

# Guidance on Lead and Copper Management

A Toolkit for Municipal Public  
Drinking Water Supplies

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A Toolkit for Municipal Public Drinking Water Supplies  
Department of Environment and Climate Change

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# 1.0 Introduction

## 1.1 Purpose

The purpose of this document is to assist the Approval Holder in complying with the Nova Scotia Department of Environment and Climate Change's (ECC) Requirements for Lead and Copper Management. The requirements are repeated in this document for ease of reference.

The document addresses six key areas of an effective lead and copper management program:

- 1) Planning your program;
- 2) Communicating your program and obtaining participants;
- 3) Collecting samples for lead and copper;
- 4) Notifying and investigating the source of lead;
- 5) Taking action; and
- 6) Record keeping and reporting.

*Refer to Appendix A, Figures 2 and 3 for an overview of the process.*

## 1.2 Background

In 2019, Health Canada published new maximum acceptable concentrations (MAC) for lead and copper in drinking water, introduced new sampling protocols and changed the point of compliance from the drinking water distribution system to the customer's tap.

The lead guideline was reduced from a MAC of 0.010 mg/L (10 µg/L) to 0.005 mg/L (5 µg/L). A new MAC of 2 mg/L (2000 µg/L) was introduced for copper and the aesthetic objective (AO) was reaffirmed at 1 mg/L (1000 µg/L).

Exposure to lead and copper through drinking water is only a concern if the contaminants are ingested. Inhalation and dermal exposure through bathing and showering are not significant routes of exposure.

The toxicity of lead has been extensively documented. Although the MAC is set at 5 µg/l, there is no safe level of lead. Children, under the age of six, and pregnant women are most susceptible to the health effects of lead. In children and fetuses, exposure has resulted in adverse neurological development and behavioral effects. Increased blood lead levels in children are strongly linked to reduced Intelligent Quotient (IQ) scores that can result in lifelong impacts to quality of life. Women who are exposed to lead can expose their fetuses and infants during pregnancy and breastfeeding. In adults, lead exposure can cause increased blood pressure and kidney damage.

While small amounts of copper are necessary for good health, too much can lead to negative health effects. Short-term exposure to high levels of copper in drinking water may cause nausea, stomach pain, vomiting and diarrhea. Longer-term exposure may cause effects to the liver and kidneys. Copper exposure is particularly a concern for people with Wilson's disease.

Lead and copper can occur naturally in the environment; however, they are usually found in drinking water as a result of corrosion (leaching) from distribution and plumbing system components. Lead and copper concentrations are typically very low in water leaving the treatment plant but may increase as the water travels from the treatment facility to the customer.

There are several factors that influence whether lead and copper will be found in drinking water.

### **1) Plumbing Components**

The components of the distribution, building and household plumbing systems may contain lead and copper. The main source of lead and copper in drinking water are pipes, valves, fittings, and faucets including those containing brass (Figure 1). Where present, lead service lines contribute 50% to 75% of the total lead concentration at the tap. The National Plumbing Code (NPC) allowed lead in pipes until 1975, lead in solder until 1986 and lead in fittings/faucets until 2013. The NPC continues to recognize copper as an acceptable material for plumbing.

### **2) Water Chemistry**

The chemical composition of the water (e.g., pH and alkalinity) in contact with distribution and plumbing system components containing lead and copper will influence dissolution rates. While an in-depth discussion of corrosion assessment and control are beyond the scope of this document, water quality factors influencing lead and copper corrosion are found in Appendix B.

### **3) Water Stagnation**

The longer plumbing components containing lead and copper are in contact with the water, particularly corrosive water (e.g., low pH and alkalinity), the higher their concentrations will be until they reach equilibrium.

### **4) Hydraulic Disturbances**

Fluctuations in flow conditions occur for a variety of reasons in drinking water distribution systems (e.g., flushing programs, waterline repair, etc.). These fluctuations may result in the physical detachment of lead and copper particles from pipe scales resulting in an increase of lead and copper at the customer's tap.

## Figure 1. Sources of Lead in Drinking Water

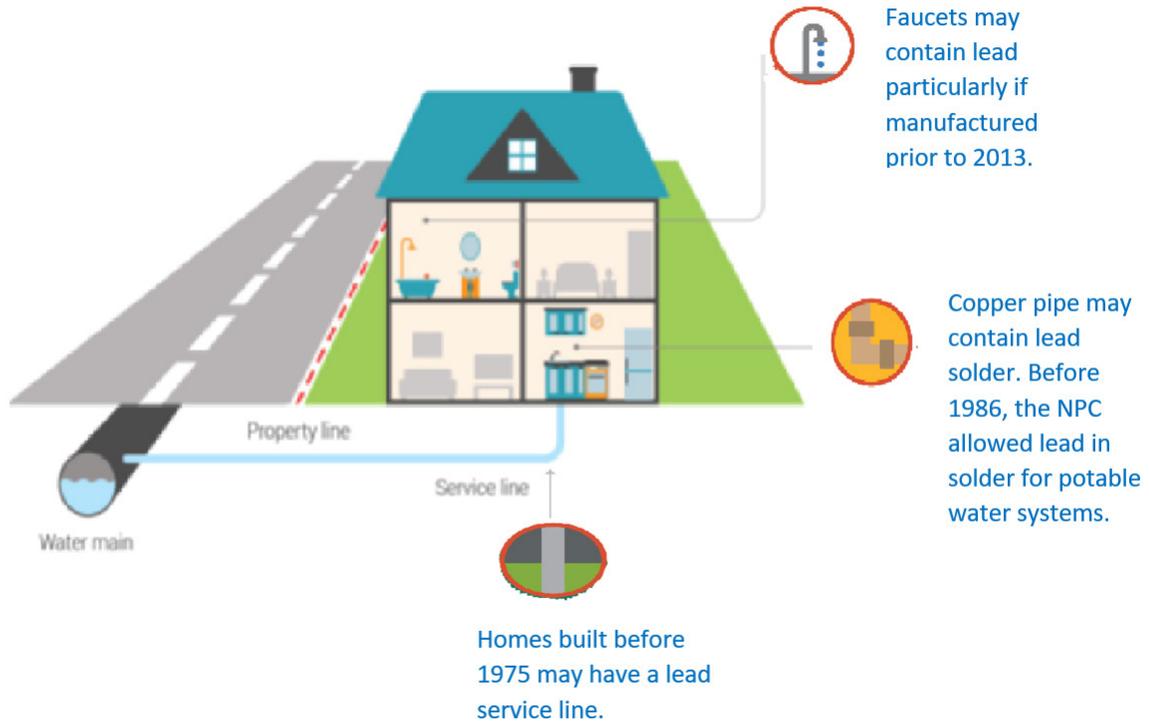


Figure 1. Adapted from Health Canada's *Drinking Water: What About Lead?*, 2019

## 2.0 Planning Your Program

### 2.1 Develop a System for Record Keeping and a Lead Service Line Inventory

ECC recommends the Approval Holder develop a system (e.g., database, spreadsheet, etc.) for recording information obtained from their lead and copper sampling program. The system may serve as a tool for developing an inventory of lead service lines (where present), program evaluation, notifying customers, recording corrective actions, regulatory reporting and demonstrating due diligence.

The following is a list of recommended fields:

- Name of owner(s);
- Civic and mailing address of owner(s);
- Construction date;
- Service line material, pipe length, diameter (public portion, if known);
- Service line material pipe length, diameter (private portion, if known);
- Sample location (e.g., kitchen faucet);
- Initial sample protocol;
- Lead and copper sample results;
- Method used to investigate source of lead (e.g., profile sampling);
- Lead profile sampling results;
- Details of corrective actions taken (e.g., letters to owners, service line replacement); and
- Post lead service line replacement results, if applicable.

## 2.2 Develop a Communication Plan

A communication plan will enable the Approval Holder to provide accurate information regarding their lead and copper sampling program in a prompt and consistent manner. ECC recommends the communication plan include the following:

- A main communications contact and back-up if that person is not available;
- Accurate, concise and clear information to be communicated;
- Who will receive the information? – entire community, targeted residences;
- How the information will be communicated – media release, website, mail, etc.; and
- When the information will be communicated.

The Approval Holder should communicate at regular intervals with those households that are known to have lead service lines (e.g., annually and during events known to create hydraulic disturbances such as road or watermain repair, flushing waterlines, etc.)

