

The Michigan Lead and Copper Rule

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Lead in Drinking Water

- Lead is a poison – a potent and irreversible neurotoxin. There is no safe level of lead exposure.
- Water is a lead exposure pathway intended for human consumption; water is necessary for survival.
- The time to address lead in water is when lead is detected in the environment, not when lead is detected in children.
- Corrosion control reduces but does not prevent exposure to lead in water.
- Routine blood lead testing of toddlers is designed to detect exposure from lead paint and dust, not water.
- The populations most vulnerable to lead in water, pregnant women and formula fed infants, are not tested for lead exposure.

Lead in water is a lifelong exposure risk



Most vulnerable to lead in drinking water

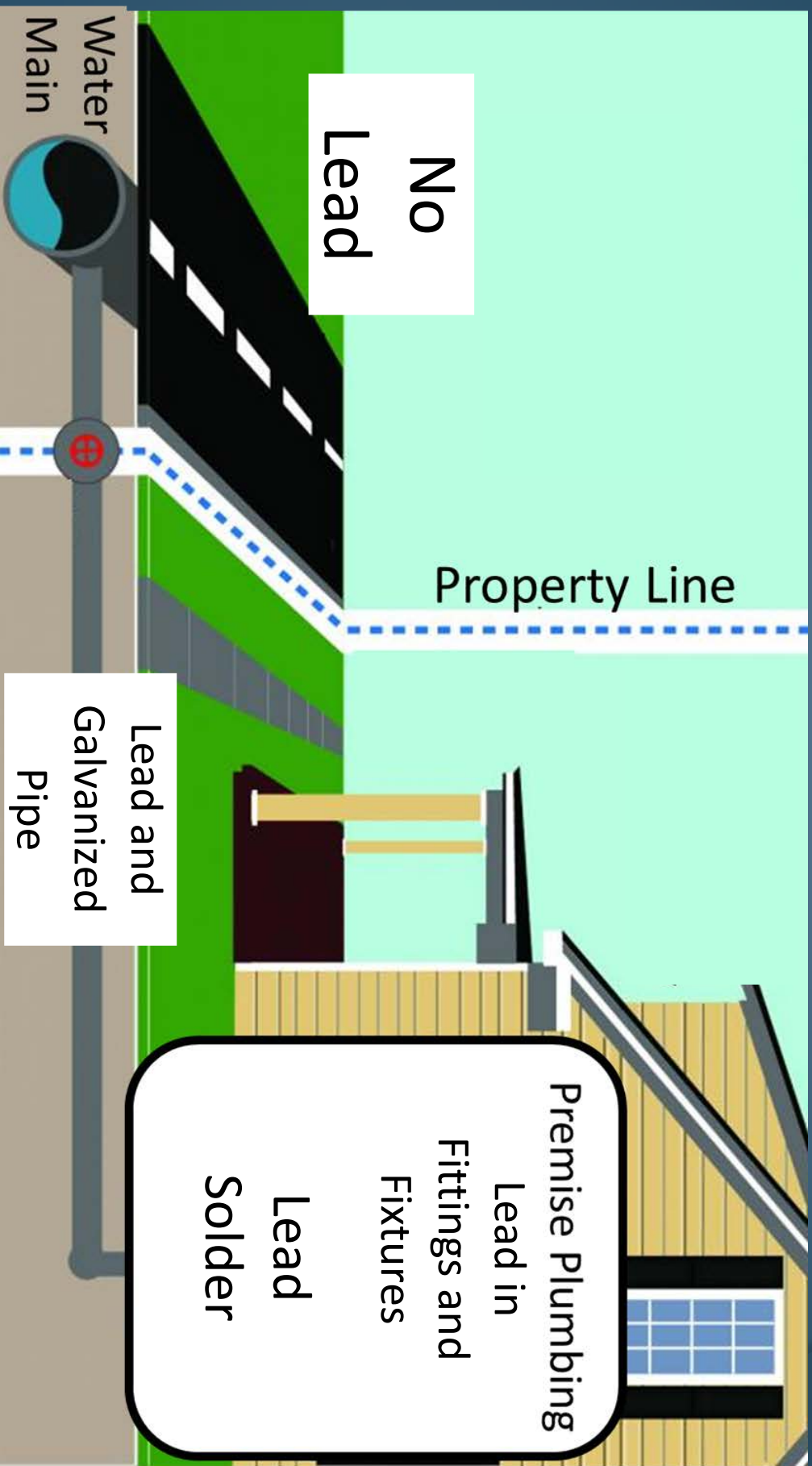


Most tested for lead exposure



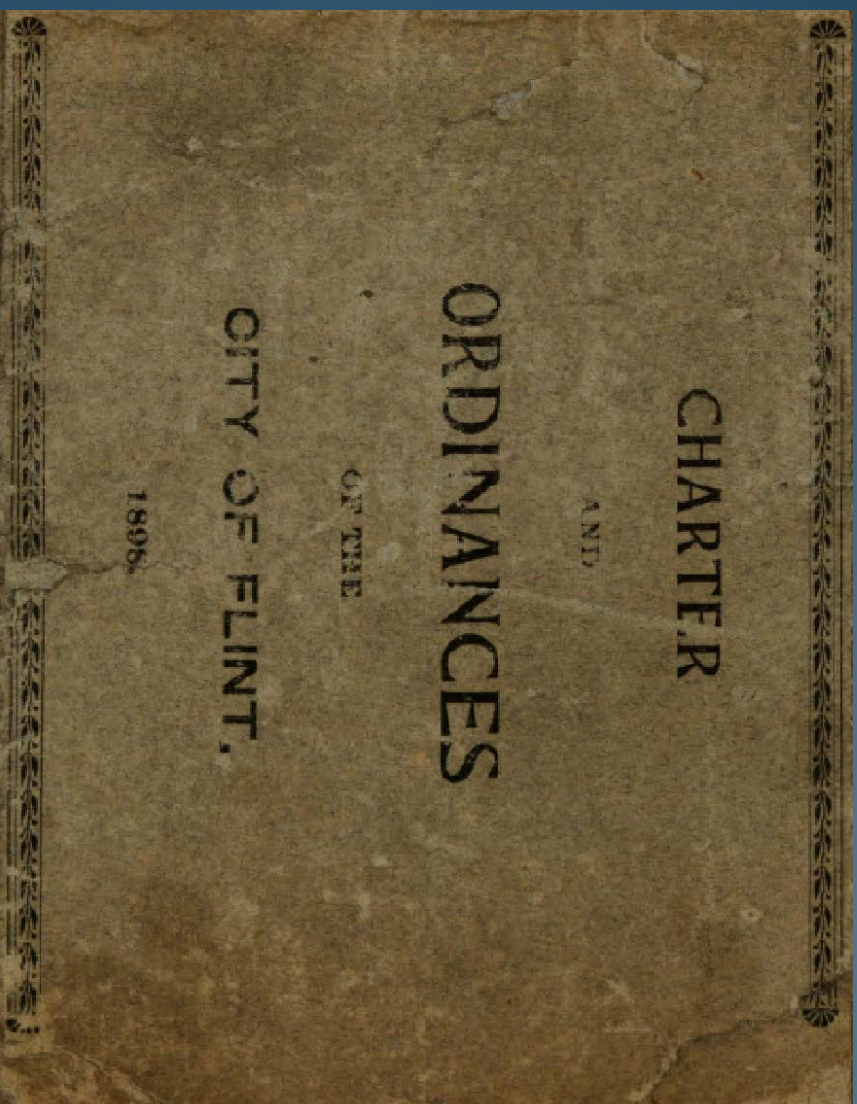
Lifelong exposure

Sources of Lead In Drinking Water



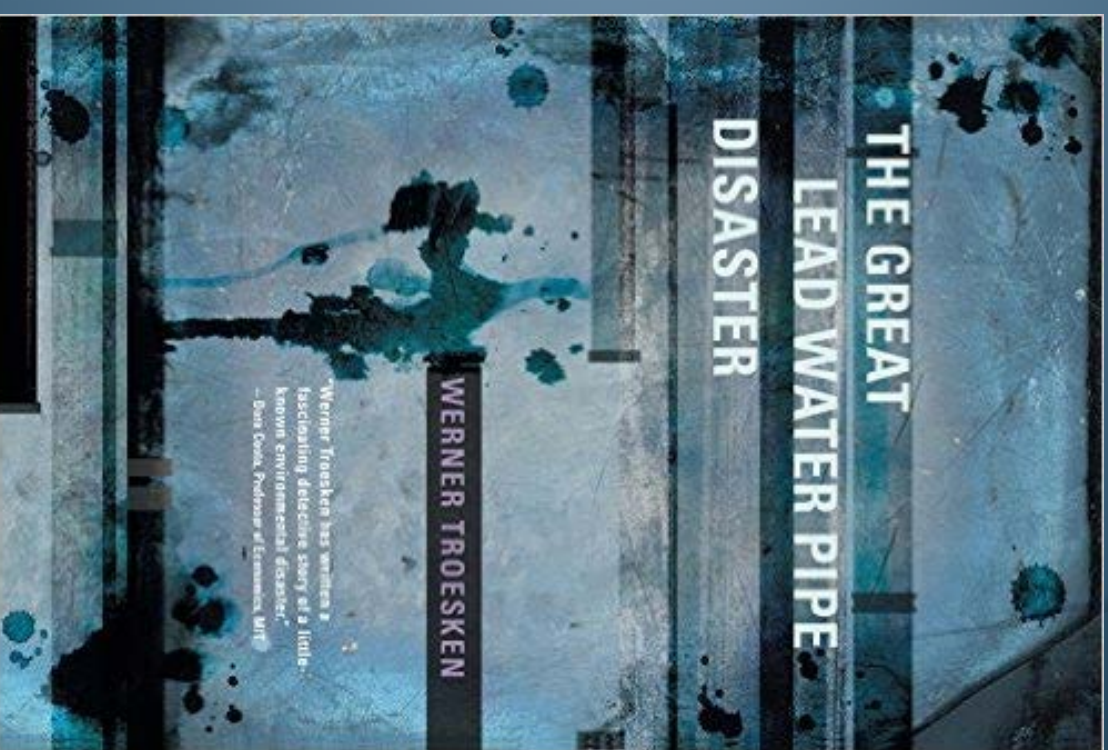
Graphic Adapted from: <http://www.clevelandwater.com/customer-service/protect-your-home/home-tips>

Why lead pipe?



Lead pipe to be used.

SEC. VI. All connections with any water or gas mains shall be made with lead pipe, which,

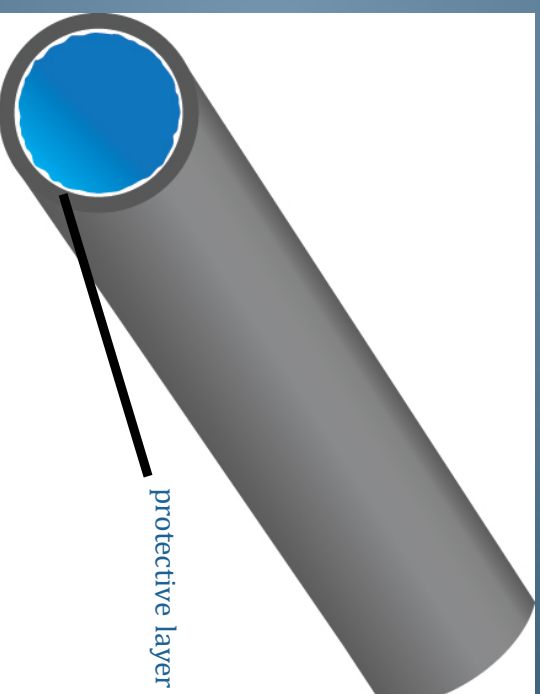


"Werner Troesken has written a fascinating detective story of a little-known environmental disaster."
— Dan Cook, Professor of Environmental Health

