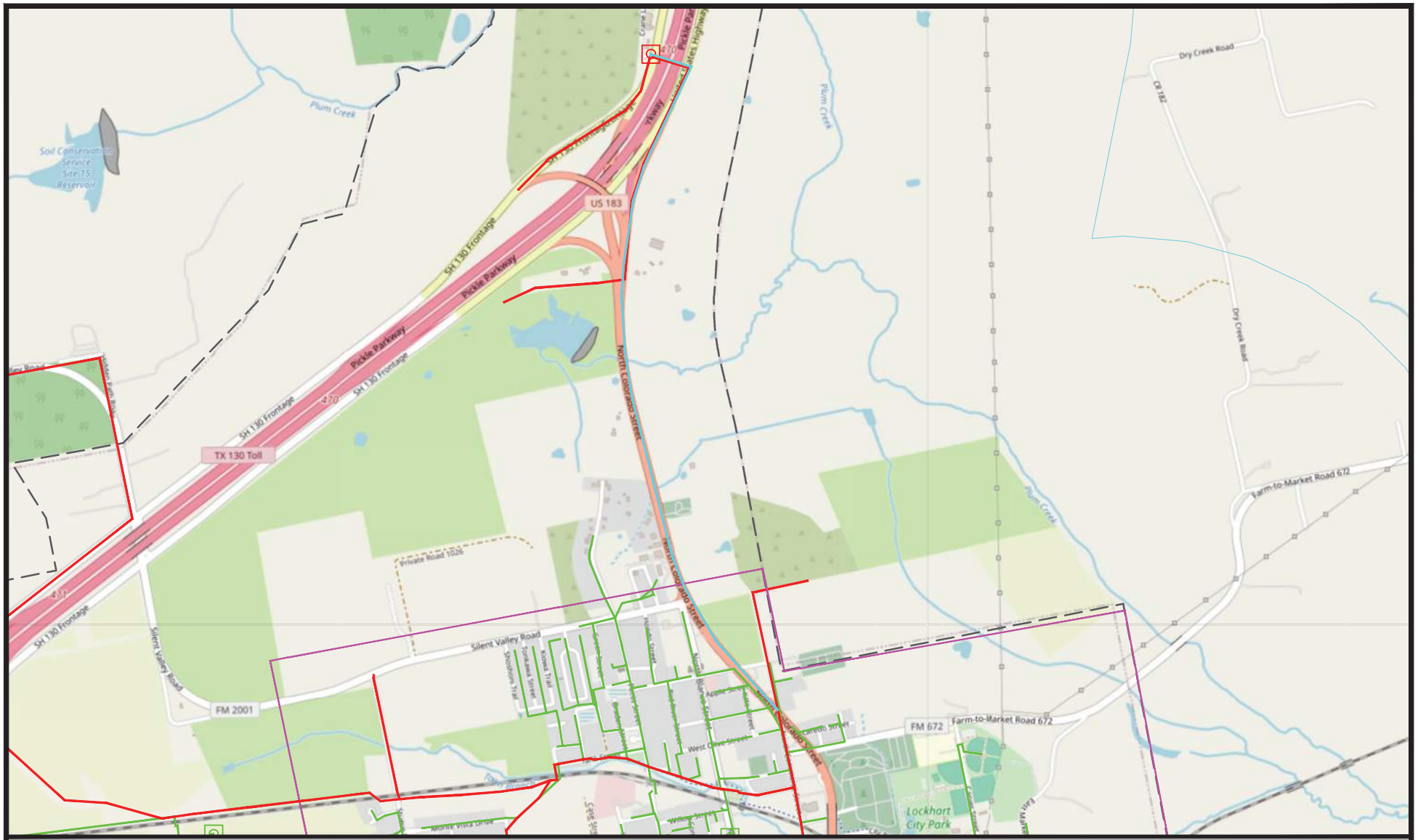

LEGEND

- PROPOSED PROJECT S-30
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 14,500LF OF PLUM CREEK FORCE MAIN

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG N. COLORADO ST & LOVER'S LANE OR INSTALLATION OF S-18 AND S-19

ESTIMATED COST: $3,263,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-30
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

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LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-31
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: SOUTH COMMERCE LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG S. COMMERCE ST & SEAWILLOW RD OR INSTALLATION OF S-26

ESTIMATED COST: $1,605,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY	FIGURE # S-31	
DATE:	JUNE 2024		

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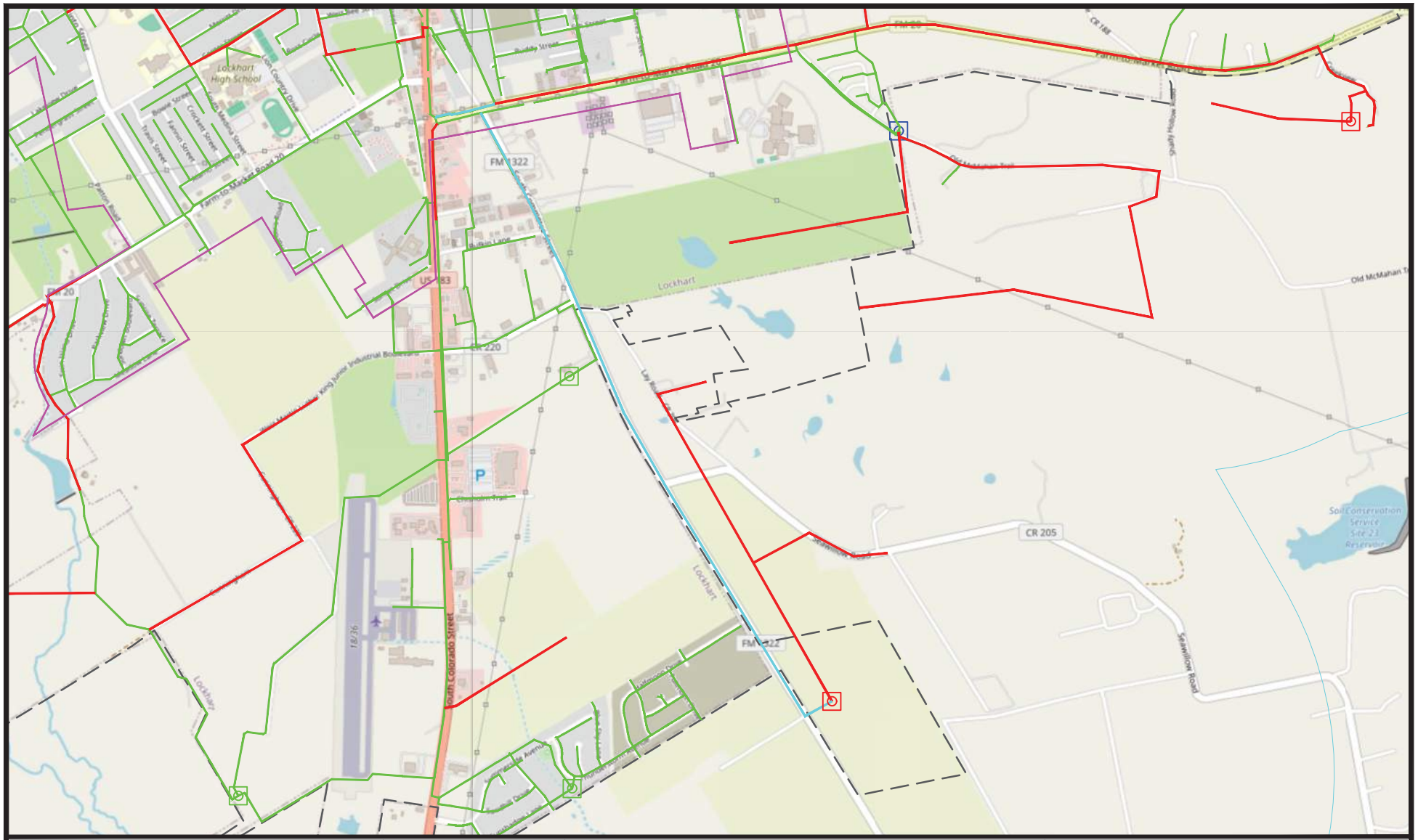

LEGEND

- PROPOSED PROJECT S-32
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: INSTALLATION OF 10,400LF OF SOUTH COMMERCE FORCE MAIN

PROJECT TRIGGER: INCREASED DEVELOPMENT ALONG S. COMMERCE ST & SEAWILLOW RD OR INSTALLATION OF S-26

ESTIMATED COST: $2,340,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-32
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
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(512) 329-6080

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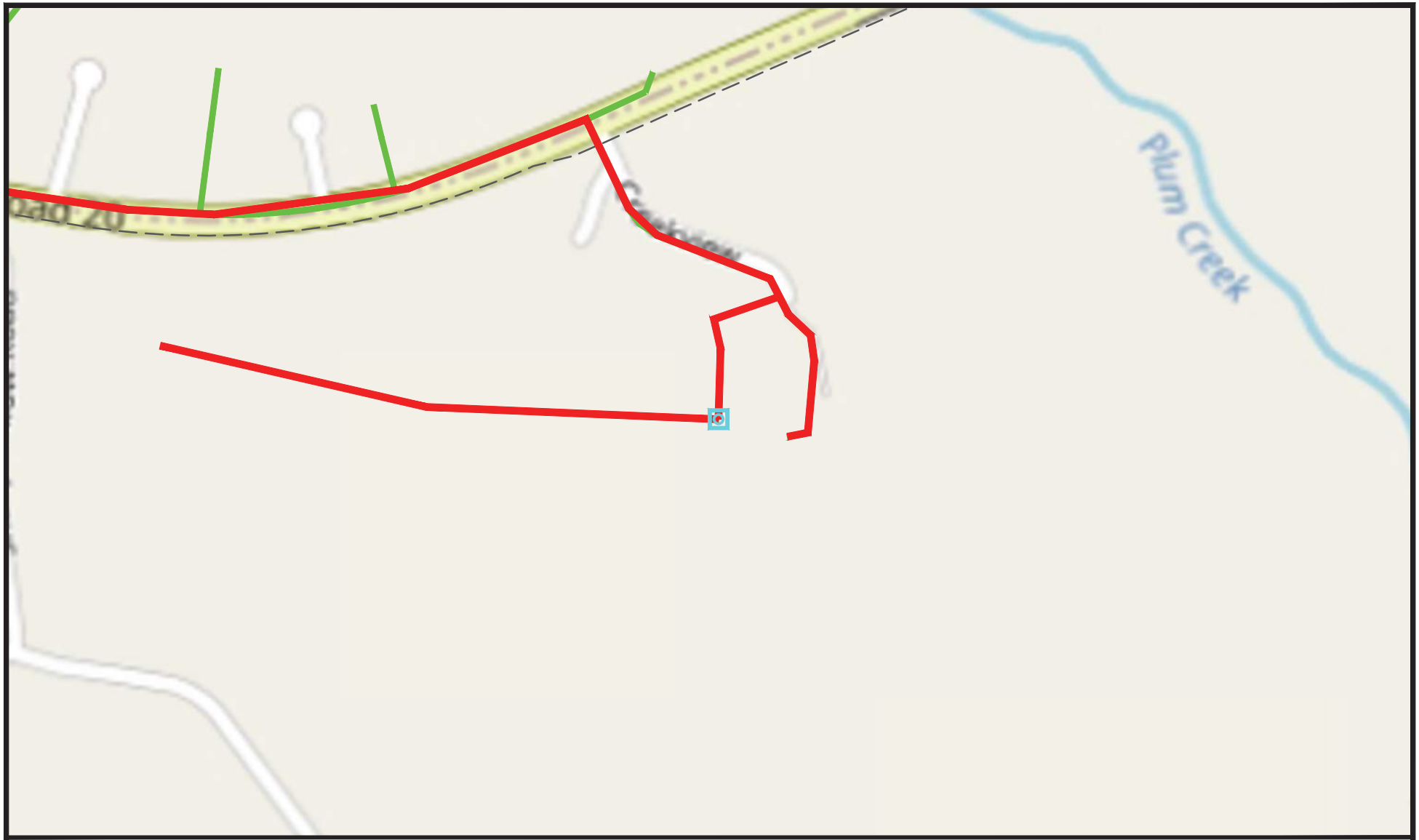

LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-33
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: FM 20 EAST LIFT STATION

PROJECT TRIGGER: INCREASED DEVELOPMENT SOUTH OF BLACKJACK ST & EAST OF SIERRA VISTA COVE

ESTIMATED COST: $1,763,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

FIGURE # S-33

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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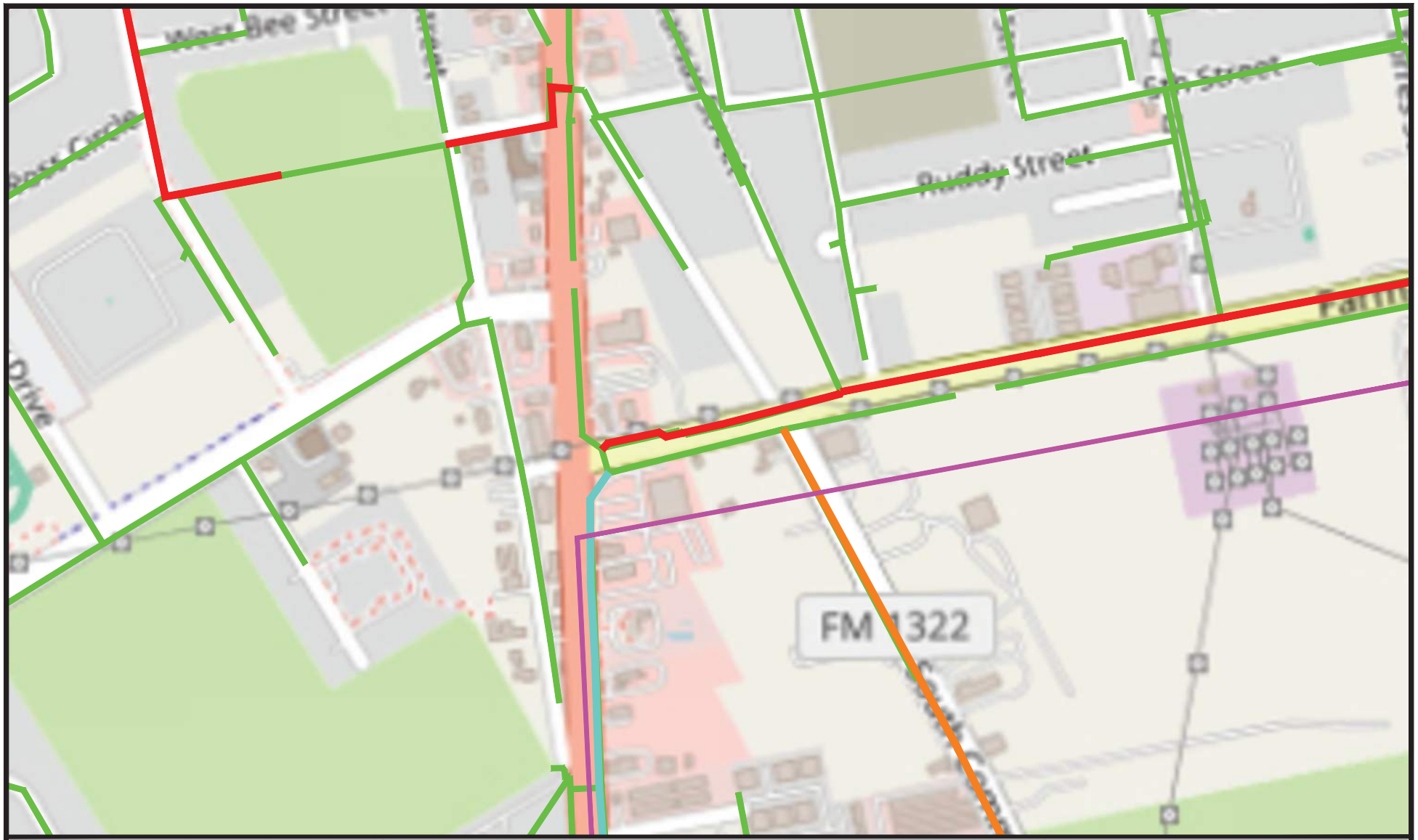

LEGEND

- PROPOSED PROJECT S-34
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 900LF OF PIPE FROM 8" & 12" TO 30" ALONG BLACKJACK ST

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50% DRY WEATHER FLOW IN LINE EXCEED 0.46MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $433,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-34
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-35
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 1,000LF OF PIPE FROM 6" TO 8" ALONG SYCAMORE ST & KENNEDY LS ABADONMENT.

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50% DRY WEATHER FLOW IN LINE EXCEED 0.46MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $350,000

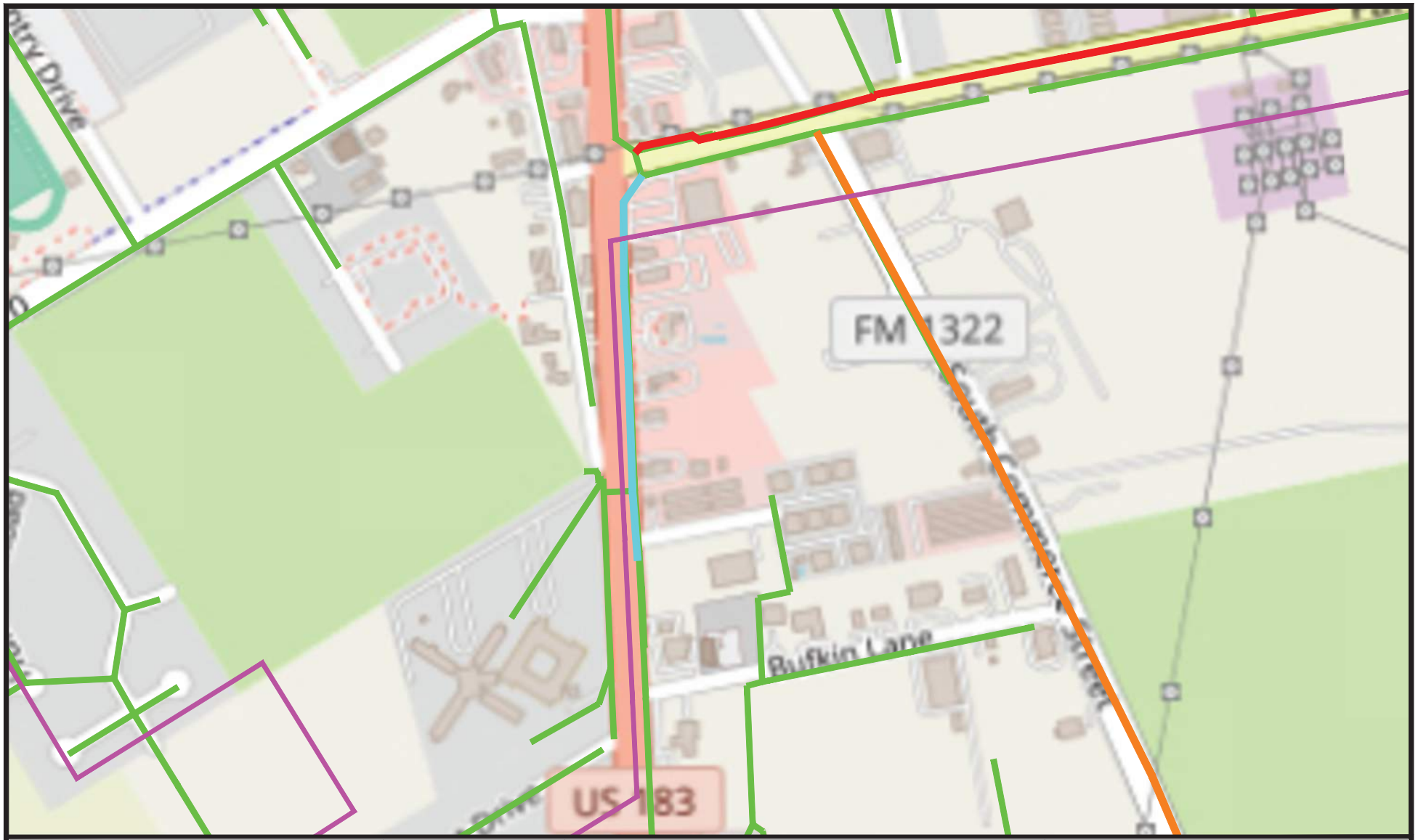
2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY		
APPROVED BY:	TMONTGOMERY	FIGURE # S-35	
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

C:\PWWORKING-TRD\D0393582\SEWER SYSTEM DATA DRIVEN PAGES.DWG - 6/25/24



LEGEND

- PROPOSED PROJECT S-36
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 1,400LF OF PIPE TO 21" FROM 12" ALONG S. COLORADO ST.

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50%. PROJECT TRIGGER - DRY WEATHER FLOW IN LINE EXCEED 0.46MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $372,000

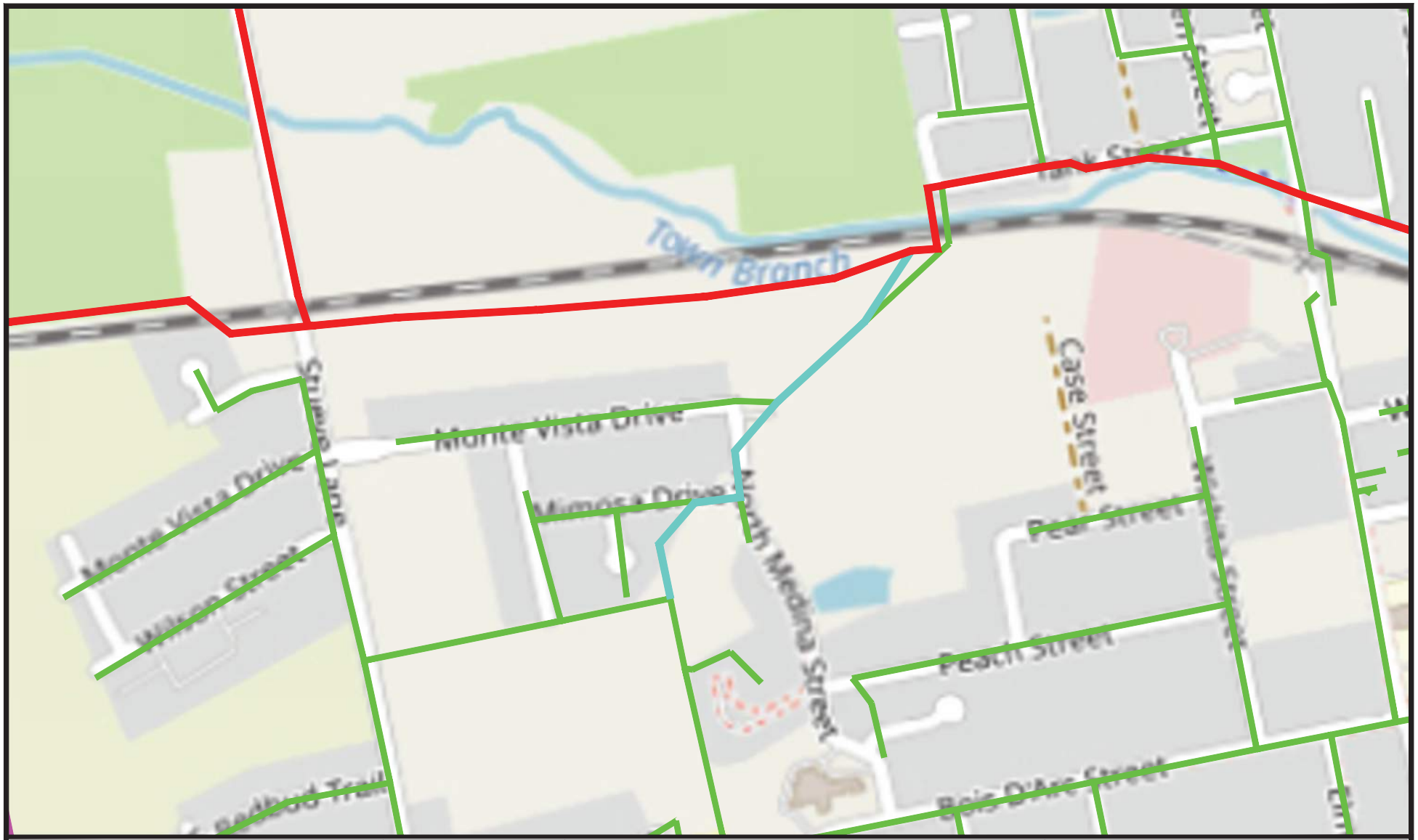
2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-36
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

C:\PWWORKING-TRD\D0393582\SEWER SYSTEM DATA DRIVEN PAGES.DWG - 6/25/24



LEGEND

- PROPOSED PROJECT S-37
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 1,700LF OF PIPE FROM 8" TO 15" ACROSS RAILROAD AND ALONG N. MEDINA ST.

