CITY OF DURHAM

Date: **March 7, 2022**

To: **Wanda S. Page, City Manager**
Through: **Bertha T. Johnson, Deputy City Manager**
From: **Donald F. Greeley, Director, Water Management**
Subject: **Professional Services Contract Award to Schnabel Engineering South, P.C. for Little River Dam Embankment Settlement and Seepage Improvements**

Executive Summary
In September of 2021, the Department of Water Management (DWM) issued a Request for Qualifications (RFQ) for Professional Engineering Services for the Little River Dam Embankment Settlement and Seepage Improvements project. The project provides preliminary engineering for measures needed to address evidence of embankment settlement and seepage that has been observed since construction of the dam in the 1980s. These improvements are required in order to prevent serious dam safety issues from developing in the future.

The DWM received two Statements of Qualifications (SOQs) on October 12, 2021. The firm Schnabel Engineering South, P.C. (Professional Corporation), was selected based on the qualifications presented. A scope and fee have been negotiated for preliminary engineering services for the project. Detailed design, permitting, bidding and construction related services will be conducted through future contract amendments.

Motion
To authorize the City Manager to execute a contract with Schnabel Engineering South, P.C. for professional services for the Little River Dam Embankment Settlement and Seepage Improvements project in the amount of $1,139,721;

To establish a contingency fund for the contract in the amount of $114,000; and

To authorize the City Manager to negotiate and execute amendments to the contract provided the cost of all amendments together with the original contract amount does not exceed $1,253,721.

Background
The DWM owns and operates Little River Dam, one of two raw water supply reservoirs for the City of Durham. Little River Dam was constructed between 1984 and 1987. The dam is classified as a large, high hazard structure by North Carolina Dam Safety. Several signs of embankment settlement and concentrated seepage have been observed in the decades following construction of the dam, including: heave and settlement along embankment crest, settlement of spillway bridge road approaches, settlement near the raw water pipeline tunnel, development of a sinkhole on the upstream embankment slope, and observation of turbid seepage emerging from the spillway chute slab.

A series of investigations were conducted in 2003 and 2006 following observed seepage on the spillway slab. Although the exact seepage path was not found at this time, a system of relief wells was installed in the area of concern, and the embankment drains were inspected and flushed. A series of geotechnical investigations were performed in 2019 to investigate another observed seepage event along with recurring signs of settlement and to determine remedial actions necessary. Areas of poorly compacted soils were identified near the spillway sidewalls and the raw water pipeline tunnel at this time. In addition, a limited stability analysis was conducted in 2019 on a portion of the left spillway sidewall.

Due to concerns resulting from these investigations, in conjunction with the observed settlement and seepage described above, the consultant recommended remedial measures aimed at eliminating the source of seepage on the spillway slab, restoring functionality of the deteriorated embankment drainage system, and improving sliding and rotational resistance of the spillway sidewalls. While these concerns do not represent an imminent dam safety emergency, the improvements described herein are required in order to prevent these items from progressing into a serious dam safety issue in the future. Continued maintenance of the dam structure is critical to the protection of downstream properties and the reliability of the City's water supply sources.

Issues and Analysis

The RFQ was advertised in September of 2021. On October 12, 2021 the DWM received SOQs from Freese and Nichols, Inc. and Schnabel Engineering South, P.C. The selection committee was made up of three members from the DWM and one member from the Equity and Inclusion Department. Proposals were evaluated based on the following criteria, as outlined in the RFQ: project approach, proposed team, experience on similar projects and anticipated schedule. The committee selected Schnabel Engineering based on their detailed project approach, their demonstrated expertise with large, high hazard dams in North Carolina, the availability of a local team, and the excellent level of service provided to the City on past investigations and maintenance projects at both Little River and Lake Michie Dams.

The project objectives are to:

- Restore and maintain functionality of embankment drainage system
- Improve sliding and rotational resistance of spillway sidewalls
- Resolve seepage from embankment through left sidewall onto spillway chute
- Automate measurement of seepage from behind left sidewall
- Repair road approach settlement at spillway bridge
- Repair undermined concrete drainage channel on left embankment
- Rehabilitate raw water pipeline tunnel, including the above ground tunnel enclosure
- Develop plan for recoating of spillway gates
- Repair miscellaneous areas of concrete degradation

The Preliminary Engineering phase will include evaluation of multiple alternatives to address the issues outlined above. This evaluation will include review of historical studies, collection of comprehensive site survey data, structural stability analysis and onsite inspections. Recommended alternatives and opinions of probable construction cost will be documented in a Preliminary Engineering Report (PER). Preliminary layouts and conceptual level drawings will be developed for the recommended improvements.