Corrosion Control

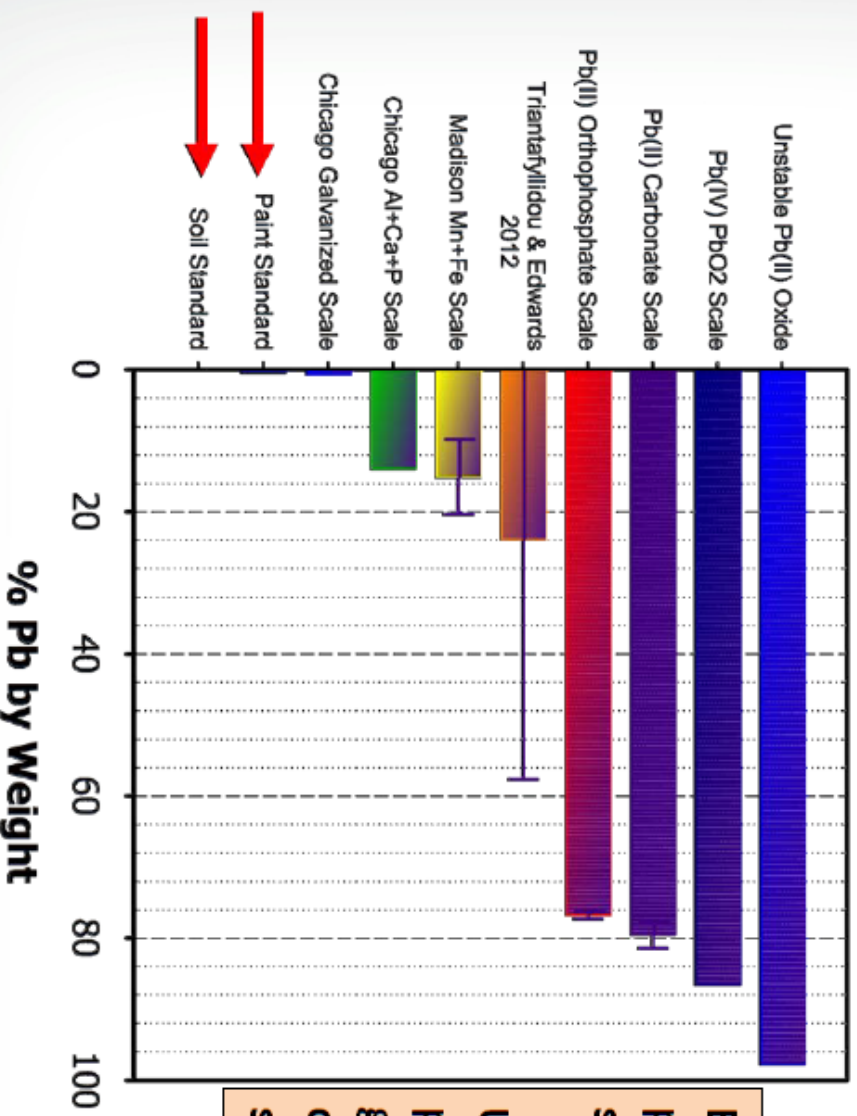
Reduces the Risk of Lead Leaching into Water

- Forms a protective layer inside plumbing materials to reduce lead and other metals from dissolving into the water
- Specific to source water, treatment, and distribution materials
- Corrosion control reduces release of lead in drinking water but does not eliminate risk



Source: Great Lakes Water Authority

Protective Coating and Particulate Lead



Erosion and suspension of particles from pipe corrosion scales and deposits is inevitable. Untimely release of small particles can potentially result in greater relative exposure from drinking water than paint or soils

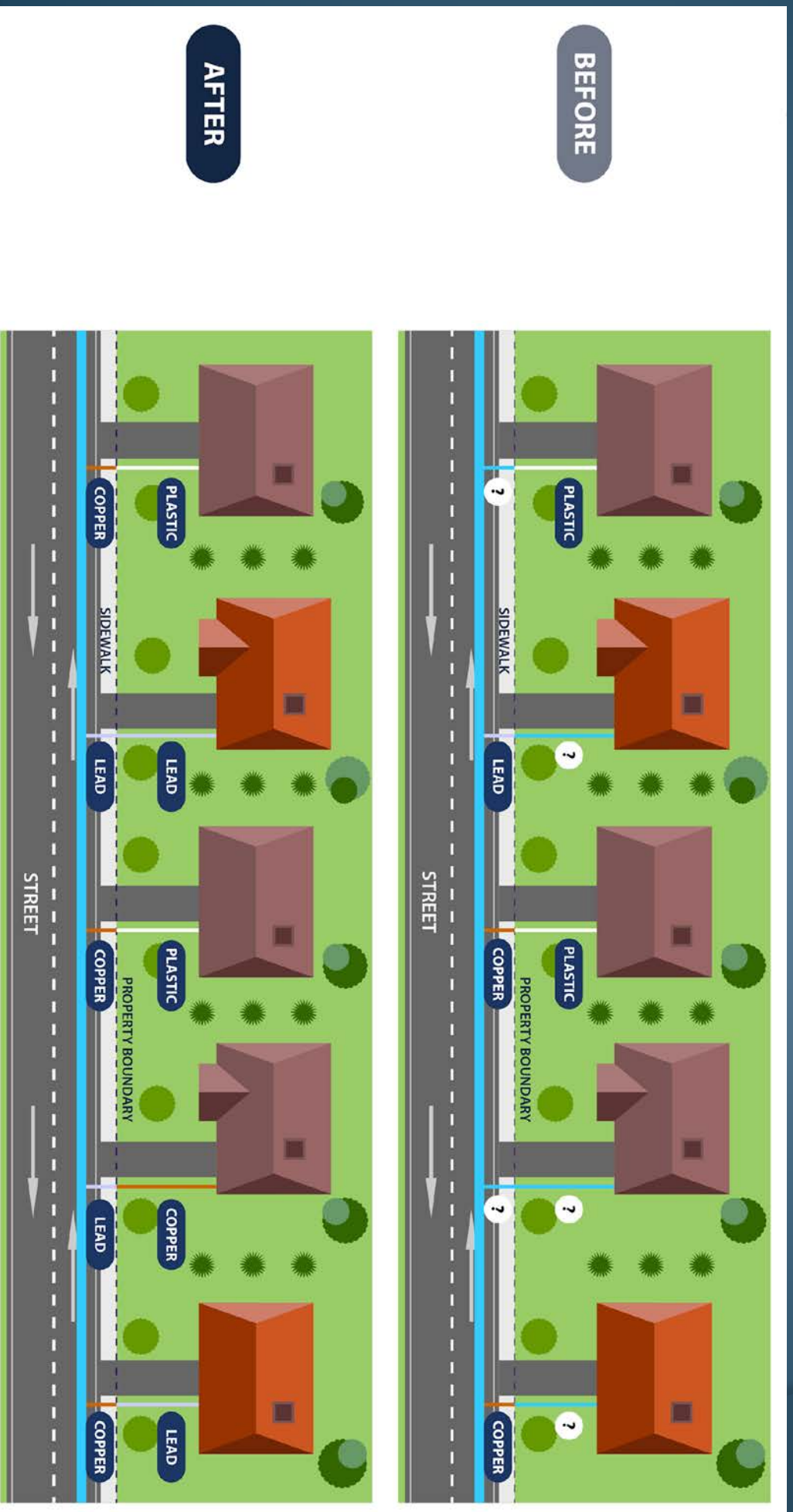
Drinking through lead-painted straws

**WHAT CHANGED WITH
MICHIGAN'S 2018
LEAD AND COPPER RULE?**

Distribution System Materials Inventory Requirements

- Preliminary Distribution System Material Inventory by 1/1/20
 - Based on existing sources of information
- Complete Distribution System Material Inventory By 1/1/25
 - Written notification is only required for homes with a lead service line, or a service line with unknown material.
- Annual Consumer Confidence Report
 - Water systems must provide information regarding the materials in their distribution system in the annual consumer confidence report

