



**Date:** May 2, 2017

**To:** Thomas J. Bonfield, City Manager  
**Through:** W. Bowman Ferguson, Deputy City Manager  
**From:** Donald F. Greeley, Director, Water Management  
**Subject:** Lake Michie and Little River Raw Water Pump Station Improvements – Award Professional Services Contract to Hazen and Sawyer, P.C.

### **Executive Summary**

In January 2017, the Department of Water Management (DWM) issued a Request for Qualifications (RFQ) for Professional Engineering Services for the Lake Michie and Little River Raw Water Pump Station Improvements. The project consists of mechanical, electrical, and building system upgrades to improve reliability of the Lake Michie and Little River Raw Water Pump Stations.

The DWM received two Statements of Qualifications (SOQs) on February 28, 2017 in response to the RFQ. The firm Hazen and Sawyer was selected based on the qualifications presented, and a scope of services has been negotiated for the Preliminary Engineering phase of the project. The contract will be amended at later dates to include the Detailed Design phase and the Construction Services phase.

### **Recommendation**

The Department recommends that the City Council:

1. Authorize the City Manager to execute a contract with Hazen and Sawyer for Professional Engineering Services for Lake Michie and Little River Raw Water Pump Station Improvements at a contract cost of \$751,294.00.
2. Establish a contingency fund in the amount of \$75,000.00.
3. Authorize the City Manager to negotiate and execute change orders provided that the total contract cost does not exceed \$826,294.00.

### **Background**

Lake Michie and Little River Reservoirs serve as the primary drinking water supplies for the City of Durham. The Lake Michie Dam and pump station was constructed on the Flat River between 1924 and 1927. The Little River Dam and pump station was constructed on the Little River between 1984 and 1987.

In 2015, condition assessments were performed on dam and pump station assets at both the Lake Michie and Little River sites and a 50-Year Rehabilitation Plan (Plan) was developed for both facilities. The Plan resulted in capital-improvement recommendations that should be implemented so that the dams and raw water pump stations operate safely and reliably for the next 50 years.

At Lake Michie, the condition assessments found numerous mechanical, electrical, and building systems in poor condition, well beyond their useful service life, and in need of replacement. The condition assessments at Little River found that some mechanical and electrical components are in a

deteriorated condition and approaching the end of their useful service life, requiring rehabilitation or in some cases replacement.

This first phase will result in a Preliminary Engineering Report (PER) that will evaluate alternatives, recommend upgrades and equipment, develop facility layouts and construction sequencing, and establish estimates of cost for the required improvements. The contract will be amended at later dates to include the Detailed Design phase and the Construction phase services.

Preliminary Engineering activities include the following services:

- A. **Hydraulic modeling.** Hydraulic modeling of the raw water pumps, piping, and reservoirs will be performed to assess the available pumping capacity and the upgrades needed to accommodate current and future water demands out to 2060. Preliminary selection of pumping equipment will be made and layouts for other infrastructure improvements will be developed.
- B. **Pumping Equipment Assessments.** If necessary based on results of hydraulic modeling, detailed condition assessments and field testing of existing pumps will be conducted to determine rehabilitation measures required for any pumps planned to remain in service.
- C. **Raw Water Transmission Main Assessments.** In field C-Factor testing will be conducted for existing raw water pipelines to determine extent of friction losses and to accurately identify pumping capabilities of the facility and whether transmission main improvements will be needed.
- D. **Valves and Actuators.** Equipment selections will be made for replacement of deteriorated valves and automated actuator systems at both facilities to provide functionality commensurate with each individual valve's designated purpose.
- E. **Intake Sluice Gates (Lake Michie).** Recommendations will be made for equipment selection and construction methods for replacing non-functional raw water intake gates and providing automated operation of gates. This task is critical since there is currently no way to hold back water from the lake in order to replace equipment inside the pump station.
- F. **Crane and Hoist System (Lake Michie).** Alternatives for electrifying the existing manual crane and hoist system will be evaluated, and equipment selections will be made to ensure that the crane system can be retrofitted to serve the facility with all planned upgrades considered.
- G. **Destratification Systems.** Raw water quality data will be analyzed and current technologies will be evaluated for improving water quality near the intakes for both lakes. This is needed to improve water quality during the summer months when algae blooms are common in the lakes, resulting in potable water taste and odor problems. Equipment recommendations will be made considering treatment effectiveness, power consumption, construction challenges, and operation and maintenance costs.
- H. **Stoplog Monorail (Little River).** Options will be evaluated, and equipment will be recommended for repairing or replacing the existing monorail which has become misaligned since construction of the dam, making stoplog installation behind spillway gates extremely difficult.
- I. **Electrical Equipment and Instrumentation.** Electrical loads will be determined for proposed equipment improvements and distribution equipment preliminary sizing and layouts will be developed for both sites, including new standby generator sizing. Coordination with Duke Energy will be conducted for required improvements to the incoming electrical feed and

