



Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-270

Proposal Title: Using Underground Utility Mapping to Preserve Minnesota's Environment

Project Manager Information

Name: Stephen Swazee

Organization: SharedGeo

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Project Basic Information

Project Summary: Project will protect Minnesota's water resources and environment from hazardous material spills by developing nationally unique underground utility mapping software which will help minimize strikes on buried infrastructure.

Funds Requested: \$175,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Small Projects (H)

Secondary Category: Methods to Protect, Restore, and Enhance Land, Water, and Habitat (F)

Project Location

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

Statewide

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.

Despite decades of technology advancements in Geographic Information Systems (GIS), the nation's 811 community has made little progress in utilizing these advancements to create accurate, state-of-the-art, understanding about the location of underground infrastructure. To this day, a contractor, or homeowner, must legally adhere to the concept of "Call Before You Dig" so that locator personnel will come to the dig site and use a magnetic anomaly detector to mark the sensed location of underground utilities before any excavation takes place. This approach is problematic on many levels, especially when it comes to accuracy. For example, markings on snow cover in Minnesota are transient, and spray paint laid down by marginally trained individuals (there is no required training program for locators) can only achieve something akin to "looks about right". As a result, the Common Ground Alliance estimates that during 2021, the most current annual reporting period available, there were 2,265 unintentional excavation strikes on Minnesota's buried infrastructure. Given a large percentage of these strikes occur on hazardous material transmission or distribution pipelines, the potential for harm to Minnesota's land, water, or air is substantial.

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.

Since August 2020, a Minnesota public-private consortium comprised of Gopher State One Call (GSOC), Minnesota Geospatial Advisory Council's Emergency Preparedness Committee, and a diverse group from the state's utility community have been working together to improve excavation safety through use of geospatial technologies. Central to this team's effort has been development of prototype software (FuzionView) which will allow accredited locators, engineers, excavators, and facility operators to accurately view in near real-time underground infrastructure line data within a specific GSOC ticket notice site, thereby significantly supplementing the existing "Call Before You Dig" process. As validated by over a year of testing in Glencoe, MN, this prototype software has demonstrated the feasibility of requesting, receiving and aggregating GIS line data of multiple facility operators and then harmonizing that information into a unified view of the subsurface within a GSOC ticket area. Efforts are now underway to move from proof-of-concept to production development and statewide deployment of this software. When released as an open-source product in 2026, FuzionView will provide improved understanding about location of underground infrastructure, and pave the way for introduction of future technologies which will further reduce construction strikes, such as Augmented Reality (AR).

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?

Endorsed by the Clean Water Council, Minnesota Geospatial Advisory Council, and Association of Minnesota Counties, development of FuzionView is nationally unique and visionary effort which will protect Minnesota's natural resources by substantially reducing inadvertent damage to hazardous material pipelines. Every accident of this type which can be avoided will keep pollutants out of the state's forests, fields and streams, and prevent the need to burn-off dangerous chemicals into the air. The software will also provide data about abandoned and unrecorded pipelines, and pipeline material types, information which could be used to potentially locate toxic elements leaking into the environment.

Activities and Milestones

Activity 1: Develop and Release Open Source Production Software

Activity Budget: \$96,500

Activity Description:

In close collaboration with the Minnesota Underground Utilities Mapping Project Team, SharedGeo has developed prototype software (FuzionView) which allows accredited locators, engineers, excavators, and facility operators (public and private operators of utility infrastructure) to accurately view underground infrastructure line data within a specific Gopher State One Call requested notice site. Through funding received or committed from other partners for this activity (\$102,500), work has begun on developing a stable, reliable production system that collects near real-time data from facility operators, allows administrators to test and monitor the system, controls access to data, and produces reports tailored to users' needs. In addition, the system will be able to provide data to engineers designing projects that could impact underground utilities, and provide a way for locators and excavators to report unknown or abandoned features to facility operators ("field collects"). The funds requested here are to complete the development and testing of this software so that it can meet real-world needs.