Water systems must know the materials of all water service connections by January 1, 2025



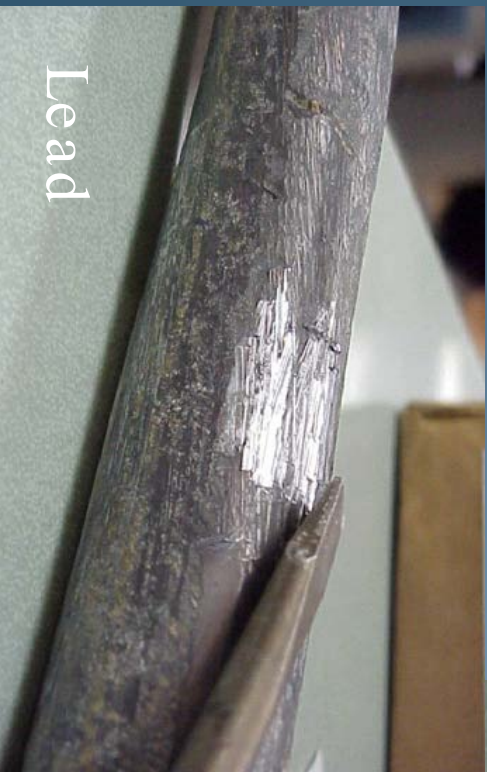
Service Lines



Copper



Galvanized
Steel



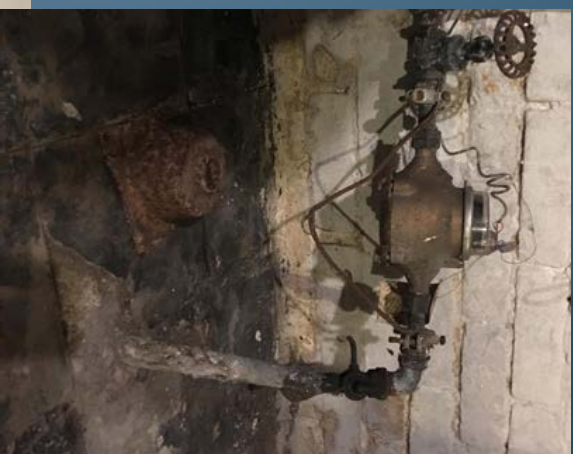
Lead



Plastic

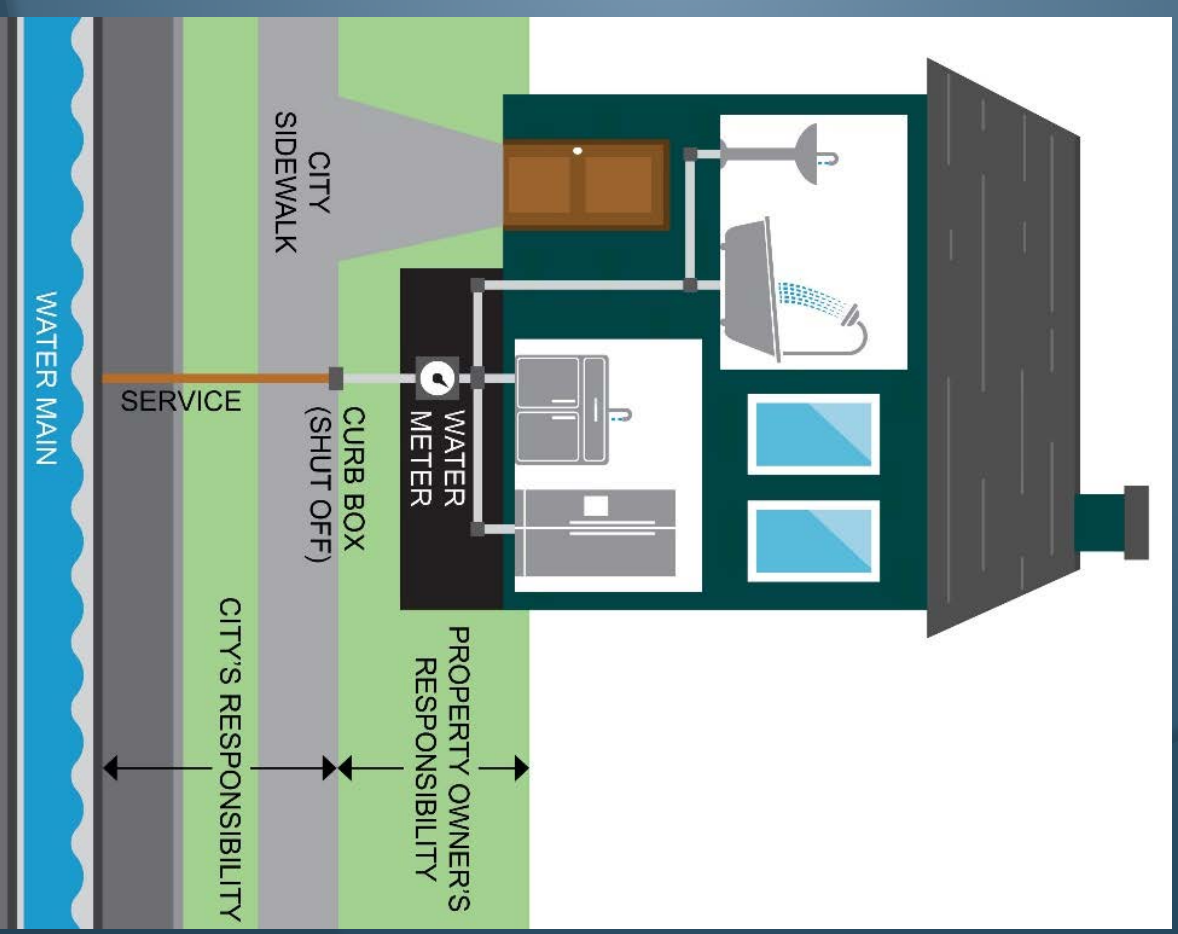
Source: Great Lakes Water Authority

Lead Service Lines



The Michigan LCR Bans Partial Lead Service Line Replacements

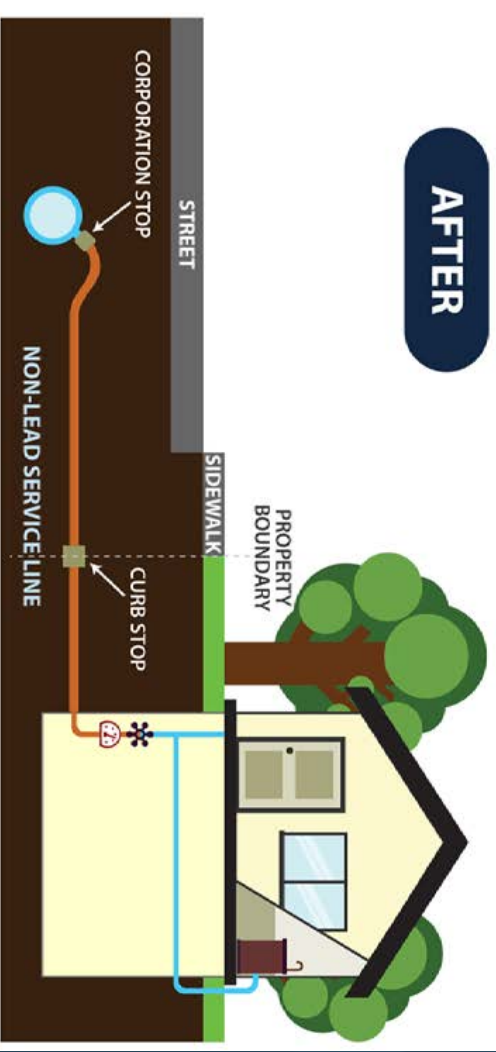
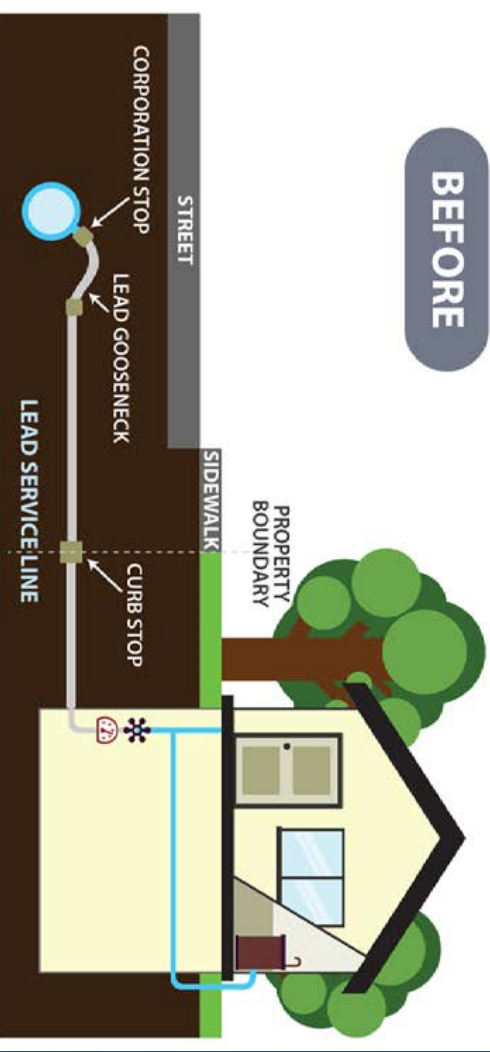
- Partial Replacements Increase Exposure Risk:
 - Cutting lead pipes releases lead particles
 - Construction and excavation can loosen corrosion control coating
 - New connection can create galvanic corrosion
- Large mass of lead still in contact with drinking water
- Costs more to finish replacement at later date



Source: Detroit Water and Sewerage Department

All Lead Service Lines Must Be Removed

- All gone in 20 years
- Largest source of lead in contact with drinking water
- Corrosion control reduces but does not prevent lead exposure
- Particulate lead release and acute exposures can happen at any time
- Removal is the only permanent solution



