

Note: Some names and email addresses have been removed from this document for publication.

Project Description

We nominate the Lead Service Line Data Collection and Display Team for a Governor's Geospatial Commendation. Nearly 1,000 community public water supplies in Minnesota submitted data through the combined effort of public water supply staff, 18 consulting engineering firms, and Minnesota Rural Water Association. The Minnesota Department of Health (MDH) conceived and coordinated the project, and U-Spatial at the University of Minnesota harmonized and displayed the data. This effort culminated in a website, the [Minnesota Lead Service Line Map](#), where anyone can search for and find on a map the service line material for any of the 1.5 million addresses that receive water from a water system in Minnesota.

Background

Lead is a poisonous metal that can cause long-term health and behavioral problems when ingested. Lead in drinking water poses a significant public health risk, especially to children. Before lead was recognized as a health hazard, many water systems used lead pipes as service lines, the pipes that convey drinking water from water mains to buildings. Recognizing this as a potential source of lead consumption, the Environmental Protection Agency 2021 Lead and Copper Rule Revisions (LCRR) required all community water systems in the United States to create inventories of the materials used for every service line.

The Minnesota Department of Health (MDH) is the agency responsible for ensuring that public water systems maintain compliance with the LCRR in Minnesota. MDH is responsible for guiding and supporting the Public Water Supplies (PWS) in completing the required inventories of service line materials. During the creation of initial service line inventories, MDH provided training to help PWS accurately identify, document, and report service line materials. MDH also established a Service Line Inventory Technical Assistance program to support the PWS in creating the required inventories. This program engaged a pool of pre-qualified consulting engineering firms. These consulting firms assisted PWS with records reviews, visual inspections, GIS data entry, and data validation to create accurate service line inventories.

In partnership with MDH, U-Spatial at the University of Minnesota created and published the Minnesota Lead Service Line Map, a user-friendly website that allows anyone to search for an address or browse an interactive map to investigate service line materials. The tool displays whether a service line is lead, non-lead, or unknown, and identifies which public water supply serves each address. While many cities across the United States have developed similar maps, Minnesota is the first state to offer a centralized, statewide platform for accessing this information. This innovation reflects a commitment to transparency and public health and sets a national precedent for how states can empower residents with accessible, location-specific environmental data.

Project Development

To ensure consistent and accurate reporting across the state, MDH adapted the EPA guidance on lead service line inventories into a set of standardized data submission protocols tailored for Minnesota's diverse water systems. MDH developed simple and detailed spreadsheet templates to accommodate systems with varying levels of data availability and technical capacity that did not want to submit their inventory with GIS. These templates guided systems in documenting both the utility and customer owned portions of service lines, including classifications based on ownership and material type.

MDH and U-Spatial also created GIS data standards and submission procedures. GIS data was submitted through REST endpoints, hosted feature services, geodatabases, and shapefiles. By aligning with EPA requirements while offering flexible levels of detail and submission formats, MDH enabled water systems to compile and submit inventories that meet federal compliance standards.

Many PWS independently managed their own GIS mapping and lead service line inventories. These systems, often with dedicated staff and internal resources, were able to use their existing infrastructure and technical expertise to conduct thorough records reviews, perform field verifications, and build accurate, spatially referenced inventories. In other PWS, the service line inventory was completed through close collaboration between the PWS staff and one of the consulting engineering firms in the technical assistance program. PWS staff brought invaluable local knowledge, historical context, and operational insight to the process. At the same time, consultants provided critical technical expertise, helping to interpret records, conduct field verifications, map service lines, and prepare data for submission in compliance with state and federal standards. This partnership was especially crucial for smaller or under-resourced systems, where consultants helped fill capacity gaps. Together, PWS personnel and consultants formed a statewide team that ensured inventories were accurate, complete, and submitted on time. We estimate over 2,000 people across Minnesota contributed to the success of this project.

U-Spatial staff integrated and harmonized the data generated by Minnesota's PWS, which range from single apartment buildings to large utilities serving multiple cities. Given the wide variation in data formats, technical capacity, and geographic scope, U-Spatial developed a data infrastructure capable of standardizing submissions from all system sizes. A key component of this effort was geocoding: converting addresses and location descriptions into geographic coordinates. U-Spatial used geocoding to map service line data that was submitted by address, parcel, or descriptive location. Approximately two thirds of the data was submitted in a GIS format or with GPS coordinates and the remaining one third was submitted without coordinate information and was geocoded.

The web application features a map-based interface that connects users to the database of service line information. It serves two primary user groups:

1. Citizens, who want to view the service line material for specific addresses.
2. Decision-makers, who need access to summary statistics and progress updates.