Activity Milestones:

Description	Approximate Completion Date
Complete initial software rewrite which is already underway through currently committed funding	September 30, 2024
Complete planned software enhancements to include field collects and engineering systems; release version 1.0.	March 31, 2025
Complete bug fixes and add enhancements needed after version 1.0 release	June 30, 2026

Activity 2: Develop Procedures and Processes and Onboard Utilities

Activity Budget: \$44,500

Activity Description:

This second activity is focused on developing standard processes and procedures for onboarding facility operator data streams which will make this project successful. While another part of the overall effort has been focused on developing appropriate legal agreements to facilitate secure sharing of data streams, this effort will be focused on the technical elements. Work to date indicates this project will need to work closely with at least 20 major Minnesota utility operators to enable their technology so that visualization of their underground line data can be securely shared, and restricted to only within the boundary of a dig area. Funding received or committed from other partners for this activity (\$22,500) has enabled initial work with a limited number of utility operators. Funds requested here are to complete this statewide activity with as many other remaining utilities as possible.

Activity Milestones:

Description	Approximate Completion Date
Complete initial plan, then continuously update procedures and processes for onboarding facility operators	September 30, 2024
Continuously onboard facility operators by providing technical training and support	June 30, 2026

Activity 3: Develop Software Technical Documentation and Community Outreach Materials

Activity Budget: \$34,000

Activity Description:

The end product software of this project will be released into the public domain so that benefit of this innovative effort can be used not only here in Minnesota, but in other states and Canada as well. To make this reality possible it is imperative that the software is released with detailed documentation which facilitates install, modification and use. In addition, it is anticipated targeted outreach will be needed which, at a minimum, reaches the following communities: locators, excavators, facility operators and design engineers. Funds as requested for this activity will support those efforts.

Activity Milestones:

Description	Approximate Completion Date
Complete development of software documentation	March 31, 2025
Complete development of outreach materials	March 31, 2025
Complete outreach activities	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Gopher State One Call	Gopher State One Call	Project oversight	No
Minnesota's Utility Community	Minnesota's 2,000 plus facility operators	Project partners providing data and developmental feedback	No
Minnesota Underground Utility Mapping Project Team	Minnesota Underground Utility Mapping Project Team	Project team of the Minnesota Geospatial Advisory Council's Emergency Preparedness Committee, a public-private consortium of 25 individuals advising on overall project development	No
One Call Concepts	One Call Concepts	Contractor - Call center service provider to Gopher State One Call	No

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?

SharedGeo will release software into the public domain at project end and anticipates project will self-fund after that. The Minnesota Legislature created nonprofit 811 service for the state, Gopher State One Call, has oversight on development efforts and is committed to using resultant software as part of its future delivery of services. In addition, given this is the first time this capability will be available in the 811 community, interest is strong in both the United States and abroad. It is believed these facts strongly indicate subsequent product growth and financial support will not be an issue at project conclusion.

Project Manager and Organization Qualifications

Project Manager Name: Stephen Swazee

Job Title: Executive Director

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

Steve Swazee is retired Navy Captain and former Delta Air Lines 747 pilot who has chaired the Emergency Preparedness Committee (EPC) of the legislatively enacted Minnesota Geospatial Advisory Council since 2008. He was also previously a member of the Minnesota Geospatial Advisory Council and Geospatial Information and Technology Association (GITA) Board of Directors. During Hurricanes Katrina, Ophelia, Rita and Wilma in 2005, he was recalled to active duty to serve as the senior Department of Defense (DoD) Emergency Preparedness Liaison Officer at the Pentagon. He was subsequently a by-name appointment to the DHS-DoD post-Katrina data work group charged with developing a national Common Operating Picture - geospatial situational awareness viewer - that can be used by all levels of responders and decision makers. He is a graduate of the Naval Post-Graduate School of Aviation Safety, and while on active duty was the Director of Safety and Standardization of the U.S. Marine Corps' largest Air Group. His expansive experience in the use of geospatial visualization led him to help found St. Paul based SharedGeo, a nonprofit well known for its innovative mapping products which are typically released into the public domain. He has served as that organization's Executive Director since 2008, and in 2010 was awarded a Governor's Commendation for his service to the state as chair of the EPC.

