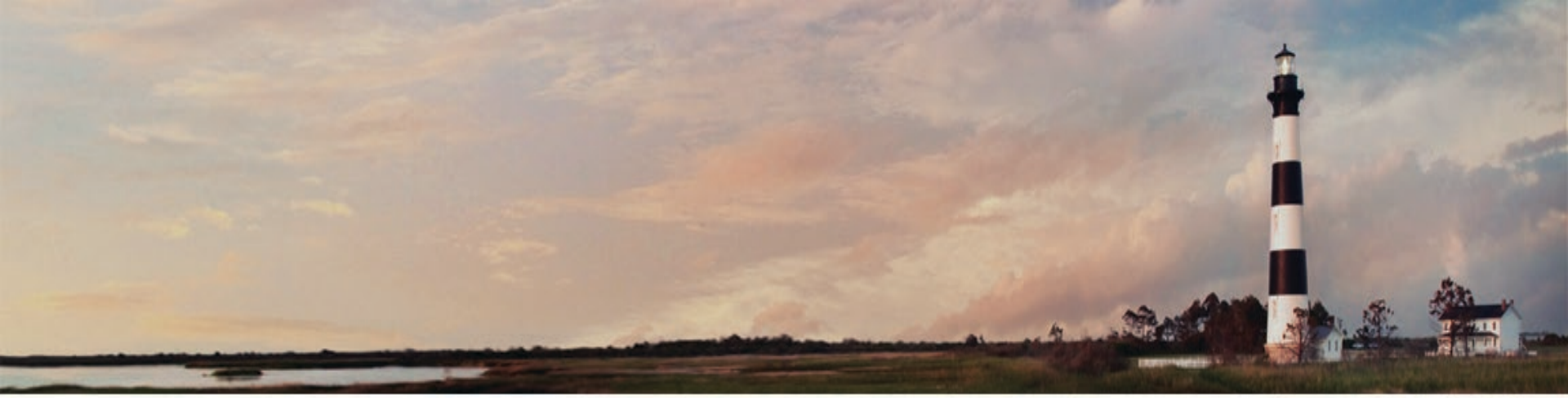

Lead Service Line Inventory Workshop

Public Water Supply Section

Workshop Overview

1. Classifying Service Lines
2. Investigation Methodology
3. Tracking the Inventory
4. Public Accessibility Requirements

Get the Lead Out!

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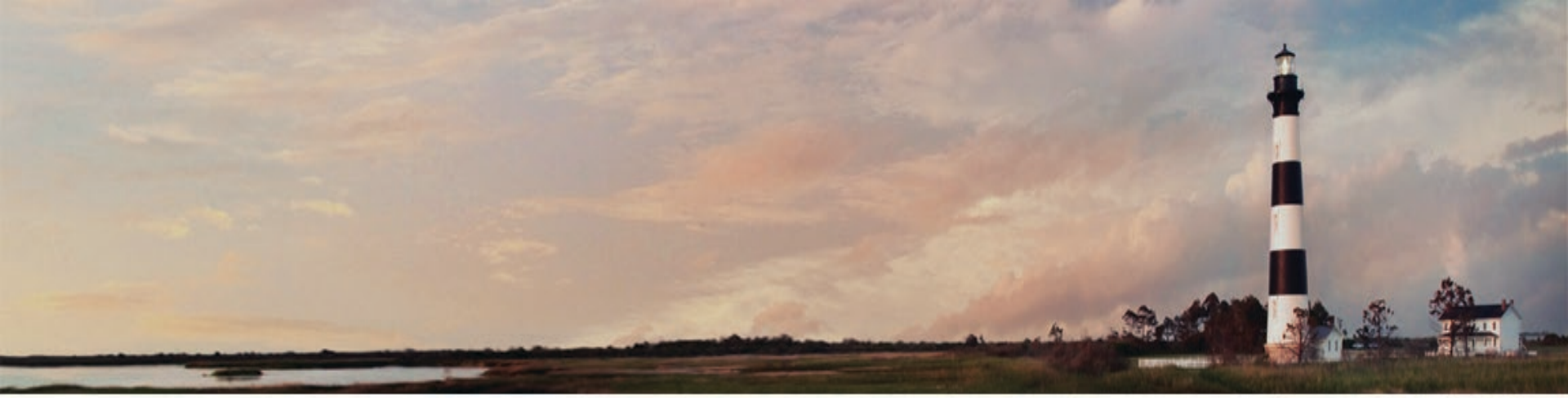
General Inventory Requirements

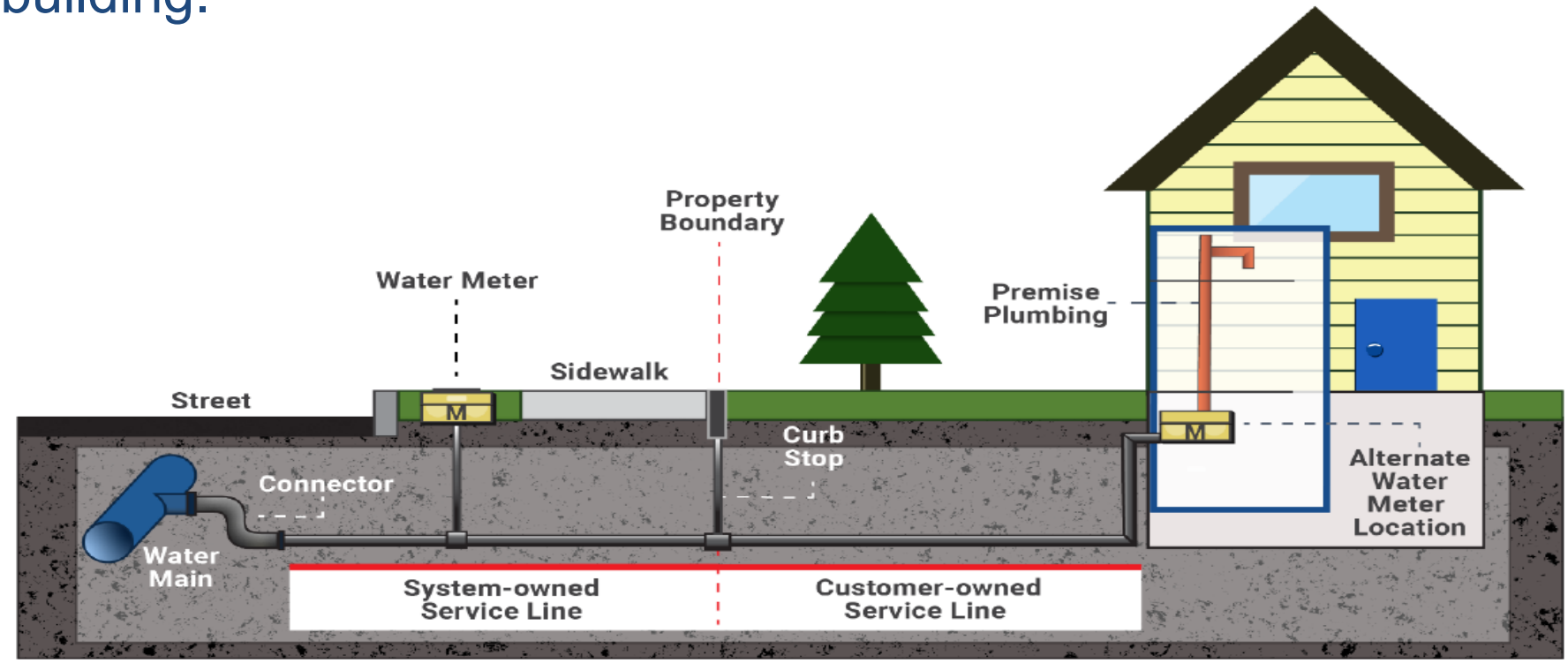
- All **Community (CWS)** and **Non-transient, Non-community (NTNC)** water systems must complete an initial inventory of service line materials in their distribution system (Lead Service Line Inventory).
- Initial Lead Service Line Inventories are due by **October 16th, 2024**.