## 2.3 Conduct a System Survey

### Requirement:

Prior to conducting sampling, the Approval Holder shall perform a survey of their distribution system to identify areas at a higher risk of lead and copper release due to the presence of lead service lines, lead containing solders, brass fittings, galvanized steel, unplasticized polyvinyl chloride, copper pipes and fittings.

Given the health effects of lead and that there is no safe level, sampling locations shall be prioritized based on the presence of lead containing materials in the distribution and plumbing system.

**Where records are available** on the construction materials used for service lines and fittings, the Approval Holder shall select locations for sampling in the following sequence:

- 1) At least 50% of sampling locations have lead service lines, where present (high risk location);
- 2) Sample locations that have copper pipe with lead solders (medium risk location); and
- 3) Sample locations with brass fittings containing lead (low risk location).

**Where records are not available** on the construction materials used for service lines and fittings, the Approval Holder shall select locations for sampling based on the date of construction in this order:

- 1) Built prior to 1975 (high risk location);
- 2) Built after 1975, but before 1986 (medium risk location); and
- 3) Built after 1986 (low risk location).

Historical records (e.g., plumbing codes, building permits, water meter records, etc.) and the age of the residence or building can assist the Approval Holder determine if leaded materials may be present in distribution and plumbing system components. The National Plumbing Code (NPC) allowed the use of lead in pipes until 1975 and lead in solders in plumbing and distribution systems until 1986. Since 2013, plumbing fittings must meet the low lead requirement of 0.25% lead as a weighted average. The NPC permitted the use of galvanized steel until 1980 and continues to recognize copper as an acceptable material for plumbing components.

This information can be combined with water quality data on corrosivity such as low (<7) or fluctuating pH ( $\pm 0.2$  pH units), alkalinity (<30 mg/L), corrosion inhibitor and disinfectant residual, etc.; customer complaints (e.g., red water complaints); and known dead ends in the distribution systems to prioritize sample collection sites.

The Approval Holder may use this information to create a map or schematic of the distribution system that identifies high (e.g., lead service lines), medium (e.g., copper pipe with lead solder) and low risk zones for lead release. ECC recognizes that what is considered a low-risk sample location for lead may be a high-risk location for copper. Given that there is no safe level of lead, sampling locations shall be prioritized based on the potential presence of leaded materials.

## 3.0 Communicating Your Program and Obtaining Participants

Customer communication is key to the success of your lead and copper management program. Customers have a right to know the actions the Approval Holder is taking to determine lead and copper concentrations, identify sources of lead, and measures the owner(s) can take to reduce their exposure. Transparent and timely communication are key in building consumer confidence.

### 3.1 Communicate to Your Community

The Approval Holder should communicate the program to their community prior to conducting sampling. This demonstrates your commitment to ensuring all residents have access to clean, safe drinking water and this awareness may increase homeowner participation in your program. Examples of communication methods include:

- Media release to local radio stations or newspapers;
- Website;
- Social media; and
- Presentations.

The Approval Holder should communicate information on the following:

- Purpose of the lead and copper management program;
- Health effects of lead and copper;
- Ways to reduce exposure to lead in drinking water;
- Steps the Approval Holder is taking to assess exposure and address exceedances;
- How to identify lead service lines;
- How customers can request to have their water sampled; and
- A map or schematic showing the location of lead service lines, if present.

## 3.2 Target Communication to Obtain Volunteers

### Requirement:

In accordance with section 2.0, the Approval Holder shall target participants:

- In high and medium risk sample locations; or
- If the minimum number of participants outlined in Table 2 are not obtained, participants in low-risk sample locations shall be targeted.

Prior to April 1<sup>st</sup> of each year, the Approval Holder shall carry out at least one of the following methods of communication to obtain participants:

- Phone;
- Communication within a water bill;
- Letter or email to the residence owner(s); or
- Flyer or pamphlet left at the residence.

The Approval Holder shall provide the following information in their communication:

- Brief description of the program and regulatory responsibility;
- Why the customer's residence was selected for participation; (e.g., records indicate presence of lead service line, age of the residence, etc.);
- Health effects of lead and copper above the MAC;
- Actions the owner(s) will be required to take if they agree to participate (e.g., book day and time for sample collection); and
- Actions the Approval Holder will take once they receive the sample results.

If the minimum number of sample locations outlined in Table 2 are not obtained, the Approval Holder will be considered in compliance with the minimum requirements to obtain the required number of program participants if they demonstrate compliance with sections 2.0 and 3.0 of this document (i.e. identify the number of sample locations targeted, why the locations were selected, provide a copy of public communications including the date sent and method of communication).

Once the owner(s) have agreed to participate in the Approval Holder's lead and copper management program, the Approval Holder shall comply with the minimum requirements for sampling, notification, and annual reporting as outlined in this document.

Refer to Appendix D for an example communication the Approval Holder may use to obtain participants.

## 4.0 Collecting Samples for Lead and Copper

### **Requirement:**

The Approval Holder shall collect the minimum number of samples outlined in Table 2 for lead and copper from residences in accordance with the requirements outlined in this section. Both lead and copper can be analyzed from the same sample.

For example, If your system has a population of  $\leq 100$ , you are required to collect 5 samples from single unit or multi-unit residences (less than or equal to 6 units).

### **Requirement:**

The Approval Holder shall include their operating approval number and the method of sampling (i.e., random daytime testing (RDT), profile sampling (PS)) on the laboratory's sample submission form. The method of sampling shall be abbreviated and included as part of the sample location information (e.g., 126 Sussex Drive-RDT or location A-PS).

Prior to collecting samples, ECC recommends, the Approval Holder contact the laboratory to ensure they have an adequate supply of sample bottles and are prepared to receive the samples. The purpose of the sampling protocol outlined in this section is to assess public exposure to lead and copper. Sampling may also serve as a screening tool to identify sources of lead in the distribution system in situations where the Approval Holder does not have access to records.

ECC recommends that, in addition to sampling, the Approval Holder consider other methods to identify the service line material of construction. Examples may include visual inspection, scratch tests of the private portion of the service line at the water meter or shut-off valve, capitol projects, hydro excavation, etc.

## 4.1 Single Unit and Multi-unit Residences (Less Than or Equal to 6 Units)

### 4.1.1 Sampling Protocol

#### Requirement:

The Approval Holder shall collect samples for lead and copper utilizing the RDT protocol outlined in Table 1 from the minimum number of sample locations identified in Table 2.

**Table 1: Sampling Protocol for Single Unit and Multi-Unit Residences  
(Less Than or Equal to 6 Units)**

Sampling Type	Location	Protocol
RDT	Kitchen cold water faucet	<ul style="list-style-type: none"><li>• Do not remove faucet aerator.</li><li>• Collect first draw sample in 1L bottle (no prior flushing).</li></ul>

#### Notes:

1. To facilitate sample collection, the sample may be collected by the owner or occupant.
2. Samples shall be collected from the kitchen cold water faucet as this is the location most often used to obtain water for cooking and drinking purposes. If there is a point-of-use treatment device on the kitchen faucet an alternate location such as the bathroom cold water faucet shall be used.
3. Samples shall be collected in wide mouth bottles without removing the faucet aerator or screen at an uninterrupted flow rate representative of typical household use.
4. Do not collect samples from residences that have a point-of-entry treatment device such as a water softener.

## 4.1.2 Minimum Number of Samples

### Requirement:

The Approval Holder shall collect samples for lead and copper from the minimum number of sample locations outlined in Table 2 based on the population served. The samples shall be collected between May 1st and September 30th of each year.

**Table 2: Minimum Number of Sample Locations – Single Unit and Multi-Unit Residences (Less Than or Equal to 6 Units)**

Number of People Served*	Number of Sample Locations (Annual)
≤500	5
501-3,300	10
3,301-10,000	20
10,001-100,000	30
>100,000	50

*\*Number of people served refers to the average population served by the municipal public drinking water supply.*

To meet the minimum number of samples in any given sampling period, the Approval Holder shall not collect multiple samples from the same single unit or multi-unit residence (less than or equal to 6 units).

Where the Approval Holder has system specific knowledge on the diameter of lead service lines used to connect single and multi-unit residences they may use this knowledge to target residences as opposed to the cut-off value of 6 units. For example, if you know your utility did not use lead service lines to connect multi-unit residences with greater than 4 units then the Approval Holder may use 4 units as their cut-off for sample site selection.

