



**AGREEMENT FOR GOODS AND/OR SERVICES
TASK AUTHORIZATION #1**

Chatham County, NC

PO Box 1809

Pittsboro, NC 27312

FNI PROJECT TBD

DATE: September 13, 2022

This authorization is in accordance with the terms and conditions outlined in the Agreement for Goods and/or Services effective July 1, 2022.

Project Name: Water Master Plan Phase 2

Project Description: FNI recently completed the Water Master Plan, Phase 1 effort, which included water model development and verification steps. Phase 2 of the Water Master Plan builds on the water model development to calibrate the model, evaluate existing and future system performance to develop a prioritized capital improvements plan using risk-based assessment inputs.

Chatham County has requested that Freese and Nichols, Inc. (FNI) develop a Water Master Plan for the County's three water systems (North, Asbury, and Southwest). The Water Master Plan will be utilized by the County in planning, scheduling, budgeting, and designing water system improvements necessary to meet the needs of its customers now and in the future. A phased, multi-year Water Master Plan is proposed that will allow the County flexibility with budgeting future tasks. Phase 1 included water model development (Task A) and verification (Task B) and a technical memorandum (Task C).

Phase 2 includes Tasks D through H outlined below (Project):

- Task D – Field Testing
- Task E – Water Model Calibration
- Task F – Population and Demand Projections
- Task G – Hydraulic Analyses and System Performance
- Task H – Water Line Risk Based Assessment
- Task I – Capital Improvements Plan and Report

Future phases of the Water Master Plan, not included as part of this scope, will be defined in coordination with the County and may include the following tasks:

- Facility Risk Based Assessment
- Water System Rate Study
- On-Call Water Modeling Services

Basic Services:

Task D – Field Testing

- D1. Identify and Map Pressure Recorder Locations: FNI will meet with the County to identify up to twenty-four (24) locations for field testing based on model calibration needs and areas of concern from the County.
- D2. Conduct Pressure Testing
 - a. Pressure Recorders: Up to twelve (12) pressure testing recorders will be furnished by FNI and installed by FNI and County staff; the remaining pressure recorders will be supplied by the County.
 - b. Testing Plan: SCADA data will be requested for the field-testing time periods. FNI will prepare procedures for field testing showing proposed location of testing, duration of testing, required SCADA data during testing period, and assistance from the County. FNI will set up the pressure recorders for the desired recording interval and download and process the field-testing data.
 - c. Install Pressure Recorders: The pressure recorders will be installed for two separate periods of time: one period of time for twelve recorders in the North Water System and a second period of time for the same twelve recorders in the Asbury and Southwest Water Systems. Testing will consist of recording pressure readings for two (2) separate time periods, for a min of one week per time period.

FNI will coordinate with the County and other consultants performing work in the Southwest system for water loss study to obtain and review available field data information as available.

Task E – Water Model Calibration

- E1. Conduct EPS Model Calibration: FNI will conduct a 24-hour extended period simulation model calibration by adjusting c-factors, peaking factors, diurnal curves, and demand distribution until modeling results match the field pressure measurements and pump/tank operation to within industry standards. FNI will provide comparison graphs and mapping to document model calibration results.
- E2. Meet with County to Review Water Model Calibration Results: FNI will prepare mapping showing comparison of water pressure testing results and SCADA data vs. model pressure results for water model calibration and meet with the County to demonstrate results.

Task F – Population and Water Demand Projections

- F1. Meeting with Planning Department: FNI will meet with the County Planning staff to discuss population and land use assumptions, projected growth rates, and potential redevelopment areas. Future water service areas for the existing, 5-year, 10-year, and 20-year planning periods will be discussed. If available, the County will provide available demographic data in tabular or GIS format to be utilized in this study. During this meeting, FNI and the planning staff will identify potential growth or redevelopment areas in the water distribution system.
FNI understands the County has some recent planning and growth information from their Local Water Supply Plan and from the Western Intake Partnership project. FNI will review this data as made available by the County and incorporate the information with additional growth planning to develop future system demands.
- F2. Distribute Residential Population and Employment: Develop updated population and employment estimates and projections to allocate across the water service area for each future planning period. Populations and commercial acreage will be distributed for three development categories: residential, non-residential, and large user industrial demands.