PROJECT TRIGGER: UNDER DESIGN EVENT, WWF CREATE BACKWATER CONDITIONS. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~6,750

ESTIMATED COST: $476,000

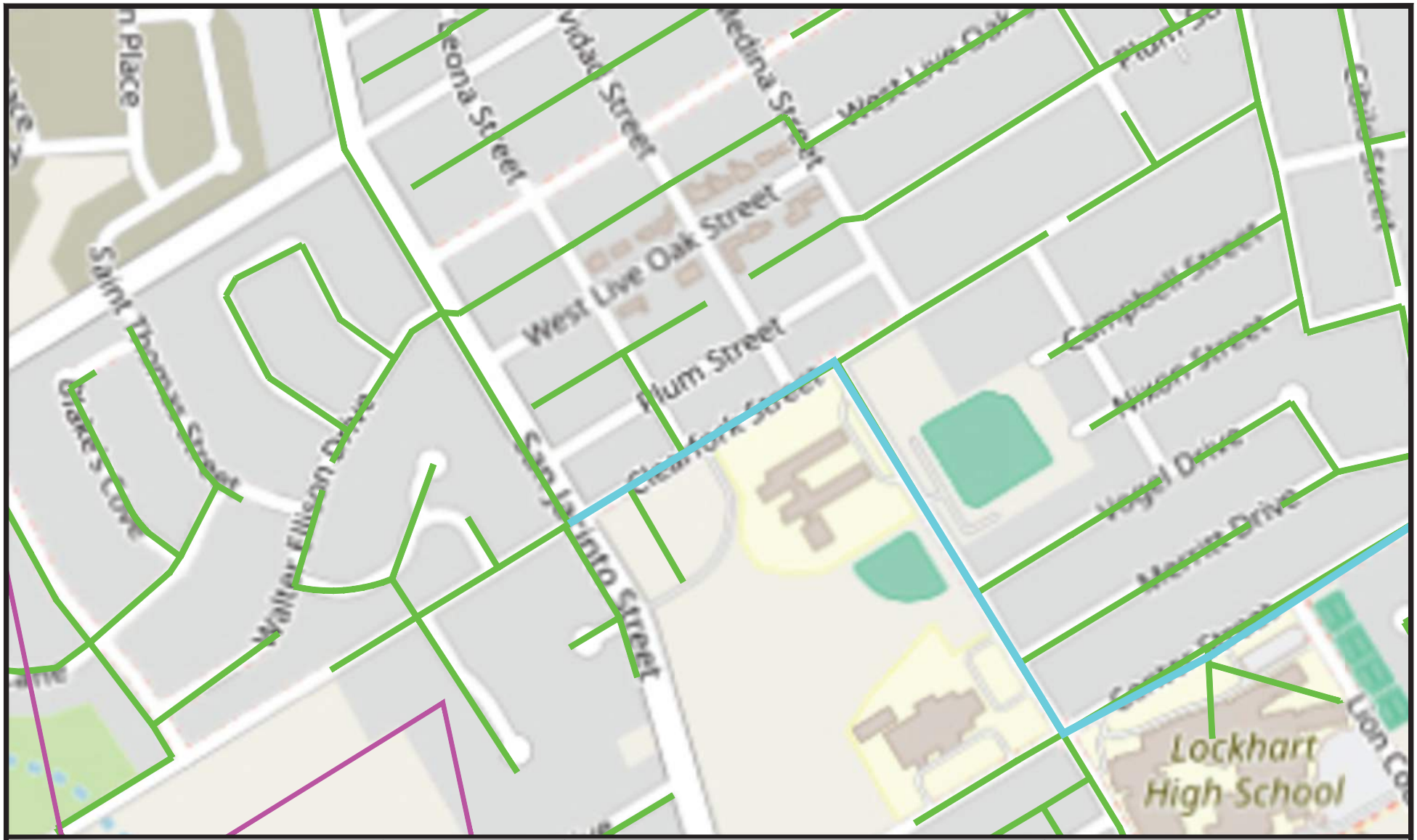
2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-37
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

C:\PWWORKING-TRD\D0393582\SEWER SYSTEM DATA DRIVEN PAGES.DWG - 6/25/24



LEGEND

- PROPOSED PROJECT S-38
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2028

PROJECT DESCRIPTION: UPSIZE 6,000LF OF PIPE FROM 8", 10", & 12" TO 18" FROM CLEARFORK ST TO S. MEDINA ST

PROJECT TRIGGER: UNDER DESIGN EVENT, WWF CREATE BACKWATER CONDITIONS.

ESTIMATED COST: $1,620,000

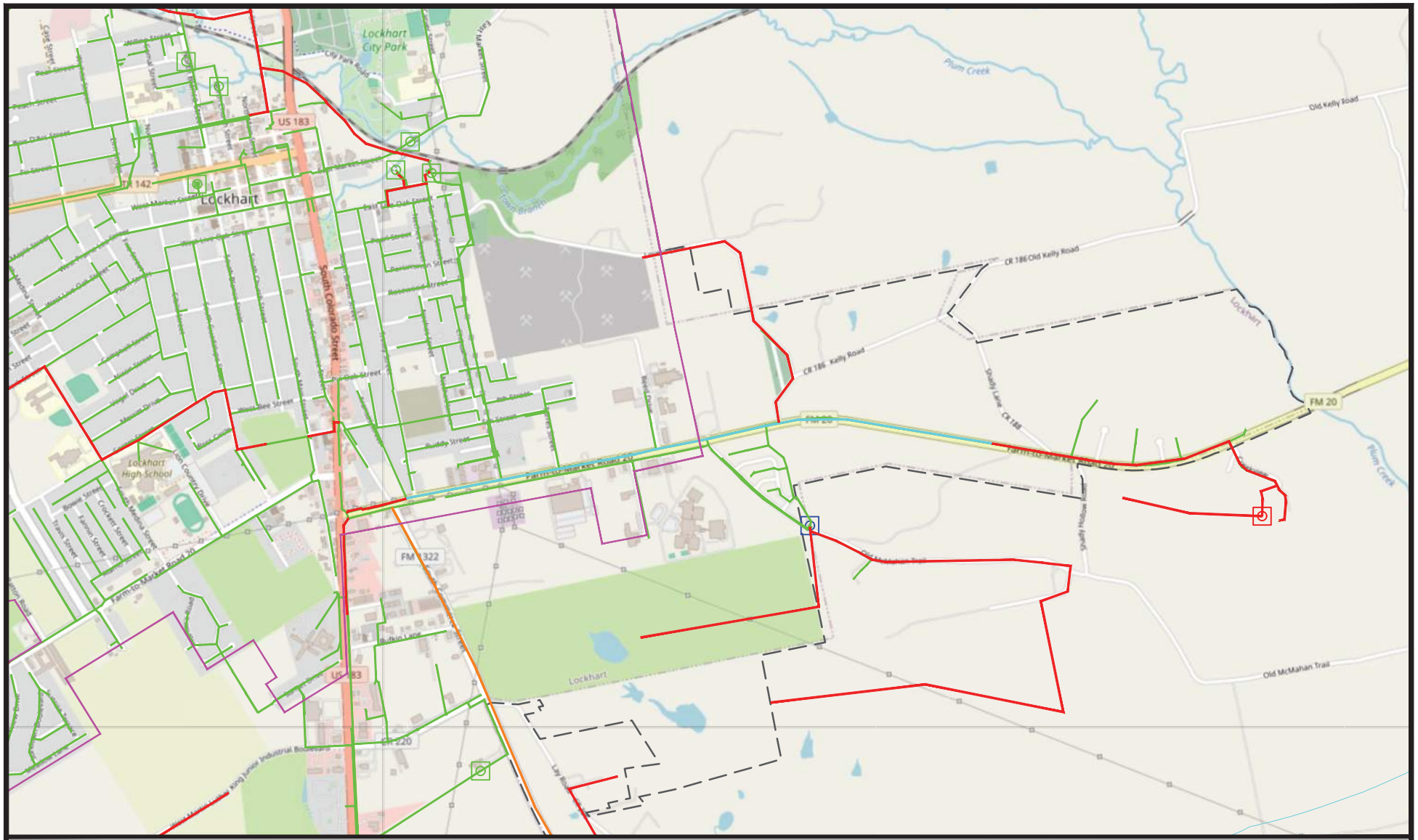
2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-38
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

C:\PWWORKING-TRD\D0393582\SEWER SYSTEM DATA DRIVEN PAGES.DWG - 6/25/24



LEGEND

- PROPOSED PROJECT S-39
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 1000 2000

SCALE : 1" = 2000'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: UPSIZE 8,600LF OF PIPE FROM 21" TO 30" ALONG BLACKJACK ST

PROJECT TRIGGER: UNDER DESIGN EVENT, WWF CREATE BACKWATER CONDITIONS. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~8,000 OR DWF EXCEEDS 1.17MGD TO THE FM20 PLANT

ESTIMATED COST: $2,963,000

2024 WATER/WASTEWATER MASTER PLAN CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-39
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-40
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2043

PROJECT DESCRIPTION: UPSIZE 3,900LF PIPE FROM 10", 12", & 15" TO 18" ALONG TWIN ISLAND DRIVE

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50%. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~12,000 OR DRY WEATHER FLOW TO FM20 EXCEEDS 1.75MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $1,050,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-40
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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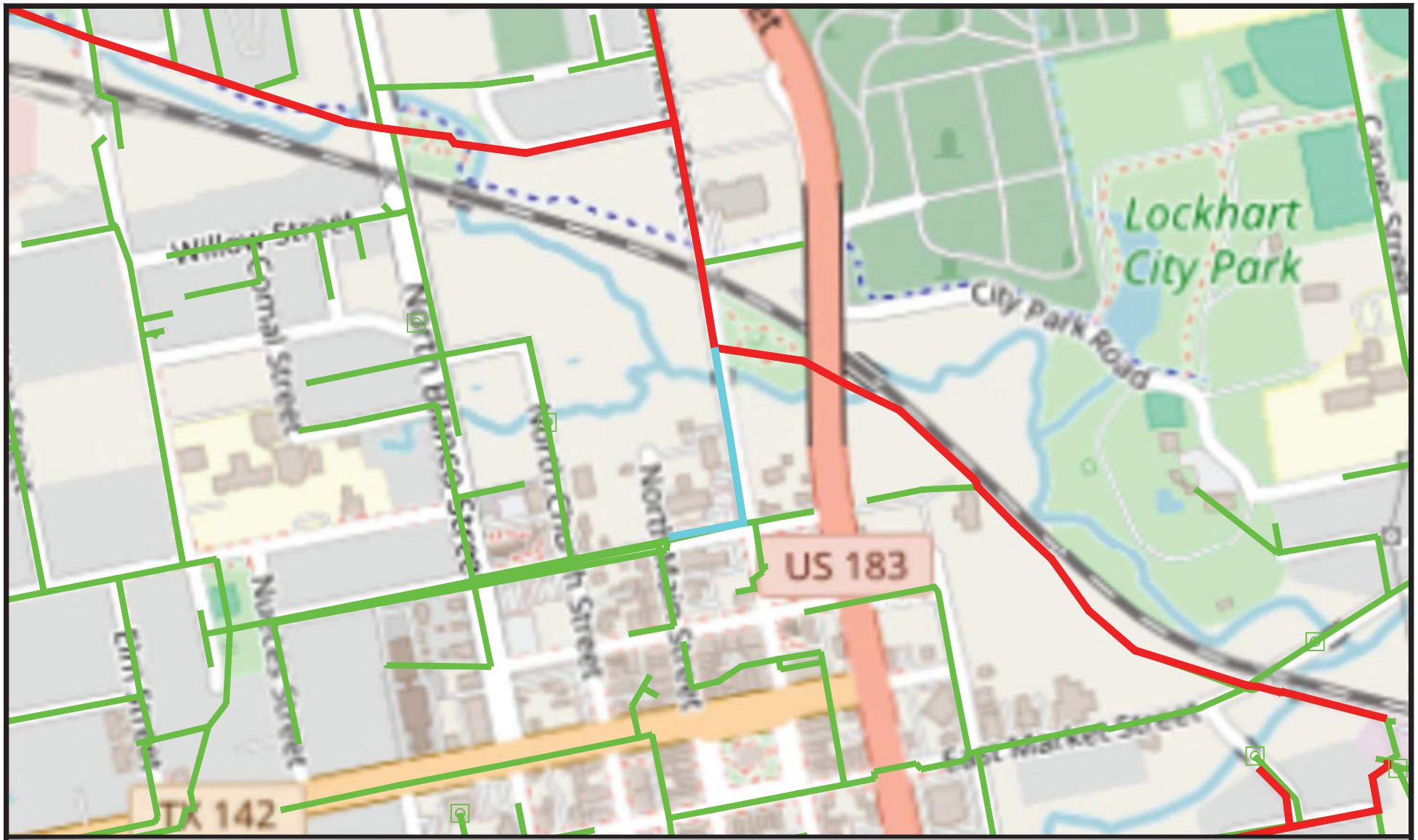

LEGEND

- PROPOSED PROJECT S-41
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2043

PROJECT DESCRIPTION: UPSIZE 900LF OF PIPE FROM 8" TO 12" ALONG NORTH COMMERCE ST

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50%. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~12,000 OR DRY WEATHER FLOW TO LARREMORE WWTP EXCEED 1MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $242,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-41
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- PROPOSED PROJECT S-42
- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION/IMPROVEMENTS
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 500 1000

SCALE : 1" = 1000'

PLANNING HORIZON: 2043

PROJECT DESCRIPTION: UPSIZE 5,100LF OF PIPE FROM 21" & 24" TO 30" ALONG BLACKJACK ST

PROJECT TRIGGER: UNDER PEAK DWF CONDITIONS, D/D IS GREATER THAN 50%. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~12,000 OR DRY WEATHER FLOW TO FM20 EXCEEDS 1.75MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $1,768,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-42
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-43
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2033

PROJECT DESCRIPTION: CENTURY OAKS LS IMPROVEMENTS - INCREASE CAPACITY TO 0.85MGD CAPACITY & INCREASE FORCEMAIN DIAMETER TO 8"

PROJECT TRIGGER: UNDER DESIGN EVENT, WWF CREATE BACKWATER CONDITIONS. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~8,000 OR DWF EXCEEDS 1.17MGD TO THE FM20 PLANT

ESTIMATED COST: $1,250,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-43
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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LEGEND

- EXISTING LIFT STATION
- EXISTING FORCE MAIN
- EXISTING SEWER LINE
- PROPOSED LIFT STATION S-44
- PROPOSED FORCE MAIN
- PROPOSED SEWER LINES
- LOCKHART CITY LIMITS

N

0 250 500

SCALE : 1" = 500'

PLANNING HORIZON: 2043

PROJECT DESCRIPTION: AIRPORT LS IMPROVEMENTS - INCREASE CAPACITY TO 2MGD & INCREASE FORCEMAIN DIAMETER TO 12".

PROJECT TRIGGER: UNDER DESIGN EVENT, WWF CREATE BACKWATER CONDITIONS. PROJECT TRIGGER - # OF CONNECTIONS WITH SYSTEM IS GREATER THAN ~12,000 OR DRY WEATHER FLOW TO FM20 EXCEEDS 1.75MGD UNDER DWF CONDITIONS.

ESTIMATED COST: $2,000,000

2024 WATER/WASTEWATER MASTER PLAN
CITY OF LOCKHART, TX

SEWER CAPITAL IMPROVEMENTS PROJECTS

DRAWN BY:	RMACIAS	PROJECT NUMBER:	529230
CHECKED BY:	TMONTGOMERY	FIGURE #	S-44
APPROVED BY:	TMONTGOMERY		
DATE:	JUNE 2024		

Lockhart TEXAS
505 E HUNTLAND DR
STE 250
AUSTIN, TX 78750
(512) 329-6080

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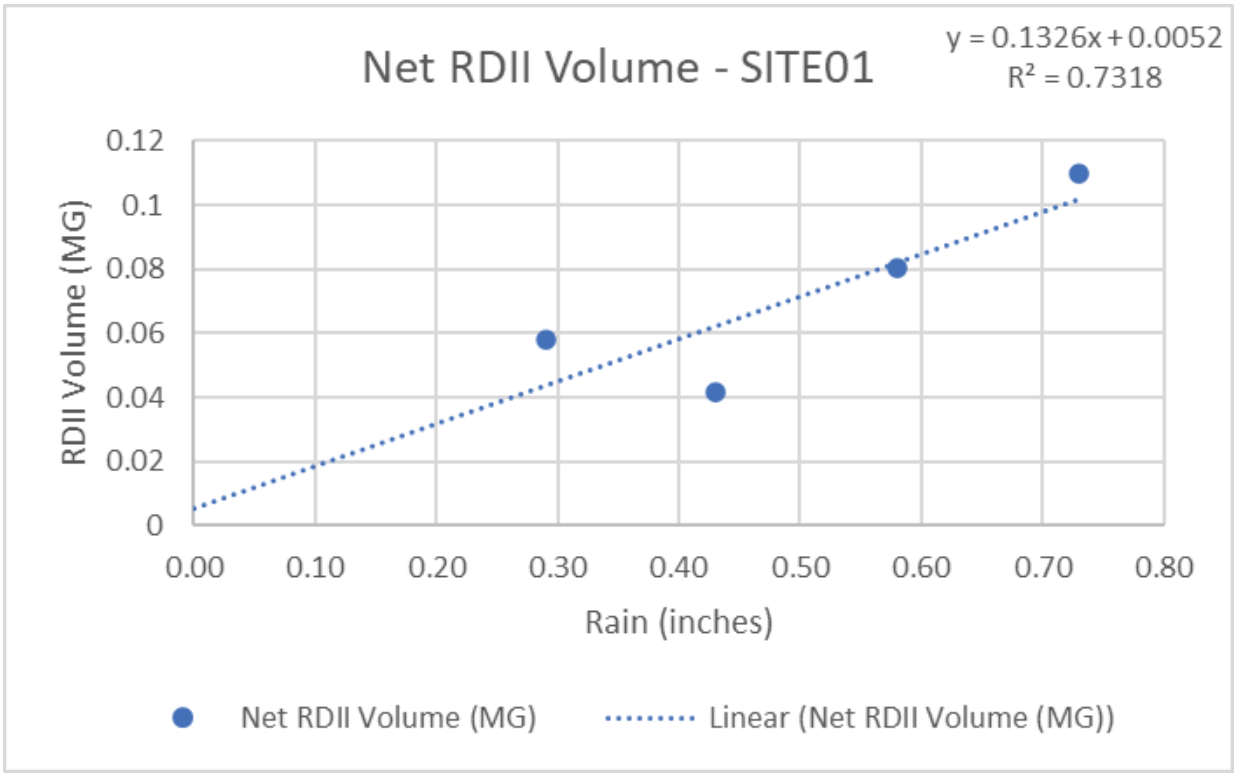
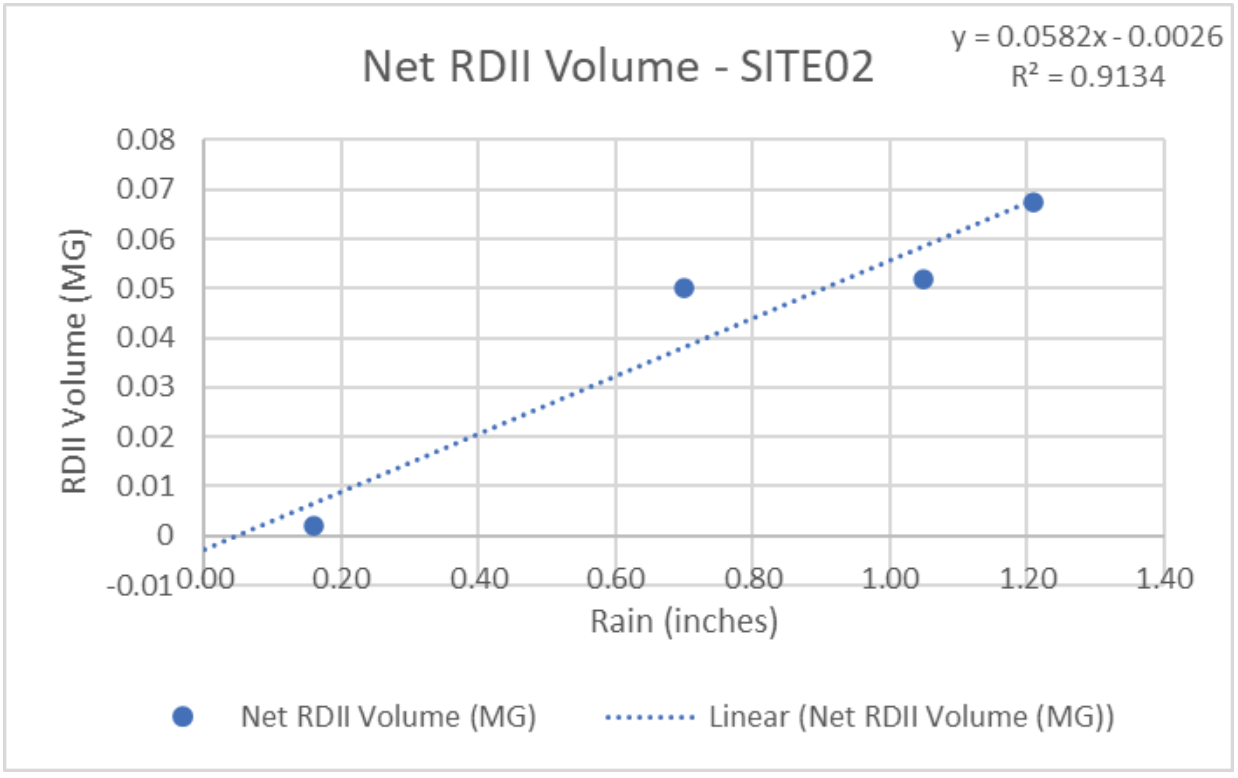
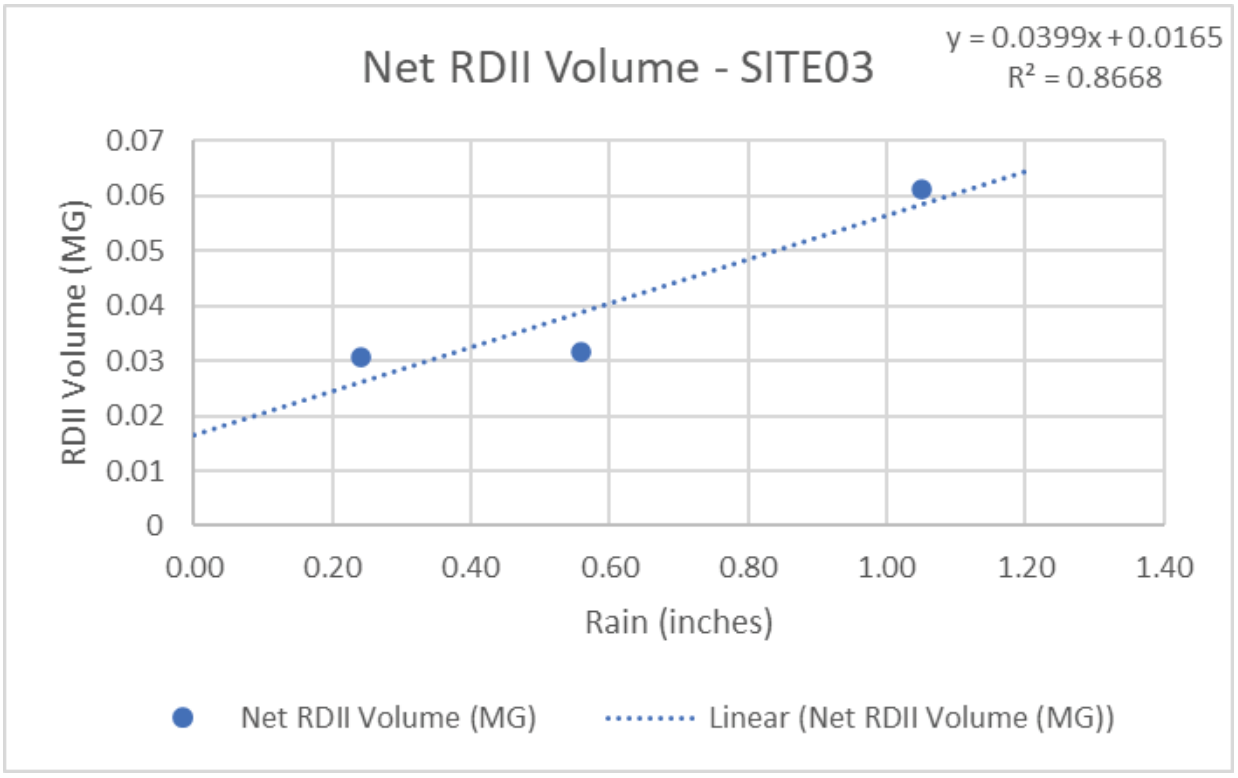
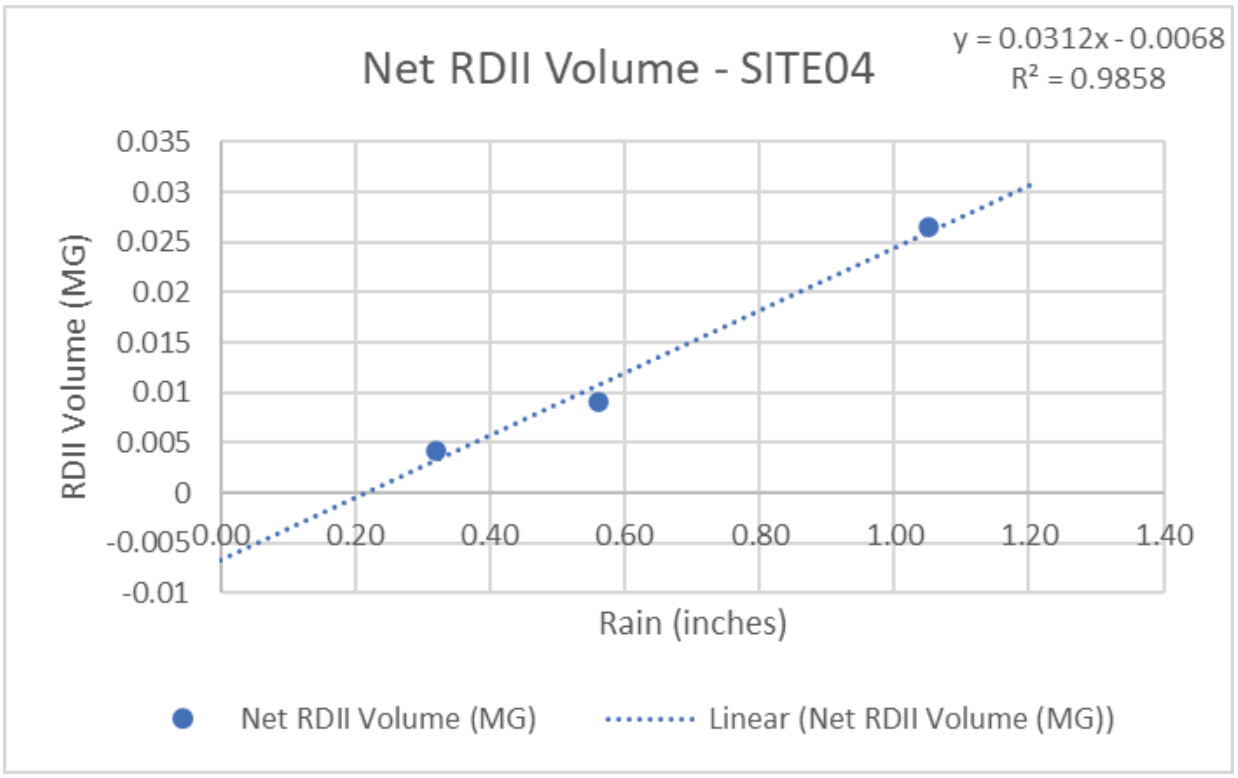
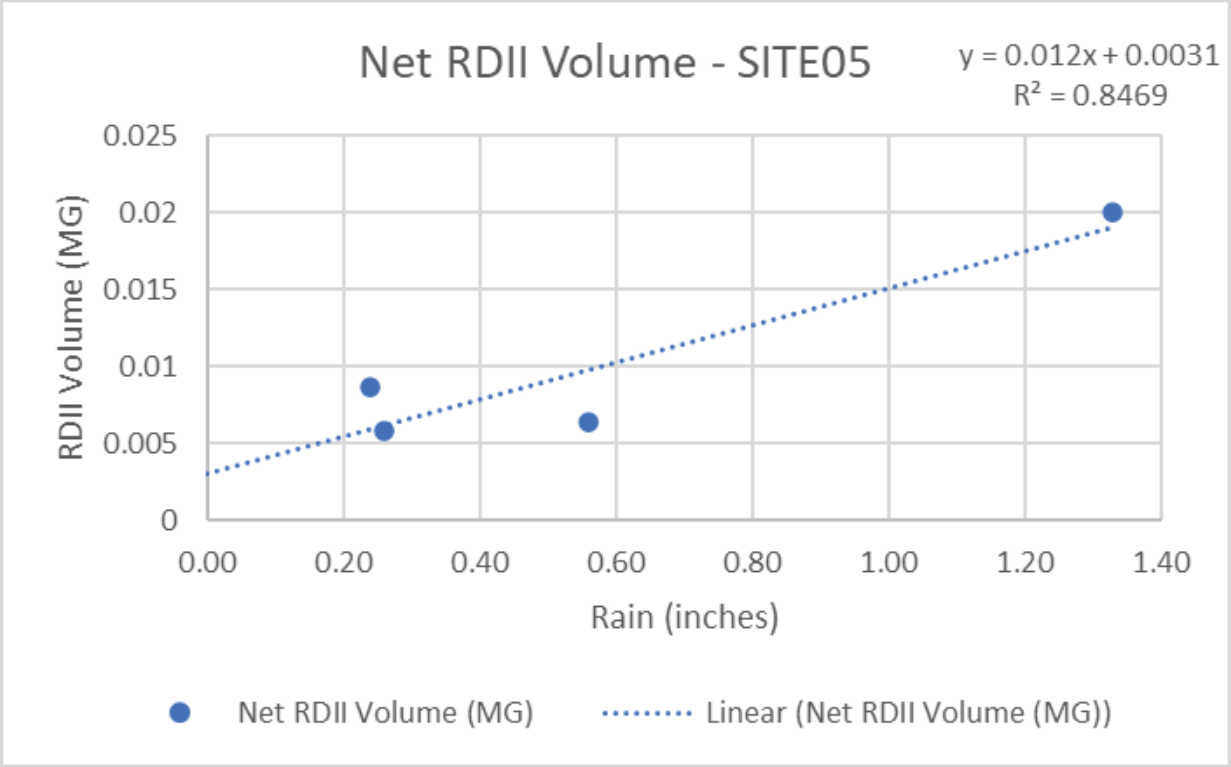
APPENDIX D – RDII ANALYSIS RESULTS

