



# ORANGE WATER AND SEWER AUTHORITY

*A public, non-profit agency providing water, sewer and reclaimed water services  
to the Carrboro-Chapel Hill community.*

## **REQUEST FOR QUALIFICATIONS**

**Orange Water and Sewer Authority  
Water System Risk and Resilience Assessment and Emergency Response Plans  
Issue Date: August 28, 2019**

**Submittal Deadline: September 25, 2019 at 2PM**

### **1. INTRODUCTION**

Your firm is hereby invited to submit a written statement of qualifications (SOQ) to provide professional engineering services for a Water System Risk and Resilience Assessment in compliance with the requirements of America's Water Infrastructure Act of 2018 (AWIA). OWASA will conduct a Qualification-Based Selection process to identify the best qualified firm with which to negotiate a contract.

**To be considered by OWASA, responses to this RFO must be received by 2:00 p.m. Eastern Time on Wednesday, September 25, 2019. Refer to Section 5 – Submittal Requirements for details.**

### **2. OBJECTIVES**

The primary objective of the project is to:

- a) Prepare an actionable Risk and Resilience Assessment that meets the requirements of AWIA

Additional objectives of the project may include:

- a) Assist with preparing Emergency Response Plans that meet the requirements of AWIA
- b) Assist with preparing the Source Water Protection Plan in compliance with the North Carolina Source Water Protection Planning Rule (15A NCAC 18C.1305)
- c) Conduct a Risk and Resilience Assessment at OWASA's Mason Farm Wastewater Treatment Plant and other OWASA facilities not covered by the AWIA assessment

### **3. BACKGROUND AND DESCRIPTION**

OWASA is a public, non-profit water, wastewater and reclaimed water agency established in 1977 to serve the Carrboro-Chapel Hill Community. OWASA provides service to approximately 85,000 residents through about 20,000 customer accounts.

OWASA owns and maintains 3 raw water reservoirs, over 14 miles of raw water lines, the Jones Ferry Road Water Treatment Plant, 383 miles of drinking water lines, 6 drinking water storage tanks and 4 water booster pumping stations, 348 miles of wastewater collection lines (14 miles of this total are pressurized force mains), 21 wastewater pumping stations, the Mason Farm

Wastewater Treatment Facility, 5 miles of reclaimed water lines, about 2,300 fire hydrants and over 10,925 manholes.

OWASA's existing raw water supplies are University Lake, Cane Creek Reservoir, and the Quarry Reservoir. OWASA also holds a storage allocation at the B. Everett Jordan Reservoir (Jordan Lake) in Chatham County. University Lake is located near the Jones Ferry Road Water Treatment plant and has a usable storage capacity of about 450 million gallons. The Cane Creek Reservoir is located near NC Highway 54 about 11 miles west of Carrboro and can store approximately 3 billion gallons. The Quarry Reservoir is located on NC Highway 54 about 5 miles west of Carrboro and can provide a total storage volume of 2 to 3 billion gallons.

Water from University Lake, Cane Creek Reservoir, and the Quarry Reservoir is treated at the Jones Ferry Road Water Treatment Plant. The Water Treatment Plant was originally built in 1948 and has undergone several upgrades. Today, the Water Treatment Plant has a total permitted capacity of 20 MGD.

OWASA also has existing interconnections from the City of Durham, the Town of Hillsborough, and Chatham County as well as an allocation of 5% of Jordan Lake's Water supply storage capacity.

More information about OWASA's system of assets can be found in the [Asset Management Program \(July 2017\)](#) report.

OWASA has previously completed a vulnerability assessment in 2003, and a Water Treatment Plant and Wastewater Treatment Plant Risk and Reliability assessment in 2018. Additionally, OWASA maintains a comprehensive emergency management plan.

This project is expected to result in a Risk and Resilience Assessment and subsequent Emergency Response Master Plan which will meet the requirements and deadlines established within the American Water Infrastructure Act of 2018.

#### **4. SCOPE OF SERVICES**

The engineering services required for this project are expected to be completed to meet the objective outlined above and in general accordance with a scope of services as needed to accomplish the tasks listed below. **However, the final scope of services will be negotiated with the selected engineering firm and may include modified and/or additional tasks.**

1. Risk and Resilience Assessment
  - a. Utilize generally accepted Water Sector Guidance documents, procedures and best practices
  - b. Conduct the vulnerability assessment of threats including but not limited to malevolent acts, natural hazards, physical assets, security practices, cybersecurity, financial infrastructure, and operation and maintenance practices