- F3. Develop Design Criteria for Water Demand Projections: Based on a review of historical water production data, FNI will review existing demand projection methodologies and provide recommendations to update the design criteria for demand projections.
- F4. Water Demand Projections: FNI will utilize the updated water demand design criteria to allocate future residential and non-residential demand. FNI will allocate population and employment estimates and demand projections across the water service area for each planning period.
- F5. Meeting to Discuss Population, Employment, and Demand Projections: FNI will facilitate a meeting with the County staff to discuss the results of demand projections and distribution. FNI will address one round of comments on the distribution of the population and employment data as well as the water demand projections.

Task G – Hydraulic Analyses and System Evaluation

- G1. Evaluate Water Supply Integration Alternatives: FNI shall conduct a workshop with the County staff to discuss and document current water supply alternatives. Up to four alternatives will be developed during the workshop that FNI shall further evaluate. FNI will recommend a water supply integration strategy to be used in the development of the water distribution system improvements. Water supply alternatives will include evaluation of the new water supply from the WIP WTP and connection options into the North Water System.
- G2. Evaluate Water System Capacity Requirements: FNI shall evaluate existing and future pumping, storage, and production capacity based on the level of service criteria determined by the County. Existing system deficiencies and future improvements will be identified for each water system component.
- G3. Existing System Evaluation: FNI will conduct EPS/Steady-State modeling of the existing water system under average day and maximum day operating conditions to determine capacity and deficiencies within the existing water system. FNI will also evaluate fire flow availability using the model and the maximum day demand conditions.

Evaluate system looping options to support resiliency. In conjunction with the County, focus on areas of the system where over 100 connections are fed from a single water line. Including parameters in a risk-based assessment of the water lines.

Existing system analysis will include an evaluation of the current location and settings of main line PRVs within the distribution system and recommendations on optimization of those locations and settings to meet existing system needs and future growth.

FNI will evaluate the existing Nature Trail BPS and its design and operational parameters and assist the County with recommendations for future operations. This includes one site visit to the BPS to determine existing configuration and control options.
- G4. Meeting to Review Existing System Analysis: FNI will prepare maps showing the existing system analysis results for the water distribution system. FNI will meet with the County to demonstrate these results and solicit comments.
- G5. Develop System Improvements Alternatives for the 5-, 10-, and 20-year Planning Periods: FNI shall utilize the water model to develop and analyze alternatives to determine sizing of water system transmission, elevated and ground storage, and pumping facilities needed to serve 20-year demands throughout each pressure zone. FNI shall develop interim model runs for the 5-year and 10-year planning periods to determine phasing of water system improvements. System improvements will include production, conveyance, storage, and pumping needs.
- G6. Future Water Distribution System Improvements Alternatives Workshops: FNI will conduct up to two (2) workshops with County staff presenting results of the evaluation of the future system, including mapping and modeling results. The workshops will enable FNI and County staff to evaluate system deficiencies, the impact of current recommended system improvements, and develop potential system

improvement alternatives. FNI will model and further evaluate the system improvement alternatives developed during the workshops. FNI will further refine alternatives to address system deficiencies.