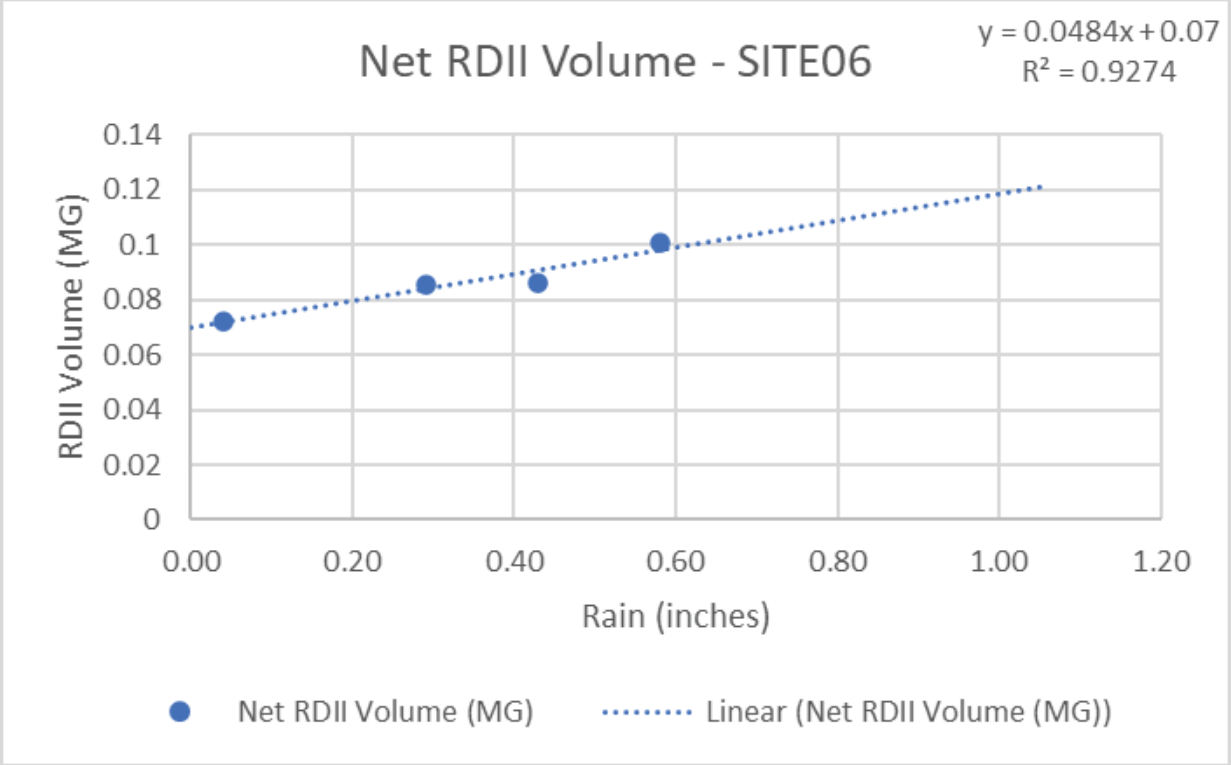

Net RDII Volume - SITE01
y = 0.1326x + 0.0052
R² = 0.7318
RDII Volume (MG)
0.12
0.1
0.08
0.06
0.04
0.02
0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

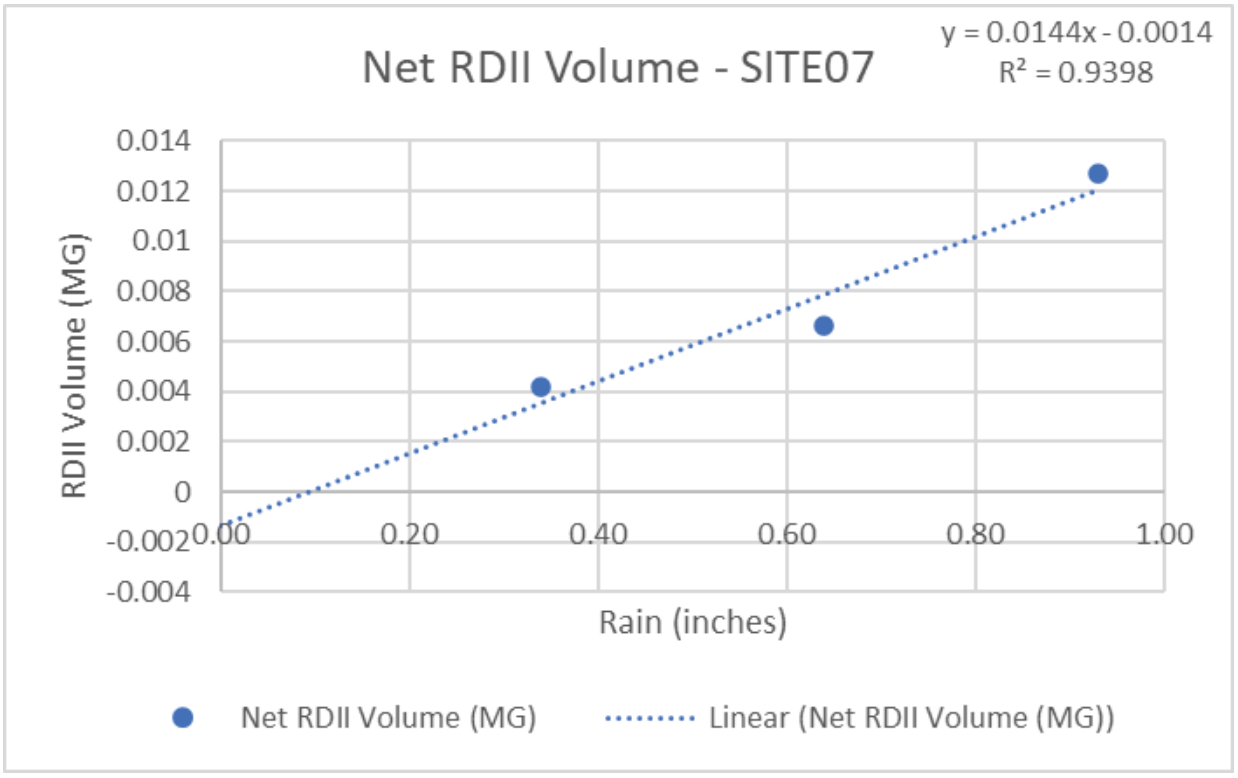

Net RDII Volume - SITE02
y = 0.0582x - 0.0026
R² = 0.9134
RDII Volume (MG)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

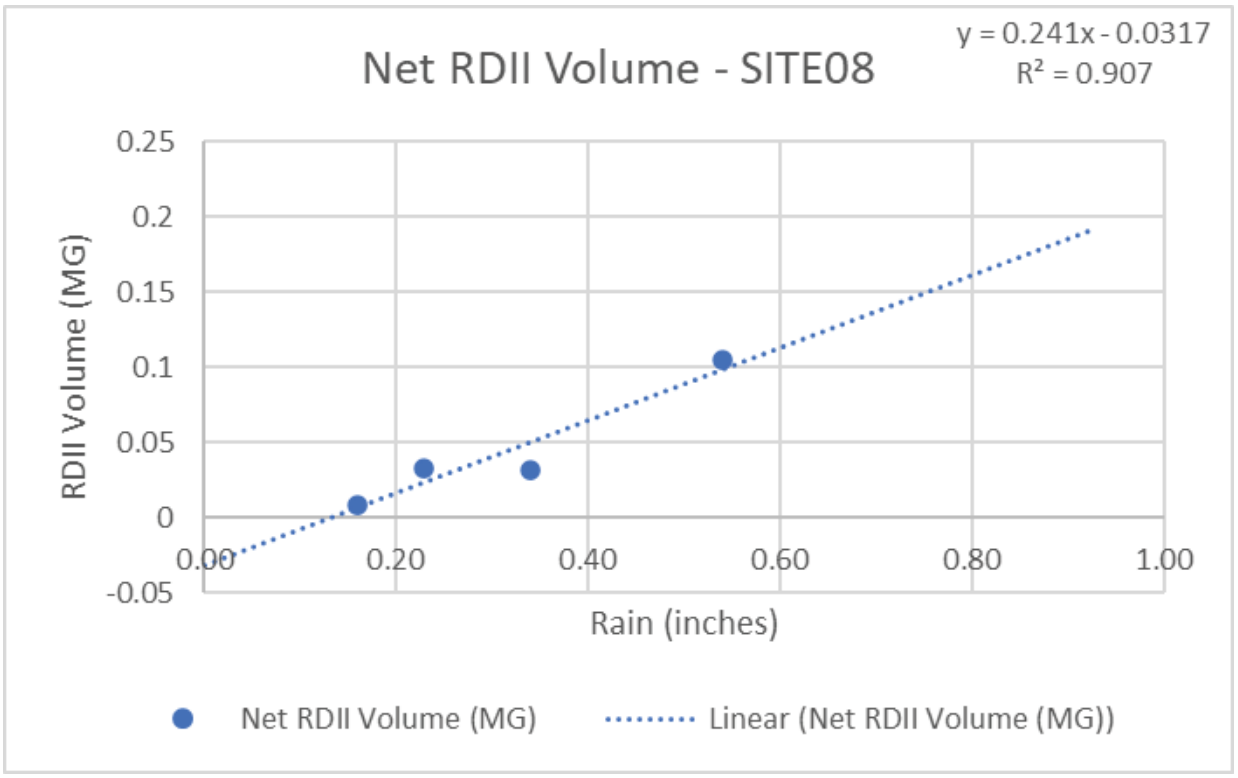

Net RDII Volume - SITE03
y = 0.0399x + 0.0165
R² = 0.8668
RDII Volume (MG)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

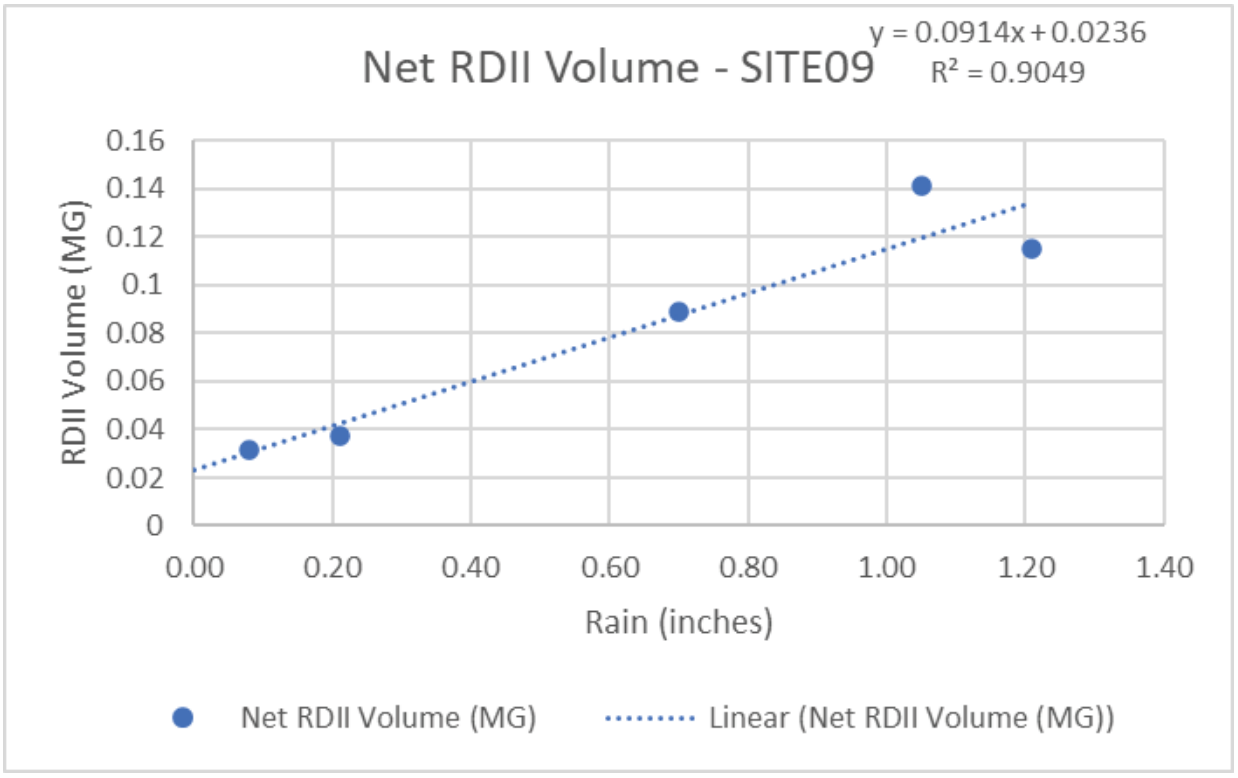

Net RDII Volume - SITE04
y = 0.0312x - 0.0068
R² = 0.9858
RDII Volume (MG)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

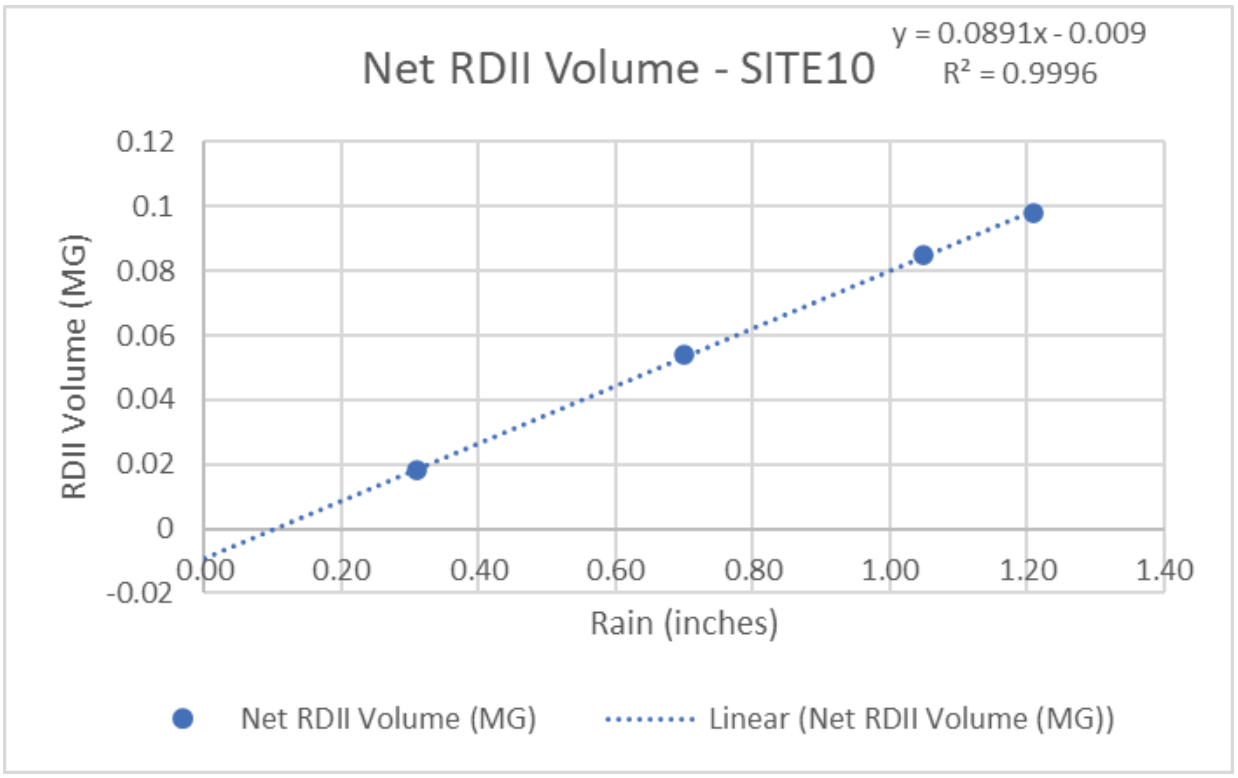

Net RDII Volume - SITE05
y = 0.012x + 0.0031
R² = 0.8469
RDII Volume (MG)
0.025
0.02
0.015
0.01
0.005
0
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))


Net RDII Volume - SITE06
y = 0.0484x + 0.07
R² = 0.9274
RDII Volume (MG)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0.00
0.20
0.40
0.60
0.80
1.00
1.20
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))


Net RDII Volume - SITE07
y = 0.0144x - 0.0014
R² = 0.9398
RDII Volume (MG)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
-0.004
0.00
0.20
0.40
0.60
0.80
1.00
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

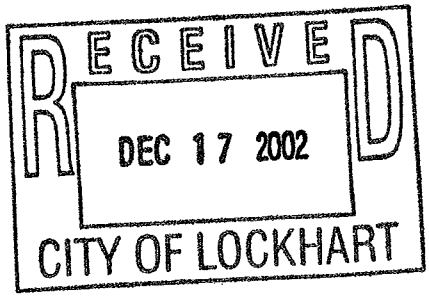

Net RDII Volume - SITE08
y = 0.241x - 0.0317
R² = 0.907
RDII Volume (MG)
0.25
0.2
0.15
0.1
0.05
0
-0.05
0.00
0.20
0.40
0.60
0.80
1.00
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))


y = 0.0914x + 0.0236
R² = 0.9049
Net RDII Volume - SITE09
RDII Volume (MG)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))


y = 0.0891x - 0.009
R² = 0.9996
Net RDII Volume - SITE10
RDII Volume (MG)
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Rain (inches)
Net RDII Volume (MG)
Linear (Net RDII Volume (MG))

APPENDIX E – THE CITY OF LOCKHART'S WATER AGREEMENTS

E.1 - LULING-LOCKHART AGREEMENT



WATER SUPPLY AGREEMENT

BETWEEN

GUADALUPE-BLANCO RIVER AUTHORITY,

CITY OF LOCKHART, TEXAS, AND

CITY OF LULING, TEXAS

December 2002

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WATER SUPPLY AGREEMENT
BETWEEN
GUADALUPE-BLANCO RIVER AUTHORITY,
CITY OF LOCKHART, TEXAS, AND
CITY OF LULING, TEXAS

THE STATE OF TEXAS

COUNTY OF CALDWELL

THIS AGREEMENT (herein called the "Agreement") made and entered into this ___ day of _____, 2002, by and between **GUADALUPE-BLANCO RIVER AUTHORITY**, a governmental agency of the State of Texas, a conservation and reclamation district and body politic and corporate, created and operating under the provisions of the Guadalupe-Blanco River Authority Act, as amended (compiled as Article 8280-106, Vernon's Texas Civil Statutes), enacted pursuant to Article XVI, Section 59 of the Constitution of Texas ("GBRA"), the **CITY OF LOCKHART, TEXAS**, a municipal corporation and home-rule city situated in Caldwell County, Texas, organized and operating under the provisions of its charter and the Constitution and laws of the State of Texas ("City of Lockhart"), and the **CITY OF LULING, TEXAS**, a municipal corporation and home-rule city situated in Caldwell County, Texas, organized and operating under the provisions of its charter and the Constitution and laws of the State of Texas ("City of Luling") (herein collectively referred to as the "Parties");

W I T N E S S E T H:

Recitals

GBRA owns and operates the Luling Water Treatment Plant located in the City of Luling, which stores, processes, and treats run-of-river water diverted from the San Marcos River pursuant to Certificate of Adjudication No. 18-3896. Under the terms of a water supply contract entered into between GBRA and the City of Luling on November 4, 1975 ("1975 Water Supply Contract"), GBRA has agreed to and does provide from the Luling Water Treatment Plant to the City of Luling potable water required by the City of Luling for its own use and for distribution to

all customers served by the City of Luling's water distribution system up to, but not to exceed, a maximum monthly quantity equal to 2.5 million gallons per day times the number of days in a calendar month and a maximum continuous rate of delivery of 1,735 gallons per minute. Pursuant to the terms of the 1975 Water Supply Contract, GBRA has the right to contract with other persons to provide them water from the Luling Water Treatment Plant, upon approval by the City of Luling. Subject to the terms of this Agreement, the 1975 Water Supply Contract remains in force and in full effect between GBRA and the City of Luling.