- c. Conduct a gap analysis of existing OWASA risk and resiliency documents, reports, and studies
  - d. Identify actionable strategies to reduce risk and improve resiliency and provide a cost benefit analysis of suggested strategies
  - e. Provide Risk and Resilience Assessment by December 31, 2020 that meets the EPA requirements outlined in AWIA
2. Emergency Response Plan
- a. Utilize generally accepted Water Sector Guidance documents, procedures and best practices
  - b. Conduct gap analysis of and review existing OWASA emergency action plans
  - c. Update necessary emergency action plans to comply with AWIA requirements
  - d. Assist with a comprehensive emergency response master plan by June 30, 2021 that provides consistency between previously prepared emergency action plans and fills in any gaps between the emergency action plans and the EPA requirements outlined in AWIA
  - e. Provide recommendations for conducting the 5-year emergency response plan review required by AWIA
  - f. Provide recommendations for training, drills, exercises, and audits that would support the emergency response plan(s)

## **5. SUBMITTAL REQUIREMENTS**

**Responses to this RFQ must be received by OWASA no later than 2:00 p.m. Eastern Time on Wednesday, September 25, 2019. To be considered, please submit eight (8) hard copies and one (1) electronic copy in PDF format on a flash drive of the required qualifications to:**

Allison Spinelli, P.E.  
Utilities Engineer  
Orange Water and Sewer Authority  
400 Jones Ferry Road  
Carrboro, North Carolina 27510

Submittals (**including** resumes) shall be limited to a maximum of 10 double-sided pages (i.e., 20 pages printed double-sided onto 10 sheets of 8-1/2"x11" paper). Total page count excludes the cover, cover letter, title sheets, dividers, etc. Only double-sided proposals shall be accepted.

Each submittal must include the following in order to be considered:

- a) ***Statement of Interest [5 points]*** explaining your firm's interest in performing the work on this project, including how the project aligns with your firm's capabilities.
- b) ***Project Team/Org Chart [20 points]*** showing the proposed project team members, including sub-consultants (if any), identifying their respective roles on the project, and indicating their availability to support this project. Each proposal shall include resumes of key team members. The primary contact shall be clearly identified.
- c) ***Project Approach [30 points]*** describing your proposed approach to accomplish the work to meet the project objectives, identifying the means and methods for how your team will

gather information, evaluate and make recommendations for the completion of this project. Provide detailed information that will allow OWASA staff to distinguish your team from other firms that may be competing for this project.

- d) **Project Schedule [25 points]** showing a realistic anticipated timeline with subtasks for completion within the scope of the original contract and in compliance with the deadlines within AWIA.
- e) **Past Experience and References [20 points]** for similar projects completed within the last six (6) years. Identify who served as project manager and key lead technical roles in those projects along with key elements of the project that relate to the specific objectives of this RFQ.
- f) **Contract Objections:** It is OWASA's intention to use a contract similar to the one included as Attachment 1. If your firm objects to any element of the contract, please state the objections in the submittal.

## **6. SELECTION PROCESS**

OWASA intends to select a firm on a qualifications basis within three weeks of receiving the responses to this RFQ. However, if based on the SOQ submitted, OWASA may decide to conduct presentations and the short-listed firms will be notified. OWASA expects to complete final scoping and contract negotiation by November 2019. OWASA reserves the right to reject any and all proposals, to waive any and all formalities, and to disregard all nonconforming or conditional submittals.

If OWASA cannot reach an agreement with the initially selected firm, OWASA will then proceed to negotiate with other firms that submitted qualifications or will reissue the RFQ.

## **7. OWASA POINT OF CONTACT**

Allison Spinelli will be OWASA's primary point of contact for all consultant selection matters relating to this project. **All questions regarding this Request for Qualifications must be emailed on or before Friday, September 20, 2019** to Ms. Spinelli at [aspinelli@owasa.org](mailto:aspinelli@owasa.org).

## **8. SUPPLEMENTAL INFORMATION**

Reliability and Risk Assessment Evaluation Report (CH2MHill 2018) – Executive Summary  
Reliability and Risk Assessment Evaluation Report (CH2MHill 2018) – [OWASA Board of Directors Agenda Item](#)

No other documents will be shared as supplemental information for this RFQ.