## 4.2 Distribution Systems that Purchase Water from Another Municipal Public Drinking Water Supply

### Requirement:

In determining the minimum number of required lead and copper samples, the Approval Holder of a distribution system that purchases water from an Approval Holder of an adjacent municipal public drinking water supply to which they are connected may request that ECC consider their population part of the Approval Holder's population from which they purchase water. Otherwise, each Approval Holder shall collect the minimum number of samples from their system as outlined in Table 2.

ECC will consider the request if a signed written agreement between the two Approval Holders is provided that identifies which Approval Holder is responsible for the following:

- Obtaining program participants (sections 2 and 3);
- Sample collection (section 4);
- Notification of sample results (section 5);
- Investigation to determine the source of lead (section 5);
- Taking action, if applicable (section 6); and
- Annual reporting (section 7).

## 4.3 Sample Information

### Requirement:

The following information shall be recorded for each sample, as available:

- Civic address of sample location;
- Name, telephone number and email address of the owner(s);
- Mailing address of the owner(s);
- Public side service line material and diameter;
- Private side service line material and diameter at shut-off valve or water meter;
- Name of sampler, date and time of sample collection;
- Sample location (i.e. kitchen or bathroom faucet); and
- Sampling method (e.g. 1L RDT or profile sampling).

Refer to Appendix C for an example Sample Information Form.

Table 3 may assist the Approval Holder in identifying the service line material at the owner's water meter or shut-off valve:

**Table 3: Identifying Service Line Material of Construction**

Material	Description
Lead	Dull grey-silver color that turns bright silver when scratched with a key or coin. A magnet will not stick to the pipe.
Galvanized Steel	Dull grey-silver color. A magnet will stick to the pipe.
Copper	The color of a penny.
Plastic	May be a variety of colors. Looks and feels like plastic.

It is important to note that the portion of service line within the home may be composed of a different material than the buried portion of the service line.

## 4.4 Change of Sample Locations

### **Requirement:**

There is no requirement for the Approval Holder to continue to sample from locations where lead concentrations are below the detection limit to meet the minimum number of required samples each year.

If there were detectable levels of lead in a sample, the Approval Holder may choose to keep the residence or building as a sample location if the owner(s) are willing.

# 5.0 Notifying and Investigating the Source of Lead

## 5.1 Initial Notification

Letters have been prepared to assist the Approval Holder in notifying the owner(s) of their sample results. Refer to Appendix E for single and multi-unit residences with less than or equal to 6 units.

### 5.1.1 Sample Result is Below the MAC for Lead and Copper:

If there is no exceedance of the lead or copper MAC, the Approval Holder shall notify the owner(s) of their sample results by mail or email within **30 days** of receiving the results from the lab.

### 5.1.2 Sample Result Exceeds MAC for Lead or Copper

#### Requirement:

If there is an exceedance of the lead or copper MAC, the Approval Holder shall notify ECC by telephone immediately upon becoming aware of the sample results from the lab and provide the results to ECC by email. In addition, the Approval Holder shall notify the owner(s) of their sample results within **14 days** of receiving the results from the lab.

The Approval Holder shall recommend measures the owner(s) can take to reduce their exposure.

The following measures shall be included in the letter or email notification from the Approval Holder to the owner(s) to outline measures they can take to reduce their exposure:

- Flush pipes by running the water until it is cold (about a minute) after water has been sitting in pipes for several hours (e.g. first thing in the morning, after work, etc.);
- Use a drinking water treatment device certified to meet the National Sanitation Foundation (NSF) standards 53 or 58 (reverse osmosis units) for the removal of lead and copper. While a faucet mounted unit is preferred, pitcher style filters are also acceptable;
- Inspect and clean faucet aerators or screens monthly. If there is debris, inspect and clean more frequently to remove particles that may contain lead;
- Replace brass faucets and valves with those certified to have a low lead content; and
- If the private side of the service line is composed of lead, replace it.

## 5.2 Investigate to Determine the Source of Lead

### Requirement:

For location(s) that exceed the MAC for lead, the Approval Holder shall submit a plan to ECC on or before October 31st of the same year in which the initial sample(s) was collected. The plan shall outline how the Approval Holder plans to determine the source of lead, demonstrate compliance with this section and include a schedule for implementation.

**Note:** There is no requirement to investigate the source of lead if the service line material is already known. There is also no requirement to investigate the source of copper as it is an acceptable plumbing material.

If the owner(s) will not allow the Approval Holder to carryout the actions outlined in this section, the Approval Holder will be considered in compliance if they complete the following assessment to rule out the source of lead from their distribution system infrastructure:

- Carryout the notification described in section 5.1;
- Verify the lead and copper concentrations leaving the treatment facility are below the MAC; and
- Verify the lead and copper concentrations at a nearby location in the distribution system are below the MAC. An acceptable nearby location may be a fire hydrant, closest approved microbiological or corrosion monitoring location within the same hydraulic zone.

### 5.2.1 Single Detached Residences

#### Requirement:

If acceptable to the owner, the Approval Holder shall conduct profile sampling as outlined in Table 4 at each single detached residence that exceeded the lead MAC to determine the source (i.e., household plumbing versus lead service line).

In lieu of profile sampling, the Approval Holder may conduct hydro excavation to determine the presence of a lead service line. If the Approval Holder selects an alternate method to determine the source of lead, the method shall be reviewed and accepted by ECC prior to implementation.

## Requirement:

**Table 4: Profile Sampling Protocol**

Sampling Type	Location	Protocol
Profile	Kitchen cold water faucet	<ul style="list-style-type: none"><li>• Allow water to stagnate in pipes for a minimum of 6 hrs.</li><li>• Label a minimum of four 1-L bottles in the order they will be filled.</li><li>• If present, do not remove the faucet aerator or screen.</li><li>• Without flushing and ensuring minimal wastage between bottles, turn on the cold-water faucet and fill each of the 1-L bottles consecutively.</li></ul>

**Notes:**

1. During the minimum 6-hr stagnation period, no water can be used in the residence. This includes water for flushing toilets, showering, laundering clothes, etc. It is best to collect the samples first thing in the morning or after work, if water is not used during the day.
2. To facilitate sample collection, the owner or occupant may collect the samples utilizing instructions provided by the Approval Holder.
3. Samples shall be collected from the kitchen cold water faucet as this is the location most often used to obtain water for cooking and drinking purposes. If there is a point-of-use treatment device on the kitchen faucet, an alternate location such as the bathroom cold water faucet shall be used.
4. Samples shall be collected in wide mouth bottles without removing the faucet aerator or screen at an uninterrupted flow rate representative of typical household use.
4. Do not collect samples from residences that have a point-of-entry treatment device.

Depending on the pipe material(s), length(s) and diameter(s), more than four 1-L samples may be required to cover the pipe volume from the kitchen or bathroom faucet to the watermain. To determine the number of 1L sample bottles to cover the pipe volume (public side + private side + household plumbing) refer to Table 5.

**Table 5: Pipe Length Corresponding to 1-L of Water**

Material	Length of pipe equivalent to 1-L of water	
	3/4" (20 mm) nominal ID	12" (12 mm) nominal
Polyvinyl chloride (PVC)	12' (3.7 m)	22' (6.7 m)
Lead	12' (3.7 m)	26' (7.9 m)
Galvanized steel	9.5' (3 m)	17' (5.2 m)

### 5.2.2 Multi-unit Residences Less than or Equal to 6 Units

**Requirement:**

Due to the difficulty in coordinating stagnation periods for each unit in multi-unit residences, the Approval Holder may use an alternate method such as hydro excavation to identify the presence of a lead service line. If the Approval Holder selects a method other than hydro excavation, the method shall be reviewed and accepted by ECC prior to implementation.

### 5.3 Profile Sampling – Interpretation of Sample Results

**Requirement:**

To inform appropriate corrective actions, the Approval Holder shall interpret the results of profile sampling to determine if the source of lead is the service line and/or premise plumbing.

The Approval Holder must assess whether the profile sample results suggest that lead is coming from the service line and/or the premise plumbing. Refer to Appendix F for an example interpretation.

