Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: D. Albrey Arrington, Ph.D.
Executive Director

FROM: Clinton R. Yerkes CRY
Deputy Executive Director

DATE: July 12, 2016

SUBJECT: DEEP BED SAND FILTERS ENGINEERING
CHANGE ORDER #3

Hazen and Sawyer, as you will recall, are providing Construction Services on the Deep Bed Sand Filter project. Change Order #1 was approved to include Electrical Building Improvements. Change Order #2 was recently approved to provide water quality testing to determine the Deep Bed Filter improvement in treatment over our existing travelling bridge filters.

The attached Task Order #20-Change Order #3 from Hazen provides a summary of the Geotechnical and Materials Testing Services that are needed during construction and how Hazen will provide these services to the District. Hazen will be using GFA, Inc. to do the testing and pass through the charges to the District. GFA will be charging consistent with our annual contract unit pricing where applicable.

Staff recommends approval of the following motion:

> **"THAT THE DISTRICT GOVERNING BOARD authorize Change Order #3 to the Engineering Services Contract with Hazen & Sawyer for the Deep Bed Sand Filters Contract in an amount not to exceed $20,000.00."**

V:/cip/proj/deepbedfilters/eng/Chng Orders/CO#3 Board Memo

TASK ORDER No. 20 – Change Order No. 3

Loxahatchee River Environmental Control District

Wastewater Treatment Plant

Deep Bed Sand Filters – Construction Phase Geotechnical Engineering and Material Testing Services

Date: July 11, 2016

PREAMBLE

The existing traveling bridge filters and filter structure at the Loxahatchee River District (hereinafter LRD) wastewater treatment facility have served the LRD for over 20 years and are in need of significant rehabilitation and repair. Hence, in lieu of repair and replacement, it is the LRD staff's desire to replace the filters with deep bed sand filters. Deep bed filters offer additional benefits over traveling bridge filters including denitrification (i.e., nutrient removal) capabilities as well as proven performance during plant upset conditions. The LRD Board authorized Hazen and Sawyer, P.C. (hereinafter CONSULTANT) to provide engineering services for the design, permitting, bidding, construction management, inspection and startup of new deep bed filters to replace the existing traveling bridge filters at the LRD wastewater treatment facility. This authorization was provided under CONSULTANT Task Order No. 20 (approved at the April 17, 2014 Board meeting).

Subsequent to the approval of Task Order No. 20, geotechnical investigations revealed the need to perform additional soil stabilization work to ensure anticipated settlement of the proposed deep bed filter structure was limited to acceptable levels. For the purpose of improving the subsurface conditions, vibrocompaction within the footprint of the deep bed filter structure was selected and incorporated into the subsurface preparation requirements of the construction phase of the project. The incorporation of vibrocompaction into the construction phase of the project requires additional construction phase geotechnical engineering services associated with monitoring and test borings to verify the effectiveness of the vibrocompaction activities performed during construction. Additionally, material testing associated with laboratory soil testing (Proctor tests), in-place density/moisture testing of compacted fills, molding of cast-in-place concrete cylinders, temperature and slump testing of cast-in-place concrete, and compression testing of concrete cylinders not previously included in Task Order No. 20 or subsequent change orders is necessary to ensure quality control of material placement during construction. This Change Order No. 3 to Task Order No. 20 provides for the additional geotechnical engineering services associated with vibrocompaction activities, Proctor tests, density/moisture testing of compacted fills, and cast-in-place concrete testing during the construction phase of the project. The work will be performed by CONSULTANT subconsultant on a unit price not-to-exceed basis.

SCOPE OF SERVICES

Task 1 – Geotechnical Services

The Geotechnical Services to be provided by CONSULTANT will consist of performing vibroflotation monitoring at the deep filter construction site as well as 30-foot verification test borings to be performed after vibrocompaction is complete.