AGREEMENT  
BETWEEN

**ORANGE WATER AND SEWER AUTHORITY,**

a political subdivision of the State of North Carolina, its successors and assigns, hereinafter referred to as "Owner" through its Board of Directors,

and

**CONSULTANT NAME**

its successors and assigns, hereinafter referred to as "Consultant"

IN ORANGE COUNTY NORTH CAROLINA

FOR  
CONSULTING SERVICES

WITNESSETH:

WHEREAS, Owner intends to conduct a study of the sanitary sewer system within its service area; and,

WHEREAS, Owner requires certain consulting services in connection with the project (the Services); and,

WHEREAS, Consultant is prepared to provide the Services;

NOW THEREFORE, in consideration of the mutual terms and conditions, promises and payments contained in this Agreement, Owner and Consultant agree as follows:

ARTICLE 1 - TIME FOR PERFORMANCE

1.1 The effective date of this Agreement is \_\_\_\_\_ and shall remain in effect until terminated. Consultant shall perform the services described in Attachment B (herein, the Project Scope of Services) to this Agreement. Owner will issue a separate Notice to Proceed for the work, and the work shall proceed according to the schedule as described in the Project Scope of Services. Any work initiated by Consultant prior to the Owner's written authorization of the Project will be at the Consultant's sole risk.

ARTICLE 2 - GOVERNING LAW

2.1 This Agreement shall be governed by the laws of the state of North Carolina. Any disputes which may arise out of this agreement shall be filed in the North Carolina Court of Justice, The Superior Court of Orange County NC.

ARTICLE 3 - SERVICES TO BE PERFORMED

3.1 Consultant shall perform the Services described in the Project Scope of Services as authorized

under this Agreement. Consultant shall provide all services as set forth in the Project Scope of Services, including the necessary, incidental and related activities and services required and contemplated in the Consultant's level of effort.

3.2 Consultant and Owner acknowledge that the Scope of Services described for the Project does not delineate every detail and minor work task required to be performed by Consultant to complete the work authorized by the Scope of Services. If during the course of the performance of the services authorized by this Agreement, Consultant determines that work should be performed to complete the Project which is in the Consultant's opinion outside the level of effort originally anticipated, whether or not the Project Scope of Services identifies the work items, Consultant shall notify Contract Administrator in writing within 30 days and wait for Owner approval before proceeding with the work. If Consultant proceeds with said work without notifying the Contract Administrator, said work shall be deemed to be within the original level of effort described in the Project Scope of Services. Notice to the Contract Administrator does not constitute authorization or approval by Owner to perform the work. Performance of work by Consultant outside the originally anticipated level of effort without prior written Owner approval is at the Consultant's sole risk.

3.3 Upon mutual written agreement, the Project Scope of Services may be modified. The Owner and the Consultant may negotiate additional scopes of services, compensation, time of performance and other matters related to the project. If the Owner and Consultant cannot contractually agree, Owner shall have the right to immediately terminate negotiations at no cost to the Owner and to procure services from another source.

#### ARTICLE 4 - OWNER'S RESPONSIBILITIES

4.1 Owner shall be responsible for all matters described in the Project Scope of Services (Attachment B).

#### ARTICLE 5 - COMPENSATION AND METHOD OF PAYMENT

5.1 Owner agrees to pay Consultant as compensation for performance of services as described in the Project Scope of Services. Compensation may be as a lump sum or as maximum amount not-to-exceed. The maximum amount not-to-exceed method of compensation will utilize hourly billing rates established as part of this Agreement.

5.2 Consultant shall separately invoice for services rendered each month. Each project invoice shall reflect percentage of work completed to date and for the invoiced month. Invoices shall provide a detailed breakdown of hours worked, hourly billing rates by each individual, and the expenses attributable to the project during the period.

5.3 The Owner shall assign a Project CIP Number, as well as a Purchase Order Number for the Project to facilitate internal contract administration. Each Project Invoice must reference the assigned CIP Number and the Purchase Order Number for the Project and be sent directly to the Owner's Project Manager as assigned. Payment terms shall be the net invoice amount within 30 days.

5.4 The hourly billing rates for this agreement are set forth in Attachment A to this agreement and shall be used for maximum not-to-exceed compensation.

5.5 The reimbursable expenses for this agreement are set forth in Attachment A to this agreement and shall be used for maximum amount not-to-exceed compensation. Consultant shall be allowed to adjust expense items in accordance with changes in IRS criteria for deductible expenses.

5.6 Consultant shall keep such records and accounts and require any and all consultants and sub-consultants to keep records and accounts as may be necessary in order to record complete and correct entries as to personnel hours charged to the project and any expenses for which Consultant expects to be reimbursed. All books and records relative to the project shall be available at all reasonable times for examination and audit by Owner and shall be kept for a period of three (3) years after completion of all work pursuant to this Agreement. Incomplete or incorrect entries in such books and records shall be grounds for Owner's disallowance of any fees or expenses based upon such entries.

#### ARTICLE 6 - STANDARD OF CARE

6.1 General: Consultant shall exercise the same degree of care and diligence in the performance of the Services as is ordinarily exercised by a professional serving under similar circumstances.

