Administrative Use Only
Agreement Date: 10/13/2022

PROFESSIONAL SERVICES AGREEMENT BETWEEN
BLACK & VEATCH LTD OF MICHIGAN
AND THE CITY OF ANN ARBOR
FOR ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

This agreement ("Agreement") is between the City of Ann Arbor, a Michigan municipal corporation, having its offices at 301 E. Huron St. Ann Arbor, Michigan 48104 ("City"), and Black & Veatch Ltd of Michigan ("Contractor"), a(n) Michigan Corporation, with its address at 3550 Green Court, Ann Arbor, MI 48105. City and Contractor are referred to collectively herein as the "Parties." The Parties agree as follows:

I. DEFINITIONS

Administering Service Area/Unit means Public Services Area / Wastewater Treatment Services Unit.

Contract Administrator means Keith Sanders, acting personally or through any assistants authorized by the Administrator/Manager of the Administering Service Area/Unit.

Deliverables means all Plans, Specifications, Reports, Recommendations, and other materials developed for and delivered to City by Contractor under this Agreement.

Project means Ultraviolet (UV) Disinfection System Replacement Project.

II. DURATION

Contractor shall commence performance on October 13, 2022 ("Commencement Date"). This Agreement shall remain in effect until satisfactory completion of the Services specified below unless terminated as provided for in Article XI. The terms and conditions of this Agreement shall apply to the earlier of the Effective Date or Commencement Date.

III. SERVICES

A. The Contractor agrees to provide professional engineering services ("Services") in connection with the Project as described in Exhibit A. The City retains the right to make changes to the quantities of service within the general scope of the Agreement at any time by a written order. If the changes add to or deduct from the extent of the services, the compensation shall be adjusted accordingly. All such changes shall be executed under the conditions of the original Agreement.

B. Quality of Services under this Agreement shall be of the level of quality performed by persons regularly rendering this type of service. Determination of acceptable quality shall be made solely by the Contract Administrator.

C. The Contractor shall perform its Services for the Project in compliance with all statutory, regulatory, and contractual requirements now or hereafter in effect as may be applicable to the rights and obligations set forth in the Agreement. The Contractor shall also comply with and be subject to the City of Ann Arbor policies applicable to independent contractors

D. The Contractor may rely upon the accuracy of reports and surveys provided to it by the City (if any) except when defects should have been apparent to a reasonably competent professional or when it has actual notice of any defects in the reports and surveys.

IV. INDEPENDENT CONTRACTOR

The Parties agree that at all times and for all purposes under the terms of this Agreement each Party's relationship to any other Party shall be that of an independent contractor. Each Party will be solely responsible for the acts of its own employees, agents, and servants. No liability, right, or benefit arising out of any employer/employee relationship, either express or implied, shall arise or accrue to any Party as a result of this Agreement.

Contractor does not have any authority to execute any contract or agreement on behalf of the City and is not granted any authority to assume or create any obligation or liability on the City's behalf, or to bind the City in any way.

V. COMPENSATION OF CONTRACTOR

A. The Contractor shall be paid in the manner set forth in Exhibit B. Payment shall be made monthly, unless another payment term is specified in Exhibit B, following receipt of invoices submitted by the Contractor, and approved by the Contract Administrator.

B. The Contractor will be compensated for Services performed in addition to the Services described in Article III, only when the scope of and compensation for those additional Services have received prior written approval of the Contract Administrator.

C. The Contractor shall keep complete records of work performed (e.g. tasks performed, hours allocated, etc.) so that the City may verify invoices submitted by the Contractor. Such records shall be made available to the City upon request and submitted in summary form with each invoice.

VI. INSURANCE/INDEMNIFICATION

A. The Contractor shall procure and maintain from the Effective Date or Commencement Date of this Agreement (whichever is earlier) through the conclusion of this Agreement, such insurance policies, including those set forth in Exhibit C, as will protect itself and the City from all claims for bodily injuries, death or property damage that may arise under this Agreement; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor, any subcontractor, or anyone employed by them directly or indirectly. Prior to commencement of work under this Agreement, Contractor shall provide to the City documentation satisfactory to the City, through City-approved means (currently myCOI), demonstrating it has obtained the policies and endorsements required by Exhibit C. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractor(s) (if any).

B. Any insurance provider of Contractor shall be authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-authorized insurance companies are not acceptable unless approved in writing by the City.

C. To the fullest extent permitted by law, Contractor shall indemnify, defend, and hold the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses, including attorney's fees, resulting or alleged to result, from any acts or omissions by Contractor or its employees and agents occurring in the performance of or breach in this Agreement, except to the extent that any suit, claim, judgment or expense are finally judicially determined to have resulted from the City's negligence or willful misconduct or its failure to comply with any of its material obligations set forth in this Agreement.

VII. COMPLIANCE REQUIREMENTS

A. Nondiscrimination. The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of the Ann Arbor City Code and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

B. Living Wage. If the Contractor is a "covered employer" as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Agreement a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Agreement are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

VIII. WARRANTIES BY THE CONTRACTOR

A. The Contractor warrants that the quality of its Services under this Agreement shall conform to the level of quality performed by persons regularly rendering this type of service.

B. The Contractor warrants that it has all the skills, experience, and professional licenses (if applicable) necessary to perform the Services pursuant to this Agreement.

C. The Contractor warrants that it has available, or will engage, at its own expense, sufficient trained employees to provide the Services pursuant to this Agreement.

D. The Contractor warrants that it has no personal or financial interest in the Project other than the fee it is to receive under this Agreement. The Contractor further certifies that it shall not acquire any such interest, direct or indirect, which would conflict in any manner with the performance of the Services it is to provide pursuant to this Agreement. Further Contractor agrees and certifies that it does not and will not employ or engage any person with a personal or financial interest in this Agreement.

E. The Contractor warrants that it is not,and shall not become overdue or in default to the City for any contract, debt, or any other obligation to the City including real and personal property taxes. Further Contractor agrees that the City shall have the right to set off any such debt against compensation awarded for Services under this Agreement.

F. The Contractor warrants that its proposal for services was made in good faith, it arrived at the costs of its proposal independently, without consultation, communication or agreement, for the purpose of restricting completion as to any matter relating to such fees with any competitor for these Services; and no attempt has been made or shall be made by the Contractor to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

G. The person signing this Agreement on behalf of Contractor represents and warrants that she/he has express authority to sign this Agreement for Contractor and agrees to hold the City harmless for any costs or consequences of the absence of actual authority to sign.

