EXHIBIT A
SCOPE OF WORK
Proposal to City of Riviera Beach Utilities District for Drinking Water System Risk and Resilience Assessment

Work Authorization No. 6

(February 24, 2021)

INTRODUCTION AND BACKGROUND

On October 23, 2018, America's Water Infrastructure Act (AWIA) was signed into law. The law requires each community water system (CWS) serving more than 3,300 people to develop or update its risk and resilience assessment (RRA) and emergency response plan (ERP). Each CWS is identified by its public water supplier (PWS) identification number (PWSID). The law specifies the components that risk assessments and ERPs must address and establishes deadlines by which a CWS must certify to the U.S. Environmental Protection Agency (EPA) completion of the RRA and ERP. Deadlines for completing and certifying RRAs/ERPs vary by the number of customers served by each CWS/PWS. The deadline for completing and certifying an ERP is six months following the RRA certification.

The City of Riviera Beach Utility Special District owns and operates a CWS (PWSID 4501229) that is comprised of groundwater supply wells, water treatment and pumping systems; and storage and distribution facilities. This CWS serves a total population of 39,268 people (FDEP Basic Facility Report, May 2020). Based on its population, the deadline for the CWS to certify its RRA is June 30, 2021.

AWIA requires RRAs to include:

- The risk to the system from malevolent acts and natural hazards.
- The resilience of the pipes and constructed conveyances, physical barriers, source water, water collection and intake, pretreatment, treatment, storage and distribution facilities, electronic, computer, or other automated systems (including the security of such systems) which are utilized by the system.
- The monitoring practices of the system
- The financial infrastructure of the system
- The use, storage, or handling of various chemicals by the system
- The operation and maintenance of the system

PROJECT DESCRIPTION

The City of Riviera Beach Utility Special District (DISTRICT) has requested that Brown and Caldwell (CONSULTANT) assist in conducting an RRA of its drinking water system in keeping with the deadline and other requirements of AWIA. CONSULTANT will conduct the RRA using the standard and tools defined below:

- Risk Analysis and Management for Critical Asset Protection (RAMCAP®) Standard for Risk and Resilience Management of Water and Wastewater Systems Using the ASME-ITI RAMCAP® Plus Methodology (American Water Works Association, July 1, 2010). This standard is commonly referred to as the AWWA J100-10(R13), or simply "J100." The J100 Standard offers liability protection under the Department of Homeland Security's Support Anti-Terrorism by Fostering Effective Technologies (SAFETY) Act program. The RRA will be conducted in compliance with mandatory processes for Steps 1 through 6 of the J100 Standard. The RRA will not contemplate non-mandatory processes of the J100 Standard nor will it include the seventh (last) step of the J100 methodology. The last step (Risk/Resilience Management) is beyond AWIA requirements for RRAs.
- Baseline Information of Malevolent Acts (EPA, July 2019). This EPA publication includes nine manmade (intentional and accidental) threat categories. EPA developed these threat categories by grouping malevolent threats listed in AWWA J100 into a smaller set of threat categories.
- Brown and Caldwell's RRA spreadsheet tool which was developed using the resources stated above.
- American Water Works Association (AWWA) Cybersecurity Guidance and Assessment Tool (September 2019)

SCOPE OF WORK

CONSULTANT'S scope of services is provided in this section. Meetings/workshops and deliverables are identified under their related tasks. CONSULTANT will provide senior-level review of project deliverables. The reviewers will be knowledgeable in their respective fields and qualified to perform the requisite quality assurance/quality control (QA/QC) reviews. Reviewers will be familiar with the project, but not involved in day-to-day project activities, so that they can provide an independent evaluation.

Task 1 – Project Management

CONSULTANT will provide the following project management services:

- Setup project in CONSULTANT'S project management system
- Prepare Project Management Plan and Quality Control Plan
- Conduct internal kickoff meeting with key project staff
- Provide overall project management and coordination
- Prepare and manage project schedule
- Manage project budget and earned value in CONSULTANT'S project management system
- Prepare and submit to DISTRICT monthly progress reports and invoices

Deliverables

- Monthly progress reports and invoices (as a PDF)
- Project Schedule (as a PDF)

Task 2 – Kickoff Meeting

CONSULTANT will prepare for and conduct a comprehensive kickoff meeting with DISTRICT staff. During this meeting, CONSULTANT and DISTRICT will confirm project objectives; discuss relevant DISTRICT documents and relevant undocumented practices; and identify key DISTRICT staff that will participate in assessment workshops/meetings. For this meeting,

Deliverables

- Kickoff meeting agenda in PDF file format
- Kickoff meeting summary in PDF file format

Task 3 - Data Collection and Review

CONSULTANT will provide a data request to DISTRICT and DISTRICT will be responsible to provide requested data/documents to CONSULTANT. This task also includes CONSULTANT'S effort to review the data/documents. Requested data will include critical infrastructure security information. Therefore, CONSULTANT assumes that DISTRICT will host a secured file-share location for information exchange (see also, Assumptions).