#### ARTICLE 7 - LIABILITY AND INDEMNIFICATION

7.1 General: Having considered the potential liabilities that may exist during the performance of the Scope of Services, the benefits of the project, and the Consultant's fee for the Services, and in consideration of the promises contained in this Agreement, Owner and Consultant agree to allocate and limit such liabilities in accordance with this Article.

7.2 Indemnification by Consultant: Consultant agrees to defend, indemnify, and hold harmless Owner, its agents, and its employees from and against legal liability for all claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are caused by Consultant's negligent acts, errors, or omissions.

7.3 Employee Claims: Consultant shall indemnify Owner against legal liability for damages arising out of claims by Consultant's employees to the extent such claims arise out of Consultant's negligent acts, errors or omissions.

7.4 Survival: Upon completion of all Services, obligations, and duties provided for in this Agreement, or if this Agreement is terminated for any reason, the terms and conditions of this Article shall survive.

#### ARTICLE 8 - INSURANCE

8.1 During the performance of the Services under this Agreement, Consultant shall maintain the minimum levels of insurance shown below and provide certificates of such coverage to Owner prior to performance. All policies must provide ten (10) days advance written notice to Owner in the event of cancellation, expiration, or alteration.

8.1.1 General Liability Insurance, with a combined single limit of \$1,000,000 for each occurrence and \$1,000,000 in the aggregate.

8.1.2 Automobile Liability Insurance, with a combined single limit of \$1,000,000 for each person and \$1,000,000 for each accident.

8.1.3 Workers' Compensation Insurance in accordance with statutory requirements and Employers' Liability Insurance, with a limit of \$500,000 for each occurrence.

8.1.4 Professional Liability Insurance, with a limit of \$1,000,000 annual aggregate.

#### ARTICLE 9 - OWNERSHIP OF DOCUMENTS AND INTELLECTUAL PROPERTY

9.1 Except as otherwise provided herein, documents and reports prepared by Consultant as part of the Services shall become the property of Owner upon payment for same. All finished or unfinished documents, data studies, surveys, drawings, maps, models, photographs and reports prepared or provided by Consultant in connection with this Agreement become the property of the Owner, whether the projects are completed or not, and shall be delivered by Consultant to the Owner within ten (10) days after receipt of written notice and upon payment for same. Consultant shall retain its rights to its specifications, databases, computer software, and other proprietary property. Rights to intellectual property developed, utilized, or modified in the performance of the Services shall remain the property of Consultant. Any use by Consultant of intellectual property owned by Owner is authorized solely for the project.

#### ARTICLE 10 - TERMINATION

10.1 This Agreement may be terminated by either party upon written notice in the event of substantial failure by the other party to perform in accordance with the terms of this Agreement. The nonperforming party shall have fifteen calendar days from the date of the termination notice to cure or to submit a plan for cure acceptable to the other party.

10.2 Owner may terminate or suspend performance of this Agreement for Owner's convenience upon written notice to Consultant. Consultant shall terminate or suspend performance of the Services on a schedule acceptable to Owner. If termination or suspension is for Owner's convenience, Owner shall pay Consultant for all the Services performed and termination or suspension expenses. Upon restart, an equitable adjustment shall be made to Consultant's compensation.

#### ARTICLE 11 - DELAY IN PERFORMANCE

11.1 Neither Owner nor Consultant shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the nonperforming party. For purposes of this Agreement, such circumstances include: floods; earthquakes; fire; epidemics; war, riots, and other civil disturbances; strikes, lockouts, and other labor disturbances; sabotage; judicial restraint; and the inability to procure permits, licenses, or authorizations from any local, state, or federal agency for which such permits have been properly applied for in accordance with the specified Project Schedule for any of the supplies, materials, accesses, or services required to be provided by either Owner or Consultant under this Agreement.

11.2 Should such circumstances occur, the nonperforming party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement. Consultant shall be entitled to an equitable adjustment in schedule and compensation in the event such circumstances occur.

ARTICLE 12 - COMMUNICATIONS

12.1 Any communication required by this Agreement shall be made in writing to the address specified in the Project Scope of Services. The Contract Administrator for the Owner shall be specified in the Project Scope of Services. Nothing contained in this Article or the Project Scope of Services shall be construed to restrict the transmission of routine communications between representatives of Owner and Consultant.

ARTICLE 13 - WAIVER

13.1 No waiver by either Owner or Consultant of any breach of this Agreement shall be of any effect unless it shall be written and signed by the waiving party. Such a waiver shall not affect the waiving party's rights with respect to any other or further breach.

