

EXHIBIT A
TO THE AGREEMENT BETWEEN OWNER AND ENGINEER
FOR PROFESSIONAL DESIGN AND BIDDING SERVICES
July 20, 2020

Mitchell WTP Sedimentation Process Improvements

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 November 5, 2019 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 the addition of plate settler equipment and related structural improvements to the existing sedimentation basins at the Mitchell Water Treatment Plant. The project involved with this exhibit expands on the Mitchell WTP Residuals Phase 1 project to increase efficiencies of the removal of solids from the treatment process. Permitting and Bidding activities shall be combined with the overall scope of the Project described herein consists of the following:

- Addition of plate settlers at each of the six (6) existing sedimentation basins
- Modifications to the existing flocculation basins including design of new flocculators
- Modifications to the existing rapid mix basins
- Installation of a static mixer for raw water service
- Structural modifications to the sedimentation basins to accommodate the addition of plate settlers
- Process mechanical and instrumentation work related to the improvements listed above.

This scope of services consists of the following major tasks:

- Task 010 – Project Management and Administration
- Task 300- Permitting
- Task 400- Bidding
- Task 500- Preliminary Design for Sedimentation Basin Improvements
- Task 600- Final Design for Sedimentation Process Improvements
- Task 900 – Additional Unspecified Services

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

TASK 0100 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 300 PERMITTING

CDM Smith will incorporate the design documents for the Mitchell WTP Sedimentation Process Improvements into the design documents for the Mitchell WTP Residuals -Phase 1 to create a single document set for permit applications, bid solicitation and construction. As such, the permitting effort for this work shall be incorporated into the permitting scope of Mitchell WTP Residuals Improvements- Phase 1, under a separate contract.

TASK 400 BIDDING

Bidding services for this scope of work shall be incorporated into the bidding of Mitchell WTP Residuals Improvements-Phase 1.

CDM Smith will incorporate the design documents for the Mitchell WTP Sedimentation Process Improvements into the design documents for the Mitchell WTP Residuals Improvements -Phase 1 to create a single document set for permit applications, bid solicitation and construction. As such, the bid support services for this work shall be incorporated into the bid support services for the Mitchell WTP Residuals Improvements-Phase 1 project, under a separate contract. One combined bid package shall be prepared for the scope of the Mitchell WTP Residuals Improvements -Phase 1 and Mitchell WTP Sedimentation Basin Improvements, described herein.

TASK 500 PRELIMINARY DESIGN FOR SEDIMENTATION PROCESS IMPROVEMENTS

This task will include a Kickoff Conference Call for the added Project scope of work, data collection, hydraulic analysis, field evaluations and structural analysis, coordination with equipment manufacturers, and preparation of a preliminary engineering Technical Memorandum (TM).

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

501 Project Kickoff Conference Meeting

- The ENGINEER team and the OWNER staff will hold a joint Project Kick-off Conference meeting. In this meeting the team will review the original project goals and establish modification(s) to existing goals and critical success factors and will facilitate the transfer of information needed to begin the work.
- The OWNER will provide recently-completed CADD files prepared by Others to improve the sedimentation basins at the Mitchell WTP; including the Bid Documents for the Contract #2017-035 Mitchell Filter Plant Structural and Durability Improvement Project by SKA

Consulting Engineers, the Mitchell WTP Rapid Mix – Flocculation – Sedimentation Preliminary Engineering Report by Hazen & Sawyer (November 2019), and other projects as requested by ENGINEER.

- The OWNER will provide relevant records and data needed for the ENGINEER to perform Preliminary Engineering.
- Evaluate Project schedule and procurement options for the Project.
- Confirm compliance with applicable codes and OWNER standards.

502 Hydraulic Analysis

- A hydraulic analysis will be conducted to evaluate the impact of the addition of plate settlers to the sedimentation basins and the addition of a static mixer in lieu of a vertical mixer in the rapid mix basin.
 - Hydraulic profiles for average and maximum plant flow will be calculated from the water surface elevation in the filters to the discharge of the raw water lines for the addition of the plate settlers. The hydraulic profiles and a discussion of the hydraulic impacts of the plate settler addition will be included as part of the Preliminary Engineering TM discussed under Task 506 – Deliverables. Included in the discussion of hydraulic impacts will be an evaluation of whether an increase in water level at the flocculation and sedimentation basins will require increasing the sidewall depth at these basins to provide additional freeboard.
 - Hydraulic evaluation of addition of a static mixer in lieu of a vertical mixer in the rapid mix basin will be performed. Mixing energies will be reviewed for high, average and low flow periods to evaluate if mixing intensity is adequate for the dispersion of chemicals.

