Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458-8964
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

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

MEMORANDUM

TO: Governing Board Members

FROM: Clinton R. Yerkes
Deputy Executive Director

DATE: December 10, 2015

SUBJECT: CLEANING, TV, INSPECTION, and LATERAL LINING SERVICES CONTRACT CHANGE ORDER #1

In July the Governing Board authorized approval of a piggy-back annual contract with LMK Pipe Renewal, LLC for the subject services in the amount of $90,000.00. This included Riverside Improvement Area, and other areas identified as high maintenance or infiltration areas (primarily some of our oldest neighborhoods). However, the full extent of repairs is not often known until we are able to complete the inspection.

The initial work in Riverside Improvement Area under this contract has been completed, and engineering staff are requesting an additional $49,820.00 be added to the contract to address the gravity systems associated with Lift Stations 57, 58, 62, 65, 66, 68, 94 and 97.

Should you have any questions concerning this matter, please contact me or Kris Dean.

The following motion is suggested for approval of this item:

"THAT THE DISTRICT GOVERNING BOARD authorize Change Order #1 to the Cleaning, TV, Inspection and Service Lateral Lining Services contract with LMK Pipe Renewal, LLC, by $49,820.00."

V:/cip/proj/RiversdImpvmt/LMK/CO#1 Board Memo

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE, JUPITER, FLORIDA 33458
(561) 747-5700 FAX (561) 747-9929

CHANGE ORDER # 1
DATE: DECEMBER 10, 2015

PROJECT NAME: CLEANING, TV, INSPECTION, and LATERAL LINING SERVICES CONTRACT

OWNER: LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

CONTRACTOR: LMK PIPE RENEWAL, LLC

THE FOLLOWING CHANGES:

Increase total contract amount to cover additional anticipated work inspections prior to establishing any major renewal or replacement projects. Proposal attached.

JUSTIFICATION:

Areas are particular concern for repairs and infiltration/inflow.
Work can be completed within "piggy-back" contract schedule.

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE:	$ 90,000.00
Current Contract Price:	$ 90,000.00
Contract Price due to this Change Order will be *INCREASED* by:	$ 49,820.00
The New Contract Price including this Change Order will be:	$139,820.00

CHANGE TO CONTRACT TIME:

The DATE OF COMPLETION of all work will be: UNCHANGED

APPROVED BY CONTRACTOR: _____
LMK PIPE RENEWAL, LLC DATE

APPROVED BY OWNER: _____
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT DATE

V:/cip/proj/Deep Bed Fltr/eng/Chng Ordrs/CO#2

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Deputy Executive Director

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Should you have any questions concerning this matter, please contact me or Kris Dean.

The following motion is suggested for approval of this item:

"THAT THE DISTRICT GOVERNING BOARD authorize Change Order #1 to the Cleaning, TV, Inspection and Service Lateral Lining Services contract with LMK Pipe Renewal, LLC, by $49,820.00."

V:/cip/proj/RiversdImpvmt/LMK/CO#1 Board Memo

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE, JUPITER, FLORIDA 33458
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CHANGE ORDER # 1
DATE: DECEMBER 10, 2015

PROJECT NAME: CLEANING, TV, INSPECTION, and LATERAL LINING SERVICES CONTRACT

OWNER: LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

CONTRACTOR: LMK PIPE RENEWAL, LLC

THE FOLLOWING CHANGES:

Increase total contract amount to cover additional anticipated work inspections prior to establishing any major renewal or replacement projects. Proposal attached.

JUSTIFICATION:

Areas are particular concern for repairs and infiltration/inflow.
Work can be completed within "piggy-back" contract schedule.

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE:	$ 90,000.00
Current Contract Price:	$ 90,000.00
Contract Price due to this Change Order will be *INCREASED* by:	$ 49,820.00
The New Contract Price including this Change Order will be:	$139,820.00

CHANGE TO CONTRACT TIME:

The DATE OF COMPLETION of all work will be: UNCHANGED

APPROVED BY CONTRACTOR: _____
LMK PIPE RENEWAL, LLC DATE

APPROVED BY OWNER: _____
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT DATE

V:/cip/proj/Deep Bed Fltr/eng/Chng Ordrs/CO#2

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

MEMORANDUM

TO: Governing Board Members

FROM: Clinton R. Yerkes
Deputy Executive Director

DATE: December 10, 2015

SUBJECT: DEEP BED SAND FILTERS ENGINEERING
CHANGE ORDER #2

In April the Governing Board authorized Hazen & Sawyer to proceed with design services on the Deep Bed Sand Filter project. Change Order #1 was later approved to include Electrical Building improvements.

The attached Task Order #20 from Hazen & Sawyer provides a summary of the proposed work and the reasons for developing this base of information in the preamble and more detailed description of the services is provided in the scope.

Should you have any questions regarding this change please contact Dr. Arrington or Mr. Muniz.