GBRA and the City of Luling have determined that the Luling Water Treatment Plant's current capacity to process and treat water diverted from the San Marcos River is in excess of the City of Luling's past and reasonably foreseeable future demand for treated water under the terms of the 1975 Water Supply Contract. GBRA and the City of Luling agree that the Luling Water Treatment Plant's excess capacity is sufficient to allow GBRA to market and sell water treated by the Luling Water Treatment Plant to a third person.

The City of Lockhart wishes to secure a long-term, reliable quantity of treated water of good quality to provide for its own uses and for distribution to the customers it serves by the City of Lockhart water distribution system. The City of Lockhart has determined that excess capacity from the Luling Water Treatment Plant can provide the City of Lockhart with a feasible, economical, and high quality municipal water supply and that the City of Lockhart's best interests will be served by entering into this Agreement according to the terms and within the time limits set forth in this Agreement. Pursuant to Section 8.1 of the 1975 Water Supply Contract, the City of Luling has agreed to the sale of water from the Luling Water Treatment Plant to the City of Lockhart, as set forth in this Agreement.

For the mutual benefit of the Parties, GBRA, the City of Luling, and the City of Lockhart have agreed to enter into this Agreement for the financing, design, permitting, construction, operation, and maintenance of facilities that will enable GBRA to pump treated water from the Luling Water Treatment Plant to the Lockhart Water Treatment Plant ground storage reservoir through the Water Delivery System that will be financed, designed, permitted, constructed, operated, and maintained as set forth in this Agreement.

GBRA, the City of Luling, and the City of Lockhart are each authorized to enter into this Agreement by the Constitution and laws of the State of Texas, and in particular Texas Government Code § 791.026. GBRA, the City of Luling, and the City of Lockhart have agreed that the City of Lockhart will make sufficient annual payments to GBRA so that GBRA will be able to pay all financing, design, permitting, construction, operation, and maintenance expenses associated with the Project (hereinafter defined) and the expenses of the Luling Water Treatment Plant that are allocated to the City of Lockhart, which are hereinafter set forth.

Agreement

For and in consideration of the mutual promises, covenants, obligations, and benefits in this Agreement, GBRA, the City of Luling, and the City of Lockhart agree as follows:

ARTICLE I

DEFINITIONS

Unless the context requires otherwise, the following terms and phrases used in this Agreement shall have meanings as follows:

(1) "Agreement" means this Agreement.

(2) "Annual Budget" has the meaning set forth in Section 5.3 of this Agreement.

(3) "Bond Resolution" means the resolutions or indentures adopted by the GBRA Board of Directors authorizing the issuance of the Bonds and providing for their security and payment, as such resolutions or indentures may be amended or supplemented from time to time.

(4) "Bonds" means the issue or issues of revenue bonds or other obligations of GBRA that are hereafter issued pursuant to Section 2.6 of this Agreement, and any refunding bonds issued in lieu thereof.

(5) "Certificate of Adjudication No. 18-3896" means Certificate of Adjudication No. 18-3896 issued by the Texas Water Commission to GBRA, as it is currently amended and as it may be amended in the future, pursuant to which GBRA is authorized to divert and use not to exceed 2,800 acre-feet of water per year from the San Marcos River for municipal purposes.

(6) "City of Lockhart" has the meaning set forth in the introductory paragraph of this Agreement.

(7) "City of Luling" has the meaning set forth in the introductory paragraph of this Agreement.

(8) "Commencement Date" has the meaning set forth in Section 2.11 of this Agreement.

(9) "Effective Date" means the date when this Agreement has been approved and executed by all of the Parties.

(10) "Fiscal Year" means the fiscal year of GBRA, which presently commences on September 1 and ends on August 31.

(11) "GBRA" has the meaning set forth in the introductory paragraph of this Agreement.

(12) "Point of Delivery" has the meaning set forth in Section 3.1 of this Agreement.

(13) "Project" means the Water Delivery System and all lands and interests in lands on which such system is located or which are necessary for the efficient operation and maintenance thereof, as may be modified from time to time in accordance with the terms of this Agreement, as well as all activities related to the financing, permitting, design, and construction of the Water Delivery System.

(14) "Project Costs" has the meaning set forth in Section 2.6 of this Agreement.

(15) "Project Review Committee" has the meaning set forth in Section 7.1 of this Agreement.

(16) "TCEQ" means the Texas Commission on Environmental Quality or any successor agency.

(17) "Water Delivery System" includes all the facilities designed, permitted, constructed, operated, and maintained by GBRA in accordance with Article II of this Agreement, for the purpose of supplying water from the Luling Water Treatment Plant to the Lockhart Water Treatment Plant ground storage reservoir. Without limiting the generality of the foregoing, the term "Water Delivery System" includes a pump station to be constructed at the Luling Water Treatment Plant, a transmission pipeline that will be constructed to connect the Luling Water Treatment Plant to the Lockhart Water Treatment Plant ground storage reservoir, and all necessary meters, monitoring equipment, valves, and lands, interests in lands, and rights-of-way

necessary for the construction, operation, and maintenance of the Water Delivery System. The Water Delivery System further includes any modifications, renovations, or improvements necessary at the Luling Water Treatment Plant for the construction, operation, and maintenance of the Water Delivery System.

(18) "1975 Water Supply Contract" has the meaning set forth in the Recitals to this Agreement.

ARTICLE II

CONSTRUCTION OF THE WATER DELIVERY SYSTEM

Section 2.1 Design, Construction, Permitting, and Operation. GBRA shall be responsible for and will retain full control of financing, design, permitting, construction, operation, and maintenance of the Water Delivery System. GBRA at its sole discretion will select and retain all legal, financial, engineering, and other consultants that GBRA determines are necessary and beneficial to its satisfaction of obligations under this Agreement.

Section 2.2 Ownership of the Water Delivery System. GBRA shall own all aspects of the Water Delivery System, including all facilities comprising or necessary for the operation of the Water Delivery System. After all of the debt incurred by GBRA relating to the Project is paid in full, ownership of the portion of the Water Delivery System located outside of the Luling Water Treatment Plant will be conveyed to the City of Lockhart if GBRA is not able to continue supplying water under the terms of this Agreement.

Section 2.3 Acquisition of Real Estate, Easements, and Permits. GBRA shall determine the general location of the proposed pump station and the necessary rights-of-way that must be acquired for installation of the pump station, transmission main, and all necessary meters, monitoring equipment, and valves for the Water Delivery System. GBRA will acquire and hold title to all necessary real estate and easements for any rights-of-way necessary for the Water Delivery System, and any permits necessary for the Water Delivery System will be acquired by GBRA and held in its name.

Section 2.4 Water Appropriation Permits or Amendments. In the event that GBRA determines it is necessary to seek an amendment to Certificate of Adjudication No. 18-3896, to seek acquisition of any other water appropriation permit or certificate of adjudication, to

seek an amendment to any other permit or certificate held in its name, or to seek the issuance of a new permit, in order to satisfy its obligations under the terms of this Agreement, GBRA agrees to seek to acquire such permit or Certificate and/or submit to the TCEQ the appropriate application or petition and to diligently pursue said application or petition in good faith. The City of Luling and the City of Lockhart agree to cooperate with GBRA in any such efforts.

Section 2.5 **Grants**. The Parties agree to cooperate in making application for such Federal or State grants as GBRA may determine to be desirable and available to obtain all or part of the funds for the financing, design, permitting, and construction of the Project. The City of Lockhart shall receive the full benefit of any grant made by the United States of America or the State of Texas or any of their agencies toward the cost of the financing, design, permitting, and construction of the Project. The sums to be paid by the City of Lockhart for services rendered by GBRA under this Agreement shall not include any compensation or reimbursement to GBRA to recompense GBRA for any costs or expenses associated with the pursuit of any such grants.

Section 2.6 **Authority to Obtain Funds**. At its sole discretion, GBRA may issue Bonds in an initial amount sufficient to pay for any or all of the costs associated with the Project.

If GBRA determines to issue the Bonds, the Bond Resolution shall be furnished to the City of Lockhart for approval by the City Council for the City of Lockhart as to substance and as to form, and upon delivery of each issue of the Bonds, GBRA shall furnish to the City of Lockhart a maturity schedule showing the annual payments of principal and interest required to retire the Bonds.

Section 2.7 **Preliminary Design and Cost Estimate**. GBRA agrees that it will prepare and forward to the City of Lockhart for its approval a preliminary design and cost estimate for the financing, design, permitting, and construction of the Project. After GBRA receives all necessary approvals from the City of Lockhart, GBRA will proceed with financing, design, permitting, and construction associated with the Project, consistent with the preliminary design and cost estimate provided to the City of Lockhart, subject to any change orders issued during construction.

Section 2.8 Inspection. The City of Lockhart's representatives shall have reasonable access at all times to construction in progress and may make such inspections thereof as the City of Lockhart deems necessary or desirable.

Section 2.9 Conditions to Construction. It is understood and agreed that any obligation on the part of GBRA to construct, complete, operate and maintain the Water Delivery System shall be subject to (a) the acquisition by GBRA of any existing permit or certificate of adjudication, and/or the issuance by the TCEQ to GBRA of any new permit or amendment to an existing permit or certificate of adjudication, as may be necessary for GBRA to fulfill its obligations under this Agreement, as provided in Section 2.4, above; (b) GBRA's obtaining sufficient funds to pay all Project Costs associated with the financing, design, permitting, and construction associated with the Project, including the sale and delivery of the Bonds upon terms satisfactory to GBRA; (c) GBRA's ability to obtain all sites, rights-of-way, easements, labor, equipment, and materials required for the construction of the Water Delivery System; (d) GBRA's obtaining all permits and licensees required to construct the Water Delivery System; and (e) GBRA's obtaining all permits and licenses required to and necessary for it to operate and maintain the Water Delivery System.

Section 2.10 Completion of the Water Delivery System. GBRA agrees to use due diligence to substantially complete the Water Delivery System so that it is operational by October 30, 2004 or 730 days after the Effective Date, whichever is later; however, it is agreed that GBRA shall not be liable to any person, including any Party or its customers, for any damages, whether direct, indirect or consequential, allegedly resulting from any delay, regardless of cause, in the completion or operation of the Water Delivery System.

Section 2.11 Commencement of Operations. GBRA will determine the date on which operation of the Water Delivery System will commence (the "Commencement Date"), and will notify the City of Luling and the City of Lockhart at least thirty (30) days prior to such date. On the Commencement Date, and thereafter while this Agreement is in force and effect, GBRA will operate the Water Delivery System to furnish water to the City of Lockhart as provided in this Agreement.

Section 2.12 Preparation of First Budget and Rates. Approximately forty-five (45) days prior to the Commencement Date, GBRA will prepare and submit to the City of Lockhart its tentative budget and rates for the months remaining in the then current GBRA Fiscal Year. The budget shall include all payments and expenses by all Parties associated with the Water Delivery System.

ARTICLE III

POINTS OF DIVERSION AND DELIVERY, QUANTITY, QUALITY, CONNECTIONS, AND MEASUREMENTS

Section 3.1 Points of Diversion and Delivery. The Point of Diversion from the San Marcos River shall be the point or points of diversion authorized under Certificate of Adjudication No. 18-3896. The Point of Delivery for all water supplied by GBRA under this Agreement shall be at a water meter to be installed by GBRA near the point of connection between the Water Delivery System and the Lockhart Water Treatment Plant ground storage reservoir. Additional points of delivery can be designated by agreement of the Project Review Committee. Title to water delivered under this Section 3.1 transfers to the City of Lockhart when the water passes through the meter at the Point of Delivery or any future substituted or designated point(s) of delivery as agreed to by the Parties in writing.

Section 3.2 Maximum Rate of Delivery. From and after the Commencement Date, GBRA shall divert at the Diversion Point and supply to the City of Lockhart at the Delivery Point water from the run-of-river flows of the San Marcos River under Certificate of Adjudication No. 18-3896 or other water rights owned by GBRA pursuant to the terms of this Agreement, to the extent such water is available and can be lawfully diverted under the terms of such Certificate of Adjudication or water rights. GBRA will supply water under this Agreement at the diversion rate specified by the City of Lockhart from time to time, however, GBRA shall not be obligated to provide instantaneous deliveries to the City of Lockhart at the Delivery Point at any time at a total rate in excess of 694 gallons per minute.

Section 3.3 Quantity. Subject to the terms and conditions set forth in this Agreement, after the Commencement Date, GBRA agrees to use reasonable diligence to deliver

to the City of Lockhart up to 365.0 million gallons of water per year for a period of twenty-five (25) years. GBRA will use good faith efforts to deliver to the City of Lockhart one (1) million gallons of water per day; however, GBRA does not guarantee the delivery of up to one (1) million gallons of water on any day to the City of Lockhart from the Water Delivery System.

a) **City of Luling's Use.** GBRA, the City of Lockhart, and the City of Luling acknowledge that the water to be provided to the City of Lockhart under this agreement is part of the 2.5 million gallons of treated water per day that GBRA has agreed to supply to the City of Luling under Section 4.1 of the 1975 Water Supply Contract. GBRA and the City of Lockhart agree that if the City of Luling's daily water demand is such that the combined demands of the City of Luling and the City of Lockhart cannot be met within the capacity of the Luling Water Treatment Plant, the City of Luling's demand will be met in full, and the supply of water to the City of Lockhart under this Agreement will be reduced accordingly. Nothing in this Agreement shall be interpreted to require the City of Luling to reduce its water demand to accommodate the City of Lockhart's demand hereunder.

b) **Expansion of Luling Water Treatment Plant.** GBRA, the City of Lockhart, and the City of Luling agree that if GBRA and the City of Lockhart determine the Luling Water Treatment plant must be expanded to meet the water demand needs of the City of Lockhart and the City of Luling under this contract, the expansion will be at the sole cost and expense of GBRA and/or the City of Lockhart. The City of Luling shall not be required to share in the cost of such expansion as long as its demand for water is within the 2.5 million gallons per day set forth in the 1975 Water Supply Agreement, unless changing regulations require such an expansion to the Luling Water Treatment Plant.

Section 3.4 Allocation of Water During Drought. The sole exception to Section 3.3. a) shall be during conditions of low river flow in which this allocation provision shall apply. During conditions of low river flow when water from the Luling Water Treatment Plant cannot be supplied to meet the demands of both the City of Luling and the City of Lockhart, the parties agree that water actually delivered to both the City of Luling and the City of Lockhart will be

reduced proportionately. The City of Luling grants its consent to such proportionate reduction in water actually delivered only in drought conditions, pursuant to Section 8.1 of the 1975 Water Supply Contract. During such conditions, GBRA agrees to use its best efforts to facilitate the use of alternate water supplies to meet the demands of the City of Luling and the City of Lockhart. The City of Lockhart and the City of Luling agree that the groundwater wells in their water distribution systems shall be maintained in good operating condition, capable of being utilized to serve as backup during periods of drought when the Luling Water Treatment Plant cannot meet the instantaneous demands of the City of Luling or the City of Lockhart.

Section 3.5 **Exclusive Source of Water.** Until all the debt incurred by GBRA relating to the Project is paid in full by the City of Lockhart, the City of Lockhart agrees that it will not pursue or obtain potable surface water from any source other than GBRA and the Water Delivery System without the prior written approval of GBRA. GBRA will not unreasonably withhold approval.

Section 3.6 **Conservation**. The City of Lockhart agrees to implement water conservation and drought management programs applicable to the use of water. The City of Lockhart's water conservation and drought management programs shall, at a minimum, comply with all standards that may be required or minimum standards recommended by the Texas Water Development Board, TCEQ, and GBRA.

Section3.7 **Water Quality**. GBRA makes no representations or warranties concerning the quality of raw water at the Point of Diversion. GBRA will use reasonable diligence and care in treating water delivered to the Luling Water Treatment Plant and will use its best efforts to deliver at the Delivery Point treated water of a quality that conforms to applicable TCEQ standards for potable water.

Section 3.8 **Connection by GBRA**. Connection to the Water Delivery System at the Point of Delivery shall be made by GBRA when the Water Delivery System is completed and operational. Connection shall be made in accordance with plans, specifications, and requirements prepared or adopted by GBRA. The minimum size of the connection will be a 6-inch tap.

As part of the Water Delivery System, GBRA will design, acquire, install, construct, maintain, and operate facilities intended to prevent backflow at the Point of Delivery.

Section 3.9 **Measurement of Water**. GBRA shall install, operate, maintain, and read one or more meters, which shall record the volume of water delivered to the Point of Delivery. GBRA also shall install, operate, maintain, and read one or more meters to record the total amount of treated water supplied into the Water Delivery System from the Luling Water Treatment Plant (the "Treated Water Meters").

GBRA shall keep accurate records of all measurements of water delivered under this Agreement, and the resulting records and measuring device(s) used shall be open for inspection by the Parties at all reasonable times. Measuring devices and recording equipment shall be accessible for periodic adjusting and testing and for the installation of any check meter(s). GBRA shall calibrate its water meter(s) annually. GBRA shall give the City of Lockhart and the City of Luling reasonable notice of the date and time when any such calibration is to be made and, if a representative of the City of Lockhart or the City of Luling is not present at the time set, calibration and adjustment may proceed in the absence of such representatives. The City of Lockhart and the City of Luling shall have access to such metering equipment at all reasonable times, but the reading, calibration, and adjustment thereof shall be done by the employees or agents of GBRA.

Section 3.10 **Reading of Meters**. GBRA shall read all of the meters monthly and will promptly give written notice to the City of Lockhart and the City of Luling of the quantity of water delivered during said month.

ARTICLE IV

BILLING, CHARGES, AND TERMS

Section 4.1 **Charges**. The City of Lockhart acknowledges and recognizes the statutory and contractual duty of GBRA to fix and from time to time to revise (if and when necessary in accordance with the provisions of this Agreement relating to fixing of charges) the charges for services to be rendered and made available to the City of Lockhart hereunder so that

the total amount to be paid by the City of Lockhart shall at all times be not less than an amount sufficient to pay or provide for the payment of all of the following:

(i) principal and interest on any Bond(s) issued to pay for the financing, refinancing, design, permitting, construction, and equipping the Project;

(ii) operation and maintenance of the Water Delivery System;

(iii) operation and maintenance of the Luling Water Treatment Plant;

(iv) reserve and contingency fund payments, if any; and

(v) capital recovery charge.

Section 4.2 **Debt Service Charges.** Any Bonds will be payable from and secured by a pledge of all or a portion of the sums of money to be received by GBRA under this Agreement. Each month, the City of Lockhart shall pay to GBRA 1/12th of the annual debt service on the Bonds plus a debt coverage factor of 10%.

Section 4.3 **Principal and Interest Payments Unconditional.** In order to make the Bonds marketable at the lowest available interest rate, it is to the mutual advantage of all Parties that the City of Lockhart's obligation to make the payments required hereunder be, and the same is hereby, made unconditional. All sums payable hereunder to GBRA shall, so long as any part of the Bonds are outstanding and unpaid, be paid by the City of Lockhart without set-off, counterclaim, abatement, suspension, or diminution, except as otherwise expressly provided herein; and so long as any part of the Bonds is outstanding and unpaid, this Agreement shall not terminate, nor shall the City of Lockhart have any right to terminate this Agreement nor be entitled to the abatement of any payment or any reduction thereof nor shall the obligations hereunder of the City of Lockhart be otherwise affected for any reason, it being the intention of the Parties that so long as any part of the Bonds is outstanding and unpaid, all sums required to be paid by the City of Lockhart to GBRA shall continue to be payable in all events and the obligations of the City of Lockhart hereunder shall continue unaffected, unless the requirement to pay the same shall be reduced or terminated pursuant to an express provision of this Agreement.

Section 4.4 **Water Delivery System Charge.** The Water Delivery System charge shall be paid monthly by the City of Lockhart to GBRA for general and ongoing operation of the Water Delivery System, including regular maintenance and replacement. The Water Delivery System Charge will be calculated by multiplying a delivered water rate expressed in dollars per 1,000 gallons times the greater of: (1) the actual amount of water expressed in thousands of gallons taken by the City of Lockhart at the Point of Delivery during the preceding calendar month or (2) 250,000 gallons per day. The delivered water rate is subject to adjustment by the GBRA Board of Directors on an annual basis, and will be generally calculated by dividing the estimated annual operating and maintenance expenses for the Water Delivery System by the estimated amount of water to be delivered to the City of Lockhart.

Section 4.5 **Luling Water Treatment Plant Charge**. The Luling Water Treatment Plant charge shall be paid monthly by the City of Lockhart to GBRA. The Luling Water Treatment Plant charge will be calculated by multiplying a water treatment rate expressed in dollars per 1,000 gallons times the actual amount of water taken by the City of Lockhart at the Treated Water Meters during the preceding calendar month, expressed in thousands of gallons. The water treatment rate will be generally based on the estimated annual operating budget for the Luling Water Treatment Plant divided by the amount of treated water estimated to be produced by the Luling Water Treatment Plant during the ensuing GBRA fiscal year.

Section 4.6 **Reserve and Contingency Funds**. Reserve and contingency payments shall be paid monthly by the City of Lockhart to GBRA and maintained as required by the Bond Resolution.

Section 4.7 **Capital Recovery Charge.** The City of Lockhart shall pay to GBRA each month, and GBRA shall remit to the City of Luling each month, a capital recovery charge for the use of the Luling Water Treatment Plant. The capital recovery charge for the use of the Luling Water Treatment Plant will be calculated at $0.11 per 1,000 gallons of water actually delivered, to the City of Lockhart at the Treated Water Meters during the preceding calendar month.

Section 4.8 **Billing**. GBRA shall render bills to the City of Lockhart at least once each month for the payments required by this Article IV. GBRA shall, until further notice, render

such bills on or before the fifth day of each calendar month and such bills shall be due and payable by the City of Lockhart on the fifteenth day of each month or ten (10) days after such bill is deposited into the U.S. mail, properly stamped and addressed to the City of Lockhart or delivered to the City of Lockhart by other means acceptable to the City of Lockhart, whichever is later, and thereafter interest shall accrue thereon at the rate of seven percent (7%) per annum until paid in full. By sixty (60) days' written notice to the City of Lockhart, GBRA may change the date by which it shall render bills, and all bills shall thereafter be due and payable ten (10) days after such dates as herein provided. The City of Lockhart shall make all payments in such coin or currency of the United States of America as at the time of payment shall be legal tender for the payment of public and private debts and shall make payment to GBRA at its office in the City of Seguin, Guadalupe County, Texas, or at such other place as GBRA may from time to time designate in writing.

Section 4.9 **Delinquency in Payment**. If the City of Lockhart fails to pay any bill when due and payable, GBRA may give written notice of delinquency to the City of Lockhart and, if all bills due and unpaid, including interest thereon, are not paid within thirty (30) days after delivery of such notice, then the City of Lockhart agrees that GBRA shall be authorized, at its option, to institute suit for collection thereof and to collect any amounts due and unpaid, together with interest thereon and reasonable attorneys' fees; the City of Lockhart further agrees that GBRA may, at its option, discontinue processing and supplying water to the City of Lockhart until all amounts due and unpaid are paid in full with interest as herein specified. Any such discontinuation of service by GBRA shall not, however, relieve the City of Lockhart of its unconditional obligations to make the payments required by this Article IV.

