Action Requested/Required:

- ☐ Vote/Action Requested
- ☑ Discussion or Presentation Only
- ☐ Public Hearing

Report Date: _____
Hearing Date: _____
Voting Date: _____

Department: Community Development **Presenter(s) & Title:** Bethany Watson, City Engineer

Agenda Item Title:

Discussion on approval for Task Order 13 to Black & Veatch for Canton's Water System Master Plan Project in the amount of $486,500.00

Summary:

City Staff has requested a proposal from B&V to update Canton's 2018 Water Master Plan to provide a road map for the future system needs through 2070. The Master Plan is required to be updated every 5 years by the MNGWPD. B&V has provided a proposal that understand the multi-faceted challenges of providing quality water supply to Canton's growing residential population and businesses, including the water treatment capacity needs and the goal of developing a comprehensive, long-term solution so that infrastructure recommended in the short term fits into an overall strategy for the future. This plan will include: Water Demand Forecasts, Water Supply Evaluation (safe yield for the Reservoir), Water Treatment Facilities Plan (New/Upgraded Water Plant), Water Distribution System Evaluation, Capital Improvements Plan, and a Master Plan Report. Staff has requested $50,000 in contingency for stakeholder and coordination with Cherokee County Water Sewer Authority.

Budget Implications:

Budgeted? ☑ Yes ☐ No ☐ **N/A**

Total Cost of Project: $ 486,500.00 Check if Estimated ☐

Fund Source: General Fund ☐ Water & Sewer ☑ Sales Tax ☐ Other: _____

Staff Recommendations:

Staff recommends approval for Task Order 13 to Black & Veatch for Canton's Water System Master Plan Project in the amount of

Reviews:

Has this been reviewed by Management and Legal Counsel, if required? ☐ Yes ☐ No

Attachments:

Proposal
Agreement

THIS SERVES AS A SUPPLEMENTAL AGREEMENT made as of _____, between the **City of Canton, Georgia, (OWNER)** and **Black & Veatch Corporation, (Consultant).**

Owner and **Consultant** have previously executed a Professional Services Agreement dated December 20, 2018 and amended February 3, 2022, that defines general terms under which **Consultant** will furnish General Consulting Engineering Services and Project Engineering Services to **Owner**. **Owner** now wishes to engage **Consultant** to provide services in connection with the Project known as Task Order to. 13 - Canton's Water System Master Plan. The Scope of Services is defined in Attachment A.

The fee for these services will be a Time and Expense Amount as outlined in Exhibit A of the Professional Services Agreement. Payments will be made monthly in accordance with the number of hours worked by the personnel of **the Consultant**. The amount will not exceed amount of Four Hundred Eighty-Six Thousand Five Hundred ($486,500.00).

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement as of the day and year first above written.

Owner:	**Consultant:**
City of Canton	Black & Veatch Corporation
Bill Grant	William J. Wells By (Typed Name)
Mayor Title	_____ Title
_____ Signature	_____ Signature
Attest:	Attest:
_____	_____ _____ _____

Approved as to form

_____

Robert M. Dyer
City of Canton
Attorney

ATTACHMENT A

PROPOSAL FOR

WATER SYSTEM MASTER PLAN

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PREPARED FOR

City of Canton

6 MAY 2025

BLACK & VEATCH

Exhibit A
Scope of Services

Project Background

The City of Canton (City) requested Black & Veatch (BV) update Canton's 2018 Water Master Plan to provide a road map for the future system needs through 2070. The goal of the Water System Master Plan (Plan) is to assess the current system and develop a suite of recommended solutions for water supply, treatment, and water distribution system to meet both the short-term and long-term system needs cost effectively. The Plan will prioritize improvements while providing triggers to maintain flexibility to adapt to changing conditions and opportunities.

The City's water treatment plant (WTP) was originally constructed in the 1920s, with expansions and improvements to meet evolving standards and growth. The City is currently permitted to withdraw 18.7 MGD (monthly average) and 23.0 MGD (maximum day) from the Etowah River. The WTP is permitted to treat 5.45 MGD. The higher withdrawal rate is based on the City's ability to release water from the Hickory Log Creek Reservoir to supplement flow in the Etowah River. Based on recent drought analysis, Georgia Environmental Protection Division (EPD) is indicating that the yield from the reservoir may need to be reduced. The Canton WTP conveys treated water to the distribution system and customers via its high service pump station and network of 145 miles of piping.

