

RESOLUTION NO. 24-024

**Riley-Purgatory-Bluff Creek Watershed District
Board of Managers**

**AUTHORIZING BARR TASK ORDER NO. 040B FOR THE APPLICATION OF
ALUMINUM SULFATE TO LOTUS LAKE**

Manager _____ offered the following resolution and moved its adoption, seconded by Manager _____.

Whereas Riley-Purgatory-Bluff Creek Watershed District has adopted a watershed management plan in accordance with Minnesota Statutes section 103B.231, and the capital improvement program of RPBCWD's 2018 10-Year Watershed Management Plan includes Lotus Lake In-lake Phosphorous Control, and

Whereas RPBCWD applied the first dose of alum to Lotus Lake in 2018 with the intention that monitoring of sediment would determine when the second dose would be applied, and

Whereas sediment sampling performed in 2020 showed a significant decline in sediment phosphorous release in the treated areas and elevated release rates in those areas not treated, and

Whereas Barr Engineering presented their findings and recommendations to the Board of Managers at their March 13th, 2024, regular meeting and a straw poll survey of the managers indicated favorability for proceeding with a second alum dose as recommended;

NOW, THEREFORE, BE IT RESOLVED that the RPBCWD Board of Managers authorizes execution of Task Order 040B authorizing Barr to finalize dosing calculations, develop bidding documents and assist the district with bid solicitation and administration, observe and supervise the alum application, and collect samples and analyze data post application for an amount not to exceed \$41,600.

The question was on the adoption of the resolution and there were __ yeas and __ nays as follows:

	<u>Yea</u>	<u>Nay</u>	<u>Abstain</u>	<u>Absent</u>
Crafton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duevel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pedersen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ziegler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Upon vote, the president declared the resolution _____ April 3, 2024.

* * * * *

I, Tom Duevel, secretary of the Riley Purgatory Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as the same appears of record and on file with the District and find the same to be a true and correct transcription thereof.

IN TESTIMONY WHEREOF, I set my hand this _____ day of _____, 2024.

Tom Duevel, Secretary

**TASK ORDER No. 40B –
Final Design and Bidding Support Services for Lotus Lake Alum Treatment (2nd Dose)
Pursuant to Agreement for Engineering Services**

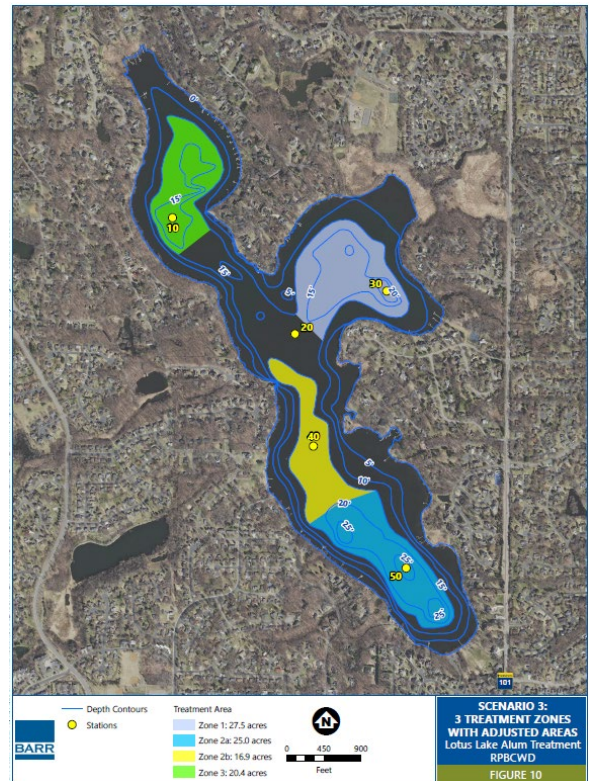
Riley Purgatory Bluff Creek Watershed District and BARR Engineering Company.

This Task Order 40B is issued pursuant to Section 1 of the above-cited engineering services agreement between the Riley Purgatory Bluff Creek Watershed District (District) and BARR Engineering Company (Engineer) and incorporated as a part thereof.

1. Background

In 2017, a Use Attainability Analysis was completed for Lotus Lake that determined internal phosphorus (P) loading as a result of sediment phosphorus release was as much as 68% of the phosphorus budget to the lake. In 2018, sediment cores were collected from Lotus Lake to determine sediment P release rates and the potential need for an alum treatment. Based on these results, an alum treatment was completed in the Fall of 2018, applying one half of the prescribed dose in the two deep application zones. While total phosphorus and Secchi depth improved in the lake, algal blooms continued to occur. Barr recently reviewed lake sediment and water quality data for Lotus Lake to assess the effectiveness of the first application and determine the need for a second alum application for the lake. The assessment findings were presented and discussed at the March 13, 2024 board of Manager regular meeting (see recommended treatment zone in the adjacent image). The assessment recommends proceeding with a second alum application to further reduce sediment phosphorus loading and complete the dose for the two original application zones. Two new zones of application were also identified to reduce sediment phosphorus loading from other areas in the lake. These two new zones include some shallower areas of the lake but are still greater than 15 feet in depth.

