

CCNA2018 AMENDMENT 1 TO WORK ORDER 4

**EVALUATION OF A PILOT STUDY OF USING
EVAPORATION TECHNOLOGY FOR LEACHATE MANAGEMENT**

This Amendment 1 to Work Order Number 4 is entered into as of this ___ day of _____, 201_, pursuant to that certain Continuing Consulting Engineering Services Agreement for Professional Services entered into as of this 17th day of April, 2018 (collectively referred to as the "Agreement"), by and between INDIAN RIVER COUNTY, a political subdivision of the State of Florida ("COUNTY") and Geosyntec Consultants, Inc. ("Consultant").

1. The COUNTY has selected the Consultant to perform the professional services set forth in existing Work Order Number 4 , Effective Date February 4, 2019.
2. The COUNTY and the Consultant desire to amend this Work Order as set forth on Exhibit A (Scope of Work) attached to this Amendment and made part hereof by this reference. The professional services will be performed by the Consultant for the fee schedule set forth in Exhibit A (Fee Schedule), and within the timeframe more particularly set forth in Exhibit A (Time Schedule), all in accordance with the terms and provisions set forth in the Agreement.
3. From and after the Effective Date of this Amendment, the above-referenced Work Order is amended as set forth in this Amendment. Pursuant to paragraph 1.4 of the Agreement, nothing contained in any Work Order shall conflict with the terms of the Agreement and the terms of the Agreement shall be deemed to be incorporated in each individual Work Order as if fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Work Order as of the date first written above.

CONSULTANT:

**BOARD OF COUNTY COMMISSIONERS
OF INDIAN RIVER COUNTY**

By: _____

By: _____
....., Chairman

Print Name: Thomas A. Peel, Ph.D.

Title: _____

BCC Approved Date: _____

Attest: Jeffrey R. Smith, Clerk of Court and Comptroller

By: _____
Deputy Clerk

Approved: _____
Jason E. Brown, County Administrator

Approved as to form and legal sufficiency: _____
Dylan T. Reingold, County Attorney

EXHIBIT A

PROFESSIONAL SERVICES

7 November 2019

Mr. Himanshu Mehta, P.E., Managing Director
Solid Waste Disposal District
Indian River County
1325 74th Avenue SW
Vero Beach, Florida 32968

**Subject: Proposal for Engineering Services
Evaluation of a Pilot Study for Use of
Thermal Evaporation Technology for Leachate Management
Indian River County Landfill Facility
Vero Beach, Indian River County, Florida**

Dear Mr. Mehta:

Geosyntec Consultants, Inc. (Geosyntec) is pleased to submit this proposal to Indian River County (IRC), Solid Waste Disposal District (SWDD) to provide engineering services related to conducting an independent evaluation of a pilot study using a thermal evaporation technology for the management of leachate from the IRC Landfill (IRCL) facility in Indian River County, Florida. This proposal presents the scope of work, schedule, and budget estimate for conducting the pilot study. The proposal was prepared in response to the verbal and 10 September 2019 email requests from Mr. Himanshu Mehta, P.E., Managing Director, of SWDD to Dr. Kwasi Badu-Tweneboah, P.E. of Geosyntec.

Geosyntec has prepared this proposal as Exhibit A of Amendment 1 to CCNA-2018-WO No. 4, pursuant to that certain Continuing Contract Agreement for Professional Services, dated April 17, 2018 (collectively referred to as the "Agreement"), by and between INDIAN RIVER COUNTY, a political subdivision of the State of Florida ("COUNTY") and Geosyntec ("Consultant").

The remainder of this proposal presents: (i) project background; (ii) proposed scope of work; (iii) schedule; and (iv) budget estimate.

PROJECT BACKGROUND

The IRCL facility is located in southern Indian River County, east of Interstate 95, south of Oslo Road, and west of Rangeline Road in Vero Beach, Florida. The landfill property includes the Class I landfill, an inactive Construction and Demolition (C&D) debris disposal facility, and other support facilities. A Residuals Dewatering Facility (RDF) is also operated at the IRCL facility by the IRC Department of Utility Services (IRCDUS). Leachate from the Class I landfill and centrate

(i.e., dewatering liquids) from the RDF are transmitted via force main to the West Regional Wastewater Treatment Facility (WRWWTF) for treatment and disposal.