Task 2 – Construction Materials Testing Services

CONSULTANT will provide Construction Materials Testing Services for the Deep Bed Filters project as outlined below:

Task 2a - Laboratory Soil Testing

Laboratory soil testing will be required to identify the properties and suitability of the soil to be used at the site. CONSULTANT will conduct Proctor tests required to obtain material's maximum density and optimum moisture content, which would be used to verify that the degree of compaction in the field is achieved.

Task 2b - Field Density / Moisture Testing

CONSULTANT will provide a field technician to test the in-place density of the compacted fills. For this testing, CONSULTANT will use the Nuclear Method (ASTM D2922) in the field, which will be correlated with the corresponding laboratory proctor compaction tests.

Task 2c - Cast-in-Place Concrete Testing

CONSULTANT will provide an ACI-certified technician to test the concrete delivered to the site. In accordance with the project specifications, for every 50 cubic yards or fraction thereof of concrete placed per day the technician will measure the temperature of the concrete, air content of the concrete, and mold a set of five compression cylinders per ASTM C-31. The cylinders will be cured in the laboratory, with one cylinder tested at seven days and three at 28 days. CONSULTANT will also determine the slump and temperature of the concrete for each concrete truck.

DELIVERABLE

All test results shall be in the form of a written report(s) delivered to LRD in PDF format by CONSULTANT.

TIME OF COMPLETION

Task 1 – 90 days from Notice-to-Proceed

Task 2 – 600 days from Notice-to-Proceed (throughout project construction duration).

COMPENSATION

The compensation for engineering services provided under this Task Order 20 Change Order No. 3 shall be on a not-to-exceed basis for a total amount of $20,000.00. A cost breakdown by task for engineering services described in this task order follows:

DESCRIPTION	NOT TO EXCEED FEE
Task 1 – Geotechnical Services	$7,600.00
Task 2 – Construction Materials Testing Services	$12,400.00[1]
Total Change Order No. 3 Cost	**$20,000.00**

1) Compensation shall be on a per-test basis, based on the following schedule:

DESCRIPTION	RATE	ESTIMATED QUANTITY	ESTIMATED TOTAL
Pavement Area Soils			
Stabilized Subgrade Density - Pavement	$22.00 Each	4	$88.00
Base Density	$22.00 Each	4	$88.00
Sidewalk Density	$22.00 Each	10	$220.00
Laboratory Testing			
Proctors	$80.00 Each	4	$320.00
Stabilized Subgrade Limerock Bearing Ratio (LBR)	$250.00 Each	3	$750.00
Sieve Analysis	$45.00 Each	3	$135.00
Wash 200	$35.00 Each	3	$105.00
Underground Utilities Below Pavement			
Storm Drain Backfill Density	$22.00 Each	45	$990.00
Miscellaneous Piping Density	$22.00 Each	20	$440.00
Backfill Around Structure Density	$22.00 Each	30	$660.00
Building Areas/Footing			
Pad Density Tests	$22.00 Each	18	$396.00
Footings Density	$22.00 Each	16	$352.00
Concrete Testing			
Test Cylinders in Building & Grout Prism	$70.00 per Set	40	$2,800.00
Air Content	$15.00 per Set	40	$600.00
Engineering Review of Test Results			
Review of Test Results by Senior Geotechnical Engineer	$100.00 per Hour	2	$200.00
Technician Time			
Technician Time	$45.00 per Hour	20	$900.00

SCHEDULE

The duration of major work tasks are summarized below:

DESCRIPTION	ESTIMATED COMPLETION TIME FROM NTP(1)
Task 1 – Geotechnical Services	90 days
Task 2 – Construction Materials Testing Services	600 days
Total Project Duration	**600 days(2)**

1) NTP = Notice to Proceed issued to Contractor.
2) **Duration dependent upon Contractor's actual construction schedule.**

Albert Muniz, P.E.
Vice President / Hazen and Sawyer

July 11, 2016
Date