Classifying Service Lines

Service Line Definition

- The pipe connecting the water main to the interior plumbing in a building.



- The service line may be owned only by the water system or customer or split between the water system and the customer.

Classification Requirements

- ALL service line connections must be included regardless of ownership status.
- Include service lines intended for non-potable uses such as fire suppression.

Classifying Entire Service Line

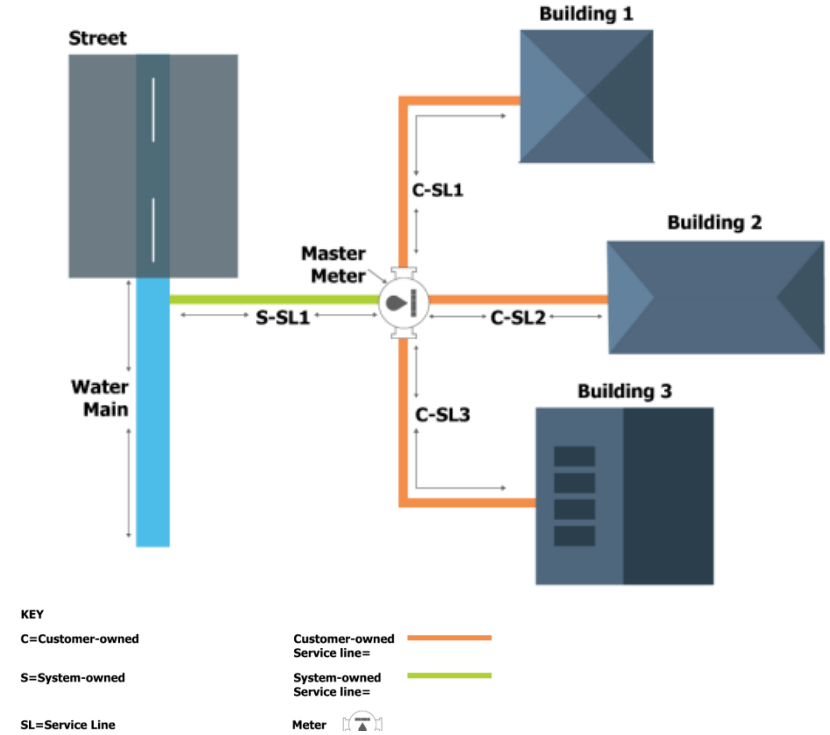
Classification of Entire Service Line When Ownership is Split		
System-Owned Portion	**Customer-Owned Portion**	**Classification for Entire Service Line**
Lead	Lead	Lead
Lead	Galvanized Requiring Replacement	Lead
Lead	Non-lead	Lead
Lead	Lead Status Unknown	Lead
Non-lead	Lead	Lead
Non-lead and never previously lead	Non-lead, specifically galvanized pipe material	Non-lead
Non-lead	Non-lead, material other than galvanized	Non-lead
Non-lead	Lead Status Unknown	Lead Status Unknown
Non-lead, but system is unable to demonstrate it was not previously Lead	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Lead	Lead
Lead Status Unknown	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Non-lead	Lead Status Unknown
Lead Status Unknown	Lead Status Unknown	Lead Status Unknown

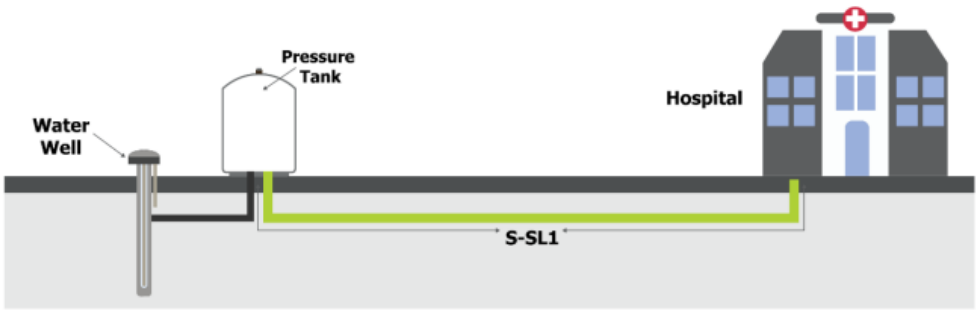
Source: *Exhibit 2-3 of Guidance for Developing and Maintaining a Service Line Inventory (USEPA, 2022).*

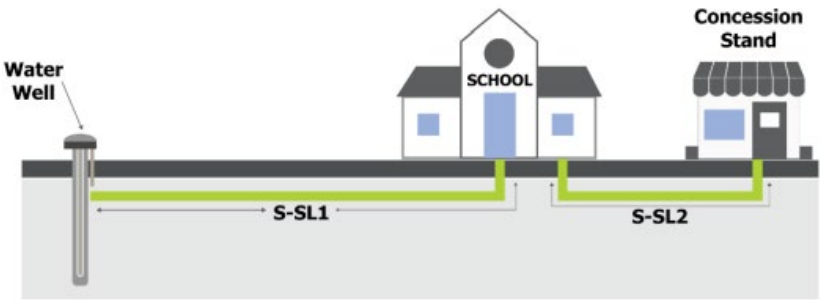
Classifications for Small Systems

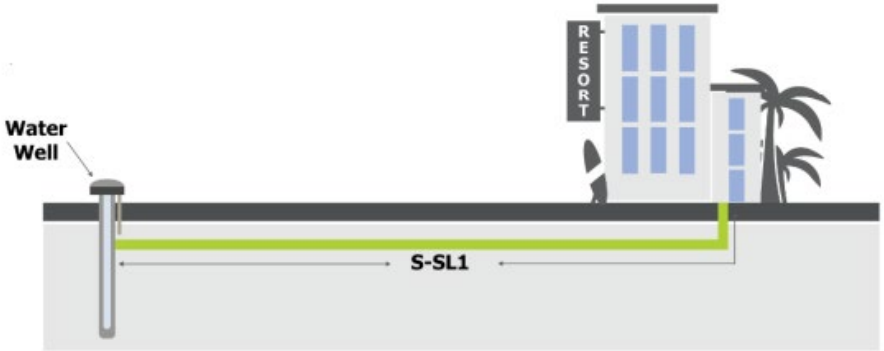
- If your system owns the entire service line, use the same material classification for both “System-Owned” and “Customer-Owned”.
- EPA released simplified guidance tailored to small CWSs and NTNC systems

Examples of Small Systems









KEY

NTNCWS=Non-transient non-community water system

S=System-owned

SL=Service Line

System-owned Service line=

Meter

Pressure Tank

Well

9

Category Overview

- Classifications must be:
  - Lead
  - Galvanized Requiring Replacement (GRR)
  - Non-lead
  - Unknown (Lead Status Unknown)