ARTICLE 14 - SEVERABILITY

14.1 The invalidity, illegality, or unenforceability of any provision of this Agreement, or the occurrence of any event rendering any portion or provision of this Agreement void, shall in no way affect the validity or enforceability of any other portion or provision of this Agreement. Any void provision shall be deemed severed from this Agreement, and the balance of this Agreement shall be construed and enforced as if this Agreement did not contain the particular portion or provision held to be void. The parties further agree to amend this Agreement to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this Article shall not prevent this entire Agreement from being void should a provision which is of the essence of this Agreement be determined void.

ARTICLE 15 - SUCCESSORS AND ASSIGNS

15.1 Owner and Consultant each binds itself and its directors, officers, partners, successors, executors, administrators, assigns, and legal representatives to the other party to this Agreement and to the directors, officers, partners, successors, executors, administrators, assigns, and legal representatives of such other party in respect to all provisions of this Agreement.

ARTICLE 16 - ASSIGNMENT

16.1 Neither Owner nor Consultant shall assign any rights or duties under this Agreement without the prior written consent of the other party. Unless otherwise stated in the written consent to an assignment, no assignment will release or discharge the assignor from any obligation under this Agreement. Nothing contained in this Article shall prevent Consultant from employing independent consultants, associates, and subcontractors to assist in the performance of the Services. Consultant will not employ subcontractors for the performance of the Services without the prior written approval of Owner, which approval shall not be unreasonably withheld. Consultant shall have the right to assign duties to any of Consultant's related or affiliated companies.

ARTICLE 17 - THIRD PARTY RIGHTS

17.1 Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than Owner and Consultant.

ARTICLE 18 - MISCELLANEOUS

18.1 INTERPRETATION: The language of this Agreement has been agreed to by both parties to express their mutual intent and no rule of strict construction shall be applied against either party hereto. The headings contained in this Agreement are for reference purposes only and shall not affect in any way the meaning or interpretation of this Agreement. All personal pronouns used in this Agreement shall include the other gender, and the singular shall include the plural, and vice versa, unless the context otherwise requires. Terms such as “herein,” “hereof,” “hereunder,” and “hereinafter” refer to this Agreement as a whole and not to any particular sentence, paragraph, or section where they appear, unless the context otherwise requires. Whenever reference is made to a Section or Article of this Agreement, such reference is to the Section or Article as a whole, including all of the subsections of such Section unless the reference is made to a particular subsection or subparagraph of such Section or Article.

18.2 CONSULTANT'S STAFF: Consultant shall provide the key staff identified in their proposal for the Project as long as said key staff are in Consultant's employment.

18.2.1 Consultant will obtain prior written approval of Contract Administrator to change key staff members. Consultant shall provide Contract Administrator with such information as necessary to determine the suitability of proposed new key staff. Contract Administrator shall be reasonable in evaluating key staff qualifications.

18.2.2 If Contract Administrator desires to request removal of any of Consultant's staff, Contract Administrator shall first meet with Consultant and provide reasonable justification for said removal.

18.3 ENTIRE AGREEMENT: This Agreement, including all documents identified below, represents the entire understanding between the Owner and the Consultant as to this particular scope of work and shall supersede all prior and contemporaneous communications, representations, understandings, and Agreements relating to the subject matter hereof and may be amended only by written mutual Agreement of the parties.

18.4 ATTACHMENTS: Current listing of Attachments includes:

- Attachment A – Hourly Billing Rates and Reimbursable Expenses.
- Attachment B – Project Scope of Services.

#### ARTICLE 19 – PRE-EXISTING CONTAMINATION

19.1 Anything herein to the contrary notwithstanding, title to, ownership of, and legal responsibility and liability for any and all pre-existing contamination shall at all times remain with Owner. “Pre-existing contamination” is any hazardous or toxic substance, material, or condition present at the project site or sites concerned which was not brought onto such site or sites by Consultant.

#### ARTICLE 20 – LIMITATIONS OF RESPONSIBILITY

20.1 Consultant shall not be responsible for: (1) construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the Project; (2) the failure of any contractor, subcontractor, vendor, or other participant, not under contract to Consultant, to fulfill contractual responsibilities to Owner or to comply with federal, state, or local laws, regulations, and codes; or (3) procuring permits, certificates, and licenses required for any

construction unless such responsibilities are specifically assigned to Consultant in Scope of Services.

ARTICLE 21 – NON DISCRIMINATION CLAUSE

21.1 The Consultant shall not discriminate against any person on the grounds of race, color, national origin, sex, age, or handicap in administration of this Agreement. Nor shall any person be excluded from participation in, or be denied the benefits of any project designed under this Agreement on the grounds of race, color, national origin, sex, age, or handicap.

ARTICLE 22 – MINORITY BUSINESS PARTICIPATION

22.1 It is the policy of OWASA to provide minority businesses an equal opportunity to participate in all aspects of OWASA's contract activities. Consultant shall comply with OWASA's Minority Business Participation Outreach Plan and Guidelines.