If results of profile sampling indicate that lead is coming from the service line, whether private or public, visual confirmation should be undertaken to confirm whether the public, private or both portions of the service line are composed of lead. Once confirmed, inform the owner(s) as outlined in section 5.4, update your lead service line inventory and work with the owner(s) to replace the lead service line as outlined in section 6.0.

If results of profile sampling conclusively show that lead is coming from the premise plumbing and not from the service line, inform the owner(s) as outlined in section 5.4 and update your lead service line inventory.

If there is any uncertainty whether the service lead is composed of lead, visual inspection should be undertaken.

## 5.4 Notification of Investigation Results

### Requirement:

The Approval Holder shall notify ECC and the owner(s) by mail or email of the results of their investigation within **30 days** of identifying the source of lead. If profile sampling was conducted, the Approval Holder shall include a copy of the laboratory analysis report with their notification to ECC.

Letters have been prepared to assist the Approval Holder notify the owner of the investigation results to determine the source of lead. Refer to Appendix G.

## 6.0 Taking Action

The most effective actions to reduce public exposure to lead and copper are the removal of lead service lines and corrosion control<sup>1</sup>.

For municipal supplies that have a partial or complete service line inventory identifying the presence of lead service lines, the Approval Holder may submit a lead service line removal plan to ECC for review and acceptance as outlined in Appendix H.

Partial service line replacements may increase lead concentrations for months after replacement. If they are necessary, pipe and fitting materials should be selected with consideration of the potential for galvanic corrosion.

If the residence or building owner refuses to participate in the lead service line replacement program, the Approval Holder will be considered in compliance if they take the following measures:

- Notify ECC if the lead concentration exceeds the MAC; and
- Notify the owner(s) of their sample results and measures they can take to reduce their exposure.

### **Requirement:**

Once the lead service line removal plan is reviewed and accepted by ECC, the Approval Holder will be required to report on their progress annually as part of their annual report due on or before April 1st. Once the implementation of the plan is complete, all lead service lines are removed and the Approval Holder demonstrates water is not corrosive to distribution or plumbing system components, ECC will remove the requirements for lead and copper sampling as outlined in section 6.1.

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<sup>1</sup>Health Canada is currently revising their *Guidance on Controlling Corrosion in Drinking Water Distribution Systems* (2009). Once the document is final, ECC will provide additional guidance to the Approval Holder on the minimum requirements necessary to demonstrate the water is not corrosive to distribution and plumbing system components.

## 6.1 Removal of Lead and Copper Sampling Requirements

### **Requirement:**

The Approval Holder may submit a request to ECC to remove the requirement for the municipal public drinking water supply to collect samples for lead and copper, if they meet the following requirements:

- The municipal supply has a complete service line inventory identifying no lead service lines are present in their system; and
- The water is not corrosive to distribution and plumbing system components.

# 7.0 Record Keeping and Annual Reporting

## 7.1 Annual Sampling Plan

### Requirement:

The Approval Holder shall update their annual sampling plan to include the following information from their lead and copper management program:

- Lead and copper sampling method (e.g. RDT);
- Number of residences and buildings that will be targeted for sampling;
- Rationale for selecting the residence or building (e.g. lead service line, date of construction ); and
- Methods implemented and/or planned to obtain participants.

The Approval Holder shall submit the annual sampling plan to ECC on or before October 1<sup>st</sup> of each year.

## 7.2 Annual Report

### Requirement:

The Approval Holder shall report the following information to ECC annually on or before April 1<sup>st</sup>:

- Number of samples collected for lead and copper;
- Population served;
- Civic address of sample location or unique identifier (e.g., Location A);
- Service line material (public and private side if known);
- Sample date;
- Initial sample protocol (e.g., RDT);
- Sample location (e.g. kitchen faucet);
- Initial lead and copper sample results; and
- Date owner(s) notified of sample results (include an example copy of communication).

In addition, the Approval Holder shall report the following information for each location that exceeds the lead MAC.

- Investigation method to determine source of lead (e.g., profile sample, hydro excavation, etc.);
- Profile sample results, if applicable;
- Date owner(s) notified of profile sample results; if applicable (include an example copy of communication); and
- Lead service line identified at location (yes or no).

### **Requirement:**

Where lead service lines are identified in the municipal public drinking water supply and the Approval Holder has submitted a plan to ECC for review and acceptance to replace the service lines, the Approval Holder shall report the following:

- The total number of LSL in the system, broken down by number of service lines with lead on the private side, public side, and both on the private and public sides;
- The number of unknown service lines, broken down by number of unknown service lines on the private side, public side, and both on the private and public sides; and
- The number of replacements completed each year against the target number. If you were unable to meet your target, you will be required to provide rationale and update your program timeline.

## 8.0 Municipal Supplies With Established Lead and Copper Management Programs

An Approval Holder with an established lead and copper management program<sup>2</sup> that meets or exceeds the minimum objectives outlined in this document may submit their program to ECC for review and acceptance as part of their annual sampling plan due on or before October 1<sup>st</sup>.

### **Requirement:**

Upon acceptance, ECC may permit the Approval Holder to continue with the requirements under the established program as an acceptable substitution for meeting a portion of the requirements outlined in this document. The Approval Holder shall not proceed with the continued implementation of their program until it has been accepted by ECC. Regardless of the program implemented, the Approval Holder shall comply with the requirements outlined in section 7.

### **Requirement:**

The submission shall include a description of the following:

- Population served by the municipal public drinking water supply;
- How sample locations will be selected (i.e., known presence of lead service line, age);
- How the program will be communicated to obtain participants;
- Number of sample locations that will be targeted each year;
- Sample method;
- How the owner(s) and ECC will be notified of sample results exceeding the lead and/or copper MAC;
- Actions that will be taken in response to a lead and/or copper exceedance; and
- For Approval Holders with a lead service line removal program, a description of the program.

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<sup>2</sup> Acceptable lead and copper management programs include those based on the Tier 1 and 2 sampling protocols outlined in Health Canada's *Guidance on Controlling Corrosion in Drinking Water Distribution Systems (2009)* or the 30 minute stagnation protocol outlined in Health Canada's *Lead Guideline Technical Document (2019)*.

