EXHIBIT A

TO THE AGREEMENT BETWEEN OWNER AND ENGINEER
FOR PROFESSIONAL DESIGN AND BIDDING SERVICES

Mitchell WTP Phase 1 Residuals Improvements - Backwash Wastewater Treatment Improvements and Sedimentation Sludge Collection System

DESCRIPTION OF ENGINEERING SERVICES AND RELATED MATTERS

This is an Exhibit attached to and made part of the supplemental agreement to the On-Call Professional Services Agreement dated January 29, 2014 between the City of Greensboro (OWNER) and CDM Smith Inc. (ENGINEER) for professional services.

1. The Basic Services of the ENGINEER as described in the Agreement are amended and supplemented as follows, to be referred to as the PROJECT:

PROJECT OBJECTIVES AND DESCRIPTION

The OWNER has requested that the ENGINEER provide professional services associated with improvements to the Mitchell WTP Filter Backwash Wastewater Treatment System, the addition of a Process Drain Pump Station, and the replacement of the Sedimentation Sludge Collection System, including the design of improvements, as outlined below and detailed in the associated Preliminary Engineering Report (PER), completed in June 2016 by ENGINEER. The overall scope of the Project consists of the following:

- Conversion and structural rehabilitation of existing clarifier into a filter backwash water equalization basin
- Replacement of backwash pumps and flow meter
- Addition of a new high rate treatment basin including mixers, plate settlers, and sludge collectors
- Addition of a dechlorination contact tank for the treated backwash water with provision for pH, turbidity and chlorine monitoring
- Addition of a recycle pump station and associated piping to raw water
- Improvements to the yard piping
- Addition of dechlorination chemical and polymer storage and feed system
- Removal of the existing sedimentation basin sludge collection system (6 basins), and replacement with a hoseless sludge collection system

- Addition of a 3 MGD process drain pump station; including preliminary evaluation of a wet pit/dry pit versus submersible pump station

- Pipeline from Drain Pump Station to the existing outfall discharge, assuming the pipeline will go under North Buffalo Creek

- Instrumentation and controls, electrical, structural, process mechanical and site civil work for the facilities listed above

This scope of services consists of the following major tasks:

- Task 010 – Project Management and Administration
- Task 100 – Preliminary Design
- Task 200 – Final Design
- Task 300 – Permitting
- Task 400 – Bidding and Award
- Task 900 – Unspecified Additional Services

The detailed scope of services for the Basic Services included under this Exhibit follows:

TASK 010 PROJECT MANAGEMENT AND ADMINISTRATION

This task includes managing the project team, coordinating the work, developing and maintaining a project schedule, tracking budget/work progress, invoicing and accounting, providing regular updates to the OWNER, managing scope compliance, managing regulatory compliance, oversight of technical products, and quality assurance checks on work and deliverables. Accounting and administrative support to achieve the tasks listed.

TASK 100 Preliminary Design

This task will include project kickoff, data collection, surveying, geotechnical investigation, field evaluations, meetings with OWNER staff, development of process control and instrumentation diagrams, hydraulic analysis, meetings with equipment vendors, and preparation of 30% design drawings. Through this process the ENGINEER and OWNER collaborate to develop a layout of the proposed facilities. Following the review of a conceptual design for improvements, the Engineer will proceed with the geotechnical investigation.

The ENGINEER shall develop the overall 30% design of the facilities at the Mitchell WTP, which are to include:

- Improvements to the existing filter backwash water equalization basin, including separating into two partitions, addition of hyperbolic mixers, mixing, and submersible solids handling pumps

- Addition of a new high rate treatment basin, utilizing plate settlers

- Addition of a dechlorination contact tank for treated backwash water with provision for pH, turbidity and chlorine monitoring system on the new wash water treatment system
- Addition of a recycle pump station and associated piping to raw water
- Improvements to the yard piping and control systems
- Addition of dechlorination chemical and polymer storage and feed system
- Removal of the existing sedimentation basin sludge collection system (6 basins), and replacement with a hoseless sludge collection system
- A Drain Pump Station, approximately 3 MGD capacity, constructed below grade near the entrance of the plant. Associated piping, electrical and SCADA improvements
- Instrumentation, electrical, structural, process mechanical and site civil discipline work to support a complete design of all items listed above.
- Diesel fuel tank demolition and related permitting requirements
- Design a force main from Drain Pump Station to Manhole-7 (MH7) on the North Buffalo Creek Interceptor.

