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Scope of Services
City of Seguin
Water and Wastewater Master Plans
December 17, 2019

PROJECT UNDERSTANDING:

Freese and Nichols, Inc. (FNI) understands that the City of Seguin (City) is seeking professional engineering assistance to prepare a Wastewater Master Plan, perform an update to the Water Master Plan, and develop an Asset Management Program. The intent of the wastewater study is to develop a capital improvements plan for the wastewater collection system. FNI will update population and non-residential land use assumptions from recent studies with assistance from City staff and utilize this information to develop wastewater flow. A hydraulic model of the wastewater collection system will be developed using a combination of GIS data, as-built data, and field measurements. FNI will utilize the wastewater hydraulic model to evaluate lift stations, collection system capacity, and future system improvements. FNI will develop a comprehensive Wastewater Capital Improvement Plan. The results of this study will be summarized in the Wastewater Master Plan Report.

The purpose of the Water Master Plan Update is to perform an update to the capital improvements plan for the water distribution system developed in 2015. FNI will utilize the population and non-residential land use assumptions from the Wastewater Master Plan to develop updated water demand projections. The hydraulic water model will be updated with changes to GIS, as-built, and field data since 2015. The updated hydraulic water model will be used to evaluate distribution system capacity and develop future system improvements. FNI will perform an update to the comprehensive Water Capital Improvement Plan and summarize the results of this study in the Water Master Plan Report.

The objective of the Asset Management Program Development is to improve the data management process for water and wastewater system assets. FNI will assess available sources of water and wastewater system data and conduct a gap analysis to identify potential enhancements. A series of workshops will be conducted to determine the needs and recommendations for CMMS software. FNI will also develop a water and wastewater pipeline inspection prioritization plan to aid City inspection efforts. FNI will develop asset management recommendations for the water and wastewater systems, discuss the results in a workshop with City staff, and present the of this study in the Asset Management Program Report.

Project Outline

Task A: Population and Wastewater Flow Projections
Task B: Temporary Flow Monitoring
Task C: Wastewater Development and Calibration
Task D: Hydraulic Analysis and System Evaluation
Task E: Capital Improvement Plan and Master Plan Report
Task F: Wastewater Model Training and Software Purchase
Task G: Asset Management Program Development
Task H: Water Master Plan Update

Task A: Population and Wastewater Flow Projections

A1. Project Kick-off Meeting: Freese and Nichols, Inc. (FNI) will meet with the City to review scope, project team and schedule of the project, and present a data request memorandum.

A2. Data Collection and Review: FNI will compile information from the City including GIS files, as-built drawings, lift station layouts, pump curves, recently completed system improvements, and wastewater flow data.

A3. Meet with City Planning Department: FNI will attend one meeting with representatives from the City's Planning Department to identify growth areas and make adjustments to the land use assumptions identified in the City's 2015 Water Master Plan.

A4. Wholesale Customer Evaluation: In coordination with the City, FNI will evaluate the future potential for the City to provide both water and wastewater wholesale service to surrounding municipalities. Water demand and wastewater flow projections will be developed for identified potential wholesale customers.

A5. Develop and Distribute Population and Non-residential Growth Projections: FNI will work with City staff to develop and document population and non-residential growth projections by wastewater basin for existing, 5-year, 10-year, and 20-year conditions. Growth projections will be distributed throughout the wastewater service area but developed for implementation in a future water master plan update.

A6. Review Historical Wastewater Flows: FNI will obtain and evaluate historical wastewater flows to develop historical trends and calculate peaking factors. This data along with flow monitoring data will be used to determine expected per-capita loads for future projections.

A7. Develop Design Criteria for Wastewater Flow Projections: Based on the review of historical data, FNI will develop design criteria for wastewater flow projections including per-capita flow rates, non-residential flow rates, and peaking factors.

