



2020 LEAD SERVICE LINE INVENTORY

ANTELOPE VALLEY DISTRICT METHODOLOGY & PROCEDURE REPORT

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1 - INTRODUCTION

1.1 PURPOSE OF THIS PROCEDURE DOCUMENT

This document outlines the steps, data, and decision methodology used to develop the inventory of lead service lines in the Cal Water Antelope Valley District (District). This inventory meets the legislative requirements established by California Senate Bill No. 1398, approved September 27, 2016.

1.2 GENERAL INFORMATION

Year of Development	2018
Developed By	Bryan Wilfley – Tank & Pipeline Infrastructure Supervisor
Business Owner	Asset Management Department
Contact Information	bwilfley@calwater.com – (408) 483-9943
Responsible Party	Stephen Harrison – Director of Asset Management
Contact Information	sharrison@calwater – (408) 367-8528

2 - California Senate Bill 1398 Overview

2.1 ORIGIN OF CALIFORNIA SENATE BILL 1398

In 2014, the city of Flint Michigan changed their source of water without making the necessary changes to their treatment process to prevent corrosion within the distribution system. The chemistry of the new water source descaled pipes within the distribution system causing lead to leach into the drinking water; primarily from the service lines. This incident resulted in many adverse water quality and health effects in the city of Flint.

Following the highly publicized events in Flint, Senator Connie M. Leyva proposed Senate Bill 1398 (SB 1398) to identify known lead user service lines and to identify areas that may have lead user service lines. This Bill, along with Senate Bill 427 (SB 427), which provides clarification to SB 1398, works to improve drinking water safety by eliminating lead from water distribution systems.

2.2 REQUIREMENTS OF SB 1398

SB 1398 requires all California public water systems to compile an inventory and report known and potential lead user service lines. User service lines are defined by Section 64551.60 of Title 22 of the California Code of Regulations as “the pipe, tubing, and fittings connecting a water main to an individual water meter or service connection”.

The Bill provides two discreet deadlines with specific compliance points. They are summarized below:

- July 1, 2018
 - Compile an inventory of all user service lines and place into three categories:
 - Lead – pipe, tubing or fitting material is identified as lead.
 - Unknown – pipe, tubing or fitting material is unknown.
 - Known – pipe, tubing or fitting material is known.
 - Provide replacement plan for any known lead user service lines.
- July 1, 2020
 - Update existing inventory of all user service lines.
 - Provide replacement plan for any user service lines of unknown material.

2.3 REPORTING

To achieve compliance, the Cal Water user service line inventory will be reported to the California State Water Resources Control Board - Division of Drinking Water (DDW) as part of the annual reporting process. The data has been organized to match Section 19 of the Electronic Annual Reporting (EAR) System. Additionally, this methodology report and relevant maps will be provided to augment the EAR data reported.

3 - METHODOLOGY

3.1 GOAL

The ultimate end state goal of the inventory is to identify the materials for 100% of Cal Water user service lines to ensure the non-existence of lead as a user service line material. Installation records are often incomplete or missing altogether since user service line information was historically seen as unimportant. Using data collection and analysis, testimonies, historical record research and sound logical assumptions, a user service line inventory can be developed with reasonable certainty.

3.2 GENERAL METHOD

To achieve the goal of 2020 Lead Service Line Inventory effort there are two general approaches to identifying the material of user service lines: direct or indirect. Outside of digging each user service line up, identifying the material directly requires that there is an existing record of the user service lines material. This data may reside in multiple locations. Identifying a material indirectly is a much more complicated process. This process requires some installation data (date and location) and a precedent for material type. Given the complex nature of this process, the majority of the discussion of the methodology is dedicated to the process of identifying materials indirectly.

3.3 RECOMMENDED METHODS

The water system in each District is comprised of materials and systems with varying construction dates, years of acquisition, construction standards, and material availability. As such, to effectively comply with established compliance points, a multilateral process had to be developed and implemented. The Lead Service Line Replacement Collaborative (LSLR) and American Water Works Association (AWWA) Research Foundation provided additional direction on effective methods to use in compiling an accurate inventory.