ARTICLE V

ACCOUNTING AND RATES

Section 5.1 **Accounting**. GBRA covenants and agrees that it will maintain books, records, and accounts relating to the financing, design, construction, operation, and maintenance of the Water Delivery System, in keeping with standard accounting practices and the same shall be available for inspection by the City of Lockhart and the City of Luling at reasonable hours

and under reasonable circumstances. GBRA will operate the Water Delivery System on the basis of its fiscal year.

Section 5.2 **Audits**. After the end of its Fiscal Year, GBRA will have its financial records audited by a certified public accountant and shall annually provide the City of Lockhart and the City of Luling a copy of GBRA's Comprehensive Annual Financial Report showing in reasonable detail the financial condition associated with the Water Delivery System as of the close of the Fiscal Year.

Section 5.3 **Annual Rates**. Except as otherwise provided in Section 2.12 above, not later than the 1st day of July of each year that GBRA operates the Water Delivery System, GBRA shall cause to be prepared its tentative operating and maintenance budget and rates for all expenses associated with the Water Delivery System for the next ensuing Fiscal Year, including without limitation all payments for expenses specified in Section 4.1 of this Agreement. A copy of such tentative budget and rates shall be filed with the City Secretaries for the City of Lockhart and the City of Luling. If no protest by the City of Lockhart on such tentative rates is presented to GBRA within thirty (30) days after such filing, the tentative rates shall be considered for all purposes as the rates for the next ensuing Fiscal Year. If a protest is timely filed by the City of Lockhart, the City Manager for the City of Lockhart and the GBRA General Manager shall each appoint three representatives to a committee to meet at a time and place designated by GBRA to consider and agree on final rates for the Water Delivery System. If for any reason the final rates have not been agreed to by the beginning of a Fiscal Year, the rates for the preceding Fiscal Year shall remain in force. If no final agreement on the rates is reached by the ninetieth (90th) day of the new Fiscal Year, the Board of Directors of GBRA shall adopt the tentative rates, or may adopt such amendments thereto as it deems proper. The rates thus adopted by the Board of Directors of GBRA shall be the final rates for the next Fiscal Year. In the event that the City of Lockhart disagree with the final rates, it may pursue any relief available to it under existing law including filing complaints at any administrative agencies with appropriate jurisdiction.

Section 5.4 **Annual Adjustment**. Promptly after the end of each Fiscal Year, all expenses associated with the Luling Water Treatment Plant actually incurred during that Fiscal Year by GBRA and chargeable to the City of Lockhart under Section 4.5 of this Agreement shall

be determined. If the sum of all payments made by the City of Lockhart pursuant to Section 4.5 is less than the amount of the actual expenses associated with the Luling Water Treatment Plant actually incurred during that Fiscal Year by GBRA and chargeable to the City of Lockhart under Section 4.5 of this Agreement, then the City of Lockhart shall pay the amount of such deficiency with the next monthly bill or bills, not to exceed three monthly bills. If the sum of all payments made by the City of Lockhart pursuant to Section 4.5 is more than the amount of actual expenses chargeable to the City of Lockhart, any such excess shall be applied as a credit to the City of Lockhart's next monthly bill or bills.

ARTICLE VI

OPERATION OF THE WATER DELIVERY SYSTEM

Section 6.1 **Standard of Operation**. GBRA shall operate the Water Delivery System in accordance with accepted good business practices, and GBRA agrees to use reasonable diligence and care to hold itself continually ready, willing, and able to render a water supply to the City of Lockhart as provided in this Agreement.

Section 6.2 **Responsibility of Operation**. As among the Parties, GBRA shall be solely responsible for operation of the Water Delivery System, and GBRA shall be an independent contractor in the operation and maintenance of the Water Delivery System

Section 6.3 **Regulatory Action**. The Parties recognize that the obligations of GBRA to render services to the City of Lockhart by operation of the Water Delivery System as provided in this Agreement are subject to all present and future orders, rules, and regulations of relevant regulatory bodies, and the Parties agree to cooperate to make such applications and to take such actions as may be desirable to obtain compliance therewith. In the event additional facilities or improvements are required to adequately treat and supply water in accordance with such orders, rules, regulations, or permits, the Parties will cooperate to determine the additional facilities or improvements that are or may be required. Upon the execution of supplemental contracts, GBRA will authorize and use its best efforts to sell its revenue bonds or other obligations to obtain the necessary capital funds to construct such additional facilities or improvements.

Section 6.4 Contracts by GBRA. GBRA agrees to operate the Water Delivery System initially for the sole use and benefit of the City of Lockhart. GBRA shall have the right, however, to contract with other persons to render services from the operation of the Water Delivery System, with the approval of the City of Lockhart. GBRA shall have the further right to enlarge the size and capacity of the Water Delivery System at its own expense for the use and benefit of other persons with the consent of the City of Lockhart. Such contract with other persons and such enlargements in size and capacity shall not, however, impair the right of the City of Lockhart to receive the quantities of water listed in Section 3.3 of this Agreement, subject to the exceptions articulated in this Agreement, except with the consent of the City of Lockhart. Nothing herein contained, however, shall be construed to release the City of Lockhart from its unconditional obligation to make payments to GBRA as provided in Section 4.2 of this Agreement. No contracts entered into by GBRA under this section shall limit or diminish the right of the City of Luling for water under this Agreement or the 1975 Water Supply Agreement

Section 6.5 Contracts by the City of Lockhart. If GBRA serves additional persons from the Water Delivery System under Section 6.4 of this Agreement and the City of Lockhart determines that it has surplus capacity in the Water Delivery System, the City of Lockhart shall have the right to enter into subcontracts with such other GBRA customers under which the City of Lockhart's excess capacity may be used by such other customers, with the approval of GBRA. The consideration as between or among the City of Lockhart and such other customers of GBRA may be determined by the contracting parties, but no such contract or approval thereof by GBRA shall relieve the City of Lockhart of its primary obligation to GBRA under the terms of this Agreement. No contract entered into by the City of Lockhart under this section shall limit or diminish the rights of the City of Luling for water under this Agreement or the 1975 Water Supply Agreement.

Section 6.6 Additional Users. The Parties agree to seek additional supplies of water for the City of Lockhart and/or other GBRA customers as may be necessary or desirable to maintain the usefulness of the Water Delivery System. In the event that other GBRA customers are provided water, with the City of Lockhart's approval, through the Water Delivery System using capacity allocated to the City of Lockhart, the City of Lockhart and GBRA will determine how much compensation, if any, will be received by the City of Lockhart for use of its capacity

by others in the Water Delivery System. Any such additional users will be required to comply with the water conservation requirements of GBRA.

Section 6.7 Additional Facilities to Serve Exclusively Other Customers. The Parties recognize that GBRA may hereafter be called upon to finance, construct, acquire, and equip facilities to treat and deliver water exclusively for persons other than the City of Lockhart or the City of Luling. In such event, any such facilities shall not constitute a part of the Water Delivery System or the Luling Water Treatment Plant, notwithstanding that they may be physically connected with or to the Water Delivery System or the Luling Water Treatment Plant, or located on properties of the Water Delivery System or the Luling Water Treatment Plant, and the revenues received by GBRA from the use, ownership, operation, lease, or sale of such facilities shall not constitute revenues received by GBRA by reason of its ownership or operation of the Water Delivery System. However, if such facilities are either (i) located on properties of the Water Delivery System or (ii) physically interconnected to the Water Delivery System, then GBRA shall obtain the prior written consent of the City of Lockhart if the approval is related to the Water Delivery System or the City of Luling if the approval is related to the Luling Water Treatment Plant. It is expressly agreed that revenues received by GBRA from the use, ownership, operation, lease, or sale of such facilities shall be available to pay the annual cost of operating and maintaining such facilities and may be pledged and applied to the payment of revenue bonds or other obligations issued by GBRA to construct or acquire and equip such facilities and acquire the sites therefore.

ARTICLE VII

PROJECT REVIEW AND TERMS OF AGREEMENT

Section 7.1 Project Review Committee. GBRA, the City of Luling, and the City of Lockhart agree that representatives from each Party will meet on an annual basis to review operational data, costs, capital improvements, rates, operations, maintenance schedules, and other matters related to the design, permitting, construction, operation, and maintenance of the Water Delivery System.

Section 7.2 **Term and Extension of Term**. The Termination Date for this Agreement shall be 25 years after the Commencement Date, unless such date is extended by written agreement of all Parties, or until all debt incurred by GBRA relating to all aspects of the Water Delivery System is paid in full by the City of Lockhart whichever is later. Not less than five years prior to the Termination Date, the Project Review Committee will address water availability and the possible extension of this Agreement.

Section 7.3 **Termination.** The City of Lockhart may withdraw its execution of this Agreement if it has not been executed by the City of Luling and GBRA by January 1, 2003. The City of Luling may withdraw its execution of this Agreement if it has not been executed by the City of Lockhart and GBRA by January 1, 2003.

Section 7.4 **Rights and Obligations after Termination.** Except as specifically provided otherwise in this Agreement, all of the rights and obligations of the Parties under this Agreement shall expire on Termination of this Agreement, except that Termination of this Agreement shall not affect any rights or liabilities accrued prior to such termination. GBRA will continue to operate the Water Delivery System for the benefit of the City of Lockhart upon Termination of this Agreement.

ARTICLE VIII

OTHER PROVISIONS

Section 8.1 **Consent to Water Lines.** If any water lines or appurtenances relating to the Water Delivery System are located on land now or hereafter owned by the City of Luling or the City of Lockhart or in any present or future roads, streets, alleys, highways, or public places within present or future corporate limits of the City of Luling or the City of Lockhart, the City of Luling and the City of Lockhart hereby consent thereto and hereby grant or agree to grant to GBRA the right, privilege, easement, and right-of-way, or agree to grant a franchise, to use such lands, roads, streets, alleys, highways, or public places for the purpose of maintaining, operating, laying, repairing, and removing such water mains or lines and appurtenances.

Section 8.2 **Force Majeure.** If force majeure prevents any Party from performing any of its obligations under this Agreement (except the unconditional obligation of the City of

Lockhart to make the payments required in this Agreement), in whole or in part, then the obligations of such Party, to the extent affected by such force majeure, shall be suspended during the continuance of any inability so caused, so long as such Party is exercising due diligence to resume performance at the earliest practicable time. As soon as reasonably possibly after the occurrence of the force majeure relied upon, the Party whose contractual obligations are affected thereby shall give notice and full particulars of such force majeure to the other Parties. The term "force majeure," as used herein, shall include, without limitation of the generality thereof, acts of God, strikes, lockouts or other industrial disturbances, acts of the public enemy, acts of terrorism, orders of any kind of government of the United States, the State of Texas, or any civil or military authority, insurrections, riots, epidemics, landslides, lightning, earthquakes, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraint of government and people, civil disturbances, explosions, breakage or accidents to machinery, pipelines, or canals, partial or entire failure of water supplies, and an inability on the part of GBRA to operate the Luling Water Treatment Plant or to supply water under the terms of this Agreement, and any other inability of any Party, whether similar to those enumerated or otherwise, that are not within the control of the Party claiming such inability, and which such Party could not have avoided by the exercise of due diligence and care. It is understood and agreed that the settlement of strikes and lockouts shall be entirely within the discretion of the Party having the difficulty and that the above requirements that any force majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes and lockouts by acceding to the demands of the opposing party or parties when such settlement is unfavorable to it in the judgment of the Party having the difficulty.

Section 8.3 Remedies Upon Default. It is not intended hereby to specify (and this Agreement shall not be considered as specifying) an exclusive remedy for any default, but all such other remedies existing at law or in equity may be availed of by any Party and shall be cumulative. Recognizing, however, that each Party's undertakings herein are obligations, failure in the performance of which cannot be adequately compensated in money damages alone, each Party agrees, in the event of any default on its part, that the other Parties shall have available to them the equitable remedy of specific performance in addition to any other legal or equitable remedy that may also be available to them.

Section 8.4 **No Additional Waiver Implied.** No waiver or waivers of any breach or default (or any breaches or defaults) by any Party hereto of any term, covenant, condition, or liability hereunder, or of performance by any other Party of any duty or obligation hereunder, shall be deemed or construed to be a waiver of subsequent breaches or defaults of any kind, under any circumstances.

Section 8.5 **Redemption of Bonds.** At such time or times as the Bonds, or any of them, are optional for prior redemption, GBRA agrees, upon receipt of a timely request from the City of Lockhart and upon the City's providing sufficient funds to GBRA, to redeem such Bonds or any part thereof as requested by the City of Lockhart in accordance with the provisions of the Bond Resolution.

Section 8.6 **Insurance.** GBRA will at all times keep insured such parts of the Water Delivery System as are usually insured by municipal corporations and political subdivisions in Texas operating like properties in similar locations with a responsible insurance company or companies against risks, accidents, or casualties against which and to the extent that insurance is usually carried out by such municipal corporations and political subdivisions; provided, however, that at any time while any contractor engaged in construction work shall be fully responsible therefore, GBRA shall not be required to carry such insurance. The premiums for such insurance shall be an operating and maintenance expense of Water Delivery System. In the event of any loss or damage, any insurance proceeds shall be used by GBRA to promptly repair or replace the destroyed or damaged portion of the Water Delivery System, or as otherwise directed by an applicable Bond resolution.

Section 8.7 **Address and Notice.** Unless otherwise provided in this Agreement, any notice, communication, request, reply, or advice (herein severally and collectively, for convenience, called "Notice") herein provided or permitted to be given, made, or accepted by any Party to another Party must be in writing and may be given or be served by depositing the same in the U.S. mail postpaid and registered or certified and addressed to the Party to be notified, with return receipt requested, or by delivering the same to an officer of such party, or by prepaid telegram, when appropriate, addressed to the party to be notified. Notice deposited in the mail in the manner hereinabove described shall be conclusively deemed to be effective,

unless otherwise stated in this Agreement, from and after the expiration of four (4) days after it is so deposited. Notice given in any other manner shall be effective only if and when received by the Party notified. For the purpose of notice, the addresses of the parties, until and unless changed as hereinafter provided, shall be as follows:

If to GBRA, to:
Guadalupe-Blanco River Authority
Attention: General Manager
933 East Court Street
Seguin, Texas 78155

If to the City of Lockhart, to:
City of Lockhart
Attention: City Manager
P.O. Box 239
Lockhart, Texas 78644

If to the City of Luling, to:
City of Luling
Attention: City Manager
P.O. Box 630
Luling, Texas 78648

The Parties shall have the right from time-to-time and at any time to change their respective addresses and each shall have the right to specify as its address any other address by at least fifteen (15) days written notice to the other Parties.

Section 8.8 Modification. This Agreement shall be subject to change(s) or modification(s) only with the mutual consent of the governing bodies of each Party hereto.

Section 8.9 Assignability. This Agreement shall not be assignable by any Party without the prior written consent of each of the other Parties.

Section 8.10 Parties in Interest. This Agreement shall be for the sole and exclusive benefit of GBRA, the City of Luling, and the City of Lockhart. GBRA is hereby granted the specific right to assign, mortgage, transfer in trust, pledge, or otherwise hypothecate or encumber the City of Lockhart's obligations to make payments under this Agreement.

Section 8.11 Captions. The captions appearing at the first of each numbered article and section in this Agreement are inserted and included solely for convenience and shall never be considered or given any effect in construing this Agreement, or any provision thereof, or in connection with the duties, obligations, or liabilities of the respective Parties hereto or in ascertaining intent, if any question of intent should arise.

Section 8.12 Severability. The provisions of this Agreement are severable, and if any provision or part of this Agreement or the application thereof to any person or circumstance shall ever be held by any court of competent jurisdiction to be invalid or unconstitutional for any reason, the remainder of this Agreement and the application of such provision or part of this Agreement to other persons or circumstances shall not be affected thereby.

Section 8.13 Merger. Other than the 1975 Water Supply Agreement between GBRA and the City of Luling, this Agreement constitutes the entire agreement among the parties relative to the subject matter hereof. There are no oral agreements, covenants, representations, or warranties among the parties concerning the subject matter of this agreement. Unless specifically modified in this Agreement, nothing in this paragraph shall serve to supercede or otherwise affect the terms of the 1975 Water Supply Agreement between GBRA and the City of Luling. IN WITNESS WHEREOF, the Parties hereto have executed this Agreement in six copies, each of which shall be deemed to be an original, as of the 11th day of DEC., 2002.

GUADALUPE-BLANCO RIVER AUTHORITY

By _____
W. E. West, Jr.
General Manager

ATTEST:

By _____

(SEAL)

CITY OF LULING, TEXAS

By_____
The Honorable Mike Hendricks
Mayor, City of Luling, Texas

ATTEST:

By_____
City Secretary, City of Luling, Texas

(SEAL)

APPROVED IN WRITING AS TO FORM
BEFORE EXECUTION AND DELIVERY:

By_____
City Attorney, City of Luling, Texas

CITY OF LOCKHART, TEXAS

By_____
The Honorable Ray Sanders
Mayor, City of Lockhart, Texas

ATTEST:

By_____
City Secretary, City of Lockhart, Texas

(SEAL)

APPROVED IN WRITING AS TO FORM
BEFORE EXECUTION AND DELIVERY:

By_____
City Attorney, City of Lockhart, Texas

THE STATE OF TEXAS §

COUNTY OF GUADALUPE §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared William E. West, Jr., known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the GUADALUPE-BLANCO RIVER AUTHORITY, a conservation district and political subdivision, and that he executed the same as the act of such conservation district and political subdivision for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 11 day of December, 2002.

SUSAN K. COCHRAN
Notary Public
State of Texas
Comm. Exp. 10-10-2004

(Seal)

Susan K. Cochran
Notary Public
The State of Texas

THE STATE OF TEXAS §

COUNTY OF Caldwell §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared _____, Ray Sanders, Mayor, City of Lockhart, Texas, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 2nd day of December, 2002.

JACQUE STAHL
MY COMMISSION EXPIRES
January 31, 2006

(Seal)

Jacque Stahl
Notary Public
The State of Texas

THE STATE OF TEXAS §

COUNTY OF Caldwell §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared _____, Mike Hendricks, Mayor, City of Luling, Texas, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 5th day of December, 2002.

Annie Gonzales
Notary Public
The State of Texas

(Seal)

ANNIE GONZALES
NOTARY PUBLIC
STATE OF TEXAS
My Commission Expires 10-17-2004

September 25, 2013

Vance Rodgers
City Manager
City of Lockhart
P.O. Box 239
Lockhart, TX 78644

Dear Mr. Rodgers:

Enclosed please find a fully executed copy of the First Amendment to Water Supply Agreement Between the Guadalupe-Blanco River Authority, City of Lockhart, Texas and City of Luling, Texas.

Sincerely,

Darel Ball
Division Manager, Hays Caldwell Counties

Enc.

Main Office: 933 East Court Street ~ Seguin, Texas 78155
830-379-5822 ~ 800-413-4130 ~ 830-379-9718 fax ~ www.gbra.org

GBRA Guadalupe-Blanco River Authority
flowing solutions

FIRST AMENDMENT TO WATER SUPPLY AGREEMENT BETWEEN THE GUADALUPE-BLANCO RIVER AUTHORITY, CITY OF LOCKHART, TEXAS, AND CITY OF LULING, TEXAS

This is the First Amendment ("First Amendment") to the Water Supply Agreement dated December 11, 2002 (the "Agreement") between the Guadalupe-Blanco River Authority, a conservation and reclamation district and political subdivision of the State of Texas ("GBRA"), the City of Lockhart, Texas ("Lockhart"), and the City of Luling, Texas ("Luling").

WHEREAS, subject to GBRA's requirement to meet the City of Luling's treated water demands first, the Agreement provides that GBRA will use good faith efforts to deliver to the City of Lockhart up to 1.0 MGD of treated water from the Luling Water Treatment Plant; and

WHEREAS, the Agreement provides for a Capital Recovery Charge that will be charged to Lockhart and the funds from such charge which will be remitted to Luling; and

WHEREAS, Lockhart and Luling have agreed that the Zedler Mill Dam located downstream of the Luling Water Treatment Plant is a valuable environmental, recreational, and drinking water asset; and

WHEREAS, Lockhart and Luling further agree that the Zedler Mill Dam is in need of repairs; and

WHEREAS, Lockhart has agreed to provide some funding for the Zedler Mill Dam repairs through an increase in the Agreement's Capital Recovery Charge.

NOW THEREFORE, in consideration of the mutual promises and obligations set forth in the 2002 Agreement, GBRA, Lockhart, and Luling agree to amend the 2002 Agreement as follows:

Section 4.7 Capital Recovery Charge – Section 4.7 shall be changed in its entirety to read:

The City of Lockhart shall pay to GBRA each month, and GBRA shall remit to the City of Luling each month, a capital recovery charge for the use of the Luling Water Treatment Plant. The base amount of the capital recovery charge for the use of the Luling Water Treatment Plant will be calculated at $0.11 per 1,000 gallons of water actually delivered, to the City of Lockhart at the Treated Water Meters during the preceding calendar month. Additionally, in order to assist Luling with the cost of repairs to the Zedler Mill Dam, GBRA shall charge Lockhart and remit to Luling a "supplemental capital recovery charge" of $0.04 per 1,000 gallons of water actually delivered to the City of Lockhart at the Treated Water Meters during the preceding calendar month. Such "supplemental capital recovery charge" shall commence on October 1, 2013 and shall terminate on December 1, 2027.

All Other Terms Remain in Force and Effect GBRA, Lockhart and Luling INTEND AND AGREE that all other terms and conditions of the 2002 Agreement not expressly amended by this First Amendment, shall remain in full force and effect. If there is a conflict between terms and conditions in this First Amendment and the 2002 Agreement, the terms and conditions of this First Amendment control. This First Amendment shall be executed in triplicate counterparts, each of

which shall constitute an original and is effective on the latest date it is signed below by the respective authorized representatives of Lockhart, Luling and GBRA.

City of Lockhart, Texas
Signed on September 3rd, 2013

By Lew White
Mayor – City of Lockhart

City of Luling, Texas
Signed on September 12, 2013

By
Mayor – City of Luling

Guadalupe-Blanco River Authority
Signed on September 23, 2013

By
General Manager - GBRA

THE STATE OF TEXAS §

THE COUNTY OF CALDWELL §

BEFORE ME, the undersigned authority, personally appeared **Lew White**, Mayor of the City of Lockhart, Texas personally known or identified to me as the person and officer whose name is subscribed to this instrument. He acknowledged to me that he executed this instrument for the purpose and consideration expressed in it and in his capacity as the authorizing representative of the City of Lockhart, Texas.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 3rd day of September 2013.

(SEAL)

JULIE MLADENKA BOWERMON
My Commission Expires
April 26, 2015

Julie Bowerman
Notary Public
The State of Texas

THE STATE OF TEXAS §

THE COUNTY OF CALDWELL §

BEFORE ME, the undersigned authority, personally appeared **Mike Hendricks**, Mayor of the City of Luling, Texas personally known or identified to me as the person and officer whose name is subscribed to this instrument. He acknowledged to me that he executed this instrument for the purpose and consideration expressed in it and in his capacity as the authorizing representative of the City of Luling, Texas.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 12th day of September 2013.

(SEAL)

MARTHA C VELASQUEZ
Notary Public, State of Texas
My Commission Expires
February 06, 2014

Martha C. Velasquez
Notary Public
The State of Texas

THE STATE OF TEXAS §

COUNTY OF GUADALUPE §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared **W.E. West, Jr.**, General Manager of the Guadalupe-Blanco River Authority, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the Guadalupe-Blanco River Authority, and that he executed the same for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 23rd day of September, 2013.

(SEAL)

Christy S. Dietert

Notary Public
The State of Texas

CITY OF Lockhart

(512) 398-3461 • FAX (512) 398-5103
P.O. Box 239 • Lockhart, Texas 78644

August 14, 2013

COPY

Mayor Mike Hendricks
City of Luling
509 East Crockett Street
Luling, Texas 78648

Dear Mayor Hendricks:

The Lockhart City Council agreed on August 6, 2013, to increase the current capital fee paid to the City of Luling from 11 to 15 cents per one thousand gallons of treated water delivered to Lockhart through December of 2027. Based on prior history, the total of payments to the City of Luling for the water delivered to Lockhart will be about $56,000 per year beginning with October of 2013 water pumping amounts.

We readily realize the importance of the Zedler Dam to the City of Luling for its valuable environmental and recreational attributes, and of course as the main drinking water source for Luling. We also recognize that the dam repairs must be done to protect Luling's valuable asset. The City of Lockhart cannot contribute cash directly to the required dam repairs since it does not own any portion of that asset, but Council voted to help with a portion of the capital debt payments for the money borrowed for the project.