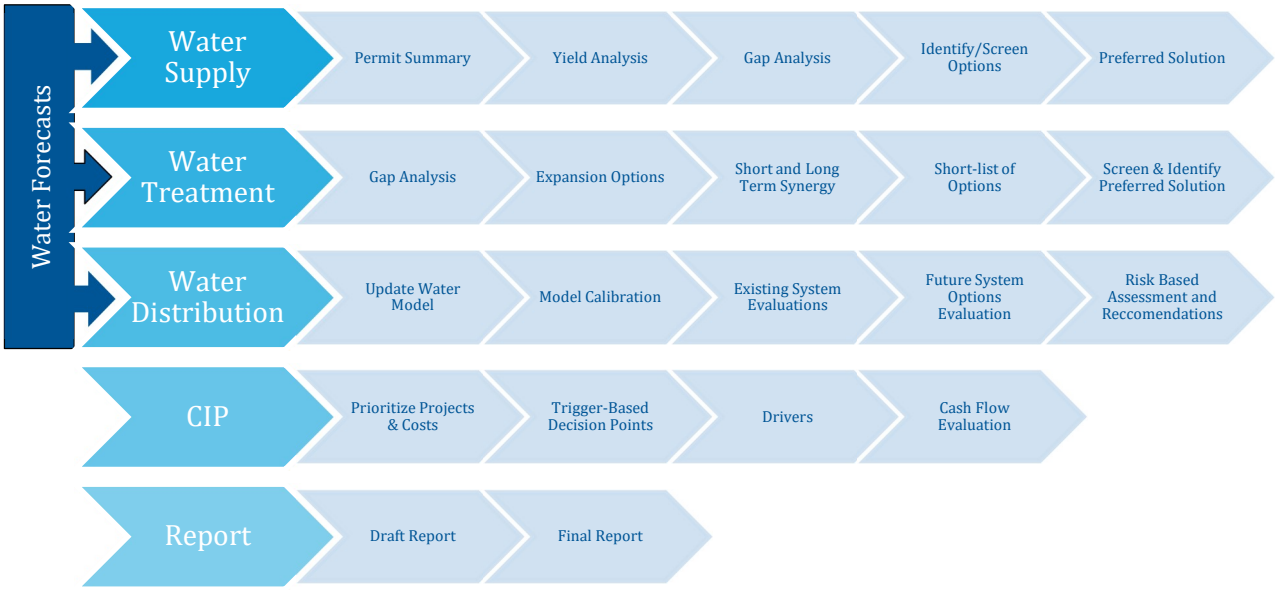
BV understands the multi-faceted challenges of providing quality water supply to Canton's growing residential population and businesses, including the water treatment capacity needs and the goal of developing a comprehensive, long-term solution so that infrastructure recommended for the short-term fits into an overall strategy for the future.

The Plan will include the following elements to provide a comprehensive view of the system needs:

- Water Demand Forecasts
    - Develop water demand forecasts through 2070
    - Consider climate resiliency and water conservation impacts
- Water Supply Evaluation:
    - Review current permitted raw water withdrawals
    - Assess current water supply yields from the Hickory Log Creek Reservoir
    - Identify gaps, if any, between available water supply capacity and forecasted water supply needs
- Water Treatment Facilities Plan:
    - Summarize existing, permitted water treatment capacity and operational maximum treatment capacity
    - Establish water quality and treatment goals
    - Identify gaps between current water treatment capacity and future water demand forecasts
    - Consider options to expand treatment capacity in conjunction with water supply options;

        - Incorporate results of previous studies, including the recent water treatment plant feasibility evaluation
        - Consider treatment processes and hydraulic capacity of the treatment facility
        - Identify, assess and compare options that satisfy both short-term needs provide long-term solutions
    - Business Case Evaluation: Screen options to identify the solution that ranks highest with both economic and non-economic factors
- Water Distribution System Evaluation:
    - Update the water distribution system model to include infrastructure built since 2018
    - Use the model to evaluate short-term and long-term system performance and infrastructure improvements.
    - Prioritize water system improvements, for both water capacity expansion and asset renewal and replacement projects.
- Capital Improvements Plan:
    - Summarize completed or in progress water infrastructure improvements recommended in the 2018 Water Master Plan
    - Summarize recommended water system infrastructure improvements, including trigger-based decision points and improvement drivers.
    - Establish a capital improvements plan (CIP)to provide insights into financial needs for both short- and long-term infrastructure investments.
- Master Plan Report:
    - Prepare a draft and final report to document the planning process.

The process is shown below graphically. The water demand forecasts form the foundation of the plan, and the water supply, treatment and distribution are interrelated.



The following scope of services provides details on tasks, meetings, and deliverables.

Scope of Services

The services to be provided in each phase of this project will be as follows:

- Task 100: Project Management
- Task 200: Data Request and Review
- Task 300: Water Demand Forecasts
- Task 400: Water System Climate Resilience
- Task 500: Water Supply Evaluation
- Task 600: Water Treatment Evaluation
- Task 700: Water Distribution System Assessment
- Task 800: Capital Improvements Plan
- Task 900: Master Plan Report

Task 100: Project Management

Task 110 – Project Kickoff

Schedule and prepare for project kickoff meeting; discuss goals of the project, scope, schedule, budget, and data request needs. Project kickoff meeting will be hybrid with key team members attending in person while others attending virtually.

Task 120 – Project Coordination

1. Provide project management and administration for a 13-month project period
    a. Correspond and consult with Canton staff
    b. Coordinate activities on the project team
    c. Develop and implement specific work plans, procedures and quality control and quality assurance plan
    d. Provide overall project direction to meet Canton's project goals
2. Maintain project files and documents
3. Prepare monthly invoices and status reports to document project progress
4. Maintain decision log for the project

Task 130 – Project Communication

1. Arrange for and participate in monthly project status meetings (virtual) to review progress, budget, schedule, changes in scope of services and exchange of information and ideas.
2. Prepare and distribute meeting notes within one week of the meeting. Action items and decisions will be documented in the meeting notes.
3. Meeting notes will be prepared and provided along with presentation materials for all workshop and technical meetings.

Deliverables:

- Project Schedule
- Monthly Project Progress Reports
- Monthly Project Status Meeting Notes

Meetings:

- Project Kickoff
- 12-Monthly Project Progress Meetings, Virtual

Task 200. Data Request and Review

Task 210 – Data Request

BV will prepare an initial data request to discuss during the project kick-off meeting. The data request will include items such as historical water purchases, production data, customer metered billing data, SCADA Data, previous studies by others, and other information. Updated GIS of the water system shapefiles or geodatabase will be requested for model updates. The data request will be prioritized to help the City focus its efforts on the most important data pieces first to keep the project moving forward.

Task 220 – Data Review

BV will review the requested data as it is received and may request a virtual meeting to review any questions or anomalies in the data sets. The data request spreadsheet will be updated with to indicate data received until all requests are completed. An updated copy of the data request spreadsheet will be included in the monthly progress report.