The following motion is suggested for approval of this item:

"THAT THE DISTRICT GOVERNING BOARD authorize Change Order #2 to the Engineering Services Contract with Hazen & Sawyer, P.C. for the Deep Bed Sand Filters Contract in an amount not to exceed $134,500.00."

Signed,

Clinton R. Yerkes
Deputy Executive Director

V:/cip/proj/deepbedfilters/eng/CO#2 Board Memo

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE, JUPITER, FLORIDA 33458
(561) 747-5700 FAX (561) 747-9929

CHANGE ORDER # 2

DATE: DECEMBER 10, 2015

PROJECT NAME: DEEP BED SAND FILTERS

OWNER: LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

CONTRACTOR: HAZEN & SAWYER, P.C.

THE FOLLOWING CHANGES:

Quantification of Treatment and Water Quality Improvements in accordance with attached proposal.

JUSTIFICATION:

Evaluate and quantify the effectiveness of Deep Bed Filters vs. Travelling Bridge Filters at removal of chemicals and pathogens.

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE:	$1,412,268.00
Current Contract Price including C.O. #1:	$1,469,698.00
Contract Price due to this Change Order will be *INCREASED* by:	$ 134,500.00
The New Contract Price including this Change Order will be:	$1,604,198.00

CHANGE TO CONTRACT TIME:

The DATE OF COMPLETION of all work will be: UNCHANGED

APPROVED BY CONTRACTOR: On File
Hazen & Sawyer, P.C. DATE

APPROVED BY OWNER: _____
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT DATE

TASK ORDER No. 20 – Change Order No. 2

Loxahatchee River Environmental Control District

Wastewater Treatment Plant

Deep Bed Sand Filters – Quantification of Treatment and Water Quality Improvements

Date: December 10, 2015

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).

Currently, there is very little published information on the potential environmental benefits of emerging contaminant removal and log removal of cryptosporidium and giardia across travelling bridge filters, deep bed filters, and many other types of filtration technology. While limited information exists regarding emerging contaminant removal by filtration in general, there have been no comprehensive studies that evaluate the effluent water quality impacts when changing from an older technology such as travelling bridge filters to deep bed filters, in terms of pathogens or chemical contaminants. The Loxahatchee River District's filter replacement provides a prime opportunity to evaluate the impact of the filtration technologies on emerging contaminant removal and disinfection while providing a concrete means by which improvements in water quality can be measured.

Subsequent to the approval of Task Order No. 20, LRD staff requested additional work associated with quantification of treatment and water quality improvements related to the deep bed filters. This Change Order No. 2 to Task Order No. 20 provides for sampling, analysis, and report preparation of findings related to quantification of water quality improvements anticipated.

SCOPE OF SERVICES

Task 1 – Sampling and Analysis

The scope of services to be provided with this change order include the following activities and direct costs:

- Development and implementation of sampling plan (see below) for existing traveling bridge filters and new deep bed filters once constructed
- Analysis of filter influent and effluent water quality for select contaminants of emerging concern (CECs) and pathogens (crypto, giardia, bacteria)

- Coordinating sampling events with contract laboratories and the LRD laboratory
- Review of all data and interpretation of results
- Development of a summary report and manuscript to be submitted for peer review and publication in trade, industry, or academic journal
- Loxahatchee River District staff will provide the following services during this study:
  - ✓ Staff to collect and ship samples to the contract laboratories and the LRD laboratory as indicated by the sampling plan
  - ✓ Costs associated with shipping samples to the commercial laboratory
  - ✓ Operational data related to current synthetic media filters and travelling bridge filters, and the future deep bed sand filters

Sampling plan description:

To provide a solid foundation of information regarding performance of current travelling bridge and synthetic media filters and a comparison with the new deep bed sand filters, a sampling plan is proposed that looks at CEC removal through the filtration and chlorination steps at the facility and also limited cryptosporidium and giardia testing across the filtration processes. A list of analytes of CECs will be developed that focuses on compounds that have various levels of biodegradation, adsorption to filter media or biofilms, and oxidation by chlorine. Tables 1 and 2 show the list of key compounds, separated by group, which will provide the best indication of filter performance. This list of analytes in Tables 1 and 2 will be the main focus of the study phase; however the analytical laboratory employs two separate methods that incorporate an additional 82 analytes that are included in the per sample analysis fee at no additional charge. The full set of analytes is provided is attached to this change order.

