

# DENVER WATER LEAD REDUCTION PROGRAM

## SEMI-ANNUAL REPORT – 2023

**Version 1.0:** [August 10, 2023](#)

**Presented by:** Denver Water



# ISSUE AND REVISION RECORD

| Version | Date      | Originator | Checker                        | Approver                       | Description       |
|---------|-----------|------------|--------------------------------|--------------------------------|-------------------|
| 1       | 8/10/2023 | LRP Team   | Erika Bender & Quirien Muylwyk | Alexis Woodrow & James Patanio | Formal submission |
|         |           |            |                                |                                |                   |
|         |           |            |                                |                                |                   |

Document ID: DWLRP-1621808796-1482

# TABLE OF CONTENTS

|   |    |
|---|----|
| Executive Summary.....  | 8  |
| Part 1: Introduction.....   | 10 |
| What to Expect: Reporting on Program Activities.....  | 12 |
| Performance Dashboard.....  | 15 |
| Part 2: Required Reporting .....  | 16 |
| 7.B.i CCT .....   | 16 |
| Summary of Actions Taken to Reduce Drinking Water Exposure to Lead at Locations with Elevated Lead Levels [7.B.i.a] .....       | 18 |
| Lead Sampling Results from LCR Compliance and Customer Requested Sampling and 90 <sup>th</sup> Percentiles [7.B.i.b and c]..... | 19 |
| Corrosion Control Treatment Water Quality Parameters for pH and Alkalinity [7.B.i.d] .....                                      | 21 |
| Water Quality Sampling Results from Pre-LSLR Sampling [7.B.i.e] .....   | 21 |
| Water Quality Sampling Results for Post-LSL Replacement [7.B.i.e].....  | 23 |
| Water Quality Results from Select Households (1983 to 1987 Homes) [5.D] .....   | 25 |
| 5th L Sample Collection .....   | 25 |
| 7.B.ii LSL Inventory .....  | 26 |
| Current LSL Inventory [7.B.ii.a, b, c, and d] .....   | 27 |
| Number of LSL Replacements Completed and Incorporated into the Inventory [7.B.ii.d] .....                                       | 30 |
| Investigations of Service Line Material [7.B.ii.b] .....  | 31 |
| Updated LSL Inventory Map [7.B.ii.c] .....  | 36 |
| Summary of Changes to the LSL Inventory [7.B.ii.d].....   | 36 |
| 7.B.iii LSL Replacements.....   | 37 |
| Summary of LSL Replacement Activity during the Reporting Period including Address and Date of Replacement [7.B.iii.a] .....     | 38 |
| Type of LSL Replacements Completed during this Reporting Period [7.B.iii.b] .....   | 39 |
| Customer Consent and Refusal List for LSL Replacement [7.B.iii.c].....  | 40 |
| Emergency Repairs Resulting in a Partial LSL Replacement [7.B.iii.d] .....  | 42 |
| 7.B.iv Filters.....   | 43 |
| Initial Filter Distribution to All Customers Enrolled in the Filter Program [7.B.iv.a] ....                                     | 46 |

|  |    |
|--|----|
| Replacement Filter and Replacement Filter Cartridge Distribution to Customers Enrolled in the Filter Program [7.B.iv.b].....   | 47 |
| Occupancy Changes [5.C].....   | 48 |
| Filter Distribution to Formula-fed Infants in Select Households [5.D].....   | 48 |
| Formal Filter Adoption Survey [7.B.iv.c] .....   | 48 |
| Informal Filter Adoption Survey .....  | 49 |
| Filter Opt-Out List of Customers using Bottled Water or an Alternate Filter [7.B.iv.d] 50                                      |    |
| Filter Refusal List [7.B.iv.e] .....   | 50 |
| Summary of Data to Document Filter Distribution and Filter Program Participation ...   | 51 |
| Confirmation of Filter Performance in the Field [7.B.iv.f] .....   | 52 |
| Information About Filter Usage and Maintenance Collected during Filter Performance Testing [7.B.iv.g] .....                    | 52 |
| Confirmation of Direct Contact with 95% of All Customers Enrolled in the Filter Program [5.G] .....                            | 52 |
| 7.B.v Compliance Metrics per Paragraphs 2.C, 3.D, 4.I, 5.G, 6.B and 6.C .....  | 53 |
| 7.B.vi Communications, Outreach and Education .....  | 55 |
| Outcomes of COE Activities between Jan. 1 and June 30, 2023 (unless otherwise noted) [7.B.vi.a].....                           | 56 |
| Public Outreach .....  | 57 |
| Material Development and Owned Media [7.B.vi.a].....   | 60 |
| Internal Communications and Coordination .....   | 62 |
| Above and Beyond Stories .....   | 63 |
| 7.B.vii Health Equity and Environmental Justice .....  | 64 |
| HE&EJ Integration in the Lead Reduction Program .....  | 65 |
| Incorporating HE&EJ Principles via Communications, Outreach and Education [7.B.vii.a, 7.B.vi.b and to support 7.B.vii.c] ..... | 66 |
| Example of Partners in Action: .....   | 69 |
| HE&EJ Principles Applied to ALSLR Program [7.B.vii.a] .....  | 70 |
| HE&EJ Principles Applied to Filter Program [7.B.vii.a].....  | 71 |
| HE&EJ Principles Applied to Water Quality Sampling .....   | 72 |
| HE&EJ Compliance Metric [7.B.vii.c] .....  | 72 |
| Lessons Learned through HE&EJ Efforts .....  | 74 |
| Part 3: Learning by Doing .....  | 75 |

## LIST OF TABLES

|   |    |
|---|----|
| Table 1. What to Expect in this Report .....  | 13 |
| Table 2. Dates for Data Included in the Semi-Annual Report for 2023 .....   | 14 |
| Table 3. Overview of 7.B.i Requirements .....   | 17 |
| Table 4. Count of Properties with Elevated Lead Concentrations in LCR and Customer<br>Requested Samples <sup>1</sup> .....              | 19 |
| Table 5. LCR Lead Concentrations for LSL and CPLS Homes (Since Program Inception)<br>.....  | 19 |
| Table 6. Summary of LCR 90 <sup>th</sup> Percentile Lead Concentrations (Jan. 1 to June 30, 2023)<br>.....                              | 20 |
| Table 7. Minimum Daily Average pH Reported Each Month .....   | 21 |
| Table 8. Summary of Water Quality Results pre-LSL Replacement at Single-Family<br>Residences using the 3-Bottle Test .....              | 22 |
| Table 9. Summary of Post-Replacement Sampling Offers and Water Quality (Jan. 1<br>through June 30, 2023) .....                          | 24 |
| Table 10. Overview of 5 <sup>th</sup> Liter Sampling Data in Spring 2023 .....  | 26 |
| Table 11. Overview of 7.B.ii Requirements .....   | 27 |
| Table 12. Lead Service Line Inventory as of June 30, 2023 .....   | 29 |
| Table 13. Number of LSL Replacements Between Jan. 1 and June 30, 2023.....  | 30 |
| Table 14. Outcomes from Visual <sup>1</sup> Verifications as part of the 2023 ALSLR Plan (Jan. 1 to<br>June 30, 2023) .....             | 33 |
| Table 15. Outcomes from Visual Investigations <sup>1</sup> Independent of the 2023<br>ALSLR Plan from Jan. 1 to June 30, 2023 .....     | 34 |
| Table 16. Outcomes from Water Quality Verifications <sup>1</sup> as part of the 2023 ALSLR Plan<br>(Jan. 1 to June 30, 2023) .....      | 35 |
| Table 17. Outcomes from Water Quality Investigations <sup>1</sup> Independent of the 2023 ALSLR<br>Plan (Jan. 1 to June 30, 2023) ..... | 35 |
| Table 18. Number of Investigations Performed to Determine the Material of the Service<br>Line between Jan. 1 and June 30, 2023.....     | 36 |
| Table 19. Overview of 7.B.iii Requirements .....  | 38 |
| Table 20. Type of LSL Replacements (Jan. 1 to June 30 <sup>1</sup> , 2023) .....  | 40 |
| Table 21. Summary of Consent and LSL Refusal List (Jan. 1 to June 30, 2023) .....   | 41 |
| Table 22. Overview of 7.B.iv Requirements .....   | 44 |
| Table 23. Summary of Filter Distribution (Jan. 1 to June 30, 2023) .....  | 46 |
| Table 24. Summary of Six-Month Supply post-LSL Replacement Filter Distribution (June 4<br>to Dec. 31, 2022) .....                       | 47 |
| Table 25. Summary of Filter Program Opt-Outs .....  | 50 |
| Table 26. Summary of Filter Refusal List.....   | 51 |
| Table 27. Summary of Compliance .....   | 53 |
| Table 28. Overview of 7.B.vi Requirements .....   | 56 |
| Table 29. Overview of 7.B.vii Requirements .....  | 65 |

|  |    |
|--|----|
| Table 30. Projected HE&EJ Compliance Metric Calculation for 2023 ..... | 74 |
|--|----|

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 1. Dashboard as Posted to the Denver Water Website (Data to June 30, 2023) ...                                      | 15 |
| Figure 2. Changes in the Base and Current Inventory (Jan. 1 to June 30, 2023, using Data from Table 12) <sup>1</sup> ..... | 37 |

## LIST OF APPENDICES

|                 |   |
|-----------------|---|
| Appendix REG-1  | List of Compliance-Related Submissions (First Six-Month Period of 2023)   |
| Appendix CCT-1  | Summary of Response to Elevated Lead Levels (First Six-Month Period of 2023)  |
| Appendix CCT-2  | Post LSL Replacement Sampling – Summary of Completed Offer to Test (Cumulative since LRP Inception)                   |
| Appendix CCT-3  | Post LSL Replacement Sampling – Summary of Incomplete Offer to Test (Cumulative since LRP Inception)                  |
| Appendix CCT-4  | Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Cumulative since LRP Inception) |
| Appendix INV-1  | Summary of Service Line Status and p-Value (First Six-Month Period of 2023)   |
| Appendix INV-2A | Line by Line p-Value Changes: Status Descriptions and Notes (First Six-Month Period of 2023)                          |
| Appendix INV-2B | Line by Line p-Value Changes by Status (First Six-Month Period of 2023)   |
| Appendix INV-3  | Results from Visual Verifications as part of the 2023 ALSLR Program (First Six-Month Period of 2023)                  |
| Appendix INV-4  | Results from Visual Investigations not part of the 2023 ALSLR Program (First Six-Month Period of 2023)                |
| Appendix INV-5  | Water Quality Investigations (First Six-Month Period of 2023)   |
| Appendix LSL-1  | Addresses and Types of Replacements (First Six-Month Period of 2023)  |
| Appendix LSL-2  | LSL Replacement Refusal List (First Six-Month Period of 2023)   |
| Appendix LSL-3  | Properties with a Partial Replacement (Cumulative since LRP Inception)  |
| Appendix LSL-4  | Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (Since Program Inception)    |
| Appendix LSL-5  | Ownership Changes for Properties on the Refusal List (First Six-Month Period of 2023)                                 |

|                 |  |
|-----------------|--|
| Appendix FIL-1  | Filter Program Opt-Outs (First Six-Month Period of 2023)                             |
| Appendix FIL-2  | Filter Program Refusals (First Six-Month Period of 2023)                             |
| Appendix FIL-3  | Confirmation of Filter Performance in Field Results (First Six-Month Period of 2023) |
| Appendix FIL-4  | Occupancy Changes – COE Distribution (First Six-Month Period of 2023)                |
| Appendix FIL-5  | Occupancy Changes – Pitcher Filter Distribution (First Six-Month Period of 2023)     |
| Appendix FIL-6  | Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2023)     |
| Appendix FIL-7  | Filter Program Replacement Cartridge Returns (First Six-Month Period of 2023)        |
| Appendix FIL-8  | Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2023)  |
| Appendix COE-1  | Stakeholder Advisory Committee 2023 Membership List                                  |
| Appendix COE-2  | January and March Issues of WaterNews  |
| Appendix COE-3  | Construction Preparedness Virtual Community Meeting Email Invitations                |
| Appendix COE-4  | Lead Service Line Replacement Overview Booklet – Mailed with Consent Form (Updated)  |
| Appendix COE-5  | What to Expect with Service Line Replacement Booklet – Provided at In-Home Visit     |
| Appendix COE-6  | No Parking Card  |
| Appendix COE-7  | Investigation Potholing Notification Postcard (Updated)                              |
| Appendix COE-8  | Program Removal Mailing List (p-Value Changes)                                       |
| Appendix COE-9  | Investigation Water Quality Test Kit Offer Postcard                                  |
| Appendix COE-10 | March Subscriber Email   |
| Appendix COE-11 | Earned Media Reports   |
| Appendix COE-12 | TAP Stories Published  |
| Appendix COE-13 | Website Visits   |
| Appendix HEJ-1  | Ambassador Partner Spanish Language Articles   |
| Appendix HEJ-2  | Vietnamese Materials   |
| Appendix HEJ-3  | Youth Education Knowledge Drops Newsletter Content                                   |

## LIST OF ACRONYMS

|                 |  |
|-----------------|--|
| µg/L            | micrograms per liter                                     |
| mg/L            | milligrams per liter                                     |
| ALSLR           | Accelerated Lead Service Line Replacement                |
| CASS            | Coding Accuracy Support System                           |
| CCT             | Corrosion control treatment                              |
| CDPHE           | Colorado Department of Public Health and Environment     |
| COE             | Communications, Outreach and Education                   |
| CPL             | Copper plumbing with lead solder                         |
| EPA             | Environmental Protection Agency                          |
| FFLSLP          | Federally Funded Lead Service Line Program               |
| GRR             | Galvanized requiring replacement                         |
| HE&EJ           | Health equity and environmental justice                  |
| LCR             | Lead and Copper Rule                                     |
| LCR Variance    | Dec. 16, 2019, Variance Order                            |
| LCRR            | Lead and Copper Rule Revisions                           |
| LCRR Variance   | Nov. 30, 2022, Variance Order                            |
| LIMS            | Laboratory Information Management System                 |
| LRP             | Lead Reduction Program                                   |
| LRPP            | Lead Reduction Program Plan                              |
| LSL             | Lead service line  |
| LSLR            | Lead service line replacement                            |
| NSF             | National Sanitation Foundation                           |
| OCCT            | Optimal corrosion control treatment                      |
| QA/QC           | Quality Assurance / Quality Control                      |
| T&D             | Transmission and Distribution                            |
| WTP             | Water treatment plant                                    |
| 2023 ALSLR Plan | 2023 planned replacements (regardless of funding source) |



## EXECUTIVE SUMMARY

Denver Water is committed to reducing the lead exposure levels to customers from lead service lines (LSLs) and plumbing. In December 2019, Denver Water began the process of implementing the Lead Reduction Program (LRP) in accordance with the Environmental Protection Agency (EPA)'s Dec. 16, 2019, Variance approval of Denver Water's request for modification of optimal corrosion control treatment (OCCT) under the Lead and Copper Rule (LCR). In 2022, Denver Water sought a new Variance under the Lead and Copper Rule Revisions (LCRR) and currently implements the LRP under the updated Nov. 30, 2022, Variance. Additionally, in late 2022, Denver Water received funding for lead service line removal made possible by the Bipartisan Infrastructure Act, which dedicated federal funds specifically for lead service line removal. These funds are being used to increase the total number of lead service lines replaced in 2023 and 2024. Denver Water aims to replace approximately 5,600 additional lead service lines made possible using the federal funds. From the perspective of the public, everything is under the larger umbrella of the Lead Reduction Program. For the purposes of reporting, the work completed using federal funds is treated separately from the Lead Reduction Program. However, in some sections of the report, references to the *federal plan* may occur regarding investigations, LSL replacements and COE activities. Copies of the reports related to the use of federal funds for lead service line replacement are available upon request.

The LRP provides a holistic and permanent lead reduction approach that will significantly reduce lead exposure to customers and be less harmful to the environment than orthophosphate treatment. The semi-annual report for 2023 presents the performance of the LRP for Jan. 1 through June 30, 2023, as implemented per the Lead Reduction Program Plan (LRPP). The Nov. 30, 2022, Variance went into effect Jan. 1, 2023, and all results presented in this report for Jan. 1 through June 30, 2023, fall under its jurisdiction.

From Jan. 1 through June 30, 2023, the following have been achieved:

- Results from lead sampling indicate that lead levels continue to decline at homes with lead service lines and homes with copper plumbing with lead solder from the continuously maintained elevated pH ( $8.8 \pm 0.3$ ) in the distribution system. The 90th percentile lead levels continued to be measured at less than 5 µg/L in 2023.

**TABLE ES-1. CCT PERFORMANCE BASED ON OVERALL 90<sup>TH</sup> PERCENTILE LEAD CONCENTRATION**

| LCR Six-Month Sampling Period  | 2019 | 2020 | 2021 | 2022 | 2023             |
|--|------|------|------|------|------------------|
| Spring Overall 90 <sup>th</sup> Percentile Lead Concentration (µg/L) | 10.0 | 6.7  | 4.1  | 3.9  | 3.6 <sup>1</sup> |
| Fall Overall 90 <sup>th</sup> Percentile Lead Concentration (µg/L)   | 11.0 | 4.4  | 4.4  | 3.8  | --               |

<sup>1</sup> The 90th percentile Spring 2023 lead concentration as approved by CDPHE in their Aug. 1, 2023, letter.

- A total of 3,311 LSL replacements were completed, meeting 74% of the annual replacement goal of 4,477.
- A total of 3,900 investigations of service lines were completed, using a combination of methods, such as water quality sampling, potholing, interior inspections and desktop review. The number of investigations surpasses the annual investigation goal of 2,421 (1.4% of unknown service lines).
- Approximately 91% of samples collected from filters in the customers' homes had non-detect lead concentrations, and 100% of samples collected from filters in the customers' homes had lead concentrations under 3 µg/L.

The 2023 annual report will detail the filter adoption survey, which is to occur in the second half of 2023, and will present the results of the equivalency model for the program year 2023. Overall, the performance of the first half of 2023 is on track to meet and/or surpass the performance metrics for the program year.

## PART 1: INTRODUCTION

In 2012, at the end of Denver Water’s annual lead and copper monitoring period, the 90th percentile value for lead levels in tap water was 17 µg/L, exceeding the Lead and Copper Rule (LCR) action level of 15 µg/L.<sup>1</sup> From 2013 through 2017, Denver Water completed several corrosion control studies and adjusted treatment to optimize pH/alkalinity control. Based on these studies, in 2018, the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division designated phosphate-based corrosion inhibitor addition (orthophosphate) as the optimal corrosion control treatment (OCCT) and ordered Denver Water to install and operate the designated corrosion control treatment by March 20, 2020. The designation of orthophosphate raised concerns among stakeholders that increased loads of phosphorous from orthophosphate treatment would adversely impact Colorado’s streams and rivers, which were already nutrient-stressed, as well as regional wastewater treatment operations, and drinking water treatment supplies. Denver Water was also concerned that orthophosphate treatment would not solve the ultimate public health issue of tackling lead at its source through removal of LSLs.

In response, Denver Water developed a proposal to implement the Lead Reduction Program (LRP), as a holistic alternative treatment technique with a permanent solution to addressing lead in drinking water through the removal of all lead service lines (LSLs) within 15 years. To request approval, Denver Water developed a Lead Reduction Program Plan (LRPP) that described how Denver Water planned to implement the LRP if it were approved.<sup>2</sup> On Nov. 15, 2019, CDPHE granted Denver Water’s request to modify the OCCT designated for Denver Water in accordance with § 11.26(3)(d)(iii) of the Colorado Primary Drinking Water Regulations, 5 CCR §§ 1002-11, et seq., subject to the Environmental Protection Agency (EPA)’s approval of Denver Water’s variance request. Subsequently, on Dec. 16, 2019, EPA granted the Variance to Denver Water from OCCT pursuant to § 1415(a)(3) of the SDWA, 42 U.S.C. § 300g-4, and 40 C.F.R. § 142.46 for a three-year term beginning Jan. 1, 2020.<sup>3</sup>

In December 2019, Denver Water began the process of implementing the Lead Reduction Program Plan (LRPP) in accordance with EPA’s Dec. 16, 2019, Variance (LCR Variance) approval of Denver Water’s request for modification of OCCT under the LCR.

Denver Water met or surpassed all performance metrics required as part of the LCR Variance in the first three years of the program:

- Results from LCR compliance sampling indicate that lead levels continue to decline.

---

<sup>1</sup> Note there have been no exceedances of the 90th percentile calculation under the LCR since 2012.

<sup>2</sup> See Denver Water’s [lead webpage](#) for more information on how the LRP is currently implemented and the [resource page](#) for all supporting documentation of the LRP.

<sup>3</sup> See Denver Water’s [2019 Variance](#) for more details.

- Since the implementation of corrosion control treatment (CCT) in March 2020, the 90th percentile lead levels have continuously been measured at less than 5 µg/L.
- By the end of 2022, over 15,000 LSLs have been replaced, nearly 10,000 in areas designated as having health equity and environmental justice (HE&EJ) concerns.
- As part of the Filter Program, all customers who have a likely or confirmed LSL are provided a pitcher filter kit and continue to be supplied replacement cartridges, per the manufacturer’s recommendations.
- Consistently, the filter adoption survey has shown an adoption rate of over 80%.

In 2022, Denver Water sought a new Variance under the Lead and Copper Rule Revisions (LCRR). On Nov. 30, 2022, EPA issued a new variance that allows Denver Water to continue to implement the LRPP as an alternative treatment technique for the remaining 12 years of the program through Jan. 1, 2025. Denver Water currently implements the LRPP under the updated Nov. 30, 2022, Variance (LCRR Variance).<sup>4</sup> All references to the Variance throughout this report are for the LCRR Variance, which the Denver Water LRP operates under, as of Jan. 1, 2023.

