

EXHIBIT A
SCOPE OF SERVICES

Owner: Durham County
Engineer: Black & Veatch International Company
Project: Triangle Wastewater Treatment Plant – Chemical Feed System Improvements

This Scope of Services includes engineering design, permitting, and bidding services for refurbishing and incorporating improvements to the plant's sodium hypochlorite chemical feed system. Black & Veatch will provide engineering services defined herein for the project. Black & Veatch can also provide the supplemental services described herein authorized by the Owner under a written Task Order which will include a description of the scope along with a fee and schedule.

PROJECT DESCRIPTION

This project includes upgrades to the plant's existing sodium hypochlorite to address issues associated with reliability, maintenance, and process control. Improvements discussed under this scope of services are based on a site visit by B&V with Durham County operational staff on July 18, 2018 and agreed to an email sent by Durham County on July 31, 2018. The Scope of Services for this project includes the following task:

- Task I Projection Implementation and General Administration
- Task II Permitting
- Task III Basic Design Services
- Task IV Bidding and Award
- Task V Supplemental Services

The scope of work includes civil, mechanical, structural, and electrical services associated with the design with this Project.

I. PROJECT IMPLEMENTATION AND GENERAL ADMINISTRATION

A. Project Schedule

1. A Project Schedule will be developed for the scope of work provided herein and reviewed with the Owner at the basis of design workshop, which will be performed at the onset of the project. The Project Schedule will provide durations allocated for design, permitting, and bidding, as well as include milestone dates for project deliverables.
2. The Project Schedule will be updated and reviewed at each major milestone with the Owner.

B. Project Meetings

1. Conduct a basis of design workshop with the Owner at the inception of the project. The workshop will include a 2-hour site visit by key design B&V staff and Operational staff, as required, to assess the improvements followed by a collaborative workshop with Durham County staff. The objective workshop will be used to establish the design criteria,

improvements, and details, which will serve as the basis for developing the contract documents. The design elements established in this workshop will be summarized in a letter with any supporting sketches and details to the County.

2. Conduct periodic meetings with the Owner, as described herein, to discuss Project status. A total of 2 meetings are anticipated during the design phase; one at the 50% milestone, and second meeting at the 90% milestone, and a third meeting at the 100% milestone to address questions and finalize the contract documents. In addition, bi-monthly conference calls will be set-up with the Owner to provide progress updates and address any questions or clarify requirements. B&V has also budgeted time to attend the pre-bid and bid opening.
 3. Decisions and action items that transpire during the design review meetings discussed above under item no. 2 will be summarized and provided to the Owner.
- C. Project Administration. Engineer will perform project administration activities throughout life of Project. The following will be included:
1. Maintain a project filing system throughout life of Project to use for storage and retrieval of Project documents.
 2. Prepare monthly invoices for Engineer's services in format acceptable to Owner.
 3. Maintain a project cost accounting system throughout life of Project.
 4. Provide Project Cost Trend Reports at project review meetings. Trend Reports shall include a concise summary of unanticipated and Owner-requested changes to the scope of work and cost of each item. If scope changes are made, the fee will be reviewed and adjusted as necessary and acceptable to both Owner and Engineer.

II. PERMITTING

A. Permitting

1. For the design phase, provide assistance to Owner in obtaining permits and approvals from federal, state, and local agencies and from utility companies. Owner will pay for all permit fees. The following permits and approvals have been budgeted under this scope of work:
 - Authorization to Construct (ATC) from NCDWQ, Division of Water Resources
2. Black & Veatch will be responsible for submitting the ATC permit application, and responding to questions, regarding the permit application associated with this scope of work inclusive of attending any regulatory meetings, as may be necessary to discuss the work covered under their scope of services.
3. Regulatory Meetings. Assistance will include the following:
 - a. Preparation of applications, exhibits, and supporting documentation as necessary for Owner's execution and submittal.
 - b. Furnishing additional information about the design.
 - c. Communicating with agencies as necessary. A total of two meetings are anticipated.

III. BASIC DESIGN SERVICES

A. General. Design services will be conducted in three phases (50% milestone, 90% milestone, and 100% milestone) and focused on developing the front-end documents, technical specifications, and drawings. The basis of design workshop will set-forth the criteria and elements that will be used for detailed design. The contract documents developed as part of the basic design services will include the following activities:

1. Prepare detailed drawings and specifications Contract Documents for the proposed construction work and for the materials and equipment required.
2. Arrange for 3 formal project review meetings scheduled with Owner to review the deliverables associated with the 50%, 90%, and 100% milestones.
3. The front-end documents will be comprised of Durham County's front-end documents modified by Black & Veatch with consent from the Owner, based on the scope of work.
4. Design drawings will be developed using a 22" x 34" format using Black & Veatch standard border.
5. Design drawings will be developed based on the McKim & Creed and CDM Smith record drawings furnished by the Owner for said improvements. These drawings will be x-referenced and masked accordingly to develop the drawings depicting the required improvements with newly created drawings and details developed, as required.
6. As part of the Basic Design Services, the Engineer shall produce interim documents for the purposes of review by Owner's staff and Engineer's quality control. The interim documents shall serve as milestones wherein certain features shall be fixed after a period of Owner review. The purpose of the interim documents and fixing certain features will be to communicate the design progress and avoid later revisions that would impact design efficiency and Project cost and schedule. Changes made after fixing features will be considered Additional Services. Interim submittals will include specifications and construction drawings.
7. The documents shall be prepared for selection of private construction contractors on a competitive bid basis, in accordance with North Carolina State bidding laws. Contracts will be arranged for single prime construction.
8. Conduct internal quality control and constructability reviews at Project milestones.
9. Prepare an opinion of probable construction cost at 50%, 90%, and 100% milestones.