IX. OBLIGATIONS OF THE CITY

A. The City agrees to give the Contractor access to the Project area and other City-owned properties as required to perform the necessary Services under this Agreement.

B. The City shall notify the Contractor of any defects in the Services of which the Contract Administrator has actual notice.

X. ASSIGNMENT

A. The Contractor shall not subcontract or assign any portion of any right or obligation under this Agreement without prior written consent from the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under the Agreement unless specifically released from the requirement, in writing, by the City.

B. The Contractor shall retain the right to pledge payment(s) due and payable under this Agreement to third parties.

XI. TERMINATION OF AGREEMENT

A. If either party is in breach of this Agreement for a period of fifteen (15) days following receipt of notice from the non-breaching party with respect to a breach, the non-breaching party may pursue any remedies available to it against the breaching party under applicable law, including but not limited to, the right to terminate this Agreement without further notice. The waiver of any breach by any party to this Agreement shall not waive any subsequent breach by any party.

B. The City may terminate this Agreement, on at least thirty (30) days advance notice, for any reason, including convenience, without incurring any penalty, expense or liability to Contractor, except the obligation to pay for Services actually performed under the Agreement before the termination date.

C. Contractor acknowledges that, if this Agreement extends for several fiscal years, continuation of this Agreement is subject to appropriation of funds for this Project. If funds to enable the City to effect continued payment under this Agreement are not appropriated or otherwise made available, the City shall have the right to terminate this Agreement without penalty at the end of the last period for which funds have been appropriated or otherwise made available by giving written notice of termination to Contractor. The Contract Administrator shall give Contractor written notice of such non-appropriation within thirty (30) days after it receives notice of such non-appropriation.

D. The provisions of Articles VI and VIII shall survive the expiration or earlier termination of this Agreement for any reason. The expiration or termination of this Agreement, for any reason, shall not release either party from any obligation or liability to the other party, including any payment obligation that has already accrued and Contractor's obligation to deliver all Deliverables due as of the date of termination of the Agreement.

XII. REMEDIES

A. This Agreement does not, and is not intended to, impair, divest, delegate or contravene any constitutional, statutory and/or other legal right, privilege, power, obligation, duty or immunity of the Parties.

B. All rights and remedies provided in this Agreement are cumulative and not exclusive, and the exercise by either party of any right or remedy does not preclude the exercise of any other rights or remedies that may now or subsequently be available at law, in equity, by statute, in any agreement between the parties or otherwise.

C. Absent a written waiver, no act, failure, or delay by a Party to pursue or enforce any rights or remedies under this Agreement shall constitute a waiver of those rights with regard to any existing or subsequent breach of this Agreement. No waiver of any term, condition, or provision of this Agreement, whether by conduct or otherwise, in one or more instances, shall be deemed or construed as a continuing waiver of any term, condition, or provision of this Agreement. No waiver by either Party shall subsequently affect its right to require strict performance of this Agreement.

XIII. NOTICE

All notices and submissions required under this Agreement shall be delivered to the respective party in the manner described herein to the address stated below or such other address as either party may designate by prior written notice to the other. Notices given under this Agreement shall be in writing and shall be personally delivered, sent by next day express delivery service, certified mail, or first-class U.S. mail postage prepaid, and addressed to the person listed below. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; (2) the next business day when notice is sent next day express delivery service or personal delivery; or (3) three days after mailing first class or certified U.S. mail.

If Notice is sent to the CONTRACTOR, it shall be addressed and sent to:

Black & Veatch Ltd. Of Michigan
ATTN: David S. Koch, P.E.
Associate Vice President
3550 Green Court
Ann Arbor, MI 48105

If Notice is sent to the CITY, it shall be addressed and sent to:

City of Ann Arbor
ATTN: Brian Steglitz, P.E.
Interim Public Services Area Administrator
301 E. Huron St.
Ann Arbor, Michigan 48104

With a copy to: The City of Ann Arbor
ATTN: Office of the City Attorney
301 East Huron Street, 3rd Floor
Ann Arbor, Michigan 48104

XIV. CHOICE OF LAW AND FORUM

This Agreement will be governed and controlled in all respects by the laws of the State of Michigan, including interpretation, enforceability, validity and construction, excepting the principles of conflicts of law. The parties submit to the jurisdiction and venue of the Circuit Court for Washtenaw County, State of Michigan, or, if original jurisdiction can be established, the United States District Court for the Eastern District of Michigan, Southern Division, with respect to any action arising, directly or indirectly, out of this Agreement or the performance or breach of this Agreement. The parties stipulate that the venues referenced in this Agreement are convenient and waive any claim of non-convenience.

XV. OWNERSHIP OF DOCUMENTS

Upon completion or termination of this Agreement, all documents (i.e., Deliverables) prepared by or obtained by the Contractor as provided under the terms of this Agreement shall be delivered to and become the property of the City. Original basic survey notes, sketches, charts, drawings, partially completed drawings, computations, quantities and other data shall remain in the possession of the Contractor as instruments of service unless specifically incorporated in a deliverable, but shall be made available, upon request, to the City without restriction or limitation on their use. The City acknowledges that the documents are prepared only for the Project. Prior to completion of the contracted Services the City shall have a recognized proprietary interest in the work product of the Contractor. Unless otherwise stated in this Agreement, any intellectual property owned by Contractor prior to the effective date of this Agreement (i.e. Prexisting Information) shall remain the exclusive property of Contractor even if such Preexisting Information is embedded or otherwise incorporated in materials or products first produced as a result of this Agreement or used to develop Deliverables. The City's right under this provision shall not apply to any Preexisting information or any component thereof regardless of form or media.

XVI. CONFLICTS OF INTEREST OR REPRESENTATION

Contractor certifies it has no financial interest in the Services to be provided under this Agreement other than the compensation specified herein. Contractor further certifies that it presently has no personal or financial interest, and shall not acquire any such interest, direct or indirect, which would conflict in any manner with its performance of the Services under this Agreement.

Contractor agrees to advise the City if Contractor has been or is retained to handle any matter in which its representation is adverse to the City. The City's prospective consent to the Contractor's representation of a client in matters adverse to the City, as identified above, will not apply in any instance where, as the result of Contractor's representation, the Contractor has obtained sensitive, proprietary or otherwise confidential information of a non-public nature that, if known to another client of the Contractor, could be used in any such other matter by the other client to the material disadvantage of the City. Each matter will be reviewed on a case by case basis.