Plastic | Scratched Lead | Copper | Galvanized Steel & valve

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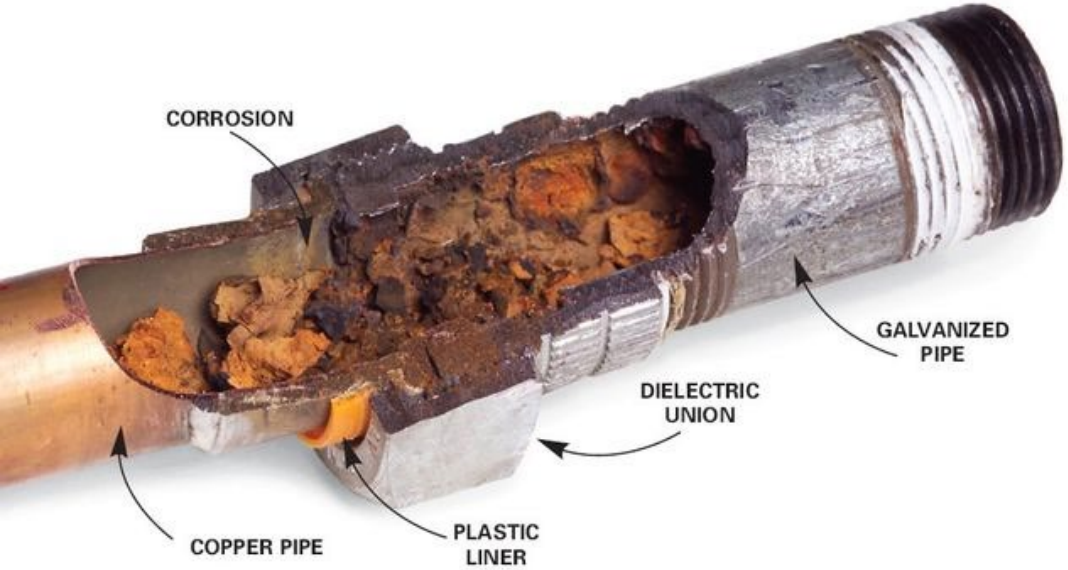
Lead

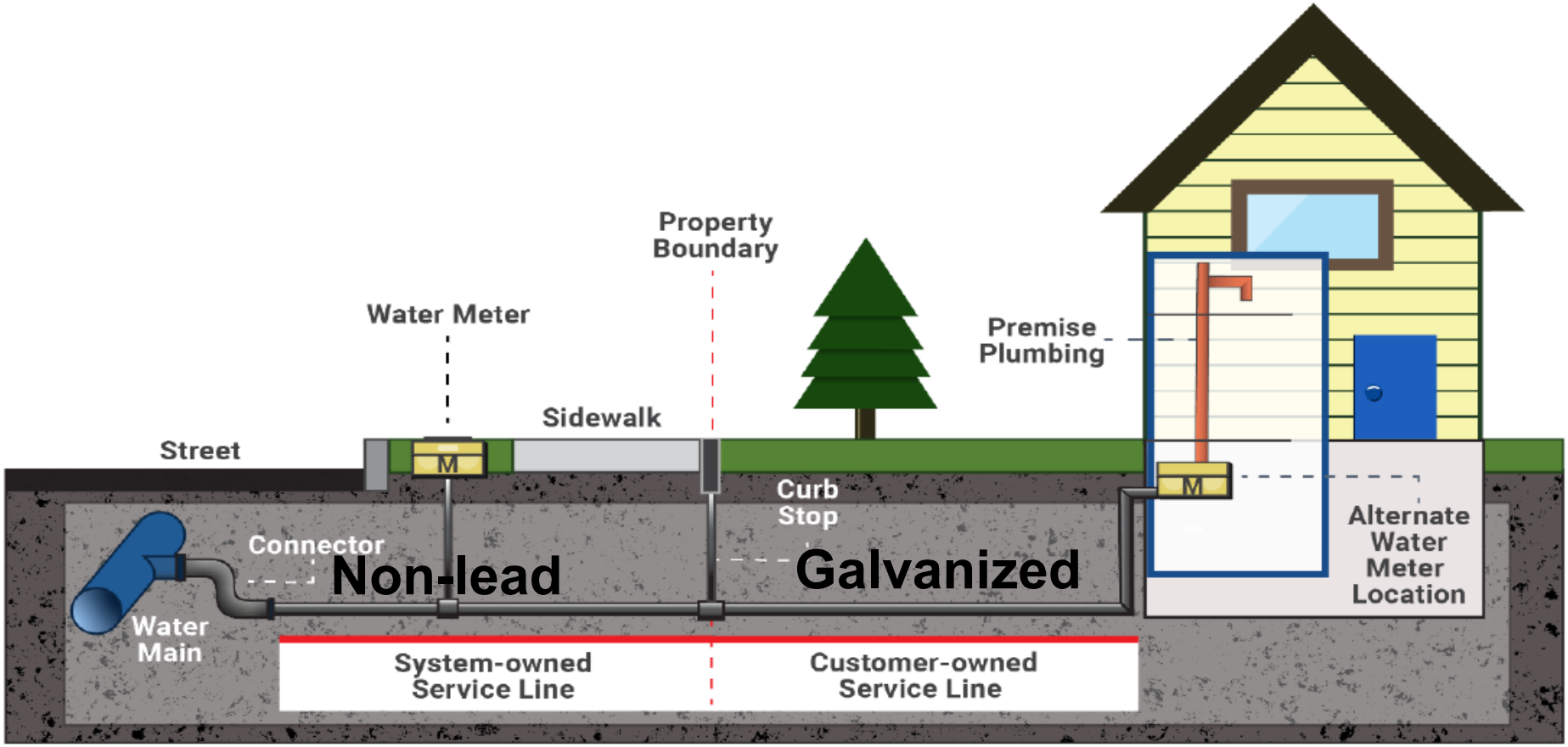
- If any portion of the service line is made of **lead**, it is a **Lead Service Line**.

Galvanized Requiring Replacement

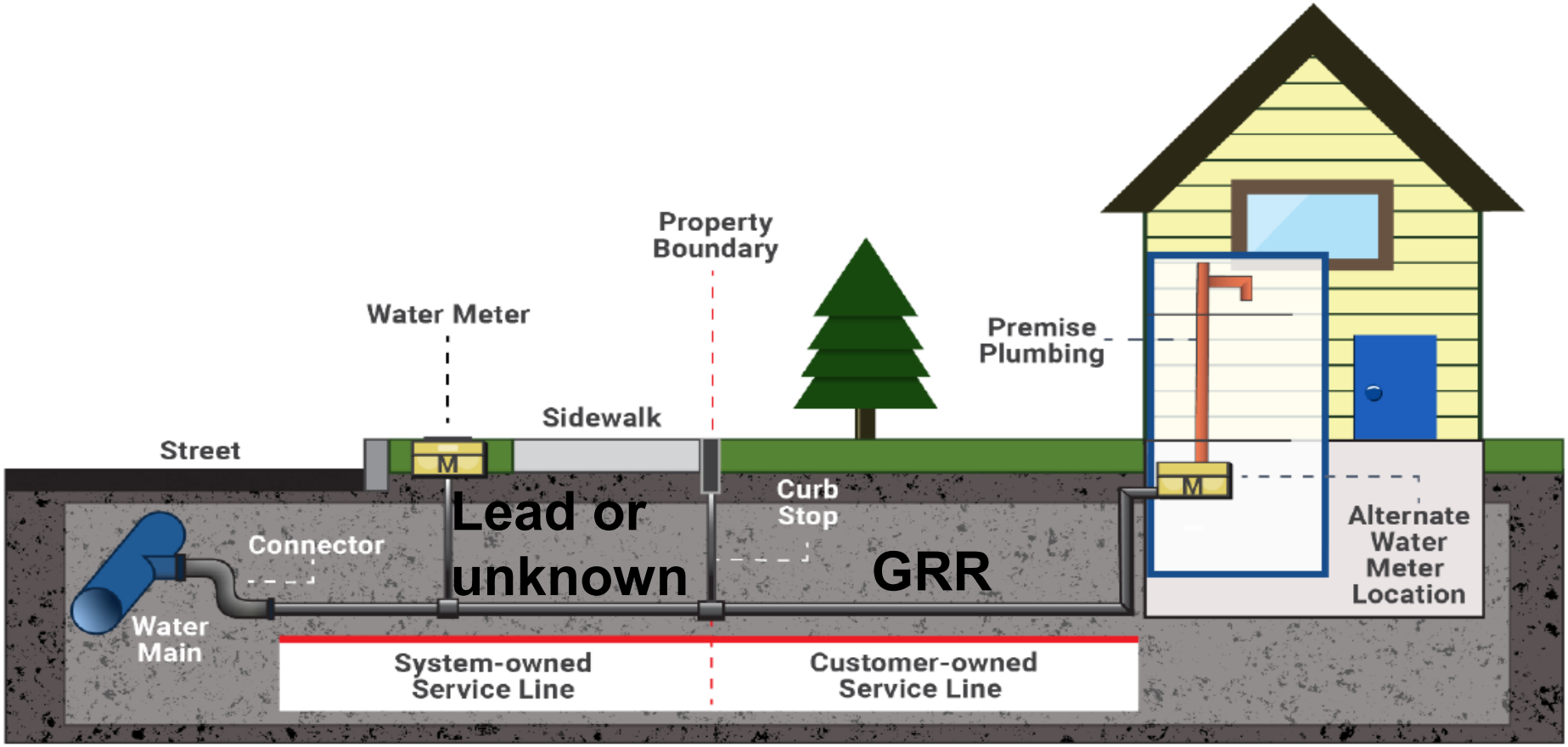
- If a **galvanized service line** is or ever was downstream of a **lead** service line or is currently downstream of an **unknown** service line, then the service line is **Galvanized Requiring Replacement**.
- If the water system is unable to prove that the galvanized service line was never downstream of a lead service line, then it must assume there was an upstream lead service line.