Deliverables

- Data Request in MS Word file format
- Threat Likelihood Questionnaire
- AWWA Cybersecurity Screening Questionnaire
- AWWA Cybersecurity Controls Questionnaire

Task 4 – Asset Characterization

CONSULTANT will work with DISTRICT to develop an inventory of DISTRICT'S critical assets. Examples of critical assets include:

- Supply interconnects
- Wells and well pumps
- Treatment systems
- Chemical dosing systems
- Pumping stations
- Storage tanks
- Transmission and distribution piping
- Process control systems (i.e., SCADA)
- Enterprise systems such as customer information and billing systems

The inventory will also include the following fields for each critical asset:

- Internal and external supporting or protective infrastructure
- Protective countermeasures such as equipment and practices which help DISTRICT to detect, deter, delay, prepare for, and/or respond to a hazard or threat
- Asset replacement costs
- Percent of total population that would be denied service if the asset were unavailable

Using CONSULTANT'S knowledge of DISTRICT'S water system and data/information received under Task 3, CONSULTANT will set up DISTRICT'S RRA Model, and populate the Critical Asset Inventory in the RRA model. After CONSULTANT has populated the model to the extent possible, CONSULTANT will lead two asset characterization workshops with DISTRICT. During the workshops, CONSULTANT will present the asset inventory and work with DISTRICT to finalize it.

Deliverables

- Water System Asset Characterization Workshop(s) - 4 hours total
- Process Control and Enterprise Systems Asset Characterization Workshop(s) – 4 hours total
- Workshop summaries in PDF file format
- Critical Asset Inventory in MS Excel file format

Task 5 – Threat Analysis

Threat categories to be considered for analysis include the following:

- Manmade threats (accidental and intentional) included in Table 4 of EPA's Baseline Information on Malevolent Acts (EPA, July 2019):
  - Physical assault on utility
  - Physical sabotage
  - Theft or diversion
  - Contamination of source water (accidental and intentional)
  - Contamination of finished water (accidental and intentional)
  - Cyber-attack on process control systems
  - Cyber-attack on business enterprise systems
- Natural hazards such as floods, hurricanes, tornadoes, and earthquakes
- Dependency hazards which are interruptions of supply chains
- Proximity hazards which refer to utility assets being located near dangerous sites

CONSULTANT will work with DISTRICT to:

- Identify the asset types that may be impacted by the threats listed above. The purpose of this effort is to build asset-threat (AT) pairs, which are the backbone of the RRA.
- Estimate the likelihood that the threats listed above will occur in a one-year period ("threat likelihood"). This will be accomplished as described below.
  - Manmade Threats - For manmade threats, the default threat likelihood provided in Tables 6 – 13 of Baseline Information on Malevolent Acts (EPA, July 2019) will be used as a starting point. CONSULTANT will work with DISTRICT to increase or reduce the default likelihood using DISTRICT's responses to questionnaires delivered under earlier tasks.
  - Natural Hazards - CONSULTANT will independently perform a threat analysis on natural hazards because the analysis is not subjective.
  - Dependency and Proximity Hazards - For proximity and dependency hazards, the threat estimate will consider the frequency of historical events to estimate the likelihood of the threats.

CONSULTANT will:

- Build AT pairs in the RRA model
- Populate the model with EPA default threat likelihood values for manmade threats
- Conduct a threat analysis for natural hazards to estimate a threat likelihood for each natural hazard and populate the model with the values

After CONSULTANT has populated the model to the extent possible, CONSULTANT will lead two threat analysis workshops. During the workshops, CONSULTANT will:

- Confirm AT pairs to be evaluated by the RRA model
- Discuss increasing/decreasing threat likelihood default values of manmade threats based on DISTRICT-specific information collected under Task 3, and finalize the values in the model
- Present results of CONSULTANT'S natural hazards analysis and finalize threat likelihood of natural hazards in the model
- Work with DISTRICT to estimate threat likelihood of dependency and proximity hazards and finalize the values in the model

Deliverables

- Water System Assets Threat Analysis Workshop(s) - 4 hours total
- Process Control and Enterprise Systems Threat Analysis Workshop(s) – 4 hours total
- Workshop summaries in PDF file format
- List of asset-threat pairs and threat likelihood values in MS Excel file format

Task 6 – Vulnerability and Consequence Analyses

For each AT pair, CONSULTANT will work with DISTRICT to estimate the:

- Vulnerability likelihood of the asset to the threat. Vulnerability likelihood is the likelihood that the threat, if realized, would result in the worst reasonable consequences. A vulnerability analysis evaluates the ability of each critical asset and its protective systems to withstand each specified threat.
- Worst reasonable consequences that can be caused by the specific threats on the critical assets, considering existing protective countermeasures are in place. Consequences will include:
  - Number of fatalities
  - Number of serious injuries
  - Utility economic costs, which will be limited to asset replacement costs and lost revenue from water outages to affected customers
  - Regional economic costs, which will be based on a regional multiplier. Regional costs are intended to represent lost revenue from businesses and industries that cannot operate due to water service impacts and/or evacuations (from a release of hazardous gas), as well as other impacts on the regional economy.