This letter serves as a commitment based Council's action on August 6, 2013, for the City of Lockhart to increase the current capital payments made to the City of Luling by 4 cents per one thousand gallons of water delivered to the City of Lockhart via the Lockhart water transmission main through December, 2027, or as may be amended in agreement of both parties. Billing will be through a GBRA monthly invoice at 15 cents per one thousand gallons delivered to Lockhart as is done now; GBRA then writes a check to the City of Luling.

I hope things are well with you and the City of Luling.

Best regards,

Lew White
Mayor

WATER SUPPLY AGREEMENT
BETWEEN
GUADALUPE BLANCO RIVER AUTHORITY
CITY OF LOCKHART TEXAS
CITY OF LULING TEXAS

Section 47 Capital Recovery Charge

The City of Lockhart shall pay to GBRA each month and GBRA shall remit to the City of Luling each month a capital recovery charge for the use of the Luling Water Treatment Plant The capital recovery charge for the use of the Luling Water Treatment Plant will be calculated at 0.11 per 1000 gallons of water actually delivered to the City of Lockhart at the Treated Water Meters during the preceding calendar month.

Section 72 Term and Extension of Term

The Termination Date for this Agreement shall be 25 years after the Commencement Date (Dec 11, 2002) unless such date is extended by written agreement of all Parties or until all debt incurred by GBRA relating to all aspects of the Water Delivery System is paid in full by the City of Lockhart whichever is later Not less than five years prior to the Termination Date the Project Review Committee will address water availability and the possible extension of this

CITY OF Lockhart

(512) 398-3461 • FAX (512) 398-5103
P.O. Box 239 • Lockhart, Texas 78644

August 14, 2013

COPY

Mayor Mike Hendricks
City of Luling
509 East Crockett Street
Luling, Texas 78648

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We readily realize the importance of the Zedler Dam to the City of Luling for its valuable environmental and recreational attributes, and of course as the main drinking water source for Luling. We also recognize that the dam repairs must be done to protect Luling's valuable asset. The City of Lockhart cannot contribute cash directly to the required dam repairs since it does not own any portion of that asset, but Council voted to help with a portion of the capital debt payments for the money borrowed for the project.

This letter serves as a commitment based Council's action on August 6, 2013, for the City of Lockhart to increase the current capital payments made to the City of Luling by 4 cents per one thousand gallons of water delivered to the City of Lockhart via the Lockhart water transmission main through December, 2027, or as may be amended in agreement of both parties. Billing will be through a GBRA monthly invoice at 15 cents per one thousand gallons delivered to Lockhart as is done now; GBRA then writes a check to the City of Luling.

I hope things are well with you and the City of Luling.

Best regards,

Lew White
Mayor

E.2 - CARRIZO PROJECT AGREEMENT

GONZALES CARRIZO WATER SUPPLY PROJECT
TREATED WATER SUPPLY AGREEMENT
BY AND BETWEEN
THE GUADALUPE-BLANCO RIVER AUTHORITY AND
CITY OF LOCKHART

This Gonzales Carrizo Water Supply Project Treated Water Supply Agreement ("Agreement") is made and entered into by and between the Guadalupe-Blanco River Authority ("GBRA"), a Texas conservation and reclamation district organized under Article 16, Section 59 of the Texas Constitution, and City of Lockhart ("Customer"), a municipal corporation, (collectively, the "Parties"). The Effective Date of this Agreement is February 13, 2018.

RECITALS

GBRA has leased the right to produce groundwater from 42,000 acres of land in Gonzales and Caldwell counties, Texas.

GBRA is authorized by the Gonzales County Underground Water Conservation District, pursuant to Production and Transportation Permit No. 01-13-01 to produce and transport out of the District up to 15,000 acre-feet of leased groundwater from the land leased by GBRA, subject to the restrictions and limitations in Production and Transportation Permit No. 01-13-01.

GBRA is financing the acquisition of groundwater leases and the construction of facilities to pump, treat, and transport the groundwater from the well fields in Gonzales and Caldwell counties to the Customer.

GBRA intends to contract with Alliance Regional Water Authority to jointly construct, operate, and co-own groundwater treatment and transportation facilities to treat and transport the groundwater for GBRA and Alliance, and GBRA anticipates such joint construction and co-ownership will reduce the cost of the Project (as defined in Article I) and of Alliance's groundwater project.

GBRA anticipates completing the construction of the Project in 2023.

The Customer has determined that it needs an additional source of water to meet its retail water demands in the future.

The Customer has determined that obtaining water from the Project is in the best interest of the Customer.

GBRA and the Customer anticipate there will be other customers who will obtain water from the Project and because of the unique circumstances of each customer, the agreements regarding the Project and the supply of water may not be identical.

The Customer acknowledges that District Fees and Groundwater Lease Payments will begin in January 2019, before the construction of the Project is completed and delivery of water from the Project has commenced, and, at that time, the Customer may be required pursuant to Section 4.4(a) to begin paying the Gonzales Carrizo Water Charge, which will be based only on those costs being incurred by GBRA.

AGREEMENT

For and in consideration of the mutual promises, covenants, obligations, and benefits described in this Agreement, and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, GBRA and the Customer agree as follows:

ARTICLE I
DEFINITIONS

"Alliance Regional Water Authority" or "Alliance" means the regional water authority created and operating under Texas Special District Local Laws Code Chapter 11010.

"Annual Commitment" means 3,000 acre-feet of treated water per year which GBRA agrees to produce for the Customer and the Customer agrees to purchase pursuant to this Agreement.

"Authorized Area of Use" means the Customer's retail water service area as it may exist from time to time.

"Bonds" means all bonds and other obligations issued, executed, and outstanding from time to time to finance or refinance the cost to acquire groundwater leases, and the cost to plan, design, construct, acquire, repair, improve, and upgrade the Gonzales Carrizo Water Supply Project, including without limitation of the generality of the foregoing, any costs necessary or desirable to maintain or increase capacity of the Project to 15,000 acre-feet per year and comply with applicable laws, rules, and regulations.

"District" means the Gonzales County Underground Water Conservation District.

"District Fees" means the fees charged by the District, as amended by the District from time to time, to pump and transport groundwater, including but not limited to permit fees, export fees, monitoring agreement fees, and export fee surcharges related to a mitigation agreement with the District.

"Effective Date" means the date identified in the preamble paragraph of this Agreement, being the same date that the later of GBRA or the Customer signs and enters into this Agreement.

"Fiscal Year" means September 1 to August 31 or such other 12-month period as determined by GBRA.

"Gonzales Carrizo Water Supply Project" or "Project" means the project described in Section 2.1 of this Agreement.

"Groundwater Lease Payments" means the payments for the right to produce 15,000 acre-feet of groundwater from land leased by GBRA in Gonzales and Caldwell counties, 3,000 acre-feet of which are for the Customer; such lease payments shall be subject to an annual consumer price index increase as reflected in the groundwater leases.

"Operation, Maintenance, and Administrative Expenses" means the reasonable, necessary, and actual costs incurred by GBRA for the operation, maintenance, and administration of the Project, including without limitation:

(a) wages and salaries, employee benefits, chemicals, the purchase and carrying of stores, materials, and supplies, power, supervision, engineering, testing, auditing, franchises, waste disposal charges and assessments, claims, insurance, contract operators and all other items and expenses of a like or different nature reasonably required for the efficient maintenance and operation of the Project and the performance of this Agreement;

(b) repairs and replacements of damaged, worn-out or obsolete parts or facilities of the Project, and any relocations of pipelines, or replacements of wells;

(c) improvements and betterments to keep the Project in operation to render adequate service to the Customer and other customers of the Project and to comply with the requirements of any rule, regulations, or permit issued by any regulatory body having jurisdiction; and

(d) the reasonable and necessary costs of GBRA's administration of the Project, which shall be based upon a formula, to be set by the Board of Directors of GBRA in the annual budget of GBRA, that fairly apportions GBRA's administration costs.

"Permit" means Gonzales County Underground Water Conservation District's Production and Transportation Permit No. 01-13-01, as it may be amended from time to time.

"Point of Delivery" means the point or points at which GBRA will deliver to the Customer the Annual Commitment, as agreed to by the Customer and which will be generally described in Exhibit A attached hereto and incorporated herein for all purposes.

ARTICLE II
GONZALES CARRIZO WATER SUPPLY PROJECT

2.1 Description of the Gonzales Carrizo Water Supply Project. The Gonzales Carrizo Water Supply Project primarily consists of groundwater leases for the Carrizo Aquifer water in Gonzales and Caldwell counties, facilities to pump, treat, and convey groundwater in and from Gonzales and Caldwell counties, including but not limited to water treatment plant(s) and associated facilities, and facilities to convey treated water through and to Gonzales, Guadalupe, Caldwell, Hays, and Comal counties. The Project may also include storage and blending facilities, and other facilities necessary or desirable for the supply of treated water to GBRA customers. The Project also includes all lands and interests in lands necessary and desirable for the construction, operation, and maintenance of the Project facilities.

2.2 GBRA Responsibilities and Ownership.

(a) GBRA shall own the Project, including all of the facilities and interest in the land comprising the Project, and shall be responsible for the operation, maintenance, design, permitting, financing, construction, expansions, extensions, and other modifications to the Project to provide a long-term water supply on behalf of the Customer and other Project participants. GBRA may co-own the Project with other water suppliers.

(b) GBRA will seek financing through the Texas Water Development Board and issue Bonds to finance the Project. Thereafter, GBRA may issue Bonds in the future, at the times and in the amounts determined by GBRA, to refinance the Project and to repair, extend and improve the Project as deemed necessary by GBRA, provided, however, in no event shall GBRA issue Bonds to refinance the Project which would extend the final maturity of any outstanding Bonds (and which would result in the extension of the Termination Date of this Agreement pursuant to Section 6.1(c) hereof) unless it receives the prior written consent of the Customer, which shall not be unreasonably withheld, and all other customers that would be similarly affected.

2.3 Contingency.

(a) Notwithstanding any other requirements in this Agreement, this Agreement is contingent on GBRA obtaining financing for the acquisition and construction of the Project.

(b) If, by July 1, 2018, GBRA and Alliance have not executed a contract for the joint construction, operation, and co-ownership of facilities to treat and transport GBRA's and Alliance's groundwater, the Parties may renegotiate the Customer's participation in the Project.

2.4 Customer Operational Meetings and Bond Consultation.

(a) At least once each quarter of the year, GBRA shall hold a meeting with the Customer and all other customers of the Project to provide information to and obtain information from the Customer regarding the operation and maintenance of the Project, the rates and charges for the Project, water supply matters, District matters, any operating or debt service reserve fund that GBRA reasonably expects will be created or funded pursuant to Section 4.1 within the next quarter, and other matters related to the Project. The Customer, by written notice to GBRA, may waive the meeting for any quarter of the year.

(b) Before issuing any Bonds for the Project, GBRA shall consult with the Customer regarding the need to issue Bonds, and the structure and terms of the Bonds. GBRA shall consider any issues or concerns raised by the Customer; however, subject to the requirements of Section 2.2(b) and 4.1, GBRA shall have the sole authority to issue Bonds, and to determine the structure, terms, and timing of the Bonds.

(c) No earlier than sixty (60) days before the Notice of Rate Change provided by Section 4.5, but no later than fifty (50) days before such notice, GBRA will provide the Customer with a draft budget for the next fiscal year. The Customer may provide comments on that draft budget, which GBRA will consider in the development of the final budget.

2.5 Future Water Supply Projects. GBRA will notify the Customer of any GBRA project to develop additional phases of the Mid-Basin Water Supply Project so that the Customer has a reasonable opportunity to participate and purchase water from such project.

ARTICLE III
WATER QUANTITY AND DELIVERY

3.1 Quantity. GBRA shall sell to the Customer and the Customer shall purchase the Annual Commitment per year. Payments for the Annual Commitment shall be made pursuant to Section 5.1 of this Agreement and shall include the charges described in Article IV. GBRA will deliver up to the Annual Commitment, less de minimis losses associated with the transmission and treatment of the water, to the Customer's Point of Delivery. Notwithstanding the foregoing, GBRA's obligation to deliver up to the Annual Commitment to the Customer is subject to any restrictions and limitations in the Permit, and in any financing requirements associated with the Project. On or before July 1 of each year, the Customer shall notify GBRA in writing the amount of the Annual Commitment the Customer estimates it will need during the next Fiscal Year. The purpose of the notification is to allow GBRA to prepare its operational budget for the next Fiscal Year and effectively plan for the next Fiscal Year's water supply demands, however, the estimate is not intended to obligate the Customer to take the estimated amount or to limit the Customer to the estimated amount, nor is the Customer's failure to communicate the estimate by the deadline a breach of this Agreement. The Customer agrees to communicate with GBRA on a regular basis to inform GBRA of the Customer's water supply requirements from the Project.

3.2 Quality. GBRA shall deliver to the Point of Delivery water of a quality that meets or exceeds the drinking water standards of the Texas Commission on Environmental Quality, or its successor agency, or any other applicable regulatory agency for potable water and using a disinfection method that makes the water suitable for blending with the Customer's other water supplies.

3.3 Source of Water. The water GBRA treats for delivery to the Customer under this Agreement may be from any source or combination of sources that may be available to GBRA, including, without limitation, groundwater, surface water from Canyon Reservoir under GBRA's Certificate of Adjudication 18-2074, run-of-river flows of the Guadalupe River or its tributaries under existing, amended or new water rights, and water obtained from sources other than surface waters of the Guadalupe River Basin.

3.4 Purpose of Use. Treated water delivered to the Customer under this Agreement may only be used for municipal and industrial use. No water delivered to the Customer under this Agreement may be used outside the boundaries of the Authorized Area of Use without prior written consent by GBRA, such consent shall not be unreasonably withheld. No water delivered to the Customer under this Agreement may be used to irrigate any golf course, unless it is first beneficially used for drinking water purposes.

3.5 Rate of Delivery. GBRA agrees to make the water available to the Customer under this Agreement in the amounts required by the Customer up to a rate of delivery of water which shall not exceed 1,860 gallons per minute at any instant in time. The Customer acknowledges that delivery of water at such a rate constantly throughout a calendar year would result in delivery of the Annual Commitment less de minimis losses, expected to be 1% or less during that year.

3.6 Measuring Equipment.

(a) Water Meter. GBRA shall furnish and install a meter or other equipment and devices at the Point of Delivery to measure quantity of water delivered under this Agreement (the "Water Meter"). The Water Meter shall remain the property of GBRA. GBRA shall operate and maintain the Water Meter in good operating condition. GBRA shall provide the Customer with written notice at least ten (10) days in advance of any replacement of the existing Water Meter. The written notice will include a description of the new Water Meter that will be installed.

(b) Meter Reading. The reading, calibration and adjustment of the meters described in this Section 3.6 shall be done only by the employees or agents of GBRA. The results of each reading of the Water Meter shall be recorded in a journal or other record book maintained in GBRA's office and representatives of the Customer may inspect the same at any time during reasonable business hours.

(c) Meter Calibration. GBRA will calibrate the Water Meter at least annually. GBRA shall give the Customer reasonable notice of the date and time when any such

calibration shall occur, and at the request of the Customer, conduct the calibration in the presence of the Customer. In addition to the annual calibration, the Customer shall have the right to request that GBRA calibrate the Water Meter not more than once in each year, in the presence of a representative of the Customer. If, upon any test, the percentage of inaccuracy of any metering equipment is found to be in excess of five percent (5%), the registration thereof shall be corrected, and accounts adjusted, for a period extending back to the time when such inaccuracy began, if such time is ascertainable; and if such time is not ascertainable, then for a period extending back one-half (1/2) of the time elapsed since the last date of calibration, but in no event further back than a period of six (6) months. If, for any reason, the Water Meter is out of service or out of repair so that the amount of water delivered cannot be ascertained or computed from the reading thereof, the water delivered through the period Water Meter is out of service or out of repair shall be estimated and agreed upon by the Parties hereto upon the basis of the best data available. For such purpose, the best data available shall be deemed to be the registration of any check meter or meters if same have been installed and are accurately registering. Otherwise, the amount of water delivered during such period may be estimated (a) by correcting the error if the percentage of the error is ascertainable by calibration tests or mathematical calculation, or (b) by estimating the quantity of water delivered by deliveries during the preceding period under similar conditions when the Water Meter was registering accurately.

3.7 Title to and Responsibility for Water. Title to and responsibility for all water made available by GBRA under this Agreement shall be in GBRA to the Point of Delivery, at which point title shall pass to the Customer. The Customer and GBRA hereby agree to save and hold each other harmless from all claims, demands, and causes of action which may be asserted by anyone on account of the transportation, storage, delivery, processing and handling of such water while title to and responsibility for the water remains in the other Party.

3.8 Reuse and Resale. The Customer agrees that, at all times during the term of this Agreement, it shall not engage in, or seek regulatory approval to engage in, indirect reuse of water delivered to the Customer under this Agreement, unless the Customer and GBRA expressly agree to allow indirect reuse and prescribe the terms thereof in writing. As used in this subsection, "indirect reuse" as used herein means the use for one or more beneficial purposes of the water remaining after initial use at the time or after that water is discharged into a watercourse, lake, or other body of state-owned water. The Customer shall not resell water delivered to the Customer under this Agreement on a wholesale basis to any third party without GBRA's prior written consent, which shall not be unreasonably withheld. Notwithstanding the foregoing, the Customer shall not execute any wholesale water supply contract that will jeopardize the tax exempt status of the Bonds issued for this Project. Nothing in this Agreement shall impair the Customer's ability to directly reuse water delivered to the Customer under the terms of this Agreement.

3.9 Connection by GBRA; Responsibilities of Customer.

(a) Connection of the Customer's water system to the Project at the Point of Delivery shall be made by GBRA at the completion of the construction of the Project. Connection shall be made in accordance with the plans, specifications, and requirements prepared and adopted by GBRA and shall be accomplished by GBRA setting the Water Meter

and physically tying it to the Customer's water system at the Point of Delivery. GBRA will own, operate, and maintain the connecting facilities at the Point of Delivery.

(b) The Customer shall construct, maintain, and operate at its own cost and expense, all facilities and equipment necessary to receive and take the treated water delivered under this Agreement. Any facilities and equipment connecting to the Project must be constructed with an air gap connection meeting GBRA's standard specifications.

3.10 Allocation of Water During Shortage. During conditions beyond GBRA's control when water cannot be supplied to meet the demands of all customers, the water to be distributed shall be divided among all customers of the Project, pro rata, according to the amount each may otherwise be entitled under their respective contracts with GBRA, subject to reasonable conservation and drought management plans and requirements based on particular purposes of use of the water, so that preference is given to no one and everyone suffers alike.

ARTICLE IV
RATES AND CHARGES

4.1 Gonzales Carrizo Debt Service Charge.

(a) The Gonzales Carrizo Debt Service Charge is the amount to be charged to the Customer during each Fiscal Year equal to the portion of the total principal and interest requirements on all outstanding Bonds due during such Fiscal Year, plus a coverage factor not to exceed 10% of such portion, that is allocated to the Customer by GBRA in accordance with this Section and to be paid pursuant to the provisions of all applicable bond resolutions. Such allocation shall be based on the percentage equal to the Customer's Annual Commitment divided by the annual commitment of all customers that enter into an agreement with GBRA to receive water from the Project (the "Customer's Pro Rata Portion") and taking into account preferences the Customer elects to exercise with respect to the structure of the debt service for each series of Bonds which differ from the structure of any other customer that enters into a similar agreement with GBRA to receive water from the Project, if any. The Gonzales Carrizo Debt Service Charge charged to the Customer, together with the similar charge that is charged to all other customers that receive water from the Project (but excluding the not to exceed 10% coverage amount charged to all customers), shall be sufficient to cover the annual debt service requirements on the Bonds during each Fiscal Year. Following the delivery of a series of Bonds, GBRA shall provide the Customer with a schedule showing the Gonzales Carrizo Debt Service Charge for all outstanding Bonds to be paid by the Customer that will be applicable for each Fiscal Year following the delivery of such series of Bonds. GBRA expects that such schedule will not change unless additional Bonds are issued or additional funds are required to fund deposits into a reserve account related to the Bonds (as described in Section 4.1(b) below), but GBRA reserves the right to modify such schedule to correct any ambiguities or mistakes or account for any other changes deemed necessary and appropriate.

(b) In the event it becomes necessary for GBRA to make deposits into an operating or debt service reserve fund established pursuant to a resolution authorizing a series of Bonds which will not be funded with proceeds of a series of Bonds, GBRA shall promptly notify

the Customer of such event, and the Gonzales Carrizo Debt Service Charge charged to the Customer shall thereafter be adjusted for each applicable Fiscal Year by an amount equal to the Customer's Pro Rata Portion of the additional amount required to be deposited into such operating or debt service reserve fund.

4.2 Gonzales Carrizo Water Rate and Charge.

(a) The Gonzales Carrizo Water Rate is the rate per acre-foot of treated water determined by the Board of Directors of GBRA to then be in effect for the commitment of capacity in the Project. Subject to Section 4.5, the GBRA Board of Directors may at any time and from time to time change the Gonzales Carrizo Water Rate. The Gonzales Carrizo Water Rate shall be sufficient to cover Groundwater Lease Payments, the District Fees, and the fixed Operation, Maintenance, and Administrative Expenses of the Project, as those payments, fees, and expenses are incurred.

(b) The Gonzales Carrizo Water Charge is equal to the Gonzales Carrizo Water Rate multiplied by the Annual Commitment.

4.3 Gonzales Carrizo Delivery Rate and Charge.

(a) The Gonzales Carrizo Delivery Rate is the rate per 1000 gallons of water determined by the GBRA Board of Directors to then be in effect for the delivery of water through the Project. Subject to Section 4.5, the GBRA Board of Directors at any time and from time to time may change the Gonzales Carrizo Delivery Rate. The Gonzales Carrizo Delivery Rate shall be sufficient to cover variable Operation, Maintenance, and Administrative Expenses related to the delivery of water through the Project that are not otherwise included in the Gonzales Carrizo Water Rate or the Gonzales Carrizo Debt Service Charge.

(b) The Gonzales Carrizo Delivery Charge per month shall be calculated by multiplying the amount of Project water, expressed in thousands of gallons, delivered in the month to the Customer at the Point of Delivery as measured by the Water Meter by the then-current Gonzales Carrizo Delivery Rate.

4.4 Commencement of Payments.

(a) The assessment of the Gonzales Carrizo Water Charge shall commence the month that GBRA begins paying any Groundwater Lease Payments, District Fees, or any Operation, Maintenance, and Administrative Expenses of the Project, whichever is earlier, on the Project from funds other than Bond proceeds.

(b) The assessment of the Gonzales Carrizo Delivery Charge shall commence the month that GBRA begins to supply water to the Customer through the Project.

4.5 Notice of Rate Change. If GBRA desires to adjust the Gonzales Carrizo Debt Service Charge, the Gonzales Carrizo Water Rate, or the Gonzales Carrizo Delivery Charge, it shall, at least sixty (60) days before the first day on which such adjustment is to become

effective, give written notice to the Customer; however, the failure to provide such notice shall not invalidate the adjusted charge or rate.

ARTICLE V
PAYMENT OF CHARGES

5.1 Billing and Payment. GBRA will render bills to the Customer once each month for the payments required by this Agreement. GBRA will bill the Customer and the Customer shall pay GBRA one-twelfth of the Gonzales Carrizo Debt Service Charge and the Gonzales Carrizo Water Charge each month during the year. GBRA will bill the Customer and the Customer shall pay the Gonzales Carrizo Delivery Charge each month during the year. Any prepayments shall be shown on the bill as a credit. GBRA shall, until further notice, render such bills on or before the 10th day of each month and such bills shall be due and payable at GBRA's office indicated below by the 20th day of each month or fifteen (15) days after such bill is deposited into the United States mail, properly stamped, addressed and postmarked to the Customer, whichever is later. GBRA may, however, by sixty (60) days written notice, change the monthly date by which it shall render bills, and all bills shall thereafter be due and payable ten (10) days after such date or fifteen (15) days after such bill is deposited into the United States mail, properly stamped, addressed and postmarked to the Customer, whichever is later. The Customer shall make all payments in such coin or currency of the United States of America as at the time of payment shall be legal tender for the payment of public and private debts and shall make payment to GBRA at its office in Seguin, Texas, or at such other place as GBRA may from time to time designate by sixty (60) days written notice.

5.2 Source of Payments. The Parties agree and the Customer represents and covenants that all moneys required to be paid by the Customer under this Agreement shall constitute reasonable and necessary operating expenses of the Customer's water utility system ("Customer's System"), as authorized by the Constitution and the laws of the State of Texas. All payments required to be made by the Customer to GBRA under this Agreement shall be payable from income of the Customer's System. GBRA shall never have the right to demand payment by the Customer of any obligations assumed by or imposed upon it under or by virtue of this Agreement from funds raised or to be raised by taxation and the Customer's obligation under this Agreement shall never be construed to be a debt of the Customer of such kind as to require it under the Constitution and the laws of the State of Texas to levy and collect a tax to discharge such obligation.