A8. Develop and Distribute Wastewater Flow Projections: FNI will develop wastewater flow projections for existing, 5-year, 10-year, and 20-year conditions using the future land use assumptions and selected design criteria. Flows will be calculated by wastewater basin. FNI will distribute wastewater flows throughout the service area based on the existing and future population distribution.

A9. Progress Meeting #1 – Population and Wastewater Flow Projections: FNI will attend a progress meeting with the City to discuss the results and process of the population and wastewater flow projections.

A10. Draft Technical Memorandum – Population and Wastewater Flow Projections: FNI will prepare a technical memorandum that documents the assumptions and analysis of historical data and future population and wastewater flow projections. FNI will submit one (1) electronic file in PDF format of the draft TM for review.

A11. Finalize Technical Memorandum – Population and Wastewater Flow Projections: FNI will revise the memorandum to incorporate comments from the City. FNI will submit five (5) hard copies and one (1) electronic file in PDF format of the final TM.

Task B: Temporary Flow Monitoring

B1. Meeting with City to Discuss Flow Monitoring Locations: FNI will meet with the City to discuss the proposed temporary flow monitoring sites. FNI will prepare mapping showing the proposed locations and will present to the City. FNI will update the mapping based on City comments before submitting to the flow monitoring subconsultant.

B2. Temporary Flow Monitor Installation, Calibration, and Data Collection: Install and calibrate twelve (12) temporary velocity/depth type flow meters and two (2) rainfall gauges at the agreed upon locations. Temporary flow meters shall remain in place for a minimum of thirty (30) days. Based on weather conditions and the quality of recorded data, the flow monitoring period may be extended in thirty (30) day increments for an additional fee to a maximum of one hundred and twenty (120) days.

B3. Flow Monitoring Data Analysis and Evaluation: Reduce raw field monitoring data and tabulate 15-minute flow data for the entire flow monitoring period. Prepare flow hydrographs and scattergraphs for the flow monitoring period. Flow data will be analyzed for average dry weather flow, peak dry weather flow, and wet weather peak flow rates. Flow data will be compared with rainfall data to determine amount of inflow/infiltration experienced during selected storm events. FNI will also prioritize flow monitoring locations based on the evaluation results and identify six (6) locations for potential permanent flow monitoring.

Task C: Wastewater Model Development and Calibration

C1. Evaluate GIS Connectivity in Wastewater Line GIS Files and Build the Wastewater Model: FNI will evaluate the GIS files of the City's wastewater lines for connectivity. FNI will address any connectivity issues required for the model and request as-built drawings as needed for data verification. FNI will import 8-inch and larger lines and critical 6-inch lines into the wastewater modeling software from GIS. City staff will provide manhole measure down data for major interceptors where as-built drawings are not available.

C2. Manhole Measure Down Field Survey: If data is not available from GIS or as-built records on critical system infrastructure field investigation is necessary to populate missing data. If City staff cannot perform manhole measure down field inspections, FNI will survey up to fifty (50) manholes. This estimate includes twenty-five (25) manholes located in paved roads or easily accessible areas and twenty-five (25) manholes in off-road areas. Manhole measure down field inspections data includes manhole rim elevation, manhole floor elevation, pipe invert elevation, pipe diameter, pipe material, flow direction, photographs, system connectivity, and general condition.

C3. Lift Station Field Inspection: FNI will develop a lift station inspection sheet to document lift station condition and TCEQ compliance parameters including pumps, electrical, structural, regulatory, and other physical data. FNI will perform twenty-eight (28) lift station inspections and populate the lift station inspection sheets for each location. Recommendations for improvements will be developed, but cost estimates for improvements are not included.

C4. Update GIS with Field Survey Data: FNI will update GIS with the results of the manhole and lift station inspection data including manhole rim elevation, manhole floor elevation, pipe invert elevation, pipe diameter, pipe material, wet well dimension, flow direction, system connectivity, and general condition. FNI will provide revised GIS data to the City.

