EXHIBIT A

SCOPE OF SERVICES

Proposal to City of Riviera Beach Utilities District for Implementation Prioritization and Construction Sequencing for WTP Improvements
Work Authorization No. 3
(Effective December 17th, 2018)

Date:	December 5th, 2018
Submitted by:	Nigel Grace, PE, Vice President
Firm:	Brown and Caldwell

1. BACKGROUND

The City of Riviera Beach Utility Special District (RBUD) owns and operates a Water Treatment Plant (WTP), located at 600 West Blue Heron Boulevard, Riviera Beach, Florida 33404. The WTP has been challenged to consistently achieve desired performance due to varied constraints arising from inoperable equipment, inadequate monitoring and control capabilities, equipment that is approaching the end of their functional and reliable useful life, sub-optimal process applications and deferred maintenance. Several investigations have identified specific WTP improvement needs that generally include safety, secondary disinfection, filtration, softening/sludge handling, chemical feed system, pumping, electrical and rehabilitation needs.

RBUD is undertaking a capital improvement program to address the identified challenges of which the secondary disinfection improvements have been identified as an initial area of focus to improve residual stability and the control of disinfection byproducts formation. The secondary disinfection improvements, include the conversion from the use of chlorine gas to commercial sodium hypochlorite and relocation/replacement of other equipment currently housed in a structurally compromised North Chemical Building. The removal of process-critical equipment from the North Chemical Building will eliminate the need for continued use of this building and allow for its future rehabilitation or removal.

Secondary disinfection involves the coordinated and controlled application of chlorine and ammonia to achieve a combined chloramine residual that is maintained throughout the distribution system. RBUD currently has a detailed design for a new sodium hypochlorite feed system that would enable it to achieve controlled delivery of chlorine. The existing ammonia feed system relies on the use of gaseous ammonia that does not have the capability of being automatically controlled to deliver a defined dose in proportion to the chlorine residual, plant flow conditions, and monitored water quality. Consequently, it is recommended that the current sodium hypochlorite design be augmented to include the required ammonia system modifications.

Given the diverse improvement needs identified for the existing WTP, it is important that coordinated facility improvements be evaluated to ensure that planned improvements align not only with the current short-term priorities, but the long term needs of the facility. This will reduce the likelihood of short term investments conflicting with and undermining the efficacy of longer

term treatment improvement objectives. For example, RBUD envisions a future condition where membrane treatment is integrated into the WTP and existing facility/process components that are beyond their functional useful life are retired. In this scenario, it would be RBUD's objective that this future vision guides current implementation decisions. To that end, this project also includes high level planning of the future site utilization/buildout with consideration of elements of the existing plant that may be retired/demolished, sequence of construction, maintenance of operational continuity, site utilization and other consideration such as consolidation of chemical feed systems and integration with potential future membrane facility needs. By establishing a high level and integrated consideration of future needs, the objective is that RBUD can proceed with greater confidence that currently planned improvement will incorporate the flexibility to be compatible with future needs.

2. SCOPE OF SERVICES

The Consultant will perform the engineering scope of services as described herein.

Task 1 - Project Kickoff and Coordination Activities

Project kickoff and coordination activities include the following subtasks:

Task Objectives: This task includes preliminary project planning inclusive of preparation of a project risk register and safety planning, project kick off activities, team coordination activities and project meetings.

Activities:

1. Conduct project set-up activities that include administrative activities required to start a project, including preparation of a Health and Safety Plan and Risk Register. This activity assumes RBUD will provide its Health and Safety Plan for the WTP site.

2. Consultant shall prepare and submit a project work plan to review with RBUD staff at the project kick-off meeting.

3. Prepare for and participate in kickoff meeting

4. Manage the work of internal staff resources and coordinate work activities being performed by subconsultants

5. Prepare for and attend up to four (4) two-hour project review and status meetings to be held with RBUD staff throughout the course of the project. Scheduling of the meetings will be driven by the preparation of draft work products and the need for project coordination.

Deliverables:

1. Meeting Agenda, Draft and Final Meeting Minutes

2. Project Work Plan – inclusive of risk register and Health and Safety Plan

Task 2 – Establish Functional Requirements of Disinfection and Associated Improvements

Task Objectives: The functional requirements of an integrated ammonia and chlorine feed system will be developed to define how the systems are intended to operate under normal situations and the range of flexibility to be incorporated into the design with respect to applied location for each chemical, water quality monitoring and control capabilities. With the alternative use of sodium hypochlorite and an aqueous form of ammonia, the impact of the applied chemicals on water chemistry and scale forming tendency will be evaluated and appropriate mitigation strategies developed. It is noted that the current SHC system design incorporates the use of carbon dioxide for pH (and thus scale-formation) control of the settled water.