5.3 Payments Unconditional. The Customer recognizes that any debt instruments relating to the Project, including the Bonds, will be payable from and secured by pledges of the sums of money to be received by GBRA from the Customer under this Agreement and from other customers under similar contracts. In order to make such debt instruments marketable at the lowest available interest rate, it is to the mutual advantage of GBRA and the Customer that the Customer's obligation to make the payments required hereunder be, and the same is hereby, made unconditional. So long as any part of such debt instruments are outstanding and unpaid, all sums payable hereunder to GBRA shall be paid by the Customer without set-off, counterclaim, abatement, suspension or diminution. So long as any part of such debt instruments are

outstanding and unpaid, the Customer shall have no right to terminate this Agreement or be entitled to the abatement of any payment or any reduction thereof, and the obligations hereunder of the Customer shall not be otherwise affected for any reason (including but not limited to the inability of GBRA to deliver water under this Agreement), it being the intention of the Parties that, so long as any portion of such debt instruments are outstanding and unpaid, all sums required to be paid by the Customer to GBRA shall continue to be payable in all events and the obligations of the Customer hereunder shall continue unaffected, unless the requirement to pay the same is reduced or terminated pursuant to an express provision of this Agreement. It is specifically provided, however, that this Section shall not prevent the Customer from exercising any rights related to breach of this Agreement by GBRA.

5.4 Covenant to Maintain Sufficient Income. The Customer agrees to fix and maintain rates and collect charges for the facilities and services provided by Customer's System as will be adequate to permit the Customer to make prompt payment of all expenses of operating and maintaining the Customer's System, including payments under this Agreement, and to make prompt payment of the interest on and principal of any debt instruments of the Customer payable, in whole or in part, from the revenues of the Customer's System. The Customer further agrees to comply with all of the provisions of the ordinances, resolutions, orders or indentures authorizing its debt instruments which are payable, in whole or in part, from the revenues of the Customer's System.

5.5 Continuing Disclosure Agreement. If GBRA is required by 17 C.F.R. § 240.15c2-12 ("Municipal Securities Disclosure Rule"), as that rule may be amended from time-to-time by the Securities and Exchange Commission, to enter into a "Continuing Disclosure Agreement" with the Customer to fulfill GBRA's obligations under the Municipal Securities Disclosure Rule, the Customer and GBRA agree to execute a Continuing Disclosure Agreement. The form of such Continuing Disclosure Agreement shall be approved by GBRA's bond counsel in order to comply with the then-current requirements of the Municipal Securities Disclosure Rule. Similarly, if the Municipal Securities Disclosure Rule does not technically apply to the initial purchaser of a series of Bonds but such initial purchaser otherwise requires GBRA to provide continuing disclosure from the Customer, the Customer and GBRA agree to execute an agreement detailing the continuing disclosure information to be provided by the Customer. The form of such agreement shall be approved by GBRA's bond counsel in order to comply with the requirements of such initial purchaser.

5.6 Delinquency of Payment. All amounts due and owing to GBRA by the Customer shall be billed and paid monthly, and if not paid when due, bear interest at the same rate as the post-judgment interest rate as set out in Section 304.003(c), Texas Finance Code, or any successor statute from the date when due until paid, provided that such rate shall never be usurious or exceed the maximum rate as otherwise permitted by law. If any amount due and owing by the Customer is placed with an attorney for collection by GBRA and GBRA prevails, then the Customer shall pay to GBRA, in addition to all other payments provided for by this Agreement, including interest, GBRA's reasonable collection expenses, including court costs and attorney's fees. The Customer further agrees that GBRA may, at its option, discontinue delivering treated water until all amounts due and unpaid are paid in full with interest as herein

specified. Any such discontinuation shall not, however, relieve the Customer of its unconditional obligation to make the payments required hereunder, as provided by Section 5.3 of this Agreement. The Customer agrees that GBRA may, at its option, terminate this Agreement for the Customer's failure to pay due and unpaid amounts, and, notwithstanding anything to the contrary in Section 5.3, if GBRA terminates this agreement for default in payments, the unconditional obligation to make the future payments shall terminate except that the Customer shall continue to be obligated to make payments for amounts due and unpaid at the time of termination, which shall survive the termination of the Agreement. Notwithstanding anything in this Agreement to the contrary, the Parties agree that the Customer's default under this Section 5.6 shall not result in termination of this Agreement until thirty (30) days after the date that the Customer receives written notice from GBRA specifying the default and the requirements to cure the same.

ARTICLE VI
TERM AND TERMINATION

6.1 Term.

(a) This Agreement shall be in force and effect until the latter of 11:59 p.m. Central time on December 31, 2058, or as it may be extended pursuant to subsection (b) and (c) below ("Termination Date").

(b) Unless written notice to terminate this Agreement is provided by either Party to the other Party at least three (3) years before the Termination Date, this Agreement shall automatically renew for an additional ten (10) year period. Unless notice is provided as described in this subsection (b), this Agreement will automatically renew for perpetual successive renewal periods of ten (10) years.

(c) Notwithstanding subsections (a) and (b) of this Section, if all the Bonds (including principal and interest) will not be fully paid by the Termination Date then the Termination Date shall be extended to December 31 of the year in which the Bonds are to be paid. Any extension by GBRA pursuant to this subsection shall be effective as of the date that GBRA gives the Customer written notice of the extension.

6.2 Rights after Termination. Except as specifically provided otherwise in this Agreement, all of the rights and obligations of the Parties under this Agreement shall terminate upon termination of this Agreement, except that such termination shall not affect any rights or liabilities accrued prior to such termination.

ARTICLE VII
OTHER PROVISIONS

7.1 Water Conservation and Drought Contingency Plans. The Customer agrees to provide to the maximum extent practicable for the conservation of water, and agrees to design, construct, operate and maintain its facilities in a manner that will prevent waste of water. The

Customer shall develop and implement a water conservation plan or water conservation measures and a drought contingency plan using the elements of Chapter 288 of the TCEQ's rules that are applicable to the Customer and its uses, and that are consistent with GBRA's water conservation and drought contingency plans for wholesale customers in accordance with the provisions of Section 3.10. Such plans, at a minimum, shall comply with all minimum standards that may be required or recommended by the Texas Water Development Board (TWDB) and the TCEQ. If the Customer intends to resell the water to another wholesale customer, the Customer shall require the successive customer in the resale to implement water conservation and drought contingency plans in accordance with the applicable provision of Chapter 288 of the TCEQ's rules and the applicable provisions of GBRA's water conservation and drought contingency plans.

7.2 Regulatory Requirements. This Agreement is subject to all applicable federal, state, and local laws and any applicable ordinances, rules, orders, and regulations of any local, state, or federal governmental authority having jurisdiction. This Agreement is specifically subject to all applicable sections of the Texas Water Code and the rules of the TCEQ, or any successor agency subject to Section 7.10 below regarding severability and provided that changes in the law shall not be applied retroactively to amend this Agreement unless retroactivity is required by law.

7.3 Interest in Gonzales Carrizo Water Supply Project. The Customer is not entitled to any equity interest in GBRA's Project for any reason including, without limitation, the payments made to GBRA under this Agreement.

7.4 Remedies. It is not intended hereby to specify (and this Agreement shall not be considered as specifying) an exclusive remedy for any default by either Party, but all such other remedies existing at law or in equity shall be cumulative including, without limitation, specific performance may be availed of by either Party. The prevailing Party shall be entitled to any reasonable attorney's fees, court costs or other expenses incurred in bringing or defending any suit alleging such default or claim.

7.5 Actual Damages. No Party shall be liable or have any responsibility to the other for any indirect, special, consequential, punitive or delay-related or performance-related damages including, without limitation, lost earnings or profits. Such limitation on liability shall apply to any claim or action, whether it is based on whole or in part on agreement, negligence, strict liability, tort, statute or other theory of liability.

7.6 Assignability. No Party may assign its rights or obligations under this Agreement without first obtaining the written consent of the other Party, which consent shall not be unreasonably withheld or delayed. Further, the Customer may not assign its rights or obligations under this Agreement if such assignment is prohibited by the Project's Bonds or would alter the tax-exempt status of those Bonds.

7.7 Entire Agreement. This Agreement constitutes the entire agreement between the Parties, and supersedes any prior understanding or oral or written agreements between the Parties respecting the subject matter of this Agreement.

7.8 No Third Party Beneficiaries. This Agreement does not create any third party benefits to any person or entity other than the signatories hereto and their authorized successors in interest, and is solely for the consideration herein expressed.

7.9 Due Authorization and Binding Obligation. This Agreement has been duly authorized, executed and delivered by all necessary action of the Parties. This Agreement, and the terms, covenants, and conditions herein contained, shall inure to the benefit of and be binding upon the heirs, personal representatives, successors, and assigns of each of the Parties hereto.

7.10 Severability. If any provision of this Agreement shall be held or deemed to be or shall, in fact, be invalid, inoperative or unenforceable as applied in any particular case in any jurisdiction or jurisdictions, or in all jurisdictions because it conflicts with any provisions of any Constitution, statute, administrative rule, regulation or finding, rule of public policy, or for any other reason, this Agreement shall remain in effect and be construed as if the invalid, inoperative, or unenforceable provision had never been in the Agreement, and such circumstances shall not have the effect of rendering the provision in question invalid, inoperative or unenforceable in any other case or circumstance, or of rendering any other provision or provisions of this Agreement invalid, inoperative or unenforceable to any extent whatever.

7.11 Waiver and Amendment. Failure to enforce or the waiver of any provision of this Agreement or any breach or nonperformance by either Party shall not be deemed a waiver by the other Party of the right in the future to demand strict compliance and performance of any provision of this Agreement. No officer or agent of GBRA is authorized to waive or modify any provision of this Agreement. No modifications to or recession of this Agreement may be made except by a written document signed by all Parties' authorized representatives.

7.12 Force Majeure. If for any reason of force majeure, either Party is rendered unable, wholly or in part, to carry out its obligations under this Agreement, then that Party shall give notice of the reasons in writing to the other Party within a reasonable time after the occurrence of the force majeure event. The obligation of the Party giving the notice, so far as it is affected by the force majeure, shall be suspended during the continuance of the inability then claimed, but for no longer period, but only so long as the Party giving notice uses its best efforts to mitigate the impact and remedy the condition which constitutes the force majeure. The term "force majeure" as used in this Agreement shall mean acts of God, strikes, lockouts, or other industrial disturbances, acts of public enemy, order or actions of any kind of government of the United States or the State of Texas, or any civil or military authority, insurrection, riots, epidemics, landslides, lighting, earthquakes, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraints of government and people, civil disturbances, explosions, breakage or accident to dams, machinery, pipelines, canals, or other structures, partial or entire failure of water supply including pollution (accidental or intentional), and any other cause not reasonably within the control of GBRA or the Customer.

7.13 Captions. The sections and captions contained herein are for convenience and reference only and are not intended to define, extend or limit any provision of this Agreement.

7.14 Necessary Documents and Actions. Each Party agrees to execute and deliver all such other and further instruments and undertake such actions as are or may become necessary or convenient to effectuate the purposes and intent of this Agreement. In particular, and without limiting the broader meaning of the preceding sentence, the Customer agrees to timely provide GBRA with all records, financial and operating information of the Customer reasonably requested by GBRA in connection with the issuance of Bonds to be provided to rating agencies, municipal bond insurance companies, potential purchasers of the Bonds (including the Texas Water Development Board), or other third parties.

7.15 Applicable Law and Venue. This Agreement shall be construed and enforced in accordance with the laws of the State of Texas. The obligations contained within this Agreement are performable in Hays County, Caldwell County, Comal County or Guadalupe County, Texas. Any action in law or equity brought to enforce or interpret any provision of this Agreement shall be brought in a court of competent jurisdiction with venue in Hays County, Caldwell County, Comal County or Guadalupe County, Texas.

7.16 Negotiation by Counsel. The Parties acknowledge that each Party and its counsel have reviewed and revised this Agreement, and agree that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting Party shall not be employed in the interpretation of this Agreement or any amendments or exhibits hereto.

7.17 Counterparts and Electronic Transmissions. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original and all of which shall constitute the same instrument. In making proof of this Agreement, it shall not be necessary to produce or account for more than one such counterpart. A telecopied or emailed electronically transmitted facsimile of an executed counterpart of this Agreement shall be sufficient to evidence the binding agreement of each Party to the terms hereof. However, each Party agrees to promptly deliver to the other Party an original, duly executed counterpart of this Agreement.

7.18 Legal Construction. Whenever context requires, the singular will include the plural and the neuter will include the masculine or feminine gender, and vice versa.

7.19 Notices. Any notice or payment required or permitted hereunder shall be in writing and shall be deemed to be delivered on the date received if delivered by hand to the address shown hereinafter for the Customer or GBRA, as appropriate, or such notice shall, if deposited in the mail, be deemed to be delivered, whether actually received or not, on the first business day after having been deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the Customer or GBRA, as appropriate, at the address shown hereinafter. For purposes of notice, the addresses of and the designated representative for receipt of notice for each of the parties shall be as follows:

For GBRA:

Guadalupe-Blanco River Authority
Attention: General Manager/CEO
933 E. Court Street
Seguin, Texas 78155

For the Customer:

City of Lockhart
Attention: City Manager
308 W. San Antonio St.
P.O. Box 239
Lockhart, Texas 78644

The Parties hereto shall have the right from time to time to change their respective addresses, and each shall have the right to specify as its address any other address within the United States of America by at least five (5) days' written notice to the other Party.

7.20 Business Days. In the event that any date or any period provided for in this Agreement shall end on a Saturday, Sunday or legal holiday, the applicable period shall be extended to the first business day following such Saturday, Sunday or legal holiday. As used herein, the term "legal holiday" means any state or federal holiday for which financial institutions or post offices are generally closed in the State of Texas.

GUADALUPE-BLANCO RIVER AUTHORITY

By: _____
Kevin Patteson, General Manager/CEO

Date: February 13, 2018

ATTEST:

_____

STATE OF TEXAS §
§
COUNTY OF GUADALUPE §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared Kevin Patteson, General Manager and CEO of the GUADALUPE-BLANCO RIVER AUTHORITY, known to me to be the persons whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the GUADALUPE-BLANCO RIVER AUTHORITY, a conservation district and political subdivision, and that he executed the same as the act of such entity for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 13th day of February, 2018.

TRICIA L RAMIREZ
Notary Public, State of Texas
Comm. Expires 12-20-2020
Notary ID 13093864-5

_____
Notary Public
The State of Texas

Notary Seal
&
I.D. No. 13093864-5

CITY OF LOCKHART

By: Lew White
Lew White, Mayor

Date: February 6, 2018

STATE OF TEXAS §
§
COUNTY OF CALDWELL §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared Lew White, Mayor of CITY OF LOCKHART, known to me to be the persons whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the CITY OF LOCKHART, a municipal corporation, and that he executed the same as the act of such entity for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 16th day of February, 2018.

CONNIE CONSTANCIO
Notary ID # 5271582
My Commission Expires
May 25, 2021

Connie Constancio
Notary Public
The State of Texas

Notary Seal
&
I.D. No. 5271582

EXHIBIT A

POINT OF DELIVERY

E.3 - LOCKHART'S GBRA AGREEMENT TO RESELL WATER

TREATED WATER SHARING AGREEMENT
BY AND BETWEEN
GUADALUPE-BLANCO RIVER AUTHORITY,
NEW BRAUNFELS UTILITES AND CITY OF LOCKHART

This Treated Water Sharing Agreement ("Agreement") is made and entered into by and between the Guadalupe-Blanco River Authority, a Texas conservation and reclamation district organized under Article 16, Section 59 of the Texas Constitution ("GBRA"), New Braunfels Utilities, a Texas municipally owned utility ("NBU"), and City of Lockhart, a municipal corporation ("City") (referenced herein as a "Party" and collectively, the "Parties").

RECITALS

1. GBRA represents that it has leased approximately 42,000 acres of land in Gonzales and Caldwell counties, Texas, the lease of which provides GBRA the right to access the Carrizo Aquifer groundwater beneath the land.

2. GBRA represents that it is currently authorized by the Gonzales County Underground Water Conservation District ("District"), pursuant to Operating Permit No. 11-16-17 and Export No. 01-13-01 (together "Permits") to produce and transport out of the District up to 15,000 acre-feet per year (AFY) of groundwater from the land leased by GBRA, subject to the restrictions and limitations in the Permits and further, GBRA represents that it has requested the District authorize the production and transportation out of the District of an additional 9,000 AFY.

3. GBRA has contracted with Alliance Regional Water Authority ("Alliance") to construct and operate certain groundwater treatment and transportation facilities pursuant to the terms of the Water Treatment and Delivery Agreement Between Alliance and GBRA dated June 27, 2018 ("Alliance Agreement"). GBRA has the contractual right to use the facilities under construction pursuant to the Alliance Agreement to treat and transport groundwater to current and future GBRA customers in Hays, Guadalupe, Caldwell, and Comal counties. A copy of the Alliance Agreement is incorporated by reference into this Agreement as if attached as an exhibit.

4. GBRA executed separate Gonzales Carrizo Water Supply Project Treated Water Supply Agreements with NBU, the City, and Goforth Special Utility District (collectively referred to as "Initial Customers") in 2018 (collectively referred to as the "2018 Agreements") to supply up to 15,000 AFY of treated water from the Project (as that term is defined in Section 2.1 of this Agreement).

5. Section 3.8 of the respective NBU and City 2018 Agreements authorize each to sublease or wholesale the water purchased from GBRA.

6. GBRA executed separate Gonzales Carrizo Water Supply Project Treated Water Supply Agreements with County Line Special Utility District, Goforth Special Utility District, Maxwell Special Utility District, and Camino Real Utility Company, LLC (collectively

referred to as "Expansion Customers") in 2022 to supply up to 8,757 AFY of additional treated water from the Project.

7. Crystal Clear Special Utility District ("Crystal Clear") is a water supply customer of Alliance and similarly will receive water from the Project upon completion of Alliance's portion of the Project.

8. GBRA anticipates construction completion of those portions of the Project necessary to serve the Initial Customers in 2024.

9. GBRA anticipates construction completion of those portions of the Project necessary to serve the Expansion Customers (the "Expansion Customers' Project Portions") in 2028.

10. Some of the Expansion Customers have determined that they need a temporary source of treated water while they await the completion of the Expansion Customers' Project Portions and the delivery of water therefrom.

11. Similarly, Crystal Clear has determined that it needs a temporary source of treated water while it awaits the completion of some of Alliance's portions of the Project and the delivery of water therefrom.

12. NBU and the City have individually determined that they have contracted with GBRA under their respective 2018 Agreements for a volume of treated water from the Project that may not all be needed for use within their utility systems prior to January 1, 2029.

13. NBU and the City have furthermore determined that they are willing to authorize GBRA to resell a portion of their Treated Carrizo Project Water (as defined below), for use by the Users (as defined below) on a short-term, temporary basis not extending beyond December 31, 2028. The volume of NBU's and City's contracted water from the Project that is available for resale under this Agreement is defined below as Shared Water.

14. NBU and the City have separately determined that it is in their best individual interest to authorize GBRA to deliver the Shared Water to the Users on a short-term, temporary basis pursuant to the terms of this Agreement and pursuant to the terms of individual contracts between GBRA and such Users.

AGREEMENT

For and in consideration of the mutual promises, covenants, obligations, and benefits described in this Agreement, and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, GBRA, NBU and the City agree as follows:

ARTICLE I
DEFINITIONS

"Alliance Regional Water Authority" or "Alliance" means the regional water authority created and operating under Texas Special District Local Laws Code Chapter 11010.

"Effective Date" means the date of the last signatory of this Agreement and enforceable as between Parties following execution by all Parties.

"Gonzales Carrizo Water Supply Project" or "Project" means the project described in Section 2.1 of this Agreement.

"Groundwater Leases" means the leases held by GBRA on approximately 42,000 acres of land in Gonzales and Caldwell counties and which provide GBRA the right to access the Carrizo Aquifer groundwater beneath the land identified in the leases.

"Provider" or "Providers" means individually or jointly, NBU and/or the City.

"Provider's Administration Fee" means the fee described in Section 3.3 (f) of this Agreement.

"Shared Water" means treated water from the Project that Providers are willing to temporarily authorize GBRA to resell and deliver to Users on a short-term basis for a period of time not extending beyond December 31, 2028.

"Shared Water Points of Delivery" means the point or points at which GBRA will deliver Shared Water to Users, in an amount and at a delivery rate not to exceed the aggregate Shared Water Commitments of the Providers and the terms of this Agreement, as such Points are generally described in **Exhibit A** attached hereto and incorporated herein for all purposes.

"TCEQ" means the Texas Commission on Environmental Quality or its successor agency.

"Termination Date" means the date upon which this Agreement terminates as described in Section 5.1.

"Treated Carrizo Project Water" means treated groundwater from the Project that GBRA is lawfully entitled to obtain, deliver and use under the terms of the Permits and Alliance Agreement.

"User" or "Users" means individually or jointly, Camino Real Utility Company LLC, County Line Special Utility District, Crystal Clear Special Utility District, and/or Maxwell Special Utility District.

ARTICLE II
GONZALES CARRIZO WATER SUPPLY PROJECT

2.1 Description of the Gonzales Carrizo Water Supply Project. The Gonzales Carrizo Water Supply Project ("Project") primarily consists of the Groundwater Leases, facilities to pump, treat, and convey groundwater in and from Gonzales and Caldwell counties, including but not

limited to water treatment plant(s) and associated facilities, and facilities to convey treated water through and to Gonzales, Guadalupe, Caldwell, Hays, and Comal counties. The Project also includes all lands and interests in lands necessary and desirable for the construction, operation, and maintenance of the Project facilities, and may further include storage and blending facilities, and other facilities necessary or desirable for the supply of treated water to Project customers, including the Initial Customers.

2.2 GBRA Project Rights, Responsibilities and Ownership.

(a) Alliance shall own and operate certain portions of the Project, as described in the Alliance Agreement. For the benefit of its customers, GBRA has secured an ownership interest in the capacity of the Project Facilities, as such term is defined in the Alliance Agreement.

(b) Under the Alliance Agreement, GBRA's ownership interest in capacity in the Project Facilities may not be terminated or abrogated, and Alliance shall be obligated to treat and deliver water from GBRA's Water Supply (as defined in the Alliance Agreement) using GBRA's capacity in the Project Facilities.

(c) GBRA shall own those Project portions not owned by Alliance, including various facilities and interest in the land comprising the Project. GBRA shall be responsible for the operation, maintenance, design, permitting, financing, construction, expansions, extensions, and other modifications to those GBRA Project portions in order to provide a long-term water supply on behalf of the Initial and Expansion Customers.

2.3 Providers' Annual Commitment of Treated Water from the Project. The Annual Commitment of treated water from the Project, as defined in their respective 2018 Agreement, is 8,000 AFY for NBU and 3,000 AFY for the City. The 2018 Agreements for NBU and the City are respectively incorporated into this Agreement by reference as if attached as exhibits.

ARTICLE III
SHARED WATER

3.1 Shared Water Available from Providers. The Parties agree that the delivery of Shared Water on a temporary, short-term basis may start on the date that the Project infrastructure necessary to deliver Treated Carrizo Project Water to the Initial Customers is completed, as such date is determined by GBRA in its sole discretion, and extend up to, but not beyond December 31, 2028. Pursuant to the terms of this Agreement, NBU hereby commits 4,000 AFY of Treated Carrizo Project Water as Shared Water and the City hereby commits 500 AFY of Treated Carrizo Project Water as Shared Water (Providers' respective "Shared Water Commitment").

3.2 Rights to Adjust Shared Water Commitment. On each anniversary of the Effective Date during the term of this Agreement, each Provider shall have the individual right to adjust its respective Shared Water Commitment, in each Provider's sole discretion, in one of the following

ways: (i) Provider may increase its then-current Shared Water Commitment by giving GBRA thirty (30) days' written notice; or (ii) Provider may decrease its then-current Shared Water Commitment, to the extent such Shared Water Commitment has not been contractually committed by GBRA to Users, by giving GBRA sixty (60) day's written notice.

3.3 Shared Water Resale Terms. During the term of this Agreement, GBRA shall use its best efforts to contract with Users for the resale of up to the then-total volume of Shared Water Commitments (initially 4,500 AFY of Shared Water).