This semi-annual report was prepared in compliance with paragraph 7.B of the LCRR Variance and commitments made by Denver Water in the 2019 LRPP. This report addresses the first six months of 2023 for the period of Jan. 1, 2023, through June 30, 2023.

The following plans are referenced throughout this report:

- LRPP (submitted Sept. 16, 2019, and approved Dec. 16, 2019) and its amendment (submitted July 17, 2023)
- 2023 Accelerated Lead Service Line Replacement (ALSLR) Plan (not a formal submission, identifies all properties planned for replacement in 2023)
- 2023 Communications, Outreach and Education (COE) Plan (submitted Feb. 10, 2023, alongside the 2022 Annual Report)
- Elevated Lead Response Plan (re-submitted July 6, 2021)
- Corrosion Control Treatment (CCT) Implementation Plan (re-submitted June 4, 2020)
- Nitrification Control Plan (re-submitted July 15, 2021)

A technical amendment to the LRPP was submitted to EPA and CDPHE on July 17, 2023, as required by the LCRR Variance.

---

<sup>4</sup> See Denver Water’s [2022 Variance](#) for more details.

*B. Reporting and Recordkeeping. All of the requirements of the LCRR other than the definition of OCCT as the term relates to 40 C.F.R. § 141.82(e) remain in effect, including the reporting and recordkeeping requirements. In addition, Denver Water shall record, maintain records of, and report the following information to CDPHE and EPA every six months on February 10 and August 10, except as noted below. Denver Water will provide any of the raw data to CDPHE and EPA, within 30 Days, when requested.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

## **What to Expect: Reporting on Program Activities**

The purpose of the semi-annual and annual reports is to document the implementation of the LRP, describe the actions taken by Denver Water to reduce lead levels and support the subsequent evaluation of the LRP performance.

The performance data included for the different elements of the LRP described in this report vary depending on the launch date of the different program elements (see Table 1). The reporting dates for the different program elements are shown in Table 2. In general, data are detailed for the first six-month period of 2023, with the exception to provide additional information not included in previous reports.

**TABLE 1. WHAT TO EXPECT IN THIS REPORT**

| <b>Paragraph<br/>(and LRP Task)</b>                    | <b>What to Expect in this Annual Report and Status</b>  |
|--|---|
| <b>7.B.i CCT</b>                                       | This section includes a summary of CCT results for the first six months of 2023.  |
| <b>7.B.ii LSL Inventory</b>                            | Denver Water first published the LSL Inventory on its website on March 5, 2020.<br>The map was updated on the Denver Water website on July 19, 2023, using data current up to June 30, 2023.                                |
| <b>7.B.iii LSL Replacements (aka ALSLR Program)</b>    | This section summarizes the number and type of replacements completed.<br>Denver Water crews have been replacing lead service lines since Jan. 1, 2020. Contractors started lead service line replacement on March 5, 2020. |
| <b>7.B.iv Filters (aka Filter Program)</b>             | This section summarizes filter distribution.<br>Initial filter distribution was completed by Sept. 21, 2020.<br>Replacement filter distribution was initiated on July 1, 2020, and continued through 2023.                  |
| <b>7.B.v Compliance Metrics</b>                        | The Equivalency Model is updated using data collected for the program year. This information will be presented in the 2023 Annual Report.   |
| <b>7.B.vi Communications, Outreach and Education</b>   | This section describes implementation of the 2023 COE Plan, <sup>1</sup> virtual community meetings, engagement with the Stakeholder Advisory Committee, and development of new customer resources and materials.           |
| <b>7.B.vii Health Equity and Environmental Justice</b> | This section summarizes implementation of the 2023 COE Plan including updates on activities to support increased equity, community partnerships and outreach.   |
| <b>Appendices</b>                                      | Appendices include CCT, LSL inventory, water quality results, LSL replacements, customer refusal lists, COE and HE&EJ.  |

<sup>1</sup> See Appendix COE-17 2023 COE Plan in the 2022 Annual Report (submitted Feb. 10, 2023).

**TABLE 2. DATES FOR DATA INCLUDED IN THE SEMI-ANNUAL REPORT FOR 2023**

| Description  | Semi-Annual Report (2023)  |
|--|--|
| <b>LCR 90<sup>th</sup> Percentile Lead Concentration based on Compliance and Customer Requested Samples</b>                          | All LCR compliance samples collected from Jan. 1 to June 30<br>All customer requested samples reported in LIMS <sup>1</sup> between Jan. 1 and June 30 |
| <b>Elevated Lead Response Reporting</b>  | All results reported in LIMS by June 30 <sup>2</sup>   |
| <b>Water Quality Sampling from Select Households (1983 to 1987 Homes)</b>  | All results reported in LIMS by June 30  |
| <b>Inventory – Posting of Map to Denver Water’s Website</b>  | Data through June 30, 2023<br>Posted July 19, 2023   |
| <b>Inventory – Update</b>  | Jan. 1 to June 30  |
| <b>Investigations – Verification Potholing as Part of ALSLR Program</b>  | Jan. 1 to June 30  |
| <b>Investigations – Investigative Potholing Independent of ALSLR Program</b>   | Jan. 1 to June 30  |
| <b>Investigations – Water Quality Sampling as part of ALSLR Program (not included in 90<sup>th</sup> Percentile Calculation)</b>     | All results reported in LIMS by June 30  |
| <b>Investigations – Water Quality Sampling Independent of ALSLR Program (not included in 90<sup>th</sup> Percentile Calculation)</b> | All results reported in LIMS by June 30  |
| <b>Water Quality Sampling Post-LSL Replacement</b>   | All results reported in LIMS by June 30  |
| <b>ALSLR Program Replacements</b>  | Jan. 1 to June 30  |
| <b>ALSLR Program Consent Forms</b>   | Jan. 1 to June 30  |
| <b>Initial Filter Distribution</b>   | Jan. 1 to June 30  |
| <b>Replacement Filter Distribution</b>   | Jan. 1 to June 30  |
| <b>Filter Program Occupancy Changes<sup>3</sup></b>  | Jan. 1 to June 30  |
| <b>Informal Filter Adoption Survey as Part of ALSLR Program</b>  | Jan. 1 to June 30  |
| <b>Filter Testing in the Field</b>   | Jan. 1 to June 30  |
| <b>COE Activities</b>  | Jan. 1 to June 30  |

<sup>1</sup> LIMS is the Laboratory Information Management System used by Denver Water.

<sup>2</sup> For samples collected and reported in LIMS by June 30 and follow-up response by June 30, 2023.

<sup>3</sup> Includes occupancy changes at ALSLR properties.

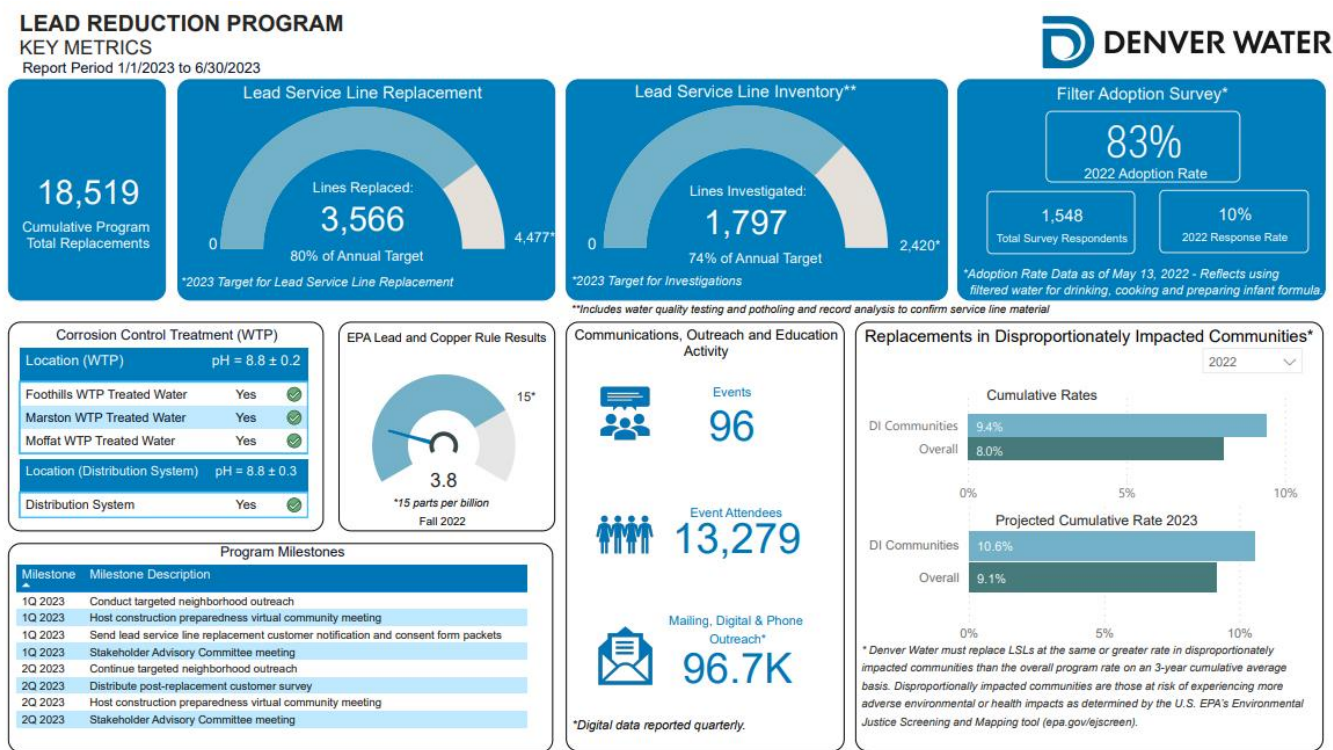


# Performance Dashboard

Denver Water uses a dashboard to communicate key metrics and share the progress of the LRP with the public. The dashboard was most recently posted on Denver Water’s website on July 19, 2023, in both English and Spanish, and currently shows data through June 30, 2023.<sup>5</sup> The dashboard can be accessed from the Denver Water website at: <https://www.denverwater.org/your-water/water-quality/lead/dashboard>.

In April 2023, the dashboard was reformatted to include the new health equity and environmental justice (HE&EJ) metric included in the LCRR Variance.<sup>6</sup> To integrate this information into the dashboard, the graph showing month-to-month service line replacement totals for the year was removed. The overall total number of replacements for the year-to-date continues to be shown in the top row of the dashboard, while the newly added HE&EJ metric is displayed in the bottom right corner, presenting Denver Water’s and the LRP’s commitment to equity.

**FIGURE 1. DASHBOARD AS POSTED TO THE DENVER WATER WEBSITE (DATA TO JUNE 30, 2023)<sup>1</sup>**



<sup>1</sup> The numbers reflected in the public dashboard through June 30, 2023, may not match the numbers presented in this report due to a data lag and reconciliation after the dashboard publication.

<sup>5</sup> See the 2020 Second Quarterly Report for an explanation of the metrics used in the dashboard.

<sup>6</sup> See Section 7.B.vii.c for details on how the HE&EJ metric is calculated.



## PART 2: REQUIRED REPORTING

### 7.B.i CCT

Section 7.B.i of the LCRR Variance addresses Denver Water's Corrosion Control Treatment (CCT) recordkeeping and reporting requirements for 2023 for the following parameters:

*i. CCT*

- a. notification to CDPHE and EPA of elevated lead levels and the actions that Denver Water is taking to reduce drinking water exposure to lead at those locations;*
- b. all lead and copper compliance tap sampling results, as required in Subpart I of 40 C.F.R. Part 141 and Section 11.26 of 5 CCR 1002-11, as well as the results of any customer requested samples;*
- c. 90<sup>th</sup> percentile lead levels overall, for LSLs, and for copper with lead solder sites;*
- d. CCT water quality parameters for pH and alkalinity; and*
- e. all lead and water quality results collected as part of Denver Water's investigation of LSLs and post LSL replacement and service line material of those sites.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

Denver Water uses a combination of water quality parameters and lead sampling results to report the performance of CCT. Since monthly reports are no longer required under the LCRR Variance, information that was previously reported as part of the monthly reports is not included in this report, with the exception of a summary of some data. Additional data can be provided upon request.<sup>7</sup>

CCT with pH adjustment is used to manage lead release from lead service lines, as well as homes with copper plumbing with lead solder. Homes with an LSL that opt out of the LRP are also offered some protection through pH adjustment. Denver Water's LRP webpage has a page dedicated to pH adjustment. The page describes the reasoning of the pH adjustment and how it benefits customers with an LSL or lead in their premise plumbing, answers FAQs and describes any downstream effects. Water treatment to adjust pH above 8.5 (required by the Dec. 16, 2019, Variance) was initiated at the Marston and Foothills Treatment Plants on March 3, 2020; treatment was initiated at the Moffat Treatment Plant when it returned to service on May 1, 2020. The cumulative 90th percentile lead level in the system before the pH change on March 3, 2020, was approximately 13 micrograms per liter (µg/L). After the pH stabilized at 8.8, the lead levels

<sup>7</sup> See Appendix REG-1 List of Compliance Related Submissions (First Six Months of 2023) for a list of submittals to EPA and CDPHE for Jan. 1, 2023, through June 30, 2023. For future reporting, if no former letters are submitted to EPA or CDPHE during the reporting period, this appendix will not be provided.

started to decline, eventually stabilizing by August of that same year to a 90th percentile lead concentration below 5 µg/L. The 90th percentile lead levels represent a greater than 60% decrease in lead levels due to CCT implementation.

During this reporting period, Denver Water continued to operate at or near a pH of 8.8 at all three plants. In addition to the information presented in this report, Denver Water also submitted several miscellaneous reports to CDPHE and EPA as required in the LRPP and described in Table 3.

**TABLE 3. OVERVIEW OF 7.B.I REQUIREMENTS**

| Paragraph Reference                             | Description   | Refer to   |
|---|---|--|
| <b>7.B.i.a</b>                                  | Notify CDPHE of elevated lead levels and actions taken by Denver Water to reduce lead exposure.   | See Table 4 and Appendix. <sup>1</sup>   |
| <b>7.B.i.b</b>                                  | Lead sampling results per the Lead and Copper Rule and from customer requested sampling.  | See Table 6 (90 <sup>th</sup> percentile to date).   |
| <b>LRPP III.E (p 70)</b>                        | Monthly trending of LCR compliance samples and customer requested samples.  | See Table 4.   |
| <b>7.B.i.c</b>                                  | 90 <sup>th</sup> percentile lead levels for LSLs and for copper with lead solder sites.   | See Table 5.   |
| <b>7.B.i.d</b>                                  | CCT parameters for pH and alkalinity, reported monthly.   | See Table 7.   |
| <b>LRPP III.E (p 70)</b>                        | Install automated pH control loops at all three treatment plants by March 2020.   | All three plants have feedback loops in place and are functioning.                               |
| <b>7.B.i.e</b>                                  | All lead and water quality sampling results from investigations for LSLs.<br>All lead and water quality sampling results from post-LSL replacement sampling.<br>Note that lead results from investigations and post-LSL replacement sampling are not included in the calculation of the 90 <sup>th</sup> percentile lead concentration. | See Table 8 and Table 9.   |
| <b>LRPP Executive Summary LRPP III.E (p 65)</b> | Targeted communications for select households built between 1983 to 1987 that self-identify as expecting or existing families with formula-fed infants and children up to 2 years of age.<br>Offer water quality sampling; provide filter if lead measured > 3 µg/L (as described in paragraph 5.D).                                    | Described with section 7.B.vi.<br>Outreach materials launched Aug. 21, 2020.<br>See Section 5.D. |
| <b>LRPP III.E (p 71)</b>                        | Complete distribution system modeling, evaluating pH, disinfection by-products and water age by Jan. 31, 2020.<br>Submit nitrification control plan by June 30, 2020, to address sampling, monitoring, and flushing.  | Submitted July 6, 2020.<br>Re-submitted July 15, 2021.   |
| <b>Voluntary</b>                                | Results from continued operation of the pipe racks.   | Submitted Feb. 16, 2022.   |

<sup>1</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2023).

Water testing is a simple method for Denver Water and its customers to identify potential risks of lead exposure. Denver Water manages lead and water quality samples via its Laboratory Information Management System (LIMS), with analysis performed by either the Denver Water Quality Lab or a contract lab. The sub-category (pre-LSLR, post-LSLR, customer-requested) under which the sample was collected is reported in LIMS, including LCR compliance samples, customer requested samples, customer requested samples from select households built between 1983 to 1987 (self-identifying as a home with a formula-fed infant), pre-LSL replacement investigative water quality samples and post-LSL replacement water quality samples. Denver Water uses a three-bottle test for customer-requested and investigative water quality sampling under the LCRR Variance for consistency with past practices, as the three-bottle technique is a very effective sampling method for finding service line material.

### [Summary of Actions Taken to Reduce Drinking Water Exposure to Lead at Locations with Elevated Lead Levels \[7.B.i.a\]](#)

Per Section 7.B.i.a of the LCRR Variance, Denver Water must provide “notification to CDPHE and EPA of elevated lead levels and the actions that Denver Water is taking to reduce drinking water exposure to lead at those locations.” In 2020, Denver Water set the elevated lead investigative response level at 15 and 25 µg/L in LCR compliance and customer requested samples, respectively, under its Elevated Lead Response Plan approved by CDPHE and EPA. Denver Water continues to sample the first liter under the LCR, but will transition to fifth-liter sampling in 2024 to meet the requirements of the LCRR.<sup>8</sup>

All customer-requested samples with first draw concentrations above 25 µg/L analyzed by month during the first half of 2023 are listed in Table 4.<sup>9</sup> A lead result over 25 µg/L in the first sample bottle for a customer’s home will trigger follow up and investigative sampling, as outlined in the Corrosion Control Treatment Implementation Plan.<sup>10</sup> Lead was measured above 25 µg/L in three samples during the reporting period for the first six months of 2023.

---

<sup>8</sup> See EPA’s [Lead and Copper Rule Revisions](#) for more details on sampling methods.

<sup>9</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2023) for elevated lead measured in the first bottle of the 3-bottle test.

<sup>10</sup> See Corrosion Control Treatment Implementation Plan re-submitted to CDPHE on June 4, 2020.

**TABLE 4. COUNT OF PROPERTIES WITH ELEVATED LEAD CONCENTRATIONS IN LCR AND CUSTOMER REQUESTED SAMPLES<sup>1</sup>**

| Description (Based on Sampling Date)                               | January 2023 | February 2023 | March 2023 | April 2023 | May 2023 | June 2023 | Response  |
|--|--------------|---------------|------------|------------|----------|-----------|---|
| <b>Properties with Lead &gt;25 µg/L in first 1 L sample bottle</b> | 0            | 1             | 0          | 1          | 0        | 1         | Reported to CDPHE within 10 days.<br>See Appendix. <sup>2</sup> |

<sup>1</sup> Although the Elevated Lead Response Plan applies only to LCR and eligible customer requested samples, the features of the plan are applied to results generated from pre-LSL replacement water quality samples obtained from properties included in the LRP for a consistent customer experience. The actions taken at these properties to investigate elevated lead are described in Appendix CCT-1 per the definition used in the LCRR Variance. Data reflect samples analyzed by June 30, 2023.

<sup>2</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2023).

**Lead Sampling Results from LCR Compliance and Customer Requested Sampling and 90<sup>th</sup> Percentiles [7.B.i.b and c]**

Per Section 7.B.i.b and 7.B.i.c of the LCRR Variance, Denver Water must provide “all lead and copper compliance tap sampling results, as required in Subpart I of 40 C.F.R. Part 141 and 5 CCR 1002-11.26, as well as the results of any customer requested samples, and 90th percentile lead levels overall, for LSLs, and for copper with lead solder sites.”

Denver Water conducts LCR compliance water quality sampling at Tier 1 sites, which are defined by the LCR as single-family structures that have an LSL or copper plumbing with lead solder (CPLS) in homes built between 1983 through 1987. The compliance period occurs January through June (Spring) and July through December (Fall). The cumulative 90th percentile lead concentration for LCR compliance samples for the Spring and Fall compliance periods since program inception is presented in Table 5. The 90th percentile calculated from the LCR compliance sampling is not to exceed 15 µg/L, as defined by the action level of the LCR. Data used to calculate the 90th percentile lead concentration align with reporting requirements of the LCR.

**TABLE 5. LCR LEAD CONCENTRATIONS FOR LSL AND CPLS HOMES (SINCE PROGRAM INCEPTION)**

| Historical Cumulative LCR Lead Concentrations (µg/L) | 2019   |      | 2020   |      | 2021   |      | 2022   |      | 2023                |
|--|--------|------|--------|------|--------|------|--------|------|---------------------|
|  | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall | Spring <sup>1</sup> |
| <b>Overall 90<sup>th</sup> Percentile</b>            | 10     | 11.8 | 6.7    | 4.1  | 4.1    | 4.3  | 3.9    | 3.8  | 3.6                 |
| <b>LSL 90<sup>th</sup> Percentile</b>                | 10     | 12.4 | 6.7    | 4.3  | 4.1    | 4.5  | 4.0    | 3.9  | 3.4                 |
| <b>CPLS 90<sup>th</sup> Percentile</b>               | 7.8    | 5.1  | 4.8    | 2.9  | 3.4    | 2.3  | 1.2    | 1.7  | 1.8                 |

<sup>1</sup> The 90th percentile Spring 2023 lead concentration as approved by CDPHE in their Aug. 1, 2023, letter.

Results from customer-requested sampling are included in the overall 90th percentile lead concentration reported in Table 6.

**TABLE 6. SUMMARY OF LCR 90<sup>TH</sup> PERCENTILE LEAD CONCENTRATIONS (JAN. 1 TO JUNE 30, 2023)**

| LCR Compliance Results for Lead – Spring 2023 Compliance Period <sup>1</sup>   | Result   | Number of Homes |
|--|----------|-----------------|
| LCR Compliance 90 <sup>th</sup> Percentile Lead <sup>2</sup>   | 3.4 µg/L | 113             |
| <b>Overall 90<sup>th</sup> Percentile Lead Concentration using LCR Compliance + Customer Requested Samples<sup>3</sup></b> | 3.6 µg/L | 426 (113 + 313) |

<sup>1</sup> The 90th percentile Spring 2023 lead concentration as approved by CDPHE in their Aug. 1, 2023, letter.