503 Structural Evaluation

- The ENGINEER will conduct a condition assessment of the sedimentation basins to visually observe the condition of the basins. This will include up to two site visits to the Mitchell WTP by a structural engineer during a period in which one or more of the sedimentation basins is offline.
- The ENGINEER will perform a structural analysis of the structure Record Drawings to determine if the thickness and reinforcing configuration of the existing sedimentation basin walls are suitable to support the plate settler equipment.
- The ENGINEER will determine the structural modifications required for the addition of plate settlers. Based on the plate settler equipment layout proposed by the manufacturer(s), the ENGINEER will identify and discuss the structural modifications required.
- The condition assessment, structural analysis, and recommended structural modifications will be documented and discussed as part of the Preliminary Engineering TM discussed under Task 506 – Deliverables.
- The Engineer shall evaluate options for the requirements for a chemical injection vault and static mixer vault.

504 Process Mechanical Evaluation

- The ENGINEER shall conduct a process mechanical evaluation that includes the following:
 - Coordination with plate settler equipment manufacturers to determine the layout of plate settler equipment within the basins. Preliminary layouts of the plate settler equipment and a discussion of related process mechanical improvements, such as the addition of wash hose stations for periodic wash-down of collected solids, shall be provided as part of the Preliminary Engineering TM.
 - Review and presentation of the plate settler design criteria. The ENGINEER shall review the plate settler design criteria provided in the Mitchell WTP Rapid Mix – Flocculation – Sedimentation Preliminary Engineering Report by Hazen & Sawyer (November 2019) and provide updated design criteria following coordination with plate settler manufacturers. During the preliminary design phase, the ENGINEER will conduct an independent technical review to verify the basis of design.
 - Evaluation of impacts to plant operations and maintenance both during construction and after the addition of plate settlers. The ENGINEER will consult with the OWNER to confirm the construction constraints driven by plant operations. The ENGINEER shall also provide a discussion of the expected impacts of plate settler addition to normal plant operation and maintenance activities. This evaluation shall be presented as part of the Preliminary Engineering TM, discussed in Task 506 - Deliverables.
 - Evaluation of static mixers - Preliminary layouts for the static mixer and chemical re-routing will be evaluated. Layouts shall include a chemical feed and static mixer vault for access to equipment. Evaluation of existing chemical metering pumps to feed the proposed static mixer shall be assessed.

505 Engineer's Opinion of Probable Construction Costs

The ENGINEER shall prepare an opinion of probable construction costs (OPCC) for recommended improvements outlined in the Preliminary Engineering TM, in accordance with AACE Class 2.

506 Deliverables

ENGINEER will provide a Preliminary Engineering TM for the OWNER to review, which will provide an advancement of the evaluations performed in the residuals master plan and the flocculation evaluation; verifying the basis of design criteria, hydraulic design, structural modifications, and other pertinent features. The TM shall also include preliminary structural and process mechanical figures for the Project.

Equipment preferences, maintenance of plant operations, OPCC, and impacts to the Phase I Residuals Improvements construction schedule will also be discussed in this TM. Maintenance of Operations of the existing plant shall be discussed.

TASK 600 FINAL DESIGN FOR SEDIMENTATION PROCESS IMPROVEMENTS

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 Design Phase, this Agreement may be amended to increase the engineering scope of services and related costs,

as described in Article 2 of this Exhibit. Final design tasks to be provided by the ENGINEER are described as follows:

601 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
- Structural
- Instrumentation

The Contract Documents associated with this Project will be incorporated into the Contract Documents for the Mitchell WTP Phase I Residuals Improvements Project.

The OPCC for the 90 percent and Final Bid Set design deliverables for this Project shall be incorporated into the 90 percent and Final OPCCs for the Mitchell WTP Phase I Residuals Improvements Project.