The following is a more detailed discussion of the activities including in the Basic Design Services for each phase of the Project along with anticipated deliverables and decision.

B. Detailed Design. Detailed design will be conducted in three phases and will be focused on the development of technical specifications, front end documents and drawings, as described in this scope of services. The following is a summary of the scope of work for the chemical feed system improvements, as agreed to by B&V and Durham County via email on July 31, 2018:

Sodium Hypochlorite

- a. Provide a more rigid and stable piping arrangement with insulation for the existing chemical feed piping that serves the clear-well storage tank.
 - b. Replacement of the existing electric actuators that serve the tank drain system for the clear-well storage tank that provide control and valve position from the plant control system located in the administration building.
 - c. Provide new chlorine analyzers and redo sample piping used to measure the chlorine residual in the clear-well and reclaimed water plant effluent.
 - d. Install a vault with rigid piping adjacent to the injection chemical injection manhole to eliminate the current concern with confined space entry associated with the existing arrangement.
 - e. Provide rigid piping in lieu of the existing tubing for discharging the hypochlorite solution into the reclaimed water pumping station wet-well.
 - f. Provide larger service vaults and conduit to improve access and maintenance for braided tubing used to convey sodium hypochlorite solution to the clear-well storage tank and reclaimed water pumping station wet-well. Investigate and design improvements to the shorten the existing conduit alignment.
 - g. Develop a design that allows the sodium hypochlorite solution to be conveyed from the bulk storage tanks that eliminates the use of totes, currently being by operations as day tanks, and the off-gas build up that has occurred in the current piping configuration.
 - h. Provide larger capacity diaphragm chemical feed pumps with calibration tubes that can be controlled and that display run/alarm status from the plant control system located in the administration building.
 - i. Develop design that simplifies current piping arrangement, which includes a service tap for the sodium hypochlorite solution within the building.
 - j. Design an improved pumping system that provides sample water to the existing CL17 meter from the above ground storage tank.
- C. 50% Design Submittal. The intent of the 50% design submittal activities will be to advance the civil/mechanical/structural/electrical design to clearly convey the scope for review by the Owner and expedite the delivery process from 50% to 90% design.
- 1. The 50% Design Submittal Activities will include:
 - a. Demolition drawings denoting work to be refurbished.
 - b. Site plan depicting locations of proposed work and staging area for contractor.
 - c. Develop P&IDs for the chemical feed systems.
 - d. Plan view piping alignments for chemical feed systems.
 - e. Isometric drawings for chemical feed systems, as required to convey piping alignments and configuration.

- f. Mechanical plans with select number of section views.
 - g. Perform a constructability review.
 - h. Develop draft front end documents inclusive of bid form.
 - i. Develop draft technical specifications using a 16 Division CSI format.
 - j. Prepare an engineer's opinion of probable construction cost.
 - k. Conduct an internal quality control review of the contract documents prior to submission to Owner.
 - l. Conduct a meeting with Owner to review documents and address comments.
 - m. Engineer's quality control and Owner's review comments shall be addressed, as part of the 90% submittal.
2. The following 50% design submittal deliverables are anticipated:
- a. Front-end documents with technical specifications.
 - b. Contract drawings, excluding design details and section views.
 - c. Engineer's opinion of probable construction cost.
- D. 90% Design Submittal. The objective of the 90% design submittal will be to progress the design to a level that can be submitted to the State for the ATC permit approval.
1. The 90% Design Submittal Activities will include:
- a. Further refine and develop plan views.
 - b. Develop civil, mechanical, electrical, and structural drawings inclusive of details and required section views to convey the scope of work.
 - c. Finalize front-end documents and technical specifications incorporating Owner review comments from the 50% design submittal and vendor review comments related to technical specifications.
 - d. Update engineer's estimate of probable construction cost.
 - e. Conduct an internal review contract documents prior to submission to the Owner.
2. The following 90% Design Submittal deliverables are anticipated:
- a. Draft contract documents that are fully developed to convey scope of work, which will be submitted concurrently to the Owner and State for permit approval.
 - b. Updated engineer's estimate of probable construction cost.
3. The status of the Work at the end of the 90% should be the following:
- a. Incorporate Owner's comments.
 - b. Submit contract documents with permit applications to regulatory agencies, as described in Section II, Permitting of this Scope of Services

- E. 100% Design Submittal. The objective of the 100% design submittal will be to finalize the contract documents incorporating Owner's and State Regulatory review comments from the 90% design submittal.
1. The 100% Design Submittal Activities will include:
 - a. Finalize contract documents, based on regulatory review and Owner's comments.
 - b. Submit to County to finalize front-end documents with advertisement and bid dates.
 - c. Final engineer's estimate of probable construction cost.
 2. The following 100% Design Submittal deliverables are anticipated:
 - a. Final draft contract documents.
 - b. Updated engineer's estimate of probable construction cost.
 3. The status of the Work at the end of the 100% should be the following:
 - a. Submit sealed contract documents to Owner for advertisement to prospective bidders.