<sup>2</sup> Includes results for all LCR compliance samples (from 1951 and older homes plus 1983 to 1987 homes with copper piping and lead solder) and reported in LIMS for the Jan. 1 to June 30, 2023, compliance period.

<sup>3</sup> Includes results from customer requested samples reported in LIMS between Jan 1. And June 30, 2023. Sampling to support the ALSLR Program is excluded from the compliance calculation.

## Corrosion Control Treatment Water Quality Parameters for pH and Alkalinity [7.B.i.d]

Per Section 7.B.i.d of the LCRR Variance, Denver Water must provide “CCT water quality parameters for pH and alkalinity.” Chemical feed systems were brought into service for enhanced pH CCT on March 3, 2020, at the Marston and Foothills Water Treatment Plants and on May 1, 2020, at the Moffat Water Treatment Plant. Trends for pH and alkalinity since Jan. 1, 2020, and operating data with adjusted pH since March 2020 can be provided upon request. Data for pH in treated water from the active water treatment plants and the distribution system are summarized in Table 7 based on the lowest daily average pH measured each month from each sampling point. On Aug. 13, 2020, Denver Water provided a letter to CDPHE that steady state performance of CCT was achieved in the distribution system. One year of data to describe CCT performance was provided to CDPHE on May 6, 2021, including pH and alkalinity data. The treatment targets for pH and alkalinity in the effluent of the three treatment plants and across the distribution system were announced by CDPHE on June 9, 2021. CDPHE established a target of  $8.8 \pm 0.2$  for pH in treated water,  $8.8 \pm 0.3$  for pH in the distribution system, and alkalinity greater than or equal to 20 mg/L as CaCO<sub>3</sub>, all effective July 1, 2021.

**TABLE 7. MINIMUM DAILY AVERAGE PH REPORTED EACH MONTH**

| Description   | January 2023   | February 2023 | March 2023 | April 2023 | May 2023 | June 2023 |
|---|--|---------------|------------|------------|----------|-----------|
| <b>Effluent LCRR Variance Requirement</b>                 | pH 8.8 +/- 0.2 in WTP effluent   |               |            |            |          |           |
| <b>Marston Water Treatment Plant Effluent<sup>1</sup></b> | 8.81   | 8.74          | 8.76       | 8.77       | 8.80     | 8.81      |
| <b>Foothills Water Treatment Plant Effluent</b>           | 8.78   | 8.77          | 8.79       | 8.81       | 8.84     | 8.83      |
| <b>Moffat Water Treatment Plant Effluent<sup>2</sup></b>  | 8.76   | 8.77          | 8.74       | N/A        | 8.87     | 8.88      |
| <b>Distribution System LCRR Variance Requirement</b>      | pH 8.8 +/- 0.3 in distribution system  |               |            |            |          |           |
| <b>Distribution System</b>                                | pH levels in the distribution have been within 8.8 +/- 0.3 since March 12, 2020. |               |            |            |          |           |

<sup>1</sup> The Marston Water Treatment Plant went offline on January 4, 2023, for maintenance and returned online February 22, 2023.

<sup>2</sup> The Moffat Water Treatment Plant went offline on March 8, 2023, and returned online May 2, 2023.

## Water Quality Sampling Results from Pre-LSLR Sampling [7.B.i.e]

Per Section 7.B.i.e of the LCRR Variance, Denver Water must provide “all lead and water quality results collected as part of Denver Water’s investigation of LSLs and post LSL replacement and service line material of those sites.” Results from water quality sampling can provide an indication of lead at single-family residential properties and, when reviewed with additional results from field methods, the status of a service line can be changed in the inventory (i.e., from unknown to confirmed LSL).<sup>11</sup> The three-bottle tests are performed to aid in the classification of service line materials of properties within Denver Water’s integrated service area to provide the following:<sup>12</sup>

<sup>11</sup> See Section 7.B.ii LSL Inventory for more details.

<sup>12</sup> Details and results for pre-LSL replacement sampling efforts can be provided upon request.

- To confirm the service line material before LSL replacement at properties included in the 2023 ALSLR task orders where lead has not been confirmed (i.e., p-value < 1<sup>13</sup>).
- To inform the inventory and predictive model at properties in the City and County of Denver and in distributor areas with a likely LSL (i.e., p-value ≥ 0.5 and < 1).
- To support the designation of the service line material at all single-family residential properties within a distributor boundary identified with a likely LSL (i.e., p-value ≥ 0.5 and < 1).<sup>14</sup>
- To validate customer comments on the presence (or absence) of an LSL and requests to opt into (or out of) the LRP.

Lead results over 3 µg/L in the second or third sample bottle will trigger a review of inclusion in the LRP, and the property will be added to the list for LSL replacement and added to the Filter Program, if not already enrolled.<sup>15</sup> A summary of the water quality results prior to LSL replacements is presented in Table 8. The maximum lead concentration measured year-to-date was 1,010 µg/L in the third bottle of samples collected at a single-family property in April 2023; the lead service line at this property was replaced in May 2023.

**TABLE 8. SUMMARY OF WATER QUALITY RESULTS PRE-LSL REPLACEMENT AT SINGLE-FAMILY RESIDENCES USING THE 3-BOTTLE TEST**

| Water Quality Sampling for Investigation (pre-LSL Replacement)   | Result for 2023 Year-to-Date | Unit |
|--|------------------------------|------|
| <b>Total Number of Kits Mailed Out<sup>1</sup></b>   | 4,926                        | Kits |
| <b>Total Number of Kits Received and Analyzed to Investigate the Service Line Material<sup>2</sup></b> | 2,224                        | Kits |
| <b>Maximum Lead Concentration Measured Year-to-Date</b>  | 1,010                        | µg/L |
| <b>Average Lead Concentration (in second and third bottles only)<sup>3</sup></b>                       | 2.95                         | µg/L |

<sup>1</sup> If a sampling kit is re-sent to a property, the additional distribution of the water quality kit is counted on top of the original distribution count.

<sup>2</sup> As reported in LIMS by June 30, 2023.

<sup>3</sup> If a value was reported as less than the detection limit (i.e., < 1 ppb) the measured value was taken as 0.5 µg/L for calculation of the average concentration.

<sup>13</sup> Since July 22, 2020, sampling kits are sent to properties with a p-value of 0.5 to 0.9. Service line material is verified at any property with a p-value < 1 is in the field before replacement, using visual inspection of materials at the interior connection and/or potholing on the exterior.

<sup>14</sup> This approach applied to all distributors with one exception. Sampling kits were delivered to 500 residential properties in Consolidated Mutual, although any customer can request a sample kit.

<sup>15</sup> The threshold used as an indicator for a lead service line was reduced to reflect the impact of corrosion control treatment with pH adjustment on lead release measured in water quality samples. Samples collected on May 1, 2020, and after with lead measured equal to or greater than 3 µg/L are considered indicative of a lead service line. Samples collected prior to May 1, 2020, are assessed using the original threshold of 5 µg/L.



## Water Quality Sampling Results for Post-LSL Replacement [7.B.i.e]

Per Section 7.B.i.e of the LCRR Variance, Denver Water must provide “all lead and water quality results collected as part of Denver Water’s investigation of LSLs and post LSL replacement and service line material of those sites.”

For LSL replacements completed prior to Dec. 31, 2019, letters were mailed to customers to offer post-replacement sampling four months after LSL replacement to single-family, multi-family and commercial properties. Customers could then call Denver Water to request a sampling kit. This process was discontinued on April 2, 2020.

For LSL replacements completed between Jan. 1 and Dec. 31, 2020, single-family residential property customers were automatically mailed a 3-bottle sampling kit approximately four months after replacement and multi-family and commercial properties were mailed a letter offering post-LSL replacement sampling inviting the customer to request a sampling kit. The letter was sent to every unit in a multi-family building.

For LSL replacements completed after Jan. 1, 2021, all single-family, multi-family, and commercial properties receive an offer letter for post-LSL replacement sampling approximately four months after LSL replacement.<sup>16</sup> If the customer elects to participate, single-family properties receive a 3-bottle sampling kit and multi-family and commercial properties receive a 1-bottle sampling kit. A summary of post-LSL replacement sampling offers is provided in Table 9. As of July 2021, only those single-family properties with replacements completed by Denver Water crews automatically receive a 3-bottle sampling kit, with offer letters continuing to be mailed to all other residential multi-family and commercial properties.

---

<sup>16</sup> See Appendix CCT-2 Post LSL Replacement Sampling – Summary of Completed Offer to Test (Cumulative since LRP Inception).



**TABLE 9. SUMMARY OF POST-REPLACEMENT SAMPLING OFFERS AND WATER QUALITY  
(JAN. 1 THROUGH JUNE 30, 2023)**

| Water Quality Sampling after LSL Replacement  | Count <sup>1</sup> |          |            |            |          |           | TOTAL |
|---|--------------------|----------|------------|------------|----------|-----------|-------|
|   | Jan 2023           | Feb 2023 | March 2023 | April 2023 | May 2023 | June 2023 |       |
| <b>Total Number of Letters Mailed to Offer Post-LSL Replacement Sampling<sup>2,3</sup></b>  | 1,474              | 520      | 347        | 24         | 105      | 659       | 3,129 |
| <b>Total Number of Kits Mailed Out<sup>2,3</sup></b>  | 399                | 170      | 525        | 112        | 114      | 245       | 1,565 |
| <b>Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality<sup>2,4</sup></b>   | 51                 | 86       | 81         | 109        | 51       | 9         | 387   |
| <b>Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality Not Previously Reported<sup>6</sup></b>                     | 61                 | 0        | 0          | 0          | 0        | 0         | 61    |
| <b>Number of Properties with Lead &gt; 15 µg/L in First Bottle<sup>2</sup><br/>(triggers additional investigation effort)</b>                           | 1                  | 1        | 0          | 0          | 1        | 0         | 3     |
| <b>Number of Properties with Lead ≥ 5 and &lt; 15 µg/L in the Second and/or Third Bottle<sup>5</sup><br/>(triggers additional investigation effort)</b> | 0                  | 0        | 1          | 1          | 0        | 0         | 2     |
| <b>Number of Properties with Lead ≥ 5 and &lt; 15 µg/L in First Bottle<sup>2</sup><br/>(triggers customer education)</b>                                | 3                  | 2        | 3          | 3          | 1        | 0         | 12    |

<sup>1</sup> Counts are based on the month of sample collection, per the LCRR Variance. Not applicable to “Total Number of Letters Mailed to Offer Post-LSLR Replacement Sampling” or “Total Number of Kits Mailed Out”, which are based on the date of mailing.

<sup>2</sup> Applies to single-family and multi-family residences.

<sup>3</sup> If a duplicate letter or sampling kit was sent to a property/customer, it is counted twice.

<sup>4</sup> Total number of kits analyzed refers to results available in LIMS by June 30, 2023, with samples collected since Jan. 1, 2023.

<sup>5</sup> Applies to single-family residences only.

<sup>6</sup> Two water quality samples collected in September and December 2022 (added to count for January), and not previously reported.

During this reporting period, 127 properties with a completed LSL replacement did not receive an offer letter or sampling kit. These properties required additional review due to the replacement being performed by a third party, data discrepancies, tap status changes, mailing address errors, etc. In many circumstances, a homeowner or contractor elects to replace a service line as part of redevelopment or renovation, a process that can take several months to complete. Once the data are reconciled, a water quality sampling kit or offer letter is sent to these properties. Due to the added time spent on the additional reviews required, 34 properties did not receive their offer letter within the six-month post-replacement timeline. A detailed list of properties that did not receive the offer and explanation is provided in Appendix CCT-3, including follow-up activities.<sup>17</sup>

<sup>17</sup> See Appendix CCT-3 Post LSL Replacement Sampling – Summary of Incomplete Offer to Test (Cumulative since LRP Inception).

Post-replacement sampling offer letter mailing lists are created every month by compiling a list of properties from the inventory where the p-value status changed to 0 due to replacement of the LSL four months prior to the month the mailing list is created. The Quality Assurance/Quality Control process to determine valid addresses includes evaluating who completed the replacement (i.e., Denver Water crews or ALSLR contractors), if the property is CASS<sup>18</sup> certified, and the initial status of the property in the inventory.

### Water Quality Results from Select Households (1983 to 1987 Homes) [5.D]

Section 5.D of the LCRR Variance provides that:

*... If a child up to 24 months of age resides in a Select Household and the water quality results in the first draw sample show lead concentrations above 3 ppb, Denver Water must offer a filter and enough replacement filters and cartridges, at no cost, to the customer until the child exceeds the age of 24 months.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

Outreach to customers residing in all households built between 1983 and 1987 was launched in August 2020, with a second round of outreach performed in November 2021. “Select households” are defined as homes built between 1983 to 1987 with copper piping and lead solder and that self-identify as having a formula-fed infant under the age of 24 months. If a customer from a 1983 to 1987 home requests a water quality sampling kit, Denver Water will mail a kit whether or not a formula-fed infant resides at the property. If lead is measured above 3 µg/L, and the customer self-identifies as having a formula-fed infant, the customer is invited to enroll into the Filter Program. In the first six months of 2023, 17 water quality sampling results were analyzed for select households, three of which identified as having a formula-fed infant. None of the households with formula-fed infants had lead measured above 3 µg/L and therefore were not enrolled in the Filter Program.<sup>19</sup>

### 5th L Sample Collection

During the Spring 2023 LCR compliance sampling round, technicians collected five 1 L sequential samples at 65 properties with an LSL included in the LCR study pool in preparation for new sampling protocols described in the EPA’s LCRR published in January 2021. Results are shown in Table 10. Lead was measured less than 1 µg/L in the 5th L at 18 properties, most of which also measured less than 1 µg/L in the first draw. The results of Table 10 were compared to results described in the LRPP which included sampling using 10 sequential samples. In general, the 5th L profile sampling suggests the first draw (i.e., the compliance sample under the existing LCR) does not capture the highest lead concentrations within a service line. Two homes had concentrations greater than 15 µg/L in the fifth draw and two homes had concentrations greater

<sup>18</sup> CASS (Coding Accuracy Support System) is used by the United States Postal Service to verify and improve the accuracy of an address and its associated zip code.

<sup>19</sup> See Appendix CCT-4 Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Cumulative since LRP Inception).

than 10 µg/L but less than 15 µg/L in the first draw. All results are an indication that the CCT component of the LRP is effective and CCT practices are expected to meet the needs of the LCRR.

**TABLE 10. OVERVIEW OF 5<sup>TH</sup> LITER SAMPLING DATA IN SPRING 2023**

| 5 <sup>th</sup> L Sampling in 2023   | Count |
|--|-------|
| Total Number of Properties Sampled for 5 <sup>th</sup> L                           | 65    |
| Number of Properties with inconclusive data (all results <1.0)                     | 15    |
| Number of Properties where the 5 <sup>th</sup> L < 1 <sup>st</sup> L concentration | 22    |
| Number of Properties where the 5 <sup>th</sup> L > 1 <sup>st</sup> L concentration | 43    |

## 7.B.ii LSL Inventory

Section 7.B.ii of the LCRR Variance requires that Denver Water maintain records and report the following information with respect to its LSL Inventory:

*ii. LSL Inventory.*

- a. *In Order to meet the October 16, 2024, deadline in which the requirements for an initial inventory that complies with the LCRR must be met:*
  1. *total number of service lines;*
  2. *the total number of replaced LSLs and GRR;*
  3. *the total number of confirmed and likely LSLs;*
  4. *the total number of unlikely LSLs;*
  5. *the total number of non-LSLs, indicating the number designated as non-LSLs solely based on statistical factors;*
- b. *the number of Investigations conducted each year, demonstrating that the cumulative average 1.4% verification rate has been met;*
- c. *an updated service line inventory map; and*
- d. *the rationale for a change in the status of a service line in the inventory (e.g., Investigation, replacement, water quality data).*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

An overview of the LSL Inventory reporting requirements is shown in Table 11.

**TABLE 11. OVERVIEW OF 7.B.II REQUIREMENTS**

| <b>Paragraph Reference</b>        | <b>Description</b>   | <b>Refer to</b>   |
|-----------------------------------|--|---|
| <b>3.A</b>                        | Continue to maintain on an ongoing basis an inventory of the material of each service line connected to the public water distribution system that is a confirmed or likely LSL.<br>By October 16, 2024, Denver Water must have conducted an initial inventory that complies with the service line inventory requirements in 40 C.F.R. § 141.84(a). | Refer to Table 12.<br><br>In progress.  |
| <b>3.C</b>                        | Continue to provide public access to its LSL inventory on its external customer website and update at least annually.<br>By October 16, 2024, the inventory must list by specific street address which service lines are lead, galvanized requiring replacement, non-lead, or lead status unknown.   | Re-posted on January 3, 2023, using data through December 28, 2022.<br>In progress.   |
| <b>7.B.ii.a.1</b>                 | Total number of LSLs and GRR.  | Refer to Table 12.<br>See Appendix. <sup>1</sup>  |
| <b>7.B.ii.a.2</b>                 | Total number of replaced LSLs during the LCRR Variance.  | Refer to Table 13.  |
| <b>7.B.ii.a.3</b>                 | Total number of confirmed and likely LSLs.   | Refer to Table 12.  |
| <b>7.B.ii.a.4</b>                 | Total number of unlikely LSLs.   | Refer to Table 12.  |
| <b>7.B.ii.a.5</b>                 | Total number of non-LSLs.<br>Total number of non-LSLs determined solely by statistical methods.  | Refer to Table 12.<br>Described after Table 12.   |
| <b>7.B.ii.b</b><br><b>3B, 3.D</b> | Number of investigations that support a determination of the material of the service line and that are performed independently of an LSL replacement or not at the request of the customer.  | Refer to Table 18.  |
| <b>LRPP III.B (p 51)</b>          | Use results from investigations to update the predictive model which is used to plan and prioritize efforts of the COE Plan, ALSLR Program and Filter Program.   | See Section 7.B.vii.  |
| <b>7.B.ii.c</b>                   | Updated LSL Inventory Map.   | <a href="https://www.denverwater.org/your-water/water-quality/lead">https://www.denverwater.org/your-water/water-quality/lead</a> |
| <b>7.B.ii.d</b>                   | Rationale for change to status of the service line in the LSL Inventory.   | See Appendix. <sup>2</sup>  |

<sup>1</sup> See Appendix INV-1 Summary of Service Line Status and p-Value (First Six-Month Period of 2023).

<sup>2</sup> See Appendices INV-2A Line by Line p-Value Changes: Status Descriptions and Notes (First Six-Month Period of 2023) and INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2023).

### Current LSL Inventory [7.B.ii.a, b, c, and d]

The initial LSL inventory designating known, suspected, and possible LSLs was submitted on Feb. 5, 2020. The baseline LSL Inventory was updated using additional information and further analysis of the data presented in the September 2019 LRPP (see Table 12). Adjustments to service line designations to either the known lead or known non-lead categories are made based on available information from:

- Potholing (main-to-meter and meter-to-building),
- Interior inspections at the point of entry,

- Water quality sample results,
- Desktop review of existing Denver Water records,
- Customer submitted proof of replacement and City of Denver plumbing permits, and
- Review of individual distributor records.

Service line reviews are an ongoing daily task of the program since 2020. Changes in the service line material designation are reflected in Denver Water’s online map which is updated bimonthly.

The information presented in Table 12 compares the current understanding of the inventory with the original base inventory submitted in September 2019. The inventory is used to establish the total number of estimated lead services and the mandated annual number of replacements. For the purposes of Table 12, the total number of “confirmed LSLs” includes the number of properties with a known lead service that remain in the ground and those that have been replaced by the LRP.

The LCRR defines galvanized requiring replacement (GRR) as any service line where either:

- 1) A portion of the line is galvanized, and that segment is or was at any time, downstream of a lead service line; or
- 2) The line is currently downstream of an unknown service line.

Currently, Denver Water does not have a clearly defined method to prove that lead was never upstream of the galvanized section and would not require replacement. Therefore, Denver Water replaces all galvanized service lines found as a precaution. Since Denver Water categorizes any service line where lead is identified as an LSL, regardless of other materials being identified, this classification encompasses GRR service lines where galvanized was confirmed downstream of lead. Therefore, as shown in Table 12, the 26,046 confirmed LSLs include a subset of service lines that can also be classified as GRR. It is important to note that a substantial number of these properties identified lead between the main and meter and galvanized between the meter and home. The additional 3,255 service lines classified as GRR in Table 12 represent those galvanized service lines where lead was not found. Ongoing investigations have shown that 3,179 of these properties have found copper upstream of the galvanized section. Denver Water continues to explore these properties through record review, water quality sampling, potholing, and interior inspections to identify trends in the installation practices from the era when galvanized was installed.

