



## Division of Drinking and Ground Waters

### Guidelines for Lead Mapping in Distribution Systems

Division: DDAGW  
Number: PWS-04-002  
Category: PWS - Guidance  
Status: Final  
Issued: 01/06/2017  
Updated: 04/01/2022

#### I. PURPOSE:

The purpose of this document is to provide guidance on how to map a distribution system to identify areas that are known to contain or likely to contain lead service lines and identify characteristics of buildings served by community water systems that may contain lead piping, solder or fixtures.

#### II. BACKGROUND:

In June 2016, HB 512 was passed to enact section 6109.121 of the Ohio Revised Code (ORC) to establish requirements governing lead and copper testing for community and nontransient noncommunity public water systems and to revise law governing lead contamination from plumbing and fixtures. The law requires community water systems to identify and map areas of their distribution systems that are known or likely to contain lead service lines. These systems are also required to identify and provide a description of the characteristics of buildings served by the system that may contain lead solder, fixtures or pipes. Single building community and nontransient noncommunity water systems are required to map areas of the system that have solder, fixtures and pipes containing lead. Water systems are encouraged to work with their local building authorities when identifying distribution areas with lead service lines, as described in section IV of this guidance document.

#### III. IDENTIFYING DISTRIBUTION AREAS WITH LEAD SERVICE LINES - COMMUNITY PUBLIC WATER SYSTEMS:

Community public water systems (CWS) can use a variety of records to identify areas that are known or are likely to have lead service lines. Details to help with identification can be found in plumbing codes and other regulatory changes, historical permit records, and information obtained during maintenance activities, such as meter replacements, water main breaks and other instances when service lines have been directly observed provide conclusive information. CWSs are encouraged to utilize customer self-reporting as a way to identify areas with lead service lines. The different data sources are discussed further below.

Service line ownership may complicate determining where lead service lines are located. Typically, the CWS owns, and may have records of the service line material from the water main up to the property line. However, the service line from the property line into the home is typically under the ownership of the property owner. This service line may or may not be the same service line material as on the water utility-owned side. This should be considered in situations where the CWS has done main replacement work in an area which would include removing the CWS-owned portion of the lead service lines. This area should still be considered as having lead service lines since the property owners' side of the lines in the area could still be made of lead.

1. Local Code and Regulatory Changes. Knowing the dates of changes which may have called specifically for lead pipe installation, or the prohibition of lead pipe may help to target certain areas. For example, many

cities proactively prohibited the use of lead somewhere in the 1930's to 1950's time range. Local plumbing permits and municipal codes may also require specific material to be used in service lines. Performing searches of local records may yield cutoff dates before which a pipe may likely be lead.

2. **Historical Permit Records.** Research into building and plumbing permits may yield information as to the material used in the service line. A survey of many of these permits in a particular area can allow a water system to classify a particular area as having a high, low or no risk of having lead lines. CWSs may also have information by reviewing their own main installation records and drawings. Often times the water main installation records and "as built" drawings will note the service line material used in a particular project. Some CWSs may have a system of "tap cards" or other type of system, specifically for keeping track of the service line materials used during the main tapping. These records should also be reviewed to determine areas with lead service lines.
3. **Maintenance and Operation Records.** CWSs have opportunities to directly view the service line materials during a variety of maintenance activities. Excavations during main breaks, main repairs, valve installations, etc. that uncover nearby service lines allow crews to view the line and determine materials used. Water meter replacement projects are another type of activity that can yield information about service line material on both the public and private side of the curb stop. CWSs may have captured service line information during these activities they can use. Even if CWSs have not captured this information in the past, they should begin capturing this data in order to improve their system knowledge and to better position themselves to answer questions about service line material, in addition to updating their maps every five years as required by this law.
4. **Customer Self-Reporting.** Through the use of public education efforts, CWSs may be able to encourage customers to observe their own water lines coming into their building to determine if they may be made of lead. Some utilities have developed videos and photographic guides which instruct customers how to do a "scratch test" to identify a lead line. Although this effort may be prone to errors, it can produce very useful information as to the material on the customer-owned side of the service line and be able to help identify areas containing lead service lines.

Various public water systems have made diagrams and videos available for use for identifying lead service lines at homes and businesses.

- City of Cleveland, Lead Treatment web site, "Check your Property."  
<http://www.clevelandwater.com/your-water/water-quality-and-treatment/lead-treatment>
- U.S. EPA, Advice to Chicago Residents web site, "What do lead service lines look like?"  
<https://www.epa.gov/il/advice-chicago-residents-about-lead-drinking-water>

Once the available information is reviewed, CWSs should use it to identify areas of distribution which meet the characteristics of having or likely to have lead lines. CWSs should be conservative in their estimates and assume that lead could have been used for service line materials unless the age of the area or specific information exists to rule out lead.

#### **IV. IDENTIFYING CHARACTERISTICS OF BUILDINGS WITH LEAD PIPING, SOLDER OR FIXTURES**

In 1986, the SDWA was amended to ban the use of lead solders which contain more than 0.2% lead. The lead ban provisions of the act became effective in Ohio Plumbing Code on March 30, 1998. The SDWA amendments also required the use of lead-free flux, pipes and fittings in new installations and repairs of public water systems, or any plumbing within a residential or nonresidential facility which provides water for human consumption. Lead-free was defined at the time as having no more than 8.0% lead (note this 8.0% was lowered to 0.25% in 2014).

