

The Department of Health
Division of Disease Control and Health Protection – Bureau of Environmental Health
Statement of Work – Research Services
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

6.1.Service Tasks Contractor will perform the following tasks:

Task A: Technology Evaluation for Field Testing: Review, Prioritization, and Development

6.1.1. [Subtask A.31 in contract CORCL] Bioreactor Simulation Tool: The Contractor will develop a process design and simulation tool for passive bioreactor treatment for nitrogen removal from onsite wastewater using biofiltration. The design tool will be used for interpretation of demonstration results and to design and scale-up treatment systems. Contractor will develop a tool for unsaturated biofilter process analysis and design. The Contractor will expand the unsaturated design tool to passive two-stage biofilters for nitrogen removal. (due 6/30/2015)

Task B: Field Testing of Technologies and Cost Documentation

6.1.2. [Subtask B.7 in contract CORCL] Field Systems Monitoring Report (per system, per event): Subject to details specified in the QAPP, the Contractor, in cooperation with the homeowner and the maintenance entity, will operate field technologies for a base period of up to 24 months and monitored for at least the following parameters: temperature, pH, alkalinity, DO, ORP, TKN, NH₃, NO_x, TSS, C-BOD₅. Additional parameters will be monitored less frequently for other parameters of interest (COD, TP, PO₄, fecal coliform, total enterococci, and SO₄ and H₂S for systems with sulfur-based denitrification). Up to 8 sample events will be conducted on each of the systems monitored.

The Contractor will submit deliverables after each monitoring event for the systems installed in Task B6 of contract CORCL, which will also include results for flowrate or treated volume, electricity and/or media use, field parameter results, chain of custody forms for samples delivered to analytical laboratory, analytical laboratory reports, and compiled results. (due 6/30/2015)

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- 6.1.3. [Subtask B.8 in contract CORCL] Field Systems Operation, Maintenance and Repairs Report (per system): The Contractor, in cooperation with the homeowner, maintenance entity, and county health department, will maintain copies of records of repairs, maintenance actions, inspection results and system observations. The Contractor will develop a report form for each entity and a summary report for each treatment system. Records will include date, description of repair and pertinent factors, and repair cost. (due 6/30/2015)
- 6.1.4. [Subtask B.10 in contract CORCL] Acceptance of System by Owner Report (per system): At the conclusion of system monitoring, a homeowner acceptance document will be provided that transfers complete ownership and operational responsibility of the system to the homeowner. In the event the homeowner does not desire to keep the study systems, FDOH will work with Contractor and homeowner to minimize disturbance, cost, and regulation to the volunteer homeowners. (due 6/30/2015)
- 6.1.5. [Subtask B.12 in contract CORCL] LCCA Template Report (final template and user guidelines): The department will gather comments on the draft LCCA from RRAC and any other interested parties and transmit such comments to the Contractor. The Contractor will address these comments in preparing final deliverables. (due 6/30/2015)
- 6.1.6. [Subtask B.13 in contract CORCL] LCCA Report (per system): Based on the LCCA Template, the Contractor will conduct an LCCA analysis for each nitrogen reduction technology evaluated during field testing using actual purchase prices, installation cost estimates, and operational costs records. (due 6/30/2015)
- 6.1.7. [Subtask B.14 in contract CORCL] Draft Task B Final Report: The Contractor will develop a final report that will summarize the results of the Task B evaluations of treatment technologies, including an aggregation of technology reports and LCCA completed over the course of the study. The report will provide summary recommendations for deploying the tested technologies to meet the objectives of the Florida Onsite Nitrogen Removal Strategy. The report will include the data on which it is based, in tabular form. (due 6/30/2015)
- 6.1.8. [Subtask B.15 in contract CORCL] Task B Final Report: The department will gather comments on the draft final report from RRAC and FDOH review and transmit such comments to the Contractor within two weeks of receiving the draft. The Contractor will address these comments in preparing final deliverables within two weeks of receiving comments. (due 6/30/2015)

Task C. Evaluation of Nitrogen Reduction Provided by Soils and Shallow Groundwater

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6.1.9. [Subtask C.14 in contract CORCL] Soils & Hydrogeologic and Monitoring Plan for S&GW Test Facility: The soil and groundwater characteristics of the test facility site will be determined by the Contractor as described in the QAPP. Characterization will include soils analyses, aquifer testing, piezometer installation and tracer testing with a conservative tracer to establish groundwater flow parameters. Based on the results of this characterization, a monitoring plan will be established for the six mini-mound systems at the soil and groundwater test facility. The location, number and frequency of sampling will be as generally defined in the QAPP, but refined based on results of this task. Additionally, field assessment for Task D model parameter estimation, model verification and validation will also be included as available from results of this task. (due 6/30/2015)

6.1.10. [Subtask C.18 in contract CORCL] Test Facility Closeout Report: At the conclusion of controlled test site monitoring, the Contractor will determine if the test facility infrastructure will be transferred to the property owner or the site restored to prior condition. If the property owner wishes to keep the facility, the Contractor will submit an acceptance document to the department that documents transfer of ownership and complete responsibility of test site infrastructure to the owner. If the property owner wants the site restored, additional funds from the change-order allowance will be needed for well abandonment. A report will be provided to document close-out of the site. (due 6/30/2015)

6.1.11. [Subtask C.26 in contract CORCL] Draft Site Summary and Close-out Memo (per site): The Contractor will prepare data tables summarizing the observations for each site, including site conditions, onsite system characteristics and soil and ground water concentrations and conditions found.