Galvanized Requiring Replacement



Galvanized Requiring Replacement



Non-Lead

- The service line is determined through an evidence-based record, method, or technique that it is not lead or GRR, then it is a **Non-lead Service Line**.
- "Non-lead" refers to the service line material only.
- Non-lead options on template:
  - Galvanized
  - Non-lead - Plastic
  - Non-lead - Copper
  - Non-lead - Other

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Unknown

- If the service line material is not known to be a lead, GRR, or non-lead service line, then it is a **Lead Status Unknown Service Line**.
- Unknown options on template:
  - Unknown – Likely Lead
  - Unknown – Unlikely Lead
  - Unknown – Lead Status Unknown

Goosenecks, Pigtails, & Connectors

- Lead goosenecks, pigtails, or connectors do not count towards lead service lines or GRR service lines for inventory purposes.
- Lead goosenecks, pigtails, or connectors are eligible for funding.

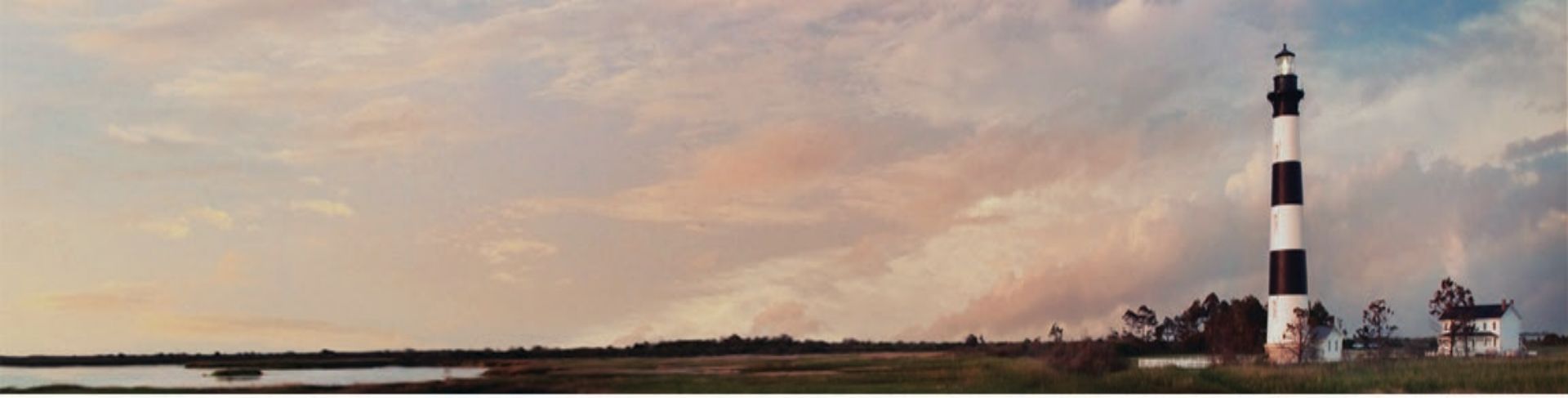
Procedure for Replacing Goosenecks, Pigtails, or Connectors

- The water system must replace any lead gooseneck, pigtail, or connector it owns when encountered.
- The water system must offer to replace a customer-owned lead gooseneck, pigtail, or connector, but is not responsible for the cost.
  - The water system is not required to replace a customer-owned gooseneck, pigtail, or connector if the customer objects.
- After replacing a gooseneck, pigtail, or connector attached to a lead service line, the water system must follow risk mitigation procedures.

Lead Service Line Replacement Plan

All water systems with one or more lead, GRR, or unknown service line in their distribution system must submit a lead service line replacement (LSLR) plan by **October 16th, 2024**.**

**Subject to change with LCRI.



Investigation Methodology

Stepwise Approach

Preliminary Records Review

- Local plumbing code history to determine when Pb was last used

Community Records

- Service line installation/maintenance records
- Plumbing permits
- Property tax records
- Meter installation records

On-site Basic/Visual Examination

- Resident survey with photos
- Repairs and meter inspection
- Partners, such as plumbers and non-water utilities

Specific Water Analysis

- Flushed samples
- Targeted service line
- Sequential/profile samples

Excavation

- Mechanical
- Vacuum

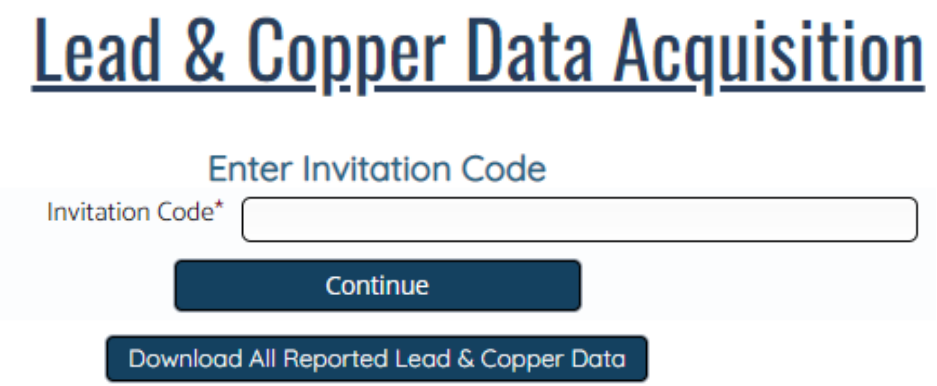
Historical Records Review

Required by the Lead & Copper Rule Revision:

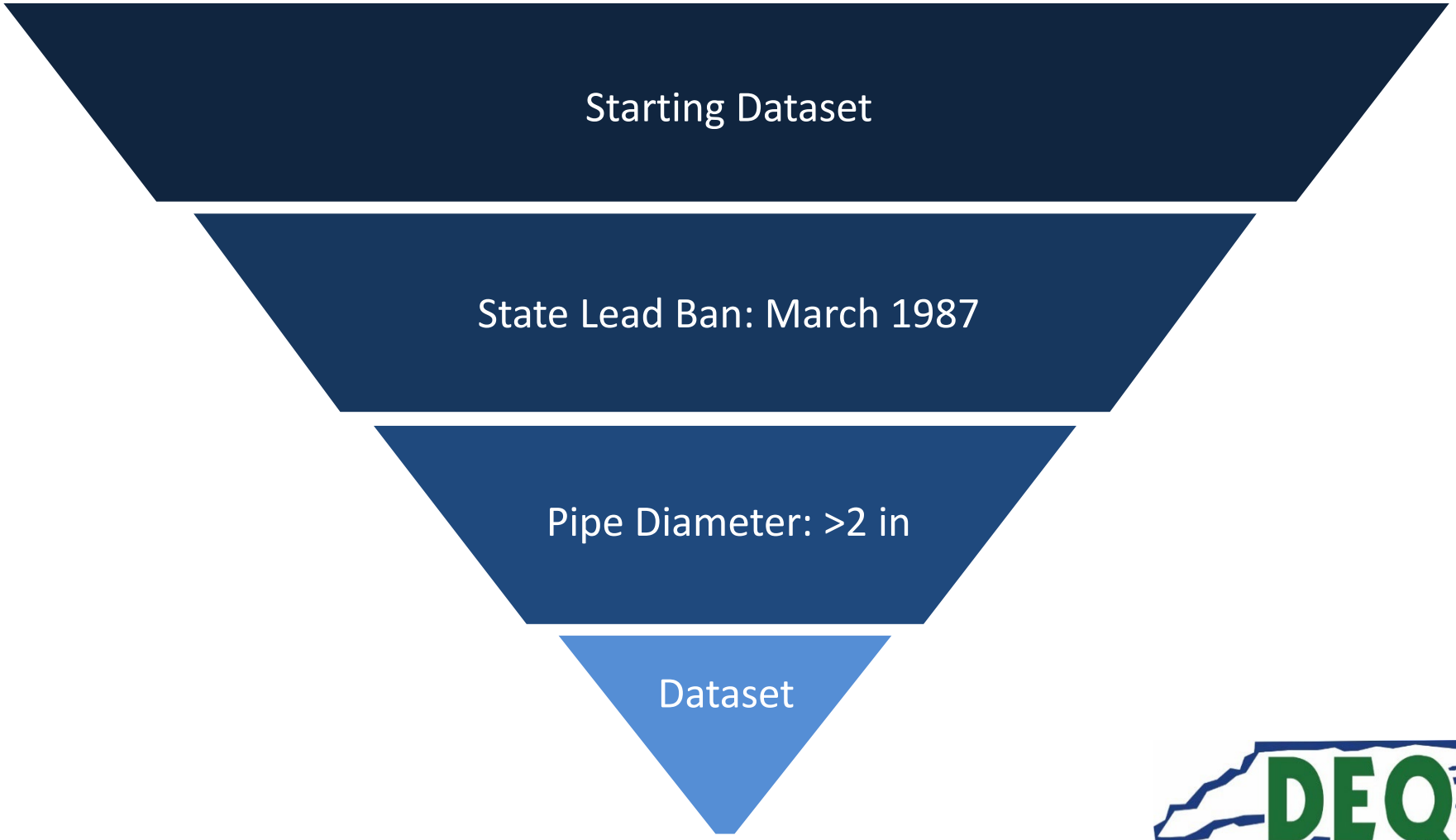
1. Previous Materials Evaluation
2. Construction Records and Plumbing Codes
3. Water System Records
4. Distribution System Inspections and Records

Previous Materials Evaluation

- Access through the Lead & Copper Data Acquisition Tool.



Construction and Plumbing Codes and Records



Water System Records

Type of Water System Record Required under the LCRR[1]	Relative information	Possible Formats
Distribution system map and drawings	Date of construction of different parts of the distribution system may help inform when and where LSLs were used.	Hard copy maps, digital maps, or web-based map applications
Historical records on each service connection	Detailed information on service line material, location, and size.	Ledgers, cards (*e.g.*, tap cards or drill records), or databases
Meter installation records	May contain the service line material. Meter size and/or type can indicate service line size or building usage.	Water system files and records
Historical capital improvement or master plans	Historical installation patterns may help inform when LSLs were used.	Archived report or electronic document
Standard operating procedures	Allowable materials for construction of service lines and for service line repairs.	Specifications and standards used by the water system

[1]Each type of water system record must be reviewed to develop the initial inventory (40 CFR §141.84(a)(3)).

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Distribution System Inspections and Records

- Verify construction and water system records
- Could include:
  - Water system responses to customer complaints
  - Inspections to locate leaks
  - Inspections to investigate meter issues

Historical Records Review

Cost

Low — Medium

Property Impact

None

Resident Impact

None

Skill Required

Low — Medium

Time

Medium

Accuracy

Low — High

Recommended Methodology

Water systems can use one or more of the following methods to verify service line material after the historical records review:

1. Visual inspection of the service line material.
2. Water quality sampling.
3. Excavation.

Visual Inspection

Conducted through:

- Customer Surveys.
  - Include photo verification.
  - Customer uses a scratch test/magnet test.
- System staff visually inspecting service line material at meter box.
- Partnering with plumbers and other utilities who may have access to the service line.

Visual Inspection

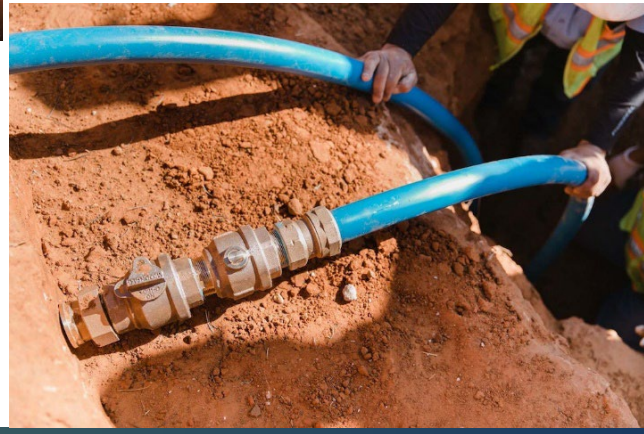
Common service line materials

Lead

Copper

Galvanized

Plastic



Visual Inspection

Cost

Low

Property Impact

None

Resident Impact

Low

Skill Required

Low

Time

Low

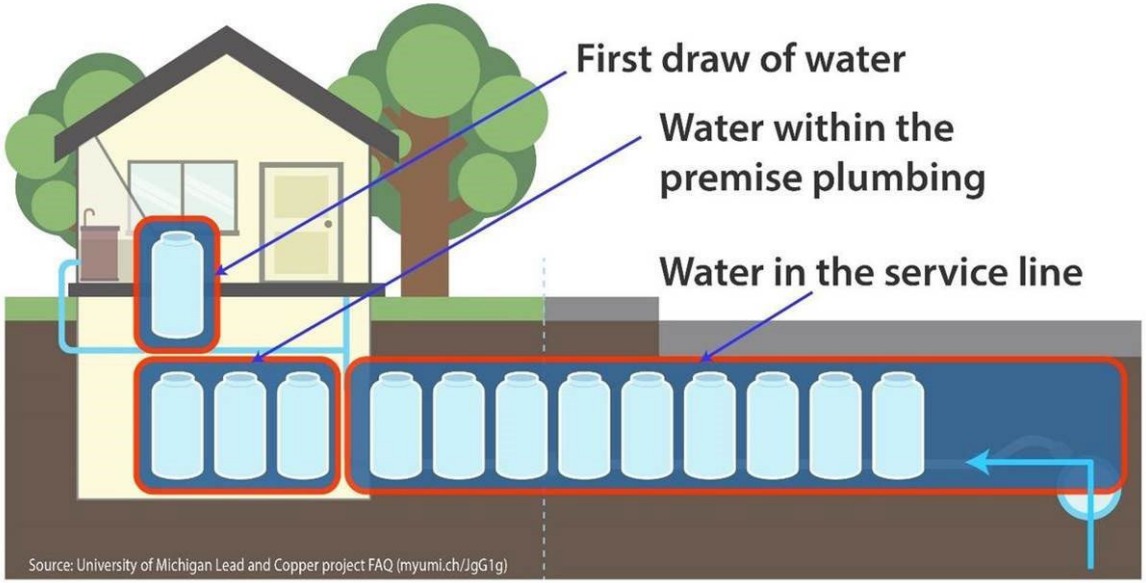
Accuracy

Medium

High

Water Quality Sampling

- Targeted sampling
  - By flushing the water in the premise plumbing and collecting and analyzing a sample from the service line.
- Flushed sampling
  - By collecting a sample from the customer's tap after a set flushing time.
- Sequential sampling
  - Using a series of consecutive samples collected from an interior tap after a stagnation period.



