



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-088

Proposal Title: Detroit Lakes Wastewater Chloride and Sulfate Treatment

Project Manager Information

Name: Susan Danzl

Organization: City of Detroit Lakes

Office Telephone: (651) 280-0884

Email: sdanzl@sehinc.com

Project Basic Information

Project Summary: This project will pilot test a novel water treatment system to reduce chlorides and sulfates to acceptable discharge limits using a low-energy technology that includes modified reverse osmosis.

ENRTF Funds Requested: \$750,000

Proposed Project Completion: December 31, 2026

LCCMR Funding Category: Water Resources (B)

Project Location

What is the best scale for describing where your work will take place?

Region(s): NW

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

The MPCA has begun implementing both chloride and sulfate limits for wastewater treatment facilities. Today, there are no cost-effective, end-of-pipe treatment options for these two parameters. The MPCA's expectation is that research and innovation will evolve to solve this dilemma and is providing compliance schedules and variances to allow time to do so. With these standards specific to Minnesota (particularly sulfate), this research and innovation will need to be local. The City of Detroit Lakes is one community facing both the new sulfate and chloride limits. As one of the first communities to be impacted by chloride limits, the City has a compliance schedule that requires meeting the chloride levels by 2033. The City recognizes that they are running out of time and cannot wait for others to identify solutions. The City is ready and willing to contribute to the state-wide efforts to find potential treatment solutions by piloting an innovative technology that offers a unique solution.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

The City of Detroit Lakes would like to conduct a 12-month pilot trial of an innovative technology to remove chlorides and sulfates from the City's wastewater treatment plant effluent in order to comply with current and impending effluent limit requirements. This award-winning technology has been trialed by the US Government for PFAS removal. This would be the first trial of the technology at a wastewater treatment facility (or dirty-water application). This novel technology uses a pretreatment/conditioning system prior to modified reverse-osmosis (RO) filtration to remove sulfate and chloride. The pretreatment system creates a zone of high turbulence causing the water to pass over a catalytically active surface multiple times. The catalytic action reduces scaling that foul RO systems, allowing for a smaller RO system that operates more efficiently. The RO system is modified to include coated membranes. This coating further reduces fouling and reduces backwash requirements.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Successfully removing chloride and sulfate from wastewater effluent in Detroit Lakes will lead to protection, conservation, preservation and enhancement of the state's natural resources. Removing the chlorides will open up more opportunity for the City's effluent to be reused for agriculture and other plants. Further, reducing the chlorides can reduce the effluent's chloride toxicity to plants and animals in the receiving waters. Sulfate limits are implemented to preserve wild rice production, and by removing sulfate, the City can reduce their impact to wild rice production. Identifying a viable technology can extend these local project outcomes to other areas of Minnesota.

Activities and Milestones

Activity 1: Equipment Procurement, Assembly, and Installation

Activity Budget: \$696,000

Activity Description:

The pilot system will be supplied by Bauer Energy Design. The equipment to be procured includes a modified reverse-osmosis system and a conditioning system which adds hydrogen peroxide. These items, along with the necessary piping, valving, and controls will be assembled on a pilot skid, also by Bauer Energy Design. The pilot skid must then be installed at the Detroit Lakes Wastewater Treatment facility with interconnecting piping and power.

Activity Milestones:

Description	Approximate Completion Date
Equipment Procurement	August 31, 2025
Equipment Assembly	September 30, 2025
Installation	December 31, 2025

Activity 2: Pilot Operation and Testing

Activity Budget: \$13,800

Activity Description:

Operate the pilot unit. Adjust operational parameters to optimize performance. Conduct laboratory tests to measure influent and effluent concentrations of sulfate and chloride. Monitor energy use, chemical, and overall maintenance requirement of the unit. Test and assess the brine sidestream for solids implications and potential options for use as a brine.

Activity Milestones:

Description	Approximate Completion Date
system start-up	January 31, 2026
Operational Variation Testing	September 30, 2026

Activity 3: Data Analysis and Report

Activity Budget: \$40,200

Activity Description:

Evaluate data collected during the pilot test and summarize in report. The report will define the parameters critical to implementing at the full-scale level and the costs to install and operate at the full-scale level. The report will also consider any implications and options for brine management.

Activity Milestones:

Description	Approximate Completion Date
Draft report	November 30, 2026
Final Report	December 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Rob Bredeson	City of Detroit Lakes	Owner	Yes
Walter Bauer	Bauer Energy Design	Technology provider	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

The results from the pilot trial will provide necessary information to size a full-scale installation. The implementation of a full-scale installation will require additional funding. This additional funding will come from a combination of the City's sewer fund, grants through PFA, other funding through the state, and low-interest loans.

Project Manager and Organization Qualifications

Project Manager Name: Susan Danzl

Job Title: Project Manager

Provide description of the project manager's qualifications to manage the proposed project.

Susan Danzl is the City of Detroit Lakes Public Utilities Wastewater Engineer. Her role will be to coordinate and schedule the pilot testing activities proposed and prepare the final documentation/report presenting the findings of the pilot study.

Organization: City of Detroit Lakes

Organization Description:

The Public Utilities in the City of Detroit Lakes, MN is responsible for providing the community of Detroit Lakes, MN with power, water, and wastewater treatment. The organization keeps "the lights on and water running. If a problem occurs, we act quickly with our local workforce."

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
							Sub Total	-
Contracts and Services								
Short Elliott Hendrickson	Professional or Technical Service Contract	Project management and report writing				0.12		\$40,000
Bohmer Municipal Services Co	Professional or Technical Service Contract	Pilot installation				0.02		\$50,000
Electrical Contractor - TBD	Professional or Technical Service Contract	pilot installation				0.02		\$50,000
Bauer Energy Design Inc	Professional or Technical Service Contract	supplying and assembling pilot unit				0.15		\$596,000
Lab testing	Professional or Technical Service Contract	testing and supplies for chloride, sulfates, metals, and PFAS				-		\$12,000
							Sub Total	\$748,000
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-

Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Assume 6 trips by SEH to the site location	pilot check in and update					\$1,800
							Sub Total	\$1,800
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	pilot report	printing draft and final reports					\$200
							Sub Total	\$200
Other Expenses								
							Sub Total	-
							Grand Total	\$750,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Total Project Cost: \$750,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [8e680f38-363.pdf](#)

Alternate Text for Visual Component

The attached is a slide deck that shows photos of a similar system installed for an agricultural facility in Michigan. In the photos, one can see the pretreatment/conditioner and a filtration system that would be used to further treat the effluent at the Detroit Lakes Wastewater Treatment Facility....

Financial Capacity

Title	File
CAFR	125d306d-ed9.pdf

Board Resolution or Letter

Title	File
Grant Application Resolution	fdfa43e3-2d9.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Rob Bredeson, City of Detroit Lakes Public Utilities

