

Exhibit A Scope of Services

PROJECT TITLE: Professional Engineering Services for Lake Deeson

EXECUTIVE SUMMARY:

Water resources across the globe are under severe pressure due to increasing anthropogenic impacts caused by excess nutrient loading, in particular phosphorus. Lakes and streams that were once healthy are rapidly becoming hypereutrophic with recurring harmful algal blooms (HABs). There is significant demand for accelerated restoration and the development of operationally and technically efficient technologies for sustainable and scalable water resource management. This proposal details new water resource management and nutrient-mitigation strategies for accelerated restoration of phosphorus-impaired water bodies.

Phosphorus is the limiting nutrient in most of Florida's surface waters. The mitigation of this pollution improves water quality and shifts ecosystem function to a less favorable environment for the formation of HABs. These ecosystem shifts and nutrient reductions are long-lasting (years to decades) and provide beneficial use benefits as well as reduction in primary productivity and the risk of HABs. Combining phosphorus removal technologies with best management strategies that reduce nutrient loading is a proactive cost-effective strategy for preventing and managing the conditions that lead to eutrophication and HABs. This proposal details a comprehensive sediment inactivation plan for Lake Deeson, a hypereutrophic nutrient-impaired lake in Polk County.

The Lake Deeson Project proposes the application of a phosphorus inactivation technology (EutroSORB® G) to bind sediment phosphorus rapidly, safely, and permanently. Pre-treatment sediment samples collected at Lake Deeson provided the baseline phosphorus load that needs to be mitigated and will be compared to post-treatment samples to quantify the permanently bound phosphorus that is no longer bioavailable for nutrient enrichment and HAB formation. The project cost-effectiveness will be measured by determining the cost/lb-P mitigated in Lake Deeson and compared to costs associated with best management practice approaches.

The information obtained during the Lake Deeson can be used to develop a complete nutrient mitigation plan for nutrient-impaired lakes in Polk County that would promote the goals of restoring impaired urban water bodies across the state of Florida.

PROJECT LOCATION: Lake Deeson is a 55-acre lake located in Polk County north of downtown Lakeland. Project Coordinates: 28.112671, -81.932074. See *Figure 1* for a location map.

OBJECTIVES: The purpose of this demonstration is to:

- Demonstrate that the application of EutroSORB G[®] can sequester phosphorus (P) within Lake Deeson sediments and prevent its subsequent release to the adjacent water column
- Demonstrate the ability for EutroSORB G to be implemented in large-scale field applications, including the ability to adjust dosing rates
- Demonstrate the efficiency and cost-effectiveness of using a lanthanum-based amendments to reduce P loads in sediments and water

APPROACH:

Lake Deeson Project: Lake Deeson is a 55-acre nutrient-impaired closed basin with an average depth of 6 feet. Given the current average trophic state index of 74 (a measure of biological activity) and average total phosphorus (TP) concentrations of 77 ug/L, Lake Deeson is classified as a hypereutrophic water body and was placed on the 303(d) list in 2003 (Figure 1).



Figure 1. Lake Deeson In-Lake Phosphorus Mitigation Location

Although Lake Deeson is classified as an impaired water body, there is an Alternative Restoration Plan (i.e., 4e Plan) that is in process to allow for implementation of future restoration activities to improve the water quality. In early 2022, historical data was reviewed, and additional sampling was completed. Data collected included water quality and sediment sampling from 4 locations in the lake. The water quality and sediment characterization data were used to develop a lake treatment implementation plan involving the application of EutroSORB[®] G, a granular lanthanum-modified bentonite clay for sediment phosphorus inactivation. Following the EutroSORB G application, the lanthanum ions sorbed to the clay matrix react rapidly and preferentially with free phosphate

compounds in water forming a highly stable inert and insoluble mineral. The resulting mineral complex becomes integrated as an inert component into the natural sediments of the waterbody and is no longer bioavailable. Due to the specificity of EutroSORB G to phosphate it will continually bind new incoming phosphorus from internal and external sources until binding capacity is exhausted. During application, EutroSORB G is first mixed with water and applied as a slurry evenly over the surface of the lake. The proposed project would be implemented in Q1 2024 with the application of ~125,000 pounds of EutroSORB G to mitigate an estimated 2,500 lbs. of phosphorus in the top 4-cm of sediment. The application process involves applying a slurry of EutroSORB G over the surface of the lake as illustrated in Figure 2.