The Parties agree that all GBRA contracts to resell Shared Water shall include:

(a) Contract counterparties that are Users or other customers that will ultimately receive water from the Project upon completion of all phases of construction;

(b) A water delivery commencement date for each User, as determined by GBRA in its sole discretion, that is no earlier than the completion of all infrastructure construction necessary to convey Treated Carrizo Project Water to the Initial Customers;

(c) A water delivery termination date that is no later than December 31, 2028;

(d) A Shared Water Fixed Rate expressed in dollars per AFY. The Shared Water Fixed Rate shall be not less than the total of Providers' actual then-current annual Gonzales Carrizo Debt Service Charge and Gonzales Carrizo Water Charge, as those terms are defined in the respective 2018 Agreements between GBRA and each of the Providers, divided by 11,000 AFY. GBRA has determined that, as of the Effective Date, the Annual Shared Water Fixed Rate would be $668.79 per AFY;

(e) A Shared Water Fixed Charge equal to the Shared Water Fixed Rate multiplied by the number of acre-feet of Shared Water committed to a User. Such Shared Water Fixed Charge shall be assessed (i) to the Users on a take or pay basis, such that the Charge is paid whether all, some or any of the water is taken or not, (ii) on a monthly basis, such that one-twelfth of the Shared Water Fixed Charge is billed by GBRA and collected from the Users each month, and (iii) such Charge shall be billed by GBRA and paid by Users starting on the month after the Effective Date;

(f) A Provider's Administration Fee equal to, a percentage multiplied by the Shared Water Charge. The initial Provider's Administration Fee of 5 percent (5%) may be increased from time to time on the anniversary of the Effective Date at the sole discretion of the Providers; provided however the percentage may not be increased more than the Consumer Price Index change for the previous year. Such Provider's Administration Fee shall be assessed (i) to the Users on a take or pay basis, such that the Fee is paid whether all, some or any of the water is taken or not, (ii) on a monthly basis, such that one-twelfth of the Provider's Administration Fee is billed by GBRA and collected from the Users each month, and (iii) such Fee shall be billed by GBRA and paid by Users starting on the month after the Effective Date;

(g) The amount of Shared Water committed to a User (expressed in AFY) which includes water lost in production, treatment and delivery;

(h) A maximum delivery rate to a User, expressed in gallons per minute (GPM), equal to the number of AFY of Shared Water committed to a User multiplied by 0.62, less actual losses occurring during production, treatment and delivery;

(i) A provision that Users may amend the contract to increase the volume of Shared Water contractually committed by GBRA, if Shared Water is available for commitment by a Provider; but that the committed volume of Shared Water may not be decreased during the term of the contract;

(j) A provision stating that no Shared Water will be provided by GBRA after the earlier of the termination date or December 31, 2028; ;

(k) A provision stating that Users' water losses will be determined and calculated using the same criteria used to determine and calculate water losses for Alliance and Providers.

(l) A provision recognizing that Users are fully and solely responsible for paying to GBRA the Gonzales Carrizo Delivery Charge, as such term is defined in the 2018 Agreements between GBRA and each of the Providers, applicable to the actual volume of Shared Water delivered to Users;

(m) A provision recognizing that Users are fully and solely responsible for the design, construction, maintenance, repair, and associated costs of any additional infrastructure (" User Extension") that might be necessary for GBRA to deliver the Shared Water beyond the Users' Shared Water Points of Delivery; that none of those User Extension costs shall be included, in whole or in part, as a cost payable by Providers under the Gonzales Carrizo Debt Service Charge and Gonzales Carrizo Water Charge, as those terms are defined in the respective 2018 Agreements between GBRA and each of the Providers;

(n) A provision recognizing that Users fully understand and accept that there is risk that the Expansion Customers' Project Portions may not be completed by December 31, 2028, and that Users fully understand and accept that no Shared Water will be available after December 31, 2028;

(o) A provision requiring Users to adopt and enforce conservation and drought contingency plans at least as stringent as those required of Providers by GBRA and regulatory agencies;

(p) A provision requiring the Users to pay a late payment charge, if applicable;

(q) A provision prohibiting the User from reselling the Shared Water to other wholesale water providers; and

(r) A provision stating that GBRA shall be responsible for notifying the Users regarding water quality issues concerning the Shared Water.

3.4 Title to and Responsibility for Shared Water. Title to and responsibility for all Shared Water made available by Providers under this Agreement shall be in GBRA while said water is within the Project. If at any time Shared Water passes a Provider's point of delivery, as such term is described in the 2018 Agreements respectively, title to and responsibility for said water shall be in Provider. In such cases, title to and responsibility for the Shared Water shall remain with Provider until such time the Shared Water leaves the Provider's water distribution system and re-enters GBRA's or a User's water conveyance system. The Providers and GBRA hereby agree to save and hold each other harmless from all claims, demands, and causes of action which may be asserted by anyone on account of the transportation, storage, delivery, processing and handling of such water while title to and responsibility for the Shared Water remains in the other Party.

3.5 Allocation of Water During Shortage. During conditions beyond GBRA's control when water cannot be supplied to meet the demands of all customers, treated water from the Project including Shared Water, shall be divided pro rata among all GBRA customers of the Project, according to the amount each may otherwise be entitled under their respective contracts with GBRA, subject to reasonable conservation and drought management plans and requirements based on particular purposes of use of the water, so that preference is given to no one and everyone suffers alike.

ARTICLE IV
REMITANCE BY GBRA OF USER PAYMENTS

4.1 Monthly Compilation of Shared Water Charges. Each month, GBRA shall compile an accounting of the previous month's Shared Water Fixed Charge, Provider's Administration Fee, and late payment fee billings to Users as well as the Users' payments thereof. Said compilation shall be transmitted to the Providers by the tenth (10^{th}) day of each month, beginning one month after the Effective Date.

4.2 Remittance of Shared Water Charges. Contemporaneous with the transmittal of the monthly compilation described in Section 4.1, GBRA shall remit payment to the Providers of the total Shared Water Fixed Charge, Provider's Administration Fee, and late payment fee payments received from Users during the previous month. Said remittance payment to Providers shall be prorated between NBU and the City based on their respective, then-current Shared Water Commitment amount.

ARTICLE V
TERM AND TERMINATION

5.1 Term. This Agreement shall be in force and effect until the earlier of (i) the date that each Expansion Customers' Project Portions are complete, as such date is determined by GBRA in its sole discretion or, (ii) 11:59 p.m. Central time on December 31, 2028 ("Termination Date").

5.2 Providers' Rights to Terminate. In addition to their other rights and remedies, each Provider shall have the right to terminate this Agreement if, after proper notice: (i) GBRA has not entered into one or more contracts with Users for the resale of at least 500 AFY of Shared Water within 180 days after the Effective Date; and/or (ii) GBRA fails to enforce the terms and limitations of GBRA's contracts with Users related specifically to the termination date, limitations on the annual volume of Shared Water committed to a User and/or the maximum delivery rate at each User Shared Water Delivery Point.

5.3 Rights after Termination. Except as specifically provided otherwise in this Agreement, all of the rights and obligations of the Parties under this Agreement shall terminate upon termination of this Agreement, except that such termination shall not affect any rights or liabilities accrued prior to such termination, including but not limited to GBRA's obligation to collect and remit to each Provider the total Shared Water Fixed Charge and Provider's Administration Fee payments paid by Users.

ARTICLE VI
OTHER PROVISIONS

6.1 Regulatory Requirements. This Agreement is subject to all applicable federal, state, and local laws and any applicable ordinances, rules, orders, and regulations of any local, state, or federal governmental authority having jurisdiction. This Agreement is specifically subject to all applicable sections of the Texas Water Code and the rules of the TCEQ, or any successor agency subject to Section 6.8 below regarding severability and provided that changes in the law shall not be applied retroactively to amend this Agreement unless retroactivity is required by law.

6.2 Remedies. It is not intended hereby to specify (and this Agreement shall not be considered as specifying) an exclusive remedy for any default by any Party, but all such other remedies existing at law or in equity shall be cumulative including, without limitation, specific performance may be availed of by any Party. The prevailing Party shall be entitled to any reasonable attorney's fees, court costs or other expenses incurred in bringing or defending any suit alleging such default or claim.

6.3 Actual Damages. No Party shall be liable or have any responsibility to the other for any indirect, special, consequential, punitive, delay-related or performance-related damages including, without limitation, lost earnings or profits. Such limitation on liability shall apply to any claim or action, whether it is based on whole or in part on agreement, negligence, strict liability, tort, statute or other theory of liability.

6.4 Assignability. The Providers may not assign their rights or obligations under this Agreement without first obtaining the written consent of GBRA, which consent shall not be unreasonably withheld or delayed.

6.5 Entire Agreement. This Agreement constitutes the entire agreement between the Parties, and supersedes any prior understanding or oral or written agreements between the Parties respecting the subject matter of this Agreement.

6.6 No Third Party Beneficiaries. This Agreement does not create any third party benefits to any person or entity other than the signatories hereto and their authorized successors in interest, and is solely for the consideration herein expressed.

6.7 Due Authorization and Binding Obligation. This Agreement has been duly authorized, executed and delivered by all necessary action of the Parties. This Agreement, and the terms, covenants, and conditions herein contained, shall inure to the benefit of and be binding upon the heirs, personal representatives, successors, and assigns of each of the Parties hereto.

6.8 Severability. If any provision of this Agreement shall be held or deemed to be or shall, in fact, be invalid, inoperative or unenforceable as applied in any particular case in any jurisdiction or jurisdictions, or in all jurisdictions because it conflicts with any provisions of any constitution, statute, administrative rule, regulation or finding, rule of public policy, or for any other reason, this Agreement shall remain in effect and be construed as if the invalid, inoperative, or unenforceable provision had never been in the Agreement, and such circumstances shall not have the effect of rendering the provision in question invalid, inoperative or unenforceable in any other case or circumstance, or of rendering any other provision or provisions of this Agreement invalid, inoperative or unenforceable to any extent whatever.

6.9 Waiver and Amendment. Failure to enforce or the waiver of any provision of this Agreement or any breach or nonperformance by any Party shall not be deemed a waiver by the other Parties of the right in the future to demand strict compliance and performance of any provision of this Agreement. No officer or agent of GBRA is authorized to waive or modify any provision of this Agreement. No modifications to or recission of this Agreement may be made except by a written document signed by all Parties' authorized representatives.

6.10 Force Majeure. If for any reason of force majeure, any Party is rendered unable, wholly or in part, to carry out its obligations under this Agreement, then that Party shall give notice of the reasons in writing to the other Parties within a reasonable time after the occurrence of the force majeure event. The obligation of the Party giving the notice, so far as it is affected by the force majeure, shall be suspended during the continuance of the inability then claimed, but for no longer period, but only so long as the Party giving notice uses its best efforts to mitigate the impact and remedy the condition which constitutes the force majeure. The term "force majeure" as used in this Agreement shall mean acts of God, strikes, lockouts, or other industrial disturbances, acts of public enemy, order or actions of any kind of government of the United States or the State of Texas, or any civil or military authority, insurrection, riots, epidemics, pandemics, landslides, lightning, earthquakes, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraints of government and people, civil disturbances, explosions, breakage or accident to dams, machinery, pipelines, canals, or other structures, partial or entire failure of water supply including pollution (accidental or intentional), and any other cause not reasonably within the control of GBRA or a Provider.

6.11 Captions. The sections and captions contained herein are for convenience and reference only and are not intended to define, extend or limit any provision of this Agreement.

6.12 Necessary Documents and Actions. Each Party agrees to execute and deliver all such other and further instruments and undertake such actions as are or may become necessary or convenient to effectuate the purposes and intent of this Agreement.

6.13 Applicable Law and Venue. This Agreement shall be construed and enforced in accordance with the laws of the State of Texas. The obligations contained within this Agreement are performable in Hays County, Caldwell County, Comal County or Guadalupe County, Texas. Any action in law or equity brought to enforce or interpret any provision of this Agreement shall be brought in a court of competent jurisdiction with venue in Hays County, Caldwell County, Comal County or Guadalupe County, Texas.

6.14 Negotiation by Counsel. The Parties acknowledge that each Party and its counsel have reviewed and revised this Agreement, and agree that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting Party shall not be employed in the interpretation of this Agreement or any amendments or exhibits hereto.

6.15 Counterparts and Electronic Transmissions. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original and all of which shall constitute the same instrument. In making proof of this Agreement, it shall not be necessary to produce or account for more than one such counterpart. A telecopied or emailed electronically transmitted facsimile of an executed counterpart of this Agreement shall be sufficient to evidence the binding agreement of each Party to the terms hereof. However, each Party agrees to promptly deliver to the other Parties an original, duly executed counterpart of this Agreement.

6.16 Legal Construction. Whenever context requires, the singular will include the plural and the neuter will include the masculine or feminine gender, and vice versa.

6.17 Notices. Any notice or payment required or permitted hereunder shall be in writing and shall be deemed to be delivered (a) on the date received if delivered by hand (with written confirmation of receipt); (b) when received by the addressee if sent by a nationally recognized overnight courier (receipt requested); (c) on the date sent by facsimile or e-mail of a PDF document (with confirmation of transmission) if sent during normal business hours of the recipient, and on the next business day if sent after normal business hours of the recipient; or (d) if deposited in the mail, whether actually received or not, on the third business day after having been deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to a Provider or GBRA, as appropriate, at the address shown hereinafter. For purposes of notice, the addresses of and the designated representative for receipt of notice for each of the Parties shall be as follows:

For GBRA:

Guadalupe-Blanco River Authority

Attention: General Manager/CEO
2225 E. Common St.
New Braunfels, Texas 78130

For NBU:

New Braunfels Utilities
Attention: CEO
263 Main Plaza
New Braunfels, Texas 78130

For the City:

City of Lockhart
Attention: City Manager
308 W. San Antonio St.
P.O. Box 239
Lockhart, TX 78644

The Parties hereto shall have the right from time to time to change their respective addresses, and each shall have the right to specify as its address any other address within the United States of America by at least five (5) days' written notice to the other Parties.

6.18 Business Days. In the event that any date or any period provided for in this Agreement shall end on a Saturday, Sunday or legal holiday, the applicable period shall be extended to the first business day following such Saturday, Sunday or legal holiday. As used herein, the term "legal holiday" means any state or federal holiday for which financial institutions or post offices are generally closed in the State of Texas.

GUADALUPE-BLANCO RIVER AUTHORITY

By: Darrell Nichols
Darrell Nichols, General Manager / CEO

Date: 08. 19. 2024

ATTEST:

Courtney Kerr Moore

STATE OF TEXAS §
§
COUNTY OF GUADALUPE §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared Darrell Nichols, General Manager/CEO of the GUADALUPE-BLANCO RIVER AUTHORITY, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the GUADALUPE-BLANCO RIVER AUTHORITY, a conservation district and political subdivision, and that he executed the same as the act of such entity for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 19th day of AUGUST, 2024.

Mary C Newman

Notary Public
The State of Texas

Notary Seal
&
I.D. No. _____

MARY C. NEWMAN
My Notary ID # 5132625
Expires May 19, 2025

NEW BRAUNFELS UTILITIES

By: _____
Ryan Kelso, Chief Executive Officer

Date: 7/16/24

STATE OF TEXAS §
§
COUNTY OF COMAL §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared Ryan Kelso, Chief Executive Officer of NEW BRAUNFELS UTILITES, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the NEW BRAUNFELS UTILITIES, a Texas municipally owned utility, and that he/she executed the same as the act of such entity for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 16th day of July, 2024.

Stephanie Anne Guerra-Hill
My Commission Expires
7/26/2028
Notary ID
129877310

_____
Notary Public
The State of Texas

Notary Seal
&
I.D. No. 129877310

CITY OF LOCKHART

By: Angie Gonzales Sanchez

Date: 04 June 2024

STATE OF TEXAS §
§
COUNTY OF CALDWELL §

BEFORE ME, the undersigned, a Notary Public in and for said State, on this day personally appeared ANGIE GONZALES-SANCHEZ MAYOR PRO-TEM of the CITY OF LOCKHART, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the CITY OF LOCKHART, a municipal corporation, and that he/she executed the same as the act of such entity for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 4th day of JUNE, 2024.

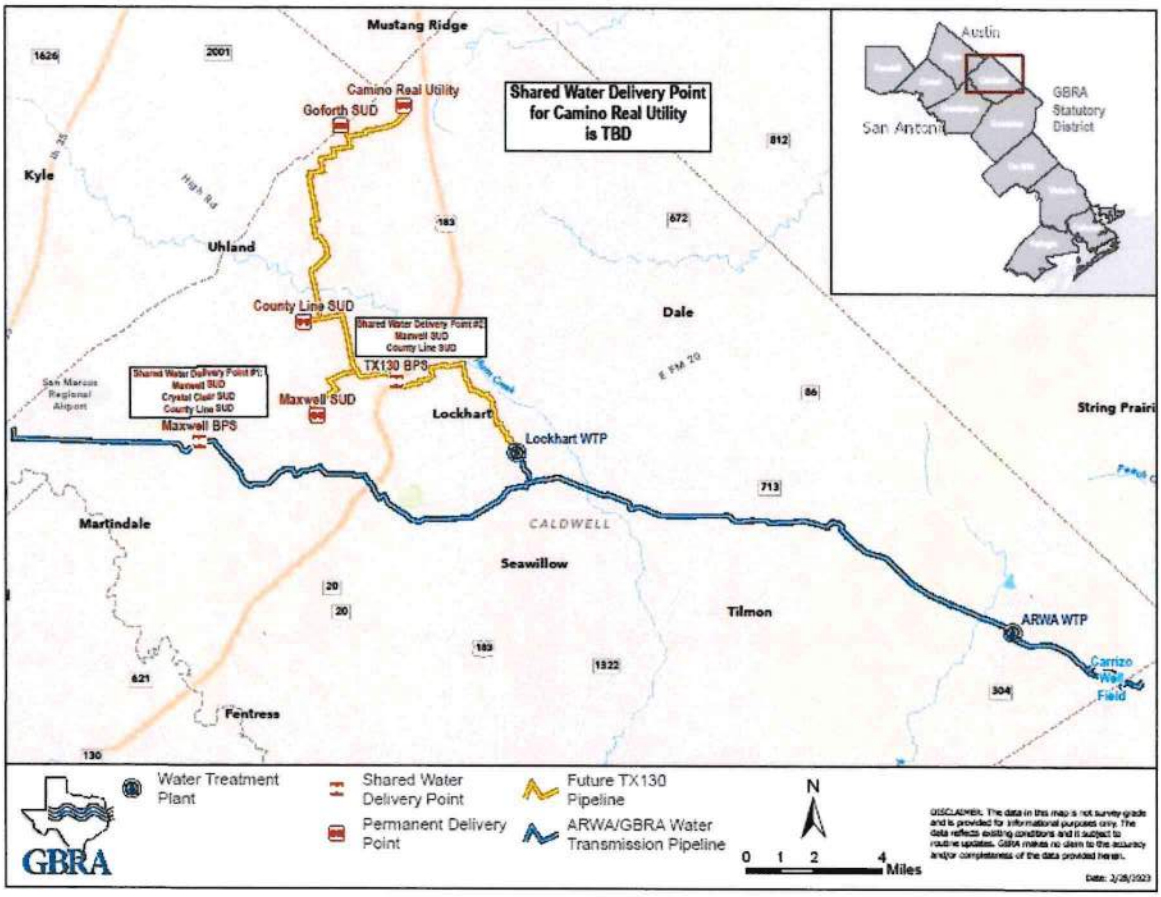
JULIE MLADENKA BOWERMON
Notary ID #126078055
My Commission Expires
April 26, 2027

Julie Mladenka Bowerman
Notary Public
The State of Texas

Notary Seal
&
I.D. No. 126078055

EXHIBIT A

USERS' SHARED WATER POINTS OF DELIVERY


Mustang Ridge
Shared Water Delivery Point for Camino Real Utility is TBD
Camino Real Utility
Goforth SUD
Kyle
Uhland
County Line SUD
Shared Water Delivery Point #2
Maxwell SUD
County Line SUD
TX130 BPS
Shared Water Delivery Point #1
Maxwell SUD
Crystal Clear SUD
County Line SUD
Maxwell SUD
Maxwell BPS
Lockhart
Lockhart WTP
Dale
String Prairi
Martindale
CALDWELL
Seawillow
Tilmon
ARWA WTP
Carrizo Well Field
Fentress
Austin
San Antonio
GBRA Statutory District
Water Treatment Plant
Shared Water Delivery Point
Permanent Delivery Point
Future TX130 Pipeline
ARWA/GBRA Water Transmission Pipeline
N
0 1 2 4 Miles
GBRA

APPENDIX F - LOCKHART'S ALTERNATIVE CAPACITY REQUIREMENT (ACR) VARIANCE APPROVAL LETTER

PWS_0280001_CO_20240716_ACR

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 16, 2024

Mr. William Wachel, P.E.
TRC Engineers, Inc.
505 E Huntland Drive
Austin, Texas 78752

Re: City of Lockhart – PWS ID No. 0280001
Request for an Alternative Capacity Exception
Caldwell County, Texas
RN 104277447 | CN 600245195

Dear Mr. Wachel:

On April 18, 2024, the Texas Commission on Environmental Quality (TCEQ) received your submittal, dated April 12, 2024, requesting an alternative capacity requirement (ACR) for the City of Lockhart public water system (PWS) be granted under the requirements specified in Title 30 of the Texas Administrative Code (30 TAC) §290.45(g). The regulations found in 30 TAC §290.45(b)(1)(D)(iii) require ground water providers with more than 250 connections and more than 200 gallons of elevated storage per connection to have a minimum combined service pump capacity of 0.6 gallons per minute (gpm) per connection at each pump station or pressure plane. You have requested a reduced service pump capacity requirement.

The City of Lockhart serves approximately 5,911 connections with treated groundwater from seven wells and with surface water purchased from the surface water treatment plant co-owned by the Guadalupe-Blanco River Authority (GBRA) and the City of Luling (TCEQ PWSID No. 0280018). The groundwater is treated at the City of Lockhart treatment plant and is then pumped into a ground storage tank where it is blended with incoming surface water from the GBRA/City of Luling. This blended water is pumped into the distribution network via two 1,400 gpm service pumps (TCEQ Facility ID Nos. PF0001 and PF0002) and a single 600 gpm service pump (TCEQ Facility ID No. PF0003). The TCEQ Technical Review and Oversight Team (TROT) reviews requests for ACRs based on an evaluation of a system's maximum daily demand (MDD) and the actual number of connections served at that time. Based on our review, we are **granting a** new ACR as follows:

Service Pump Capacity	**0.34 gpm/connection**

Your submitted daily usage data from February 2021 to February 2024 indicated a MDD of 2,471,000 gallons on September 13, 2023. The number of connections served during September 2023 was 5,762. Using the specifications in 30 TAC §290.45(g)(2) and a safety factor of 1.15, we calculated an equivalency ratio of 0.57. The above ACR was calculated using this equivalency ratio and the specifications in 30 TAC §290.45(g)(2).

As allowed by 30 TAC §290.45(g)(1)(E), the following dates were excluded from the data used to calculate the MDD: February 16-22, 2021, due to winter storm Uri. Further, the dates April 25-26, 2021, September 21, 2022, December 23-24, 2022, September 26, 2023, and January 19, 2024, due to line breaks or leaks, and lastly, June 22, 2023, due to a SCADA malfunction.

Condition of Granted ACR

Condition 1:

- **This ACR is contingent upon the continuing collection and retention of the most recent three (3) consecutive years of daily usage data.**

All ACRs are subject to periodic review. They may be revised or revoked if water demand conditions change or if evidence is found that granting it has resulted in the degradation of potable water quality or quantity. Please note that per 30 TAC §290.45(g)(6)(B), revision or revocation of granted ACRs may be initiated if any of the conditions in 30 TAC §290.45(g)(6)(A) are met. This letter must be kept on file at the water system for as long as any ACR granted in this letter is in effect. This letter must be made available to TCEQ staff upon request.

Granted ACRs only waive compliance to the 30 TAC Chapter 290 requirements explicitly stated in the TCEQ ACR letter. Noncompliance with any condition stated in this letter may result in an enforcement action as specified in 30 TAC §290.39(l)(5). Granted ACRs cannot be used as a defense in any enforcement action resulting from noncompliance with any other requirement in 30 TAC Chapter 290. If new information indicates that this exception compromises the public health or degrades service or water quality, the exception may be revoked as specified in 30 TAC §290.39(l)(2).

If you have questions concerning this letter, or if we can be of additional assistance, please contact Mr. James Belcher, E.I.T. at james.belcher@tceq.texas.gov, by telephone at (512) 239-1602, or any member of the Technical Review and Oversight Team at PTRS@tceq.texas.gov.

Sincerely,

Joel Klumpp, Manager
Plan and Technical Review Section
Water Supply Division
Texas Commission on Environmental Quality

JK/jrb

cc: The honorable Lew White, Mayor, City of Lockhart, P.O. Box 239, Lockhart, Texas 78644-0239