On February 19, 2019, SWDD authorized Geosyntec, under CCNA 2018 Work Order No. 4, to evaluate landfill liquids management alternatives for the IRC Landfill. The purpose of the study was to evaluate options for reducing the nutrient loading from the Landfill leachate and RDF centrate that are potentially impacting the stringent permit conditions at the WRWWTF. The study focused on: (i) review of the liquid chemistry and flow data; (ii) an evaluation of liquids management options; (iii) discussion of conceptual costs; (iv) summary of findings; and (v) recommendations. The results of the study were presented in a technical memorandum that was submitted to SWDD on 3 July 2019.

Based on an evaluation of leachate characteristics from the April 2019 sampling compared to historical analytical data, arsenic (As), total nitrogen (TN) and total dissolved solids (TDS) were found to exceed the local limits and would therefore require pretreatment prior to continued discharge to the WRWWTF. Also, based on a review of historical Landfill leachate flow data from June 2016 to February 2019, a peak daily flow rate of 20,000 gallons per day (gpd) was used for the evaluation of leachate management options.

Two primary leachate treatment/management strategies (i.e., onsite treatment and leachate evaporation) were evaluated in the study. The evaluated onsite treatment approach involved the use of a biological system (Membrane Bioreactor [MBR]) combined with Reverse Osmosis (RO) for the removal of the constituents to below the local limits required by the WRWWTF. One vendor of biological and/or physical treatment systems (i.e., Dynatec Systems, Inc. of Burlington, NJ) was contacted to provide the conceptual design and cost estimate to manage 20,000 gpd of leachate. The second alternative evaluated is liquids volume reduction via onsite evaporation. Two vendors of thermal leachate evaporator systems (APTIM of Acworth, GA and Heartland Water Technology, Inc. of Hudson, MA) were contacted to provide conceptual designs and cost estimates for systems to manage 20,000 gpd of leachate. Geosyntec utilized the data provided by these vendors to prepare capital and O&M comparison cost estimates for the management of leachate from the Landfill.

Based on the technical and economic evaluations presented in the study, there is a potential that leachate evaporation using the Heartland system could be a cost-competitive alternative to onsite treatment and continued discharge of pretreated effluent to the WRWWTF. To better evaluate the feasibility of leachate evaporation, a pilot study in cooperation with Heartland was recommended.

Geosyntec understands that Heartland, in collaboration with Indian River Eco District, LLC (IREDD) of Lufkin, Texas, are interested in installing a leachate evaporator system at the adjacent property currently owned by the IREDD. Therefore, SWDD has solicited a proposal from IREDD

and Heartland to conduct the pilot study to demonstrate the effectiveness of Heartland's system to evaporate leachate from the IRC Landfill. SWDD has also requested Geosyntec to submit a proposal to conduct an independent evaluation of the pilot study.

PROPOSED SCOPE OF WORK

This proposal presents the scope of work for conducting an evaluation of the pilot study to use Heartland's thermal evaporation system to manage the leachate from the IRC Landfill. The objective of the pilot study is to address some of the following technical and economic issues: (i) is there enough landfill gas (LFG) or another source(s) of heat energy available to handle the Landfill leachate flow volumes; (ii) evaluate the effectiveness of the evaporation system under site-specific conditions to confirm volume reductions of 90 percent or greater; (iii) evaluate the need to further process the residuals to pass the Paint Filter Liquids Test and Toxicity Characteristic Leaching Procedure (TCLP) requirements for disposal of these residuals at the Landfill; (iv) evaluate the ultimate management of evaporator residuals (i.e. offsite at the IRC Landfill or another disposal facility if the evaporator is installed on IRED property); and (v) re-evaluate final system costs using the pilot study results. For budgeting purposes, the scope of work will be performed in four phases as follows:

- Phase 1 – General consulting/meeting support/project management;
- Phase 2 – Pilot study coordination and site visit;
- Phase 3 – Evaluation of pilot study results; and
- Phase 4 – Preparation of Technical Memorandum.

Each of these phases is briefly described below.