The Board express some interest in the fate of aluminum applied to shallower areas of lake given heavy use by recreational powerboats including wake boats. Recent research suggests that these boats have minimal sediment disturbance to areas greater than 15 feet in depth, but research is ongoing to better understand the potential impacts of wake boats on sediments and water quality.



2. Description of Services:

Barr recently completed Task order 40, which reviewed past sediment and water quality data for Lotus Lake to determine an approach for the second dose alum application for the lake. This included adding two new treatment areas (station 10 and 40) and reducing the deep-water application area to greater than 15-feet in Zone 1 and 2a. This intent of this approach is to keep project costs similar to those previously projected to complete the second half-dose application. The next step in the Lotus Lake alum application project is to finalize the second dose application and

strategy so bidding documents can be prepared. Barr will work with District staff to develop contract documents for bidding of the second application. This task order assumes the District would complete the second dose in Fall of 2024.

To address questions about impacts from power boat use on the alum treatment, we suggest monitoring two to three additional sediment sites to track changes in aluminum and aluminum bound P (Al-P) concentrations. While changes in total aluminum and Al-P are expected, more frequent sediment monitoring may help shed some light on the potential for aluminum bound P sediments to move because of disturbance.

Barr's proposed scope of work activities are divided into four Tasks:

- Task 1: Finalize Alum Dose and Strategy
- Task 2: Develop Bidding Documents
- Task 3: Application Oversight
- Task 4: Post Alum Treatment Sediment Sampling

3. Scope of Services:

This task order includes the following tasks.

Task 1. Finalize Alum Dose and Strategy

In close coordination with District staff, Barr will use the information provided in the first application and subsequent monitoring/data review to further refine the aluminum dose and strategy for the second treatment of Lotus Lake. This includes verifying the final application dose (g/m²), treatment area, and timeframe for applications. The technical information will be developed as necessary for the bid documents such as gallons per acre, shapefiles of the treatment area, staging, and other requirements necessary to complete the project. Additionally, Barr will submit a letter of notification to the Minnesota Pollution Control Agency and Minnesota Department of Natural Resources regarding the planned alum treatment to Lotus Lake on behalf of the District.

Task 2. Develop Bidding Documents

Barr will work with the District to develop contract documents and solicit sealed bids for the specified aluminum treatment on Lotus Lake. Barr will develop construction documents for public bidding using the Engineers Joint Contract Documents Committee (EJCDC) reference specifications including front end sections (i.e. instruction to bidders, summary of work) and the general EJCDC conditions.. The development of the technical specification will be coordinated with RPBCWD staff.

The request for bids will include details on the following:

- Chemical specifications to ensure the purity of the chemical and specified aluminum doses
- Volume and application zones with specified doses
- Application requirements including equipment, site set up and break down, previous experience, and any other pertinent requirements

- Equipment specifications to ensure accurate application and handling without equipment failure
- Acceptable application conditions including water temperatures, pH, wind, and rain
- Application procedures
- Coordination as needed with selected contractor
- Acceptable staging areas and access routes to include any easement exhibits suitable for recordation.
- Bid Items and quantities
- Method of measurement and basis of payment for bid items
- Staging area and access corridor stabilization measures (post construction)
- A pre-bid meeting

Barr will lead the bidding process by preparing the bid list and bidding documents for distribution, by attending the pre-bid meeting, responding to comments during the bid period and issuing addendums as necessary, holding the bid opening, and reviewing and compiling the bid results. The project would be advertised in the District's legal papers.

Barr will develop an engineer's opinion of probable cost for the application to evaluate bids. The submitted bids will be collected and tabulated for the District to review. A recommendation letter will be provided to the District to evaluate bids for the project. No more than one round of review is included for District throughout the bidding process.

Task 3. Application Administration

Barr staff have observed alum applications on more than 30 lakes and waterbodies. The contractor will be required to continuously monitor pH throughout the application period to maintain a pH greater than 6. Because the contractor is required to monitor pH, Barr does not typically conduct any independent sampling other than jar testing on the first day. Barr's monitoring approach of alum applications typically includes:

- Site visit with contractor to walk through site set up and operations.
- Review of the contractor's spill prevention and response plan.
- Review of the contractor's work plan.
- Inspection of operations, equipment, and chemical manufacturer specs.
- Inspection of bill of ladings and chemical composition delivered on site.
- pH jar testing to guide pH control.
- Review of pH monitoring and jar testing conducted by the contractor.
- Photo logs pre and post construction activities.