step-down transformer to the Lake Michie site. Lighting improvements will be recommended for both sites, and updated arc flash hazard analysis will be conducted based on proposed electrical improvements to the Little River site. In addition, instrumentation and control systems upgrades will be evaluated to capture flow data, lake levels, dam safety instrumentation, security systems, etc. in accordance with DWM's 2016 SCADA Master Plan.

- J. **Spillway Gate Operators.** Preliminary equipment selections will be made for replacement of deteriorating and unreliable spillway gate operators at Little River Dam, including any electrical/instrumentation improvements that may be needed. The 2015 Rehabilitation Plan identified replacement of the non-functioning spillway gate operators as the top priority for dam safety at the Little River site.
- K. **Miscellaneous Building Systems.** Alternatives will be evaluated and recommendations made for providing potable water service to both sites and septic service to Lake Michie. Plans will be developed for hazardous materials (lead and asbestos) removal, miscellaneous building concrete repairs, paint/coatings rehabilitation at both facilities. Alternatives will be evaluated and recommendations made for a climate control system at Lake Michie in order to ensure that new electrical equipment can be operated and maintained in appropriate conditions. Replacement windows will be recommended for Lake Michie in coordination with Historic Preservation requirements. The original freight elevator at Lake Michie will be evaluated to determine options for modernization and safety improvements.
- L. **Constructability Evaluation.** Recommended infrastructure improvements will be evaluated for constructability and impacts to existing pump station operations. Prioritization and construction sequencing of recommended improvements will be developed, and planning level cost estimates will be provided for each recommendation.
- M. **Permitting.** All Local, State, and Federal level permits and/or approvals required to implement the proposed upgrades will be identified, and anticipated timelines and fees for obtaining regulatory approvals will be provided.
- N. **Preliminary Engineering Report.** A PER will be developed that summarizes alternatives evaluations, equipment selections, preliminary layouts, construction sequencing, maintenance of facility operations during construction, preliminary cost estimates, and anticipated construction schedule.

### Issues and Analysis

The DWM advertised the RFQ in January of 2017. On February 28, 2017, Statements of Qualifications (SOQs) were submitted by two firms:

- Brown and Caldwell, and
- Hazen and Sawyer

The selection committee was made up five members from the DWM and one member from the Equal Opportunity/Equity Assurance (EOEA) Department. With only two firms submitting SOQ's, the committee elected not to require shortlist presentations. The selection committee met on March 22, 2017 to discuss the strengths and weaknesses of each firm. Selection was made based on the following criteria, as outlined in the RFQ:

- Project Approach
- Qualifications of Proposed Team
- Experience/Past Performance on Similar Projects
- Availability

The selection committee’s summary of the qualifications provided is summarized below:

- 1.) Hazen and Sawyer
  - a. Presented a comprehensive and holistic approach to the project, giving emphasis to a wide range of issues including mechanical, electrical, building systems, historic preservation considerations, and lake-destratification alternatives.
  - b. Very strong team qualifications. Selection committee had positive history of working with most team members on projects of similar magnitude and complexity.
  - c. All key team leads were located in the firm’s local (Raleigh) office, with adequate workload availability demonstrated.
  - d. Referenced Projects:
    - i. Falls Lake Raw Water Pump Station Improvements (City of Raleigh)
    - ii. Water Shortage Response Plan Trigger Update and Supply System Optimization Modeling (City of Durham)
    - iii. PO Hoffer Water Treatment Facility Upgrades (City of Fayetteville)
    - iv. Deer Creek Pumping Station (Baltimore, MD)
    - v. Jordan Lake Aeration Evaluation (Town of Cary)
    - vi. Bellamy Reservoir Improvements (Madbury, NH)
    - vii. Miscellaneous building/architectural improvement projects
  
- 2.) Brown and Caldwell
  - a. Strong approach in several areas, with emphasis given to maintaining operations during construction and optimizing operational efficiencies.
  - b. Strong team qualifications, but selection committee had little past history working with key team members on projects of similar magnitude and complexity.
  - c. Good workload availability demonstrated, but key team leads for mechanical and electrical specialties were not local (Atlanta, GA, Irvine, CA, St. Paul, MN).
  - d. Referenced Projects:
    - i. Condition Assessment and Rehabilitation Plan for Lake Michie and Little River – served as subcontractor on this project (City of Durham)
    - ii. Lake Moultrie Raw Water Pump Station and Water Treatment Plant Capacity Upgrades (Moncks Corner, SC)
    - iii. Four Mile Run (Sewer) Pump Station Upgrade (Alexandria Renew Enterprises, VA)
    - iv. Saluda and West Columbia (Sewer) Pumping Stations (Columbia, SC)
    - v. Main (Sewer) Pumping Station Upgrades (Pittsburgh, PA)

**Alternatives**

Alternative 1: Do not move forward with the project. This alternative is not recommended. The improvements outlined herein are needed in order to continue to provide a safe and reliable source of raw water to meet the City’s potable water demands for another 50 years.

**Financial Impact**

The necessary funds are available as follows:

ORG	OBJ	PROJ	AVAILABLE
4100P002	731004	P0804	\$751,294.00
4100P002	731900	P0804	\$75,000.00

**UBE REQUIREMENTS**

No MUBE or WUBE goals were set.

Hazen and Sawyer will subcontract to the following certified firms:

<b>Firm</b>	<b>ID</b>	<b>City/State</b>	<b>Amount</b>	<b>% of Contract</b>
Ellum Engineering, Inc.	WUBE	Raleigh, NC	\$ 15,000.00	2.0%
Froehling & Robertson, Inc.	MUBE	Fairview, NC	\$ 1,600.00	0.2%

**WORKFORCE STATISTICS****Total Workforce:**

<b>Employment Category</b>	<b>Total Employees</b>	<b>Total Males</b>	<b>Total Females</b>
Project Manager	200	179	21
Professional	524	357	167
Technical	105	78	27
Clerical	66	11	55
Labor	0	0	0
<b>Total</b>	<b>895</b>	<b>625</b>	<b>270</b>

**Male:**

<b>Employment Category</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian or Pacific Islander</b>	<b>Indian or Alaskan Native</b>
Project Manager	160	5	6	7	1
Professional	285	13	22	37	0
Technical	46	14	7	11	0
Clerical	6	1	1	3	0
Labor	0	0	0	0	0
<b>Total</b>	<b>497</b>	<b>33</b>	<b>36</b>	<b>58</b>	<b>1</b>

**Female:**

<b>Employment Category</b>	<b>White</b>	<b>Black</b>	<b>Hispanic</b>	<b>Asian or Pacific Islander</b>	<b>Indian or Alaskan Native</b>
Project Manager	17	0	2	2	0
Professional	126	8	15	17	1
Technical	21	0	4	2	0
Clerical	32	10	8	5	0
Labor	0	0	0	0	0
Total	196	18	29	26	1