**TABLE 12. LEAD SERVICE LINE INVENTORY AS OF JUNE 30, 2023**

| Status of Service Line  | Sept. 6, 2019 Submittal (Aug. 8, 2019 Data) | Feb. 5, 2020 Submittal (Jan. 28, 2020 Data) | Feb. 10, 2023 Submittal (Dec. 31, 2022 Data) | Aug. 10, 2023 Submittal (June 30, 2023 Data) |
|---|---|---|--|--|
|   | BASELINE INVENTORY <sup>1</sup>             | INITIAL INVENTORY <sup>2</sup>              | 2022 ANNUAL REPORT <sup>3,11</sup>           | CURRENT INVENTORY <sup>4</sup>               |
| <b>Confirmed LSL</b><br><i>(previously referred to as Known Lead)</i> | 1,066                                       | 1,149                                       | 16,145 <sup>5</sup>                          | 26,046 <sup>5</sup>                          |
| <b>GRR<sup>6</sup></b>  | <i>(Included with Confirmed LSL count)</i>  |   | 2,760  | 3,255  |
| <b>Likely LSL</b><br><i>(Suspected Lead + Possible Lead)</i>          | 83,480                                      | 82,337                                      | 58,394                                       | 46,854                                       |
| <i>Suspected Lead<sup>7</sup></i>                                     | 61,374                                      | 60,549                                      | --   | --   |
| <i>Possible Lead<sup>7</sup></i>                                      | 22,106                                      | 21,788                                      | --   | --   |
| <b>Unlikely LSL</b>   | 89,388                                      | 90,745                                      | 87,589                                       | 85,791                                       |
| <b>Non-LSL<sup>8</sup></b>  | 145,766                                     | 146,528                                     | 157,826 <sup>9</sup>                         | 158,730 <sup>9</sup>                         |
| <b>Total Number of Services</b>                                       | 319,700                                     | 320,759                                     | 320,714                                      | 320,676                                      |
| <b>TOTAL ESTIMATED Number of Lead Service Lines</b>                   | <b>63,955</b>                               | <b>63,195</b>                               | <b>62,504</b>                                | <b>63,410<sup>10</sup></b>                   |

- <sup>1</sup> The “baseline inventory” is the basis for the 7% LSL replacements per year.
- <sup>2</sup> Provided an initial inventory within 35 days of the effective date of the Dec. 16, 2019, Variance, per paragraph 3.A.
- <sup>3</sup> The “annual report inventory” is used in the application of the equivalency model to evaluate the performance of the LRP. For the 2020 and 2021 annual report inventories, refer to the respective annual reports.
- <sup>4</sup> The “current inventory” is the basis of enrollment in the Filter Program (calculated as the sum of the properties with a confirmed or likely LSL, plus distribution of additional filters to multiple units at the same property and less the number of vacant properties).
- <sup>5</sup> Since the 2020 Annual Report, and the current inventory counts for “confirmed LSL” include properties that are either known to be lead or that have had a lead service line replaced. 18,763 properties categorized as “confirmed LSL” in the current inventory were replaced since program inception (see Table 13 and Table 20). Due to ongoing data integration and QC processes, 137 of the 18,763 properties identified as confirmed replacements remain to be integrated into the LRP database to drive a p-value change to 0. Of these 137, 1 remains as “unlikely LSL,” 119 as “likely LSL,” 37 as “confirmed LSL,” and 21 are described as non-active or non-potable (coded as NULL). The counts for these categories in the current inventory (most right column) have been reduced accordingly.
- <sup>6</sup> Previous inventory reporting counted GRRs under the “confirmed LSL” count. GRRs in the June 30, 2023, LSLI include galvanized-galvanized (21 properties), copper-galvanized (3,179 properties), and galvanized-copper (55 properties) service lines. Properties with galvanized (and no lead identified in potholing) with water quality results  $\geq 3$   $\mu\text{g/L}$  lead are included in this number.
- <sup>7</sup> The terms “suspected” and “possible” lead will not be used within this table after Oct. 16, 2024 (inventory due date under the LCRR).
- <sup>8</sup> The “non-LSL” count currently does not include properties where galvanized was identified but did not require replacement (lead was never upstream of the galvanized service line). Denver Water plans to assess their processes in 2023 for galvanized service lines to identify which galvanized service lines require replacement.
- <sup>9</sup> Since the 2020 Annual Report, the counts for “non-LSL” do not include the properties at which the LSL was replaced as part of the LRP (see Table 13 and Table 20), as these are already included in the count for “confirmed LSL.”
- <sup>10</sup> See Appendix INV-1 Summary of Service Line Status and p-Value (First Six Month Period of 2023) for details on how this was calculated.
- <sup>11</sup> Inventory values updated to reflect omission of 1,716 replacements that were not counted in Table 12 in the Feb. 10, 2023, submittal.

Of the 158,730 service lines identified as non-lead in the current inventory, 147,916 are included in this category based solely on statistical assumptions (145,766 from the initial September 6, 2019, inventory and an additional 2,150 since identified through desktop evaluation). The material of these service lines was not confirmed via field observations, rather the service line was classified as non-lead based on the age of the house, history of development in the Denver Water service area, operating rules requiring copper at post-1971 properties, water main tap date, etc.<sup>20</sup> Properties built or connected between 1951 and 1971 are considered “unlikely LSL” based on historical records and evidence of non-lead materials.<sup>21</sup> Denver Water continues to review investigation data on these service lines in an effort to further classify the materials of these service lines.

### Number of LSL Replacements Completed and Incorporated into the Inventory [7.B.ii.d]

The total number of LSLs replaced between Jan. 1 and June 30, 2023, is shown in Table 13. Denver Water does not count the replacement of known copper service lines (i.e., non-LSL) toward the total number of LSL replacements for compliance purposes.<sup>22</sup>

**TABLE 13. NUMBER OF LSL REPLACEMENTS BETWEEN JAN. 1 AND JUNE 30, 2023**

| Description   | Count <sup>1</sup> |
|---|--------------------|
| Number of LSLs Replaced in January 2023                                     | 79                 |
| Number of LSLs Replaced in February 2023                                    | 112                |
| Number of LSLs Replaced in March 2023                                       | 753                |
| Number of LSLs Replaced in April 2023                                       | 735                |
| Number of LSLs Replaced in May 2023   | 817                |
| Number of LSLs Replaced in June 2023  | 815                |
| <b>Total Number of LSLs Replaced in the First Six Months of 2023</b>        | <b>3,311</b>       |
| Number of LSLs Replaced not Previously Reported <sup>2</sup>                | 22                 |
| <b>Total Number of LSLs Replaced since inception of LRP on Jan. 1, 2020</b> | <b>18,780</b>      |

<sup>1</sup> The number of replacements identified in the “Lead Replacement” column of Appendix INV-2B (Line by Line p-Value Changes by Status, First Six-Month Period of 2023) does not match the number of lead service line replacements shown in Table 13 due to a lag in the quality assurance review during data integration from field replacements to LRP database.

<sup>2</sup> This includes the net change to the number of LSL replacements completed since program inception not previously reported (23 added) and previously reported LSL replacements that upon review were removed (0 deductions); see Appendix LSL-4 Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (Since Program Inception) for details.

<sup>20</sup> This is the number which retains the original number of non-lead properties (p-value = 0) from the inventory in the Lead Reduction Program Plan (see Appendix III.B.2, Preliminary Identification of Lead Service Lines).

<sup>21</sup> See Appendix II.B.2 of the Lead Reduction Program Plan for details and assumptions.

<sup>22</sup> See paragraph 4.B of the LCRR Variance and the notes for the column “Actual Previous Materials” in Appendix LSL-1 Addresses and Types of Replacements (First Six-Month Period of 2023).



## Investigations of Service Line Material [7.B.ii.b]

Section 3.D of the LCRR Variance requires that “Denver Water . . . [i]nvestigate a cumulative average of 1.4% of the total estimated number of unknown service lines in the inventory each Program Year. . .”

As required by the LCRR Variance, Denver Water continues to conduct investigations of service lines and make refinements to the LSL Inventory of service line materials connected to its water system. Investigations are performed at properties to improve the assumptions that were used to develop the LSL Inventory.

Investigations are counted by investigation type and may include desktop evaluation of available data from Denver Water, assessors, permits, distributors, and customers; water quality sampling; potholing and/or visual investigation. After 15 years of the LRP, there should be no remaining properties in the LSL Inventory categorized as likely LSL and all confirmed LSLs should be replaced.

### **Definitions used to categorize the service line material:<sup>23</sup>**

|               |  |
|---------------|--|
| Confirmed LSL | based upon direct evidence that gives a 100% estimated probability per the LRPP that a service line is an LSL or a “galvanized requiring replacement” service line.  |
| Likely LSL    | based upon available data that provides an estimated probability value between 50 to 99% that a service line is an LSL or a “galvanized requiring replacement” service line.                               |
| Unlikely LSL  | based on conflicting or missing data that provides an estimated probability value between 1% to 49% that a service line is an LSL based on the LRPP; or a “galvanized requiring replacement” service line. |
| Non-Lead      | 0% likelihood of finding lead.   |

The number of investigations to support a determination of the service line material are counted toward the required 1.4% of the unknowns in the LSL Inventory investigated each year. An unknown service line is defined as any service line that does not have a p-value of 0 (non-lead) or 1 (known lead). Denver Water considers four types of investigations that can be performed on service lines:

- 1) Potholing,
- 2) Desktop reviews,
- 3) Interior inspections, and
- 4) Water quality sampling.

A property can be counted toward an investigation up to four times (one time per category). An investigation does not need to result in a p-value change.

---

<sup>23</sup> As defined in paragraphs 1.C, 1.P, and 1.X of the LCRR Variance, dated Nov. 30, 2022, for confirmed LSL, likely LSL, and unlikely LSL, respectively. Note that the definition of non-lead was not provided in the LCRR Variance.



An investigation is counted if all the following conditions apply:

- 1) The property is originally classified as unknown (see paragraphs 3.B and 3.D in the LCRR Variance).
- 2) The investigation was performed independently of LSL replacements (see paragraph 3.D in the LCRR Variance). Visual verifications that result in a copper material designation, and therefore do not result in a replacement, are counted as an investigation. If Denver Water includes an investigation in the semi-annual report and later replaces said LSL even though it was not originally planned, that investigation will still count towards the 1.4% metric and will not be removed from the investigation metric total.
- 3) The investigation was not the result of a customer-requested water quality sample (see paragraph 1.L in the LCRR Variance).

Potholing can be used in combination with other investigative methods to determine that a property is designated “lead” or “non-lead” (i.e., p-value of 1 or 0, respectively). To confirm “non-lead,” there can be no lead or galvanized visually observed from potholing and interior inspections and there can be no contradictions with the desktop records review and/or water quality sampling results.

Verification potholing is used at properties included in the 2023 ALSLR or Federal Plan to confirm the material of the service line before replacement to help further develop the inventory. As of Aug. 10, 2020, all likely LSLs ( $p\text{-value} \geq 0.5 < 1$ ) are verified prior to replacement, with potholing and/or water quality sampling, to reduce the likelihood of replacing a non-LSL.

Visual observations are conducted on the program to observe the material type of the service line using potholing and interior inspections. Results from visual verifications are presented in Table 14 along with the next steps to either replace a service line that is confirmed to be lead or to pursue additional investigative methods. If copper is observed at three or more points used for verification (e.g., copper is observed at two exterior potholes and at the interior connection), the service line is not categorized and the p-value is not adjusted; rather, the property is subjected to additional investigation efforts (i.e., water quality sampling, data review, interior inspections, additional potholing) to identify the service line material.

**TABLE 14. OUTCOMES FROM VISUAL<sup>1</sup> VERIFICATIONS AS PART OF THE 2023 ALSLR PLAN (JAN. 1 TO JUNE 30, 2023)**

| Service Line Status before Visual Verification   | Visual Verification Outcome                                  | Update Inventory and Follow-up Action   |
|--|--|---|
| <b>Initial Status <math>p \geq 0.8</math> (total 4,451)</b>                                | 2,979 confirmed lead (lead observed in at least one point).  | Property is confirmed for 2023 ALSLR Plan.  |
|  | 669 inconclusive (copper observed at three or more points).  | Review historical and water quality data to confirm status. <sup>2</sup>  |
|  | 803 incomplete (could not pothole the minimum three points). | Return to property or find a way to obtain third point.<br>Or proceed with other investigation to confirm status. |
| <b>Initial Status <math>0.5 \leq p &lt; 0.8</math> (total 784)</b>                         | 218 confirmed lead (lead observed in at least one point).    | Property is confirmed for 2023 ALSLR Plan.  |
|  | 338 inconclusive (copper observed at three or more points).  | Review historical and water quality data to confirm status. <sup>2</sup>  |
|  | 228 incomplete (could not pothole the minimum three points). | Return to property or find a way to obtain third point.<br>Or proceed with other investigation.                   |
| <b>Total Number of Properties Visually Verified and Included in the 2023 ALSLR Program</b> |  | 5,235 <sup>3,4</sup>  |

<sup>1</sup> Potholing and interior inspection to verify the material of the service line at premises included in the 2023 ALSLR Plan that result in a designation of lead does not contribute to the required 1.4% investigations. See Appendix INV-3 Results from Visual Verifications as part of the 2023 ALSLR Program (First Six-Month Period of 2023).

<sup>2</sup> In some cases, the standard for investigations to confirm a material type was met, meaning water quality may not have been needed to confirm non-lead status.

<sup>3</sup> Includes 64 premises with initial p-values less than 0.5 in the Feb. 2020 Inventory (from Table 12) that were subsequently increased to greater than or equal to 0.5 and therefore eligible for potholing as part of the ALSLR Plan. 18 of the 64 premises have p-values that remain greater than or equal to 0.5, 13 had their p-values changed to 0 due to visual verification, and 27 had their p-values changed to 0 due to replacement as part of the ALSLR Plan (5,235 + 64 = 5,299).

<sup>4</sup> Includes 137 premises that are undergoing an additional data review to confirm findings.

During the first six months of 2023, visual investigations were performed at 1,419 properties not included in the 2023 ALSLR Plan.<sup>24</sup> Results are included below in Table 15. If a visual investigation occurred at a critical customer property and lead is found, the property is scheduled for replacement in 2023 and therefore the investigation is considered a visual verification and does not contribute to the required number of annual investigations.

<sup>24</sup> See Appendix INV-4 Results from Visual Investigations not part of the 2023 ALSLR Program (First Six-Month Period of 2023).

**TABLE 15. OUTCOMES FROM VISUAL INVESTIGATIONS<sup>1</sup> INDEPENDENT OF THE 2023 ALSLR PLAN FROM JAN. 1 TO JUNE 30, 2023**

| <b>Service Line Status before Visual Investigation</b>  | <b>Visual Investigation Outcome<sup>2</sup></b>                | <b>Update Inventory and Follow-up Action</b>   |
|---|--|--|
| <b>Initial Status<br/><math>0.5 \leq p \leq 0.9</math><br/>(total 1,410)</b>  | 840 confirmed lead (lead observed in at least one point).      | Add property to list for future LSL replacement.   |
|   | 306 confirmed copper (copper observed at all points).          | If water quality is non-detect, then remove property from LRP.                               |
|   | 264 incomplete (could not complete observation at all points). | Return to property to obtain all observation points.<br>Or proceed with other investigation. |
| <b>Initial Status<br/><math>p &lt; 0.5</math><sup>3</sup><br/>(total 5)</b>   | 3 confirmed lead (lead observed in at least one point).        | Add property to list for future LSL replacement.   |
|   | 1 confirmed copper (copper observed at all points).            | Remove property from LRP.  |
|   | 1 incomplete (could not complete observation at all points).   | Return to property to obtain all observation points.<br>Or proceed with other investigation. |
| <b>Total Number of Properties Visually Investigated Independent of the 2023 ALSLR Program (Investigative Potholing and Interior Inspections, First Six Months Only)</b> |  | 1,419 <sup>4,5</sup>   |

- <sup>1</sup> Potholing and interior inspection to investigate the material of the service line at properties not included in the 2023 ALSLR Plan contributes to the count of the required 1.4% investigations.
- <sup>2</sup> The number of visual investigations completed as shown in Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2023) does not match data shown in this table due to a time lag between field activities and the data being collected, reviewed, confirmed, and added to the LRP database. Values presented in the table above related to Appendix INV-2B reflect only visual investigations (potholing and interior inspection). Appendix INV-2B also includes p- value changes made based on other observations not included in the totals reflected in the table above.
- <sup>3</sup> This includes critical customers that were originally assigned a p-value < 0.5. Zero critical customers under this category were potholed in the first six months of 2023.
- <sup>4</sup> Includes 17 premises that are undergoing an additional data review to confirm findings.
- <sup>5</sup> Includes four additional properties, not included in above categories, two records with a Feb. 2020, p-value of 1 required further field verification, two additional records were added to the inventory after the Feb. 2020, submittal.

Results for water quality sampling at properties included in the 2023 ALSLR Plan are presented in Table 16 (i.e., verification pre-LSL replacement sampling) and results from properties not included in the 2023 ALSLR Plan are presented in Table 17 (i.e., investigative sampling).<sup>25</sup> As of Feb. 25, 2021, results from water quality sampling are assessed against a reduced threshold concentration used to indicate lead in pre-LSL replacement samples. A lower threshold was selected because of the degree of lead reduction achieved when pH is consistently maintained at  $8.8 \pm 0.3$  across the distribution system. This means that any sample collected on or after May 1, 2020, with lead measured at or above 3 µg/L in the second or third bottle of the 3-bottle test is considered conclusive for an LSL. Lead measured below this threshold at properties with an initial status of likely LSL (i.e., p-value  $\geq 0.5$ ) is inconclusive for non-lead and additional investigations or review of data are needed to determine the status of the service line material. Lead measured below this threshold at properties with an initial status

<sup>25</sup> See Appendix INV-5 Water Quality Sampling (First Six-Month Period of 2023).

of unlikely lead (i.e., p-value < 0.5) is considered conclusive for non-lead and no additional investigations are undertaken and the property is not added to the LRP. Finally, lead measured below the detection limit of 1 µg/L is also considered indicative of non-lead when and only when copper is observed at three or more points. In summary, whereas water quality sampling at or above 3 µg/L is conclusive for lead, additional steps are taken to confirm non-lead and the p-value is not reduced to 0 based on water quality results alone.

**TABLE 16. OUTCOMES FROM WATER QUALITY VERIFICATIONS<sup>1</sup> AS PART OF THE 2023 ALSLR PLAN (JAN. 1 TO JUNE 30, 2023)**

| Service Line Status in Inventory                  | Water Quality Sampling Outcome   | Follow-up Action  |
|---|--|---|
| <b>Status 0 &lt; p-value &lt; 1 (total 1,515)</b> | 580 confirmed lead (lead measured ≥ 3 µg/L in the second or third sample bottle from the 3-bottle test).   | Property added to list for LSL replacement and was replaced and/or scheduled to be replaced.    |
|   | 911 requiring further investigation (lead measured < 3 µg/L in the second and third sample bottle from the 3-bottle test)  | Review historical and potholing data to confirm status.<br>Or proceed with other investigation. |
|   | 24 confirmed non-lead in conjunction with field investigations (lead measured ≤ 1 µg/L in the second and third sample bottle from the 3-bottle test). <sup>2</sup> | Remove property from LRP.   |

<sup>1</sup> Excludes customer requested sample results. These samples were collected at properties included in the 2023 ALSLR Plan (and therefore do not count toward the required 1.4% investigations).

<sup>2</sup> Water quality samples that, in conjunction with field investigations, confirmed a non-lead status are counted toward the required 1.4% investigations.

**TABLE 17. OUTCOMES FROM WATER QUALITY INVESTIGATIONS<sup>1</sup> INDEPENDENT OF THE 2023 ALSLR PLAN (JAN. 1 TO JUNE 30, 2023)**

| Service Line Status in Inventory                | Water Quality Sampling Outcome  | Follow-up Action  |
|---|---|---|
| <b>Status 0 &lt; p-value &lt; 1 (total 654)</b> | 170 confirmed lead (lead measured ≥ 3 µg/L in the second or third sample bottle from the 3-bottle test)                   | Add property to list for LSL replacement.   |
|   | 484 requiring further investigation (lead measured < 3 µg/L in the second and third sample bottle from the 3-bottle test) | Review historical and potholing data to confirm status.<br>Or proceed with other investigation. |

<sup>1</sup> Excludes customer requested sample results. These samples were collected at properties independent of the 2023 ALSLR Plan and therefore do count toward the required 1.4% investigations, if the conditions that define an investigation are met.

All other investigations that support the determination of a service line material that count toward the 1.4% required investigations were made using desktop methods, as shown in Table

18. In summary, desktop investigations were used to support the determination of material designation of unknowns at 1,807 properties during the first six-month period of 2023.<sup>26</sup>

**TABLE 18. NUMBER OF INVESTIGATIONS PERFORMED TO DETERMINE THE MATERIAL OF THE SERVICE LINE BETWEEN JAN. 1 AND JUNE 30, 2023**

| Number of Properties Investigated   | Count   |
|---|---|
| <b>Required Number of Investigations</b>  | 2,421 (cumulative 1.4% of all unlikely and likely LSLs from the September 2019 inventory) |
| Number of Investigative Potholing in the First Six Months of 2023 as reported in the LRP database (from Table 15) <sup>1</sup>              | 1,415   |
| Number of Investigative Water Quality Sampling in the First Six Months of 2023 as reported in the LRP database (from Table 17) <sup>2</sup> | 678   |
| Number of Desktop Investigations in the First Six Months of 2023  | 1,807   |
| <b>Total Number of Investigations Completed in the First Six Months of 2023</b>   | <b>3,900</b>  |
| <b>Number of Investigations Not Previously Reported</b>   | <b>0</b>  |
| <b>Cumulative Average Annual Investigations on June 30, 2023</b>  | <b>4,177 (2.4%)<sup>1</sup></b>   |

<sup>1</sup> The average of the total investigations for the first six months of 2023 (3,900), 2020 (3,326), 2021 (4,562), and 2022 (4,918).

### Updated LSL Inventory Map [7.B.ii.c]

On March 5, 2020, the LSL Inventory was made publicly available on the Denver Water lead website (<https://www.denverwater.org/your-water/water-quality/lead>).

On July 19, 2023, the publicly available map was updated and reposted, incorporating the June 30, 2023, LSL Inventory. An updated inventory summary table is provided with each semi-annual and annual report.<sup>27</sup> The website map is updated bimonthly to reflect these changes to the LSL Inventory and will be updated and re-posted in the fall.