Cleaning of accumulated sediment from the raw water pipeline tunnel is required in order to collect detailed survey data and develop a repair plan. Note the cost of this work shown below for Task 2 is reflective of extremely difficult working conditions inside the raw water pipeline tunnel. The tunnel is approximately 600 feet long, traverses through the earthen dam embankment, underneath the lake, and terminates at the raw water intake tower. There is no lighting, power or ventilation inside the tunnel. Cleaning and surveying the tunnel will require highly specialized work in a permitted confined space and must be completed largely by hand.

The table below shows the cost breakdown for the Preliminary Engineering tasks described above. All activities will be charge on a time and materials, not-to-exceed basis. The total contract price of $1,139,721 is based on the following distribution of compensation:

Task	Description	Time and Materials Fee
1	Tunnel Sediment Material Sampling	$34,546
2	Tunnel Surveys, Cleaning, and Investigation	$306,436
2-Allowance	Offsite Liquid Disposal Option	$49,355
3	Site Surveys	$141,133
4	Embankment Grass Investigation	$14,479
5	Spillway Turbid Seepage Investigation	$76,053
6	Spillway Stability Analysis	$62,862
7	Three Dimensional Site Model	$124,435
8	Spillway Gate Coating Investigation	$22,886
9	Miscellaneous Inspections	$12,636
10	Preliminary Engineering Report	$258,570
11	Progress Meetings	$36,330
Total Contract Cost		**$1,139,721**

DWM anticipates two future contract amendments for this project. The first amendment will include professional services for detailed design, permitting and bidding. The second amendment will include professional services for construction administration and inspection. The total preliminary cost estimate for both amendments is in the range of $5,000,000 to $7,000,000. A more refined cost estimate will be provided at the conclusion of the preliminary engineering phase once alternatives for the improvements are selected.

Alternatives

Alternative No. 1 – Do not award the contract to Schnabel Engineering.
Alternative No. 2 – Do not pursue the project. Under this alternative emerging dam safety concerns would not be addressed.

Financial Impact

Funds for this contract are currently available in the following accounts:

ORG	OBJ	PROJ	Amount Available
4100P002	731004	P0520	$1,139,721
4100P002	731900	P0520	$114,000
Total			$1,253,721

Equal Business Opportunity Summary
The Equity & Inclusion Department reviewed the proposal submitted by Schnabel Engineering, P.C. of Greensboro, NC and determined that they are in compliance with the Ordinance to Promote Equal Business Opportunities in City of Durham Contracting. The goals are MUBE 0% and WUBE 0%.

Schnabel Engineering will utilize the following certified firm:

Firm	ID	City/State	Amount	% of Contract
CH Engineering, PLLC	WUBE	Raleigh, NC	$105,450.00	9%

Contractor Workforce Diversity & Hiring Practices
According to the contractor's responses to the "Contractor Workforce Diversity Questionnaire," the Consultant is a large employer consisting of "mostly professional/skilled" workers. The contractor states: "Although our demographics are representative of the AEC (architecture, engineering and construction) industry, we do not yet have the level of diversity that our company ultimately strives for. We are leveraging the efforts of the Unity Council and our recruiting team to help build the pipeline for finding top talent and building diversity within our workforce in order to enhance the culture of our company and the client and community partnerships we build". The Consultant did list many examples of efforts they make to have a more diverse workforce:

- Advertising employment opportunities with the Society of Women Engineers
- Regularly recruiting from Historically Black Colleges and Universities
- Participating in numerous youth outreach initiatives including with NCA&T
- Working through Schnabel's Unity Council on initiatives that include diversity and inclusion surveys, vetting unconscious bias training for companywide rollout, internal mentoring program and upcoming community outreach initiatives to support STEM education.

WORKFORCE STATISTICS FOR PRIMARY LOCATION

Total Workforce:

Employment Category	Total Employees	Total Males	Total Females
Project Manager	24	20	4
Professional	19	17	2
Labor	2	0	2
Clerical	2	1	1
Total	47	38	9

Male:

Employment Category	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manager	19	0	1	0	0
Professional	13	2	1	1	0
Labor	0	0	0	0	0
Clerical	1	0	0	0	0
Total	33	2	2	1	0

Female:

Employment Category	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manager	3	0	1	0	0
Professional	1	0	1	0	0
Labor	2	0	0	0	0
Clerical	1	0	0	0	0
Total	7	0	2	0	0

Attachments

1 – Draft Agreement
2 – Scope of Work
3 – UBE Compliance Report
4 – Workforce Diversity Questionnaire
5 – Notice of Intent to Award