C5. Incorporate and Evaluate Wastewater Facility Data: FNI will verify the configuration of lift stations and control structures with as-built drawings and field inspection results and incorporate them into the wastewater model. FNI will obtain lift station and WWTP flow data to be used for model development and to assist in model calibration.

C6. Conduct Wastewater Model Calibration: FNI will utilize available data, including flow monitoring data, to replicate existing collection system conditions in the wastewater model. FNI will conduct model calibration by adjusting model parameters to match model results to field measurements.

C7. Progress Meeting #2 – Wastewater Model Development and Calibration: FNI will attend a progress meeting with the City to discuss wastewater model development and calibration.

Task D: Hydraulic Analysis and System Evaluation

D1. Identify Requirements for System Improvements: FNI will develop target design criteria for interceptors, force mains and lift stations, including allowable surcharging and minimum/maximum velocities.

D2. Evaluate WWTP Capacity: FNI will evaluate required WWTP capacity for projected wastewater flows, including the need for additional treatment facilities outside of the current WWTP.

D3. Wastewater System Evaluation: FNI will utilize wastewater flow projections and the calibrated wastewater model to evaluate the collection system for existing, 5-year, 10-year, and 20-year conditions. FNI will identify modeled deficiencies for potential system improvements. FNI will provide mapping to document the system evaluation results.

D4. Develop Wastewater System Improvement Alternatives: Utilizing the modeling results, FNI will develop and size improvements to address identified system deficiencies and provide service to projected development. Improvement alternatives will be sized to serve projected 20-year flows. FNI will use interim 5-year and 10-year model simulations to determine the phasing of improvements. FNI will provide mapping to show recommended improvement alternatives by phase.

D5. Progress Meeting #3 – System Evaluation and Improvement Alternatives: FNI will meet with the City to present the results of the hydraulic analysis and system evaluation and discuss identified improvement alternatives.

Task E: Capital Improvement Plan and Master Plan Report

E1. Develop Capital Improvement Plan (CIP) Costs, Phasing Plan & Mapping: FNI will develop a draft prioritized wastewater system CIP with descriptions, cost estimates, and phasing for each proposed project. Costs will be in Year 2020 dollars and will include engineering and contingencies. Draft CIP scheduling of projects will be developed based upon modeling results, future land use projections, annexation plans, and reliability needs. FNI will develop mapping showing project locations.

E2. Draft Wastewater Master Plan Report: FNI will prepare a Draft Wastewater Master Plan Report discussing assumptions, methodologies, and findings for population and wastewater flow projections, model development and calibration, existing and future system hydraulic analyses, and recommended capital improvement plans including schedule and costs of improvements. The report will include colored maps showing proposed system improvements. FNI will submit one (1) electronic file in PDF format of the draft Report for review.

E3. Progress Meeting #4 – Draft CIP and Master Plan Report: FNI will meet with the City to discuss draft CIP and project phasing. FNI will also discuss and solicit comments on the Draft Wastewater Master Plan Report.

E4. Revise and Finalize Wastewater Master Plan Report: FNI will revise the report based on City comments and submit five (5) final hard copies and one (1) electronic copy in PDF format of the Wastewater Master Plan Report to the City.

E5. Utility Advisory Committee Presentation: FNI will present the Wastewater Master Plan report to Utility Advisory Committee. FNI will be available to answer questions and discuss content.

E6. City Council Presentation: FNI will present the Wastewater Master Plan report to City Council. FNI will be available to answer questions and discuss content.

Task F: Wastewater Model Training and Software Purchase

F1. Purchase InfoSewer Software: FNI will purchase, on the City's behalf, one floating seat license for the InfoSewer wastewater modeling software for up to 5,000 links. A floating seat license consists of a software license installed on a server that can be accessed by multiple users but is limited to a single user at any one time. The first year of annual maintenance is typically included in the initial software cost, but subsequent year annual maintenance costs are an additional fee.