XVII. SEVERABILITY OF PROVISIONS

Whenever possible, each provision of this Agreement will be interpreted in a manner as to be effective and valid under applicable law. However, if any provision of this Agreement or the application of any provision to any party or circumstance will be prohibited by or invalid under applicable law, that provision will be ineffective to the extent of the prohibition or invalidity without invalidating the remainder of the provisions of this Agreement or the application of the provision to other parties and circumstances.

XVIII. EXTENT OF AGREEMENT

This Agreement, together Exhibits A, B, and C, constitutes the entire understanding between the City and the Contractor with respect to the subject matter of the Agreement and it supersedes, unless otherwise incorporated by reference herein, all prior representations, negotiations, agreements or understandings whether written or oral. Neither party has relied on any prior representations, of any kind or nature, in entering into this Agreement. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Agreement, regardless of the other party's failure to object to such form. This Agreement shall be binding on and shall inure to the benefit of the parties to this Agreement and their permitted successors and permitted assigns and nothing in this Agreement, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Agreement. This Agreement may only be altered, amended or modified by written amendment signed by the Contractor and the City. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed to be one and the same agreement.

XIX. ELECTRONIC TRANSACTION

The parties agree that signatures on this Agreement may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Agreement. This Agreement may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

XX. EFFECTIVE DATE

This Agreement will become effective when all parties have signed it. The Effective Date of this Agreement will be the date this Agreement is signed by the last party to sign it.

[REMAINDER OF PAGE LEFT BLANK; SIGNATURE PAGE FOLLOWS]

FOR Black & Veatch Ltd. of Michigan

By _____ Digitally signed by Koch, David S. Location: Chicago, IL USA Reason: I agree to the terms defined by the placement of my signature on this document Contact Info: KochDS@bv.com Date: 2022.09.06 12:53:33-05'00'

Name: David S. Koch

Title: Associate Vice President

Date: 06 September 2022

FOR THE CITY OF ANN ARBOR

By _____ 09/30/2022

CHRISTOPHER TAYLOR, MAYOR

09/30/2022

By JACQUELINE BEAUDRY, CITY CLERK

Jacqueline Beaudry, City Clerk

Date: _____

Approved as to substance

09/14/2022

BRIAN STEGLITZ, PUBLIC SERVICES AREA ADMINISTRATO

09/30/2022

MILTON DOHONEY JR., CITY ADMINISTRATOR

Milton Dohoney Jr., City Administrator

10/12/2022

ATLEEN KAUR, CITY ATTORNEY

Atleen Kaur, City Attorney

EXHIBIT A
SCOPE OF SERVICES

Background
The City of Ann Arbor Wastewater Treatment Plant (WWTP) provides wastewater treatment for the City of Ann Arbor and portions of three adjacent townships. The plant treats an average of 18 million gallons per day (MGD) with a design capacity of 29.5 MGD.

The WWTP has used Ultraviolet (UV) treatment for disinfection of the final effluent before discharge into the Huron River. The existing Trojan UV4000 system was started up in December 2000 and needs to be replaced due to the manufacturer discontinuing production of certain parts and maintenance items. Therefore, the system has reached the end of its useful life and must be replaced.

Objective
Black & Veatch Ltd of Michigan (B&V) will provide Professional Engineering Services to the City of Ann Arbor in connection with its WWTP UV Disinfection System Replacement Project. Under this Project, the City intends to replace the existing UV system used for disinfection of the WWTP's final effluent.

The scope of services will also include integration of the control system for the new disinfection system with the WWTP's Process Information and Control System (PICS). The control strategy will utilize the existing PLC programming files and obtain preferences and opinions from plant supervisors.

This UV Disinfection Replacement Project shall include two phases described as follows:

Phase 1 shall include an evaluation of the existing system to understand the design conditions, hydraulic limitations, and piping configuration associated with the Trojan UV4000 system. The scope of services will also include integration of the control system for the new disinfection system with the WWTP's Process Information and Control System (PICS). The control strategy will utilize the existing PLC programming files and obtain preferences and opinions from plant supervisors.

Once the physical constraints are understood, B&V shall identify feasible alternative UV systems for disinfection and present the alternatives and costs to City staff in a report. Ann Arbor WWTP staff will consider those alternatives and ask questions necessary to identify and choose a preferred replacement option.

Phase 1 services shall include a condition assessment of the existing UV concrete structure that will be taken into consideration for evaluation of replacement alternatives. This phase also includes development of a detailed design package for a replacement disinfection system and an accurate opinion of probable cost for the owner-selected option. Phase 1 services shall also include bid and advertising support (e.g., conducting a pre-bid meeting, preparing and routing any necessary addenda, providing bid evaluations, recommendation of award, etc.). B&V will coordinate work with City of Ann Arbor WWTP staff who will provide access to the WWTP, UV equipment, electrical equipment, PICS information, and provide WWTP records necessary to complete the Scope of Services.

B&V shall prepare a plan and schedule for approval by City staff that includes any shutdowns or bypass pumping required to provide disinfection during construction of a replacement disinfection system. If disinfection must be interrupted during construction, the interruption duration shall be defined in the construction documents. A complete and well detailed maintenance of plant operations (MOPO) plan, developed with WWTP staff, shall be included in the contract documents.

Final design documents shall be signed and sealed (each drawing) by a Professional Engineer licensed in the STATE OF MICHIGAN. All plans and specifications shall be prepared in accordance with the City's Public Services Area Standard Specifications. The Consultant shall also prepare and provide documentation for submittal of all necessary state and local permit applications. The Consultant shall prepare the EGLE Part 41 application for construction of the new disinfection system.

The Consultant shall submit a proposed design schedule for Phase 1 services that includes the number of meetings with City of Ann Arbor staff during the design process. Also, as part of their proposal, the Consultant shall submit a list of expectations for City of Ann Arbor staff time to provide information or time commitment during the design phase.

The Consultant shall provide two sets of biddable drawings and specifications. The design documents shall include a sequence of construction and appropriate modifications to the existing tank, piping, electrical and control systems. The Consultant shall provide all bid documents in MS Word format and/or AutoCAD 2015 format.

B&V will have approximately 12 months to complete all work identified in Phase 1 of the Scope of Engineering Services (evaluation, design, and contract document preparation). Construction activities for the Project are expected to begin during the fall of 2023.

The City anticipates seeking a proposal from B&V for Phase 2 of this project, which will include engineering support services and construction management for UV replacement. Work scope and budget for the second phase services are not part of this RFP.

Black & Veatch prepared the attached proposed work plan, which outlines their detailed scope of services.