ARTICLE 23 – E-VERIFY

23.1 Consultant shall comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Further, if Consultant utilizes a subcontractor, Consultant shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes.

IN WITNESS WHEREOF, Owner and Consultant have executed this Agreement.

OWNER:

ORANGE WATER AND SEWER AUTHORITY

BY: \_\_\_\_\_

TITLE:

DATE: \_\_\_\_\_

CONSULTANT:

CONSULTANT NAME

BY: \_\_\_\_\_

TITLE:

DATE: \_\_\_\_\_

APPROVED AS TO FORM AND LEGALITY:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Robert Epting, Esquire  
Authority General Counsel

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Stephen Winters  
Director of Finance and Customer Service

**ATTACHMENT A**

**HOURLY BILLING RATES AND REIMBURSABLE EXPENSES**

**INTRODUCTION**

The hourly billing rates are set forth below.

<b>Billing Category</b>	<b>Individual Name and Title</b>	<b>Hourly Billing Rate for the Agreement</b>
Principal		
Senior Project Manager		
Senior Discipline Engineer		
Project Manager		
Project Engineer		
Engineer		
Engineering Associate		
Senior Technician		
Technician		
Administrative Assistant		

**BILLING CATEGORY DEFINITIONS**

The following table provides broad definitions for various Billing Categories. As a guideline, expected experience and duties for each of the categories have been included in the Billing Category Definitions. It is expected that in some instances the actual experience of an individual may be different than what is required for the corresponding Billing Category. In all such cases, Consultant will provide appropriate justification and seek approval from the Owner.

<b>Principal</b>	This is the firm’s corporate officer. In some cases “Principal” may be the owner or one of the partners of the firm, and is generally in a position to make all the corporate level decision for the firm as it pertains to this Agreement.
<b>Senior Project Manager</b>	Person in this position provides senior level project management, provides high level of professional input for the project and is generally responsible for conducting high level project review. This person has a Professional Engineering license in North Carolina and professional-level experience of over 15 years.

DESIGN SERVICES AGREEMENT

<b>Senior Discipline Engineer</b>	Person in this position is considered the firm's expert for a particular discipline. This person will oversee Engineering work of particular discipline at the highest level for the firm. This person has a Professional Engineering license in North Carolina and professional-level experience of over 18 years. Engineering Disciplines may include, but are not limited to: Structural Engineering, Water Resources, Environmental Engineering, Transportation, Electrical Engineering, Mechanical Engineering, Pump Station Design, Instrumentation and Control, Construction Management, Power Generation, etc.
<b>Project Manager</b>	Person in this position provides day-to-day Project Management for the Project and acts as the key client contact. This person has a professional license in North Carolina and professional-level experience of over 8 years.
<b>Project Engineer</b>	Person in this position provides day-to-day engineering work for various disciplines as required by individual projects. This person has a professional license in North Carolina and professional-level experience of over 8 years.
<b>Engineer</b>	Person in this position provides day-to-day engineering support to the Project Manager, Project Engineer and other team members as required for their respective projects. This person has a professional license in North Carolina and professional-level experience of over 3 years.
<b>Engineering Associate</b>	Person in this position provides day-to-day engineering support to the Project Manager, Project Engineer, Engineer and other team members as required for their respective projects. This person is an Engineering Intern or has an Engineering Associates degree with appropriate technical experience.
<b>Senior Technician</b>	Person in this position provides senior technical-level support to the Project Team. Support may include CAD services, GIS, or other technical-level work. This person has 10 years of experience providing technical-level work.
<b>Technician</b>	Person in this position provides technical-level support to the Project Team. Support may include CAD services, GIS, or other technical-level work. This person has 4 years of experience providing technical-level work.
<b>Registered Land Surveyor</b>	This person is a North Carolina Board of Engineers and Land Surveyors certified Land Surveyor and has 4 years of professional-level experience.
<b>2 Person Survey Crew</b>	These individuals form a surveying team, acting as an Instrument Person and Rod-Person.
<b>Administrative Assistant</b>	This person performs administrative and clerical-level work for the Project Team, including data entry, word processing, and other non-technical support work as needed for the Project.