F2. Wastewater Model Training Workshop: FNI will prepare model training presentation material and load the City's wastewater model on FNI owned computers for use during training. FNI will coordinate with Innovyze to install temporary training licenses for up to six (6) people on FNI owned computers for use in model training. FNI will conduct eight (8) hours of training on selected software with the use of the City's wastewater model. The training will include instructions on setting up, running, and modifying the model as well as viewing results.

F3. Follow-up Coordination and Model Assistance: FNI will provide up to sixteen (16) hours of follow-up coordination after the model training to answer questions and provide additional instruction if necessary.

Task G: Asset Management Program Development

G1. Data Collection and Review: FNI will coordinate with City staff to assimilate and categorize the available water and wastewater system data sources, including GIS, financial asset and IT records, hydraulic models, CCTV and inspection data, maintenance history, warranty data, O&M Manuals, shop drawings, pump curves, as-built drawings, and work order system data.

G2. Analyze and Document GIS Data Structure, Attributes, and Sources and Perform Gap Analysis: FNI will review the GIS existing data structure for the water and wastewater systems including the attribute data and multiple data sources used to populate the GIS. FNI will document water and wastewater GIS structure, data model, attributes, data entry process, and source data. FNI will conduct a gap analysis to identify potential enhancements to GIS attribute data, data structure modifications, and integration with other systems to facilitate implementation of the asset management program.

G3. Review and Document Other System Asset Data and Perform Gap Analysis: FNI will review and document water and wastewater system asset data including financial asset and IT records, hydraulic models, CCTV and inspection data, maintenance history, warranty data, O&M Manuals, shop drawings, pump curves, as-built drawings, and work order system data. FNI will conduct a gap analysis to identify enhancements to water and wastewater system asset data, data structure modifications, and integration with other systems to facilitate implementation of the asset management program.

G4. Business Process and Organizational Structure Review: FNI will conduct interviews with utility management, operations, maintenance, GIS, IT, and Finance staff to gain understanding of current business processes and organizational roles and responsibilities. FNI will review and document existing water and wastewater utility business processes including but not limited to GIS updates, work order life cycle, preventative maintenance strategies, financial asset records, regulatory reporting, and other utility business processes.

G5. CMMS Software Evaluation and Selection Workshops: FNI will submit one technical memorandum and conduct two planning workshops for a computerized maintenance management system.

i. FNI will submit a technical memorandum recommending business processes and organizational responsibilities to effectively utilize CMMS software for maintenance management. The recommendations will be based on a review of the current organization and selected interviews with staff. The memorandum will outline the processes the CMMS will support and the organizational responsibilities for these processes and for the management of the CMMS.

ii. FNI will then evaluate available CMMS software and conduct a workshop to discuss the capabilities of different CMMS software packages including pros, cons, and general ranges of costs for the City to review and make a selection. FNI will evaluate available CMMS software based on the City's current processes for both water and wastewater systems and implementation with existing City software including Tyler financial. FNI will provide a software recommendation and suggest the general implementation process. The outcome of this workshop will be a decision by the City about the software to be implemented.

iii. The second workshop will be an implementation planning session to cover topics such as (1) end user hardware and network/communications requirements for the CMMS, (2) CMMS platform details (hosted or on-premises servers for the application and database software), (3) integration requirements, (4) implementation schedule and requirements/constraints for City staff participation, including establishment of the City CMMS implementation team (CMMS Team), and (5) strategy for training and ongoing support. Following this workshop, FNI will prepare a brief memorandum documenting assumptions for the CMMS technical architecture and the implementation schedule and will update the opinion of costs for the software and services associated with CMMS implementation.