Proposed Work Plan

The City's overarching project goal is to successfully replace the City's existing UV disinfection system by the end of the fiscal year 2024. The replacement of these facilities is critical for meeting permitted disinfection requirements as well as staying within the time period of available spare parts of their existing outdating and upsupported UV system.

The Black & Veatch team will guide the City to efficiently select a UV technology, negotiate with the selected vendor, plan for MOPO throughout construction and expedite the design phase for increased construction flexibility.

PROJECT UNDERSTANDING

The City of Ann Arbor (the City) owns and operates the Wastewater Treatment Plant (WWTP) that provides wastewater services to the local community. The WWTP staff has been operating a Trojan UV4000 system since its installation in 2000. During 2021, Trojan Technologies informed owners of the UV4000 system that they will no longer support this product with spare parts starting in July 2022. Because of this, the City must replace its UV disinfection equipment by July 2024 to avoid exhausting spare components inventory and risking compliance issues. This date in 2024 is a key project date setting the overall study, design and construction schedule.

Black & Veatch has helped a number of clients through the process of replacing UV4000 and will bring this knowledge to assist the City in this important project.

The overall goal is to replace the existing Trojan UV4000 with a new UV Disinfection Facility and minimize potential construction and operational delays through a collaborative study and design process.

Another key project element is defining and understanding the design criteria and existing site infrastructure. Based on a site visit, existing site infrastructure will be used to the best extent possible for the replacement of the existing UV disinfection equipment. The plant hydraulics will need to be assessed to define the impact to upstream and downstream flow conditions. UV electrical equipment will require evaluation of existing electrical supply, connection to the plant control system and space availability. Our design team has developed an approach that has been used for similar UV disinfection projects which, simultaneously assesses key project elements to avoid project design delays while capturing schedule efficiency.

OVERVIEW OF PROJECT APPROACH

To achieve these major goals and objectives, our work plan will address five important components (shown below) that will provide the project foundation and project delivery plan throughout the planning, design and construction of this project. Tasks 1 through 3 of the Project Delivery Plan can be completed concurrently as part of the preliminary design phase.

Project Delivery Plan

WWTP UV DISINFECTION REPLACEMENT PROJECT

PROJECT DELIVERY PLAN – KEY ELEMENTS

1 Establish Design Criteria

1.1: HISTORICAL DATA REVIEW

- Flow
- Effluent Quality
- Structural
- Electrical

1.2: ONSITE TESTING

- UV Transmittance
- UV Dose

3 Equipment Selection & Procurement

3.1: TECHNICAL EVALUATION WORKSHOP

3.2: TECHNOLOGY EVALUATION: SITE VISITS AND VIRTUAL TOURS

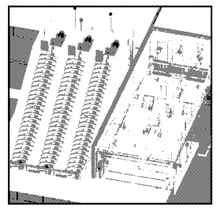
3.3: EQUIPMENT PRESELECTION OR PROCUREMENT

4 Detailed Design

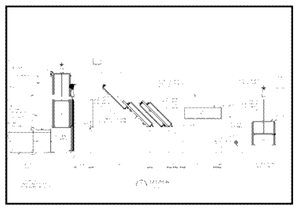
4.1: COLLABORATIVE DESIGN DELIVERABLE REVIEW

4.2: COORDINATION WITH SELECTED VENDOR

4.3: PERMITTING AND REGULATORY COLLABORATION



- BIM VR



- Bid Documents

2 Existing Site Conditions

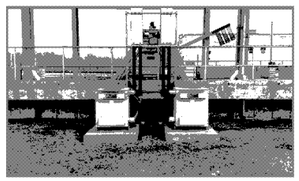
2.1: EXISTING INFRASTRUCTURE MODIFICATIONS

2.2: EVALUATION OF HYDRAULICS

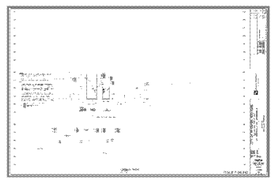
2.3: SITE ELECTRICAL SUPPLY, STRUCTURAL, I&C AND REDUNDANCY

2.4: MAINTENANCE OF PLANT OPERATIONS

- Power Supply & Reliability

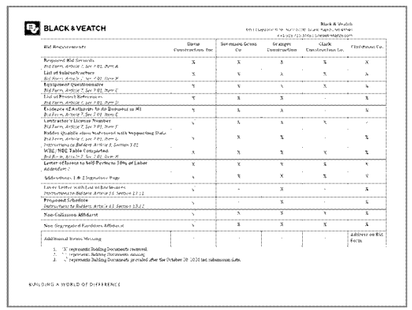


- Existing Infrastructure



- Site Hydraulics

5 Bid Phase & Award



- Thorough Evaluation of Bids
- Recommendation of Award

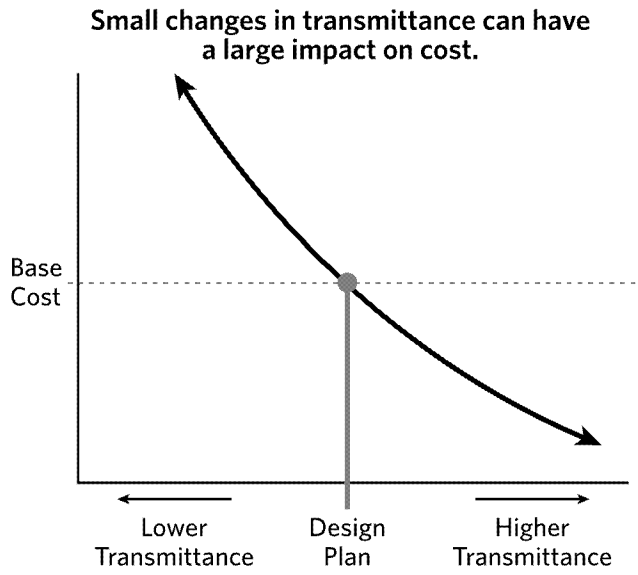
1 Establish Design Criteria

A key objective to our approach to this project is to ensure that we have a firm understanding of the City's goals and objectives as well as the WWTP historical performance of the existing UV Trojan UV4000 system.

Our understanding of the City's goals is to replace the UV4000 in 18 months using the least amount of CAPEX with a system that provides increased OPEX savings while staying in compliance during construction. One of the key tasks identified as part of the preliminary design efforts includes establishing design criteria for the project. Establishing design criteria early within the preliminary design phase will ensure the design team and the City are in agreement from the beginning of the project.