Barr staff plan to be on sight early in the project (day 1 of application) to inspect the site, conduct an independent jar test, and inspect contractor application and water quality monitoring equipment. Barr staff then review daily reports, monitoring logs, and jar tests on successive days when contractor is on site. Barr assumes 2 days of application to complete the alum treatment. After the application is complete, a site inspection is conducted after demobilization. Barr will document any

damage to the application site (staging area and boat launch) and restoration that may be required by the contractor.

Task 4. Post Alum Treatment Sediment Sampling and Boat Use Survey

One of the ways to track potential impacts from sediment disturbance is to measure total aluminum and Al-P in surficial sediments over time while estimating the disturbance potential. To help determine potential impacts in Lotus Lake, we suggest follow up sampling in the Spring of 2025 to establish baseline aluminum concentrations that can be tracked over time. Sampling the 5 established sites more frequently can provide some evidence for potential disturbance. Site 20 can be used as a control site since it is outside alum application areas. Changes at sites 10 and 40 can provide data on changes in aluminum over time. To strengthen the evidence, we suggest adding two locations including an intermediate depth site between stations 40 and 50 and a site close to station 10, in the 10 to 15 foot depth zone. At each site, 7 sediment sections will be analyzed for phosphorus fractions (loosely bound P, iron-bound P, labile organic P), total iron and aluminum, extractable iron and aluminum as well as sediment physical properties. Since sediment P release is the direct concern for water quality, we suggest measuring P release at all of these sites. The study would then be repeated in the Spring of 2026, however 2026 costs are not included in this task order.

In May of 2025, intact sediment cores will be collected at the locations discussed above by District staff using a gravity coring device, minimizing disturbance to the sediment/water interface. All cores will be sectioned at 2-centimeter intervals over the upper 10 cm and 5-centimeter intervals between 10 and 20 centimeters for sediment analyses. Three cores from each site will be used to determine sediment P release using laboratory sediment P release experiments.

Finally, an understanding of boat use and type on Lotus Lake will help inform the potential impacts of wake boat use on the alum treatment. Barr will provide input to inform District staff efforts to conduct a boat use survey on Lotus Lake to estimate the number of wake boats on Lotus Lake, the amount of use, and other information to better describe recreational powerboating on Lotus Lake.

A technical memorandum will be developed which summarizes the results of the sediment sampling.

4. Assumptions:

- Barr has include mileage, any necessary materials or equipment, within the scope of services.
- Barr will attend the pre-bid meeting to walk through the specifications
- The District will pay UW-Stout and RMB laboratory analytical costs directly which is not included in this budget
- RPBCWD staff will collect sediment cores as directed by Barr staff, deliver cores to respective labs as required, and manage all chain of custody requirements
- RPBCWD staff will conduct a boat use and type survey on Lotus Lake.

5. Deliverables:

The following deliverables will be prepared and provided to the District:

- MPCA application notification letter
- Contract documents for bidding
- Summary of bid results and recommendations
- All photos, logs, notes etc. related to application observation
- Technical memorandum for final sediment sampling

6. Budget:

Services under this Task Order will be compensated for in accordance with the engineering services agreement and will not exceed \$41,200, without authorization by the Administrator or Board of Managers. Barr understands the importance of working as efficiently as possible while providing the services needed for design and construction of a resilient project. Therefore, we will look for cost saving during the entire design process to avoid unneeded duplication of past efforts. The following table provides a breakdown of the anticipated cost for major tasks associated with scope of services describe above.

Task	Task Description	Anticipated Budget	Anticipated Completion Date
1	Finalize Dose and Strategy	\$2,400	June 2024
2	Develop Bidding Documents	\$16,800	June 2024
3	Application Observation	\$5,600	September 2024
4	Post Alum Treatment Data Analysis and Reporting ^{1,2}	\$16,800	July 2025
Task Order 40B Total		\$41,600	

¹This task includes time for data analysis and reporting only. RPBCWD is responsible for all analytical and field collection costs.

² Analytical costs for the Spring 2025 sampling are estimated at \$27,940, excluded from this task order, and would be paid directly by RPBCWD. Sampling and analysis cost that would happen in 2026 are excluded from this task order.

7. Schedule and Assumptions Upon Which Schedule is Based

The schedule outlined above assumes project initiation will occur in April 2024. The schedule may be modified depending on actual initiation of project work, stakeholder reviews, permit approvals, and stakeholder coordination efforts. The schedule will be further developed as part of project initiation and reviewed with the District as part of Task 1.

IN WITNESS WHEREOF, intending to be legally bound, the parties hereto execute and deliver Task Order 41A of this Agreement.

CONSULTANT

**RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT**

By _____

By _____

Its _____

Its _____

Date:

Date:

APPROVED AS TO FORM & EXECUTION