Deliverables:

- Data request tracking spreadsheet and updates

Task 300: Water Demand Forecasts

Task 310 – Historical Demand Analysis and Metrics Development

1. Review historical water purchase, production, and consumption records. BV will review and evaluate historical water purchase/production data and historical water consumption data by customer classification over the last 3 to 5 years, as available from the City.
2. BV will calculate and summarize historic water usage metrics, including average day, maximum day, per capita usage, non-revenue water (NRW), and peaking factors.

Task 320– Population Forecasts

1. Request Traffic Analysis Zone (TAZ) population data from the Atlanta Regional Commission (ARC) and population forecast data from the Georgia Office of Planning and Budget (OPB).
2. Future Land Use, Demographics and Development
   - One meeting with City staff to understand future service areas, future service goals, anticipated local development drivers and likely targets for redevelopment and infill, major industries or employers and projected timing (Future Land Use and Development Vision Meeting).
   - One meeting with identified stakeholders from City or County departments, such as planning and/or economic development to gain additional insights into the community growth vision and locations of likely future development (Stakeholder Meeting: Planning and/or Economic Development Partners).

3. Develop Population Forecasts, incorporating local growth vision:
   - BV will compile available data from the ARC and Georgia OPB population forecasts, as well as the meetings described above) to develop population estimates through the planning period.
   - Local plans for growth, including future land use plan and known developments and employment centers will also be incorporated.
   - Population will be estimated through 2070, using years 2025 (Baseline), 2030, 2035, 2040, 2050, 2060 and 2070.
4. Schedule and hold Population Forecasts Review Meeting to discuss population forecasts through the planning period and make one round of edits to incorporate input.

Task 330 – Water Demand Forecasts

1. Water demand forecasts are foundational to the planning process, any changes to the forecasts once finalized will have ripple impacts through the project; we will collaborate with Canton on development of the demand forecasts to capture elements that may impact water needs in the future. Once the Population and Water Demand TM is finalized, changes to population or demand forecasts will result in scope change and project schedule delay.
2. Future water demands will be forecast for the 2025 (Baseline), 2030, 2035, 2040, 2050, 2060 and 2070 planning horizons.
3. Residential and commercial water demands will be developed using population-based metrics for water consumption; employment data will be considered if accurate and available.
4. Large water customers, such as industry or other large employment centers will be estimated based on current water usage patterns and/or typical water consumption for the business type.
5. All customer categories will be compiled to develop average day and maximum day water demand forecasts, in both tabular and chart formats.
6. Water demand forecasts for years 2025 (Baseline), 2030, 2035 and 2050 will be spatially allocated.
7. Develop a conservation water demand forecast to reflect reduced consumption as a result of conservation and efficiency efforts based on information developed by the Metropolitan North Georgia Water Planning District (Metro Water District).
8. Water Demand Workshop. BV will present the draft population and water demand forecasts to obtain input and feedback. One round of updates to the forecasts will be made to incorporate feedback.
9. Once adjustments are incorporated and forecasts are final, technical evaluations and options identification will begin.

Task 340 – Population and Water Demand Technical Memorandum (TM)

1. Prepare draft document to summarize the population and water demands forecasts. One round of review comments from the City will be incorporated into the forecasts TM to finalize it.

Deliverables:

- Population and Water Demand TM - Draft and Final

Meetings:

- Future Land Use and Development Vision (Hybrid)
- Stakeholder Meeting: Planning and/or Economic Development Partners (In-person)
- Population Forecasts Review Meeting (Virtual)
- Water Demand Workshop (Virtual or Hybrid)

Task 400. Water System Climate Resilience

To comply with requirements of Metro Water District, the Plan must consider climate resilience based on the Climate Resilience Study developed for the Metro Water District in 2015. Based on this document, the climate is anticipated to be hotter and wetter for North Georgia. Climate resilience will be considered in terms of impact to water demand forecasts, as well as water system infrastructure. Suggested approaches to mitigate risk and enhance resilience, including reference to Canton's America's Water Infrastructure Act (AWIA) Risk and Resilience recommendations. A summary for inclusion in the Master Plan Report will be drafted.

Deliverables:

- Draft Water System Climate Resilience Summary

Task 500. Water Supply Evaluation

Task 501- Existing Water Supply Summary

1. Summarize Existing Water Supply Capacity: Summarize existing permitted water supply sources, including purchased water sources through intergovernmental agreements for average and maximum water withdrawals, and minimum in-stream flow requirements.
2. Compare the total current permitted water supply to the water demand forecasts to identify any gaps in water supply availability.

Task 502 – Safe Yield Evaluation

Due to changes in climate patterns and more extreme droughts since the original yield for Hickory Log Creek Reservoir was completed, an update to the safe yield evaluation provides insights into water supply availability.

1. Safe Yield Evaluation coordination meeting will be conducted to discuss the safe yield for Hickory Log Creek Reservoir. A map of the watershed with nearby stream gauges, known water withdrawals and discharges will be developed to facilitate the discussion provided this information is readily available or provided by the City. Data sources for the evaluation will be discussed and confirmed.
2. Water Balance Model Development: A spreadsheet model will be developed for the Hickory Log Creek Reservoir, using the following steps:
    a. Reservoir Capacity – A stage-storage-surface area relationship for the reservoir will be established for the water balance model. We will review existing engineering drawings or technical memorandums of the reservoir from the City's archived information. If this information is not available, Black & Veatch can

develop an estimate based on publicly available terrain data; however, these datasets may not accurately represent the existing ground elevation below the water surface. Any recent bathymetric data is preferred, as it provides insights into possible sedimentation within the reservoir that could potentially reduce the storage capacity. If the reservoir has pool elevations, such as flood pool and minimum pool elevation, this information will be requested.