In 1996, the SDWA was further amended to state the following is unlawful:

1. For any person to introduce into commerce any pipe, pipe fitting, plumbing fitting or plumbing fixture, that is not lead free, except for a pipe that is used in manufacturing or industrial processing; or
2. Any person engaged in the business of selling plumbing supplies; except manufacturers, to sell solder or flux that is not lead free; or
3. Any person to introduce into commerce any solder or flux that is not lead free unless the solder or flux bears a prominent label stating that it is illegal to use the solder or flux in the installation or repair of any plumbing providing water for human consumption.

In 2011, SDWA Section 1417 was amended for the prohibition on use and introduction into commerce of lead pipes, solder and flux. These new requirements became effective on January 1, 2014. The amendments specifically modified the applicability of the prohibitions by creating exemptions for certain non-potable applications, changed the definition of “lead-free” by reducing lead content from 8% to a weighted average of not more than 0.25% in the wetted surface material (primarily affects brass/bronze), eliminated the provision that required certain products to comply with “voluntary” standards for lead leaching, and established a statutory requirement for calculating lead content.

The exemptions to the SDWA Section 1417 are pipes, pipe fittings, plumbing fittings or fixtures, including backflow preventers, which are used exclusively for non-potable services, such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses where the water is not anticipated to be used for human consumption. The exemption also applies to toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are 2 inches in diameter or larger. In addition to the SDWA, the Community Fire Safety Act of 2013 exempted fire hydrants from this requirement.

As a result of these amendments, buildings constructed after 2014 are the least likely to have plumbing containing lead materials, so these consumers are at the lowest risk of exposure to lead from drinking water.

Because it is practically impossible to determine the lead content of an installed fixture, fitting or pipe, it should be assumed that the manufacture or installation date is the primary indicator of the lead content. Therefore, the characteristics of buildings and piping solder or fixtures would be **buildings in Ohio built prior to 1998 or that use plumbing material or solder manufactured before 1998 may have materials with greater than 8% lead and are at a higher risk of contributing lead to the drinking water than materials manufactured after 1998. In addition, buildings built and plumbing materials manufactured after 2014 were required to have less than 0.25% lead by weight and have the lowest risk for contributing lead to the drinking water. It should be noted however that, although prohibited, some use of leaded solder or leaded components may have occurred after the prohibitions became effective.**

## **V. MAPPING REQUIREMENTS AND RECOMMENDATIONS**

Once identified, areas of the system known or are likely to have lead service lines must be plotted on a map of the entire distribution system. The different areas on the map must be distinguished by different colors or other obvious mapping tools. An electronic copy of the map using mapping software, a map in a PDF or another generally used electronic file type is the preferred product, but hard copy colored maps are acceptable. The maps must be capable of being copied in color for distribution to the required parties and consumers upon request.

The maps must be an appropriate scale and identify major streets, landmarks, bodies of water or other methods of orientation so that the reader of the map could easily determine the areas covered by the map. They must also include a north arrow as a directional reference.

It is recommended that maps show the land parcel and building outline, or otherwise identify the structures that

are being served by the system.

Where the information is available, water systems should identify individual service connections on the map by selecting one of the color schemes and naming conventions listed below, and include a legend with or in the map.

**Colors**

Lead = 

Non-Lead = 

No Information = 

**Example of Public Side of Service Line and Private Side of Service Line**



**VI. SUBMITTAL REQUIREMENTS:**

The following requirements are to be submitted to respective parties by December 31, 2022.

1. Submit a report to Ohio EPA, Division of Drinking and Ground Waters (DDAGW) containing, at minimum, the information below. (Addresses are listed in section IX of this guidance.)
  - a. The map detailed in section V of this guidance.
  - b. A list of sampling locations that are Tier I sites used to collect samples, as required by rules adopted under ORC Section 6109.121, including contact information for the owner and occupant of each sampling site. If there is not a sufficient number of Tier 1 sites available, systems should include Tier 2 sites to complete monitoring. Systems may meet this criterion by resubmitting their sample monitoring point ID sheet. This information should be resubmitted to the District Office as sites are updated.

Upon review, Ohio EPA may determine the initial map submittal is incomplete and request public water systems to resubmit the report, map or list of sampling locations as specified in this guidance.

2. Submittals to Ohio EPA will count as submission to Ohio Departments of Health (ODH) and Jobs and Family Services (ODJFS). PWSs will not need to submit a separate copy to ODJFS and ODH.

**VII. FINANCIAL ASSISTANCE:**

Financial assistance is available for systems for fulfilling the mapping requirements of ORC Section 6109.121. For more information, please see the tab “Drinking Water Assistance Fund” on the following web site: [Financial Assistance | Ohio Environmental Protection Agency](#)

**VIII. HISTORY:**

The Division of Drinking and Ground Waters first issued this document on January 6, 2017, and published the first update on April 1, 2022.

**IX. SUBMITTAL INFORMATION:**

**Electronic copies smaller than 20 mb:** DDAGW\_Lead\_Maps@epa.ohio.gov

**Electronic copies larger than 20 mb:** [https://fileshare.epa.ohio.gov/filedrop/DDAGW\\_Lead\\_Maps](https://fileshare.epa.ohio.gov/filedrop/DDAGW_Lead_Maps)

**Hard copies:**

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