CCNA2018 WORK ORDER _4_

FEASIBILITY EVALUATION OF LANDFILL LIQUIDS MANAGEMENT OPTIONS

This Work Order Number _4__ is entered into as of this ___ day of _____, 2019_, 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").

The COUNTY has selected the Consultant to perform the professional services set forth on Exhibit A (Scope of Work), attached to this Work Order 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), attached to this Work Order and made a part hereof by this reference. The Consultant will perform the professional services within the timeframe more particularly set forth in Exhibit A (Time Schedule), attached to this Work Order and made a part hereof by this reference all in accordance with the terms and provisions set forth in the Agreement. 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:

By: _____

Thomas A. Peel, Ph.D.

Title: **Senior Vice-President**

BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY

By: _____

Bob Solari, Chairman

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

SCOPE OF WORK, FEE SCHEDULE,
AND TIME SCHEDULE

Geosyntec consultants

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11 February 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
Focused Feasibility Evaluation of Landfill Liquids Management Options
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 a focused feasibility evaluation of landfill liquids management options for the IRC Landfill (IRCL) facility in Indian River County, Florida. This proposal was prepared in response to verbal and 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 CCNA-2018-WO No. 4, pursuant to that certain Continuing Contract Agreement for Professional Services, dated 17 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 ("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 serves the unincorporated Indian River County and municipalities of Vero Beach, Orchid, Fellsmere, Sebastian, and Indian River Shores. 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) was constructed and started operation on 5 March 2010 at the site. 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.

The regional lift station, force main, and WRWWTF are operated and maintained by the IRC Utilities Department (IRCUD). The WRWWTF is permitted by the Florida Department of Environmental Protection (FDEP) with Permit No. FL0041637 to operate and discharge treated effluent into the: (i) Lateral D Canal (Part I.A of Permit); and (ii) created wetland as land application and to the countywide reuse system (Part I.B of Permit).

Geosyntec understands that the WRWWTF is currently designed and permitted to treat 6 million gallons per day (mgd). However, the treatment capacity is limited by restrictions on the amount of treated effluent, due to severe Total Maximum Daily Load (TMDL) and wasteload allocations (WLA), that can be discharged to the Lateral D Canal via created wetlands (4 mgd). The treated effluent that can go to the created wetlands can also be reclaimed for use by golf courses and other services; however, the demand for this reclaimed wastewater declines during the rainy seasons resulting in more flow to the wetlands. The component of the treated effluent that cannot be used as reclaimed wastewater is hereafter referred to as wet weather liquid. It is also anticipated that the capacity that can be discharged into the Lateral D Canal may be further restricted by nutrient WLA for the facility established as part of the TMDL for the Indian River Lagoon.

The SWDD in conjunction with the IRCUD would like to explore other liquids management options for the combined leachate and centrate liquids from the IRCL facility. Besides discharging the liquids to an off-site publicly-owned treatment works (POTW), such as the WRWWTF, the other commonly used leachate management approaches at MSW (i.e., Class I) landfills are: (i) on-site leachate recirculation back into the landfill; (ii) volume reduction using evaporation technology; (iii) discharge into an on-site underground injection control (UIC) well; (iv) off-site trucking to an UIC well; and (v) on-site treatment using a variety of physical, chemical, and/or biological approaches ranging from reverse osmosis (RO) to sequencing batch reactors (SBRs), aerated lagoons, and constructed wetlands. On-site treatment may be performed to meet industrial pretreatment standards for eventual discharge to a POTW, or it may be utilized as a stand-alone treatment system for subsequent discharge via a National Pollutant Discharge Elimination System (NPDES) permit or an UIC permit, on-site reuse, or land application. The SWDD Board has previously provided IRC staff direction of not pursuing the use of an UIC well (either onsite or off-site) but rather pursue other viable options for the treatment and disposal of the liquids from the IRCL facility. Therefore, this proposal is focused on some of the other leachate management options described above.

PROPOSED SCOPE OF WORK

This proposal presents the scope of work for conducting a focused feasibility evaluation of liquids management options for the IRCL facility. The project objectives are to evaluate existing conditions and to provide recommendations towards a more sustainable liquids (leachate-centrate) management strategy, including the identification of a potentially more cost-effective

and environmentally friendly liquids management option for the IRCL facility. 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 – Review of liquids chemistry and flow data;
- Phase 3 – Evaluation of liquids management options; and
- Phase 4 – Preparation of a 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 the SWDD and IRCUD, 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 and IRCUD staff to obtain information required to complete the evaluation; and (ii) project review meeting with SWDD and IRCUD staff to review and discuss findings from the evaluation. Details of these meetings are discussed in subsequent phases of this proposal. Geosyntec has assumed that the kickoff meeting will be held via teleconference in order to reduce overall costs and expedite the process of completing the project.

Phase 2 – Review of Liquids Chemistry and Flow Data

Geosyntec will review chemistry and flow rates data for the landfill leachate and RDF centrate, WRWWTF permit requirements (discharge and monitoring), other discharge requirements for the treatment plant, and other information that are deemed relevant for the feasibility evaluation. Some of this information may be available in the document titled "Indian River County Landfill Preliminary Leachate Pretreatment Evaluation" prepared by CDM Smith Inc. and dated April 11, 2018 (hereafter referred to as CDM Smith Report).