b. Inflows Analysis – Based on historic streamflow data, the amount of water that is potentially available to supplement water supply in the reservoir will be estimated. Different hydrologic techniques can be employed to make this estimate; the most appropriate technique will be selected based on the characteristics of the system and data availability. The selected approach for developing streamflow time-series will fall within the following scope:

    i. The USGS gaging station within the reservoir watershed will be the primary source of streamflow data. Sufficient data may be available from this source to perform the required hydrological analyses, which should include more than a decade of flow data and a period of severe drought. Area-adjustment to the stream gage data will be performed as needed to account for differences the contributing area.
    ii. In the absence of a USGS gaging station within the reservoir watershed, an evaluation of other nearby stream gages will be performed to locate the nearest stream gage that has similar watershed characteristics.
    iii. Rainfall-runoff models and generation of synthetic streamflow series (stochastic hydrology techniques) are not included in this scope. If it is determined that these are necessary for this system, a separate scope of work with the associated costs and time requirements will need to be developed to address this effort.

c. Demand and Outflow Analysis – This task includes identifying known major reservoir demands (greater than 10% of the water supply of the reservoir) and accounting for the basic dam operational water release rules. Required minimum instream flows will be incorporated into this analysis.

d. Water Balance Model – Utilizing the reservoir stage, storage, and surface area information along with the adjusted stream inflow records and outflow information, a Microsoft Excel Spreadsheet water balance model will be developed. This model will calculate the daily stage and volume in the reservoir over time based on historic streamflow records that include severe drought conditions. This model can be used to estimate the safe yield available from the reservoir.

e. Model Confirmation – With the known water inflows and outflows on the reservoir, a comparison of the estimated water surface elevations from the spreadsheet model can be compared to recorded reservoir elevations during the model period, if this information is available. With the planning-level water balance model, it is expected that there will be differences, and an analysis of the differences will be developed to provide an estimate of the model's accuracy.

3. Reservoir Safe Yield Evaluation – Using the water balance model, the safe yield of the system will be determined. Typically, the safe yield is the amount of water that can be drawn from the reservoir under all conditions, which is why it is critical that the evaluation include a severe drought time period. With known inflows and outflows to the reservoir included in the model, the safe yield would represent the additional flow that could be withdrawn under all conditions during the model period of record.
4. Gap Analysis: Using the updated capacity of existing water supply sources, including the Hickory Log Creek updated safe yield and likely available withdrawals from the Etowah River, compare the capacity to the water demand forecasts through 2070 to identify any water supply gaps.
5. If water supply gaps are identified, BV will share this information with the City for consideration of an additional service to identify and evaluate additional water supply options.
6. Technical Memorandum
    a. A Technical memorandum will be prepared for the water supply evaluation, including discussion of existing water supply sources, permitted capacity and updated safe yield for existing supplies based on drought of record, and water supply gaps, if any.
    b. A summary of the evaluation process and safe yield development will also be included in this document.
    c. Draft TM will be submitted for review and any comments will be incorporated into the final document, which will be included as a chapter of the water master plan report.

Deliverables:

- Draft Water Supply Technical Memorandum
- Safe Yield Evaluation Model

Meetings:

- Safe Yield Results Meeting and Gap Analysis (Virtual)

Task 600. Water Treatment Facilities Planning

The Canton Water Treatment Plant (WTP) was originally constructed in 1920, with expansion and improvements over time. It is currently permitted to treat 5.45 MGD. Recent improvement projects at the water treatment plant include the completed flocculated system replacement, and the intake upgrade, which is under construction. The intake project includes a new intake screen, one additional intake pump, and adjustable frequency drives on the high service pumps.

During the preparation of the 2018 Canton Water Master Plan, a new 8-10 MGD water treatment plant was assumed to be constructed on a City-owned parcel near Hickory Log Creek Reservoir in the near-term; as a result, no analysis of expansion options and transitions were developed.

In 2024, the summer peak day demand reached 4.8 MGD, or 88 percent of the WTP capacity. To support the City's decision-making process, this treatment facilities planning task, will

identify a range of options for capacity expansion and phasing to accommodate short-term demands and be part of a long-term solution. The options will include those concepts identified in the recent WTP feasibility study, as well as other alternatives to support long-term phasing.

Task 601- Treatment Capacity Needs

1. Compare the permitted water treatment and intergovernmental water purchase agreements with the updated water demand forecasts to identify the timeline for treatment capacity needs.
2. Include impacts for anticipated or programmed changes to water purchase agreements and consider possible future arrangements.
3. Prepare graphs and tables to indicate the anticipated needs over the planning horizon, through 2070.

Task 602 – Water Quality and Treatment Goals

1. Regulatory review and comparison to evaluation of historic water quality data.
2. Develop a list of potential water quality impacts based on existing and future foreseeable regulations. Emerging contaminants on the UMCR5 list as well as PFAS will be considered.
3. Develop a draft list of recommended treatment goals for the Canton WTP to target compliance with existing and future regulatory requirements and emerging contaminants identified in this task.