At the conclusion of home site monitoring, the Contractor will submit homeowner acceptance documents to the department that either transfer ownership and responsibility of monitoring points to the homeowner (e.g., piezometers) or all monitoring points will be removed by the Contractor and the site shall be returned to its original configuration. If monitoring points are to be removed, additional funds from the change-order allowance will be needed for well abandonment.

A report will be provided to the department to document close-out of each home site. The draft close-out memos will be submitted to FDOH for review and comment. (due 6/30/2015)

6.1.12. [Subtask C.27 in contract CORCL] Final Site Close-Out Memo (per site): Comments will be provided by the department within two weeks of receipt and the Contractor will prepare a final close-out memo. (due 6/30/2015)

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- 6.1.13. [Subtask C.30 in contract CORCL] Change-order Allowance: Funds from this allowance will be required for well abandonment under Tasks C.18 and C.26. (due 6/30/2015)

Task D Nitrogen Fate and Transport Modeling

- 6.1.14. [Subtask D.12 in contract CORCL] Aquifer-Complex Soil Model Performance Evaluation: Performance evaluation of the aquifer-complex soil model will include implementation checks, corroboration/calibration, parameter sensitivity analysis and an uncertainty analysis. Data sets from Florida identified during subtask D3 and Task C will be used. Metrics will include comparisons of average concentration in the plume or mass flux crossing a boundary between actual field data (as available) and model output, the range in calibrated parameter set values that result in similar agreement between model results and data, model-parameter correlation and bias, and the potential for different parameter combinations to achieve the same agreement between model results and data. (due 6/30/2015)

Similar to the complex soil model, a more rigorous performance evaluation is also required. Model-evaluation statistics will be used to determine whether the model can appropriately simulate the observed data. Multiple methods for evaluating the model performance will be used to ensure model quality assurance evaluation that is not hindered by the specific limitations of a single calibration statistic or identify if further evaluation of the model is warranted. (due 6/30/2015)

- 6.1.15. [Subtask D.13 in contract CORCL] Validate/Refine Aquifer-Complex Soil Model with Data Collection from Task C: Based on the results from subtask D12, the integrated aquifer and complex soil model will be revised/improved using site-scale field data collected from Task C. Validation will be used to compare the corroborated/calibrated model to actual field data. The validation/refinement procedure will be an iterative process and may suggest revisions in the data collection plan or in the model itself (parameterization or improvements). Data from Task C home sites as well as other available data sources will be used to validate the model. (due 6/30/2015)

- 6.1.16. [Subtask D.14 in contract CORCL] Development of Aquifer-Complex Soil Model for Multiple Spatial Inputs: A model will be developed, possibly by revising an existing model, to simulate nitrogen concentrations and mass flux from several OSTDS in a development-scale area. The model will be calibrated using existing data from a development-scale plume, based on metrics such as average concentration in the plume or mass flux crossing a boundary. (due 6/30/2015)

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- 6.1.17. [Subtask D.16 in contract CORCL] Task D Report and Users Guide (Draft): The Task D draft final report will be developed based on a compilation of Task D reports, progress reports, and technical memos to summarize the results of the Task D modeling. The report will include a User's Guide, and model development, input parameter selection, and uncertainty assessment. The User's Guide will provide detailed technical data including fundamental assumptions that were incorporated into tool development, description of the tool development, and description of parameters that affect nitrogen reduction performance. (due 6/30/2015)

Task E Project Management, Coordination and Meetings

- 6.1.18. [Subtask E.2 in contract CORCL] PM-Project Progress Reports (per bimonthly report): Bimonthly progress reports will be provided that summarize the general status of each task, progress during the reporting period, activities planned in the next reporting period, and any issues, problems or decisions with significant effect on project implementation. This task includes time for the project manager, for project team and Program Coordination, Subcontract maintenance, project financial analysis, and invoicing. (due 6/30/2015)

- 6.1.19. [Subtask E.4 in contract CORCL] RRAC or TRAP Meeting Attendance (per meeting): The Contractor shall attend meetings of the RRAC, TRAP or other occasions as requested by the department in writing. (due 6/30/2015)

6.2. Deliverables: Contractor must complete the following deliverables in the time and manner specified.

Task A: Technology Evaluation for Field Testing: Review, Prioritization, and Development

- 6.2.1. Description of model development process, verification, modeling calibration, sensitivity analysis, simulation results, the functioning spreadsheet models, and guidance on their use for the bioreactor design tool unsaturated bioreactor model and the coupled bioreactor model – as authorized in a letter dated April 4, 2011 and for the amounts specified in an email sent November 12, 2014 and as specified in Task 6.1.1.