CONSULTANT will:

- Populate the RRA model with the number of fatalities and injuries from manmade threats
- Populate the model with estimated utility and regional economic costs
- Implement adjustments to the model, as needed

After CONSULTANT has populated the model to the extent possible, CONSULTANT will lead two vulnerability/consequences analysis workshops. During the workshops, CONSULTANT will:

- Present the number of fatalities and injuries from manmade threats and finalize the values
- Work with DISTRICT to populate vulnerability likelihood for each threat/hazard and apply to AT pairs
- Present CONSULTANT'S utility and regional economic cost estimates and finalize values

Deliverables

- Water System Vulnerability & Consequence Workshop(s) - 4 hours total
- Enterprise and Process Control Systems Vulnerability & Consequence Workshop(s) – 4 hours total
- Workshop summaries in PDF file format
- Vulnerability likelihood and consequences for each AT pair in MS Excel file format

Task 7 – Baseline Risk and Resilience Assessment

CONSULTANT will use data developed in earlier tasks to perform a baseline risk and resilience assessment for each asset-threat pair. The analysis will include:

- Monetized utility consequences
- Monetized regional consequences
- Monetized risks to DISTRICT
- DISTRICT's economic resilience
- Asset resilience

Deliverables

- BC's RRA spreadsheet tool in MS Excel file format. The tool includes all inputs and results of the RRA
- Review meeting to discuss results of the RRA
- User's Guide explaining the spreadsheet tool and how to update it
- Training on using/updating the RRA spreadsheet tool
- A letter from CONSULTANT to DISTRICT that will:
  - State that DISTRICT has completed an RRA of its community water system
  - State that the RRA is compliant with AWIA requirements and consistent with the J100 Standard
  - Provide instructions regarding the EPA certification process (DISTRICT must self-certify the RRA)
  - Be signed by Florida registered professional engineer

Task 8 – Asset Management Roadmap

The purpose of this task is to provide DISTRICT with a roadmap for building its asset management program for its water and wastewater systems. While not required to meet AWIA requirements, this task is an important complement because DISTRICT'S lack of a structured framework for managing its assets impacts system reliability. The role of an asset management program is to identify risks that aging infrastructure impose on the DISTRICT. Whereas the RRA is for identifying risks to the water system from natural hazards and manmade and dependency/proximity threats.

For this task, CONSULTANT will review the current state of DISTRICT'S asset management tools, data, and processes and then develop an asset management roadmap which will include:

- A one-page primer introducing asset management and the business case for building an asset management program. The primer will be general in nature rather than specific to DISTRICT
- Graphics that frame out various aspects of asset management and the types of data, tools and processes that support each aspect

- A matrix of asset management tools on the market now, including published system requirements and benefits that are publicly available or known to CONSULTANT; task effort does not include contacting vendors or participating in demonstrations
- A schedule identifying high-level actions and tool types for DISTRICT to consider in the near term and over the next several years

Deliverables

- Asset Management Roadmap as a PDF
- Up to ten slides for DISTRICT to use for internal presentations (in MS PowerPoint)

SCHEDULE

CONSULTANT'S letter to DISTRICT recommending certification of the RRA will be delivered by June 30, 2021. The Asset Management Roadmap will be completed by August 31, 2021.

COMPENSATION

CONSULTANT shall perform the services defined in this Scope of Work for a lump sum fee of $101,966. 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.

No.	Task	Total
1	Project Management	$ 10,804
2	Kick-off Meeting	$ 1,894
3	Data Collection/Review	$ 4,901
4	Asset Characterization	$ 14,148
5	Threat Analysis	$ 14,352
6	Vulnerability/Consequence Analysis	$ 19,419
7	Risk and Resilience Analysis	$ 21,448
8	Asset Management Roadmap	$ 15,000
	Project Total	**$ 101,966**

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

- All meetings and workshops will be provided in a virtual format. Meetings will be hosted by Brown and Caldwell using Microsoft Teams
- Requested data, project deliverables, and associated information will include critical infrastructure security information. Therefore, CONSULTANT assumes that DISTRICT will host a secured file-share location for information exchange.
- Critical infrastructure security information exchanged during this project should be classified by DISTRICT as the most protected type of information and it should be protected from public information requests.
- Condition assessment of assets is not included.
- Geoprocessing or development of maps or figures is not included.
- Detailed physical security risk assessments are not included. Physical security assessments are limited to documenting existing security equipment and measures reported by DISTRICT to be installed and operable.
- Detailed cybersecurity risk assessments are not included. Cybersecurity assessments are limited to the guidance provided in EPA's Baseline Information on Malevolent Acts (EPA, July 2019) and AWWA Cybersecurity Assessment Tool and guidance.

SUBMITTED FOR APPROVAL BY:

BROWN AND CALDWELL

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PREPARED BY:

BROWN AND CALDWELL

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