



# Madison Water Utility

Leading the national charge on  
lead line replacement

## Project at a Glance

### Utility Overview

- Utility: Madison Water Utility
- Location: Madison, Wisconsin
- Population served: 250,000
- Service area: 100 square miles

### Challenges

- Elevated levels of lead in drinking water
- Need for innovative way to meet the requirements of the Lead and Copper Rule

### Solution

- A comprehensive Lead Line Replacement Program that mandated all lead service lines, both on public and private property, in Madison are replaced over a 10-year period.

### Costs and Funding Sources

- Total program cost: ~\$15.5 million
  - Reimbursements Replacement Cost (Private lead lines): ~\$3.8 million
  - Replacement Cost (Public lead lines): ~\$9.6 million
- Funding sources:
  - Antenna rental revenues: Used for replacements on private property
  - Capital improvement budget: \$1-1.5 million annually between 2000 and 2006 used for utility-side lead service replacements (approximately 15% of overall annual capital budget); less than \$100,000 annually after 2006

### Benefits



**Puts Madison on the map as a national leader for service line replacement**



**Saves approximately \$2.5 million in costs (as of 2018) by avoiding the need for ongoing treatment**



**Improves water quality and reduces lead levels in drinking water**



**Engages the community**



**Protects public health and safety**



In 1991, the Environmental Protection Agency passed the Lead and Copper Rule. The new federal regulation required water providers to reduce lead levels if monitoring at customer taps showed elevated lead concentrations.

## BACKGROUND

---

Madison is located in Dane County of south-central Wisconsin—75 miles west of Milwaukee and 120 miles northwest of Chicago—and covers close to 100 square miles. Wisconsin has a continental climate with variable weather patterns and large seasonal temperature variation from 80 degrees in summer to 10 degrees in winter.

Madison Water Utility serves just over 250,000 people in Madison and neighboring communities. Madison is one of the fastest growing regions in Wisconsin and boasts a 10-year growth rate nearly double the national average. Madison's water comes from a deep aquifer beneath the city.

## CHALLENGE

---

In 1991, the Environmental Protection Agency (EPA) passed the Lead and Copper Rule (LCR). The new federal regulation required water providers to monitor drinking water at customer taps. If, based on that sampling, lead concentrations exceeded an action level of 15 parts per billion (ppb), the LCR then required utilities to undertake a number of additional actions to control corrosion. The following year, in 1992, Madison Water Utility conducted its first round of testing in accordance with the LCR. The results of these samples revealed elevated levels of lead above the action level.

Madison Water Utility's first step was to evaluate potential ways to achieve the required reductions under the LCR. Working with its consultant, the utility soon learned through a series of tests and studies that adding the chemicals usually used to address elevated levels of lead in drinking water would not satisfactorily resolve the issue, as adding the chemical orthophosphate would compound existing phosphorous pollution in the streams to which Madison discharges its wastewater. Taking a truly One Water approach, Madison viewed the need to reduce lead levels in its drinking water holistically from source to tap to receiving water. Practically, this meant identifying and replacing all lead service lines — no simple task.



## SOLUTION

To implement the Lead Service Line Replacement Program, Madison Water Utility first addressed three initial challenges:

- (1) The **EPA had to approve the utility's proposal** to bypass the treatment techniques specified in the LCR, as the regulation did not otherwise allow the city to use lead line replacement as a compliance mechanism. Based on the research and data collected, the EPA did approve Madison's request to meet the LCR through the Lead Service Line Replacement Program.
- (2) Madison Water Utility **needed to work with the community** to address concerns about the need for and cost of the lead line replacement program. Through extensive public education and outreach efforts, the utility successfully gained the community's support.
- (3) Madison Water Utility needed to **identify a creative funding source** for certain portions of the Lead Service Line Replacement Program. To finance lead line replacement on private property, the utility decided to rent space on its water towers for cellular antennas.

### Lead Service Line Replacement Program

Madison's Lead Service Replacement Line program was the first of its kind in the country. It was aimed at replacing all lead service lines in the city, most of which were on private property. The program was comprised of two elements:

- (1) a **regulatory mandate** that all lead service lines be replaced; and
- (2) a **reimbursement mechanism** to help customers pay for the cost of private replacements.

The regulatory mandate was established in an ordinance adopted by Madison's Common Council in 2000. The ordinance required that all lead service lines, including those both publicly and privately owned, were to be replaced over the next decade. For customers that were subject to this mandate, the ordinance also provided

that Madison Water Utility would reimburse half of the customer's cost of replacement up to \$1,000 (later increased to \$1,500). Customers refusing to comply would be subject to fines of \$50-\$1,000 per day.

To implement these program elements, Madison Water Utility conducted extensive field outreach and education, including meetings and education materials for homeowners on how to locate and test their service lines. The utility also sent thousands of customer surveys to identify lead service lines, as records of the piping material for property owners' laterals were not available.





## By implementing the Lead Service Line Replacement Program, Madison has reduced lead in its drinking water pursuant to the LCR

## RESULTS

Through Madison Water Utility's commitment to regulatory compliance and public health, the utility was able to overcome numerous challenges to implement a first-of-its-kind program. Benefits range from the obvious health and safety benefits of reducing Madison residents' exposure to lead in drinking water to the indirect benefits of having an engaged community that is informed about where their drinking water comes from.

### Public Health Benefits

By implementing the Lead Service Line Replacement Program, Madison has reduced lead in its drinking water pursuant to the LCR. In particular, sampling done in 2011 and 2014 reported lead results of 3 ppb, which is well below the 15-ppb action level.

### Social Benefits

In total, the community has replaced 8,000 lead service lines, 5,600 of which were on private property. Eighty percent of the replacements were finished in the first six years of the program, including all lead lines serving schools and apartment buildings.

Since the program's implementation, Madison residents are also more aware of their local water infrastructure. They have a deeper understanding of where their water comes from and are more engaged with their water utility's operations.

### Economic Benefits

As of 2018, the Lead Service Line Replacement Program has already saved Madison approximately \$2.5 million in costs by avoiding the need for ongoing treatment.

### Sources

AWWA regulatory seminar PowerPoint "Madison's experience with lead"

["Climate of Wisconsin," Wisconsin State Climatology Office](#)

November 28, 2018, Interview with Madison Water Utility staff

["Madison, Dane County lead the state population growth in latest U.S. Census estimates," Wisconsin State Journal, May 27, 2017.](#)

[U.S. Census Bureau data for Madison, WI](#)

[Madison Water Utility: About](#)

[Madison Water Utility: Water Conservation and Sustainability Plan](#)

[Madison Water Utility: EPA seeks details of Madison's Lead Service Replacement Program](#)

[Madison Water Utility: Information for utilities on lead service replacement](#)  
[U.S. Climate Data for Madison, WI](#)

[Madison Water Utility: Information for utilities on lead service replacement](#)  
[U.S. Climate Data for Madison, WI](#)

[Madison Code of Ordinance, Chpt. 13.18, § 4, Lead Service Line Replacement \(accessed January 5, 2019\).](#)

[Madison Code of Ordinance, Chpt. 13.18, § 6, Lead Service Line Replacement \(accessed January 5, 2019\)](#)

[Madison Code of Ordinance, Chpt. 13.18, § 8, Lead Service Line Replacement \(accessed January 5, 2019\).](#)

Petition to the Public Service Commission Re Lead Line Replacement Program