DDW has identified six core methods by which an accurate inventory can be developed. The following sections outline these methods:

(A) Tap Cards or tickets from initial service installation.

These records are work orders for the installation of a water service. At Cal Water these records are known as Service Orders and are maintained within the Customer Care and Billing (CC&B) program. Records that predate the CC&B system have been maintained in physical form.

(B) Plans from water main installation, rehabilitation, and replacement

These records, also known as as-builts, are maintained in the Cal Water GIS and in physical form.

(C) Records indicating when buildings were constructed.

Building construction dates are obtained from the County records.

(D) Meter replacement records

Records for meter replacements are maintained in the CC&B system.

(E) Distribution maps, drawings, or Geographical Information System (GIS).

These records document the actual final installation of infrastructure. Data from these records are maintained in the Cal Water GIS.

(F) Visual confirmation of pipe material by plumbers or utility crews during maintenance or installation activities.

This process relies on incidental reporting of existing materials as identified by workers in the field. This data, if captured at all, is typically found on work orders.

(G) Interviews with water system personnel and/or past employees.

Legacy knowledge from current or past employees may contain vital information regarding the distribution network and can help steer the project team for optimized information development.

(H) Field investigations.

Field investigations represent the final measure to be taken to identify user service line material. This is due to the extensive resources required for direct potholing or sample taking.

It is important to note that the methods described above outline sources of information rather than methods to achieve a completed inventory. To complete the inventory, Cal Water used all of the sources of information above in varying degrees of application. Details in the application of these methods are described in Section 4.

4 - APPROACH

4.1 GENERAL

The abstract approach for this effort is relatively simple: determine with reasonable certainty the material of construction for each user service line. The focus of this effort is to classify each service into one of the following three categories:

- Lead – this user service line has known lead piping, tubing or fittings.
- Known – the material for this user service line is known based on installation data.
- Unknown Service – the material for this user service line is unknown.

The discussion below describes the sources used, assumptions and inferences, and the analysis to develop the inventory. Next to the headings for each section is a letter referencing the DDW recommended method from eAR report. The letters tie to the definitions in Section 3.3.

A temporary designation of Unknown Non-lead was developed and used to help prioritize the investigation. This designation was used for services where the specific material may not have been known but strong evidence that the material was not lead exists. Using this designation, Cal Water was able to focus efforts where the material was unknown and lead could not be ruled out. Section 4.3.4 outlines the process used to eliminate the temporary designation.

4.2 DATA SOURCES

4.2.3 CUSTOMER CARE & BILLING (CC&B) SYSTEM (A) (D)

Cal Water's CC&B system is a database that primarily stores customer data but also houses some asset data, specifically user service line data. The system has evolved from older databases with the initial database creation being September 1, 1989. When user service lines are installed through service orders (discussed later herein), attribute data such as material type and installation date is captured in CC&B. The

attribute data is not a required input as the system is specifically designed to manage customer data and not asset data. This means that data regarding installation date and material type may be incomplete.

It should be noted that services installed prior to the initial creation of the database carried an installation date of September 1, 1989. This date is equivalent to an unknown installation date and has been designated as unknown for this analysis/inventory. Some services were at some point retroactively updated with the proper installation date, however; this was not a common practice by the Customer Service Representatives in the past.

4.2.4 SERVICE ORDERS (A) (F) (H)

At Cal Water, a work order is completed for any installation, replacement, or abandonment of a user service line. These work orders are called Service Orders and are maintained in the CC&B system. Prior to computerized databases, service orders were maintained in a paper file system. The data on these service orders, current and prior, contain installation date at a minimum and often material type.