New Sampling Protocol Measures Higher Risk Water

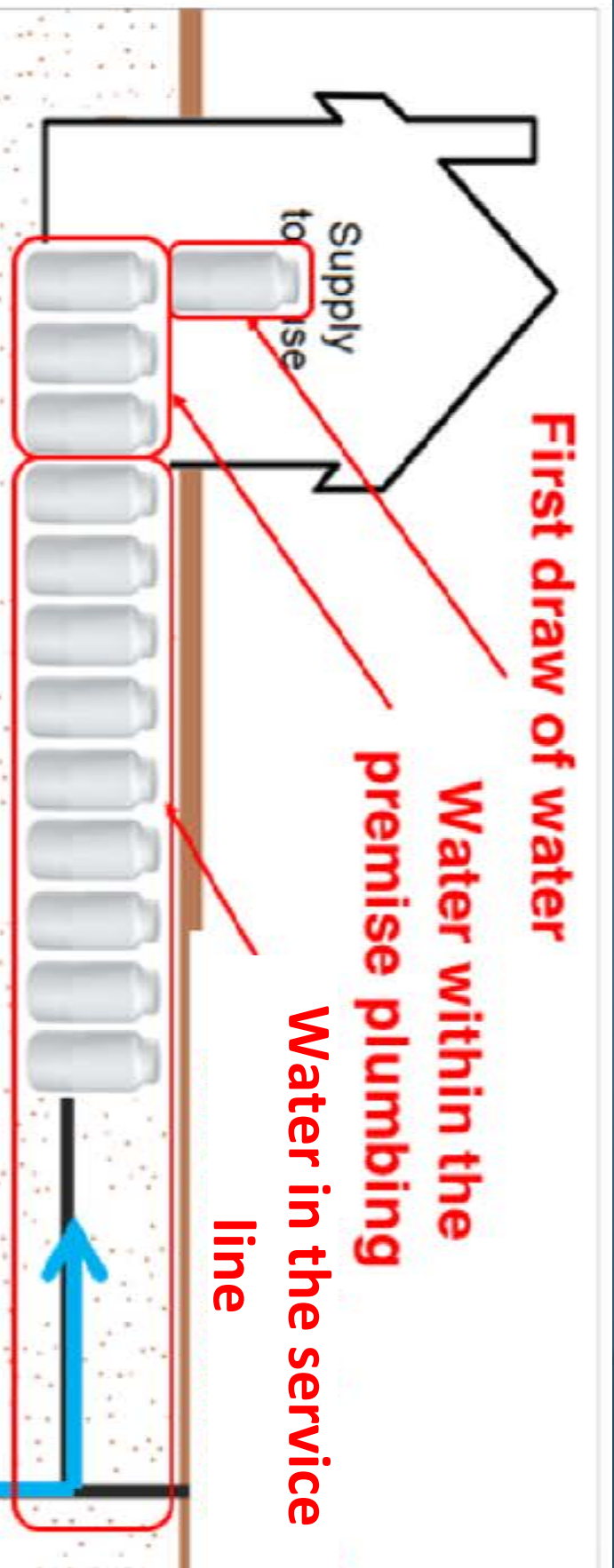