Items not listed above are not included in the ENGINEER'S assumptions for the final design of this Project. It is assumed that the ENGINEER will prepare documents for one construction package, and all equipment will be specified under that package.

The following is a summary of key steps within this phase of the Project design:

101 Project Kickoff

- The ENGINEER team and the OWNER staff will hold a joint Project Kick-off Meeting. In this meeting the team will establish project goals and critical success factors, facilitate the transfer of information needed to begin the work, and include a walkthrough of the affected facilities.
- The OWNER will provide recently-completed CADD files prepared by Others to improve the facilities at the Mitchell WTP; including the Bid Documents for the Fiscal Year 2019 Major Electrical Improvements Project, and other projects as requested by ENGINEER.
- The OWNER will provide relevant records and data needed for the ENGINEER to perform Preliminary Design
- ENGINEER shall conduct a preliminary design workshop that includes the following:
    - Comparison of layouts between wet pit/dry pit drain pump station and submersible type pump station

- Prepare a capital cost analysis for the two types of pump stations

- Review the proposed capacity of the drain pump station; to include gravity flow capacities and flow conditions versus force main flows to the proposed pump station

- Review design criteria for the backwash pumps addition.

- Evaluate equipment lead time and procurement options for the project.

- Evaluate electrical improvements required for the backwash pumps addition and provide electrical system preliminary design including brief text description and a single line electrical diagram. Electrical load calculations will be prepared for utility power and standby generator power. It is currently assumed for design that the utility and generator services are adequate for the new backwash pumps. An arc flash analysis will be included, which will be carried through to design with the appropriate labeling/placarding of the new facilities.

- The preliminary design will overview the findings relative to number of pumps, pump sizing, VFDs, and other features.

- Confirm compliance with applicable codes and OWNER standards.

102 Site Survey, Geotechnical Investigation, and Environmental Soil Sampling

- The ENGINEER will rely on the site survey completed by Waller and Associates in 2017/2018, and will provide additional surveying services to complete the design of the proposed improvements. This supplemental survey shall include (1) verification of critical hydraulic control elevations and structures, piping, and other important topographic features in and near the existing wash basin structure; and (2) additional topographic survey swath from the plant main entrance, across Benjamin Parkway and the North Buffalo Creek to the adjacent greenway.

- ENGINEER will perform a geotechnical investigation to provide subsurface information in the area of the proposed improvements. Up to thirteen (13) geotechnical borings will be drilled within the proposed improvement areas. The borings will range in depth for this task from 10 to 50 feet. A monitoring well will be installed near the proposed trenchless crossing to provide groundwater elevation data.

- Geotechnical Laboratory testing will consist of index testing (moisture content, Atterberg limits, gradation size), and strength testing (compressive strength of soil and/or rock). Upon completion of the subsurface investigation, a Geotechnical Design Report will be prepared addressing the design and construction considerations for the improvements.

- Environmental soil sampling will be required due to two fuel tanks being demolished in the area of the proposed rapid rate treatment basin. Environmental Laboratory testing (TPH-GRO, TPH-DRO, VOCs by 8260, and Total Metals by 6010) will include up to five (5) environmental samples to be taken within the proposed improvement areas. The results of the environmental soil sampling will be provided to the OWNER in a Technical Memorandum. No additional environmental work is assumed at this time.

- The Survey shall include Level B Sue investigation and up to five Level A pot-holes to locate an underground utility. If additional Level A SUE is required, there will be an additional fee of $1200 per additional pothole.

103 30% Design Documents

Prepare Documents to include overall 30% design drawings showing an advancement of the designs performed in prior projects; verifying the basis of design criteria, site layout, hydraulic design, control, and other pertinent features.

The Documents shall include the following:

- Partial General drawings
- Partial Civil drawings
- Partial Process Mechanical drawings
- Partial Electrical drawings
- Partial Instrumentation/Automation drawings

Based on the ENGINEERS understanding of the project, it is assumed that no architectural and building mechanical (HVAC, plumbing, fire protection) drawings are required, with the exception of a building code analysis sheet.

During the preliminary engineering phase, and prior to delivery of the 30% design documents to the OWNER, the ENGINEER will conduct an independent technical review to verify the basis of design.