### Summary of Changes to the LSL Inventory [7.B.ii.d]

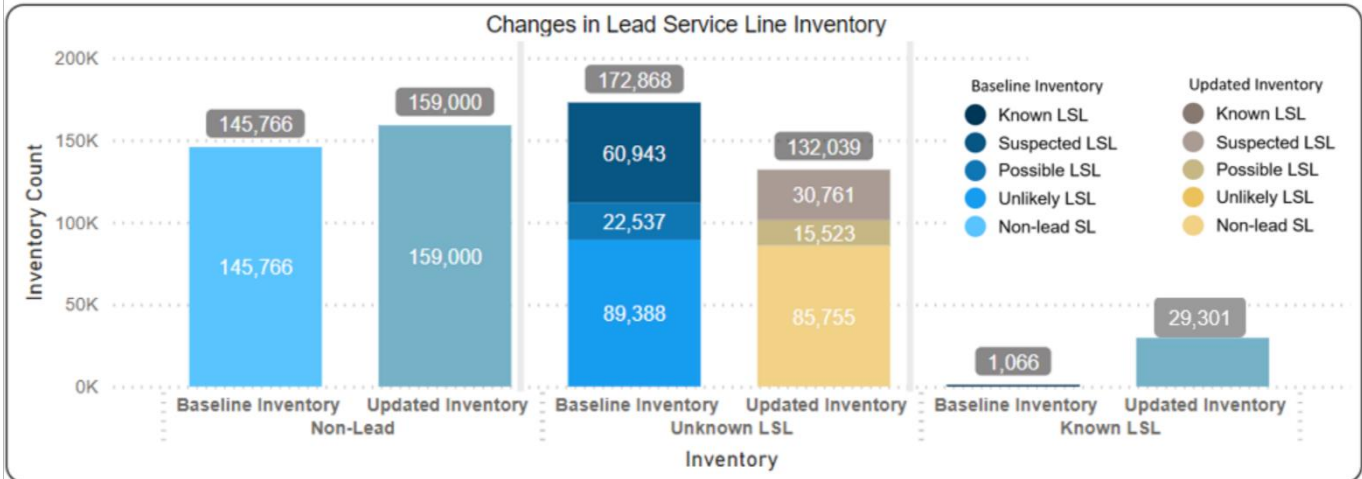
Between Jan. 1 and June 30, 2023, updates to the LSL Inventory continued as additional data were gathered and reviewed. During this period, 14,065 changes were made to the LSL Inventory of which 13,865 were changes to the status of the service line (i.e., p-value).<sup>26</sup> This included changes based on confirmation from Denver Water, customers, and distributors; review of historical data; direct evidence such as water quality and/or potholing; and replacements. In addition to material status changes, 90 service lines were removed from the inventory as tap cuts or non-potable service connections. Service lines previously deemed inactive were added back

<sup>26</sup> See Appendix INV-2B Line by Line p-value Changes by Status (First Six-Month Period of 2023) for desktop reviews that resulted in a p-value change.

<sup>27</sup> See Appendix INV-1 Summary of Service Line Status and p-Value (First Six-Month Period of 2023).

to the inventory upon review of the data, affecting 50 properties in this reporting period.<sup>28</sup> These changes are shown in Figure 2 and are accounted for in Table 12.

**FIGURE 2. CHANGES IN THE BASE AND CURRENT INVENTORY (JAN. 1 TO JUNE 30, 2023, USING DATA FROM TABLE 12)<sup>1</sup>**



<sup>1</sup> Confirmed LSL is the count of the Current Inventory in Table 12 for “Confirmed LSLs” plus “GRRs” (26,046 + 3,255 = 29,301).

### 7.B.iii LSL Replacements

Section 7.B.iii of the LCRR Variance requires that Denver Water report and maintain records of LSL replacements, including the following:

*iii. LSL Replacements.*

- a. the address and date of all LSL replacements occurring during the variance, including by year;*
- b. the type of LSL replacement (as outlined in paragraph 4.B);*
- c. the unique customer identification number of Customer Premises on the refusal list and documented attempts to contact the property owner; and*
- d. those Customer Premises where Denver Water performed a partial LSL replacement and property owner consent could not be obtained.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

Replacements under the ALSLR Program started on March 5, 2020, and results from Jan. 1 to June 30, 2023, are described in this section. An overview of the LSL replacement requirements is shown in Table 19.

<sup>28</sup> See Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2023).

**TABLE 19. OVERVIEW OF 7.B.III REQUIREMENTS**

| Paragraph Reference | Description  | Refer to  |
|---------------------|--|---|
| 4.E                 | Offer post-LSL replacement sampling within six months.   | Ongoing.  |
| 7.B.iii.a           | Address and date of all replacements.  | See Appendix. <sup>2</sup>  |
| 7.B.iii.b           | Type of replacement.   | See Table 20 and Appendix. <sup>3</sup>   |
| 7.B.iii.c<br>4.H    | Refusal list with service point ID and documented attempts for customer contact.<br>Track changes in customer account holders against Service Line Refusal List.                                       | See Appendix. <sup>4</sup>  |
| LRPP III.D (p 62)   | Provide education and filters to residents of multi-family properties on the Service Line Refusal List.  | Not applicable for this reporting period. <sup>1</sup>                            |
| 7.B.iii.d           | Number of properties where a partial replacement was performed, and consent was not granted by the property owner to replace a lead service line in full.  | See Table 20 and Appendix. <sup>4</sup>   |
| LRPP III.D (p 57)   | Replace LSL at properties with consistently high lead release and critical customers.  | Described in this section.  |
| LRPP III.D (p 58)   | Complete approximately 2,000 investigations per year in the first five years of the Lead Reduction Program to update the predictive model and improve the quality of information in the LSL Inventory. | See Table 18.   |
| LRPP III.D (p 60)   | Property owners will be reminded via English and Spanish signage placed at the limits (ends of streets) within geographic work areas four to five weeks in advance of construction.                    | Implemented July 20, 2020.  |
| LRPP III.D (p 60)   | Provide flushing instructions following LSL replacement.   | Provided to all customers in post-LSL replacement education package. <sup>5</sup> |

<sup>1</sup> There were 24 multi-unit properties added to the Refusal List in 2023. These customers are in the Filter Program, received mailed educational materials (both with the replacement filters and via the annual filter reminder postcard), and will receive sampling kits in mid-2023.

<sup>2</sup> See Appendix LSL-1 Addresses and Types of Replacement (First Six-Month Period of 2023).

<sup>3</sup> See Appendix LSL-2 LSL Replacement Refusal List (First Six-Month Period of 2023).

<sup>4</sup> See Appendix LSL-3 Properties with a Partial Replacement (Cumulative since LRP Inception).

<sup>5</sup> See Appendix COE-21 Updated Post-Replacement Flushing Instructions from the 2022 Annual Report.

### Summary of LSL Replacement Activity during the Reporting Period including Address and Date of Replacement [7.B.iii.a]

Denver Water crews started LSL replacements in the fourth program year on Jan. 4, 2023, ALSLR contractors started on Feb. 27, 2023, and Federal contractors started on April 10, 2023. The ALSLR and Federal contractors focused primarily on geographic task order work areas, with newly consented properties from adjacent task orders from previous program years. Newly consented properties include properties that had an ownership change that resulted in the new owner providing consent, or properties that were either a refusal or no response that recently changed to consented. A total of eight geographic task orders each with approximately 500 to 600 properties each were developed and issued to three ALSLR contractors. A total of six work areas each with approximately 300 to 400 properties each were developed and issued to three



Federal contractors. Additional work areas will be issued in the second half of 2023. A list of addresses and dates for each replacement can be found in the appendices.<sup>29</sup>

Denver Water crews completed LSL replacements as part of water main replacement work and emergency repairs and assisted with geographic area LSL replacements. Denver Water crews continue to target critical customers at schools, daycare centers, and child care facilities within City and County of Denver to confirm the status of the service line and replace lead where found. The properties originally included in previous ALSLR Plans that required additional follow-up to make three reasonable attempts at contact were included in the 2023 ALSLR Plan. Any daycare or child care facility added to CDPHE's licensed child care facility dataset since 2020 was added to the 2023 ALSLR Plan. At the start of the year, the critical customer list included 782 properties verified as critical customers within the City and County of Denver.<sup>30</sup> Most of these were properties from previous ALSLR Plans with a small number of newly identified critical customers for the 2023 ALSLR Plan. Since the start of the year, 17 properties were removed from the critical customer list upon confirmation of a non-LSL via investigation and six LSLs were replaced in the 2023 ALSLR Plan. At the end of this reporting period, 86 critical customers remain with either likely or confirmed LSLs. For these remaining properties, all contact attempts have not resulted in a response or the property is slated for future activities. Investigation of service line materials and replacement (as needed) will be completed as consent is received.

As part of the Elevated Lead Response Plan, Denver Water crews perform prioritized individual replacements at properties where lead is measured above 150 µg/L and at properties where lead is measured above 25 µg/L, the properties shall be prioritized as they are added to task orders as part of the 2023 or future ALSLR Plan.

#### [Type of LSL Replacements Completed during this Reporting Period \[7.B.iii.b\]](#)

The types of replacements completed between Jan. 1 and June 30, 2023, are presented in Table 20. Denver Water maintains a detailed list of the type of LSL replacements completed and the associated addresses.<sup>29</sup>

---

<sup>29</sup> See Appendix LSL-1 Addresses and Types of Replacement (First Six-Month Period of 2023).

<sup>30</sup> This number includes all critical customers within the service area, regardless of p-value.



**TABLE 20. TYPE OF LSL REPLACEMENTS (JAN. 1 TO JUNE 30<sup>1</sup>, 2023)**

| Type of LSL Replacement<br>Jan. 1 to June 30, 2023   | Denver Water<br>(Watermain,<br>Emergency,<br>and ALSLR) <sup>2</sup> | Third Party<br>(Developer,<br>Homeowner,<br>and Other) <sup>3</sup> | Total         |
|--|--|---|---------------|
| <b>Full Lead Replacement<sup>4</sup></b>   | 1,955  | 147   | 2,102         |
| <b>Partial Lead Replacement, such that no Lead Remains After Replacement<sup>5</sup></b>   | 978  | 5   | 983           |
| <b>Full Galvanized Replacement</b>   | 3  | 0   | 3             |
| <b>Partial Galvanized, such that no Lead or Galvanized Remains After Replacement<sup>6</sup></b>                                 | 223  | 0   | 223           |
| <b>TOTAL REPLACEMENTS in Reporting Period, with no Lead Remaining After Replacement</b>  | <b>3,159</b>   | <b>152</b>  | <b>3,311</b>  |
| <b>TOTAL REPLACEMENTS Not Previously Reported<sup>7</sup></b>  | 2  | 20  | 22            |
| <b>TOTAL REPLACEMENTS completed since LRP Inception</b>  | <b>17,485</b>  | <b>1,295</b>  | <b>18,780</b> |
| <b>Emergency Repair, Partial Replacement (i.e., where consent was NOT granted and lead may remain in the ground)<sup>8</sup></b> | 117  | 3   | 120           |

<sup>1</sup> Properties that had a replacement on or before June 30, 2023, may not have been captured in the database for this report due to the time necessary to QA the data following the replacement date. Replacements affected by this time lag will be reported in the Annual Report for 2023.

<sup>2</sup> Includes LSL replacements completed as part of water main projects, emergency repairs, scheduled repairs, and ALSLR and Federal individual and geographic replacements completed by Denver Water or its contractors.

<sup>3</sup> Includes LSL replacements completed by developers, property owners and other government agencies as identified in Appendix LSL-1 (Addresses and Types of Replacement (First Six-Month Period of 2023)).

<sup>4</sup> Includes replacements of service lines described as lead-lead, lead-galvanized, lead-unknown and galvanized-unknown. This also includes service lines designated as either unknown-unknown or copper-copper with p-value  $\geq 0.5$  at properties where a service line replacement was completed by someone other than the ALSLR contractors (such as third party).

<sup>5</sup> Includes replacements of service lines described as lead-copper, lead-PEX, lead-PVC and copper-unknown. If verification reveals copper at three or more locations, the service line is counted as replaced if the p-value is  $\geq 0.5$ . See Appendix LSL-1 (Addresses and Types of Replacement (First Six-Month Period of 2023)).

<sup>6</sup> Includes replacements of service lines described as copper-galvanized, galvanized-copper, and galvanized-PEX.

<sup>7</sup> This includes replacements completed in the first six-month period of 2022 but not previously reported (14 added); see Appendix LSL-4 (Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (Since Program Inception)).

<sup>8</sup> Includes all properties cumulative since program inception; see Appendix LSL-3 (Properties with a Partial Replacement (Cumulative since Program Inception)).

### Customer Consent and Refusal List for LSL Replacement [7.B.iii.c]

Per Section 7.B.iii.c of the LCRR Variance, Denver Water must provide “the unique customer identification number of Customer Premises on the refusal list and documented attempts to contact the property owner.” Distribution of notification letters, including consent forms, was initiated in October 2022, to property owners included in the 2023 ALSLR Plan. Since then, notifications were mailed to all properties identified in the geographic work areas of the 2023 ALSLR Plan, after which multiple contacts are made to obtain signed consent forms.<sup>31</sup>

<sup>31</sup> See Appendix LSL-2 LSL Replacement Refusal List (First Six-Month Period of 2023).

Reconnaissance or pre-construction meetings are conducted with each property owner to plan the LSL replacement work and schedule the replacement.

A summary of the number of property owners contacted and number of signed consent forms returned is presented in Table 21. Between Jan. 1 and June 30, 2023, a total of 360 property owners refused to participate in the ALSLR Program or were non-responsive following multiple attempts at contact. At least three attempts to obtain voluntary consent from a property owner are undertaken before work can start to replace the LSL.

**TABLE 21. SUMMARY OF CONSENT AND LSL REFUSAL LIST (JAN. 1 TO JUNE 30, 2023)**

| Description  | Customer Consented <sup>1</sup> | Customer Refused <sup>2</sup> |
|--|---------------------------------|-------------------------------|
| <b>Total Number of Properties for which Consent was Given or Refused during the First Six Months of 2023</b> | 6,661                           | 353                           |

<sup>1</sup> The total number of signed consent forms represent the ALSLR contractors and Denver Water crew work. A revised procedure to track all Denver Water crew consents was implemented in 2023.

<sup>2</sup> The total number of refusals year-to-date includes attempts made by the ALSLR contractors (223 properties), Federal contractors (104 properties) and Denver Water crew efforts (26 properties). These include properties with descriptions of “consent not granted due to refusal” and “non-responsive” after at least three attempts were made and the task order goes through administrative close out. When a customer refuses or is non-responsive, the service point ID is provided to the COE team for follow-up. See explanations in Appendix LSL-2 LSL Replacement Refusal List (First Six-Month Period of 2023).

A range of outreach methods is used to contact property owners.<sup>32</sup> Denver Water sends at least two attempts at contact by mail plus one attempt at contact using a different method, such as email, phone calls or door-to-door canvassing. A property is described as “pending” while the task order for the affected work order remains open (i.e., there is ongoing construction activity). A property is considered “non-responsive” and added to the Refusal List as task orders for a work area are closed out (i.e., the construction crew demobilizes). This process is part of administrative closeout of the task order.

While the ALSLR contractors are in an area with active construction activity, additional attempts such as door-knocking, phone calls and emails may be made to contact the property owner to seek consent. If an owner refuses to participate in the ALSLR Program, the property is added to the LSL Replacement Refusal List, along with an explanation for refusal, if available. If a property owner declines due to a previous undocumented service line replacement, additional information may be requested from the owner to document a past replacement to support the removal of the property from the LRP.

When a property owner declines to participate, Denver Water is committed to continuing engagement with the property owner to encourage participation. A database is maintained to track attempted contacts at properties where consent to replace the LSL has not been provided.<sup>33</sup> An outreach approach was identified for customers with properties on previous Refusal Lists who have not had an ownership change and therefore have not been contacted

<sup>32</sup> See Appendix COE-15 2023 COE Plan included with the Annual Report for 2022.

<sup>33</sup> See Appendix LSL-2 LSL Replacement Refusal List (First Six Months of 2023).

through the ownership change follow-up process. Denver Water conducts investigative potholes at properties from previous years' Refusal Lists within or adjacent to identified 2023 task orders, provided there is no conflict, no street moratoriums or the property is already identified as lead as part of 2023 task orders. At non-responsive properties, Denver Water conducts a four-point investigation (two potholes main-to-meter and two potholes meter-to-building), and, at refusal properties, Denver Water conducts two main-to-meter potholes where possible to identify the service line material. Previous refusals that could be identified as non-lead under a four-point investigation were removed from the inventory. Denver Water will continue outreach to previous refusals where lead was found to gain consent and perform a replacement despite previous contact attempts and refusal. This effort will continue through 2023. Additionally, any change to the property ownership triggers additional outreach to obtain consent to replace the LSL. Between Jan. 1 and June 30, 2023, one change in ownership occurred at a property on the Refusal List. Follow-up is underway to gain consent for replacement from the new owner within a year of the change of ownership.<sup>34</sup>

There are circumstances where consent has been given, but an inspection of the property reveals a safety or security hazard that prevents the LSL replacement from being performed. The property owner is informed both verbally and in writing that the hazard must be addressed within 14 days of receiving the notification. If the problem is not fixed within that timeframe, the property is treated as not responsive and is added to the list of "non-responsive" until the issue is resolved, and the LSL can be replaced.<sup>35</sup>

#### Emergency Repairs Resulting in a Partial LSL Replacement [7.B.iii.d]

During this reporting period, 10 partial replacements occurred as a result of emergency repair (i.e., some lead may remain in the ground). This affected a total of 120 properties since program inception in January 2020 as a result of:<sup>36</sup>

- No consent or no available contact information for the property owner and therefore consent could not be obtained at the time of the work (this affected eight properties).
- The property owner declined replacement at the time of the work (this affected 26 properties).
- No consent to perform the full replacement due to no response from the property owner (this affected 68 properties).
- Restricted access due to the interior plumbing arrangement (this affected eight properties).

---

<sup>34</sup> See Appendix LSL-5 Ownership Changes for Properties on the Refusal List (First Six-Month Period of 2023).

<sup>35</sup> See Appendix COE-D.12 Safety or Repairs Needed Notification Letter of Second Quarter Report (2020).

<sup>36</sup> See Appendix LSL-3 Properties with a Partial Replacement (Cumulative since LRP Inception).

- Property redevelopment (four properties).
- To be rescheduled because property owner was not comfortable with replacement during COVID-19 (three properties).
- Restricted access due to gas station logistical constraints (one property).
- Meter to main replaced, meter to building potholing and/or replacement scheduled for a later date (two properties).

Attempts to obtain consent to complete the replacement in full were made and outreach with the property owner continues in order to seek consent and/or address any safety issues that currently bar entry to the property.

## 7.B.iv Filters

Section 7.B.iv of the LCRR Variance requires that Denver Water report and maintain records related to its filter distribution program. Specifically, Section 7.B.iv requires reporting and recordkeeping of the following:

### *iv. Filters.*

- a. summary of addresses of Customer Premises where filters and replacement cartridges have been provided, and certification of the number of homeowners with confirmed or likely LSLs that are not part of filter program because they use their own filter or bottled water. Detailed records must be retained by Denver Water and provided to EPA or CDPHE upon request;*
- b. the total number of filters and replacement cartridges distributed per Program Year;*
- c. the percent filter adoption for each year of the variance<sup>37</sup>, and the method used to determine this rate;*
- d. a list of unique customer identification numbers reporting the use of bottled water or a filter certified NSF/ANSI (53) for removal of lead, and any changes in the list;*
- e. a list of unique customers identification numbers for customers enrolled in the filter program who have refused a filter or replacement cartridges or have opted out of enrollment in the filter program;*
- f. filter lead sampling results collected under paragraph 5.F above;*
- g. information about filter use under paragraph 5.E; and*

<sup>37</sup> The LCRR Variance requires a filter adoption survey every other year, rather than every year, as previously required in the LCR Variance. As stated in the LRPP technical amendment, Denver Water will use the adoption rate of the previous year's survey on non-survey years for the purposes of the equivalency model.

*h. Denver Water shall notify CDPHE and EPA within 30 Days if data indicate lead levels are about 5 ppb in filtered drinking water and shall provide the measured levels of lead in filtered water. All other levels shall be reported in the semi-annual and yearly reports.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

Denver Water provides pitcher filters and filter cartridges to all customers within the service area that have the potential for a lead service line. Every six months, per the manufacturer’s recommendations, customers receive filter cartridge replacements. The initial pitcher filter distribution was launched in 2020, and any customers that are added to the program are promptly sent a filter pitcher and cartridge. Customers can request a pitcher or cartridge replacement, read about the Filter Program, and watch a video on proper filter usage through Denver Water’s filter webpage.

The Filter Program includes the distribution of pitcher filters, ongoing outreach and education to encourage pitcher filter use and the distribution of filter cartridge replacements. The Filter Program targets properties with confirmed and likely LSLs (i.e., with p-values 0.5 and higher). Using the current LSL Inventory from Table 12, it is estimated that Filter Program participants consist of approximately 78,659 Denver Water household units.

This section summarizes the milestones of the Filter Program to-date, including filter refusals/opt-outs, six-month supply of replacement filters distributed post-LSL replacement, filter survey results from the ALSLR Program, and filter performance testing in the field. An overview of the filter reporting requirements is shown in Table 22.