602 Deliverables

ENGINEER will provide submittals of drawings at 30 percent for the work included in this Amendment for the Owner to review. Design milestones for 30 percent and 60 percent shall be submitted to the Owner independently of the original scope of the Residuals Phase 1 Project. The 90 percent submittal will be a compilation of the Sedimentation Process Improvements described herein and the Residuals Phase 1 work from the Contract dated January 15, 2019.

Engineer shall submit a partial set of proposed technical specifications at the 60 percent submittal pertaining to the Flocculation and Sedimentation Process Improvements. 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 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 90 percent submittal will include all design drawings, details, and front end and technical specifications for the complete design package of the and Residuals Phase 1

improvements. The ENGINEER will include a construction sequence specification for the overall Project in the 90-percent submittal which will become part of the contract documents.

603 Technical and Constructability Review

The ENGINEER will meet with the OWNER at the 30 and 60 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. These meetings will include the work within the Sedimentation Process Improvements scope of work.

At the 60 percent completion stage for the Flocculation and Sedimentation Process Improvements, the ENGINEER will conduct both internal and external technical and constructability reviews of the design documents.

The Work under this Amendment will be incorporated into the Mitchell WTP Phase I Residuals Improvements Project at the 90 percent design milestone. At the 90 percent completion stage, the ENGINEER will conduct a final biddability/constructability review of the design documents. Following the technical reviews, the documents will be submitted for review by the OWNER.

604 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. Since the Work under this Project will be incorporated into the Mitchell WTP Phase I Residuals Improvements Project, the 90 percent design milestone for this Project shall coincide with the 90 percent milestone for the Phase I Residuals Improvements Project. The ENGINEER will lead the meetings and provide meeting minutes to document the discussion and action items.

TASK 900 ADDITIONAL UNSPECIFIED SERVICES

This task is a general allowance for the addition of work to the ENGINEER'S scope that is not explicitly stated in TASKS 010 - 600. 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 600, herein, and the timeframe described in Section 4 of this document.

- **Permitting Services.** Since the Project described in this Exhibit is expected to be incorporated and bid as part of the Mitchell WTP Phase I Residuals improvements Project, any permitting requirements for this Project will be covered under the Permitting (300) task for the Phase I Residuals Improvements Project. It is assumed that all improvements will be included in one permitting package.
- **Bidding and Award Services.** Since the Project described in this Exhibit is expected to be incorporated and bid as part of the Mitchell WTP Phase I Residuals improvements Project, any bidding and award requirements for this Project will be covered under the Bidding and Award (400) task for the Phase I Residuals Improvements Project.
- **Upgrades of the filters, piping modifications inside of the existing filter building, or unspecified facilities.**

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,
- The addition of plate settlers at the sedimentation basins will not require any new instrumentation or controls equipment. Existing instrumentation at the sedimentation basins shall be relocated as necessary to facilitate structural modifications and installation of the plate settler equipment.
- 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.

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;
 - Review and input on deliverables within 10 working days from receipt;
 - 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.

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 OWNER's staff that the ENGINEER may begin work.
- Tasks 010-600 will be completed within 12-months of notice-to-proceed (NTP). Schedule extensions related to the addition of authorized scope shall be determined at the time of authorization.
- 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 600, the OWNER agrees to pay the ENGINEER a lump sum amount of \$973,600. 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 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 a not to exceed amount of **\$1,073,600**.

Table 5-1. Estimated Task Value Breakdown

| Task | Sedimentation Process Improvements |
|---|---|
| 010 Project Management and Administration | \$117,500 |
| 300- Permitting | \$0 |
| 400-Bidding | \$0 |
| 500-Preliminary Design of Flocculation and Sedimentation Process Improvements | \$341,600 |
| 600- Final Design of Flocculation and Sedimentation Process Improvements | \$514,500 |
| | |
| TOTAL LUMP SUM FEE | \$973,600 |
| 900 Additional Unspecified Services | \$100,000 |
| Total Authorization (Not-to-Exceed) | \$1,073,600 |
| | |
| <i>MBE/WBE Participation (included in Tasks 100-600)</i> | <i>\$259,570</i> |
| <i>Percentage of MBE/WBE Participation</i> | <i>24.2%</i> |
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