104 Engineer's Opinion of Probable Construction Costs

The ENGINEER shall prepare an opinion of probable construction costs (OPCC) for the 30% design deliverable, in accordance with AACE Class 2.

105 Deliverables

ENGINEER will provide submittals of drawings at the 30 percent design stage for the OWNER to review, which will be a partially complete drawing set for the project.

106 30% Design Workshop

The ENGINEER shall conduct and prepare handouts for a 30% Design Workshop; where the project team can review and comment on the 30% design drawings. Equipment preferences, maintenance of plant operations, OPCC, and construction schedule will be discussed at this meeting. The workshop is a launching pad into the Final Design phase – with the purpose of identifying key issues early in the project.

The ENGINEER shall provide the OWNER with copies of the Workshop PowerPoint slides and handouts.

The ENGINEER shall develop the final design of the facilities at the Mitchell WTP for the above-listed scope. In the event that additional facilities are to be included based on the results of the Preliminary Engineering Phase and Workshop, this Agreement may be amended to increase the engineering scope of services and related costs, as described in Article 2. Final design tasks to be provided by the ENGINEER are described as follows:

201 Design Drawings and Specifications

Prepare Contract Documents to include final drawings and specifications showing the scope, extent, and character of the work to be performed and furnished by contractor. Specifications shall be prepared, where appropriate, in general conformance with the 50-division format of the Construction Specifications Institute. The Contract Documents shall include plans and specifications for the following design disciplines:

- General
- Civil
- Process Mechanical
- Electrical
- Instrumentation
- Structural
- Architectural Code Sheet

OWNER will provide their standard format for the procurement documents (Division 00).

202 Engineer's Opinion of Probable Construction Costs

The ENGINEER shall prepare an updated opinion of probable construction costs (OPCC) for the 90 percent and Final Bid Set design deliverables in accordance with AACE Class 2.

203 Deliverables

ENGINEER will provide submittals of drawings at the 60 and 90 percent design stages for the OWNER to review. Engineer shall submit a partial set of proposed technical specifications at the 60 percent submittal and a full set of specifications at the 90 percent submittal. Specifications shall be prepared, where appropriate, in general conformance with the 50-division format of the Construction Specifications Institute. After review comments have been addressed on the 90 percent submittal, a Bid Set submittal will be provided to OWNER.

- The 60 percent submittal will include design drawings and most design details and technical specifications. A table of contents of the front-end documents will be provided.
- At the 60-percent design stage the ENGINEER will prepare a draft sequence of construction plan for maintenance of plant operations during construction. At the 60 percent review meeting, the ENGINEER will consult with the OWNER to confirm the construction constraints driven by plant operations. The ENGINEER will include a construction sequence specification in the 90-percent submittal which will become part of the contract documents.

- The 90 percent submittal will include all design drawings, details, and front end and technical specifications.

204 Technical and Constructability Review

At approximately the 60 percent completion stage of the drawings and specifications, the ENGINEER will conduct internal technical reviews of the design documents. It is assumed the TRC Review will be an abbreviated review process since the project is effectively maintenance of existing facilities. At approximately the 90 percent completion stage, the ENGINEER will conduct a final internal biddability/constructability review of the design documents. Following the technical reviews, the documents will be submitted for review by the OWNER.

205 Project Meetings

The ENGINEER will meet with the OWNER at the 30, 60, and 90 percent design milestones to keep the OWNER apprised of project progress and significant issues, collect and discuss the OWNER's input and review comments, and exchange information. The ENGINEER will lead the meetings and provide meeting minutes to document the discussion and action items.

TASK 300 PERMITTING

The ENGINEER shall assist the OWNER in applying for permits associated with the Project including the following subtasks:

301 Regulatory Review

The ENGINEER shall finalize the list of permits and permit updates required to implement the project based on the information included in the Preliminary Engineering Report (2016).

Where necessary, the ENGINEER shall discuss the proposed Project with the applicable regulatory agencies to define the permit update requirements and to identify the major permitting issues that must be resolved.

A permit tracking table shall be developed to address the major issues identified and to facilitate the permit acquisition process. This table will be maintained and provided to the OWNER when desired to explain the progress of permitting work during this phase.