**TABLE 22. OVERVIEW OF 7.B.IV REQUIREMENTS**

| Paragraph Reference                                 | Description  | Refer to   |
|---|--|--|
| <b>7.B.iv.a</b>                                     | Summary of addresses of all customers enrolled in the Filter Program and provided with filters and cartridges. Certification of number of customers with a confirmed or likely LSL that use their own filter or bottled water. | See Table 23.  |
| <b>7.B.iv.b</b>                                     | Total number of filters and cartridges distributed per year.   | See Table 23.  |
| <b>7.B.iv.c</b>                                     | Percent filter adoption rate during a survey year. <sup>1</sup><br>Description of method to determine the filter adoption rate.  | To be reported in the 2023 Annual Report.  |
| <b>7.B.iv.d</b>                                     | Maintain list of addresses and Service Point Identification that use a filter or bottled water and any changes to the list.  | See Appendix. <sup>2</sup>   |
| <b>7.B.iv.e</b><br><b>5.A</b>                       | Maintain Filter Refusal or Opt-Out List.<br>Maintain list of addresses and SP IDs that have refused enrollment in the Filter Program or opted out.   | See Appendix. <sup>3</sup>   |
| <b>7.B.iv.f</b><br><b>7.B.iv.g</b><br><b>5.F.ii</b> | Confirmation of filter performance in the field (50+ locations included in the LCR compliance sampling).<br>Collect samples using a protocol approved by EPA and CDPHE.  | See Appendix for sample results from Jan. 31 to April 28, 2023. <sup>2</sup><br>Protocol for filter sample collection approved July 17, 2020, by EPA.<br>Included in this section. |

| Paragraph Reference                                  | Description   | Refer to  |
|--|---|---|
|  | Collect additional information regarding the use and operation of the filter.   |   |
| <b>7.B.iv.h</b>                                      | Notify CDPHE and EPA within 30 days of receiving sample results indicating measurable lead in filtered samples.   | See Appendix. <sup>4</sup>  |
| <b>5.B</b>   | Distribute replacement cartridges to customers enrolled in the Filter Program per the filter manufacturers' recommended replacement rate and until six months after LSL replacement.  | See this section.<br>Distribution as part of Filter Program since March 24, 2020. |
| <b>5.C</b>   | Provide education materials within two weeks of a change in customer account.<br>Provide filters and replacement cartridges within 35 days of a change in customer account.   | See Appendix. <sup>5,6</sup>  |
| <b>5.D</b>   | Offer filters to 1983 to 1987 households with a child up to 24 months of age and lead > 3 µg/L in the first bottle of the 3-bottle test.<br>Develop COE plan to focus on this audience.   | See this section and results in section 7.B.i CCT.<br>See 2023 COE Plan.          |
| <b>5.E.i</b>   | Survey enough customers enrolled in the Filter Program to receive a minimum of responses from remaining program participants that is consistent with a 95% confidence level and 3% margin of error.<br>Seek approval from CDPHE and EPA for the filter adoption survey questions prior to distribution. | See 2022 Annual Report.<br>Approved on Sept. 10, 2020. <sup>7</sup>               |
| <b>5.G</b>   | Document contact to provide lead outreach and education materials to at least 95% of customers enrolled in the Filter Program each year.  | Postcards will be sent in the second half of 2023.                                |
| <b>LRPP Executive Summary (p 9) and III.C (p 56)</b> | If the localized filter adoption rate is less than 65%, additional outreach and education will be provided to that area.  | Not applicable for this reporting period.   |
| <b>LRPP III.C (p 55)</b>                             | Survey filter use as part of ALSLR Program following LSL replacement.   | See this section and Appendix. <sup>8</sup>                                       |

<sup>1</sup> The LCRR Variance requires a filter adoption survey every other year (starting in 2023), rather than every year, as previously required in the LCR Variance. As stated in the LRPP technical amendment, Denver Water will use the adoption rate of the previous year's survey on non-survey years for the purposes of the equivalency model.

<sup>2</sup> See Appendix FIL-1 Filter Program Opt-Outs (First Six-Month Period of 2023).

<sup>3</sup> See Appendix FIL-2 Filter Program Refusals (First Six-Month Period of 2023).

<sup>4</sup> See Appendix FIL-3 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2023).

<sup>5</sup> See Appendix FIL-4 Occupancy Changes – COE Distribution (First Six-Month Period of 2023).

<sup>6</sup> See Appendix FIL-5 Occupancy Changes – Pitcher Filter Distribution (First Six-Month Period of 2023).

<sup>7</sup> See Third Quarter Report of 2020 (Appendix FIL-29 OMB Approved Filter Adoption Survey Questions).

<sup>8</sup> See Appendix FIL-6 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2023).



### Initial Filter Distribution to All Customers Enrolled in the Filter Program [7.B.iv.a]

Per Section 7.B.iv.a of the LCRR Variance, Denver Water must provide a “summary of addresses of Customer Premises where filters and replacement cartridges have been provided, and certification of the number of homeowners with confirmed or likely LSLs that are not part of the filter program because they use their own filter or bottled water. Detailed records must be retained by Denver Water and provided to EPA or CDPHE upon request.” Denver Water began filter distribution on Feb. 12, 2020, with distribution to customers included in the ALSLR Program in 2020 (year 1). Denver Water initiated broader filter distribution on March 28, 2020, to all customers enrolled in the Filter Program. Initial filter distribution was completed on Sept. 21, 2020.

Pitcher filter distribution continues for occupancy changes and customer requested replacements for broken or missing pitcher filters, as shown in Table 23 for pitcher filter distribution.

**TABLE 23. SUMMARY OF FILTER DISTRIBUTION (JAN. 1 TO JUNE 30, 2023)**

| Description   | Count | Comment                    |
|---|-------|----------------------------|
| <b>Initial Pitcher Distribution for Customers Enrolled in 2023</b>  | 88    |                            |
| <b>Total Number of Households Provided with a Filter Kit between Jan. 1 and June 30, 2023</b>                         | 4,202 |                            |
| <b>Number of Households that Use their own NSF-Certified Filter or Bottled Water between Jan. 1 and June 30, 2023</b> | 3     | See Appendix. <sup>1</sup> |
| <b>Number of Households that Declined to Use a Filter or Bottled Water between Jan. 1 and June 30, 2023</b>           | 47    | See Appendix. <sup>2</sup> |

<sup>1</sup> See Appendix FIL-1 Filter Program Opt-Outs (First Six-Month Period of 2023).

<sup>2</sup> See Appendix FIL-2 Filter Program Refusals (First Six-Month Period of 2023).

New customers enrolled in the Filter Program in 2023 are included in the count for initial distribution of pitcher filters in Table 23, along with customers that were previously enrolled in the Filter Program but that failed to receive their initial pitcher filter. Together, this represents approximately 1% of the current 78,659 customers enrolled in the Filter Program. In general, the customers did not receive a pitcher filter due to either missing or erroneous address or unit number information:

- 1) At residential properties with a general address to allow customers to receive filters.
- 2) At multi-unit commercial properties with a general address to allow customers to receive filters. Some of these were identified from customers calling in to alert Denver Water of additional units or through review of unit numbers for completeness.

Addresses where filters could not be delivered were investigated for accuracy and a filter kit and program introduction booklet were sent once the address could be confirmed. Corrective actions have been implemented to reconcile all known addresses, identify incorrect addresses,

and distribute pitcher filters as required. As part of this exercise, 2,532 properties were reviewed during the first six-month period of 2023.

An analysis of return-to-sender addresses was performed in 2020 and described in the Third Quarterly Report for 2020; this exercise was not repeated. However, throughout 2023, return-to-sender addresses continued to be investigated and upon reconciliation, a filter kit is re-sent to the correct address or if vacant, the property is removed from the LRP.

**Replacement Filter and Replacement Filter Cartridge Distribution to Customers Enrolled in the Filter Program [7.B.iv.b]**

Per Section 7.B.iv.b of the LCRR Variance, Denver Water must report “the total number of filters and replacement cartridges distributed per Program Year.”

Between Jan. 1 and June 30, 2023, filter kits were distributed to an additional 4,202<sup>38</sup> customers enrolled in the Filter Program.

During this same period, 76,427 replacement filter cartridges were distributed to 75,120 addresses of customers enrolled in Filter Program in accordance with the manufacturer’s recommendation for replacement within six months. Following the improvements made in July 2021 to address late filter distribution, all properties enrolled in the Filter Program received replacement filter cartridges within the six-month replacement interval.<sup>39</sup> Of the 76,427 replacement filter cartridges sent, 2,532 properties were returned to sender.<sup>40</sup> An unsuccessful delivery prompts an investigation, and, upon reconciliation, a replacement filter is re-sent to the correct address or if vacant, the property is removed from the LRP. A summary of distribution of post-LSL replacement filters is provided in Table 24.

**TABLE 24. SUMMARY OF SIX-MONTH SUPPLY POST-LSL REPLACEMENT FILTER DISTRIBUTION (JUNE 4 TO DEC. 31, 2022)**

| Description   | Count | Comment   |
|---|-------|---|
| <b>Number of Households Provided with Six-Month Supply of Filter Replacements Post Lead Service Line Replacement between Jan. 1 and June 30, 2023<sup>1,2</sup></b> | 2,497 | This includes emergency repairs and replacements performed by Denver Water and third parties. |

<sup>1</sup> This value may not match the number of lead service line replacements completed between Jan. 1 and June 30, 2023: for example, if a customer received their initial filter pitcher and replacement filters within two months of having their lead service line replaced, additional replacement filters are provided on the six-month replacement schedule and not as part of the lead service line replacement activities.

<sup>2</sup> This value includes filter distribution to properties where the lead service line replacement was completed by a third party, as identified in Table 20.

<sup>38</sup> This number refers to the number of properties that received a new filter based on occupancy changes, high-capacity, broken filters, lost filters, etc. The number of filters distributed to these properties totals 4,202.

<sup>39</sup> See the First Semi-Annual Report of 2021 for more details.

<sup>40</sup> See Appendix FIL-7 Filter Program Replacement Cartridge Returns (First Six-Month Period of 2023).



## Occupancy Changes [5.C]

Section 5.C of the LCRR Variance states “If a change in the customer name of the water account associated with a customer enrolled in the filter program occurs at any time, Denver Water must provide the new customer with educational materials as soon as possible but no later than 30 Days following the change in customer account. If the Customer Premise or a residential unit at the Customer Premise is enrolled in the filter program, Denver Water must distribute a new filter and replacement cartridges per manufacturers’ recommended replacement rate to the new customer within 35 Days of the change in customer account. Denver Water will also make filters available for pick-up at the customers’ election.”

Denver Water was notified of 2,634 occupancy changes between Jan. 1 and June 30, 2023.<sup>41</sup> 2,184 property owners were alerted of these occupancy changes and received an introductory booklet.<sup>42</sup> Occupancy changes are tracked daily to provide multiple mailings per week to allow new occupants to receive their LRP Introductory Letter and LRP Overview Booklet within 14 days of the change in occupancy. Occupancy changes are added to weekly filter distribution batches to allow new occupants to receive a pitcher filter within 35 days of notice of new occupancy. Both the introductory materials and the filters were distributed within 14 and 35 days respectively, at all properties where a change in occupancy occurred for this reporting period.<sup>43</sup>

## Filter Distribution to Formula-fed Infants in Select Households [5.D]

Section 5.D of the LCRR Variance states, “Upon request, Denver Water will provide lead water quality sampling at no cost to any customer within its service area. If a child up to 24 months of age resides in a Select Household and the water quality results in the first draw sample show lead concentrations above 3 ppb, Denver Water must offer a filter and enough replacement filters and cartridges, at no cost, to the customer until the child exceeds the age of 24 months.”

No 1983 to 1987 households with children under 24 months of age requested enrollment in the Filter Program during the first six-month reporting period of 2023 (i.e., a select household as identified in paragraph 5.D of the LCRR Variance).<sup>44</sup>

## Formal Filter Adoption Survey [7.B.iv.c]

Under Section 5.E.i of the LCRR Variance, “Denver Water must conduct a survey in 2023 and every other program year of randomly selected customers enrolled in the Filter Program to receive a minimum of responses from remaining program participants that is consistent with a 95% confidence level and 3% margin of error. The survey must inquire whether the customer has

---

<sup>41</sup> See Appendix FIL-5 Occupancy Changes - Pitcher Filter Distribution (First Six-Month Period of 2023).

<sup>42</sup> Property owners can have multiple occupancy changes within one week. Rather than sending multiple introductory booklets, one introduction booklet will be sent to the property owner.

<sup>43</sup> See Appendix FIL-4 Occupancy Changes – COE Distribution (First Six-Month Period of 2023).

<sup>44</sup> See Appendix CCT-4 Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Cumulative since LRP Inception).

used the filter for water to make infant formula (if applicable); cooking and drinking; or is using bottled water or a filter device that is certified NSF/ANSI (53) for lead removal not provided by Denver Water for infant formula, cooking and drinking.” Per Section 7.B.iv.c of the LCRR Variance, Denver Water must report “the percent filter adoption for each year of the variance, and the method used to determine this rate.”

Filters are used to reduce exposure to lead before the lead service line is replaced and for six months following LSL replacement. The rate of filter adoption by customers enrolled in the LRP is used as an input in the equivalency model.

Filter adoption assumes customers are accepting, installing, using, and maintaining their pitcher filter properly, including replacing the filter cartridge at the appropriate time and using the pitcher filter for drinking, cooking, and infant formula, as applicable. The minimum filter adoption rate identified in the Lead Reduction Program Plan necessary to match the performance of the orthophosphate alternative is 65%.

The formal Filter Adoption Survey was approved by EPA on Sept. 10, 2020. The survey for 2023 is scheduled to be distributed August 1, 2023, to 15,000 properties or about 19% of customers enrolled in the Filter Program.

### Informal Filter Adoption Survey

Informal surveys of filter use are conducted during ALSLR pre-construction meetings and during virtual meetings asking customers about filter adoption and use. Responses from 4,601 participants were captured in the LRP database from the pre-construction meetings.<sup>45,46</sup> Of the responses, 2,187 had service line replacements. This accounts for 66% of all customers who had their LSLs replaced in 2023 and suggests that most customers are using filtered or bottled water for drinking, cooking and infant formula:

- Of the 2,187 responses, 635 customers responded to the informal filter adoption survey. The majority of customers indicated that they used filtered or bottled water for drinking (91%) and cooking (84%).
- 95% of households with a formula-fed infant indicated that they used filtered water when preparing formula.

Informal surveys of overall filter use and barriers to using filtered water for cooking are conducted as part of virtual community meetings when those meetings focus on filter use.

---

<sup>45</sup> See Appendix FIL-6 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2023).

<sup>46</sup> See Appendix FIL-8 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2023).

### Filter Opt-Out List of Customers using Bottled Water or an Alternate Filter [7.B.iv.d]

Per Section 7.B.iv.d of the LCRR Variance, Denver Water must report “a list of unique customer identification numbers reporting the use of bottled water or a filter certified NSF/ANSI (53) for removal of lead, and any changes in the list.”

The number of properties that chose to opt-out of the Filter Program to date is relatively small. Customers that opt-out of the Filter Program are contacted by Denver Water to understand the reason for opting out. Of the 134 customers that have opted out since the launch of the Filter Program, 19 use bottled water as an alternative to the filter and 27 use their own filter certified National Sanitation Foundation (NSF) 53 for lead removal. For the 88 remaining customers, Denver Water was unable to confirm if the customer was using an NSF 53-certified filter.<sup>47</sup> A summary of the Filter Program opt-outs is shown in Table 25. Contact with customers continues as part of an annual reminder to customers that have opted out or previously refused to participate in the Filter Program.<sup>48</sup>

**TABLE 25. SUMMARY OF FILTER PROGRAM OPT-OUTS**

| Program Year   | Number of Properties |  |                               |   |
|--|----------------------|--|-------------------------------|---|
|  | Total Opt-Outs       | Confirmed Using Own Supplied NSF 53 Certified Filter | Confirmed Using Bottled Water | No Confirmation of NSF 53 Certified Filter or Bottled Water |
| <b>2020 (Jan. 1 to Dec. 31, 2020)</b>  | 63                   | 9  | 6                             | 48  |
| <b>2021 (Jan. 1 to Dec. 31, 2021)</b>  | 43                   | 6  | 5                             | 32  |
| <b>2022 (Jan. 1 to Dec. 31, 2022)</b>  | 25                   | 11   | 6                             | 8   |
| <b>2023 (Jan. 1 to June 30, 2023)</b>  | 3                    | 1  | 2                             | 0   |
| <b>Total Removed from LRP due to Non-Lead Designation or LSL Replacement</b> | 0                    | 23   | 3                             | 28  |
| <b>Total Since LRP Inception</b>   | 134                  | 27   | 19                            | 88  |

### Filter Refusal List [7.B.iv.e]

Per Section 7.B.iv.e of the LCRR Variance, Denver Water must report “a list of unique customers identification numbers for customers enrolled in the filter program who have refused a filter or replacement cartridges or have opted out of enrollment in the filter program.”

From Jan. 1 to June 30, 2023, notice of refusal to participate in the Filter Program was received for 47 properties.<sup>49</sup> The reasons given for refusal included that the pitcher is too heavy to use or that the resident had a water quality test and is not concerned about the low level of

<sup>47</sup> See Appendix FIL-1 Filter Program Opt-Outs (First Six-Month Period of 2023).

<sup>48</sup> The use of an NSF 53 certified filter could not be confirmed at some properties based on call center records. This affected 12 customers that indicated that they use their own filter; these properties were moved from the Opt-Out List to the Refusal List.

<sup>49</sup> See Appendix FIL-2 Filter Program Refusals (First Six-Month Period of 2023).

lead in their water. This brings the total number of refusals to 308 since the inception of the LRP. A summary of the refusals to date is shown in Table 26.

**TABLE 26. SUMMARY OF FILTER REFUSAL LIST**

| Reporting Period   | Number of Properties Refusing to Participate |
|--|--|
| 2020 (Jan. 1 to Dec. 31, 2020)   | 30   |
| 2021 (Jan. 1 to Dec. 31, 2021)   | 73   |
| 2022 (Jan. 1 to Dec. 31, 2022)   | 158  |
| 2023 (Jan. 1 to June 30, 2023)   | 47   |
| <b>Total Removed from LRP due to Non-Lead Designation or LSL Replacement Since LRP Inception</b> | 22   |
| <b>Total Since LRP Inception</b>   | 308  |

### Summary of Data to Document Filter Distribution and Filter Program Participation

Additional details related to filter kit distribution are provided in the Appendices:

- List of premise addresses and service point identification numbers for all households that refuse to participate in the Filter Program.<sup>50</sup>
- List of premise addresses that have returned replacement cartridges to sender.<sup>51</sup>
- Filter adoption survey results summary from informal filter use surveys conducted in the field as part of LSL replacement and virtual meeting filter survey summary.<sup>52</sup>
- Detailed responses from the informal filter use field survey responses collected as part of LSL replacement activities.<sup>53</sup>
- Confirmation of pitcher filter performance in the field.<sup>54</sup>
- List of premise addresses and service point identification numbers for all households that opt-out of the Filter Program.<sup>55</sup>
- Occupancy changes for pitcher filter distribution.<sup>56</sup>

<sup>50</sup> See Appendix FIL-2 Filter Program Refusals (First Six-Month Period of 2023).

<sup>51</sup> See Appendix FIL-7 Filter Program Replacement Cartridge Returns (First Six-Month Period of 2023).

<sup>52</sup> See Appendix FIL-6 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2023).

<sup>53</sup> See Appendix FIL-8 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2023).

<sup>54</sup> See Appendix FIL-3 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2023).

<sup>55</sup> See Appendix FIL-1 Filter Program Opt-Outs (First Six-Month Period of 2023).

<sup>56</sup> See Appendix FIL-5 Occupancy Changes - Pitcher Filter Distribution (First Six-Month Period of 2023).

- Occupancy changes for filter education information.<sup>57</sup>

#### Confirmation of Filter Performance in the Field [7.B.iv.f]

Per Section 7.B.iv.f of the LCRR Variance, Denver Water must report filter lead sampling results collected. Field sampling is conducted by Denver Water in conjunction with LCR compliance sampling (see section 7.B.i). All samples collected to meet this requirement for the first six-month compliance period of 2023 are included in this reporting period. Samples were collected from 113 properties between Jan. 31, 2023, and April 28, 2023. Samples are collected using a protocol with three sample bottles to differentiate between lead measured in the first draw LCR compliance sample and lead measured in water used in filter testing and referred to as the filter influent sample. The third sample is collected from filter effluent and used with the filter influent sample to calculate the percentage of lead removal.

Lead was measured in the unfiltered tap water at less than 1 µg/L in 15 samples collected on the same day the filter effluent sample was collected. Lead was measured below the detection limit in filtered water at 48 of the 53 properties and below 3 µg/L at all properties with no exceptions<sup>58</sup>. If lead is measured above 10 µg/L from a filter, the filter is removed from the property, the customer is provided with a new filter, and the “old” filter is sent to the Denver Water lab for additional testing (using the water supplied from the lead pipe rack). Zero properties in this reporting period had lead measured above 10 µg/L in the filter effluent sample.

Results from filter testing in the field are also reviewed to identify properties with elevated lead in the first bottle for inclusion in the Elevated Lead Response Plan. There were zero properties with lead measured above 15 µg/L in the first bottle.

#### Information About Filter Usage and Maintenance Collected during Filter Performance Testing [7.B.iv.g]

Per Section 7.B.iv.g of the LCRR Variance, Denver Water must report information about filter use. Observations of filter use during filter performance testing in the field are reported with sampling results. When there are customers who are identified for inclusion in the filter performance testing in the field that do not use their filter, a sample is not collected from the filter. For this reporting period, 12 customers indicated that they did not use the filter provided by Denver Water.

#### Confirmation of Direct Contact with 95% of All Customers Enrolled in the Filter Program [5.G]

Per Section 5.G of the LCRR Variance, “Denver Water must make direct contact with lead outreach and education materials to 95% of all customers enrolled in the filter program in every Program Year.” In 2023, proof of contact with customers enrolled in the LRP is measured based

---

<sup>57</sup> See Appendix FIL-4 Occupancy Changes - COE Distribution (First Six-Month Period of 2023).

<sup>58</sup> See Appendix FIL-3 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2023).

on the mailing of filter reminder postcards. The postcards will be mailed in the second half of 2023 and will be discussed in the 2023 Annual Report.