Figure 2. EutroSORB G Application

The public boat ramp will be utilized for demonstration staging and launching of the EutroSORB G application water crafts (Figure 3).



Figure 3. Lake Deeson EutroSORB G Staging Area

Monitoring will be essential to track and quantify water quality improvements in Lake Deeson. Water quality samples will be collected pre-treatment, two weeks post-treatment, and then three times/month for twelve months and analyzed for TP, soluble reactive phosphorus (SRP), dissolved oxygen (DO), and temperature. In addition to the water quality monitoring program post-treatment sediment samples will be

collected quarterly from 4 sites and analyzed for % solids in addition to the following phosphorus fractions as mg-P/kg: labile, reductant-soluble, metal-oxide, organic, and apatite/residual. The Lake Deeson restoration effort will address the issue of phosphorus pollution and improve Florida's ability to prevent, mitigate, and clean-up nutrient impaired waters. This in-lake management program will:

- Reduce water column and sediment phosphorus levels, resulting in significantly improved water quality that will lower primary productivity and risk of HAB production
- Demonstrate a scalable treatment approach that can be broadly applied to Florida water bodies for nutrient mitigation
- Assist regulatory agencies with meeting 4e Plans and TMDL standards and,
- Reduce negative environmental and economic impacts caused by poor water quality

The data obtained from this demonstration will help guide Florida's Adaptive Management Strategies and address the goals of the Blue-Green Algae Task Force using new scalable technologies to mitigate excess phosphorus loading in impaired HAB-prone water bodies. The materials used in the Lake Deeson are based on lanthanum-based chemistries that have extensive laboratory, mesocosm trials, and full-scale field applications that have successfully demonstrated the effectiveness of these chemistries in binding phosphorus. The lanthanide chemistries that will be implemented during this proposed project have been widely used for decades to inactivate phosphorus.

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM.

Lake Deeson: Similar to how water quality monitoring and assessment provided by the Water Quality Assessment Program is the cornerstone to FDEP's strategy to achieve its goals, the data collected during the Lake Deeson demonstration will provide defensible data-driven evidence that in-lake phosphorus mitigation provides improved water quality and reduced risk of HAB formation. Monthly water quality monitoring and quarterly sediment core data will be used to demonstrate project performance and specifically quantifying the mass of phosphorus inactivated. The minimum mass of phosphorus targeted for inactivation is ~2,500 lbs. Table 1 summarizes the Lake Deeson monitoring plan.

Table 1. Lake Deeson Monitoring Plan

Task	Item	Timeline
Pre- and Post-Demonstration Monitoring & Project Schedule	Water Quality (3 sites, TP, SRP)	Pre-treatment, two weeks post-treatment, monthly post-treatment for 12 months. Project start-up targeted for Q1 2024.
	Sediment Sampling (4 sites, Phosphorus Fractionation)	Quarterly (4 events over 12 months).

The Lake Deeson sediment sampling locations are illustrated in Figure 4 below.



Figure 4. Lake Deeson Sediment Sampling Locations

The estimated funding amounts and proposed timeline for the Lake Deeson Project are provided in Table 2 below.

Table 2. Lake Deeson Phosphorus Mitigation Project Cost Summary & Timeline

Item	Costs (\$)	Notes
Materials	\$356,021	Assumes 55 acre EutroSORB G application
Monitoring & Analyses	\$20,016	Sediment (P Fractionation), Water Quality (TP, SRP)
Freight & Logistics	\$27,000	Freight, forklift, material handling equipment, and safety
Project Labor (including application)	\$77,963	Site preparation, equipment installation, material handling, sampling, and monitoring
Estimated Total Cost	\$481,000	Acres treated may affect the project cost

TASKS and DELIVERABLES:

Table 3 below summarizes the Tasks and Deliverables with the estimated Timeline. This project is a lump sum per task reimbursement with total project costs of \$481,000.