Task 603 – Facility Expansion Planning and Phasing Strategy

1. Evaluate existing treatment processes for meeting water quality goals and capacity treatment needs through the 2070 planning horizon; this task will build on the WTP feasibility study completed in January 2025.
2. Assess future capacity expansion needs and needed unit processes for future, considering current regulatory outlook, previous operating history, condition of unit processes and current performance.
3. Identify WTP options: BV will identify a suite of options, up to 6 sets, such as:
    a. Expansion and improvements of capacity at the existing WTP site, building on concepts identified in the feasibility study as part of a longer-term phasing strategy
    b. Temporary treatment trains
    c. Purchase of adjacent land to the existing WTP location to expand capacity footprint
    d. Consideration of treatment technology with compact footprint to maximize use of existing treatment location
    e. New WTP location and facilities
    f. Consideration of partnering with adjacent utilities to treat the permitted supply
4. Option Workshop Meeting: The list of options will be shared with City staff during a workshop meeting to discuss, brainstorm and eliminate any of the options or to identify any other combination of viable options

5. For each option or combination of options, a phasing plan for short-term and long-term water demand needs will be considered. Each set of options will be developed to consider the following elements:
    a. Process location / configuration
    b. Treatment technology, unit capacities and hydraulics considerations
    c. Level 5 AACE planning level cost estimate
6. Business Case Evaluation
    a. Develop screening criteria, including economic and non-economic factors, along with weighting factors
    b. Score and rank the options
    c. The top ranked option will be considered the preferred option for development of more detailed expansion plan and phasing strategy.
7. Develop Expansion Plan and Phasing Strategy
    a. For the selected option, develop a plant configuration and technology recommendation for short-term and long-term planning horizon.
    b. Perform a hydraulic analysis of the recommended long-term improvements to confirm the recommended onsite configuration and to identify flow constrictions or changes needed to accommodate appropriate flow rates for given processes.
    c. Develop an 11X17 figure with an aerial photo background to show the planned treatment configuration.
    d. Present timeline for phasing improvements from short-term through long-term planning horizon.
    e. Prepare cash flow diagram for capital treatment investments over the planning period.
8. Expansion Plan and Phasing Strategy Workshop: Meet with City staff to review the expansion plan and phasing strategy developed and solicit input and feedback.

Task 604 – Water Treatment Facilities Plan Technical Memorandum

1. Prepare a draft Water Treatment Facilities Plan TM.
2. Submit the technical memorandum to the City staff or review.
3. Address one round of City's comments for inclusion in the final report.

Deliverables:

- Water Treatment Facilities Planning Draft TM

Meetings:

- Options Workshop (Hybrid)
- Screening Meeting (Virtual)
- Expansion Plan and Phasing Strategy Meeting (Hybrid)

Task 700 – Water Distribution System Evaluation

The City's water distribution system model was developed as part of the 2018 Master Plan using Bentley's WaterGEMS software. This model will serve as the initial starting point for the water distribution system evaluation. The model will be reviewed against the City's updated GIS databased, and new pipes larger than 8-inches in diameter will be added to the model; water demand assignments will be updated as well as system operational data. The model will be recalibrated so that this tool will provide reliable output data. Future system evaluations will be conducted using the planned treatment strategy and up to two treatment locations along with intergovernmental agreement supply points will be included in the model to assess impacts to the distribution system.

Task 701 – Workshop with GIS and Water System Operations

1. BV will conduct the GIS and Water System Operations Workshop with City staff to discuss and document current operational processes as well as GIS updates in the geodatabase.
2. If not in our files, as-built drawings of key infrastructure, such as tanks and booster pump stations will be requested.
3. Performance criteria, or level of service goals, are used to identify areas of concern and system shortfalls and help identify recommended improvements. BV will prepare a table of typical design criteria, including maximum pipe velocities, maximum headloss gradient, minimum and maximum pressures, tank turn-over goals, and system storage volumes. This table will be submitted for consideration and discussion at the workshop.

Task 702 – Update Water Model Baseline Data

1. Pipelines and Facilities. Using the City's GIS data, the water model will be updated to include any new pipes added to the system since the 2018 master plan that are 8-inches or larger in diameter. In addition, facility changes will be incorporated into the hydraulic model.
2. Demand Allocation. The average day water demand spatial assignments to nodes will be updated based on the billing data and information obtained in Task 300. An additional demand set for maximum day, based on the maximum day to average day peaking factor will be created.
3. Demand Curves. Diurnal demand curves will be established using SCADA information obtained from two weeks of peak summer usage and two weeks of typical average day usage.

Task 703 – Model Calibration

1. SCADA data will serve as the basis for calibration; if additional data is needed for model validation, deployment of an appropriate number of pressure recorders to strategic locations will be discussed with the City for consideration as an additional service.
2. SCADA data will be reviewed to identify a calibration day that has typical system operations.
3. The water model will be calibrated with a 24-hour extended period simulation (EPS) against SCADA and pressure data by adjusting operations and variables.

4. Model anomalies will be identified for discussion with Canton staff to resolve.
5. A calibration results review workshop will be held to present model results and discuss possible solutions to identified calibration issues, if any.

Task 704 – Water Distribution System Evaluation

1. Conduct the existing system evaluation (2025/Baseline) using the calibrated water model. The goal of this evaluation is to assess system performance and identify deficiencies in the existing system.
    a. Compare system performance to performance criteria (velocity, headloss and pressure)
    b. Assess pumping and storage performance by pressure zone
    c. Conduct fire flow analysis to identify areas where flows or residual pressures are less than the desired goal
    d. Conduct a water age evaluation based on existing average day demands to identify areas where water turnover is low and flushing or other system modifications may be beneficial for water quality improvements.
    e. Review the existing system evaluation results with City Staff (virtually). At this meeting, we will also confirm future system modeling scenarios.
2. Conduct future system evaluations, incorporating the phasing plan for water treatment.
    a. Future water models will be developed for 2 planning horizons: 2035 (10 years), 2050 (25 years).
        i. Using the water demand forecasts, BV will spatially distribute the water demands based on Traffic Analysis Zone (TAZ) and/or future land use maps.
    b. Future modeling will begin with the 2050 model to establish longer-range capacity needs, identifying locations for water transmission mains from new treatment or supply sources and connectivity to the distribution system model. This approach facilitates using the other models for phasing and implementation of the long-term strategy for service.
        i. Compare modeled system performance to performance criteria. Infrastructure will be sized to align with performance criteria and long-term demands.
        ii. Assess pumping and storage performance by pressure zone.
        iii. Conduct fire flow evaluation at customer connections to identify areas where flows or residual pressure are less than the desired goal; identify improvements needed to improve fire flow conditions.
        iv. Conduct water age evaluation to review the impact of recommended improvements on water age and minimize impact where possible or make recommendations for potential water flushing needs.
        v. Review 2050 model results and recommendations with City staff. Present a map with the recommended improvements for 2050.
    c. The 2035 model will be used to develop phasing plans for the 2050 infrastructure improvements. Based on the water demand forecasts and locations of growth and system performance, improvements will be prioritized and phased.