**REIMBURSABLE EXPENSES**

Reimbursable expenses for each individual project shall be clearly itemized by the Consultant. The following guidelines shall be used to develop these expenses:

1. Overtime at straight time rates shall apply for exempt employees to the extent the employee works more than 40 hours per week on Owner's project.
2. Subcontracted services shall be based on Cost Plus 5%. Consultant shall obtain Owner's approval before authorizing such services.
3. Cost of printing and reproducing drawings and bid documents, except for those included in the lump sum cost.
4. Cost for use of field equipment, safety equipment and field sampling equipment.
5. Cost of courier and express mail services.
6. Living and traveling expenses when Consultant's employees are away from home on Owner's project assignments. The following limitations shall apply:
  - Base room charges (excluding taxes and other fees) shall not exceed \$119 per night.
  - Base rental car charges (excluding taxes and other fees) shall not exceed \$60 per day.
  - Meal charges per individual shall not exceed \$51 per day.
7. Automobile mileage to be reimbursed at rate established and updated by Internal Revenue Service.

**ATTACHMENT B**

**PROJECT SCOPE OF SERVICES**

**Project Title: ...**

**OWASA's Project #:**

**Project Contract Administrators:**

**OWASA**

**Consultant**

**Allison Spinelli, PE**

...

Utilities Engineer

...

Orange Water and Sewer Authority

...

400 Jones Ferry Road

...

Carrboro, NC 27510

Office: (919) 537-4229

**Project Background:**

...

...

**Project Scope:**

Task 1 – Kickoff Meeting, Flow Monitoring and Data Collection

...

Task 2 - ... ...

...

**Deliverables:**

*Specify deliverables, number of copies, and format.*

**Project Team:**

...

Key Team Members:

...

The OWNER will be notified in writing of changes to the project team members. Other staff may participate in the project in a minor role at Consultant's discretion.

**Project Schedule:**

....

*List durations for interim milestones and final completion in total number of days from Notice to Proceed.*

**Compensation:**

...

*Provide compensation basis (lump sum, cost ceiling) and subtotals by task.*

*Provide separate subtask breakdowns for projects above exemption limit, or as warranted.*

**Owner Responsibilities**

...

**Scope Exceptions, Additional Services, etc**

# Reliability and Risk Assessment Evaluation

*Prepared for*

Orange Water and Sewer Authority

July 2018



CH2M HILL North Carolina, Inc.  
3120 Highwoods Blvd; Suite 214  
Raleigh, NC 27604

# Reliability and Risk Assessment Evaluation

## Executive Summary

In February 2017, a series of events led to a water emergency, resulting in a “Do Not Use, Do Not Drink” directive for the entire Orange Water and Sewer Authority (OWASA) service area for 25 hours. The water emergency resulted from a combination of an accidental overfeed of fluoride, which was contained at the Jones Ferry Road Water Treatment Plant (WTP), and a major water main break. OWASA staff conducted After Action Reviews (AARs) on the various elements of the water emergency. The purpose of the AARs was to identify what went well in response to the water emergency, what should be repeated in the future, and where there are opportunities for improvements. One of the items identified for improvement was the need for a reliability and risk assessment to be performed on OWASA’s water, wastewater, and reclaimed water systems.

Reliability is most often defined as the probability that an item will perform its intended function for a specified interval under stated conditions. The definition is the overarching concept on which the “basis of design” is established. In the case of OWASA’s facilities, several different generations of designs and associated improvements have been made. One important insight gained from a reliability assessment is a confirmation of a single reliability statement, including performance expectations and key functions, of each facility. Reliability assessments focus on helping ensure that something is reliable, successful, or meets expectations.

Risk is defined as the effect of uncertainty on objectives. The international risk standard, ISO 31000, identifies seven components in a risk framework: establishment of the context, risk identification, risk analysis, risk evaluation, risk treatment, monitoring and review, and communication and coordination. CH2M used ISO 31000 as the framework in its approach. ISO 31000 notes an effect is a deviation from the expected, which gives root to the common perception that minimizing risk is synonymous with minimizing surprises. Risk assessments focus on helping ensure that something is not unreliable, unsuccessful, or fails to meet expectations.

CH2M HILL North Carolina, Inc. (hereafter, “CH2M”) conducted a Reliability and Risk Assessment of the Jones Ferry Road WTP and the Mason Farm Wastewater Treatment Plant (WWTP). The project was completed in accordance with the scope of services and agreement for professional services dated September 11, 2017. The evaluation analyzed the most critical plant subsystems, as identified by OWASA staff and reviewed by CH2M, at both facilities. Undertaking a formal reliability and risk analysis process is an industry-leading edge practice. OWASA performed these steps with the development of the formal root cause analysis in February 2017 related to a water emergency, conducting AARs, the initiation of this project’s risk and reliability assessment process, and the commitment to ensure this process is sustainable for OWASA.