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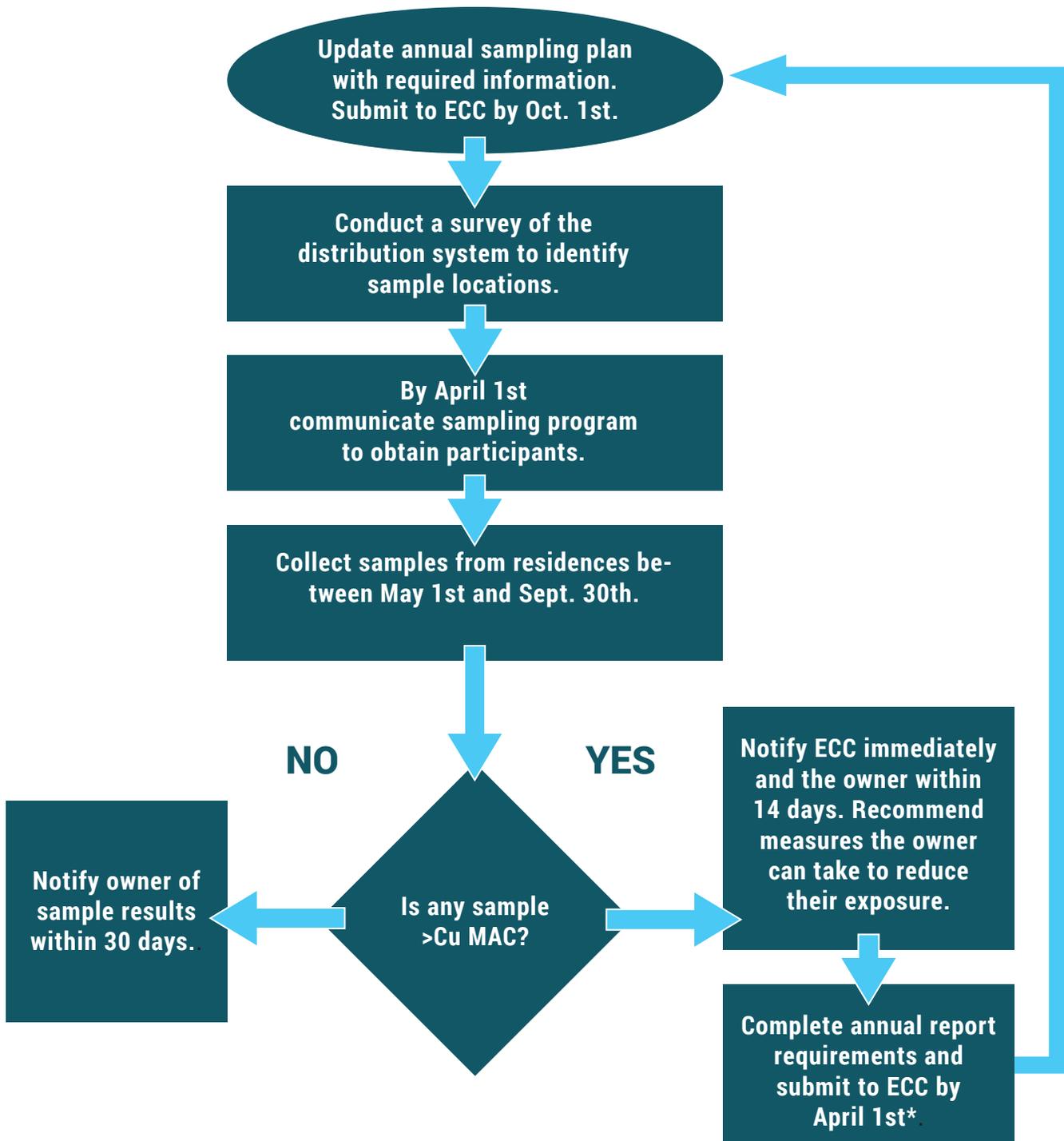
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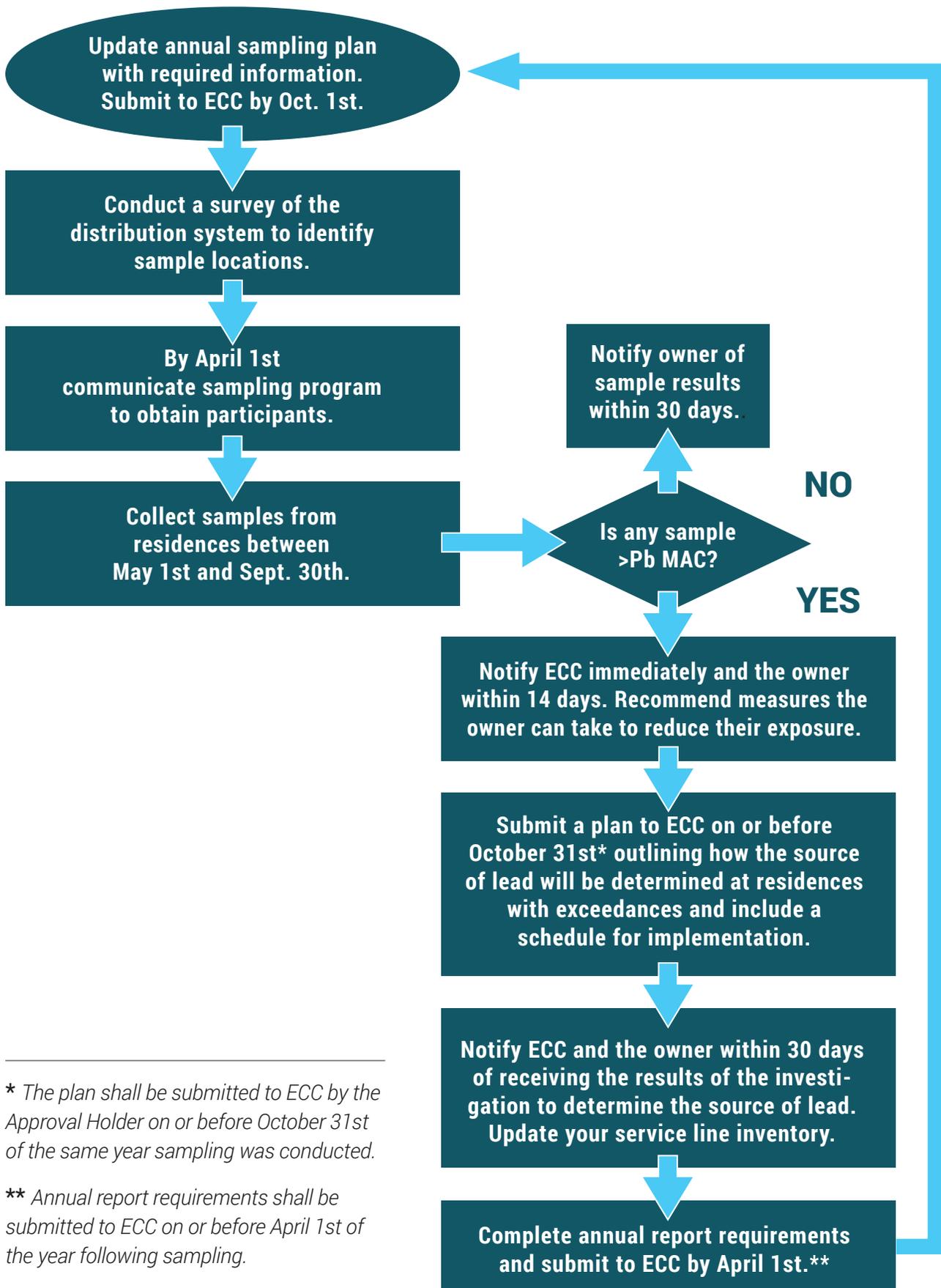
# Appendix A—Flowcharts

Figure 2: Process Overview - Copper



\*Annual report requirements shall be submitted to ECC on or before April 1<sup>st</sup> of the year following sampling.

**Figure 3: Process Overview - Lead**



\* The plan shall be submitted to ECC by the Approval Holder on or before October 31st of the same year sampling was conducted.

\*\* Annual report requirements shall be submitted to ECC on or before April 1st of the year following sampling.

# Appendix B—Water Quality Factors Influencing

**Table 6: Water Quality Factors Influencing Corrosion**

Factor	Effect
pH	Low pH causes iron, lead, and copper to corrode rapidly.
Alkalinity and Dissolved Inorganic Carbonate (DIC)	Neutralizes strong acids and provides buffering capacity against a pH drop. Affects many reactions in corrosion chemistry. DIC can be determined from pH, temperature, ionic strength, and alkalinity measurements.
Disinfectant Residual	Gaseous chlorine lowers pH. Higher chlorine residuals may result in protective lead scales.
Dissolved Oxygen	Increases corrosion of copper; effect on lead less certain.
Oxidation Reduction Potential, Redox Potential (ORP, Eh)	High ORP and high pH promote protective lead scales.
Ammonia	Interfere with the formation of passivating films. Oxidation of ammonia (nitrification) lowers alkalinity and pH, increasing corrosion.
Chloride and Sulphate	Chloride (Cl <sup>-</sup> ) and sulphate (SO <sub>4</sub> <sup>2-</sup> ) cause dissolved metals to remain soluble. Increase the salinity (TDS) and electrical conductivity of water. High chloride-to-sulphate-mass ratios (CSMRs) increase corrosion rates for lead solder connected to copper pipe.

*\*Adapted from BC Health Protection Branch, 2019 and Alberta Government, 2019.*

# Appendix C—Sample Information Form

## Sample Information Form (complete for each sample location)

Civic Address: \_\_\_\_\_

Owner Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Owner Mailing Address: \_\_\_\_\_

Service Line Material\*: \_\_\_\_\_ Diameter: \_\_\_\_\_  
(Private side at water meter or shut off valve)

Sample Location: \_\_\_\_\_ Sampler's Name: \_\_\_\_\_  
(kitchen sink or bathroom faucet)

Sample Date: \_\_\_\_\_ Sample Time: \_\_\_\_\_

### Sample Method:

- RDT – 1L (Residences and buildings < 6 units)  
Label bottle. No flushing. No stagnation. Keep faucet screen or aerator in place. Open cold-water faucet and fill 1-L bottle. Keep sample cool.
- Profile Sampling – Minimum of 4 1L bottles depends on length and diameter of pipe from water main to sample location (use best estimate). Allow water to stagnate a minimum of 6 hrs. Label bottles in the order they will be filled (e.g. 1st L, 2nd L, 3rd L, 4th L). No flushing. Minimize water loss between samples. Keep faucet screen or aerator in place. Open cold-water faucet and fill in the order they are labeled. Keep samples cool.