   d. Recommendations for improvements will be presented on maps for each planning horizon: 2025/Baseline, 2035 and 2050.
   e. Up to 3 additional modeling scenarios will be conducted to consider desired "what-if" scenarios, such as system resilience tests like power outages and system performance. The scenarios will be discussed and identified at the existing system evaluation meeting.
3. Prioritizing improvements will consider aging infrastructure as well as capacity expansions within the system. Using available GIS information on pipe age and critical customers, BV will use a process to identify critical water mains and assets that have a higher consequence of failure and identify these improvements for a higher priority ranking.
4. Technical Memorandum
   a. Prepare a draft Water Distribution System Evaluation TM.
   b. Submit the technical memorandum to the City staff for review.
   c. Address one round of City's comments for inclusion in the final report.

Deliverables:

- Water Distribution System Evaluation TM (Draft)
- Updated Water Distribution System Model

Meetings:

- GIS and Water System Operations Workshop (Hybrid)
- Initial Calibration Results Meeting (Virtual)
- Existing System Evaluation Results Meeting (Virtual)
- Future System Improvements Workshop (Hybrid)

Task 800 – Capital Improvements Plan

The CIP is the summary and prioritization of all recommendations in the Master Plan. This task also includes an American Association of Cost Estimators (AACE) Class 5 cost estimates to provide planning level costs that include factors for contingencies and engineering services.

Task 801: Draft Capital Improvements Plan

1. Prioritize capital improvements in a logical framework over time including drivers and triggers that could reshuffle the priority of the project.
2. Develop Class 5 costs for capital improvements.
3. CIP Review Meeting. The initial phasing and prioritization table will be shared and reviewed with the City.
4. Develop a one-page CIP Project Sheets that includes the location, project cost elements, need, project drivers and triggers for each capital improvements.
5. A system-wide map of recommended improvements and timing will also be developed as a large scale map (24 x 36).

Task 802: Cash Flow

1. Using the CIP phasing plan, an annualized cost will be developed to anticipate cash flow for capital investments.
2. The cash flow can be compared to current rate structures to assess revenue sufficiency, which can be added to this project as an additional service.

Task 803: Recommendations TM

1. Prepare a draft Recommendations TM that documents the capital cost and capital improvement plan approach for the master plan report.
2. Submit the technical memorandum to the City staff for review.
3. Address one round of City's comments for inclusion in the final report.

Deliverables:

- CIP Project Sheets
- Map of CIP Projects (24 x 36)
- Recommendations TM (Draft)

Meetings:

- CIP Review Meeting (Virtual)

Task 900 – Master Plan Report

Task 910 – Report Template and Initial Chapters

1. Prepare template for technical memoranda deliverables, which will be set up as a chapter in the report rather than a stand-alone technical memorandum.
2. Prepare report document, including cover, table of contents, list of tables and figures, and abbreviations, introduction and executive summary.

Task 920 – Water System Master Plan Report

1. The interim deliverable technical memoranda will be included as chapters in the report.
2. Develop the capital improvements plan chapter and related appendices.
3. Develop appendices for reference material and data sets.
4. Submit draft water system master plan report to the City for review.
5. Meet with the City to discuss comments; address feedback and finalize the Water System Master Plan report.

Task 930 – Present to the City Council

1. Provide brief presentation to the City Council for the adoption of the Final Master Plan Report.

Deliverables:

- Draft Master Plan Report
- Final Master Plan Report

Meetings:

- Review report comments (virtual)

Additional Services, Not Included in the Scope of Services:

Any work requested by the City that is not included in the Scope of Services outlined in this document, will be considered Additional Services or Supplemental Services. Additional services include items such as, but not limited to:

1. Deployment of temporary Pressure Recorders to obtain additional data for model validation in the event additional data is needed beyond the SCADA information, this task will include identifying strategic locations in the system for installation of the pressure recorders, data download and review, and additional effort in validating the model to align with the data collected.
2. Identify, review and screen water supply options if a gap between available supplies and forecasted needs is calculated.
3. Public meeting or stakeholder involvement meeting facilitation.
4. Financial rate study.
5. Field investigations, including condition assessments, surveys, etc. of water facilities.
6. GIS mapping services.
7. Presentations to the City Council or other elected officials, expect as noted in the Scope of Services