4.2.5 GEOGRAPHIC INFORMATION SYSTEM (GIS) (B) (C) (E)

The Cal Water GIS contains asset data for pipelines and other assets; however, it does not contain user service lines or meters. The GIS team is currently building this dataset but at the time of this inventory, the data does not exist. The GIS does contain accurate as-built information regarding the construction year and material for all distribution network piping. In addition, the GIS is a repository of other data; such as house construction dates from the County data.

4.2.6 LEGACY EMPLOYEE INTERVIEWS (G)

Many individuals have spent their careers serving communities through their work at Cal Water. These retirees have amassed a wealth of information over their tenure. This repository of information holds clues to past business and construction practices. Although often anecdotal, their testimony helps steer investigations, field observations, and data analysis results.

NOTE: Interviews were not conducted for Antelope Valley District, however; interviews conducted in other districts help inform the historical use of lead in Cal Water distribution systems.

4.2.7 FIELD DATA (F) (H)

Field data is the most reliable data source due to its high level of confidence. However, the cost of field data collection is very high, making it impractical to employ for all user service lines. This data comes from field crews and targeted research for this effort. Their work is captured in service orders or in “as-built” information recorded in CC&B and GIS respectively. The targeted field research varies in scope and can range from simply checking the pipe material that connects to the meter box or as complex as an excavation to expose the user service line in the street.

4.3 DATA ANALYSIS

The analysis used the data sources above to develop an inventory for user service lines in the District. Each service was categorized into one of the three categories described in Section 4.1 through the process outlined below. A flowchart describing the process with results is provided in Appendix A.

The initial steps of the process separates all services into intermediate categories of Known, Unknown Non-Lead, and Unknown. This discretization allows for filtering of the data using a succession of confidence levels, ensuring that the final material designation carries the highest level of certainty.

4.3.1 STEP 1 – CC&B MATERIAL

CC&B data was queried to identify user service lines that have a known material. These records were categorized as “Known.”

4.3.2 STEP 2 – SAFE DRINKING WATER ACT (SDWA)

The Safe Drinking Water Act went into effect on June 18, 1986. Within the SDWA, a stipulation mandates that all materials installed in water distribution systems be non-lead. It is reasonable to assume that any service installed following the initiation of the SDWA would not be lead. Even if the service material is unknown, it is still reasonable to label it as non-lead.

User service line installation dates were identified from two locations: CC&B and GIS main installation data. As discussed in Section 4.2.3, the first computerized database was created on September 1, 1989. Installation dates for user service lines installed prior to the 1989 date were not loaded into the database at the time of its inception. This was due to the large resource commitment required to retrieve this data from the paper Service Orders and input it into the system. However, during the course of regular customer service work, Cal Water employees would record the date from the historical Service Order in the computerized system.

The other source of installation data comes from main installation data stored in the GIS. It is reasonable to assume that user service lines share the same or later date as the main they are attached to. The typical practice is to install user service lines when the main is installed. If a new main is placed in a street where an old main resides, the typical practice is to run new user service lines. Even if there is a special situation where the old user service lines are reconnected to the new main, this would eliminate any lead user service line or lead gooseneck connection since it would not be practical to connect newer materials to lead lines or goose necks due to an incompatibility of connection type.

4.3.3 STEP 3 – HISTORICAL SERVICE ORDER REVIEW

Cal Water Antelope Valley District was established in 2000 through an acquisition of Dominguez Water Company who purchased Antelope Valley Water Company in 1965. Construction records, bill of materials, and service installation standards were reviewed for the District. Records show plastic as materials used for service installation since 1965, which will be referred to as the Precedent Year herein.

4.3.4 STEP 4 – MATERIAL DESIGNATION

All services carrying the Unknown Non-Lead designation were assigned a material type based on the most probable material type for that service installation date. This was done per the direction of the Division of Drinking Water to eliminate the designation of Unknown Non-Lead. The material type in these cases should be seen as an approximation.

The most probable material type for each year is based on the findings from the research of historical installation practices as described earlier herein.