Citizens can search for a specific address using the application. Each service line entry is linked to a standardized address in the format of the ArcGIS World Geocoder, allowing the application to query the database to identify and display any associated service lines. If no data is available for the searched address, the application will still navigate to the corresponding location on the map, helping users visually explore nearby areas.

For decision-makers, the application provides both statewide summaries and summaries by PWS. These summaries include totals of service lines that are known to need replacement, as well as those whose material is still unknown, which presents a snapshot of the remaining work and data gaps. The statewide summary has evolved during the project. It was originally focused on how many PWS were included in the application; it now emphasizes the progress that has been made in replacing service lines.

The website and database will continue to be updated as PWS report service line replacements and service lines with initially unknown materials are resolved. The 2025 Technical Assistance program is underway with the next round of updates expected in Fall, 2025.

Benefits and Results

The goal of the Lead Service Line Data Collection and Display Team was to make it easy for anyone to look up the service line material associated with any address. This data availability is especially important for individuals like parents, who may want to check the service line information for their child's school or daycare. It also empowers community members to assist friends, neighbors, and others in understanding the potential risks associated with their service lines. While each address with a service line that either required replacement due to lead or had unknown material was notified by mail, that method represented a point-in-time notification. This notification may not reach individuals who are more mobile, such as those who have recently moved or frequently change residences. The website provides a place where the information can be retrieved at any time.

PWS benefit from having a statewide portal. The EPA required that all water systems made their inventory data publicly available and water systems serving a population of over 50,000 residents have their service line inventories online. The statewide map satisfied this EPA requirement for these water systems, so they would not be required to maintain their own service line map or database. This was an option used by cities including Duluth and Rochester.

This centralization also eliminates the need for a resident to know which water system serves a particular address when trying to find their service line material.

Project Impact

The Lead Service Line Mapping and Data Display Project has had a significant impact on how Minnesota tracks and communicates the status of lead service line replacement across the state. Service line data from the PWS has been standardized into a single, consistent format. This allows for tracking, reporting, and comparison across communities and the creation of statewide summaries. The web application serves as a centralized platform where both the public and decision-makers can access up-to-date service line information. It supports transparency, public health awareness, and informed decision making.

Google Analytics data shows strong public interest in the tool, with spikes in traffic following outreach efforts and media coverage. The project has received coverage from major news outlets including the Star Tribune, KSTP, and WCCO. There have been more than 100,000 views of the website since it was released in October, 2024.

Participating organizations

Minnesota Department of Health – Corey Mathisen, Chad Kolstad

U-Spatial at University of Minnesota – Marylee Murphy

Minnesota Rural Water Association – John Nelson

Consulting Engineering Firms

Consulting Firm

AE2S

Apex

Bollig

Bolton & Menk

DGR

ISG

JPJ Engineering

Karvako

Moore Engineering

MSA

NERO

SEH

Stantec

TKDA

Ulteig
WHKS
Widseth (WSN)
WSB

Public Water Supplies directly contributing GIS data

Public Water Supply

Alexandria
Apple Valley
Brooklyn Park
Chanhassen

Chaska
Columbia Heights
Coon Rapids
Cottage Grove
Duluth
Eden Prairie
Eagan
Farmington
Golden Valley
Lakeville
Maple Grove
Minnetonka
Minneapolis
Norwood-Young America
Owatonna
Plymouth
Prior Lake
Rochester
Rosemount
Saint Cloud
Saint Louis Park
Saint Paul Regional Water
Services
Shoreview
White Bear Lake

Letters of Support

June 30, 2025

Minnesota Geospatial Advisory Council Awards Committee

Regarding: Governor's Certificate Award

I recommend the Minnesota Lead Drinking Water Project for the 2025 Governor's Certificate Award. The Lead Drinking Water project was managed by the Minnesota Health Department, mapped by University of Minnesota U-Spatial group and performed by 963 Minnesota drinking water producers who supply drinking water via 1.5M connections in coordination with 17 Minnesota engineering consultants.

The creation of one interactive statewide GIS map showing confirmed Minnesota drinking water connection materials for 1.5M customers supplied by 963 Minnesota drinking water producers in coordination with 17 Minnesota engineering consultants is an unprecedented achievement for Minnesota infrastructure and GIS managers that benefits all Minnesotans and that sets a new standard for Minnesota infrastructure and GIS professionals.

For one Minnesota agency to create one similar map for one drinking water supplier, as has been done elsewhere across the country, would be noteworthy. For this collaborative team to create one statewide interactive Lead Drinking Water connection map is unprecedented. While a map such as this has been the 'vision' of many long-time Minnesota GIS professionals, a project of this magnitude has never been 'completed' in Minnesota. Further acknowledgement of the significance of this statewide map is that to-date no such product has been completed nationally.