Activities:

1. Develop functional narrative for chloramination system – addressing normal, alternate, trim and maintenance operating modes for the application of chlorine and ammonia
2. Select the form of aqueous ammonia solution to use (ammonium hydroxide or ammonium sulfate) and document the basis for selection.
3. Identify online water quality monitoring capabilities required for routine monitoring and control of SHC and aqueous ammonia application
4. Refine flow metering improvements required to support functional expectations established for the chlorine and ammonia systems.
5. Forecast impact of SHC and aqueous ammonia application on the stability of settled and finished water and assess alternative approaches for mitigating impacts. This activity will consider the relative merits of carbon dioxide and use of a polyphosphate sequestering agent.
6. The layout of the proposed chemical building will be updated to incorporate additional chemicals (or space for future addition) identified in Tasks 2 and 3.
7. Prepare Technical Memorandum (#1) that concisely summarizes the major recommendations and improvement decisions (this will inform basis of design development in a subsequent task). Participate in a review meeting with RBUD staff and finalize the TM based on decisions arising from review meeting.

Deliverable:

1. Technical Memorandum #1

Task 3 – Assess Short and Long-term Chemical Utilization Needs

Task Objectives: Besides the chlorine and ammonia improvements that are the focus of the proposed improvements, RBUD additionally utilizes polymer, alum, and lime as part of its treatment scheme. These chemical feed systems also have deficiencies relative to constrained function, control and reliability that needs to be addressed. The capability does not exist to achieve consistent and controlled application of these chemicals and the structural failure of the North

Chemical Building has rendered lime feed system inoperable. Currently the capability does not exist to feed lime to the RBUD's largest lime softening treatment unit (7.5 mgd) which also requires replacement of its operative mechanism. This task will address the major considerations to guide coordinated improvements to these chemical feed systems including addressing the need, capacity requirements, location, and coordination with other planned plant improvements.

Activities:

1. Alum feed system – the use of alum in a lime softening environment is not preferred due to the risk of elevated aluminum in the treated water. Some process water quality monitoring will be required in support of this activity. It is assumed that the City will conduct the sampling and analytical work in conformance with a monitoring plan prepared by consultant. This activity will assess options for replacing the alum feed system which include decommission/removal or replace with use of a ferric coagulant.
2. Polymer system – the existing polymer system is located in the North Chemical Building and should be moved to a new location. Alternative locations for placement with an upgraded polymer feed system will be considered. Note - this activity does not include the consideration of alternative polymers or optimization of polymer dose.
3. Lime system – options for replacing the lost lime storage and feed capacity that exist in the North Chemical Building and improving the functionality and control of lime feed out of the South Chemical Building will be considered. This activity assumes the North Chemical Building will be demolished and that a new consolidated lime storage and feed system may be installed in the current footprint. A conceptual plan for sequencing the implementation of required repairs to Lime Softener #3 and lime feed modifications will be evaluated.
4. Prepare Technical Memorandum (#2) that concisely summarizes the major process recommendations and improvement decisions. Participate in a review meeting with RBUD staff and finalize the TM based on decisions arising from review meeting.

Deliverables:

1. Technical Memorandum #2

Task 4 – Long Range Site Planning for Integration of Membrane Treatment

Task Objectives: This task assumes a membrane treatment capacity in the range of 4 to 8 mgd will be integrated into the existing treatment scheme to provide an improved and more consistent treated water quality. This task includes conceptual facility planning to layout the future membrane plant to provide for integration with existing facilities as well as expandability to allow for phased transition from reliance on lime softening technology. Conceptual footprint requirements for a proposed membrane plant, initial and expandable capacity, alternative locations for placement on the site and coordination with other planned improvements will be evaluated. This evaluation will be conducted at a conceptual level and will not include detailed site investigations, assessment of subsurface conditions, or the establishment of preliminary design criteria. Furthermore, source water supply improvements are not considered.

Activities:

1. Establish approximate dimensions of a membrane process building that would include associated pretreatment, membrane process, pumping, cleaning systems, electrical/controls, and standby power generation as well as a separate degasification/clearwell structure and injection well concentrate disposal system that may be used for conceptual site planning.
2. Consider pretreatment and post-treatment chemical requirements (e.g. antiscalant, caustic, sodium hypochlorite, corrosion inhibitor) and how such potential future requirements may integrate with currently planned chemical feed system improvements.
3. Review available record drawings to assess potential locations for placement of future membrane facilities. The evaluation will assume the existing location of the maintenance building is a potential alternative. Consideration may be given to phased demolition of elements of the existing facility to make room for future facilities.
4. Prepare schematic level layouts and budgetary cost estimates for two alternative approaches for integrating membrane treatment into the existing WTP. By contrast, the no action alternative will be developed that considers retaining exclusive use of lime softening and implementing comprehensive upgrades to the existing treatment process to improve the functional and reliable useful life. Cost estimates will include capital as well as operating costs, inclusive of chemical and energy cost. Staffing (labor) costs will not be considered in this evaluation.
5. Conduct a workshop with RBUD's staff to review alternative approaches and agree on a preferred approach that may be used to advance coordinated facility planning. While the conceptual plan will be flexible to adapt to future conditions, it will be used to guide short term decisions to promote alignment of short-term and potential long-term capital investments.
6. Prepare Technical Memorandum (#3) that concisely summarizes the major recommendations and improvement decisions (this will inform basis of design development in a subsequent task). Participate in a review meeting with RBUD staff and finalize the TM based on decisions arising from review meeting

Deliverables:

1. Technical Memorandum #3

Task 5 –Constructability and Implementation Sequencing Major Improvements

Task Objectives: Based on the findings and recommendations from the previous tasks, a coordinated implementation program will be developed to address major constructability and sequencing considerations in the implementation the major capital improvements at the WTP. A preliminary implementation schedule will be developed together with a supporting narrative of key sequencing and implementation considerations. The intent is for the task to establish the guiding framework for the overall capital improvements, characterization of uncertainties, risks and supporting investigations into mitigation efforts.