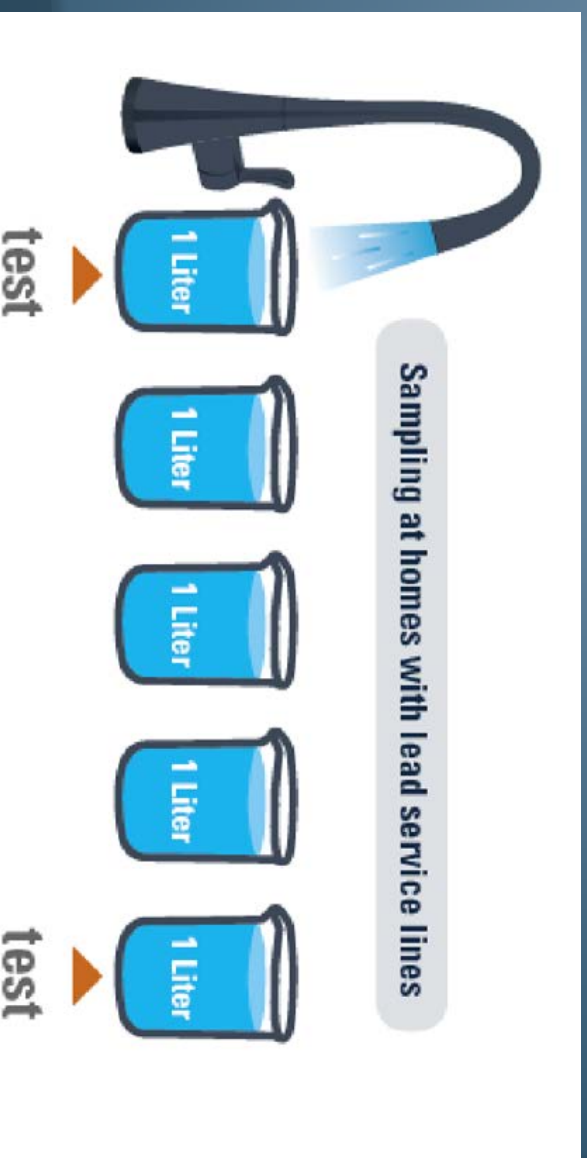
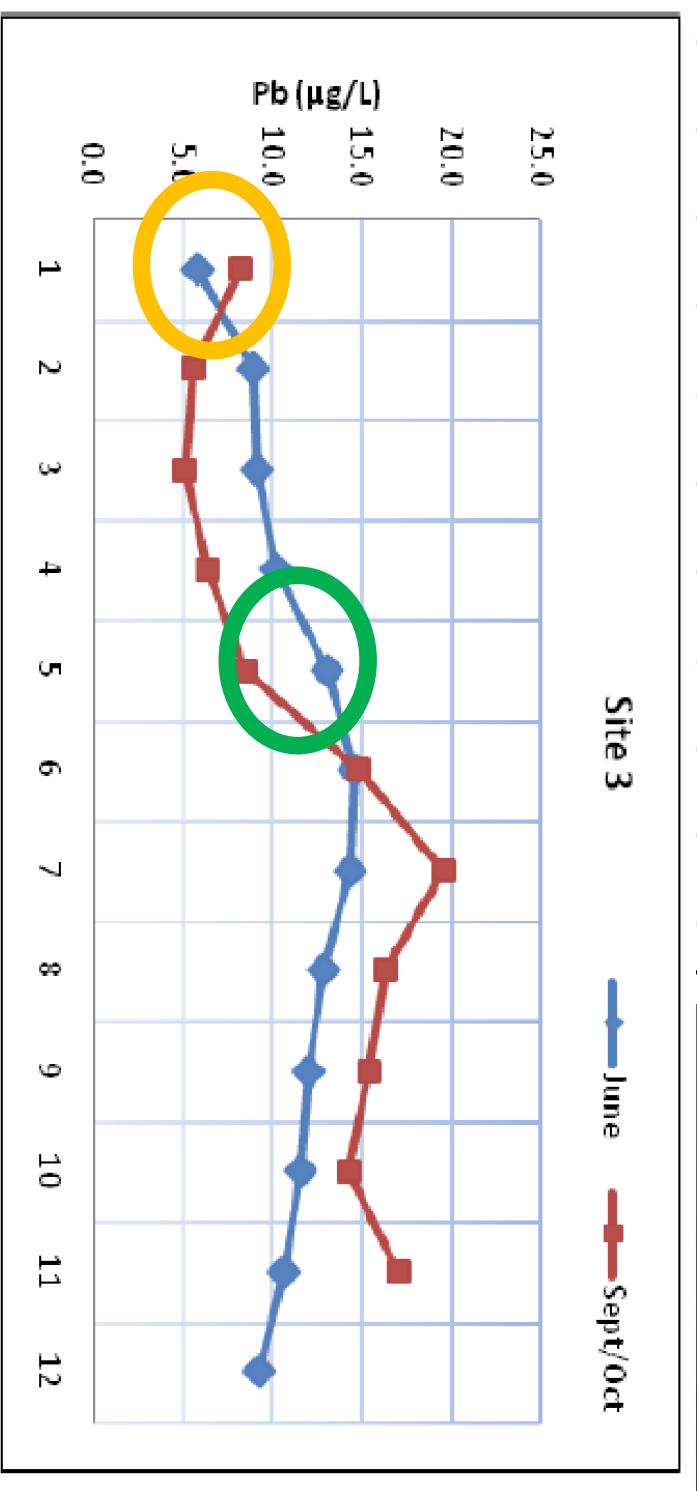
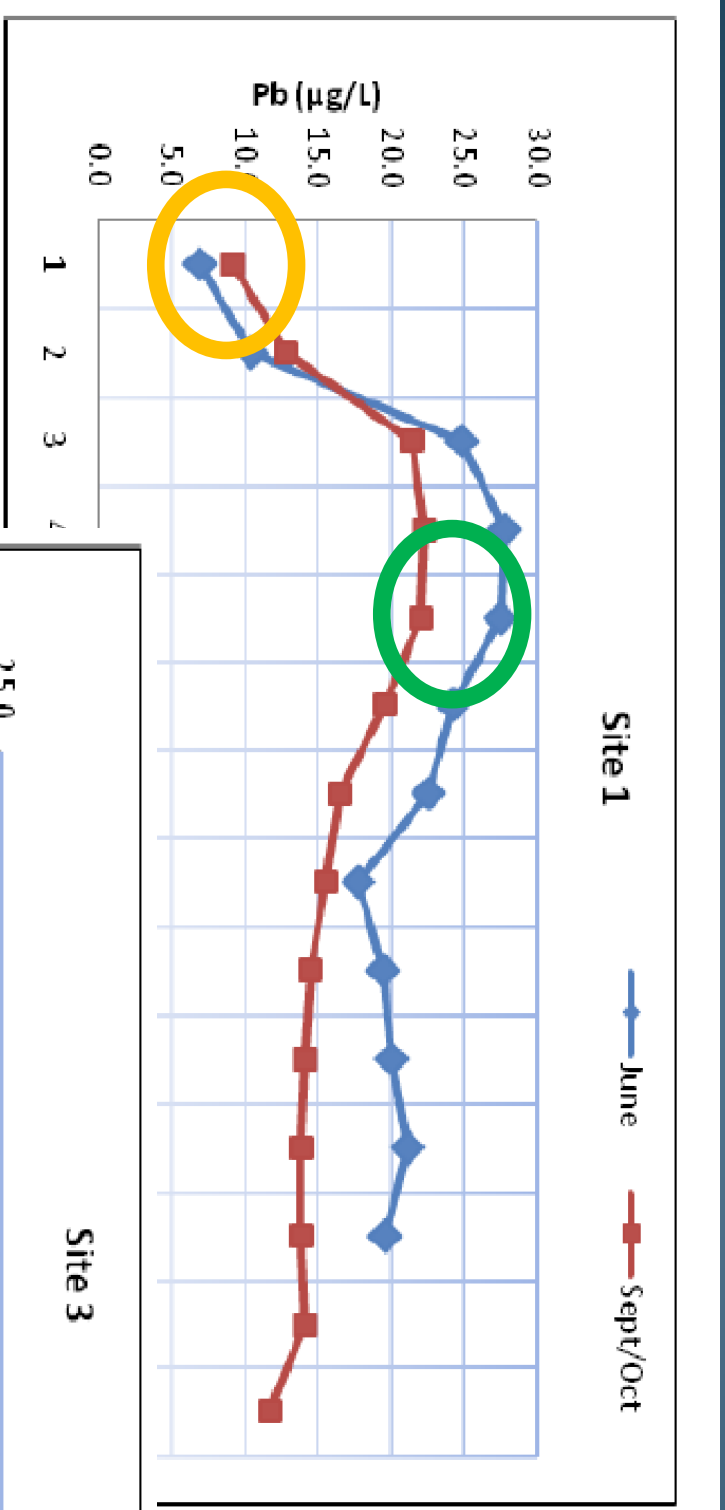