Organizational Chart

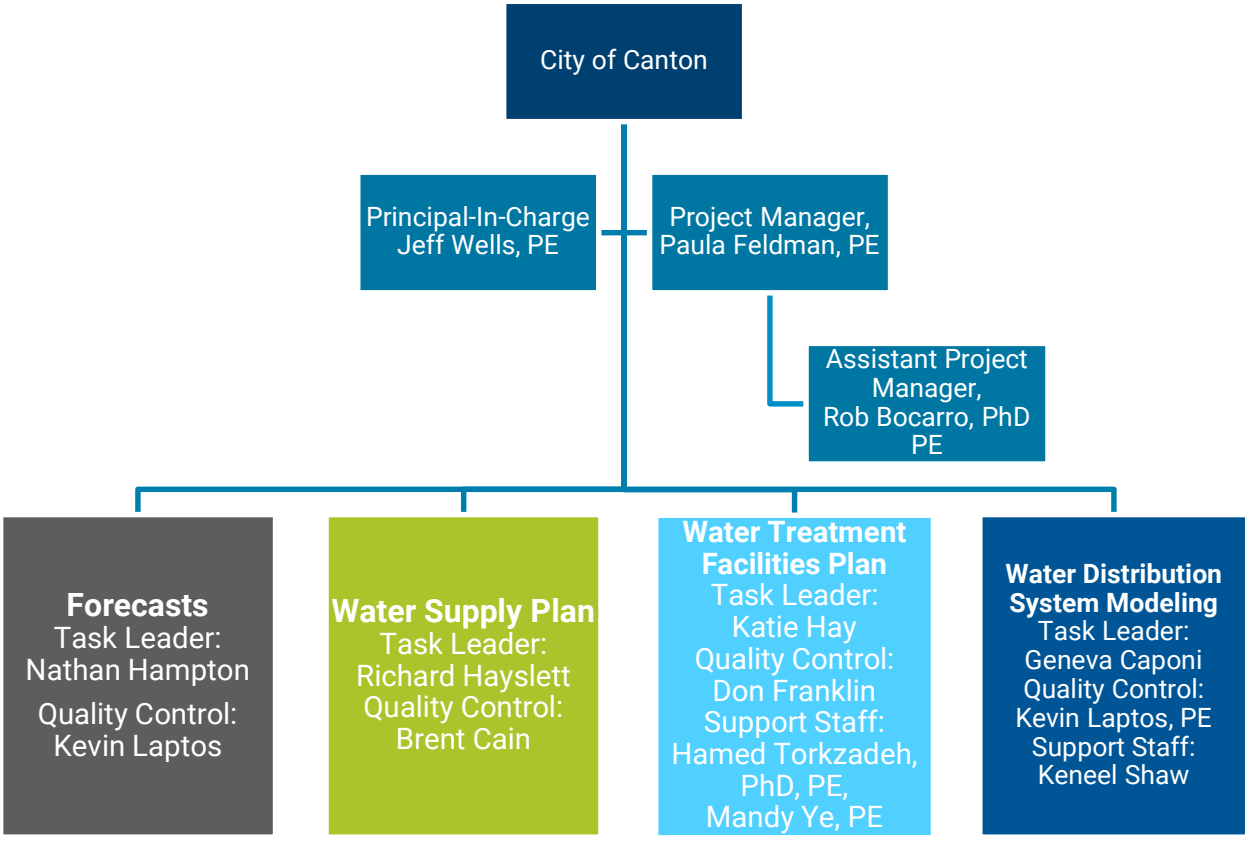


Exhibit B
Estimated Labor Hours and Associated Fee

The following estimate of labor and fee are responsive to Exhibit A - Scope of Services. The Scope of Services shown below is authorized upon execution of this task order.

An additional $50,000 of owner directed allowance is included in the estimate, to provide the City flexibility in directing additional efforts, such as coordination with stakeholders/partners or development of additional options. If additional effort is requested under this allowance, BV will not proceed without prior written authorization from the City. In the event effort is needed beyond the allowance, BV will notify the City and will not proceed without written authorization by the City.

Task	Description	Hours	Labor	Travel / Misc. Expenses	Total Price
1	Task 100: Project Management	169	$41,490	$638	$42,128
2	Task 200: Data Request and Review	87	$17,715	$0	$17,715
3	Task 300: Water Demand Forecasts	206	$45,720	$168	$45,888
4	Task 400: Water System Climate Resilience	41	$8,620	$0	$8,620
5	Task 500: Water Supply Evaluation	224	$60,495	$0	$60,495
6	Task 600: Water Treatment Evaluation	387	$79,425	$66	$79,491
7	Task 700: Water Distribution System Assessment	541	$95,375	$66	$95,441
8	Task 800: Capital Improvements Plan	181	$31,080	$0	$31,080
9	Task 900: Master Plan Report	195	$37,765	$66	$37,831
10	Task 1000: 2026 Bill Rate Escalation	0	$0	$17,811	$17,811
Subtotal					**$436,500**
	Task 1100: Owner Allowance - Owner Directed Additional Services	*0*	*$0*	*$50,000*	*$50,000*
Totals		**2,031**	**$417,685**	**$68,815**	**$486,500**