G6. Develop Asset Management Recommendations and Implementation Plan: Based on the results of the gap analysis and business process review, FNI will develop asset management recommendations for the water and wastewater systems. The recommendations will be structured to align with City and Departmental initiatives. FNI will also develop an asset management implementation plan with the following elements:

- Assignment of responsible parties
- Annual implementation schedule with milestones
- Metrics
- Staffing recommendations
- Annual budgeting recommendations
- Coordination requirements during plan implementation
- Recommendations to make asset management sustainable
- Recommendation of CMMS software and implementation schedule

G7. Water and Wastewater Pipeline Inspection Prioritization: FNI will utilize existing information on water and wastewater pipeline assets such as pipe age, material, and work order history to prioritize City inspection efforts. Inspection prioritization will include recommended scheduling, priority mapping, and recommendations for inspection data storage and formatting.

G8. Asset Management Plan Workshop: FNI will conduct a workshop with City staff to discuss the recommendations for the asset management program. Discussion will focus on data management and business process recommendations, system integration, sustainability needs, and preliminary implementation schedule.

G9. Draft Asset Management Program Report: FNI will prepare a draft report documenting the asset management program recommendations. FNI will submit one (1) electronic file in PDF format of the draft report for review.

G10. Final Asset Management Program Report: FNI will update the draft report based on comments provided by the City and prepare a final report. FNI will submit five (5) final hard copies and one (1) electronic copy in PDF format of the Asset Management Program Report to the City.

Task H: Water Master Plan Update

H1. Data Collection and Review: FNI will compile updated information on the water distribution system from the City including GIS files, as-built drawings, facility layouts, pump curves, recently completed system improvements, water demand data, and other pertinent data.

H2. Update Population and Water Demand Projections: Utilizing the population and non-residential projections from the Wastewater Master Plan, FNI will update the population and non-residential projections to match the water distribution system service area. Using the methodology outlined in the 2015 Water Master Plan, FNI will update the water demand projections based on the updated population and non-residential projections.

H3. Conduct Temporary Pressure Testing: FNI will identify locations for field testing based on model calibration needs and areas of concern from the City. Up to ten (10) pressure recorders will be provided by FNI. Procedures for field testing will be prepared showing proposed location of testing, duration of testing, required SCADA data during testing period, and assistance from water utility department. The City will be responsible for installing and removing the pressure recorders on the designated fire hydrants. The pressure recorders will be installed for a minimum of one week or up to two weeks.

H4. Obtain and Evaluate SCADA Data: FNI will obtain water system SCADA records for the temporary field pressure testing period. SCADA data will be used for system operations planning, development of diurnal curves, and to assist in model calibration.

H5. Water Model Update: FNI will migrate the hydraulic water model utilized in the 2015 Water Master Plan to the current version of InfoWater and update the model with updated demand projections and recently completed system improvements.

H6. Update Hydraulic Analysis and System Evaluation: FNI will update the existing and future system evaluation using the updated model and projections based on the design criteria recommended in the 2015 Water Master Plan. Hydraulic analysis and system evaluation will include average day

demands, maximum day demands, fire flow analysis, and compliance with TCEQ Chapter 290 requirements.

H7. Update System Improvement Recommendations: FNI will update the recommended system improvements identified in the 2015 Water Master Plan based on updated projections and hydraulic analysis results. FNI will utilize the water model to develop and size improvements for 20-year conditions.

H8. Water System Evaluation and Improvement Alternatives Workshop: FNI will attend a workshop with the City to discuss the results of the updated system analysis and present the proposed water system improvements.

H9. Water Capital Improvement Plan Update: FNI will update the prioritized water system CIP with descriptions, cost estimates, and phasing for each proposed project. Costs will be in Year 2020 dollars and will include engineering and contingencies. FNI will prioritize projects based upon modeling results, future land use projections, annexation plans, and reliability needs. FNI will develop mapping showing project locations.

H10. Draft Water Master Plan Update: FNI will prepare a Draft Water Master Plan Update Report discussing the assumptions, methodologies, and findings for the updated population and water demand projections, model update, updated hydraulic analyses, and the updated capital improvement plan recommendations including schedule and costs of improvements. The report will include colored maps showing proposed system improvements. FNI will submit one (1) electronic file in PDF format of the draft report for review.