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Task B: Field Testing of Technologies and Cost Documentation

- 6.2.2. Monitoring reports in tabular form – as specified in Task 6.1.2.
- 6.2.3. Report form for each system, summary report of observations – as specified in Task 6.1.3.
- 6.2.4. Acceptance of System by Owner Report – as specified in Task 6.1.4.
- 6.2.5. Final LCCA template and user guidelines – as specified in Task 6.1.5.
- 6.2.6. LCCA Report (per system tested) including cost analysis – as specified in Task 6.1.6.
- 6.2.7. Draft Task B Final Report – as specified in Task 6.1.7.
- 6.2.8. Final Task B Report – as specified in Task 6.1.8.

Task C. Evaluation of Nitrogen Reduction Provided by Soils and Shallow Groundwater

- 6.2.9. Soil and groundwater characterization memo and revised QAPP element for test facility – as specified in Task 6.1.9.
- 6.2.10. Test Facility Closeout Report – as specified in Task 6.1.10.
- 6.2.11. Draft Site Close-out memo – as specified in Task 6.1.11.
- 6.2.12. Final site close-out memo – as specified in Task 6.1.12.
- 6.2.13. Change-Order Allowance – Expense report related to additional costs for well abandonment – as specified in Task 6.1.13.

Task D Nitrogen Fate and Transport Modeling

- 6.2.14. Report describing performance evaluation methods and preliminary results (subtask is 100% complete) – as specified in Task 6.1.14.
- 6.2.15. Integrated Aquifer-Complex Soil Model report and the final integrated model in electronic format (e.g., Microsoft Excel spreadsheet) – as specified in Task 6.1.15.
- 6.2.16. 6.2.35 Aquifer-Complex Soil Model for Multiple Spatial Inputs white paper and the model in electronic format (e.g., Microsoft Excel spreadsheet) – as specified in Task 6.1.16.
- 6.2.17. Draft Task D Guidance Manual – as specified in Task 6.1.17.

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Task E Project Management, Coordination and Meetings

- 6.2.18. Progress reports – as specified in Task 6.1.18.
- 6.2.19. Meeting attendance as documented in the DOH produced agenda and minutes – as specified in Task 6.1.19.

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Task and Payment Schedule

TASK NO.	CORCL TASK NO.	Task	Per Deliverable Subtotal	No. of Deliverables	Cost
	A	Task A: Technology Selection & Prioritization			\$5,100
6.1.1	A.31	Bioreactor Simulation Tool	\$5,100.00	1	\$5,100
	B	Task B: Field Testing of Technologies			\$195,725
6.1.2	B.7	Field Systems Monitoring Report (per system, per event)	\$8,402.33	2	\$16,805
6.1.3	B.8	Field Systems Operation, Maintenance and Repairs Report (per system)	\$8,630.00	5	\$43,150
6.1.4	B.10	Acceptance of System by Owner Report (per system)	\$4,758.00	5	\$23,790
6.1.5	B.12	LCCA Template Report (final template and user guidelines)	\$9,080.00	1	\$9,080
6.1.6	B.13	LCCA Report (per system)	\$5,040.00	7	\$35,280
6.1.7	B.14	Draft Task B Final Report	\$45,120.00	1	\$45,120
6.1.8	B.15	Task B Final Report	\$22,500.00	1	\$22,500
	C	Task C: Evaluation of Nitrogen Reduction by Soils & Shallow GW			\$70,830
6.1.9	C.14	Soils & Hydrogeologic and Monitoring Plan for S&GW Test Facility	\$43,074.00	0.5	\$21,537
6.1.10	C.18	Test Facility Closeout Report	\$13,080.00	1	\$13,080
6.1.11	C.26	Draft Site Summary and Close-out Memo (per site)	\$8,680.00	2	\$17,360
6.1.12	C.27	Final Site Close-Out Memo (per site)	\$2,670.00	2	\$5,340
6.1.13	C.30	Change-order Allowance	\$13,513.00	1	\$13,513
	D	Task D: Nitrogen Fate and Transport Models			\$269,619
6.1.14	D.12	Aquifer-Complex Soil Model Performance Evaluation	\$127,922.99	1	\$127,923
6.1.15	D.13	Validate/Refine Aquifer-Complex Soil Model with Data Collection from Task C	\$95,733.70	1	\$95,734
6.1.16	D.14	Development of Aquifer-Complex Soil Model for Multiple Spatial Inputs	\$25,371.84	1	\$25,372
6.1.17	D.16	Task D Guidance Manual (Draft)	\$20,590.63	1	\$20,591
	E	Task E: Project Management, Coordination, and Meetings			\$26,032
6.1.18	E.2	PM-Project Progress Reports (per bimonthly report)	\$9,298.00	2	\$18,596
6.1.19	E.4	RRAC or TRAP Meeting Attendance (per meeting)	\$3,718.05	2	\$7,436
		Total			\$567,306