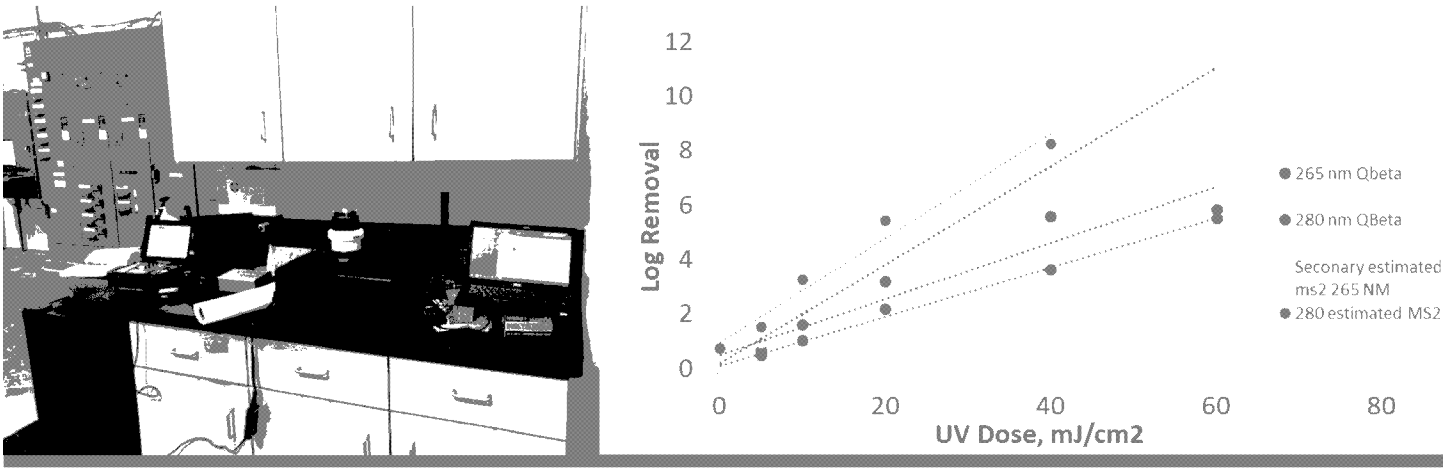
1.1 Historical Data Review

As part of the preliminary design, five years of plant operational and water quality data from the existing system will be requested to establish baseline performance. This baseline analysis helps establish existing costs that can be used to leverage energy efficiency grants similar to what Black & Veatch did at the Arrowhead Ranch facility in Glendale, AZ. This data request will include water quality information such as TSS, turbidity, transmittance, COD, as well as operational data such as power consumption and dose.



Gary Hunter will lead the data collection and review, working with the project team to develop historical performance and effluent water quality criteria. Historical UV transmittance (UVT) data will then be used to develop correlations to historical plant performance, TSS, transmittance and historical dose. The Black & Veatch team will specifically review the following components for process stability and design impacts to the disinfection system:

- Detailed evaluation of WWTP performance and filtration effluent quality allows tuning of UV operating parameters to optimize and minimize UV system equipment cost needs and energy



Right sizing the design of UV equipment relies on assessment of effluent water quality. Onsite portable testing (lab setup on left) can be performed to supplement available data. Collimated Beam testing can provide an efficient (time and cost) means : log removal and UV dosage (figure on right).

consumption. This data can be combined with historical UVT and recommended onsite testing to observe data trends and make recommendations for the design requirements of the new UV system.

- Dynamic influent peak flow events can impact overall UV performance. We will review historical peak flows to increase flexibility of operations throughout the system. This effort will match water quality transmittance with higher flow rates to determine if there is under utilized capacity. If available, our team will develop an operating strategy that can be used with one channel in service to minimize MOPO activities during construction.

1.2 Onsite Testing

Right-sizing the UV disinfection equipment relies heavily on water quality data to establish delivered dose intensity. The team understands and has been provided limited historical UVT data available from the Ann Arbor WWTP and recommends a shortened three-day special sampling period to assist with development of initial design criteria for the subsequent technology evaluation. A testing protocol will be developed for a Collimated Beam test (figures on previous page) to be completed over the course of the three-day time period. Gary Hunter will lead the protocol development and onsite testing. This testing can be initialized at the outset of the project to quickly gain critical insight for UV technology selection. Gary recently completed a similar effort for the City of Sioux City, IA. He will bring this demonstrated approach to the testing allowing for the effort to be completed efficiently. If needed, additional testing following the pre-selection of the UV equipment will allow a more robust data set to further characterize the effluent water quality and identify opportunities to optimize the operation of the new UV system during detailed design.

2 Existing Site Conditions

Our design team understands the UV process, electrical and controls equipment, as well as structural integrity of incorporating new equipment into existing infrastructure. Assessment of the existing site conditions can occur simultaneous to Task 1, increasing project efficiency and advancing design.

2.1 Existing Infrastructure Modifications

The City has already identified that an assessment of the existing UV structure should be completed due to its age. This structure was a repurposed chlorine contact basin when the existing UV system was installed in 2000. Therefore, verification of the structure life moving into the future is a critical part of this project. The Black & Veatch team, led by Todd Archer, recommends that a visual condition assessment be performed by Keith Ritsema, Patrick Powers and Adam Bender to assess the condition of the existing UV disinfection structural components, electrical and controls equipment and site conditions.

The primary goal of this effort is to reduce the risk of delays and change orders during construction by preemptively identifying potential areas of needed improvement. Our team will review each individual aspect with City staff to identify the best path forward for the project and plant operations.

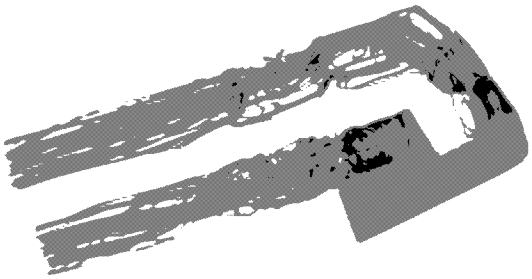
2.2 Evaluation of Hydraulics

The transition from the existing Trojan UV4000 system to a new UV disinfection system will result in hydraulic changes to the overall facility The Black & Veatch team will leverage previous record drawings and hydraulic profiles to develop a hydraulic model of the facilities from the filtration process through the outfall including, the UV bypass line. Based on the established design criteria, a peak flow capacity will be used as the basis for the evaluation. This analysis will also include evaluation of the UV bypass line. The hydraulic model will assess the peak flow and various other conditions to ensure plant operations are successfully.