Figure Source: Kelsey Pieper, UNC

Sampling Under the Revised Michigan Lead and Copper Rule



First and Fifth Liter Samples



Source: Del Toral, M. A., A. Porter and M. R. Schock (2013). "Detection and evaluation of elevated lead release from service lines: A field study." *Environmental Science and Technology* 47(16): 9300.

Where are Water Samples Collected?

- If a Michigan water utility has lead service lines, all compliance samples must be collected at lead service line homes.
 - Collect samples from a kitchen or bathroom sink in wide-mouth 1 liter bottles
 - Water should have been motionless for at least 6 hours prior to sampling
 - Aerators should not be removed or cleaned, and tap should not be flushed in anticipation of sampling
- If a water system exceeds the lead action level, it must offer to arrange tap sampling for any customer that requests it

Michigan LCR Corrosion Control and Water Quality Parameters

- More water supplies using corrosion control treatment are required to sample more water quality parameters more frequently compared to the federal rule.

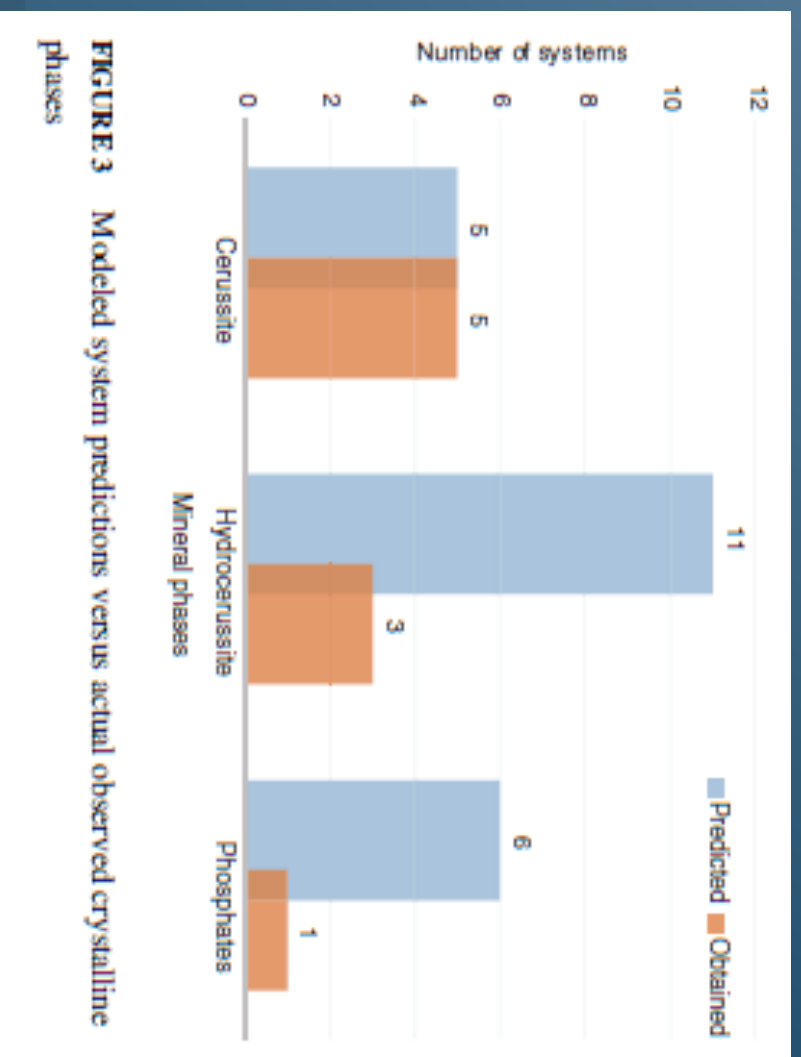
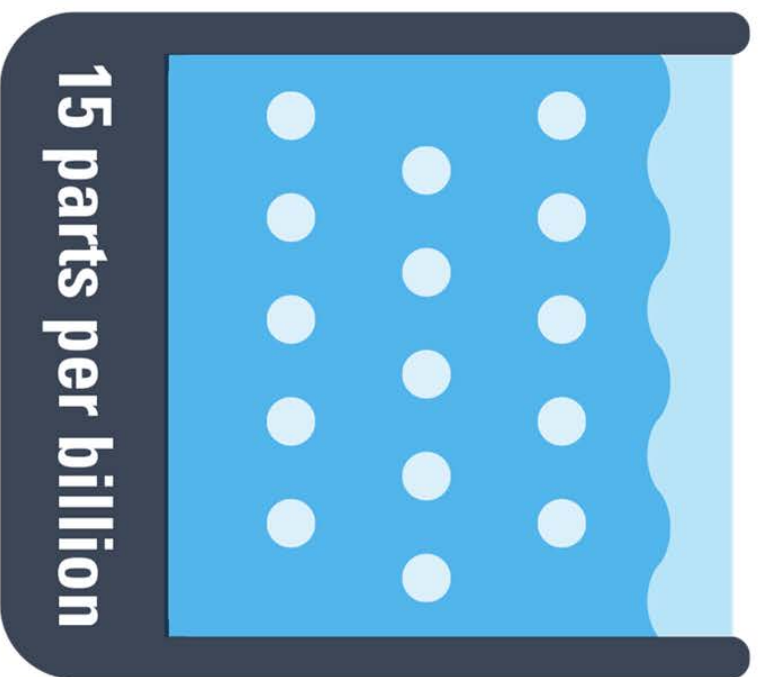