4.3.5 STEP 5 – FIELD DATA COLLECTION

The remaining unknown services are all services that have an installation date that remains unknown or is an installation date we presume to predate the Precedent Year. At this point, all practical desktop style investigations have been completed and the next step is to collect new data.

The remaining unknown services are grouped into cohorts based on similar installation dates, geography, or other similar attributes. Random samples of these cohorts are further investigated to determine the material type. The found material type is then applied to the entire cohort.

Meter Box Material Check

To reduce the overall impact to operations and the community, a meter box check was employed on the remaining unknowns. This process requires an operator to check the service line material coming into the meter box, connecting to the angle-stop (service shutoff valve). The operation will result in one of four possibilities outlined below:

Lead found – service is scheduled for replacement and notification procedures are followed.

Rigid Non-Plastic found – material is noted and recommended for replacement. Although there is no data to suggest that these services contain lead goosenecks, these services represent some of the oldest services in the system. Given the relatively low number of these services possible in the remaining dataset, these services could be replaced without significant impact to operations.

Copper found – material is updated as “known” in the LSL database and the service is removed from the scope of work for potholing and replacement.

Plastic found – material is updated as “known” in the LSL database and the service is removed from the scope of work for potholing and replacement.

The data from the Meter Box Material Check was used to develop the replacement plan outlined in Section 6.

5 - FINDINGS

5.1 BASELINE

Historically, there has never been a strong business case to record the material type for user service lines. In discussion with water purveyors and community system operators, along with information provided in the LSL Collaborative, the lack of user service line material information is common throughout the industry. Due to the lack of data for user service lines, logical inductions and deductions must be made to develop and validate this dataset.

5.2 GENERAL RESULTS

Using the methods and analysis outlined in Section 4, each user service line for the District has been classified into one of three groups:

- Lead Service – this user service line has known lead piping, tubing or fittings.
- Known Service – the material for this user service line is known based on installation and identified by field investigation data.
- Unknown Service – the material is unknown. List of addresses is in Appendix 9.

System	Total Services	Known Service	Unknown Service
Antelope Valley	1,497	1,494	3

5.3 DETAILED RESULTS

The table below contains a summary of the approximate material quantities for the District:

	Water Quality District					
Material	Fremont Valley	Grand Oaks	Lancaster	Leona Valley	Lake Hughes	Total Services
Unknown	-	-	-	-	3	3
Copper	-	-	4	1	1	6
Polyethylene (PE)	35	10	253	122	74	494
Polyvinyl Chloride (PVC)	55	34	419	333	153	994
Total services	90	44	676	456	231	1,497

6 - REPLACEMENT PLAN

6.1 GENERAL

To remain compliant with SB-1398, Cal Water has developed a replacement plan for all user service lines with an unknown material classification.

6.2 REPLACEMENT PLAN

Antelope Valley District has 3 unknown services. The replacement plan will take place in one years starting in the year 2020. Below are the expected replacement numbers with estimated associated costs.

Year	Replacements	Cost (est)
2020	3	\$16,500

6.3 PROGRAM SYNERGY

Section not used for the Antelope Valley District.

6.4 PRIORITIZED REPLACEMENT

Section not used for the Antelope Valley District.

