



Date: March 19, 2019

To: Thomas J. Bonfield, City Manager

Through: W. Bowman Ferguson, Deputy City Manager

From: Donald F. Greeley, Director, Water Management

Subject: North Durham Phase III Hydraulic Model – Professional Services Contract Award to CDM Smith, Inc.

Executive Summary

In September 2018, the Department of Water Management (DWM) issued a Request for Qualifications (RFQ) for professional engineering services to complete development of, and then implement, the City’s largest hydraulic sewer model, the North Durham sewer basin. The North Durham sewer basin is the entire geographical area that flows to the City’s North Durham Water Reclamation Facility (NDWRF). The project area, shown in the Attachment 1 map, consists of roughly 110 square miles and 53% of the City’s sewer system.

In order to develop the model, it will be necessary to include flow monitoring, surveying approximately 1,500 manholes, evaluating 33 lift stations, assessing the condition of large-diameter and high-priority sewer outfalls, allocating projected flows with the City’s Long Range Water Resources Plan and Comprehensive Plan Update, and calibration. Once calibrated, the collection system’s performance will be analyzed and a report prepared that makes recommendations for capital improvement projects.

Once completed, the model will be used to evaluate the sewer collection system needs for increasing capacity, efficiency, and proposed development. It will be an essential tool for master planning and assisting with DWM’S efforts to renew an aging sewer system, reduce rain-derived inflow and infiltration (RDII), and restore capacity in mains and at lift stations.

The DWM received two (2) responses to the RFQ. CDM Smith, Inc. was selected and a scope of services for the project has been negotiated in the amount of \$3,359,300.00. Contingency is not requested.

Recommendation

To authorize the City Manager to execute a contract with CDM Smith, Inc. for professional engineering services in the amount not to exceed \$3,359,300.00 for the North Durham Phase III Hydraulic Model.

Background

The North Durham sewer basin drains to the NDWRF. The NDWRF is currently permitted to treat an average daily flow of 20 MGD. Flow is conveyed to the NDWRF through 587 miles of gravity sewer mains ranging in size from 8-inches to 48-inches in diameter (approximately 53% of the City’s sewer collection system), 42 sewer lift stations, and 49 miles of force main.

The City has previously created uncalibrated models for sub-basins LCO, ENO, and ENOP of the North Durham sewer basin. Under this project, the last 10 sub-basins of the North Durham sewer basin (DBP, GCOR, ECO, GC1, DBO, BRO, CBO, HRO, CB1, and RMP) will be incorporated with the LCO, ENO, and ENOP sub-basins to complete a final basin-wide model of the North Durham sewer basin. The new

basin-wide model will include recently constructed infrastructure reflective of City CIP projects and new development. Field investigation and flow monitoring will be performed to calibrate the complete, basin-wide model so that it accurately reflects the conditions of the existing sanitary sewer collection system.

The model will be used to perform a study of the sewer basin and will identify areas where improvements are needed in the existing system. The study will also identify infrastructure replacements needed to support future expansion in the basin. A capital improvements plan will be developed, addressing the City's sewer collection needs in the North Durham sewer basin through the year 2040.

The City will purchase a license for Bentley SewerGEMS sewer modeling software and will utilize the basin-wide model to assess the impact of proposed new developments. The model will also be an invaluable tool to evaluate infrastructure impacts of development scenarios for the Comprehensive Plan update. The City anticipates completing a model update every five years or so, to incorporate newly-constructed infrastructure.

Issues and Analysis

In September 2018 the DWM advertised an RFQ for professional engineering services to update the City's hydraulic sewer model and evaluate the sewer collection system for efficiency and capacity improvements in the North Durham Sewer Basin. In response to the RFQ, the DWM received two (2) Statements of Qualifications (SOQs):

CDM Smith, Inc.
McKim & Creed, Inc.

The selection committee was comprised of staff from the DWM and the Equal Opportunity/Equity Assurance Department. CDM Smith not only prepared a comprehensive SOQ, but their recent experience in creating the LCO, ENO, and ENOP models; and work with the RDI/I Reduction project was impressive enough for the selection committee to unanimously select CDM Smith, Inc. for the project.