Water Quality Sampling

Cost

Low — Medium

Property Impact

None

Resident Impact

Low — High

Skill Required

Low — Medium

Time

Medium

Accuracy

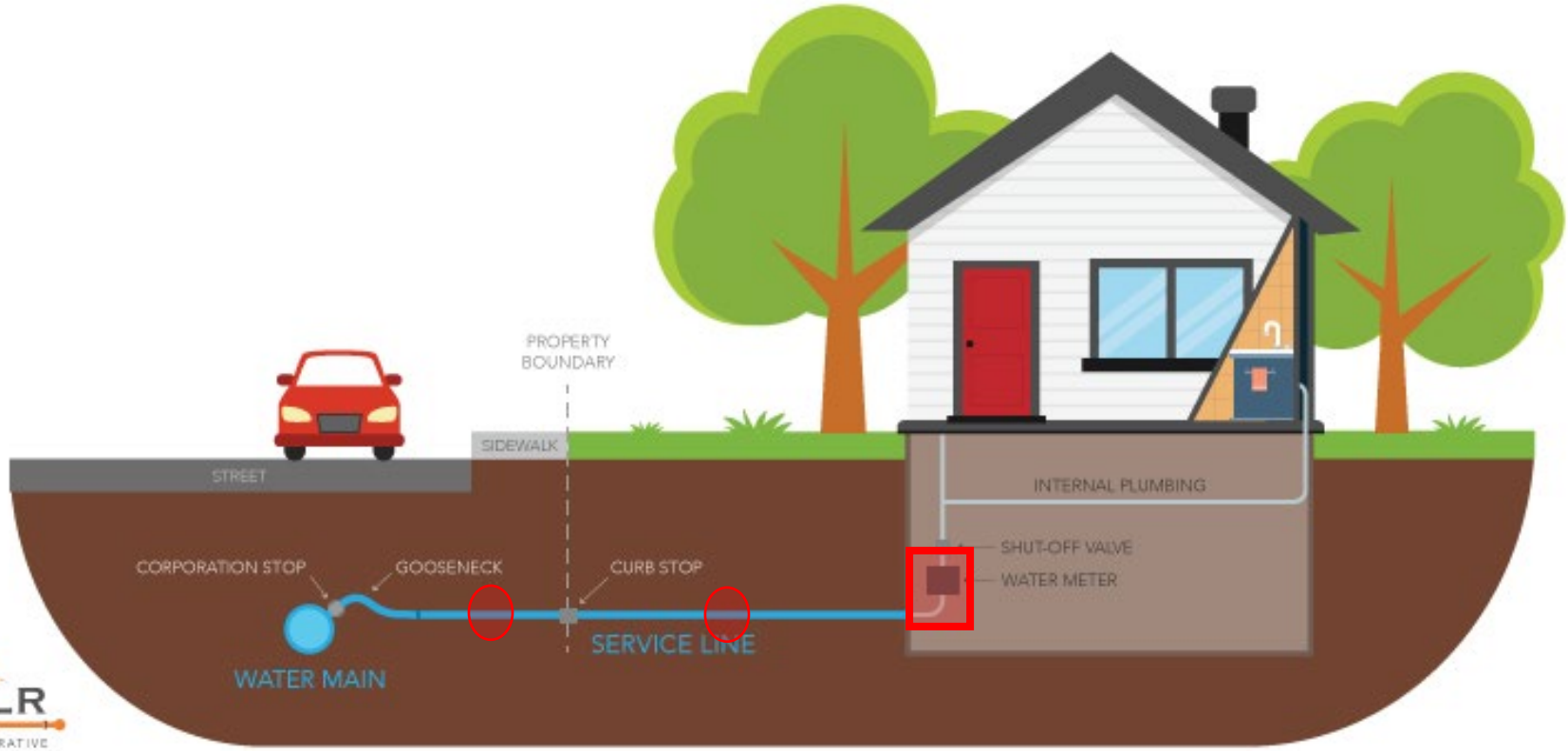
Low — Medium

Excavation

- Mechanical Excavation
  - Using a backhoe or other mechanical excavator to dig a “pothole” or test pit to expose the service line.
- Vacuum Excavation
  - Using a water jet or compressed air to loosen soil, which is vacuumed up resulting in a small hole to access the service line.

Excavation

- Recommend excavating at least 18 in. from meter box (curb stop) on both sides, and 18 in. before shutoff valve (if applicable).



Excavation

Cost

Medium — High

Property Impact

Medium — High

Resident Impact

Medium — High

Skill Required

Low — High

Time

Medium — High

Accuracy

Medium — High

Alternative Methodology

Please contact the Public Water Supply Section if you are considering using one of the following:

1. Predictive modeling
2. Emerging methods
3. CCTV Inspection

Predictive Modeling

- Trains model to look for patterns in a dataset to develop rules or algorithms.
- Uses information from known locations to estimate unknowns.
- Requires initial dataset that can be continually improved.
  - Must be representative of the distribution system.
- Estimates the *probability* of a lead service line.
  - Prioritizes areas for investigations and replacements.

Emerging Methods

- Cumulative (Passive) Sampler
  - Point of use filter attached to a kitchen tap. After normal use, cartridge is returned to the water system for analysis. Labs might be limited in ability to analyze.
  - Relies on filter's ability to extract lead mass. Has a community-specific threshold that would need to be developed.
- Ground-Penetrating Radar
  - Can accurately detect service line location and diameter, but not line material.
- Acoustic Wave Technology
  - Acoustic waves used to assess pipe wall thickness and locate pipe leaks underground. Theoretically can be used to identify material based on spectral signature.
- Electrical Conductivity and Eddy Current Technology
  - Measures localized conductivity of an object. Probe must have physical contact with pipe. Could be used in conjunction with vacuum excavation.

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CCTV Inspection

- CCTV Inspection is mentioned in the EPA guidance.
- Pittsburgh Water and Sewer Authority in Pennsylvania had no usable data for about 75% of their locations.

Lead Service Line

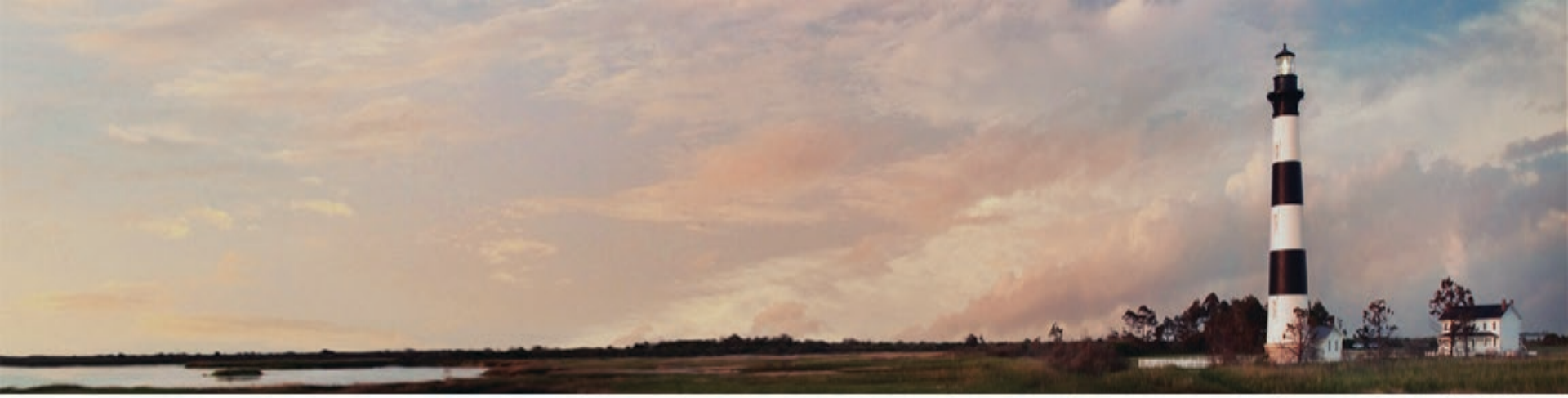
Non-Lead Service Line

Unable to Determine

Pittsburgh, PA (Bolenbaugh 2018 AWWA ACE)