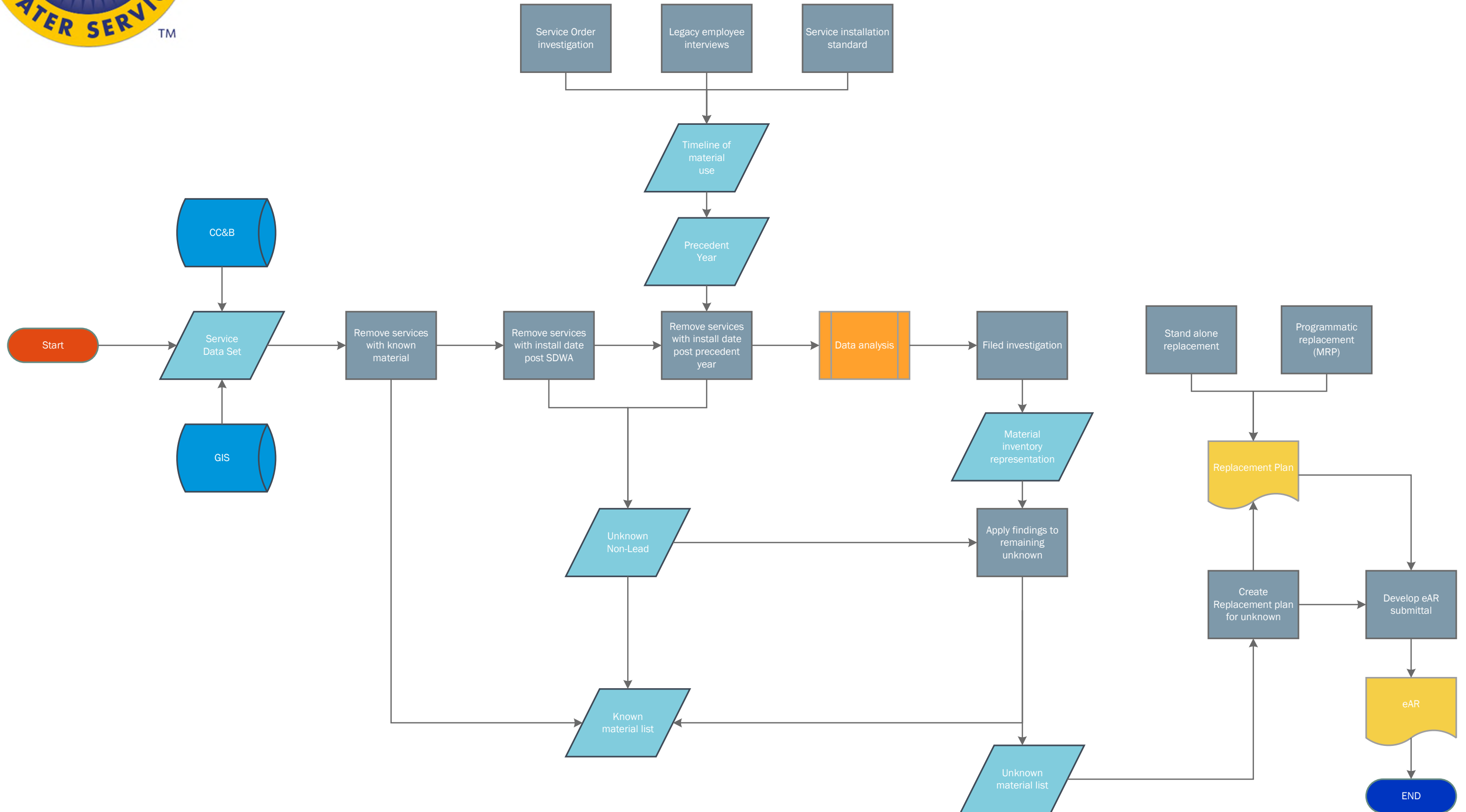
6.5 CONTINUED RESEARCH

It is likely that some of the remaining unknown user service lines have been replaced or that a record indicating their material type exists. Cal Water will continue to review new information and uncovered records for their application in identifying these remaining unknowns.