### \*Identifying Service Line Material (at location of the water meter or shut off valve):

- |                  |  |
|------------------|--|
| Lead             | <input type="checkbox"/> Dull grey-silver color that turns bright silver when scratched with a key or coin. A magnet will not stick to the pipe. |
| Galvanized Steel | <input type="checkbox"/> Dull grey-silver color. A magnet will stick to the pipe.  |
| Copper           | <input type="checkbox"/> The color of a penny.   |
| Plastic          | <input type="checkbox"/> Can be several colors. Looks and feels like plastic.  |

# Appendix D—Example Communication to Obtain Participants

Dear *(Insert customer's name)*,

*(Insert Facility Name)* is seeking your participation in our drinking water sampling program for lead and copper. *(Include reason why they were selected e.g. presence of lead service line, house age, building records, etc.)*

Participation is free and will provide you with information on lead and copper levels in your tap water. In addition, it will allow us to assess our facility's compliance with Health Canada's new drinking water guidelines for lead and copper.

In 2019, Health Canada lowered their maximum acceptable concentration (MAC) for lead in drinking water from 0.010mg/L to 0.005mg/L and introduced a new MAC for copper of 2 mg/L. They also changed the sample location for compliance. Samples for lead and copper must now be collected within homes and buildings where customers' obtain water for drinking and cooking.

Although lead and copper can occur naturally in the environment, their main source in drinking water is through leaching of plumbing materials such as pipes, solder, faucets, and fittings. While copper is an acceptable material for use in plumbing, lead is not. The National Plumbing Code (NPC) allowed the use of lead in pipes until 1975 and lead in solders in plumbing and distribution systems until 1986. Since 2013, plumbing fittings must meet the low lead requirement.

Once testing is complete, you will receive a letter with your test results and an explanation of what they mean. In addition, if your lead or copper levels exceed Health Canada's guidelines, we will provide information on how to reduce your exposure.

If you would like to participate, please contact us at *(insert facility telephone number or email)* before *(insert date)*.

Sincerely,

*(Insert facility signature block)*

# Appendix E—Example Letters – Single and Multi-unit Residences (less than or equal to 6 units)

## Letter #1: Lead and Copper Concentrations Meet the Guidelines for Canadian Drinking Water Quality

Dear *(Insert Customer's Name)*:

*(Insert Facility Name)* would like to thank-you for participating in our lead and copper sampling program. The test results for the sample collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead	<i>(insert test result)</i>	0.005 mg/L
Copper	<i>(insert test result)</i>	2 mg/L

The test results indicate your drinking water meets Health Canada's Guidelines for Canadian Drinking Water Quality for lead and copper. No further action is required on your part.

If you would like more information on lead and copper, please refer to the following factsheets:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

Health Canada: Water Talk – Copper in Drinking Water

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/water-talk-copper.html#a5>

If you have any questions, please contact us at  
*(insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

## Letter #2: Lead Concentration Exceeds and Copper Concentration Meets the Guidelines for Canadian Drinking Water Quality

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to thank-you for participating in our lead and copper sampling program. Your test results for the sample collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead	<i>(insert test result)</i>	0.005 mg/L
Copper	<i>(insert test result)</i>	2 mg/L

The test results indicate your tap water meets Health Canada's guideline for copper; however, the lead level exceeds the guideline.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life.

Lead is only a concern if ingested. There is no concern with direct contact through bathing and showering. Boiling the water will not remove lead.

Although lead can occur naturally in the environment, the main source in drinking water is through leaching of plumbing materials such as pipes, solder, faucets, and fittings. The National Plumbing Code (NPC) allowed the use of lead in pipes until 1975 and lead in solders in plumbing and distribution systems until 1986. Since 2013, plumbing fittings must meet the low lead requirement.

There are steps you can take to reduce your exposure to lead:

- Consider using a drinking water treatment device such as a faucet mounted, or pitcher style unit certified to NSF standard 53 or 58 for the removal of lead.
- Whenever water has been left sitting in pipes for several hours (e.g. overnight, during work), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.
- If you have a lead service line, replace it.

As your test results indicate a source of lead, please contact us at *(insert telephone number or email)* before *(insert date)*. We would like to conduct further investigation to determine the presence of a lead service line.

For more information on lead and copper, please refer to the following factsheets:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

Health Canada: Water Talk – Copper in Drinking Water

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/water-talk-copper.html#a5>

If you have any questions, please contact us at *(insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

### Letter #3: Copper Concentration Exceeds and Lead Concentration Meets the Guidelines for Canadian Drinking Water Quality

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to thank-you for participating in our lead and copper sampling program. Your test results for the sample collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead	<i>(insert test result)</i>	0.005 mg/L
Copper	<i>(insert test result)</i>	2 mg/L

The test results indicate your tap water meets Health Canada's guideline for lead; however, the copper level exceeds the guideline.

Current evidence indicates that short-term exposure to levels of copper in drinking water above the maximum acceptable concentration (MAC) may cause nausea, stomach pain, vomiting and diarrhea. Long-term exposure to levels above the MAC may cause effects on the liver and kidney.

Copper is only a concern if ingested. There is no concern with direct contact through bathing and showering. Boiling the water will not remove copper.

Although copper can occur naturally in the environment, the main source in drinking water is through leaching of plumbing materials such as pipes, faucets, and fittings.

There are steps you can take to reduce your exposure to copper:

- Consider using a drinking water treatment device such as a faucet mounted, or pitcher style unit certified to NSF standard 53 or 58 for the removal of lead and copper.
- Whenever water has been left sitting in pipes for several hours (e.g. overnight, during work), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.

If you would like more information on lead and copper, please refer to the following factsheets:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

Health Canada: Water Talk – Copper in Drinking Water

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/water-talk-copper.html#a5>

If you have any questions, please contact us at *(insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

## Letter #4: Lead and Copper Concentrations Exceed the Guidelines for Canadian Drinking Water Quality

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to thank-you for participating in our lead and copper sampling program. Your test results for the sample collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead	<i>(insert test result)</i>	0.005 mg/L
Copper	<i>(insert test result)</i>	2 mg/L

The test results indicate your tap water exceeds Health Canada's drinking water guidelines for lead and copper.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life.

Current evidence indicates that short-term exposure to levels of copper in drinking water above the maximum acceptable concentration (MAC) may cause nausea, stomach pain, vomiting and diarrhea. Long-term exposure to levels above the MAC may cause effects on the liver and kidney.

Lead and copper are only a concern if ingested. There is no concern with direct contact through bathing and showering. Boiling the water will not remove lead or copper.

Although lead and copper can occur naturally in the environment, their main source in drinking water is through leaching of plumbing materials such as pipes, solder, faucets, and fittings. While copper is an acceptable material for use in plumbing, lead is not. The National Plumbing Code (NPC) allowed the use of lead in pipes until 1975 and lead in solders in plumbing and distribution systems until 1986. Since 2013, plumbing fittings must meet the low lead requirement.

There are steps you can take to reduce your exposure to lead and copper:

- Consider using a drinking water treatment device such as a faucet mounted, or pitcher style unit certified to NSF standard 53 or 58 for the removal of lead and copper.
- Whenever water has been left sitting in pipes for several hours (e.g. overnight, during work), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.
- If you have a lead service line, replace it

As your test results indicate a source of lead, please contact us at (insert telephone number or email) before (insert date). We would like to conduct further investigation to determine the presence of a lead service line.