IV. BIDDING AND AWARD

- A. Black & Veatch shall perform the following services related to Bidding and Award.
1. Assist Owner in advertising for the construction project; maintain a record of prospective bidders to whom Contract Documents have been issued; attend and conduct pre-bid conference; and receive and process deposits for Contract Documents. Receive payments for construction Contract Documents from potential bidders. Black & Veatch will retain all payments to offset reproduction costs.
 2. Conduct, at a date and time selected by the Owner, a pre-bid conference. Provide meeting minutes to be distributed to all plan holders by addendum.
 3. Prepare addenda as appropriate to interpret, clarify or further define the Contract Documents. Addenda will be issued on behalf of Owner.
 4. Consult with and advise Owner to determine the acceptability of substitute materials and equipment proposed by Contractor(s) when substitution prior to the award of contracts is allowed by the Contract Documents.
 5. Attend and conduct the bid opening(s) and prepare certified bid tabulation sheets. Evaluate bids or proposals and assemble contracts for construction, materials, equipment and services. Assist Owner in contract award process.

V. SUPPLEMENTAL SERVICES

- A. Black & Veatch agrees to perform supplemental services as requested by Owner. When the need for such services is identified, the Black & Veatch will prepare a written Task Order which will include a scope, fee, and schedule; and submit Task Order to Owner for approval. If approved, Miscellaneous Supplemental Services will be performed upon receipt of written authorization from Owner.

1. Meetings with local, state, or federal agencies to discuss the Project unless specifically included in the scope of services herein.
2. Special consultants or independent professional associates requested or authorized by Black & Veatch not included in the scope of services herein.
3. Geotechnical or surveying services. It is anticipated surveying and geotechnical effort are not required for this project and that the existing record drawings will be sufficient.
4. Assistance with bid protests and re-bidding.
5. Revision of designs, drawings, and specifications to incorporate changes arising from Value Engineering review.
6. Supplemental engineering work required to meet the requirements of regulatory agencies that become effective after the date of this Agreement.
7. Operations and maintenance manual and operations training and startup assistance unless specifically included in the scope of services herein.

EXHIBIT B

BASIS OF COMPENSATION

Owner: Durham County (Owner)
Engineer: Black & Veatch International Company (Engineer)
Project: Triangle Wastewater Treatment Plant - Chemical Feed System Improvements

Compensation for the services included in Attachment A shall be on a billable hourly rate basis using the rates in the following Billable Hourly Rate Schedules. Total amount of all billings shall be on hourly rate with a not to exceed amount of \$126,000.

BILLABLE HOURLY RATE SCHEDULE

YEAR 2018

(Effective through 12/31/2018)

Black & Veatch Staff

Principal	\$260
Director	\$240
Project Manager	\$190
Senior Process Specialist	\$215
Process Specialist	\$165
Junior Process Specialist	\$145
Resident Engineer	\$155
Senior Engineering Manager	\$215
Engineering Manager	\$175
Project Engineer	\$175
Engineer 05	\$165
Engineer 04	\$155
Engineer 03	\$145
Engineer 02	\$135
Engineer 01	\$125
CAD Technician	\$105
Office Administrator/Finance	\$110
Project Admin.	\$65

All rates shall be subject to annual adjustment on January 1 of each year.

The billable hourly rates include computer, telephone, miscellaneous copying, postage, and subsistence.

The following expenses are reimbursable work items and will be billed at cost.

1. Bulk reproduction of documents.
2. Charges for review of drawings and specifications by government agencies, if any.
3. Vehicular transportation costs at the rate established by the Internal Revenue Service.
4. Airline tickets, meals and lodging with out-of-town travel.

EXHIBIT C
PROJECT SCHEDULE

Owner: Durham County
Engineer: Black & Veatch International Company
Project: Triangle Wastewater Treatment Plant – Chemical Feed System Improvements

It is recognized the schedule for the project is highly dependent on timing of available information and timely decisions by the project team. As such Black & Veatch will organize its work to perform the services within the time constraints and if impacted by issues outside their control will update Durham County of the impact to the overall schedule for approval before adjusting the project schedule. A detailed project schedule will be established at the basis of design workshop. Engineer shall update the schedule as necessary to reflect changes in tasks and information. It is anticipated the final project schedule will be developed based on a design duration of 5 months, 3 months for permitting, and 2 months allocated for bidding/advertisement and recommendation of award.