Phase 1 – General Consulting/Meeting Support/Project Management

Under this phase, Geosyntec will perform project planning and management responsibilities, such as correspondence with SWDD and IRCDUS, invoice review, project coordination, budget and schedule tracking and project administration. Geosyntec has also included a budget for preparation and attendance (by two Geosyntec personnel) at two meetings: (i) kickoff meeting with the SWDD staff; and (ii) project review meeting with SWDD staff to review and discuss the results from the pilot study. Geosyntec has assumed that the kickoff and project review meetings will be held via teleconference in order to reduce overall costs to the project. Additional meetings are discussed in subsequent phases of this proposal.

Phase 2 – Pilot Study Coordination and Site Visit

Under this phase, Geosyntec will coordinate with SWDD, IRED, and Heartland to conduct the pilot study on the IRC Landfill property. As requested by IRED and Heartland through SWDD,

Geosyntec will contact the Florida Department of Environmental Protection (FDEP) Solid Waste Section and Division of Air Resource Management (DARM) for the regulatory and permitting requirements for the pilot study as well as the eventual full-scale commercial system for the IRC Class I Landfill. Geosyntec will also review relevant documents including work plans, shop drawings and process diagrams, start-up and shut-down procedures, etc. provided by IRED and Heartland prior to the start of the pilot study. Based on a review of these documents, Geosyntec will coordinate with SWDD and/or IRED/Heartland for the sampling of leachate and final residuals from the evaporation for testing by an approved testing laboratory. The list of analytical parameters, including VOCs and HAPs, will be prepared by Geosyntec for review and agreed to by SWDD, IRED and Heartland prior to the start of the pilot study. In addition, any air sampling and stack emissions testing that may be required by DARM of FDEP will be included. For budgeting purposes, we have assumed that the sampling and laboratory analytical testing will be contracted directly by either SWDD or IRED/Heartland.

Geosyntec will conduct a site visit during the pilot study. For budgeting purposes, we have assumed that the site visit would be conducted by one Geosyntec personnel during the actual evaporation process (i.e., pilot test). Based on our understanding of the pilot study proposed by IRED/Heartland, the process will involve installation and operation of a pilot system to evaporate approximately 1,000 gpd of leachate for a total duration of five (5) days. Therefore, Geosyntec will make the site visit during Day 2 or 3 of the pilot study in order to observe the actual evaporation process.

Phase 3 – Evaluation of Pilot Study Results

The results of the plot study will be evaluated to: (i) assess the LFG or heat energy requirements to evaporate the Landfill leachate; (ii) effectiveness of the evaporation system to confirm the percent volume reduction; (iii) the need to further process the residuals to pass the Paint Filter Liquids Test and TCLP requirements for disposal at the IRCL facility or another off-site facility and its cost implications; and (iv) re-evaluate final system costs. The evaluation will also address the permitting requirements (including leachate, residuals, air emissions sampling and testing) by both FDEP Solid Waste Section and DARM with the understanding that the commercial unit might be installed on the IRED property and not the IRC Landfill property. As such, preliminary costs for the design, permitting, and construction of a piping system to convey leachate from IRC Landfill to the IRED property will be prepared.

Phase 4 – Preparation of Technical Memorandum

A technical memorandum will be prepared as the deliverable for the above scope of work. The memorandum will include discussions of the site visit, analytical results of leachate and residuals samples collected during the pilot study, permitting requirements, air quality and secondary containment requirements, preliminary leachate conveyance piping system costs, processing costs

per gallon of residuals management and disposal costs, personnel needs, maintenance costs, and other issues or concerns resulting from the site visit and evaluation of the pilot study. The total cost of operation (i.e., engineering, permitting, landfill gas (LFG) usage, processing and disposal of residuals, etc.) will be calculated and amortized over a 10-year period. A draft memorandum will first be issued to SWDD for review and will be finalized upon receipt of review comments.

SCHEDULE

Geosyntec will initiate work immediately upon receipt of Notice to Proceed (NTP) from SWDD. Geosyntec has assumed a two-month period for completion of the pilot study. As previously discussed, the actual pilot study would take 5 days to complete. However, the first month would involve planning, correspondence with FDEP, coordination with SWDD, IRED and Heartland prior to pilot study startup, and receipt and review of analytical test results following completion of the pilot study.