302 Prepare and Submit Permit Applications

Applications for the required permit updates and approvals shall be prepared for submittal to the respective agencies, where necessary. The ENGINEER will prepare and submit permit application packages on behalf of OWNER. This scope of services assumes that the following permits and approvals will be required:

- NCDEQ Public Water Supply Plans and Specifications Approval
- City of Greensboro TRC Review (Planning Dept., Landscape Approval, stormwater review)
- City of Greensboro Utility Construction Plans Review

- NCDEQ Erosion and Sedimentation Control Permit
- City of Greensboro Floodplain Permit and No-Rise evaluation
    - Clean Water Act

The OWNER will pay all permitting fees, including "fast-track" fees to expedite NCDEQ reviews and sign applications.

For the purposes of this scope, it is assumed that:

- Stormwater detention/treatment will not be required; however, this will be confirmed with City Stormwater staff during the project.
- NPDES permit modification is not included

303 Agency Meetings and Coordination

The ENGINEER will coordinate with the regulatory agencies as necessary throughout the permit application and review process. This shall include up to two regulatory agency meetings. As part of this subtask, once the permit applications are submitted, the ENGINEER shall maintain contact with the regulatory agencies to monitor and, where possible, facilitate the review process.

304 Easement Plat and Coordination

The ENGINEER will provide an easement plat and legal description to support the recording of one easement within the City owned property on the South side of Benjamin parkway.

TASK 400 BIDDING AND AWARD

ENGINEER shall perform the following services related to Bidding and Award. This Scope of Services assumes that the design will be distributed into one bid package. The ENGINEER assumes that a pre-qualification process for bidders is not included.

401 Review of Contract Documents by Engineering and Inspections Department and MWBE Office

The City has a group within the Engineering and Inspections Department that assists with reviewing and managing the bidding process. The ENGINEER will submit the plans and specifications to this group for review. The ENGINEER will assist OWNER (Water Resources Department) by working with the Engineering and Inspections Department to resolve issues with the Contract Documents related to bidding policies and front-end documents. This review shall also include a special review of the contract documents by the MWBE Office for compliance with the City's MWBE program and policies and recommendation as to potential work packages for the purpose of identifying MWBE subcontracting opportunities.

402 Bid Advertisement

Assist OWNER in advertising for construction, attend and conduct a pre-bid conference.

403 Addenda and Substitutions

Assist OWNER by preparing addenda as appropriate to interpret, clarify, or further define the Contract Documents. Addenda will be issued by ENGINEER. 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.

404 Bid Opening and Recommendation to Award

Attend bid opening and assist with the review of the bids and qualification statements. Evaluate bids or proposals and assist OWNER in the recommendation of award process.

TASK 900 UNSPECIFIED ADDITIONAL SERVICES

This task is a general allowance for the addition of work to the ENGINEERS scope that is not explicitly stated in TASKS 010 - 400. Work and the associated fees under this task will only be used with express written authorization by the OWNER's Project Manager and agreement by the ENGINEER.

2. ADDITIONAL SERVICES BY AMENDMENT

This agreement may be amended through agreement by the OWNER and ENGINEER, to include additional services.

EXCLUSIONS

Exclusions are listed below to provide clarification to the scope of work. The following items are not included in the Basic Services of this contract:

- Services extending beyond the scope described in Tasks 010 to 400, herein, and the time-frame described in Section 5 of this document.
- Upgrades of the filters, air wash system, piping at the filters, rewash, or unspecified facilities.
- Upgrades to the sedimentation basins, except for the sludge collection system
- Programming services for the PLCs and SCADA System based on the Instrumentation design.
- Piping modifications inside of the existing filter building or improvements to the existing backwash water pumping station
- A new building to house electrical equipment such as motor starters or VFDs.
- Environmental study for contaminated soils near the existing diesel fuel tanks, or remediation of any contaminated soils under or near the existing fuel tank

ASSUMPTIONS

The ENGINEER has made the following assumptions regarding the scope and nature of the work to be completed in addition to assumptions included in the scope of services listed above:

- The design documents will be prepared for competitive bidding as a single construction bid package,

- Only facilities specifically listed in the project description section of this scope of services are included,

- Process Drain Pump Station will be below grade structure with slab on grade,

- The chemical building will be a pre-engineered/pre-fabricated structure, no architectural drawings will be provided,

- It is assumed that the pumps associated with the Process Drain Pump Station will not have Variable Frequency Drives; and their associated electrical equipment will be fed power from the existing electrical buildings and new equipment will be housed in an outdoor rated enclosure. The existing building ventilation systems are assumed to be adequate for the new equipment and no additional HVAC equipment for existing buildings will be required,

- Pre-qualification for bidders, equipment, or vendors is not included,

- Services associated with pre-purchasing of equipment or preparing documents which are separate from the Bid Documents to be used for a pre-purchase equipment selection process is not included,

- Conforming of documents for construction purposes will be added by a future amendment,

- Services beyond bidding, which would include construction administration and inspection and resident project representative will be added by a future amendment,

- In-person factory witness testing of pumps or other equipment is not included.