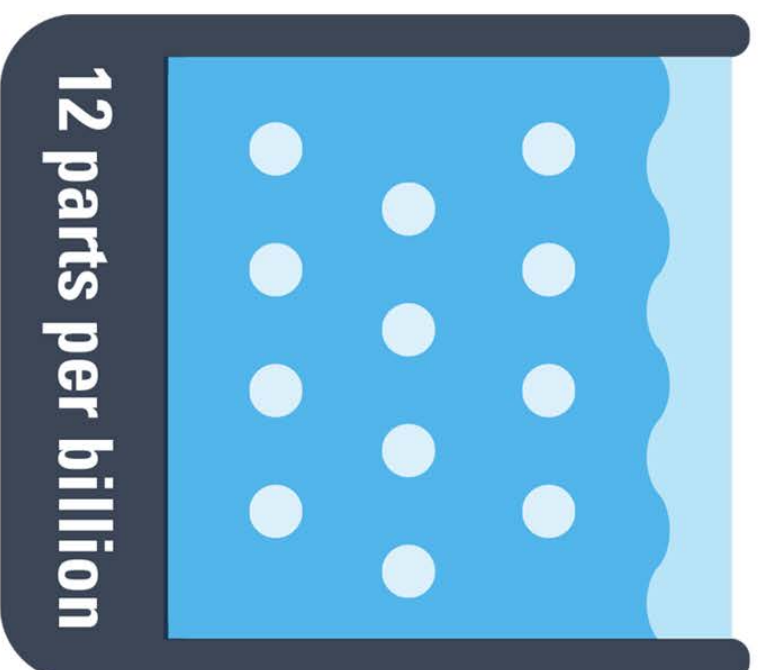
FIGURE 3 Modeled system predictions versus actual observed crystalline phases

Tully J, DeSantis MK, Schock MR. Water quality–pipe deposit relationships in Midwestern lead pipes. AWWA Wat Sci. 2019; e1127. <https://doi.org/10.1002/aws2.1127>

Lower Lead Action Level



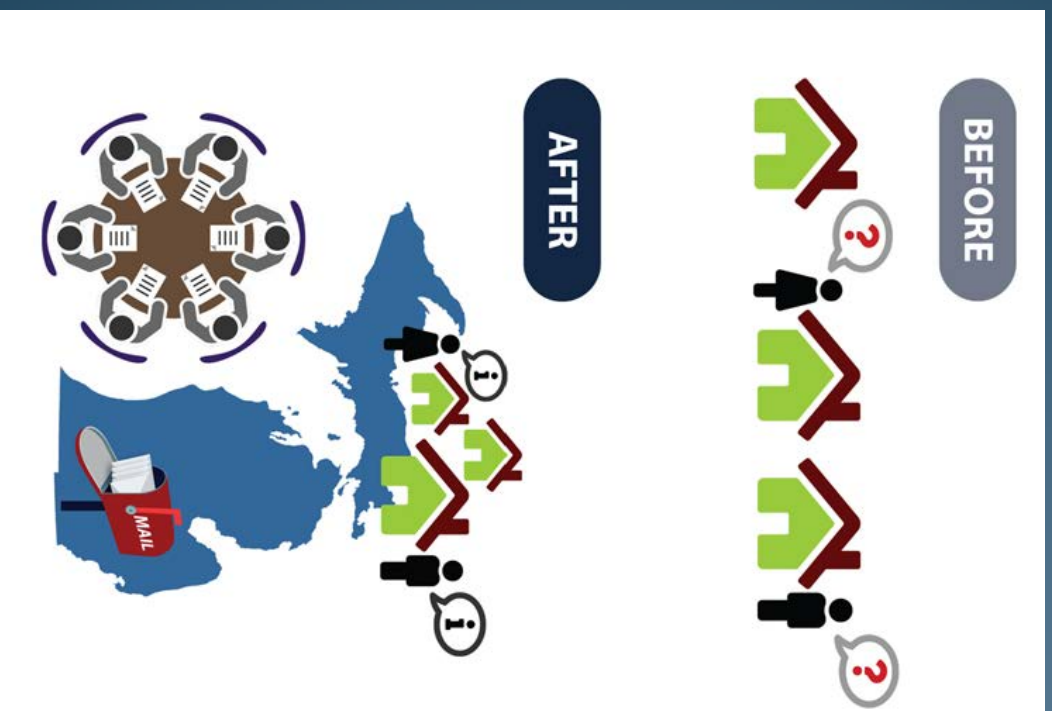
BEFORE



AFTER

Developed by the UM Lead and Copper Rule team with funds provided by the CS Mott Foundation

Transparency, Public Education, and Community Participation



- Notify homes with lead service lines within 30 days of confirming or assuming.
- New, more complete language in Public Education following a lead action level exceedance
- Water systems report range of lead sampling results and service connection data in annual consumer confidence reports
- 20 year lead service line replacement requirement starts on 1/1/2021
- EGLE has established a statewide drinking water advisory council
- Large water systems have established water system advisory councils

The Michigan Lead and Copper Rule Does Not Include:

- Requirements to distribute filters
- Requirements to address individual homes where high lead levels are measured in the water
- Requirement to evaluate corrosion control when making a source water or treatment change



Takeaways

- Lead is a potent neurotoxin with no safe level of exposure. Children and pregnant women are particularly vulnerable.
- Michigan's LCR revisions require water systems to be more proactive and transparent about lead in drinking water, but residents need to pay attention and hold water systems accountable.
- The Michigan Lead and Copper Rule is more protective than the federal rule because it requires removal of full lead service lines, improved outreach, and improved monitoring.