Task H – Water Line Risk-Based Assessment

- H1. Water Data Assessment: FNI will utilize GIS shapefiles, as-builts, work orders, maintenance records, and any other available data to determine the age and material of the water lines, pump stations, and storage tanks in the existing water distribution system. FNI will review and evaluate work order history, repair history, and maintenance data and interview utility staff to determine areas to focus renewal efforts.
- H2. Develop Condition and Criticality Scoring Parameters: FNI will develop a draft condition and criticality scoring program for water system pipelines, pump stations, and storage tanks. FNI will meet with County staff to obtain input on draft parameters.
- Potential condition parameters include:
 - Pipe age
 - Pipe material
 - Maintenance history
 - Soil conditions
 - Potential criticality parameters include:
 - Number of customers served
 - Ease of access for repairs
 - System redundancy
 - Critical facilities, e.g. hospitals and schools
 - Alley/street condition/replacement schedule
- H3. Apply Condition and Criticality Scoring System: Based on available data, FNI will utilize GIS and/or Asset Management software applications to apply the condition and criticality scoring system to the distribution pipeline network. Each line segment, pump station, and storage tank will receive a condition, criticality, and overall risk score, and an overall prioritized ranking will be prepared separately for pipelines, pump stations, and storage tanks. FNI will develop a large-scale color-coded mapping of the results of the condition, criticality, and risk scoring analysis.
- H4. Develop Prioritized Renewal CIP: FNI will work with the County to develop a strategy to utilize the results of the risk-based assessment to develop a prioritized water system renewal plan and CIP. Potential considerations include triggers for CIP inclusion and funding constraints. FNI will develop a renewal program CIP that includes project packaging, prioritization, phasing, descriptions, mapping, and cost estimates by fiscal year.
- H5. Meeting to Discuss Draft Renewal CIP: FNI will meet with the County to discuss the Draft Renewal CIP. FNI will prepare mapping and present the proposed Renewal CIP to the Owner and will address any comments provided during the meeting.

Task I – Capital Improvements Plan and Report

- I1. Develop Draft Capital Improvement Plan (CIP) Costs, Schedule, and Mapping: FNI will develop a comprehensive Capital Improvements Plan based on growth and capacity needs. Costs for each proposed project will be developed in current dollars, including engineering and contingencies. Large-scale system-wide maps will be produced showing proposed projects, costs, and recommended project phasing. FNI will also prepare a one-page summary for each project, including but not limited to a detailed description, driver, project map with planning level alignment, cost, proposed phasing, and justification.

12. Meet to Review Draft Capital Improvement Plan: FNI will meet with the County to discuss the draft CIP, project phasing, and analyze alternative completion dates as necessary.
13. Prepare Draft Water Master Plan Report: FNI will prepare a draft Water Master Plan Report summarizing growth and water demand projections, model calibration, existing and future system analysis, and CIP development. FNI will deliver an electronic PDF file of the draft report to the County to review.
14. Meet to Review Draft Report: FNI will meet with the County to discuss the draft report. FNI will solicit comments to be incorporated into the final report.
15. Revise Water Master Plan Report to Incorporate Comments: FNI will revise the report based on comments from the County and submit three (3) final hard copies and an electronic copy in PDF format of the Water Master Plan Report.

Additional Services:

The following services are not included in the proposed basic services described in the tasks above. However, FNI can provide these services, if needed, upon the County's written request. These Additional Services may include, but are not limited to:

- Water System Model Training
- On-Call Water Modeling Services
- Presentation of Results to Elected Officials
- Facility Risk Based Assessments
- Water System Rate Study

Schedule:

FNI is authorized to commence work on the Project upon execution of this Agreement and agrees to complete the services in accordance with the following schedule:

Deliverable	Milestone Deadline
Pressure Testing Results	8 weeks from NTP
Calibration Results	16 weeks from NTP
Demand Projections	12 weeks from NTP
Existing System Analyses	8 weeks from Calibration
Future System Analyses	4 weeks from Existing System Analyses
Water Line RBA	6 weeks from Future System Analyses
Draft CIP	4 weeks from Water Line RBA
Draft Water Master Plan Report	6 weeks from Draft CIP

If FNI's services are delayed through no fault of FNI, FNI shall be entitled to equitable adjustment of rates and amounts of compensation and FNI shall be entitled to adjust contract schedule consistent with the number of days of delay.