Prioritizing Areas of Investigation

- Vulnerable or environmental justice populations
  - Unknowns where childcare facilities are present
  - Populations disproportionately exposed to lead
  - Low-income areas
- Areas with the most unknowns
- Areas with the highest likelihood of lead
- Areas currently undergoing Lead Service Line Replacement
- Field investigations to verify historical records
  - Select random addresses where material has been determined through historical record
  - Compare field results to historical records



Inventory Template Overview

Inventory Template

- Systems **MUST** use the official North Carolina Template.
  - Template available at: https://deq.nc.gov/lead-service-line-inventory

Lead Service Line Inventory Template

Water systems in North Carolina are required to use the appropriate template provided by the Public Water Supply Section. Please contact the Public Water Supply Section's Lead and Copper compliance team at pwss.lcr@ncdenr.gov if you need assistance in accessing your template.

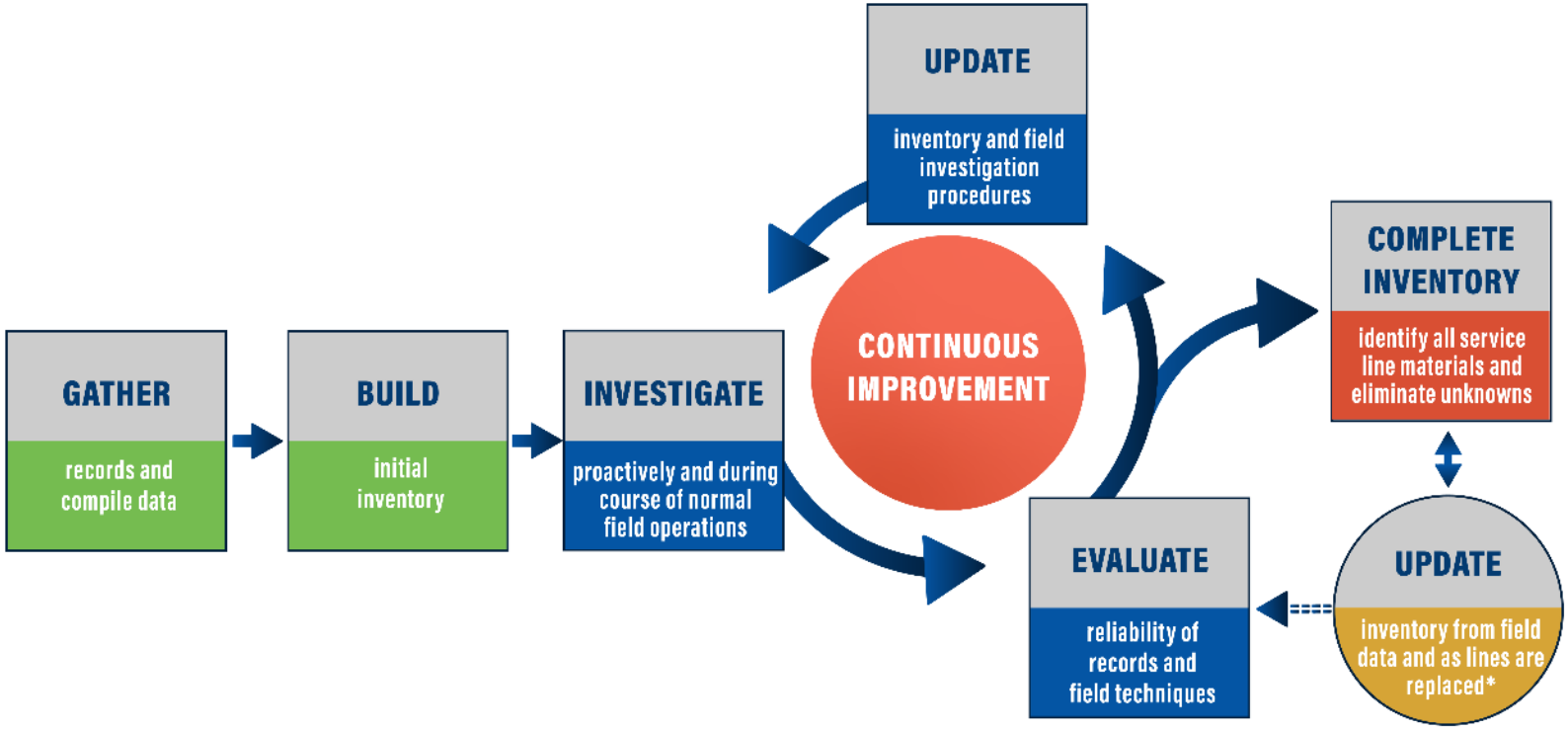
- **Template for water systems with 500 or fewer connections**
- **Template for water systems with greater than 500 but no more than 50,000 connections**
- **Template for water systems with greater than 50,000 connections**

Template Demo

Submitting the Inventory

More information to come on how to submit the inventory. Check our website at https://deq.nc.gov/lead-service-line-inventory for more information.

Updating the Inventory



*Discrepancies may be occasionally encountered. If they are repeatedly encountered, systems should reassess their confidence in their inventory's accuracy.

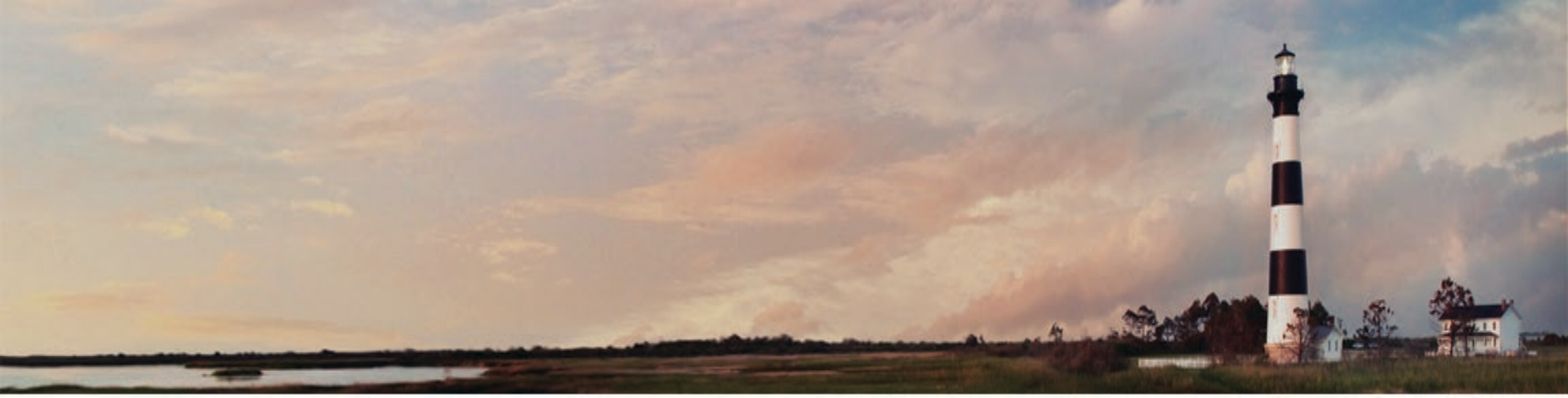
Replace Lead Service Lines

Replacing lead service lines can occur anytime in the steps shown

Update Requirements

- Current LCRR requirements for updates:
  - Systems on 6-month and annual sampling schedules submit once a year.
  - Systems on 3-year sampling schedules submit once every 3 years.

- Systems with only non-lead service lines do not have to submit updates.
  - If a lead service line is found, then the system has **30 days** to notify the state.
  - Update schedule will be established by the state.