For more information on lead and copper, please refer to the following factsheets:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

Health Canada: Water Talk – Copper in Drinking Water

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/water-talk-copper.html#a5>

If you have any questions, please contact us at *(insert facility telephone number or email address)*

Sincerely,

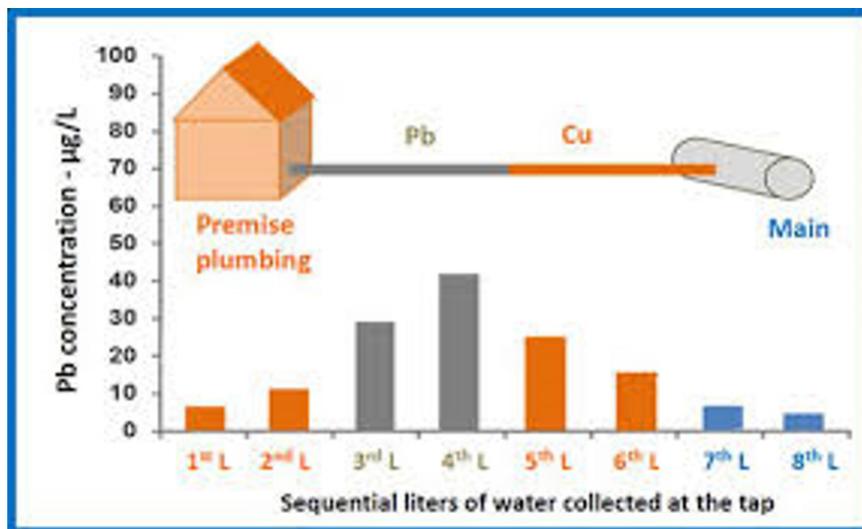
*(Insert facility signature block)*

# Appendix F—Interpretation of Profile Sample Results

To inform appropriate corrective action, the Approval Holder shall use the profile sample results to determine if the source of lead is the service line and/or premise plumbing.

Typically, the 1L sample(s) with the highest lead concentration(s) corresponds to the potential source of lead (see Figure 4)

**Figure 4. The Relationship Between Sample Volume, Lead Concentration and Source of Lead**



*Adapted from the Canadian Water Network, 2016.*

Figure 4 provides an example of how the Approval Holder may use the results from profile sampling to determine the potential source of lead. In this example, 8 1L samples were collected to cover the water volume from the watermain to the kitchen tap. The first 2 1L sample results represent the lead contribution from plumbing within the home perhaps due to the presence of lead solder. The 3rd and 4th 1L samples represent the lead contribution from a partial lead service line owned by the property owner. The 5th and 6th 1L samples represent the lead contribution from the partial copper service line owned by the Approval Holder and the 7th and 8th 1L samples represent the lead contribution from water in the main. Over the 8 sequential 1L samples the lead concentration peaks in the sample volumes corresponding to the privately owned lead service line and then decreases in the sample volumes corresponding to the publicly owned portion of the copper service line and watermain. In this example, the privately owned portion of the service line is the source of lead.

# Appendix G—Example Letters – Lead Investigation Results

## Letter #1: Profile Sample Investigation Results – Lead Service Line Present

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to inform you that the results of our investigation indicate the service line connecting your residence or building to the water main is composed of lead.

Your test results for the profile samples collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead – 1st Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 2nd Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 3rd Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 4th Litre	<i>(insert test result)</i>	0.005 mg/L

Lead service lines are the major contributor to lead levels at the tap. The most effective way to reduce your exposure to lead is complete removal of the lead service line.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life.

Lead is only a concern if ingested. There is no concern with direct contact through bathing or showering. Boiling the water will not remove lead.

*(If your facility provides filters or has a filter rebate program, include information or insert paragraphs below)*

While waiting to have your lead service line replaced, it is recommended that you use a faucet mounted or pitcher style treatment device certified to NSF standards 53 (*filters*) or 58 (*reverse osmosis units*) for the removal of lead. This information can be found on the product label.

Treatment devices are considered an interim measure. They require maintenance as per the manufacturer's recommendations and follow-up sampling to ensure the lead level meets Health Canada's guideline.

In addition to treatment, you can take the following steps to reduce your exposure:

- Whenever water has been left sitting in pipes for several hours (e.g. first thing in the morning, after work), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.

*(If a lead service line is confirmed through construction records or visual confirmation and your facility offers assistance with lead service line replacement, insert the details here or one of the following statements based on the portion of service line composed of lead)*

*(If the public side alone is composed of lead, please insert the following)*

Your *(home or building)* is connected to the watermain through a partial lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. The investigation revealed our portion of the service line is composed of lead. We will contact you when the service line is scheduled for replacement.

*(If the private side alone is composed of lead, please insert the following for the type of structure)*

Your *(home or building)* is connected to the watermain through a partial lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. The investigation revealed your portion of the service line is composed of lead. As such it is your responsibility as a *(home or building owner)* to replace it.

*(If the public and private portions are composed of lead, please insert the following for the type of structure)*

Your *(home or building)* is connected to the watermain through a full lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. Please contact us at *(insert telephone number)* when you plan to replace your portion of the service line so that we can arrange to have our portion replaced at the same time. The full lead service line must be replaced to reduce or eliminate exposure to lead.

For more information on lead, please refer to the following factsheet:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

If you have any questions, please contact us at *(insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

## **Letter #2 : Alternate Method used for Investigation– Lead Service Line Present**

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to inform you that the results of our investigation indicate the service line connecting your residence or building to the water main is composed of lead.

Lead service lines are the major contributor to lead levels at the tap. The most effective way to reduce your exposure to lead is complete removal of the lead service line.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life.

Lead is only a concern if ingested. There is no concern with direct contact through bathing or showering. Boiling the water will not remove lead.

*(If your facility provides filters or has a filter rebate program, include information or insert paragraphs below)*

While waiting to have your lead service line replaced, it is recommended that you use a faucet mounted or pitcher style treatment device certified to NSF standards 53 (*filters*) or 58 (*reverse osmosis units*) for the removal of lead. This information can be found on the product label.

Treatment devices are considered an interim measure. They require maintenance as per the manufacturer's recommendations and follow-up sampling to ensure the lead level meets Health Canada's guideline.

In addition to treatment, you can take the following steps to reduce your exposure:

- Whenever water has been left sitting in pipes for several hours (*e.g. first thing in the morning, after work*), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.

*(If a lead service line is confirmed through construction records or visual confirmation and your facility offers assistance with lead service line replacement, insert the details here or one of the following statements based on the portion of service line composed of lead)*

*(If the public side alone is composed of lead, please insert the following)*

Your *(home or building)* is connected to the watermain through a partial lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. The investigation revealed our portion of the service line is composed of lead. We will contact you when the service line is scheduled for replacement.

*(If the private side alone is composed of lead, please insert the following for the type of structure)*

Your *(home or building)* is connected to the watermain through a partial lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. The investigation revealed your portion of the service line is composed of lead. As such it is your responsibility as a *(home or building owner)* to replace it.

*(If the public and private portions are composed of lead, please insert the following for the type of structure)*

Your *(home or building)* is connected to the watermain through a full lead service line. Ownership of the service line is shared. You own the portion between the curb and your home. *(Insert facility name)* owns the portion between the curb and watermain. Please contact us at *(insert telephone number)* when you plan to replace your portion of the service line so that we can arrange to have our portion replaced at the same time. The full lead service line must be replaced to reduce or eliminate exposure to lead.

For more information on lead, please refer to the following factsheet:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

If you have any questions, please contact us at *(insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

### Letter #3: Profile Sample Investigation Results – Lead Service Line Not Present

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to inform you that the results of our investigation indicate the service line connecting your residence or building to the water main is not composed of lead.

Your test results for the profile samples collected on *(insert date)* are as follows:

Parameter	Your Results	Health Canada Guideline
Lead – 1st Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 2nd Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 3rd Litre	<i>(insert test result)</i>	0.005 mg/L
Lead – 4th Litre	<i>(insert test result)</i>	0.005 mg/L

Although lead can occur naturally in geologic materials, the main source of lead in drinking water is through leaching of plumbing materials with lead or brass components, such as pipes, solder, faucets, and fittings. The National Plumbing Code allowed lead material in pipes until 1975, lead in solder until 1986 and lead in fittings/faucets until 2013.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life. Lead is only a concern if ingested. There is no concern with direct contact through bathing or showering. Boiling the water will not remove lead.

There are steps you can take to reduce your exposure:

- Consider using a drinking water treatment device such as a faucet mounted, or pitcher style unit certified to NSF standard 53 or 58 for the removal of lead.
- Whenever water has been left sitting in pipes for several hours (*e.g. overnight, during work*), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.

For more information on lead, please refer to the following factsheet:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

*If you have any questions, please contact us at (insert facility telephone number or email address)*

Sincerely,

*(Insert facility signature block)*

## Letter #4: Alternate Method used for Investigation – Lead Service Line Not Present

Dear *(Insert customer's name)*:

*(Insert facility name)* would like to inform you that the results of our investigation indicate the service line connecting your residence or building to the water main is not composed of lead.