While not currently included in our proposed work plan, a value-added service that can be performed is computational fluid dynamic (CFD) modeling. This effort is recommended as modeling the proposed configuration will result in optimal and consistent UV performance as some structural modifications are anticipated to accommodate the selected UV equipment. An unequal flow split between channels or highly variable velocity can result in poor disinfection performance and increased

operational complexity. An example CFD analysis of UV channel configurations is shown in the figure below.

Example of CFD Modeling Results from Mallard Creek WWTP Reliability and UV Improvements in Charlotte, NC. This can be performed as a supplemental service.



2.3 Site Electrical Supply, Structural, I&C and Redundancy

A critical aspect of the change from one UV disinfection system to another includes a confirmation of the existing power supply capacity, reliability and redundancy. Our team will incorporate the power reliability measures that are used with the existing system. Led by Todd Archer, we will work early in the preliminary design to confirm the existing power supply and anticipated changes.

Our team will visually examine the existing above grade facilities, as well as the below water surface structures. Coordination with staff will occur to allow each channel to be taken offline, drained and inspected. If needed after the visual inspection, in-depth testing and inspection can be performed to assess the future life of the structure as a supplemental service.

The plant utilizes Factory Talk for the plant SCADA system. Our team also understands that the WWTP is in the process of upgrading and modernizing its control system. Depending on the timing of the upgrades, our team of experienced electrical and I&C engineers understand the need for the new UV PLC to communicate with both new and existing systems.

2.4 Maintenance of Plant Operations (MOPO)

Our team recognizes the criticality of keeping the WWTP online while the UV disinfection system is constructed. As we have learned from past WWTP projects, one of the keys to a successful construction project will be to identify and mitigate the MOPO issues early in the project. In the process of the initial development of MOPO activities, a number of items need to be considered and evaluated with Plant staff. Our team has considered a number of options that we would discuss with City Staff at the initial project kickoff, including:

1. Determining the peak flow one channel can treat and then alternating the installation/replacement of the old UV system with the new system.
2. Using the existing UV bypass line for temporary chlorination and dechlorination. EGLE will need to be contacted and agree to a variance during construction.
3. Construction of a new UV system using the UV bypass line as the influent to the new system. While this provides the least amount of disruption to the existing facility, it is also the most expensive approach.

As we have learned from past WWTP projects, one of the keys to a successful construction project will be to identify and mitigate MOPO issues early in the project.

MOPO activities will need to be balanced with cost to ensure the most cost-efficient approaches are being implemented. As part of the design our team, Kathy McGrath will utilize her operations experience and work with the City's maintenance and operations (O&M) staff to walk through the proposed construction sequencing schedule, evaluating the existing facilities and contractor requirements at each stage. Existing infrastructure will be assessed to ensure long-term operability.

3 Equipment Selection and Procurement

A key aspect for both the design team and the City is the UV equipment selection process and eventual

procurement. Several UV technology manufacturers exist, each with specific applications that are better suited to specific configurations. Our approach will include a workshop with the City to review the potential alternatives that fit in the existing UV disinfection area. A similar approach was used at the Arrowhead Ranch WRF in Glendale, AZ and the Nelson Complex in Johnson County, KS for their conversion from the Trojan 4000 system to a new UV Disinfection system.

3.1 Technology Evaluation Workshop

The Black & Veatch team will lead a technology workshop to discuss the established design criteria resulting from Task 1 and the preliminary findings of the existing site conditions from Task 2. Both of these tasks will feed into the UV technology assessment and ultimate selection. Typically, UV equipment is pre-selected or negotiated early as part of the design process to allow for a more streamlined design, buy-down of equipment lead time and reduction in changes during construction.

The Black & Veatch team recommends the City either pre-select or pre-purchase the UV equipment to reduce risks in a volatile and ever-changing market.

The technology workshop will identify comparative advantages and disadvantages of each technology, with respect to performance, O&M, ease of installation (site constraints), schedule and cost.

3.2 Technology Evaluation: Site Visits and Virtual Tours

The key to selection of a new UV system is to see what technologies other utilities have installed and how well they are operating. Our team recommends a day of site tours to nearby facilities such as Wyoming CWP and Grandville CWP; if needed, we can supplement these virtual tours with other facilities. These tours are not only to examine the UV equipment but, also electrical, I&C and other critical aspects of the system. Discussions with other operators can also be used to adjust MOPO activities to ensure a smooth transition during construction.

3.3 Equipment Preselection or Procurement

Currently, contractors are seeing a shortage of raw materials, which could impact the scheduling for this project. Recent Black & Veatch UV projects have experienced equipment lead times up to six months from approved shop drawings. Assuming the shortages continue over the next couple of years, we will evaluate strategies to accommodate long delivery times to ensure the project is completed before the end of the 2024 fiscal year. If markets recover to pre-pandemic conditions, the lead times could be closer to three months, which will help build in additional float into the schedule.

> For the City of Wyoming, pre-selection of the TrojanSignaUV equipment and development of a RFP was a successful approach to ensure a fair price and meet design and schedule requirements for the project.

One potential strategy for expediting the schedule and firming up the equipment price is to sole source or pre-purchase the UV equipment. Current pricing received from three UV disinfection equipment manufacturers ranges between $1.1M and $1.3M with increases anticipated later this year. Typically, UV manufacturer(s) are pre-selected as part of the design services so design documents (drawings and specifications) can be customized to the specific layout of that manufacturer. This approach maintains the responsibility of the UV equipment underneath the contractor. Another potential strategy to reduce the risk of equipment delays during construction is to expedite the shop drawings for the UV equipment within the first two months of construction to minimize the impact to overall construction. The construction documents can be developed such that specific deadlines are required to ensure purchase orders are issued in a timely manner.

The Black & Veatch team has used this approach to reduce schedule to allow for the installation of a UV system of Sioux City, IA in 18 months. Key to the compact schedule is being able to identify the equipment early so

that fabrication can occur and supply chain issues can be minimized. With the system pre-selected by the City, shop drawings can be completed and the system be released to fabrication.

4 Detailed Design

Critical project-specific aspects of the detailed design and implementation of this project include coordination with the pre-selected equipment manufacturer and collaborative design deliverable reviews. Britton Evans will work closely with the design team with a focus on coordination with City staff and design disciplines to ensure the final project meets the City's needs. Britton completed this effort for the City of Wyoming CWP UV Disinfection project so he is very familiar with the potential pitfalls and can help the collective team avoid them for this project.

4.1 Collaborative Design Deliverable Review

Once the manufacturer(s) for the UV system is selected, the design team will move swiftly into detailed design. Our team will incorporate the preliminary design criteria to develop a 50% set of design documents. Project deliverables include a 90% and 100% set of design documents and the 100% design documents representing the final bid documents for the project.