## 7.B.v Compliance Metrics per Paragraphs 2.C, 3.D, 4.I, 5.G, 6.B and 6.C

Section 7.B.v of the LCRR Variance requires that Denver Water report and maintain records of the following compliance metrics:

*v. Compliance Metrics. Results achieved under the compliance metrics in paragraphs 2.C [CCT Metric], 3.D [LSL Inventory Compliance Metric], 4.I [Accelerated LSL Replacement Compliance Metric], 5.G [Filter Communication Compliance Metric], 6.B [Comprehensive LRPP Performance Metric], and 6.C [Health Equity and Environmental Justice Metric] above.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

A summary of the performance metrics that will ultimately be used to evaluate the overall performance of the LRP is presented in Table 27.

**TABLE 27. SUMMARY OF COMPLIANCE**

| Paragraph | Description  | Comment             |
|-----------|--|---------------------|
| 2.C       | <b>C. Corrosion Control Treatment Metric.</b> Denver Water <u>must maintain pH and alkalinity within the ranges designated by CDPHE. For the entry points to the distribution system, pH must fall within a range of 8.6 to 9.0 and a minimum alkalinity of 20 mg/L as CaCO<sub>3</sub>; for distribution system location, pH must fall within a range of 8.5 to 9.1 and a minimum alkalinity of 20 mg/L as CaCO<sub>3</sub>.</u> CDPHE may modify these required water quality parameter ranges through a modification decision under 5 CCR 1002-11.26(3)(d)(ii). | See Section 7.B.i   |
| 3.D       | <b>D. LSL Inventory Compliance Metric.</b> Denver <u>Water must Investigate a cumulative average of 1.4% of the total estimated number of unknown service lines in the inventory each Program Year from January 1, 2020, to the Variance End Date. By the Variance End Date there must be no remaining sites in the inventory categorized as a lead, galvanized requiring replacement, or lead status unknown, as defined in paragraph 1.</u>  | See Section 7.B.ii  |
| 4.I       | <b>I. Accelerated LSL Replacement Compliance Metric.</b> Denver Water <u>must annually achieve at least a 7.0% cumulative average Program Year LSL replacement rate</u> as determined based on reporting required in paragraph 7.B. If not achieved, Denver Water shall provide public notice within 30 Days to all customers enrolled in the filter program, as required under paragraph 1.T.ii.  | See Section 7.B.iii |
| 5.G       | <b>G. Filter Communication Compliance Metric.</b> Denver Water <u>must make direct contact with lead outreach and education materials to 95% of all customers enrolled in the Filter Program</u> in every Program Year. . . Compliance shall be tracked by mailing lists and mail receipts, lists of   | See Section 7.B.vi  |

| Paragraph | Description   | Comment                                   |
|-----------|---|---|
|           | customer email addresses for customers who elect to receive email communication, or other forms of documentation approved by CDPHE.   |   |
| 6.B       | <p><b>B. Comprehensive LRPP Performance Metric.</b> Denver Water <u>must demonstrate to EPA's satisfaction, using the updated equivalency model results as reported under paragraph 7.C, that the combined actual performance of the LRPP as implemented continues to be "at least as efficient as" OCCT as that term is used in 40 C.F.R § 141.82(e) and as it relates to CDPHE's March 2018 designation of OCCT as orthophosphate treatment for Denver Water, in reducing lead exposure on an annual basis.</u></p>   | To be presented in the 2023 Annual Report |
| 6.C       | <p><b>C. Health Equity and Environmental Justice (HE and EJ) Compliance Metric.</b></p> <p>i. Denver Water <u>must annually achieve a cumulative Program Year LSL replacement rate in areas with HE and EJ concern that is equal to or greater than the total replacement rate.</u> This calculation is the number of LSLs replaced per year in areas with HE and EJ concerns divided by total number of LSLs in areas with HE and EJ concerns must be equal to or greater than the average number of LSLs replaced per year overall divided by total number of LSLs as of the variance effective date.</p> <p>ii. Denver Water <u>must make direct contact with lead outreach and education materials to more than 95% of customers as identified in areas with HE and EJ concerns enrolled in the filter program in every Program Year.</u></p> | See Section 7.B.vii                       |



## 7.B.vi Communications, Outreach and Education

Section 7.B.vi of the LCRR Variance requires that Denver Water report and maintain records for COE activities:

- vi. Communications, Outreach and Education. A summary of activities conducted under the Communications, Outreach and Education program, including the updated communications, outreach and education plan for the new Program Year. The summary will include, at a minimum:*
- a. a description of outreach activities conducted, including copies of the outreach materials provided; and*
  - b. a list of any partner organizations who conducted, or were involved in the implementation of the communications, outreach and education plan.*

*Text is taken verbatim from the LCRR Variance, dated Dec. 1, 2022.*

During the first six months of 2023, Denver Water continued its public outreach and engagement efforts based on the strategies described in the 2023 COE Plan. This included hosting two virtual community meetings on construction preparedness, convening the Stakeholder Advisory Committee for two quarterly meetings and launching a paid media campaign on filter use. COE efforts specific to each LRP element are also included in those element sections of this report and are detailed in Table 28.



**TABLE 28. OVERVIEW OF 7.B.VI REQUIREMENTS**

| Paragraph                | Description   | Comment   |
|--------------------------|---|---|
| <b>7.B.vi</b>            | 2020 COE Plan<br>2021 COE Plan<br>2022 COE Plan<br>2023 COE Plan  | See First Quarter Report of 2020.<br>See Fourth Quarter Report of 2020.<br>See Second Semi-Annual Report of 2021.<br>See Appendix. <sup>1</sup> |
| <b>7.B.vi.a</b>          | Description of COE activities conducted.<br>Copy of materials.  | Discussed in this section.<br>See Appendices for copies of materials included. <sup>2</sup>   |
| <b>7.B.vi.b</b>          | Ambassador Program Overview.  | See Section 7.B.vii.  |
| <b>7.B.vi.c</b>          | Response, date and time of in-person surveys of filter adoption and use.                                  | See Section 7.B.iv.<br>See Appendix. <sup>3</sup>   |
| <b>8.G</b>               | Notify customers enrolled in Filter Program of LRP and launch multi-media campaign.                       | Multi-media campaign launched March 23, 2020.   |
| <b>LRPP III.E (p 64)</b> | Targeted messaging to homes with copper piping and lead solder to flush the tap after periods of non-use. | See 2020, 2021 and 2022 COE Plans.  |
| <b>LRPP III.F (p 74)</b> | Stakeholder Advisory Committee  | Discussed in this section.  |

<sup>1</sup> See Appendix COE-17 2023 COE Plan from the 2022 Annual Report.

<sup>2</sup> See Appendices COE-3 through COE-6, and COE-8 through COE-16 for a copy of materials.

<sup>3</sup> See Appendix FIL-13 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2022).

### Outcomes of COE Activities between Jan. 1 and June 30, 2023 (unless otherwise noted) [7.B.vi.a]

- Denver Water hosted two bilingual, one-hour virtual community meetings in February and May 2023 focused on preparing customers for lead service line replacement. To promote the meetings, 21,281 outbound calls were made to customers identified for lead service line replacement in 2023 the day before and the day of the events, with 6,449 bilingual voicemail messages left for those who did not answer. In total, 1,951 customers participated in a virtual community meeting during the first six months of the year.
- In addition, Denver Water received requests for LRP presentations and/or attendance at community events from eight local, state and national organizations and held these presentations at various times during this reporting period.
- The Stakeholder Advisory Committee convened for two quarterly meetings on Feb. 23 and June 1. The meetings included progress updates on the LRP, an overview of Denver Water’s participation in a White House panel on lead pipe replacement, updates from committee members on work from their organizations related to lead and/or public health and an overview of new program metrics included in the LCRR

Variance. The next meeting will be held in September 2023 and a service line replacement site visit for the committee will be held in July 2023.

- Contact was made on 23 occasions with Denver City Council and Mayor’s Office and officials in suburban jurisdictions to share information and updates on the LRP.
- The LRP website received 359,958 visits and 635,447 page views since the launch of comprehensive LRP information on March 5, 2020.<sup>59</sup>
- LRP TAP stories published on denverwater.org/TAP received 1,866 views.<sup>60</sup>
- Denver Water social media activity reached approximately 27,000 individuals.
- The LRP was mentioned in 55 news media stories, with a potential aggregate readership of 5 million across online news, blogs and television.<sup>61</sup>

The following section highlights COE program activities carried out in 2023 from Jan. 1 through June 30 (unless otherwise noted), organized by strategy type.

## Public Outreach

Overview of activity grouped by outreach component:

- Virtual Meetings
  - Denver Water hosted two bilingual, one-hour construction preparedness virtual community meetings on Feb. 28 and May 9 for customers slated to receive a service line replacement in 2023.
  - The meetings were an opportunity to inform customers about what to expect before, during and after service line replacement, including the importance of filter use and flushing.
  - To promote the meetings, 21,281 outbound calls were made to customers identified for service line replacement the day before and the day of the event, with 6,449 bilingual voicemail messages left for those who did not answer. 1,521 customers participated in these meetings.
  - The voicemail provided information about why they were receiving the call, where to learn more about the LRP and how to contact Denver Water Customer Care. Voicemails were recorded in both English and Spanish.
  - Presentations and panel presentations were provided to organizations upon request to provide an overview of the LRP, gather feedback and identify areas for potential coordination. These meetings included the following:

---

<sup>59</sup> See Appendix COE-13 Website Visits.

<sup>60</sup> See Appendix COE-12 TAP Stories Published.

<sup>61</sup> See Appendix COE-11 Earned Media Reports.

- White House Press Event on Lead Pipe Removal (Jan. 27).
  - Catholic Charities Health Services Advisory Committee (Feb. 7).
  - Association of State Drinking Water Administrations – Service Line Material Field Validations (Feb. 9).
  - Cornell Institute of Public Affairs – Supporting Community Awareness and Engagement (March 17).
  - Colfax Bus Rapid Transit Community Open House (April 18).
  - American Water Works Association Conference – From Variance to Best Practice: How Denver Water’s Innovative Lead Reduction Program Became a Model for the US (April 25).
  - Community Meeting on Tap Water Safety, in coordination with CDPHE and NAACP (June 1).
  - American Water Works Association – Annual Conference and Expo – Moving Forward with Lead Service Line Replacements (June 14).
  - Watershed Summit – Lead Reduction Program and Partnerships (June 22)
- Stakeholder Advisory Committee
    - The Stakeholder Advisory Committee met for its first and second quarterly meetings of 2023 on Feb. 23 and June 1.
      - Representatives reflected a diverse group of organizations including health care, education, nonprofit and government.<sup>62</sup>
      - At the February meeting, Denver Water provided an overview of LRP progress through 2022, progress from early 2023, takeaways from Denver Water’s participation in a White House panel on lead pipe replacement, and updates from committee members on relevant work from their organizations. Topics for updates included lead testing in schools, provided by the committee’s Denver Public Schools’ representative, and Lead and Copper Rule Revisions and inventory development, provided by the committee’s EPA representative, Bob Clement.
      - At the second quarterly meeting on June 1, Denver Water provided an update on LRP progress, an overview of the new health equity and environmental justice metric included in the LCRR Variance and public dashboard, updates from committee members on their work and a preview of what to expect for a

---

<sup>62</sup> See Appendix COE-1 Stakeholder Advisory Committee 2023 Membership List.

service line replacement site visit. The committee members also shared topics they would be interested in covering in future meetings.

- Government Relations
  - 23 proactive contacts and/or meetings were held with local government officials and staff, including Denver City Council and Mayor's Office and officials in suburban jurisdictions, to share information and updates for the LRP.
    - Now that the LRP is in well underway, most of these updates included information on upcoming work areas and construction in respective Denver City Council Districts, as well as updates on issues potentially impacting customers.
  - Outside of the proactive updates, staff continues to be responsive to questions from government officials, as needed.
- Distributor Communications
  - An update on the LRP was provided at the Feb. 21, April 18 and June 20 distributor forum meetings.
  - Updates on the LRP were published in the February and May distributor newsletters.
  - Distribution of water quality sampling kits and results continues when requested by distributors' customers. Distributor LRP customers also receive replacement filters and, when there is a change in occupancy, a new filter kit.
  - Denver Water also sends distributor customers the same program removal mailings as for City and County of Denver customers. Mailings are sent when a property is removed from the LRP either due to investigation confirming a non-lead service line or six months after a lead service line has been replaced.
  - On a bimonthly basis, distributors with properties in the LRP are provided an inventory update which reflects any changes made to the status of properties in their area as a result of investigations or service line replacement.
  - In 2023, investigative potholing is beginning in distributor areas. An investigation pre-construction meeting with impacted distributors was held June 8. Distributor customers will receive the same notifications and communications related to potholing as City and County of Denver customers, and distributors were provided with talking points to support answering any customer inquiries. A digital fact sheet outlining the potholing efforts is in development for distributors in the third quarter of 2023 to use as reference.

- Earned Media
  - The LRP was covered in digital, print and broadcast news, including 9News, The American Prospect, American Society of Civil Engineers and El Comercio de Colorado and Water Finance & Management, among others.
  - There were 138 posts about the LRP on social media channels in this reporting period, resulting in 27,029 impressions. Ambassador Program partners also shared Denver Water social media posts on their own networks.
  - Denver Water also provided content for organization and neighborhood newsletters on request.
- Digital Communications
  - Denver Water distributed an email on March 31 to a database of 57,252 subscribers. The email shared how to access virtual community meeting information and recordings, an overview of federal funding and what it means for the LRP, a link to the online filter request form and an overview of the investigations process to determine service line material.<sup>63</sup>
  - Four TAP stories were published on [denverwater.org/TAP](https://denverwater.org/TAP), which included content related to the LRP. As of June 30, these stories received a total of 1,866 views.<sup>64</sup>
  - The LRP website, [denverwater.org/Lead](https://denverwater.org/Lead) (English) and [denverwater.org/Plomo](https://denverwater.org/Plomo) (Spanish), was updated with the recordings of the construction preparedness virtual community meetings, dashboards, an updated lead service line inventory and an updated pipe replacement map with the work areas for 2023. Since the launch of the LRP, [denverwater.org/Lead](https://denverwater.org/Lead) has received 359,958 visits and 635,447 page views. There were 35,196 unique website visits from Jan.1 to June 30, 2023. Since launching in October 2021, [denverwater.org/Plomo](https://denverwater.org/Plomo) (the Spanish version of the website) has received 4,096 visits and 6,069 page views. There were 1,395 unique website visits from Jan. 1 to June 30, 2023.<sup>65</sup>

### Material Development and Owned Media [7.B.vi.a]

The following materials were developed from Jan. 1 through June 30, 2023:

- The public-facing dashboard was updated to share progress and key metrics for the LRP through June 2023.<sup>66</sup> The updated dashboard is posted monthly to [denverwater.org/Lead](https://denverwater.org/Lead) and is available in both English and Spanish.

---

<sup>63</sup> See Appendix COE-10 March Subscriber Email.

<sup>64</sup> See Appendix COE-12 TAP Stories Published.

<sup>65</sup> See Appendix COE-13 Website Traffic.

<sup>66</sup> See Figure 1.

- Information on the LRP was included in the January and March issues of WaterNews, the monthly bill insert included with the bills of more than 180,000 customers who receive a bill from Denver Water. The information covered program progress through 2022, the federal funding award to further accelerate lead service line replacements, and what customers in the LRP need to know and do regarding filter use, construction and water testing.<sup>67</sup>
- ALSLR Program
  - The lead service line replacement booklet sent to customers along with the replacement consent form was updated to streamline language, add information about resources for internal plumbing replacement and include an action-item checklist for customers to follow along with the process.<sup>68</sup>
  - To facilitate the in-home visit with customers prior to service line replacement, a more detailed booklet was developed to outline what to expect before, during and after construction. The booklet acts as a guide for crews to explain the process with customers while going through their property, supporting consistent information-sharing and messaging. The booklet is then left with customers to reference if they have more detailed questions about the process.<sup>69</sup>
  - As service line replacement work moves into more densely populated areas, parking impacts and street closures will have greater impact and pose a greater inconvenience for residents. A “No Parking” sign specific to the LRP was developed to be placed on the windshields of cars in the area just prior to construction parking impacts to provide advance notification for drivers.<sup>70</sup>
- Service Line Investigations
  - The potholing notification postcard developed in 2022 to notify customers of upcoming investigative potholing activity outside of their property was updated so it could also be addressed to neighbors and surrounding residents of those properties. The notification postcard is now sent not just to those properties being potholed, but all properties in the area so that both impacted and adjacent customers are informed of the upcoming work and know what to expect.<sup>71</sup>
- Water Quality Sampling

---

<sup>67</sup> See Appendix COE-2 January and March Issues of WaterNews.

<sup>68</sup> See Appendix COE-4 Lead Service Line Replacement Overview Booklet – Mailed Consent Form (Updated).

<sup>69</sup> See Appendix COE-5 What to Expect with Lead Service Line Replacement Booklet – Provided at In-Home Visit.

<sup>70</sup> See Appendix COE-6 No Parking Card.

<sup>71</sup> See Appendix COE-7 Investigation Potholing Notification Postcard (Updated).

- As more investigative water test kits are sent to customers to inform the lead service line inventory and predictive model, a new approach was initiated to generate increased customer participation in water quality sampling. Rather than immediately sending investigative water test kits to identified customers, an offer postcard and offer email is now sent as the first step. The postcard and email highlight the benefits of completing a water test kit and ask the customer if they would be willing to complete a kit. Interested customers contact Denver Water and are sent a kit.<sup>72</sup>
  - A follow-up reminder email is sent to customers who did not initially open or click on the original offer email to generate more responses. For customers who request that a water test kit is sent to them and have not returned the samples after a reasonable processing time, a reminder call and email are sent to encourage them to send the kit back for testing.
  - Insights on the effectiveness of this approach will be included in the annual Learn by Doing report. The approach for communications around water test kits sent as part of a planned and/or completed service line replacements remains the same.

### Internal Communications and Coordination

The following summarizes efforts to continue to educate Denver Water’s employees and contractors about the components and messaging of the LRP. This ongoing engagement supports the ability of Denver Water staff and representatives to provide customers with accurate information and enhances efforts to make the LRP accessible by all.

- Internal trainings and information-sharing sessions continued to be held as needed or requested to update Denver Water teams and departments on the LRP and prepare them for handling customer or community inquiries as appropriate. Twelve sessions were held between Jan. 1 and June 30.
- Talking points continue to be developed and updated for Customer Care and other customer-facing groups to support consistent and timely responses to customer inquiries.

---

<sup>72</sup> See Appendix COE-9 Investigation Water Quality Test Kit Offer Postcard.

### Above and Beyond Stories

- Beginning in 2023, replacement crews began performing internal flushing for customers immediately following replacement. Previously, customers were given a leave-behind set of instructions for performing the interior flushing on their own. Customers continue to be provided instructions for on-going flushing post-replacement, in addition to crews now doing the immediate post-replacement internal flushing for the customer. This has opened the door to additional customer complaints about sink and faucet issues. While these are often not the result of contractor work, contractors will often provide the fix for the customer.
- In April, crews were performing a service line replacement for a rental property. An upstairs unit experienced issues with water service at the end of the replacement. The crews stayed past normal working hours to resolve the issue.



## 7.B.vii Health Equity and Environmental Justice

Section 7.B.vii of the LCRR Variance requires Denver Water to report and maintain records related to activities implemented to achieve its Health Equity and Environmental Justice principles:

- vii. Health Equity and Environmental Justice. A summary of activities conducted and designed to address HE and EJ principles set forth in the LRPP, including:*
- a. a description of how the HE and EJ principles are being incorporated into the accelerated LSL replacement program, lead filter program, and communications, outreach and education plan;*
  - b. socioeconomic or demographic data collected from outside sources (e.g., census data, local public health agencies) to target communications, outreach and education programs to specific neighborhoods, demographic cohorts, or non-English speaking groups;*
  - c. description of the values used to calculate compliance with the HE and EJ compliance metric for LSLR and lead outreach and education materials, as described in paragraph 6.C.i; and*
  - d. summary of information showing that outreach and education materials have been provided to at least 95% of the households in He and EJ areas of concern enrolled in the filter program in 6.C.ii. Detailed records must be retained by Denver Water and provided to EPA or CDPHE upon request.*

*Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.*

A commitment to equity informs all aspects of the LRP, supporting accessibility, awareness and equitable participation for all customers. An overview of HE&EJ reporting requirements is presented in Table 29.

**TABLE 29. Overview of 7.B.vii Requirements**

| Paragraph Reference          | Description  | Refer to  |
|------------------------------|--|---|
| <b>7.B.vii LRPP V (p 77)</b> | Summary of activities conducted and designed to address HE&EJ principles.  | Described in this section. See LRPP (p 77).                   |
| <b>7.B.vii.a</b>             | Description of how HE&EJ principles were incorporated into the implementation of the: <ul style="list-style-type: none"> <li>• ALSLR Program.</li> <li>• Filter Program.</li> <li>• COE Plan.</li> </ul>                                   | See First Quarter Report of 2020 and updates in this section. |
| <b>7.B.vii.b</b>             | Socioeconomic or demographic data collected from other sources to target communications, outreach and education programs to specific neighborhoods, demographic cohorts, or non-English speaking groups.                                   | See this section for how data informed COE activities.        |
| <b>7.B.vii.c</b>             | Description of values used to calculate compliance with the HE&EJ compliance metric for LSLR and lead outreach and education materials.  | Described in this section.                                    |
| <b>7.B.vii.d</b>             | Summary of information showing that outreach and education materials have been provided to at least 95% of the households in HE&EJ areas of concern enrolled in the Filter Program.  | See Section 7.B.vi.a. and this section.                       |
| <b>LRPP V (p 77)</b>         | Commitment to continue to consult and collaborate with the organizations and HE&EJ experts, stakeholders, community members and customers to continually improve upon integration of the HE&EJ principles with the Lead Reduction Program. | See this section.   |
| <b>LRPP V (p 79)</b>         | Collaborate with other agencies to address lead exposure from all sources.   | Described in this section.                                    |

### HE&EJ Integration in the Lead Reduction Program

From the initial discussions that became the Lead Reduction Program, HE&EJ (equity) has been a foundational principle driving planning, decision-making, resource allocation, strategy and tactical development, as well as work culture. Equity is not an additional consideration for these efforts, rather it is the starting point. This commitment to advancing equity comes with a commitment to internal and external collaboration, learn by doing, openness, transparency and communication. In practice, this commitment means researching and talking with subject matter experts and communities to better understand community needs and preferences; it means taking time to build long-term relationships to build trust; it means asking for (and really wanting to hear) constructive feedback to improve; it means an ongoing pledge to persist in the efforts and create progress, not perfection.