The costs developed by the consultant are in line with the previous North Durham Phases I and II modeling efforts and the ongoing development of the South Durham hydraulic model.

Alternatives

Alternative #1 – Do not move forward with the contract and perform all work in-house. The DWM staff does not have the resources or availability to develop and calibrate a hydraulic sewer model the size of the North Durham sewer basin. This would result in delayed development of the sewer basin model. The model will be utilized in making decisions regarding improvements to the sewer collection system. If not updated to include the entire basin, the model will not reflect the North Durham Basin as a whole and will limit the DWM's ability to evaluate potential improvements to the system.

Alternative #2 – Do not move forward with the project. This alternative would result in no updates to the hydraulic sewer collection system model and no future flow projections. Developing a capital improvements plan to meet future capacity requirements in the North Durham Basin would be very difficult and minimally effective or accurate without the project.

Financial Impact

Funding for this project is available in the following account:

Organization Code	Object Code	Project Code	Amount
4100 P002	731004	P28ND	\$3,359,300.00

The project includes the following task items:

Task 1	Project Kickoff and Data Review	\$22,200
Task 2	Field Data Collection	\$658,400
Task 3	Condition Assessment Evaluation and Recommendations	\$57,200
Task 4	Hydraulic Model Development	\$21,400
Task 5	Hydrologic Model Development	\$78,600
Task 6	Flow Projections	\$48,400
Task 7	Model Calibration	\$99,100
Task 8	Capacity Analysis	\$96,300
Task 9	Improvement Alternatives Analysis	\$455,600
Task 10	Prioritized CIP, Report, Project Management, and Quality Management	\$189,800
Basic Services		\$1,727,000.00
Task 11	Additional Services Allowance	
	Flow Monitoring and Rainfall Data Collection	\$78,900.00
	Supplemental Hydraulic Modeling to Support Growth in North Durham Basin	\$50,000.00
	Field Inspection	\$5,200.00
	Manhole Survey	\$32,800.00
	Lift Station Removal from Floodplain and Lift Station Abandonment	\$46,800
	Condition Assessment of Ellerbee Creek Parallel Interceptors	\$550,500
	Pipeline Cleaning	\$660,900.00
	Midland Terrace Analysis	\$26,800
	Glen Road #1 P.S. and Force Main Evaluation	\$30,400
	Other On-Call Services	\$150,000.00
Additional Services		\$1,632,300.00
TOTAL PROJECT		\$3,359,300.00

Equal Business Opportunity Summary

The Equal Opportunity/Equity Assurance Department reviewed the proposal submitted by CDM Smith, Inc. of Raleigh, NC and determined that they are in compliance with the Ordinance to Promote Equal Business Opportunities in City of Durham Contracting.

M/W UBE REQUIREMENTS

There were no MUBE or WUBE goals for this project. This is a specialized scope of work in sanitary sewer monitoring pre and post rehabilitation in which no subcontracting opportunities were identified by the Department of Water Management. CDM Smith will be utilizing the following subcontractors:

Firm	ID	City/State	Amount	% of Contract
Stewart Engineering, Inc.	MUBE	Raleigh, NC	\$205,013	8.4%

WORKFORCE STATISTICS

Total Workforce:

Employment Category	Total Employees	Total Males	Total Females
Project Manager	1180	915	265
Professional	1764	1105	659
Technical	196	177	19
Clerical	169	36	133
Labor	55	53	2
Total	3364	2286	1078

Male:

Employment Category	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manager	814	11	26	60	4
Professional	886	42	65	109	3
Technical	151	10	10	6	0
Clerical	25	4	4	3	0
Labor	32	0	20	0	1
Total	1908	67	125	178	8

Female:

Employment Category	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manager	230	10	4	21	0
Professional	506	34	47	70	2
Technical	14	2	1	2	2
Clerical	104	16	10	3	0
Labor	0	0	0	2	0
Total	854	62	62	98	2