In summary, as a long-time Minnesota engineering and GIS professional, I suggest the Minnesota Lead Drinking Water Project deserves your 2025 Governor's Certificate Award.

Cordially,

Brad Henry, PE
Mn Infrastructure Alliance (www.mninfrastructure.org), Formerly MN2050
U of M, Technological Leadership Institute - <http://isme.umn.edu/>
(612) 710-8431



June 26, 2025

Minnesota Geospatial Advisory Council
c/o Allison Slaats, Chief Geospatial Information Officer
Minnesota Geospatial Information Office (MnGeo)
Minnesota IT Services
600 N Robert Street
Suite 2800
St. Paul, MN 55146

Dear Council Members,

I am pleased to share this letter in support of the Lead Service Line Data Collection and Display Team for the 2025 Governor's Certificate Award for Exemplary Geospatial Projects.

The Lead Service Line Data Collection and Display Team's project provided a great resource for anyone who drinks tap water from the more than 1.5 million addresses that are provided drinking water from a community public water system in Minnesota.

The Lead and Copper Rule Revisions (LCRR) established by the United States Environmental Protection Agency (USEPA) required all community public water systems to complete an inventory of all drinking water lines connected to our water system. Previous inventory efforts by the City of South St. Paul left our staff with data across multiple platforms. The LCRR required all water systems to streamline this data and make it publicly accessible. This project allowed us to more effectively provide the results of the inventory to our customers because, not only did it satisfy the rule requirement established by the USEPA, but it also provided transparency of this information to all Minnesotans. Residents can easily search for their address to determine the material of their service line. This project allowed us to use the GIS information available to notify our residents about their lead service line. The City of South St. Paul has a small staff so partnering with this team provided a great benefit to our community.

The project provided a valuable resource to our water utility by creating a visual representation of the water service data. Our city is taking a proactive approach to completing replacements soon which will benefit the public health of our community.

I appreciate the opportunity to offer my support for this exemplary project.

Sincerely,

Kelsey Gelhar, PE
Assistant City Engineer

June 27th 2025

Minnesota Geospatial Advisory Council
c/o Allison Slaats, Chief Geospatial Information Officer
Minnesota Geospatial Information Office (MnGeo)
Minnesota IT Services
600 N Robert Street
Suite 2800
St. Paul, MN 55146

Dear Council Members,

I am pleased to submit this letter in support of the Lead Service Line Data Collection and Display Team for the 2025 Governor's Certificate Award for Exemplary Geospatial Projects.

The team's project has proven to be a critical and accessible resource for the more than 1.5 million addresses served by community public water systems throughout Minnesota. It not only supported compliance with federal regulations but also enhanced public access to essential information about drinking water infrastructure.

Under the Lead and Copper Rule Revisions (LCRR) established by the U.S. Environmental Protection Agency (USEPA), all community public water systems were required to complete an inventory of service lines and make this information publicly available. This project enabled us to do exactly that—efficiently and effectively—by using geospatial tools to provide transparency and clarity for residents.

Through this effort, our customers were able to search their addresses and determine whether they are served by a lead service line requiring replacement. The visual and interactive nature of the display allowed us not only to inform individual households, but also to clearly demonstrate the broader scope of the project—both within our city and across the state. This helped build community understanding and support, highlighting the scale and importance of the work ahead.

From a utility standpoint, the GIS-based display has been an invaluable planning tool. The visual representation of data helps us prioritize and coordinate necessary replacements, reinforcing our proactive approach to improving public health through timely lead service line replacement.

Thank you for the opportunity to share my strong support for this innovative and impactful project.

Sincerely,

Aaron Hauser
Water Superintendent
City of Winona



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INTERNATIONAL FALLS PUBLIC WORKS
TED BROKAW
DIRECTOR OF PUBLIC WORKS

June 26, 2025

Minnesota Geospatial Advisory Council
c/o Allison Slaats, Chief Geospatial Information Officer
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The MDH program to provide technical assistance to communities to produce the inventory allowed us to complete the inventory according to schedule. The data collection process required significant staff resources so the ability to utilize a consultant to provide assistance to our efforts was appreciated.

The project also provided a valuable resource to our water utility by providing a visual representation of the data to allow us to better plan for completing the necessary replacements in our city. Our city is taking a proactive approach to completing replacements soon which will benefit the public health of our community.

I appreciate the opportunity to offer my support for this exemplary project.

Sincerely,

Ted Brokaw, Director of Public Works