3. OWNER'S RESPONSIBILITIES

- Furnish to ENGINEER, as requested by ENGINEER for performance of Services as required by the Contract Documents, the following:

    - Available data, models, calculations, permits, CADD drawings prepared by Others relating to the design of the proposed facilities

    - Access to the Mitchell Water Treatment Plant facilities as needed;

    - Timely review and input on deliverables;

    - Other required technical information, not covered herein.

- OWNER shall be responsible for, and ENGINEER may rely upon, the accuracy and completeness of all reports, data and other information furnished pursuant to this paragraph. ENGINEER may use such reports, data and information in performing or furnishing services under this Scope of Work.

- Examine all alternate solutions, studies, reports, sketches, Drawings, Specifications, proposals and other documents presented by ENGINEER (including obtaining advice of an attorney, insurance counselor and other consultants as OWNER deems appropriate with respect to such examination) and render decisions pertaining thereto.

- Bear all costs incident to compliance with the requirements of the OWNER's Responsibilities.

- Bear all costs incident to permitting applications and bidding phase services, including reproduction of plans and specifications for bidders and plan rooms.

4. TIME PERIOD FOR PERFORMANCE

The estimated time periods for the performance of Engineering Team services as set forth in this Agreement are amended and supplemented as follows:

- All work described herein this Project Authorization will begin upon execution of this Task Authorization and written notice provided by the City's staff that the Engineer may begin work.

- Tasks 010-200 will be completed in 10-months of notice-to-proceed (NTP). Schedule extensions related to the addition of authorized scope shall be determined at the time of authorization.

- Tasks 300-400 are estimated to require approximately 4-6 months from the date that the Construction Documents are completed and ready for permit submittal. Both OWNER and ENGINEER acknowledge that the permitting and bidding processes involve significant involvement from permitting agencies and other parties, which can cause delays in the completion of these tasks which are outside the control of the ENGINEER. The ENGINEER will make a sincere effort to maintain the schedule and minimize delays.

- Schedule assumes requested data from OWNER is provided within 2-weeks of each request made in writing. Delays in the OWNER providing data to the ENGINEER may result in impacts to the project schedule described in this section.

- Schedule assumes the duration of OWNER reviews of milestone deliverables are not more than 10 working days. Delays in scheduling or completing these reviews by the OWNER may result in impacts to the project schedule described in this section.

5. PAYMENT AND COMPENSATION

The method of payment for services rendered by the ENGINEER shall be as set forth below:

For the Basic Services performed under Tasks 010 to 400, the OWNER agrees to pay the ENGINEER a lump sum amount of $1,019,300. The task values listed in Table 5-1 are estimated for invoice purposes only and are not considered task upper limits. Partial payments shall be made by the OWNER on a monthly basis in proportion to the percentage of work completed and the balance of payment made when Basic Services are completed.

An Unspecified Services allowance (Task 900) of $100,000 is included in the upper limit of this contract to allow the OWNER the means to authorize scope changes that are deemed to add value or benefit. Use of the Unspecified Services allowance shall be approved in writing by the OWNER'S Project Manager prior to ENGINEER starting work.

Any remainder in the Unspecified Additional Services allowance (Task 900), at the completion of the contract performance will not be obligated to the ENGINEER, but rather retained by the OWNER. **The Total Value of this Authorization is an upper limit amount of $1,119,300.**

Table 5-1: Estimated Task Value Breakdown

	Task	Estimated Value by Task (USD)	Total (USD)
Design Phase Services	010 Project Management and Administration	$97,100	
	100 Preliminary Design	$324,900	
	200 Final Design	$471,700	
	300 Permitting	$95,800	
	400 Bidding and Award	$29,800	
	TOTAL LUMP SUM FEE		$1,019,300
	900 Unspecified Additional Services	$100,000	
	Total Authorization (Not-to-Exceed)		$1,119,300