Table 3. Project Tasks and Timeline

Task No./ Deliverable	Task or Deliverable Title	Task Start Date	Task End Date	Deliverable Due Date/ Frequency
1	Quality Assurance Project Plan	8/1/2023	4/30/2024	
1a	Draft QAPP			2/15/2024
1b	Final QAPP			4/30/2024
2	Project Management	Upon Execution	3/1/2025	
3	Monitoring	Upon Execution	3/1/2025	30 days after the end of the previous operational quarterly sampling
4	Final Report	Upon Execution	5/1/2025	
4a	Draft Report			3/1/2025
4b	Final Approval			5/1/2025

Additional detail and requirements for the Project Tasks per the grant requirements are provided below.

Task #1: Quality Assurance Project Plan

Description: The Grantee will submit and receive approval on a Quality Assurance Project Plan (QAPP) prior to the commencement of project-related work. The QAPP must specify the sampling procedures, locations, instruments, and parameters to be sampled.

Deliverable #1a: The Grantee will submit a draft QAPP in Word format to the Department’s Grant Manager. Upon request, the Grantee will provide a paper copy of the Draft QAPP to the Department’s Grant Manager.

Deliverable #1b: The Grantee will submit the Final Department-approved QAPP electronically in PDF format to the Department’s Grant Manager. Upon request, the Grantee will provide a paper copy of the Final QAPP to the Department’s Grant Manager.

Task #2: Project Management

Description: The Grantee will perform project management, including bidding and subcontractor selection, field services, site meetings with subcontractor(s), and overall project coordination, implementation, and supervision. The Grantee will procure subcontractor(s) services in accordance with the laws of Florida.

Deliverables: Completed project management activities to date as evidenced by:

- An electronic copy of the Grantee's executed contract(s) and scope of services for project management submitted to the Department's Grant Manager prior to submitting any invoices for the subcontracted work.
- Submit meeting minutes including attendees and topics discussed.
- Before, after, and during date-stamped photos. Upon request by the Department's Grant Manager, the Grantee will provide additional supporting documentation relating to project management.

Task #3: Monitoring

Description: The Grantee will conduct monitoring in accordance with the Department-approved QAPP for this project.

Deliverables: The Grantee will submit a Quarterly Operating Report (QOR) summarizing the operations and monitoring, including text, tables, laboratory reports, figures, and appendices (as necessary). The QOR will include an Executive Summary that succinctly describes the quarter's (3 months) activities, completed operational and monitoring activities (dates completed, sampling conducted and any not conducted and why), monitoring results along with interpretation of those results (as expected or not as expected), laboratory reports and sampling logs (including field and weather data) submitted to the Department's Grant Manager. Upon request, the Grantee will provide a paper copy or copies to the Department's Grant Manager.

Task #4: Final Report

Description: The Grantee will prepare a Final Report summarizing the results of the project, including all tasks in the Grant Work Plan. The Final Report must include at a minimum:

- Project location and background, project description and timeline, grant award amount, and anticipated benefits.
- Financial summary of actual costs versus the budget, along with any changes required to the budget. Include any match or locally pledged contributions provided, along with other related project work performed outside of this Agreement to identify the overall project cost.
- Discussion of project schedule versus actual completion, including changes required to the schedule, unexpected site conditions and adjustments, significant unexpected delays, and corrections, and/or other significant deviations from the original project plan.
- Summary of activities completed as well as those not completed and why, as well as a brief summary of any additional phases yet to be completed.
- Date-stamped photo documentation of work performed (before, during and after), appropriate figures (site location, site plan[s]. etc.), appropriate tables summarizing data/information relevant to Grant Work Plan tasks, and appropriate attachments relevant to the project.
- Discussion of whether the anticipated benefits have been/will be realized (e.g., why a Best Management Practice (BMP) approach did or did not exceed the expected removal efficiency).
- Summary of monitoring activities completed and any not completed and any not completed and why, monitoring results, and an interpretation of data based on planned versus realized results.

Deliverable 4a Draft Final Report

The Grantee will submit an electronic copy of the draft Final Report in Word format to the Department's Grant Manager for review and comments, prior to submission of the Final Report. Upon request, the Grantee will provide a paper copy of the draft Final Report.

Deliverable #4b: Final Report

The Grantee will submit an electronic copy of the Final Report, with all suggested changes incorporated, in PDF format to the Department's Grant Manager for review and approval. Upon request, the Grantee will provide a paper copy of the Final Report.