Specific to the software development project described in this proposal:

- Co-chair of project since inception in 2020 - throughout that time has managed all group meetings and been a principal

in philosophy of core software design

- Through past life experience has nationally unique connections and understanding of development which will ensure project remains on schedule
- Previous project manager for multiple successful related technology projects

Organization: SharedGeo

Organization Description:

SharedGeo is a federally recognized 501 (c) 3 nonprofit founded in September 2008 with the mission to help government, nonprofit, education, and corporate entities use mapping technologies and share geographic data for the public good. SharedGeo's initial focus was on disaster response and relief operations in the United States, but it has since become engaged in a wide variety of related activities – including environmental, public safety and specialized software development. Many of its employees donate their time – which allows SharedGeo to keep expenses low and use incoming revenues to develop additional products which benefit the public. Some of its current and past clients include the nation's largest professional geospatial association focused on infrastructure, Geospatial Information & Technology Association (www.gita.org), U.S. Fish and Wildlife Service, Iowa Department Homeland Security and Emergency Management, Minnesota Department of Transportation, and Airborne Data Systems (www.airbornedatasystems.com). It is home to one of the world's 21 software programs sanctioned by the Open Source Geospatial Foundation (OSGeo), GeoMOOSE (www.geomoose.com), which since 2008 has been used by hundreds of units of government around the world to share their geospatial data with the public for free.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Project Manager		Responsible for project oversight, coordination and goal achievement			7.1%	0.2		\$15,000
Technical Lead		Responsible for management of software development and any subcontractor personnel working on the project			7.1%	0.4		\$30,000
Administrative Lead		Responsible for administration of project contract, finance tracking and submission of reports			7.1%	0.1		\$6,000
Lead Geospatial Scientist		Responsible for core code development and integration of facility operator data streams			7.1%	1		\$70,000
							Sub Total	\$121,000
Contracts and Services								
Front End Developer	Professional or Technical Service Contract	Developer to provide high quality skin for end product				0.2		\$15,000
Software Documentation	Professional or Technical Service Contract	Individual to produce software documentation				0.2		\$10,000
							Sub Total	\$25,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Hosting and other IT expenses	Fees to enable code development environment					\$5,000
							Sub Total	\$5,000
Capital Expenditures								
							Sub Total	-

Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	As needed travel to facility operators to implement services	Although it is believed most work with facility operators will be accomplished remotely, anticipate there will some cases where in person visits will be required.					\$5,000
							Sub Total	\$5,000
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Brochures for facility operator GIS department describing FuzionView system - 5,000 @ \$1.00/copy copies total	Project specific outreach to utility GIS personnel to help them understand overall concepts					\$5,000
	Printing	Facility operator decision maker informational brochures - 1,000 packets/\$2.00	Take away information packet for individuals who will make decision on corporate participation in project					\$2,000
	Publication	Three videos produced for product user community	Informational videos for different user groups which explain how this new product will work with pointers and restrictions					\$10,000
							Sub Total	\$17,000
Other Expenses								
		Graphic support	Graphic designer in support of outreach efforts. \$1,000 allocated to public information brochures, \$1,000 allocated to training support items.					\$2,000
							Sub Total	\$2,000
							Grand Total	\$175,000

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				
Cash	Contractual commitments from nonprofit Gopher State One Call and others	Funds used to commence project and cover expenses 2023 - spring 2024	Secured	\$125,000
			Non State Sub Total	\$125,000
			Funds Total	\$125,000

Attachments

Required Attachments

Visual Component

File: [0c0c5e1b-5ed.pdf](#)

Alternate Text for Visual Component

Gopher State One Call, Minnesota's 811 service, has partnered with the Minnesota Geospatial Advisory Council on the Minnesota Underground Utilities Mapping Project. The project's goal is to provide near real-time, ticket-level mapped visualizations of underground utilities to reduce strike damage on buried infrastructure. Common Ground Alliance 4-page informational flyer attached....

Financial Capacity

File: [b52ccf8b-b8a.pdf](#)

Board Resolution or Letter

Title	File
SharedGeo BOD Resolution	d3776485-563.pdf

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Minnesota Clean Water Council Policy Statement of October 18, 2021	73f39164-15f.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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

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?

No

Does the organization have a fiscal agent for this project?

Yes, SharedGeo

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing \$10,000 or more?

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?

No