BUDGET ESTIMATE

Geosyntec proposes to perform the above-referenced work on a lump sum basis for \$19,975. A detailed budget estimate is provided as Attachment A. The estimated budget for the scope of work described herein is summarized as follows:

Phase 1 – General Consulting/Meeting Support/Project Management	\$2,653
Phase 2 – Pilot Study Coordination and Site Visit	\$4,261
Phase 3 – Evaluation of Pilot Study Results	\$6,232
Phase 4 – Preparation of Technical Memorandum	\$6,829
Total Budget Estimate	\$19,975

Geosyntec will invoice SWDD each month of the project on a lump sum, percent complete basis in accordance with our Agreement. Additional services or any significant change in the scope of work will be performed using the Rate Schedule included in our Agreement.

Mr. Himanshu Mehta, P.E. Managing Director
7 November 2019
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CLOSURE

Geosyntec appreciates this opportunity to offer our services. If this proposal is acceptable, please indicate your agreement by signing the attached work authorization, which references this proposal. Please return one signed work authorization to Dr. Badu-Tweneboah's attention. Please call the undersigned with questions you may have as you review this proposal.

Sincerely,



Herwig Goldemund, Ph.D.
Senior Scientist



Kwasi Badu-Tweneboah, Ph.D., P.E.
Principal

ATTACHMENT A
DETAILED BUDGET ESTIMATE

Table 1

**BUDGET ESTIMATE
PILOT STUDY OF LANDFILL LEACHATE EVAPORATION
INDIAN RIVER COUNTY CLASS I LANDFILL
INDIAN RIVER COUNTY, FLORIDA**

PHASE 1: PROJECT MANAGEMENT/MEETINGS

ITEM	BASIS	RATE	QUANTITY	ESTIMATED COST
A. Professional Services				
a. Senior Principal	Hr	\$240	0	\$0
b. Principal	Hr	\$225	6	\$1,350
c. Senior Professional	Hr	\$205	4	\$820
d. Project Professional	Hr	\$185	0	\$0
e. Professional	Hr	\$160	0	\$0
f. Senior Staff Professional	Hr	\$140	0	\$0
g. Staff Professional	Hr	\$120	0	\$0
Subtotal Professional Services				\$2,170
B. Technical/Administrative Services				
a. CADD Designer	Hr	\$130	0	\$0
b. Senior Drafter/Senior CADD Operator	Hr	\$115	0	\$0
c. Project Administrator	Hr	\$65	4	\$260
d. Clerical	Hr	\$50	0	\$0
Subtotal Technical/Administrative Services				\$260
C. Reimbursables				
a. Lodging	Day	\$100	0	\$0
b. Per Diem	Day	\$55	0	\$0
c. Communications Fee	3% Labor	0.03	\$2,430	\$73
d. CADD Computer System	Hr	\$15	0	\$0
e. Vehicle Rental & Fuel	Day	\$150	1	\$150
f. 8"x11" Photocopies	Each	\$0.12	0	\$0
g. CADD Drawings	Each	\$3	0	\$0
Subtotal Reimbursables				\$223
TOTAL ESTIMATED BUDGET : PHASE 01				\$2,653

Table 2

**BUDGET ESTIMATE
PILOT STUDY OF LANDFILL LEACHATE EVAPORATION
INDIAN RIVER COUNTY CLASS I LANDFILL
INDIAN RIVER COUNTY, FLORIDA**

PHASE 2: PILOT STUDY COORDINATION AND SITE VISIT

ITEM	BASIS	RATE	QUANTITY	ESTIMATED COST
A. Professional Services				
a. Senior Principal	Hr	\$240	0	\$0
b. Principal	Hr	\$225	10	\$2,250
c. Senior Professional	Hr	\$205	6	\$1,230
d. Project Professional	Hr	\$185	0	\$0
e. Professional	Hr	\$160	0	\$0
f. Senior Staff Professional	Hr	\$140	4	\$560
g. Staff Professional	Hr	\$120	0	\$0
Subtotal Professional Services				\$4,040
B. Technical/Administrative Services				
a. CADD Designer	Hr	\$130	0	\$0
b. Senior Drafter/Senior CADD Operator	Hr	\$115	0	\$0
c. Project Administrator	Hr	\$65	0	\$0
d. Clerical	Hr	\$50	0	\$0
Subtotal Technical/Administrative Services				\$0
C. Reimbursables				
a. Airfare	Trip	\$300	0	\$0
b. Lodging	Day	\$150	0	\$0
c. Per Diem	Day	\$55	0	\$0
d. Communications Fee	3% Labor	0.03	\$4,040	\$121
e. CADD Computer System	Hr	\$15	0	\$0
f. Vehicle Rental & Fuel	Day	\$100	1	\$100
g. 8"x11" Photocopies	Each	\$0.12	0	\$0
h. CADD Drawings	Each	\$3	0	\$0
Subtotal Reimbursables				\$221
TOTAL ESTIMATED BUDGET : PHASE 02				\$4,261