The primary objective of the Reliability and Risk Assessment was to develop and implement a plan following industry best practices that focused on operations and maintenance (O&M) strategies and the identification of potential capital projects to mitigate and manage risk of a system failure. The evaluation included:

- highly participatory process facilitated by CH2M with industry experts and OWASA employees to identify and assess risks that would prevent OWASA from providing water, wastewater, and reclaimed water services that meet or exceeds all federal, state, and local quality requirements;
- evaluation of options and strategies (administrative controls; system and facility improvements; institutional improvements) to eliminate or mitigate the identified risks;
- prioritized implementation plan for improvements; and

- process to measure the value and effectiveness of the plan.

The assessment did *not* include external or internal security threats or natural disasters (which are covered by other confidential plans). Instead, the assessment focused on risk management “inside the fence,” (that is, water and wastewater treatment processes located at the plant sites). The detailed risk assessment did not include all the plant subsystems; however, all subsystems were reviewed and prioritized during the initial phase of the project. The assessment did not include assessment of the distribution or collection systems.

A cross-functional project team was assembled to include members of senior leadership, information technology, systems integrator, engineering, operations, and maintenance from both the water and wastewater plants. In addition, CH2M provided industry experts in operations, maintenance, reliability, system integration, and risk as key facilitators throughout the process and their outside perspective was welcomed by OWASA staff. The process was successful due to OWASA staff’s willingness to be open, honest and examine every “nook and cranny” of the plant subsystems identified for evaluation. Additionally, staff participation and feedback during each workshop and the staff’s commitment to address the outcomes of the process were key success factors of the Risk and Reliability Assessment Evaluation.

The international risk standard, ISO 31000, identifies seven components in a risk framework and was used as the underpinning framework in its approach with OWASA.

To establish the context and identify risk, CH2M reviewed performance data, provided an education workshop to align staff understanding of key concepts, conducted a chartering workshop, and performed a criticality assessment on the subsystems in each plant. Using the Solomon-Oldach Asset Prioritization method, OWASA staff determined which plant subsystems would be prioritized for the risk analysis.

Three primary assessment techniques were used for the risk analysis: Failure Modes and Effects Analysis (FMEA), Reliability Block Diagrams (RBDs), and Human Factors Analysis (HRA). FMEA is a technique used to identify the ways (modes) in which components, systems, or processes fail. An RBD is a form of a block diagram that emphasizes aspects influencing system reliability. HRA is based on the understanding that human actions are not without errors and it can assist in identifying risks, suggest potential mitigation strategies, and ultimately improve system reliability. Later in this report, the three primary assessment techniques are discussed in more detail.

Using the FMEAs and RBDs, staff identified failure modes at Jones Ferry Road WTP and failure modes at Mason Farm WWTP. CH2M then suggested risk treatment activities to address the highest risk failure modes. Staff reviewed the major proposed actions and reached consensus on risk treatment activities, which were grouped as follows:

- Capital Projects
- Operation and Maintenance (O&M) Projects
- Training and Awareness
- Preventive Maintenance
- Inspection
- Critical Spares
- Third-Party Responsibility

Risk treatment focused on selecting a preferred alternative for changing the likelihood of occurrence, the effect of the risks, or both. A qualitative assessment was conducted with the senior leadership team to establish the top 15 risk mitigation strategies at the overall system level. More detailed analysis was performed for specific modes of failure using probabilistic analysis (Monte Carlo simulations) to provide a value-based approach among a combination of ten different mitigation strategies for individual failure modes.

Probable risk reduction was calculated once risk treatment activities were applied. Human factors and interfaces that can influence risk were also discussed and reviewed.

Finally, monitoring and review consisted of developing risk registers from the selected risk treatment strategies in combination with the FMEA framework. As a result of the assessment, staff now proactively identify issues and incorporate risk mitigation techniques to continue to classify failure modes. It will be important to consistently apply lessons learned at both plants and continue the knowledge sharing moving forward not only among staff in the same department, but across all departments.

As a result of the assessment, OWASA is better informed to:

- Manage risk
- Make better-informed decisions
- Prioritize financial and staff resources

The primary actions identified as next steps include:

- Review, prioritize, delegate, and address the issues identified in the risk register (Appendix A). These items or projects will be incorporated into the O&M and CIP programs, when appropriate.
- Review and discuss other key findings included in this report.
- Engage the Board if Board-level guidance and support (resources) is required.
- The current evaluation considered the most critical plant subsystems as identified by OWASA staff; however, this represents approximately one-third of the total plant subsystems. The remaining two-thirds of the plant subsystems should be formally evaluated by OWASA staff in conjunction with outside experts. It is recommended that the risk register be reviewed in a comprehensive manner at least annually and updated quarterly. A review/revision of the risk and reliability assessment evaluation should be undertaken by OWASA every 5-years and/or whenever a change in operating context occurs.

OWASA will be able to use the risk management approach on an ongoing basis to select risk treatment strategies to implement and to understand the value of those strategies for implementation and value achieved after implementation.