Despite the availability of historical data on the general chemistry of the landfill leachate (including that contained in the CDM Smith Report), Geosyntec proposes that another round of comprehensive sampling and characterization of the leachate would be required. In addition, samples of the centrate from the RDF and the combined mixture of the leachate and centrate at the lift station prior to transfer to the WRWWTF should also be collected. The three liquid samples should be analyzed for the complete suite of parameters required by the permits of the three facilities (i.e., Landfill, RDF, and WRWWTF) as well as local discharge and NPDES permit requirements. The list of parameters will be developed for review and approval by SWDD and IRCUD following the kickoff meeting and establishment of the applicable regulatory

requirements. Geosyntec has assumed that SWDD will directly contract the sampling and analytical testing with Ideal Technical Services (ITS) and ENCO Laboratories, Inc. (ENCO), respectively. The results of the testing will be provided to Geosyntec in electronic format to expedite the review process.

Geosyntec will also need updated information on the leachate, RDF centrate, and combined lift station flow rates to make sure that there are no significant changes from those reported in the CDM Smith Report.

Phase 3 – Evaluation of Liquids Management Options

Geosyntec will compile the pertinent data, including the latest analytical data from the three samples and updated flow rates, and conduct a thorough evaluation of this information with respect to: (i) liquid chemistry and treatability; (ii) potentially applicable treatment options and relative costs of these options; (iii) local limits requirements of the WRWWTF; and (iv) feasibility of separating the landfill leachate from the centrate to meet pre-treatment and/or disposal requirements.

Based on a preliminary review of the CDM Smith Report, the landfill leachate has exceedances of the local limits for arsenic, total dissolved solids (TDS), and total nitrogen (including ammonia). Depending on the results of the proposed sampling of the three liquids, it is anticipated that the following treatment options will be evaluated: (i) biological treatment using SBR system; (ii) RO membrane system; and (iii) advanced oxidation. Each of these treatment options will be evaluated with respect to the chemical constituent(s) targeted for removal. For example, the biological treatment system is typically used to remove ammonia and other nitrogen compounds whereas RO will be focused on reducing the TDS concentration. In addition, leachate volume reduction via on-site evaporation (using waste heat and/or landfill gas combustion systems) will be evaluated with specific focus to the landfill leachate. Another potential option is with the use of “Vetiver grass” which is known to be tolerant of elevated salt ammonia concentrations (typically found in landfill leachate) and has some extensive root systems capable of high moisture uptake. It is generally used for on-site management (i.e., irrigation) of leachate rather than pre-treatment for subsequent discharge to a POTW. The number of options to be evaluated will be discussed and agreed with SWDD and IRCUD following review of the analytical data on the three liquid samples.

The evaluation of each alternative will include feasibility level cost estimates (capital, installation and O&M) for major items required for implementation of each treatment/management option. Additionally, the evaluation will include non-economic aspects, such as ease of implementation, including permitting and regulatory hurdles, the complexity of the system, robustness of the system, and other requirements. The need for a batch or pilot test program to further evaluate the viability of a treatment option will also be included. The

advantages and disadvantages of each option will be discussed, and recommendations will be presented in the technical memorandum as described under Phase 4.

Phase 4 – Preparation of Technical Memorandum

A technical memorandum will be prepared as the deliverable for the above scope of work. The memorandum will present a summary of the options evaluated as well as the conceptual costs (capital, installation and O&M) estimates and systems comparisons. The memorandum will provide recommendations on the options/alternatives evaluated for review and consideration by IRC staff and for presentation to the SWDD Board. A draft memorandum will first be issued to SWDD and IRCUD for review and will be finalized upon receipt of review comments. Geosyntec will meet with SWDD and IRCUD staff to review and address comments on the draft memorandum prior to finalization.

SCHEDULE

Geosyntec will initiate work immediately upon receipt of Notice to Proceed (NTP) from SWDD. Geosyntec anticipates the collection of background information including the sampling and analytical testing of the three liquid samples would take approximately two weeks (assuming ITS and ENCO will be issued NTP immediately), while the evaluation of leachate management options and the preparation of the technical memorandum will take an additional three to four weeks. Therefore, a draft technical memorandum will be issued to SWDD approximately six weeks after receipt of NTP. The review meeting will be scheduled following submittal of the draft memorandum.

BUDGET ESTIMATE

Geosyntec proposes to perform the above-referenced work on a lump sum basis for $30,989. The estimated budget for the scope of work described herein is summarized as follows:

Phase	Description	Cost Estimate
1	Project Management/Meetings	$ 5,313
2	Review of Background Documents/Liquids Chemistry Data	$ 7,360
3	Evaluation of Liquids Management Options	$ 11,700
4	Technical Memorandum	$ 6,616
	Total	**$ 30,989**

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.

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,

Richard Tedder, P.E,
Senior Consultant

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