Good design requires collaboration, coordination and buy-in from all parties to ensure the final design meets the City's needs.

UV Disinfection Design Specialist with 37 Years of Experience

Gary Hunter, Black & Veatch's UV specialist, has extensive experience working with all of the major manufacturers of UV equipment and optimizing control philosophies to meet site-specific operational requirements and performance goals.

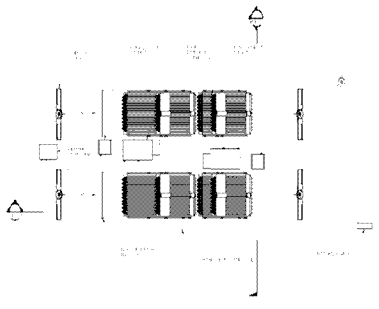
As part of the collaborative design deliverables, the Black & Veatch team will coordinate virtual milestone workshops to review design documents and address comments from the City. This provides full exposure to all the drawings and models along with navigation between 2D and 3D data at the same time. Black & Veatch has implemented this as standard practice due to the increased quality of final deliverables and reduced change orders during construction. The model space allows for open communication between all parties. Many key members of this team successfully used this approach for the new UV system being installed for the City of Wyoming.

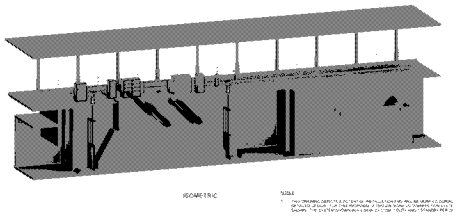
4.2 Coordination with Selected Vendor

Significant coordination between the design team and pre-selected equipment manufacturer(s) will be required during detailed design. Positive coordination between all

BIM MODEL FOR SUCCESSFUL DESIGN REVIEW

Black & Veatch will ensure that the detailed design efforts for the UV disinfection system are fully integrated into the existing facilities. A preliminary BIM model of the Ann Arbor UV disinfection structure has been developed. This will be expanded upon and included part of the 50% and 90% design reviews allowing City staff to explore the proposed design layout.





parties will ensure that systems are efficiently designed, supplied and installed. The design team will also work closely with the UV manufacturer to develop a flexible control philosophy, allowing the City to select a control strategy based on either current dose target (i.e., 30 mJ/cm^2) or the site-specific fecal coliform dose-response from ongoing Collimated Beam testing. This flexible control philosophy will allow for the UV system to operate fewer lamps at reduced power, thus minimizing maintenance requirements and optimizing energy savings while also maintaining the option to operate at a higher dose target, if desired.

4.3 Permitting and Regulatory Collaboration

Obtaining regulatory approval for a project can oftentimes present challenges. It can be highly beneficial to include EGLE in design review meetings so they can be part of the conversation. This allows EGLE to understand the project goals, drivers and decisions made along the way, leading to efficient approvals and keeping the project on schedule. Our team utilized this approach for the City of Wyoming CWP UV Disinfection project and it resulted in a very smooth and quick Construction Permit approval process.

5 Bid Phase and Award

The Black & Veatch team will prepare the applications and supporting documentation for the necessary EGLE Construction permit and City permits.

The Black & Veatch team will assist the City with advertising the project Invitation to Bid to ensure all City and/or funding advertising requirements are met. Our team will lead a pre-bid meeting, answer any questions that arise from interested parties and prepare any addenda that may be required. A complete review of each bid package will be performed and summarized in a bid evaluation and recommendation of award memorandum for the City's review and use.

PROPOSED PROJECT SCHEDULE

Our team understands that the schedule for this project is driven by the City's need to replace the existing UV disinfection equipment prior to the end of fiscal year 2024. Considering the current long-lead times for equipment, we outlined a streamlined approach to the study and design phase that facilitates a smooth transition into the construction phase of the project.

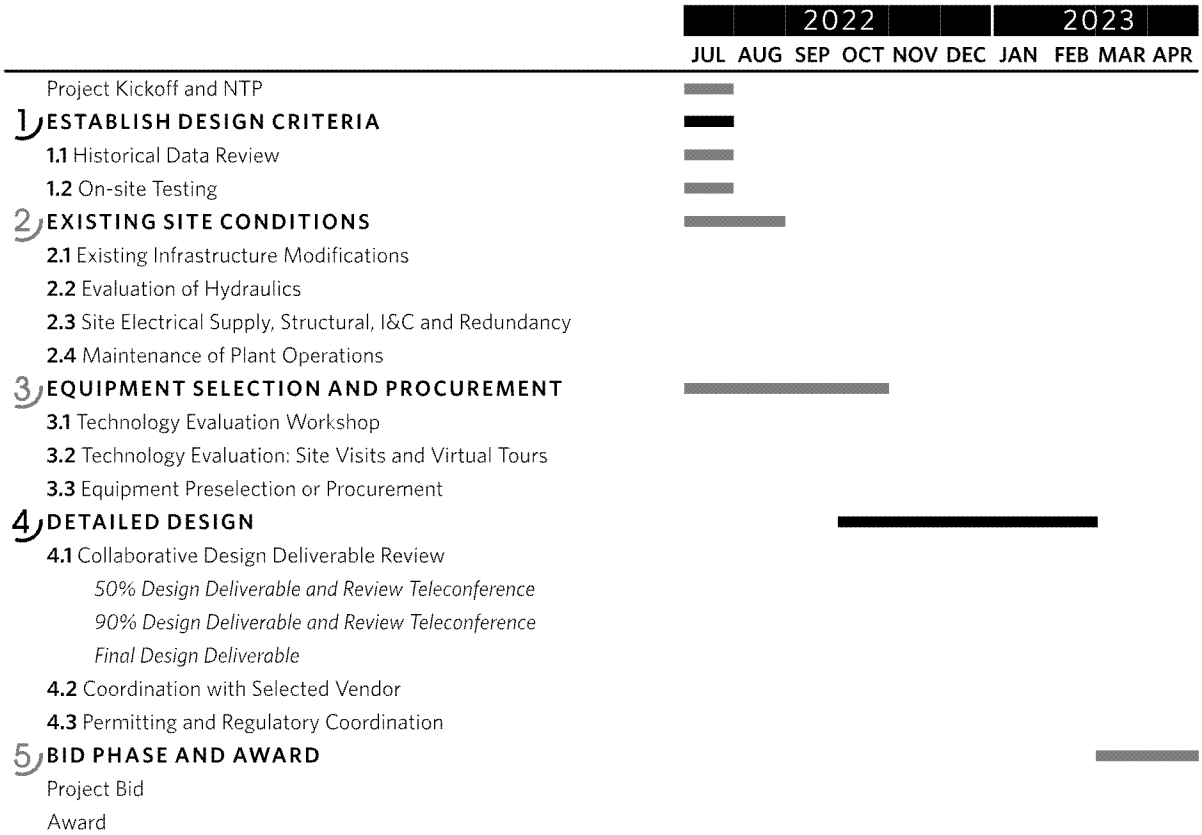


EXHIBIT B
COMPENSATION

General

Contractor shall be paid for those Services performed pursuant to this Agreement inclusive of all reimbursable expenses (if applicable), in accordance with the terms and conditions herein. The attached Fee Proposal states nature and amount of compensation the Contractor may charge the City:

D Fee Proposal

The Black & Veatch team appreciates the opportunity to provide a proposal for the City of Ann Arbor WWTP Ultraviolet Disinfection Replacement project (RFP #22-22). Our fee for this project is outlined in the table below providing the requested information for our proposed team members as well as support personnel. Our team has assumed that the project kickoff, site condition assessment and visits to other UV installations in Michigan will be held in-person with virtual meetings being utilized for all other meetings.

STAFF NAME/ BILLING RATE	BILLING RATE ($)	TASK 1 - ESTABLISH DESIGN CRITERIA	TASK 2 - EXISTING SITE CONDITIONS	TASK 3 - EQUIPMENT SELECTION	TASK 4 - DETAILED DESIGN	TASK 5 - BID PHASE AND AWARD	HOURS	LABOR	EXPENSES AND SUBCONSULTANT MARKUP	TOTAL
BLACK & VEATCH										
Heather Cheslek/Sr Project Manager	270	16	10	10	32	8	76	$20,520.00	-	$20,520.00
Gary Hunter/Sr Process Engineer	300	24	0	40	12	0	76	$22,800.00	-	$22,800.00
Todd Archer/Sr Engineering Manager	200	32	16	36	12	0	96	$19,200.00	-	$19,200.00
Britton Evans/Engineering Manager	185	6	8	6	50	12	82	$15,170.00	-	$15,170.00
Matt Coulthard/Sr Project Engineer	175	40	4	12	70	12	138	$24,150.00	-	$24,150.00
Kathy McGrath/Sr O&M Specialist	260	8	0	8	0	0	16	$4,160.00	-	$4,160.00
Mark Rogge/QA-QC Engineer	260	2	0	2	16	0	20	$5,200.00	-	$5,200.00
Patrick Powers/Sr Project Engineer	175	12	10	12	50	24	108	$18,900.00	-	$18,900.00
Henry Brown/QA-QC Engineer	260	0	4	7	7	0	18	$4,680.00	-	$4,680.00
Adam Bender/Sr Project Engineer	175	0	13	14	9	11	47	$8,225.00	-	$8,225.00
Project Engineer	145	8	0	14	136	0	158	$22,910.00	-	$22,910.00
Staff Engineer	130	0	23	140	94	10	267	$34,710.00	-	$34,710.00
Sr CAD/BIM Technician	150	0	0	24	60	0	84	$12,600.00	-	$12,600.00
Designer/Technician	95	12	0	96	233	11	352	$33,440.00	-	$33,440.00
Finance and Administration	130	4	4	4	4	4	20	$2,600.00	-	$2,600.00
Expenses	-	-							$3,211.00	$3,211.00
MOORE+BRUGGINK										
Brian Hannon/Principal	190	8	4	19	17	1	49	$9,310.00	-	$9,310.00
Jeff Landers/Engineer III	128	8	8	13	25	2	56	$7,168.00	-	$7,168.00
Jarod Stuyesant/Engineer II	107	2	9	28	37	1	77	$8,239.00	-	$8,239.00
Engineer I	92	0	6	8	36	0	50	$4,600.00	-	$4,600.00
CAD Technician II	86	0	12	10	52	0	74	$6,364.00	-	$6,364.00
Clerical	77	1	1	4	8	1	15	$1,155.00	-	$1,155.00
Expenses	-	-	-	-	-	-	0	-	$500.00	$500.00
Subconsultant Markup (5%)	-	-	-	-	-	-	0	-	$1,867.00	$1,867.00
JDH ENGINEERING										
Keith Ritsema/Sr Project Manager	165	0	18	0	22	8	48	$7,920.00		$7,920.00
Project Engineer	110	0	0	0	54	8	62	$6,820.00		$6,820.00
Expenses	-	-	-	-	-	-	0		$300.00	$300.00
Subconsultant Markup (5%)	-	-	-	-	-	-	0		$752.00	$752.00
TOTAL		**183**	**150**	**507**	**1036**	**113**	**1989**	**$300,841.00**	**$6,630.00**	**$307,471.00**

Black & Veatch Multiplier 3.16
Moore + Bruggink Mulitplier: 3.15
JDH Multiplier: 3.10

EXHIBIT C
INSURANCE REQUIREMENTS

From the earlier of the Effective Date or the Commencement Date of this Agreement, and continuing without interruption during the term of this Agreement, Contractor shall have, at a minimum, the following insurance, including all endorsements necessary for Contractor to have or provide the required coverage.

A. The Contractor shall have insurance that meets the following minimum requirements:

1. Professional Liability Insurance or Errors and Omissions Insurance protecting the Contractor and its employees in an amount not less than $1,000,000.

2. Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

   Bodily Injury by Accident - $500,000 each accident
   Bodily Injury by Disease - $500,000 each employee
   Bodily Injury by Disease - $500,000 each policy limit

3. Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 04 13 or current equivalent. The City of Ann Arbor shall be an additional insured. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. Further, the following minimum limits of liability are required:

$1,000,000	Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined
$2,000,000	Per Project General Aggregate
$1,000,000	Personal and Advertising Injury

4. Motor Vehicle Liability Insurance equivalent to, as a minimum, Insurance Services Office form CA 00 01 10 13 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be $1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

5. Umbrella/Excess Liability Insurance shall be provided to apply in excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of $1,000,000.

B. Insurance required under A.3 and A.4 above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City for any insurance listed herein.

C. Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional and unqualified 30-day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number(s); name of insurance company; name(s), email address(es), and address(es) of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions, which may be approved by the City in its sole discretion; (c) that the policy conforms to the requirements specified. Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. If any of the above coverages expire by their terms during the term of this Agreement, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.