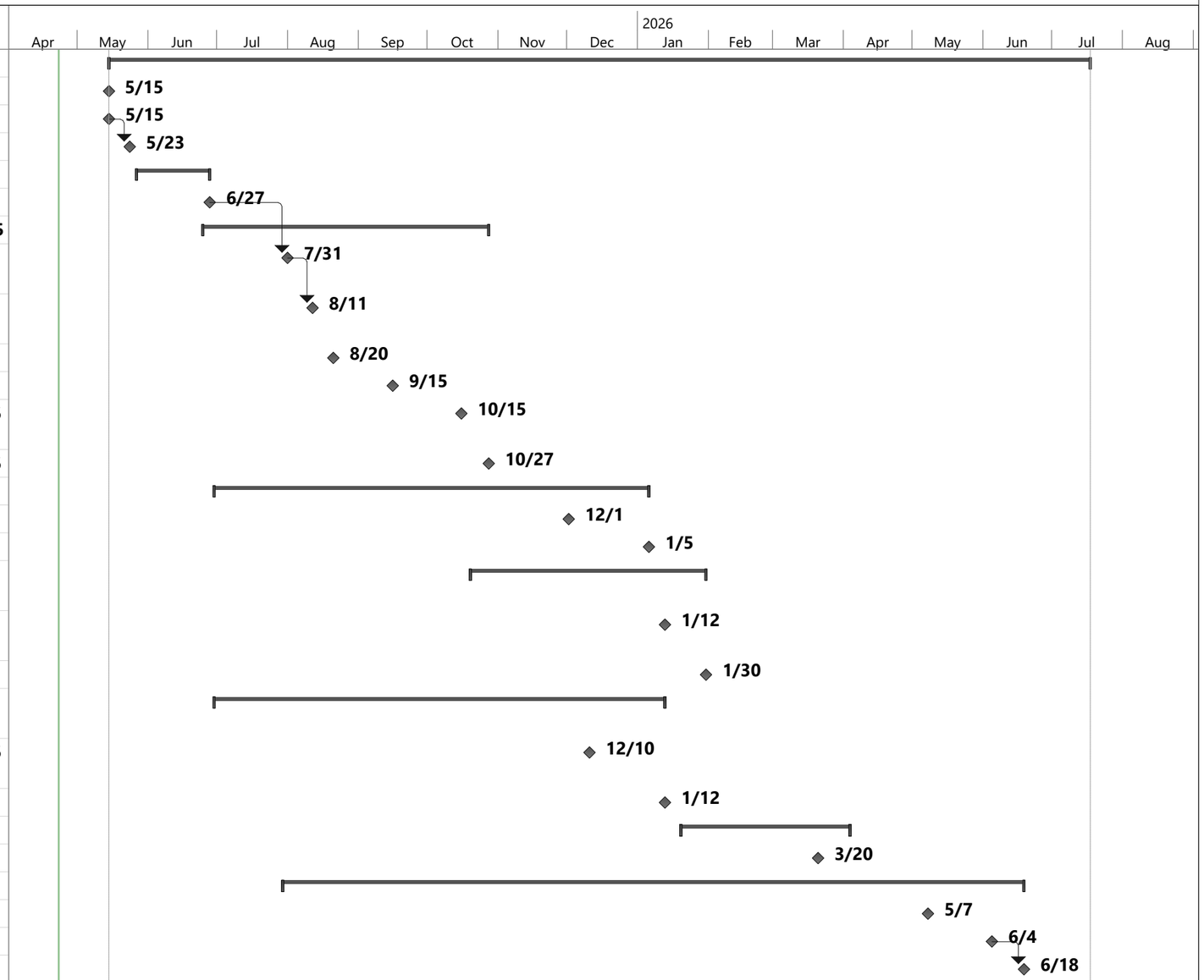
Exhibit C
Project Milestones

BV's services will commence upon written authorization from the City, which will constitute a Notice to Proceed (NTP) for the particular task. The schedule of Consultant's services will coincide with contractual milestones established between City and Consultant.

A draft milestone schedule is attached for reference. Within seven (7) calendar days of receipt of the NTP, Consultant's will submit a preliminary Schedule for the Project Kickoff meeting. Milestones will be established for each Phase.

Water System Master Plan Draft Schedule

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Task 100: Project Management**	**275 days**	**Thu 5/15/25**	**Fri 7/17/26**
2		City Council approval	0 days	Thu 5/15/25	Thu 5/15/25
3		Issue NTP	0 days	Thu 5/15/25	Thu 5/15/25
4		Kick off meeting	0 hrs	Fri 5/23/25	Fri 5/23/25
7		**Task 200: Data Request & Review**	**24 days**	**Tue 5/27/25**	**Fri 6/27/25**
10		Completed data request tracking sheet	0 days	Fri 6/27/25	Fri 6/27/25
11		**Task 300: Water Demand Forecasts**	**71 days**	**Wed 6/25/25**	**Mon 10/27/25**
13		Future Land Use / Development Vision Meeting	0 days	Thu 7/31/25	Thu 7/31/25
14		Stakeholder meeting - planning and/or economic development	0 days	Mon 8/11/25	Mon 8/11/25
16		Population Forecasts Review Meeting	0 days	Wed 8/20/25	Wed 8/20/25
19		Workshop Meeting Review Forecasts	0 days	Mon 9/15/25	Mon 9/15/25
22		Issue Draft Population & Water Demand TM	0 days	Wed 10/15/25	Wed 10/15/25
25		Issue Final TM	0 days	Mon 10/27/2	Mon 10/27/25
29		**Task 500: Water Supply Evaluation**	**107 days**	**Mon 6/30/25**	**Mon 1/5/26**
35		Issue Draft Water Supply Tech Memo	0 days	Mon 12/1/25	Mon 12/1/25
38		Prepare final as chapter for report	0 days	Mon 1/5/26	Mon 1/5/26
39		**Task 600: Water Treatment Facilities Planning**	**63 days**	**Mon 10/20/25**	**Fri 1/30/26**
45		Issue Draft Water Treatment Facilities Plan	0 days	Mon 1/12/26	Mon 1/12/26
48		Prepare final as chapter for report	0 days	Fri 1/30/26	Fri 1/30/26
49		**Task 700: Water Distribution System Assessment**	**112 days**	**Mon 6/30/25**	**Mon 1/12/26**
56		Issue Water Distribution System Evaluation Tech Memo	0 days	Wed 12/10/25	Wed 12/10/25
59		Prepare final as chapter for report	0 days	Mon 1/12/26	Mon 1/12/26
60		**Task 800: Capital Improvements Plan**	**54 days**	**Tue 1/20/26**	**Fri 4/3/26**
64		Present Recommendations	0 days	Fri 3/20/26	Fri 3/20/26
66		**Task 900: Master Plan Report**	**218 days**	**Wed 7/30/25**	**Thu 6/18/26**
71		Issue Draft MP Report	0 days	Thu 5/7/26	Thu 5/7/26
74		Issue Final Report	0 days	Thu 6/4/26	Thu 6/4/26
75		Presentation to City Council	0 days	Thu 6/18/26	Thu 6/18/26



City of Canton
Water Master Plan
Date: Wed 4/23/25

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		