Although lead can occur naturally in geologic materials, the main source of lead in drinking water is through leaching of plumbing materials with lead or brass components, such as pipes, solder, faucets, and fittings. The National Plumbing Code allowed lead material in pipes until 1975, lead in solder until 1986 and lead in fittings/faucets until 2013.

Exposure to lead can affect brain development and behaviour in children and has been linked to high blood pressure and kidney problems in adults. Every effort should be made to minimize lead exposure throughout a person's life.

Lead is only a concern if ingested. There is no concern with direct contact through bathing or showering. Boiling the water will not remove lead.

There are steps you can take to reduce your exposure:

- Consider using a drinking water treatment device such as a faucet mounted, or pitcher style unit certified to NSF standard 53 or 58 for the removal of lead.
- Whenever water has been left sitting in pipes for several hours (*e.g. overnight, during work*), run the tap for about a minute before drinking or cooking.
- Only use the cold-water tap for drinking or cooking.
- Clean your faucet screen or aerator monthly or more regularly if you see debris.
- Replace brass faucets and valves that can contain lead with fittings certified to have low lead content.

For more information on lead, please refer to the following factsheet:

Health Canada: Drinking Water – What About Lead?

[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf)

*If you have any questions, please contact us at (insert facility telephone number or email address)*

Sincerely,

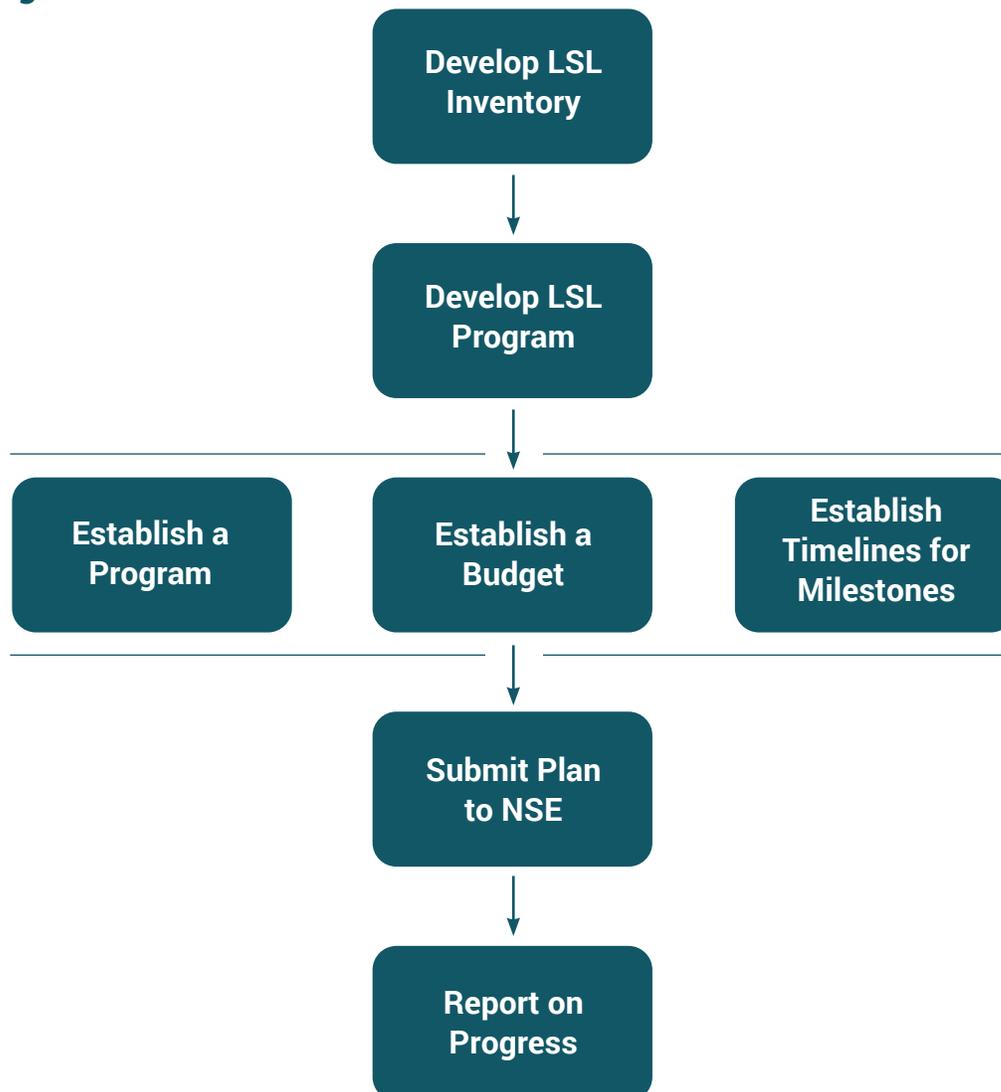
*(Insert facility signature block)*

# Appendix H—Develop a Lead Service Line Replacement Program

## Develop a Lead Service Line Replacement Program

The end-goal of the Lead and Copper Management Program is to remove all lead service lines from the distribution system to mitigate public health exposure risks. As you build your inventory year to year, through sampling and other investigative methods, you will better understand the resources and budget required to establish a sustainable lead service line replacement program.

### How do I get started?



## **Establish your inventory**

Through a combination of service records, sampling results and other investigative methods, you will be able to build an inventory of service line materials in your distribution system. The inventory will be used by the Department to assess on-going annual lead and copper sampling requirements.

Additionally, the inventory will be a fundamental tool for the approval holder to develop and manage a lead service line replacement program.

At a minimum, the inventory should include:

- Service line material on the public side (e.g. lead, copper, unknown, etc.);
- Service line material on the private side; and
- Mechanism for determining the material (e.g. service installation records, sampling, hydrovac etc.).

## **Establish a LSL Program**

The program framework is essentially an outline of the key elements that make up your LSL Program. While each plan may differ between utilities, all programs should include, at a minimum, the following components:

- Target number of annual LSL replacements;
- How the approval holder will handle LSL during watermain breaks;
- How the approval holder will manage LSL replacements as part of infrastructure upgrades;
- How the approval holder will manage LSL replacements following the replacement of the private portion by a homeowner.

When possible, both the private and public portions of the lead service line should be replaced at the same time, as partial replacements result in higher lead concentrations at the tap for prolonged periods of time. Circumstances where this may not be possible include necessary watermain repairs and replacements. In such circumstances, homeowners should be encouraged to replace the private portion. If the homeowner is unable to replace their portion, the approval should provide education resources on ways to minimize exposure to lead (e.g. flushing stagnant water, filtration devices, etc.).

## **Establish a budget**

To ensure a successful and sustainable LSL replacement program, it will be important to establish a funding mechanism for the program. Approval holders are encouraged to explore subsidy opportunities for replacement of lead on the private portion of service lines.

## **Establish Timelines for Milestones**

Your LSL Replacement Program Plan submission should include timelines for key milestones:

- The target number of LSL replacements each year; and
- An estimate of when all lead will be removed from the system. This estimate is derived from the total number of LSL from the inventory divided by the target number of replacements per year.

## **Submit LSL Program Plan to ECC for Approval**

Once developed, your plan should be submitted to NSE for review and acceptance to ensure it satisfies the requirements of the Department. If you have any questions during the planning phase, you are encouraged to contact the Department. Once you've received confirmation that the plan is acceptable to the Department, you and your project team can begin work on implementation.

## **Implementation and Progress Reporting**

Once you begin to implement your program, you will be required to report annually on your progress as part of your annual reporting requirements. Specifically, you will be required to report:

- The total number of LSL lines in your system, broken down by number of service lines with lead on the private side, public side, and both on the private and public sides;
- The number of unknown service lines, broken down by number of service lines with lead on the private side, public side, and both on the private and public sides; and
- The number of replacements completed each year against your target number. If you were unable to meet your target, you will be required to provide rationale and update your program timeline.

## **Post Lead Service Line Replacement Flushing and Sample Collection**

ECC recommends the Approval Holder adhere to ANSI/AWWA standard C810 Replacement and Flushing of Lead Service Lines, 2017, as amended from time to time, for instructions regarding flushing practices and post lead service line replacement sample collection procedures.