Public Accessibility

Public Notification

- Persons served by a **lead**, **GRR**, or **unknown** service line must be notified within **30 days** of inventory completion.
- Notice must include a statement about service line material, an explanation of lead health effects, and steps to reduce lead exposure.
- Notification requirements depend on service line material.
- Notices must be repeated annually.

Lead Service Line Notice

- Notice must include:
  - Information about opportunities to replace the service line
  - Available programs providing financing solutions to assist with replacement.
  - Statement that the water system must replace its portion if property owner notifies the system they are replacing their portion.

GRR and Unknown Service Line Notice

- Galvanized Requiring Replacement Service Line notice must include information about opportunities to replace the service line.
- Unknown Service Line notice must include information about opportunities to verify the service line material.

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Submitting Proof of Public Notice

- Submit copy of notification to the Public Water Supply Section by July 1st for the previous calendar year.
- Systems must upload a copy of the Public Notice to the state through ECERT.

Publicly Available Inventory

- All systems are required to make their inventory publicly available.

Public Inventory Requirements

- Small systems (up to 50,000 people):
  - Do **NOT** have to post inventories online.
  - Non-web-based postings include printed service line data, or information on water utility mailings and newsletters.
- Large systems (more than 50,000 people):
  - **MUST** post inventories online.
  - Can use an interactive map.
  - Could also use a cloud-based app, an online spreadsheet, or a web-hosted download.
- Non-lead systems can release a statement that they have no lead, GRR, or unknown service lines and include a summary of methodology.
  - Community Systems must include this in their Consumer Confidence Report.

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Public Inventory Requirements

- All water systems:
  - Must include location identifiers for lead and GRR service lines.
  - Should consider how to best reach their target audience.
    - Do customers have internet access?
    - Does the water system have a website?
    - Does the water system have GIS capabilities?
    - What format of information would be easiest for the public to use?
  - Should update inventories in real-time, or as close as possible.
- Community Water Systems must include instructions on how to access inventory in CCR.

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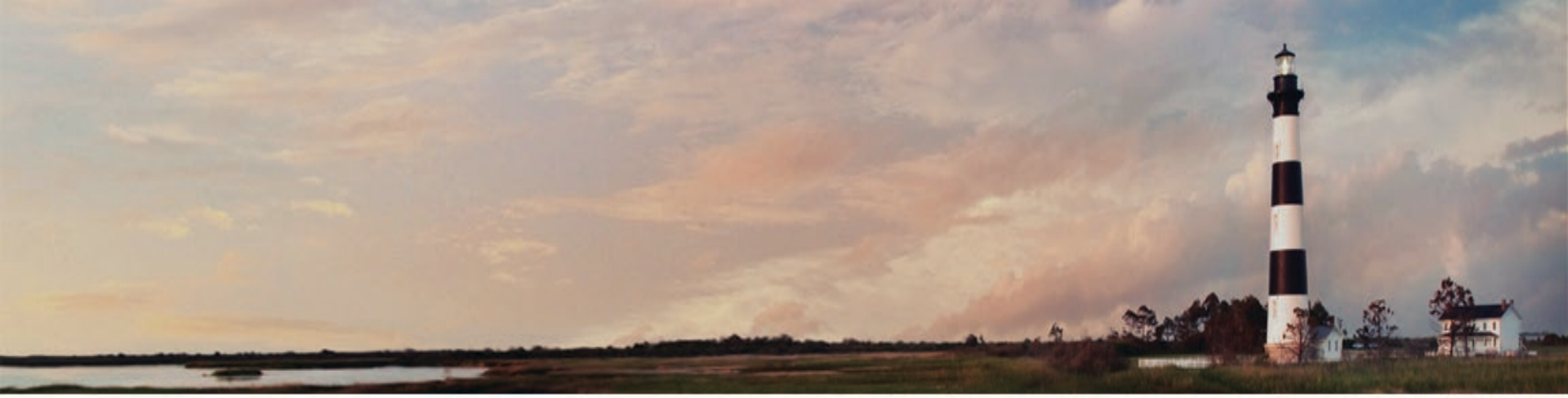

Workshop Summary

Key Takeaways

- All service lines must be classified as Lead, Galvanized Requiring Replacement, Non-Lead, or Unknown by **October 16, 2024**.
- You **must** use the official template for North Carolina for the inventory.
- Be aware of the required and approved methodology when developing the inventory.
- Know your public accessibility requirements. First certification is due to the state (via ECERT) July 1, 2025.
- There are resources available to help with completing the inventory.

FAQs

- Who pays if lead or GRR is found on the customer side?
  - "The water system is **not required** to bear the cost of replacement of the portion of the affected service line not owned by the water system." (40 CFR 141.84(d)(1)). This is subject to change with the LCRI.
- If any lead is found during investigation, is the water system required to pay for any mitigation or repair?
  - If lead is found, but not disturbed: send notice to customer following public notice requirements in 40 CFR 141.85(e).
  - If lead is found and disturbed (service shut off or bypassed without replacement): send notice about potential for elevated lead levels and instructions for flushing.
  - If lead is found and disturbed due to a replacement (gooseneck, water meter): send notice about potential for elevated lead levels, public education materials, and a pitcher or POU filter with instructions on use and 6 months of filter replacement.
- What is the legality of going onto private property?
  - Follow your local requirements.

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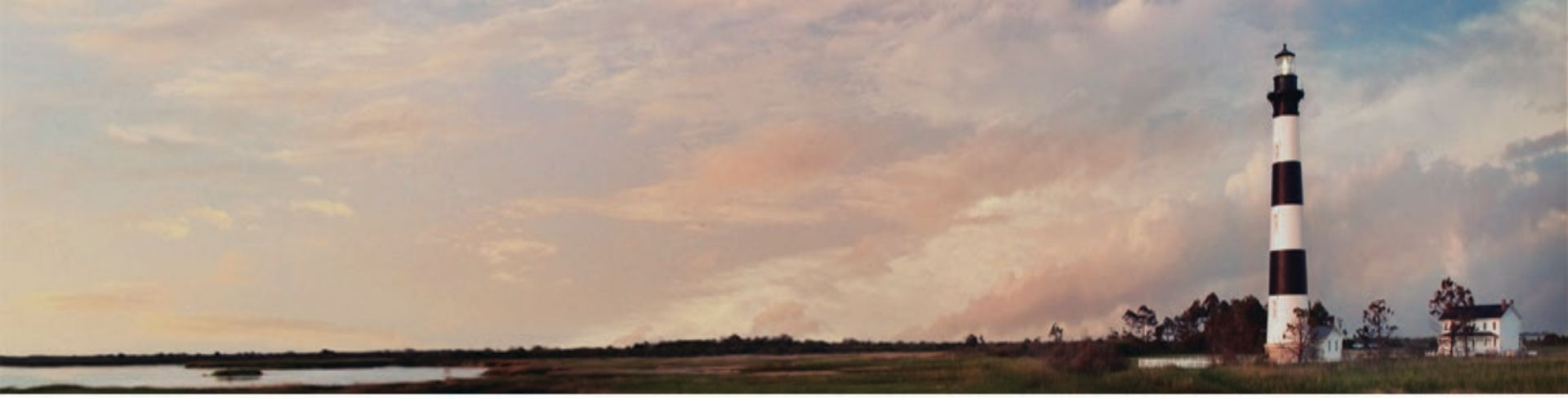

Questions?

Contact Information

Lead & Copper Team
pwss.lcr@deq.nc.gov

Sherif Ali
Lead & Copper Team Leader
Sherif.Ali@deq.nc.gov | (919) 707-9086

Hannah Mendez
Lead & Copper Rule Manager
Hannah.Mendez@deq.nc.gov | (919) 707-9090

Jim Coor
Lead & Copper Rule Manager
Jimmy.Coor@deq.nc.gov | (919) 707-9072