Table 1: Key Analytes Group by Biodegradability and Sorption to Filter Media

Description	Poor Sorption	Good Sorption
Poor Biodegradation	Meprobamate Dilantin Sulfamethoxazole	TCEP TCPP Carbamazepine
Good Biodegradation	Salicylic Acid Gemfibrozil Ibuprofen	Acetaminophen Bisphenol-A Triclosan Caffeine Fluoxetine

Table 2: Key Analytes Grouped by Chlorine Oxidation Rates

Good Chlorine Oxidation	Moderate Chlorine Oxidation	Poor Chlorine Oxidation
Salicylcic Acid	Gemfibrozil	Carbamazepine
Caffeine		Meprobamate
Sulfamethoxazole		Fluoxetine
Acetaminophen		Ibuprofen
Triclosan		TCEP
		TCPP
		Dilantin

The sampling plan to be recommended includes evaluation of current filter performance under high flow (high loading rate) conditions and low flow (low loading rate) conditions during two separate months. The intent will be to characterize current filter performance over a four week period, and then capture the ripening period and biological development of the new deep bed filters across approximately the first 9 months of operation. Both the existing filters and the new deep bed filters will be sampled during low and high flow conditions. In total, approximately 96 CEC samples and 64 crypto/giardia samples shall be analyzed. Sampling and analyses are estimated to cost approximately $113,120.00. Any additional sampling and associated costs will be coordinated prior to sampling with LRD staff for approval.

Task 2 – Report Preparation

CONSULTANT will meet with LRD staff to discuss outline for presentation of findings. Meeting may be in person or by conference call. Upon acceptance of report outline, CONSULTANT will prepare draft report summarizing the findings of the investigation. The report will be prepared within 4-6 weeks of receipt of final sample analysis results.

Copies of draft report will be submitted to LRD for review and a review meeting will be held within 2-4 weeks of delivery of draft report. Comments from LRD will be discussed and meeting minutes will be prepared to summarize discussions. A final report will then be prepared and submitted to LRD. Ten hard copies and one electronic copy of the final report will submitted to LRD

Each of the work tasks listed above will be led by CONSULTANT (i.e., Dr. Ben Stanford who studied under Dr. Shane Snyder at the Southern Nevada Water Authority, and is an internationally-recognized expert in emerging contaminant treatment and analysis). CONSULTANT has conducted several grant-funded and project-funded studies on emerging contaminants resulting in over two dozen peer reviewed publications and reports on the topic. Analytical support will be provided by Allison Reinert, whose master's thesis research was related to emerging contaminant treatment. The team of Stanford and Reinert have worked together on several high profile contaminant studies.

COMPENSATION

The compensation for engineering services provided under this Task Order 20 Change Order No. 2 shall be on a lump sum basis for a total amount of $134,500.00. A cost breakdown by task for engineering services described in this task order follows:

DESCRIPTION	NOT TO EXCEED FEE
Task 1 – Sampling and Analyses	$129,120.00
Task 2 – Report Preparation	$5,380.00
Total Change Order No. 2 Cost	**$134,500.00**

SCHEDULE

The duration of major work tasks are summarized below:

DESCRIPTION	ESTIMATED COMPLETION TIME FROM NTP(1)
Task 1 – Sampling and Analyses	30 months(2)
Task 2 – Report Preparation	~ 2 months(2)
Total Project Duration	~ 30-32 months(2)

1) NTP = Notice to proceed from start of sampling (note: initial sampling occurs immediately with final sampling initiated upon completion of deep the
2) Completion dependent upon receipt of analyses

Albert Muniz

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

December 10, 2015
Date

List of Analytes Provided by Eurofins Eaton Analytical

A-List Compounds (API Neg)	B-List Compounds (API Pos)	
2,4-D	1,7-Dimethylxanthine	Lidocaine
4-nonylphenol	Acetaminophen	Lincomycin
4-tert-octylphenol	Albuterol	Linuron
Acesulfame-K	Amoxicillin	Lopressor
Bendroflumethiazide	Androstenedione	Meclofenaminc Acid
BPA	Atenolol	Meprobamate
Butalbital	Atrazine	Metazachlor
Butylparben	Azithromycin	Nifedipine
Chloramphenicol	Bezafibrate	Norethisterone
Clofibric Acid	Bromacil	OUST (Sulfameturon, methyl)
Diclofenac	Caffeine	Oxolinic Acid
Estradiol	Carbadox	Pentoxyfiline
Estriol	Carbamazepine	Phenazone
Estrone	Carisoprodol	Primidone
Ethinyl Estradiol	Chloridazon	Progesterone
Ethylparaben	Chlorotoluron	Propazine
Gemfibrozil	Cimetidine	Quinoline
Ibuprofen	Cotinine	Simazine
Iohexal	Cyanazine	Sulfachloropyridazine
Iopromide	DACT	Sulfadiazine
Isobutylparaben	DEA	Sulfadimethoxine
Methylparaben	DEET	Sulfamerazine
Naproxen	Dehydronifedipine	Sulfamethazine
Propylparaben	DIA	Sulfamethizole
Sucralose	Diazepam	Sulfamethoxazole
Triclocarban	Dilantin	Sulfathiazole
Triclosan	Diltiazem	TCEP
Warfarin	Diuron	TCPP
	Erythromycin	TDCPP
	Flumeqine	Testosterone
	Fluoxetine	Theobromine
	Isoproturon	Theophylline
	Ketoprofen	Thiabendazole
	Ketorolac	Trimethoprim