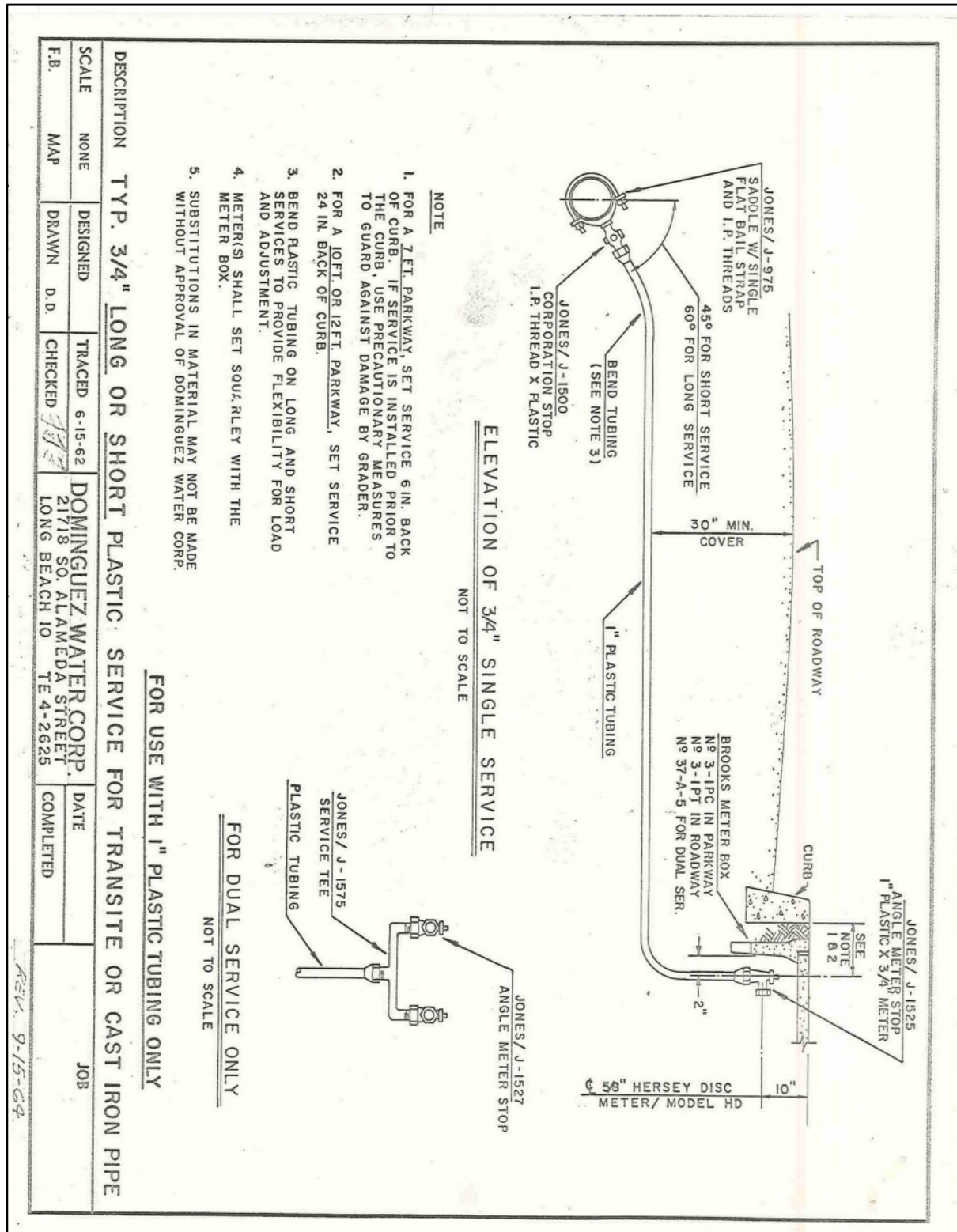
7 -APPENDIX A – PROCESS FLOWCHART



Lead Service Line Inventory Process



8 - APPENDIX B – HISTORICAL SERVICE INSTALLATION STANDARD AND CONSTRUCTION RECORD



9 -APPENDIX C – DETAILED RESULTS

The table below contains the addresses of the unknown services to be replaced according to the replacement plan.

No.	Address	City	State	Zip Code	Replacement Year
1	17601 Lone Pine Trl	Lake Hughes	CA	93532-0000	12/2020
2	43695 Trail G	Lake Hughes	CA	93532-0000	12/2020
3	43697 Trail I	Lake Hughes	CA	93532-0000	12/2020