Compensation:

FNI proposes to furnish services as described herein in accordance with Attachment CO for the not to exceed fee of One Hundred Eighty-Two Thousand and Five Hundred Nineteen dollars (\$182,519) for Basic Services broken down as follows:

Task D	Field Testing	\$17,818
Task E	Water Model Calibration	\$30,808
Task F	Population and Demand Projections	\$27,745
Task G	Hydraulic Analyses and System Performance	\$45,286
Task H	Water Line Risk-Based Assessment	\$25,023
Task I	Capital Improvements Plan and Report	\$35,839

If FNI sees the Scope of Services changing so that additional services are needed, FNI will notify the CLIENT before proceeding. Additional services shall be based on the rates in Attachment CO.

Payment of the services shall be due and payable upon submission of a statement for services. Statements for services shall not be submitted more frequently than monthly.

All other provisions, terms and conditions of the Agreement for Goods and/or Services which are not expressly amended shall remain in full force and effect.

FREESE AND NICHOLS, INC.

CHATHAM COUNTY, NORTH CAROLINA

BY: _____

BY: _____

Charles B. Archer
Print Name

Dan J. LaMontagne, PE
Print Name

TITLE: Vice President

TITLE: County Manager

DATE: _____

DATE: _____

This instrument has been pre-audited in the manner required
by the Local Government Budget and Fiscal Control Act.

Roy Lynch, Finance Officer

COMPENSATION

Compensation to FNI for Basic Services in Attachment SC shall be computed on the basis of the following Schedule of Charges, but shall not exceed One Hundred Eighty Two Thousand Five Hundred Nineteen Dollars (\$182,519).

If FNI sees the Scope of Services changing so that Additional Services are needed, including but not limited to those services described as Additional Services in Attachment SC, FNI will notify OWNER for OWNER's approval before proceeding. Additional Services shall be computed based on the following Schedule of Charges.

Schedule of Charges:

<u>Position</u>	<u>Hourly Rate</u>
Professional - 1	110
Professional - 2	135
Professional - 3	150
Professional - 4	180
Professional - 5	210
Professional - 6	225
Construction Manager - 1	87
Construction Manager - 2	115
Construction Manager - 3	140
Construction Manager - 4	185
CAD Technician/Designer - 1	105
CAD Technician/Designer - 2	120
CAD Technician/Designer - 3	145
Corporate Project Support - 1	87
Corporate Project Support - 2	105
Corporate Project Support - 3	139
Intern/ Coop	75
Senior Advisor	200

Rates for In-House Services and Equipment

<u>Mileage</u>	<u>Bulk Printing and Reproduction</u>		<u>Equipment</u>	
Standard IRS Rates		<u>B&W</u>	<u>Color</u>	
	Small Format (per copy)	\$0.10	\$0.25	Valve Crew Vehicle (hour) \$75
	Large Format (per sq. ft.)			Pressure Data Logger (each) \$100
<u>Technology Charge</u>	Bond	\$0.25	\$0.75	Water Quality Meter (per day) \$100
\$8.50 per hour	Glossy / Mylar	\$0.75	\$1.25	Microscope (each) \$150
	Vinyl / Adhesive	\$1.50	\$2.00	Pressure Recorder (per day) \$200
				Ultrasonic Thickness Gauge (per day) \$275
	Mounting (per sq. ft.)	\$2.00		Coating Inspection Kit (per day) \$275
	Binding (per binding)	\$0.25		Flushing / Cfactor (each) \$500
				Backpack Electrofisher (each) \$1,000
				<u>Survey Grade</u> <u>Standard</u>
				Drone (per day) \$200 \$100
				GPS (per day) \$150 \$50

OTHER DIRECT EXPENSES:

Other direct expenses are reimbursed at actual cost times a multiplier of 1.15. They include outside printing and reproduction expense, communication expense, travel, transportation and subsistence away from the FNI office. For other miscellaneous expenses directly related to the work, including costs of laboratory analysis, test, and other work required to be done by independent persons other than staff members, these services will be billed at a cost times a multiplier of 1.15. For Resident Representative services performed by non-FNI employees and CAD services performed In-house by non-FNI employees where FNI provides workspace and equipment to perform such services, these services will be billed at cost times a multiplier of 2.0. This markup approximates the cost to FNI if an FNI employee was performing the same or similar services.

These rates will be adjusted annually in February.