As the Lead Reduction Program has evolved, so too have its efforts and activities specific to advancing equity. The Ambassador Program, described below, has expanded to include more community partners focused on both general outreach and specific activities that support program elements. Partners have also become intertwined with the identification of ALSLR work areas to approach engagement in a way most impactful for various communities. Time and again Denver Water finds that the work of trusted partners results in tangible, positive benefits for the

program, such as a 10-15% increase in consent form response rates once partners are involved. Given that Denver Water’s efforts around equity are more deeply woven into both general program outreach and specific program elements, this report has been refreshed so that community partner activities are described either under the overall program section and/or with in specific element sections, based on the focus of activities completed. Because the nature of equity efforts and best practices are often evolving, key lessons learned are also described at the end of the HE&EJ section.

The terminology within this space is also rapidly changing in continued progress toward best capturing the characteristics of people and communities cumulatively impacted by policies, systems and associated outcomes. Throughout this section, the term “equity” is used in place of “HE&EJ.” This both simplifies the language and reflects the broad scope to which the principles of equity can be applied. Similarly, the term “disadvantaged communities” has evolved to “disproportionately impacted communities.” This aligns with the definition adopted by the Colorado legislature. At present, the term best reflects the relative impact and challenges faced by some communities.

The following sections describe how principles of equity were integrated into the various components of the LRP during the first half of 2023.

### [Incorporating HE&EJ Principles via Communications, Outreach and Education \[7.B.vii.a, 7.B.vi.b and to support 7.B.vii.c\]](#)

#### [Ambassador Program](#)

Denver Water’s Ambassador Program is a partnership with community organizations to educate customers in disproportionately impacted communities about the LRP. These customized collaboration efforts expand the LRP’s reach, build awareness of program requirements and create momentum for behavior change in the appropriate culture and language most valued in harder-to-reach communities. There are three components of the Ambassador Program:

- **Contract Partners:** Conduct extensive on-the-ground outreach using culturally appropriate messaging with tailored outreach strategies to reach enrolled customers in prioritized communities.
- **Sponsorship Awards:** The sponsorship awards initiative launched in 2021 and provides funding to community organizations to either leverage their existing programs/services/events or create new opportunities to promote the LRP in targeted communities.
- **Information Partners:** Community organizations are recruited for their willingness to use their communication channels to promote the LRP.

#### [Contract Partners](#)

- [CREA Results](#) is a community organization that specializes in the Latinx community. This group supported community outreach activities in the following neighborhoods:
  - Barnum.
  - Barnum West.
  - Clayton.
  - Elyria-Swansea.
  - Globeville.
- During the first six months of 2023, CREA Results engaged in the following work:
  - Participated in 44 in-person or virtual events to educate residents within targeted neighborhoods about the LRP with an estimated reach of 3,269 people.
  - Conducted email, phone and/or door-to-door outreach to 219 customers in targeted neighborhoods to encourage customers in the LRP to participate in the program and answer questions.
  - Hosted two radio shows and aired four public service announcements about the LRP on KNRV (1150 AM), a Spanish language radio station, with an estimated reach of 10,000 listeners per show.
  - Secured three articles in El Comercio de Colorado, a prominent Spanish-language publication with an estimated circulation of 25,000 readers per issue.<sup>73</sup>
  - Secured an interview on Estrella TV, a Spanish language television show, with an estimated viewership of 6,300.
  - Posted LRP information on Facebook, including videos 14 times with an estimated 2,761 views.

### *Sponsorship Awards*

During the first six months of 2023, the following community organizations participated in the Ambassador Program as sponsorship awardees:

- [Denver Public Schools](#) is the public school system for the City and County of Denver.
  - Educated 60 family liaisons (staff working directly with families within a school) about the LRP to help families identify if they are in the program and how to participate.
  - Shared LRP information with DPS families at three community events reaching 159 people.

---

<sup>73</sup> See Appendix HEJ-1 Ambassador Partner Spanish Language Articles.

- Distributed information at DPS' Community Hubs (a total of six) reaching approximately 800 people.
- The [Center for African American Health](#) offers African American and Black Metro Denver communities culturally responsive resources that support them in overcoming the root causes of health problems so they can maximize their individual and family health.
  - Featured the LRP in its monthly newsletters with a monthly distribution of approximately 3,800 people.
  - Distributed information on and/or discussed the LRP with 983 people through various community outreach activities.
  - Promoted the LRP on social media platforms including Facebook (3,200 followers), LinkedIn (457 followers), Twitter (489 followers) and Instagram (761 followers).
- The [Greater Metro Denver Ministerial Alliance](#) is an 82-year-old African American Civil/Human Rights Clergy organization committed to the fight for community and social justice.
  - Promoted the LRP at 13 community events including job fairs, youth forums, membership meetings, community celebrations, radio spots, luncheons and church services reaching approximately 400 people.
- [Tepeyac Community Health Center](#) is a nonprofit community health center whose mission is to inspire health, well-being and humanity in the Denver community, through all of life's stages.
  - Promoted the LRP at 47 community events (coffee with the principal, family gatherings at DPS' Community Hubs, mobile food makers, community festivals reaching approximately 1,483 people.
- [Una Mano, Una Esperanza](#) is a community organization that specializes in the Latinx community. This group supported community outreach activities in the Athmar Park, Barnum, Barnum West, Swansea and Westwood neighborhoods.
  - Coordinated a training to help residents become child care providers and included information about the LRP during two workshops, with 45 participants.
  - Promoted the LRP at 17 community events such as food banks, school events and Una Mano, Una Esperanza service programs reaching a combined total of 1,733 people.
  - Promoted the LRP on Facebook to their 1,900 followers.

### *Information Partners*

- The [Denver Public Library](#) is the public library system of the City and County of Denver.

- Distributed hard copy materials describing the LRP to their branch locations for placement in public areas.
- Facilitated a presentation on the LRP to [Plaza Program](#) staff to occur in July 2023. The Plaza Program provides programming to immigrant and refugee community members to support their experience in and navigation of Denver.
- [Inner City Health Center](#) is focused on reducing the inequity of health and wellness access and delivery in underserved populations of Denver and the surrounding metro area through two clinic offices – one in Denver, the other in Wheat Ridge.
  - Placed hard copy materials describing the LRP and directing community members to resources at both of its clinic locations.

#### Example of Partners in Action:

- Una Mano, Una Esperanza works with a senior group in the Westwood neighborhood. Marisol Valencia, a promotora with Una Mano, Una Esperanza, has taken upon herself to educate senior community members about the LRP and help them understand the program, navigate the inventory map and help them request a water pitcher filter for their family. Una Mano, Una Esperanza has gone above and beyond to ensure this particular community has equitable access to LRP information.

#### *Materials*

All customer-facing materials produced in 2023 have been translated into Spanish. The construction preparedness virtual community meetings presentation, promotional materials and follow-up communications were provided in both Spanish and English. Monthly dashboards for the LRP are available in Spanish and English at [denverwater.org/Plomo](https://denverwater.org/Plomo) and [denverwater.org/Lead](https://denverwater.org/Lead). Nine core program materials have also been translated into Vietnamese.<sup>74</sup>

The Spanish version of the LRP website, [denverwater.org/Plomo](https://denverwater.org/Plomo), continues to be updated and available to customers. To access the Spanish content, customers may simply click on the green “Español” button in the top right-hand corner of [denverwater.org/Lead](https://denverwater.org/Lead) or visit [denverwater.org/Plomo](https://denverwater.org/Plomo).

#### *Early Childhood*

Opportunities to spread LRP messaging to the early childhood community and providers continued during the first six months of 2023. Content about the LRP, federal funding, 2023 work areas and how to request a new pitcher or filter was included in the January edition of CDPHE’s “Our Voice” newsletter which goes out to 1,528 subscribers in Colorado’s early childhood community.

---

<sup>74</sup> See Appendix HEJ-2 Vietnamese Materials.

In collaboration with Denver Water’s Youth Education team, LRP messaging has been more extensively integrated into engagement with youth and their families. In spring 2023, community partner CREA Results began using the Youth Education’s team Water Wall, an interactive educational display targeted to children. The Youth Education team also incorporates LRP content on filter use into appropriate classroom visits where they engage students in hands-on learning activities. Content on the LRP and summer construction activities was also included in the May issue of Knowledge Drops, the Youth Education team’s e-newsletter distributed to teachers in the Denver Water service area.<sup>75</sup>

A second community partner, Una Mano Una Esperanza, conducted two training workshops with unlicensed childcare service providers on the LRP. The workshops had 45 participants. This organization plays an important role in connecting the LRP to the friends, family and neighborhood networks of unlicensed childcare providers.

Through collaboration with Denver Health, information on the LRP is being included in “Warm Welcome” bags for families with newborns at Denver Health. Approximately 3,600 Warm Welcome bags are distributed annually.

Sponsorships continue to be an avenue for spreading awareness of the LRP in the early childhood community. In March, Denver Water sponsored the Rocky Mountain Early Childhood Conference. The sponsorship included hosting an LRP booth to interact with conference attendees who are largely educators and administrators in the early childhood community. Denver Water also sponsored the Denver Children’s Museum Free Joy Park Night. As part of this sponsorship, the museum included LRP information in its monthly e-newsletter and Denver Water maintains a booth on the free park evening to engage with parents.

#### [HE&EJ Principles Applied to ALSLR Program \[7.B.vii.a\]](#)

Per Section 7.B.vii.a of the LCRR Variance, Denver Water must report “a description of how the HE and EJ principles are being incorporated into the accelerated LSL replacement program, lead filter program, and communications, outreach and education plan.” Denver Water provided its multicultural training program and delivered it to ALSLR field observers and contractors on Feb. 16, 2023. The training included the following topics:

- Denver Water customer journey.
- Multicultural awareness.
- Multicultural principles.
- Self-awareness and working across cultures.
- Audience language discussion.

---

<sup>75</sup> See Appendix HEJ-3 Youth Education Knowledge Drops Newsletter Content.



- Working with customers when English is not a first language and protocol for interpretation.
- Managing behaviors when working in the public sector (in the field and inside homes).
- Key program messages.
- Review of materials customers receive, including new documents developed since the original training in February 2020.

Two virtual community meetings were held in February and May targeted toward customers identified for upcoming service line replacement to share what to expect before, during and after construction. The meetings were fully bilingual, from the initial meeting promotion to the meeting presentation, poll questions and Q&A responses. The meeting recordings are also available in Spanish and English at [denverwater.org/Plomo](https://denverwater.org/Plomo) and [denverwater.org/Lead](https://denverwater.org/Lead).

In an effort to gather more signed consent forms in the Baker and Valverde neighborhoods, community partner CREA Results conducted phone calls, emails and door-to-door canvassing to speak with relevant customers about providing consent. Out of 198 properties canvassed, 133 provided consent, equivalent to a 67% success rate. The CREA team noted many of these customers were seniors who appreciated the face-to-face interaction to understand the program and consent form. Additionally, Denver Water and its contractor teams conduct additional outreach efforts beyond the minimum required to seek consent. These efforts include additional mailings, phone calls and emails to reach customers. In 2023, Denver Water took additional efforts via phone calls, emails and door-knocking to contact non-response and refusal customers from previous years who were in or near a 2023 work area to gain consent for service line replacement. Similarly, additional phone calls and emails were made to customers where an interior investigation of the service line was needed to confirm service line material.

Construction crews continue to use the iSpeak poster, which allows customers to select their preferred language from among 64 languages represented in the poster. Crews are then able to work with the customer and Denver Water to provide support in the preferred language.

### [2024 ALSLR Work Areas](#)

2024 ALSLR work area planning is underway and will be presented in the annual report.

### [HE&EJ Principles Applied to Filter Program \[7.B.vii.a\]](#)

Per Section 7.B.vii.a of the LCRR Variance, Denver Water must report “a description of how the HE and EJ principles are being incorporated into the accelerated LSL replacement program, lead filter program, and communications, outreach and education plan.”

All customers enrolled in the Filter Program received their initial filter kit in 2020 with enough replacement filters to last approximately six months. The distribution of additional



replacement filters began on Aug. 27, 2020, an approximate five-month cycle following the same schedule used for the initial filter distribution. This distribution continues in 2023.

### *Tenant Outreach*

Introductory program materials and filter kits continue to be provided to apartment complexes for distribution to tenants upon move-in. Coordination also continues with property managers to track material distribution.

During the first half of 2023, the LRP team conducted extensive investigations into multiunit rental properties to determine if any could be removed from the LRP due to a confirmed non-lead service line. As a result of this work through June 2023, three properties with 25 or more units were removed from the LRP and a subset of others will be included in 2023 investigations under the ALSLR program. Direct, customized outreach to multiunit rental properties in the LRP will be conducted in the second half of 2023 using manually researched contact information for leasing and property management offices.

In April 2023, the COE team reached out to residential property manager contacts at Denver Housing Authority to share information about getting pitcher filter kits to new tenants upon move-in. The team was able to coordinate delivery of filter kits to the dispersed housing contacts. The COE team will continue to check in with Denver Housing Authority to provide more pitcher filter kits as needed.

### *HE&EJ Principles Applied to Water Quality Sampling*

In April 2023, Denver Water conducted an extensive training with community partner CREA Results on water testing for customers. The training included the reasons Denver Water asks customers to complete water sampling and how it benefits the LRP, an overview of customer communications related to water test kits and a walk-through of the sampling instructions. In the second half of 2023, CREA Results will conduct outreach specific to water sampling to encourage relevant customers in disproportionately impacted communities to complete a water test kit.

### *HE&EJ Compliance Metric [7.B.vii.c]*

Section 6.C of the LCRR Variance requires Denver Water to ensure that the Program does not result in disproportionate impacts to areas with Health Equity and Environmental Justice concerns:

*C. Health Equity and Environmental Justice (HE and EJ) Compliance Metric.  
Denver Water will follow principles of environmental justice and equity in implementing the LRPP overall as reflected in its HE and EJ principles set forth in the LRPP. In addition, Denver Water will ensure that LSLRs are being conducted in a manner that does not result in disproportionate impacts to areas with HE and EJ concerns<sup>1</sup> as of the effective date of this variance. If Denver Water, CDPHE, and EPA determine that the changes in areas with HE and EJ*

concerns in future program years compared to those identified as of the effective date of the variance are significant, then the variance may be modified under 8.C to update the identified areas with HE and EJ concerns relied upon in this metric.

- i. Denver Water must annually achieve a cumulative Program Year LSL replacement rate in areas with HE and EJ concern that is equal to or greater than the total replacement rate. This calculation is the number of LSLs replaced per year in areas with HE and EJ concerns divided by total number of LSLs in areas with HE and EJ concerns must be equal to or greater than the average number of LSLs replaced per year overall divided by total number of LSLs as of the variance effective date.
- ii. Denver Water must make direct contact with lead outreach and education materials to more than 95% of customers as identified in areas with HE and EJ concerns enrolled in the filter program in every Program Year.

<sup>1</sup> For the purposes of this Variance, areas with HE and EJ concerns are defined as any census block group with, as of the variance effective date, an 80th percentile ranking or above (when compared to either the U.S. or State) in EPA's EJScreen tool for one or more Supplemental Index.

Text is taken verbatim from the LCRR Variance, dated Nov. 30, 2022.

The HE&EJ compliance metric is calculated using the equation below.

$$\frac{\text{average number of LSLs replaced per year}}{\text{total number of LSLs}} < \frac{\text{average number of LSLs replaced within HE\&EJ areas per year}}{\text{total number of LSLs within HE\&EJ areas}}$$

An area is defined as having HE&EJ concerns using EPA's EJScreen tool<sup>76</sup> with a state or federal 80th percentile ranking or above for one or more of the following Supplemental Indexes:

- Particulate Matter 2.5
- Ozone
- Diesel Particulate Matter
- Air Toxics Cancer Risk
- Traffic Proximity
- Lead Paint
- Superfund Proximity
- RMP Facility Proximity
- Hazardous Waste Proximity
- Underground Storage Tanks
- Wastewater Discharge

Using the definition described above, 33,605 out of 63,955 LSL properties were identified within areas of HE&EJ concerns. Table 30 calculates the projected HE&EJ compliance metric for

<sup>76</sup> Refer to <https://ejscreen.epa.gov/mapper/> for the EJScreen interactive map.

the 2023 program year. A total of 3,311 replacements were completed in the first six months of 2023, with 4,362 projected to be completed in the second six months of the year. Using both the actual and planned replacements, a projected 4,390 (13.1%) of those replacements are within areas of HE&EJ concerns. The cumulative replacement rate within HE&EJ areas of concern is projected to be 10.3% at the end of the calendar year and is higher than the projected overall cumulative replacement rate of 9.0%.

**TABLE 30. PROJECTED HE&EJ COMPLIANCE METRIC CALCULATION FOR 2023**

|   | Overall             | Within Areas of HE&EJ Concern |
|---|---------------------|-------------------------------|
| <b>Total Number of LSL Replacements Completed in First Six Months of 2023</b> | 3,311 <sup>1</sup>  | 1,400                         |
| <b>Projected Total Number of LSL Replacements Completed for 2023</b>          | 7,673               | 4,390                         |
| <b>Total Number of Properties with LSLs</b>                                   | 63,955 <sup>2</sup> | 33,605 <sup>3</sup>           |
| <b>Projected 2023 Replacement Rate</b>  | 9.0%                | 10.3%                         |

<sup>1</sup> Total number of LSL replacements as of June 30, 2023. Refer to Table 20.

<sup>2</sup> Total number of LSLs as of the LCR Variance effective date (Jan. 1, 2020).

<sup>3</sup> Calculated using the p-values, from the Sept. 6, 2019, base inventory, of properties that are within areas with HE&EJ concerns, as defined by the EJScreen supplemental indexes as of Jan. 1, 2023.

In addition to replacements within areas of HE&EJ concerns, Denver Water is also required to send outreach to 95% of customers within these areas. As mentioned in Section 5.B, in 2022, proof of contact with customers enrolled in the LRP is measured based on the mailing of filter reminder postcards. The postcards will be mailed in the second half of 2023 to meet the required 95% outreach metric for both properties within the Filter Program and properties within areas of HE&EJ concern. Additional outreach to areas of HE&EJ concern is described throughout the HE&EJ section of this report, particularly within the update on Ambassador Program activities.

### Lessons Learned through HE&EJ Efforts

The following are examples of lessons learned through HE&EJ efforts in the first six months of 2023:

- CREA Results' canvassing efforts in the Baker and Valverde neighborhoods to gather more signed consent forms had a 67% success rate. CREA reported that the door-to-door interaction was particularly impactful for seniors in these areas. This insight will be carried into ongoing consent form outreach efforts.
- Community partners continually noted the need for simpler and shorter video snippets on various aspects of the LRP that can be shared in presentations, on websites and social media. Denver Water has developed shorter and more

shareable videos which will be promoted through multiple platforms in the second half of 2023.

- Since the start of the LRP, all virtual community meetings have been provided in both English and Spanish. While there are several staff members running the English event, there has been only one interpreter for the Spanish event. Based on lessons learned from the two construction preparedness virtual community meetings in 2023, two Spanish interpreters will be used to staff virtual community meetings moving forward. This will reduce the fatigue of interpreters and reduce the potential for information to be missed.

## PART 3: LEARNING BY DOING

Five of the six elements that together make up the LRP are used to evaluate the overall effectiveness of the program (COE Plan, LSL Inventory, Filter Program, ALSLR Program and Corrosion Control Treatment). The sixth element is Learning by Doing — presented as a strategy (versus a desired outcome), as quantitative performance metrics were not identified in the LCRR Variance.

As part of the Learning by Doing element of the LRP, Denver Water is committed to:

- Evaluating the performance of the LRP to improve outcomes.
- Establishing an Advisory Committee to inform Denver Water on more efficient and effective ways to implement the LRP to achieve the LCRR Variance goals.

This means that Denver Water incorporates the Learning by Doing approach to improve outcomes during the life of the LRP. During the first six months of 2023, efforts continued to identify potentially more efficient or effective ways to implement the LRP in the Learning by Doing log. The outcomes tracked in the Learning by Doing log are presented as an independent report at the end of each program year.

The following are Learning by Doing activities from the first six months of 2023:

- The LCRR requires an updated lead service line inventory due on Oct. 16, 2024. Any property that is not a known lead or known non-lead service line is considered an unknown service line. To reduce the number of unknowns in the LSLI prior to the due date, investigation potholing properties have been included in the 2023 geographic ALSLR and Federal work areas. The potholing properties are optimized to be adjacent to geographic areas to minimize additional costs or efforts from the contractors.
- As construction both increases in frequency/occurrence and goes into higher density, downtown-adjacent neighborhoods, the likelihood of parking impacts increases. These are neighborhoods with mostly on-street parking for both residential and commercial areas. It is likely customers may have greater challenges navigating parking while

construction occurs. A “No Parking” card was developed that is placed on car windshields prior to “No Parking” signs being placed by contractors for either potholing or replacements.

Efforts continue to use the Learning by Doing approach to address challenges and improve effectiveness of outreach in hard-to-reach communities.