Activities:

1. Major plant improvement needs that require future capital investment will be characterized for the following areas – lime softening, filtration, high service, transfer pumping, sludge handling, stored water management, electrical/standby power. A high-level summary of the challenges, need for improvements and benefits will be prepared for each.
2. Prepare a high level budgetary estimate for the major areas identified for improvement.
3. Prepare an exhibit that characterizes the major potential improvements organized by process area and alignment with long term improvement objectives.
4. Develop a conceptual schedule that presents the major improvement sequences and provide a supporting summary of key considerations and assumptions
5. Identify constructability, site accessibility and maintenance of operational continuity requirements that guided the conceptual improvement implementation approach.
6. Prepare Technical Memorandum (#4) that concisely summarizes the major recommendations and improvement decisions (this will inform basis of design development in a subsequent task). Participate in a review meeting with RBUD staff and finalize the TM based on decisions arising from review meeting.

Deliverables:

1. Technical Memorandum #4

Task 6 – Supplemental Support Services

Task Objectives: This task provides for supplemental support of RBUD's staff for the delivery of workshops with key stakeholders, engagement of regulators and other supplemental needs that emerge during the performance of the work.

Activities:

1. Prepare a presentation that provides a high-level overview of the project approach inclusive of long term improvement considerations, site development priorities and key considerations in developing the recommended improvement program.
2. Prepare a presentation that summarizes technical considerations involved with the integrated chemical systems improvements. This presentation will be geared more for a technical audience such as regulators.
3. Participate in meetings/workshops with stakeholders as directed by RBUD.

Deliverables:

1. Presentations

Schedule

The project will be completed within 180 days of authorization to proceed.

Compensation

The Consultant shall perform the services defined in this Scope of Work for a lump sum fee of $ 189,150. Invoices shall be submitted monthly and identify the percentage of task completion and the corresponding fee for the billing period.

A breakdown of the proposed fee is provided below.

Task	Description	Proposed Fee
1	Project Kickoff and Coordination Activities	$14,920
2	Establish Functional Requirements of Disinfection and Associated Improvements	$56,350
3	Assess Short and Long-term Chemical Utilization Needs	$34,490
4	Long Range Site Planning for Integration of Membrane Treatment	$45,430
5	Constructability and Implementation Sequencing of Major Improvements	$27,230
6	Supplemental Support Services	$10,730

Agreement

The proposed work will be implemented under the existing General Engineering Consultant Services Agreement, dated August 21st, 2018, between the City of Riviera Beach and Brown and Caldwell.

Assumptions

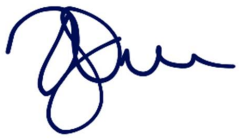
1. RBUD shall be responsible for water quality sampling and analytical work, where required.
2. Primary disinfection, which is not currently considered for implementation in the short term, also involves the coordinated application of chlorine and ammonia but with additional requirements pertaining to operating pH limitations, protection of chlorinated water from exposure to open atmospheric conditions and the controlled maintenance of a target disinfectant residual for defined contact period prior to distribution. Primary disinfection is discretionary for ground water systems and for RBUD.
3. Planned improvements will retain the current rated capacity of the WTP
4. Water supply improvements are not subject to evaluation hereunder
5. Cost estimates prepared hereunder are intended for comparative evaluations and not the establishment of capital improvement programs. Unless explicitly mentioned, cost estimating is not included in each task.
6. A code compliance review of existing structures is not included.
7. Bench-scale and/or pilot testing of alternative treatment strategies are nor included herein. Any recommended testing will be implemented as part of detailed project design/ implementation efforts.
8. This project relies on the work done by others to assess the condition and function of existing unit processes and facilities. Consequently, a condition assessment of the existing plant is not contemplated herein.

9. An assessment of concentrate disposal alternatives or the feasibility of siting an injection well at the plant site is not included. For the purpose of this evaluation it is assumed that a concentrate well will be utilized with a membrane option and that the future well may be located at the site of the WTP. It will be further assumed that the collection system will serve as a backup means of concentrate disposal.
10. An assessment of the improvement needs of the existing electrical system and standby power generation system is not included. References to electrical improvement needs is limited to the conceptual determination of load requirements and potential location(s) for placement of a replacement system. A separate electrical system evaluation is required to develop facility specific recommendations.

SUBMITTED FOR APPROVAL BY:

Albert Perez, P.E., Vice President
BROWN AND CALDWELL

PREPARED BY:



Nigel Grace, P.E., Vice President
BROWN AND CALDWELL