H11. Final Water Master Plan Update Report: FNI will update the draft report based on comments provided by the City and prepare a final report. FNI will submit five (5) final hard copies and one (1) electronic copy in PDF format of the Water Master Plan Update Report to the City.

H12. Utility Advisory Committee Presentation: FNI will present the Water Master Plan report to Utility Advisory Committee. FNI will be available to answer questions and discuss content.

H13. City Council Presentation: FNI will present the Water Master Plan report to City Council. FNI will be available to answer questions and discuss content.

Summary of Deliverables:

- Technical Memorandum: Population and Wastewater Flow Projections
- Draft Wastewater Master Plan Report
- Final Wastewater Master Plan Report
- Calibrated Wastewater Hydraulic Model
- Wastewater Model Training Material
- InfoSewer Software and License
- Draft Water Master Plan Report
- Final Water Master Plan Report
- Updated Water Hydraulic Model
- CMMS Evaluation and Implementation Recommendations Technical Memorandums
- Draft Asset Management Program Report
- Final Asset Management Program Report
- Council Presentation on Wastewater Master Plan
- Council Presentation on Water Master Plan
- Utility Advisory Committee Presentation on Wastewater Master Plan
- Utility Advisory Committee Presentation on Water Master Plan
- All electronic project files (including GIS)

Summary of Meetings:

- Project Kick-off Meeting
- Meeting with Planning Department
- Progress Meeting #1: Population and Wastewater Flow Projections
- Flow Monitoring Location Meeting
- Progress Meeting #2: Wastewater Model Development and Calibration
- Progress Meeting #3: System Evaluation and Improvement Alternatives
- Progress Meeting #4: Draft CIP and Master Plan Report
- Wastewater Model Training
- CMMS Software Selection Workshops
- Water System Evaluation and Improvements Alternative Workshop
- Council Presentation on Wastewater Master Plan
- Council Presentation on Water Master Plan
- Utility Advisory Committee Presentation on Wastewater Master Plan
- Utility Advisory Committee Presentation on Water Master Plan

Project Schedule:

FNI will complete Tasks A through G within 18 months of notice to proceed.

FNI will complete Task H within 9 months of notice to proceed.

Fee Summary:

Task	Description	Hours	Total Labor Effort	Total Expense Effort	Total Sub Effort	Total Effort
Wastewater Master Plan						
A	Population and Wastewater Flow Projections	272	$38,470	$3,130	$0	$41,600
B[(1)]	Temporary Flow Monitoring	50	$6,640	$640	$67,610	$74,890
C	Wastewater Model Development and Calibration	347	$47,620	$3,650	$10,620	$61,890
D	Hydraulic Analysis and System Evaluation	230	$32,110	$2,180	$0	$34,290
E	Capital Improvement Plan and Master Plan Report	320	$46,110	$4,140	$0	$50,250
F	Wastewater Model Training and Software Purchase	86	$12,040	$23,040	$0	$35,080
Total Wastewater Master Plan		**1,305**	**$182,990**	**$36,780**	**$78,230**	**$298,000**
Asset Management Program Development						
G	Asset Management Program Development	440	$60,740	$4,350	$92,810	$157,900
Total Asset Management Program Development		**440**	**$60,740**	**$4,350**	**$92,810**	**$157,900**
Water Master Plan Update						
H	Water Master Plan Update	527	$73,850	$7,130	$0	$80,980
Total Water Master Plan Update		**527**	**$73,850**	**$7,130**	**$0**	**$80,980**
Grand Total		**2,272**	**$317,580**	**$48,260**	**$171,040**	**$536,880**

[(1)] Flow monitoring period may be extended in 30 day increments at a rate of $38,500 per 30 day period.