Table 3

**BUDGET ESTIMATE
PILOT STUDY OF LANDFILL LEACHATE EVAPORATION
INDIAN RIVER COUNTY CLASS I LANDFILL
INDIAN RIVER COUNTY, FLORIDA**

PHASE 3: EVALUATION OF PILOT STUDY RESULTS

ITEM	BASIS	RATE	QUANTITY	ESTIMATED COST
A. Professional Services				
a. Senior Principal	Hr	\$240	0	\$0
b. Principal	Hr	\$225	6	\$1,350
c. Senior Professional	Hr	\$205	12	\$2,460
d. Project Professional	Hr	\$185	0	\$0
e. Professional	Hr	\$160	0	\$0
f. Senior Staff Professional	Hr	\$140	16	\$2,240
g. Staff Professional	Hr	\$120	0	\$0
Subtotal Professional Services				\$6,050
B. Technical/Administrative Services				
a. CADD Designer	Hr	\$130	0	\$0
b. Senior Drafter/Senior CADD Operator	Hr	\$115	0	\$0
c. Project Administrator	Hr	\$65	0	\$0
d. Clerical	Hr	\$50	0	\$0
Subtotal Technical/Administrative Services				\$0
C. Reimbursables				
a. Lodging	Day	\$100	0	\$0
b. Per Diem	Day	\$55	0	\$0
c. Communications Fee	3% Labor	0.03	\$6,050	\$182
d. CADD Computer System	Hr	\$15	0	\$0
e. Vehicle Rental & Fuel	Day	\$150	0	\$0
f. 8"x11" Photocopies	Each	\$0.12	0	\$0
g. CADD Drawings	Each	\$3	0	\$0
Subtotal Reimbursables				\$182
TOTAL ESTIMATED BUDGET : PHASE 03				\$6,232

Table 4

**BUDGET ESTIMATE
PILOT STUDY OF LANDFILL LEACHATE EVAPORATION
INDIAN RIVER COUNTY CLASS I LANDFILL
INDIAN RIVER COUNTY, FLORIDA**

PHASE 4: TECHNICAL MEMORANDUM

ITEM	BASIS	RATE	QUANTITY	ESTIMATED COST
A. Professional Services				
a. Senior Principal	Hr	\$240	0	\$0
b. Principal	Hr	\$225	8	\$1,800
c. Senior Professional	Hr	\$205	12	\$2,460
d. Project Professional	Hr	\$185	0	\$0
e. Professional	Hr	\$160	0	\$0
f. Senior Staff Professional	Hr	\$140	16	\$2,240
g. Staff Professional	Hr	\$120	0	\$0
Subtotal Professional Services				\$6,500
B. Technical/Administrative Services				
a. CADD Designer	Hr	\$130	0	\$0
b. Senior Drafter/Senior CADD Operator	Hr	\$115	0	\$0
c. Project Administrator	Hr	\$65	2	\$130
d. Clerical	Hr	\$50	0	\$0
Subtotal Technical/Administrative Services				\$130
C. Reimbursables				
a. Lodging	Day	\$100	0	\$0
b. Per Diem	Day	\$55	0	\$0
c. Communications Fee	3% Labor	0.03	\$6,630	\$199
d. CADD Computer System	Hr	\$15	0	\$0
e. Vehicle Rental & Fuel	Day	\$150	0	\$0
f. 8"x11" Photocopies	Each	\$0.12	0	\$0
g. CADD Drawings	Each	\$3	0	\$0
Subtotal Reimbursables				\$199
TOTAL ESTIMATED BUDGET : PHASE 04				\$6,829