

DENVER WATER LEAD REDUCTION PROGRAM

QUARTERLY REPORT – Q2 2020

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Presented by: Denver Water



ISSUE AND REVISION RECORD

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1	07/10/2020	LRP Team	Quirien Muylyk	Alexis Woodrow & Steve Ravel	Formal submission

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PART 1: INTRODUCTION

As we noted in our March 18, 2020 Notice¹ to the Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) describing the impacts of the COVID-19 emergency, Denver Water has taken a number of steps in light of the pandemic. You will see in this report that we are not aware of impacts on the pH/alkalinity adjustment or the Filter Program. However, in response to the COVID-19 pandemic, Denver Water has had to modify the collection process for Lead and Copper Rule Tap Sampling, the Communications Outreach and Education Program (COE) and the Accelerated Lead Service Line Replacement Program (ALSLR). The impact of the adjustments made to these parts of the Lead Reduction Program Plan are not fully known at this time, and may not be known until the conclusion of calendar year 2020.

Denver Water is committed to significantly reducing the lead exposure levels to customers from lead service lines and plumbing. The Lead Reduction Program provides a holistic and permanent lead reduction approach that will significantly reduce lead exposure to our customers and be less harmful to the environment. In December 2019, Denver Water began the process of implementing the Lead Reduction Program Plan in accordance with the EPA's December 16, 2019 Variance and the November 15, 2019 letter from CDPHE regarding conditional approval of Denver Water's request for modification of optimal corrosion control treatment (OCCT).

This Quarterly Report was prepared in compliance with paragraph 7.B of the Variance and commitments made by Denver Water in the 2019 Lead Reduction Program Plan. The report addresses the second quarter of 2020 for the period of April 1 through June 30, 2020. During this time period, Denver Water has provided three monthly reports for April 2020, May 2020 and June 2020 to CDPHE. This report includes data and information from these monthly reports as well as additional reporting as required by the Variance for the quarterly reports.

[What to Expect in this Quarterly Report with Respect to Reporting on Program Activities](#)

The purpose of the quarterly (and subsequent annual) reports is to document the implementation of the Lead Reduction Program, describe the actions taken by Denver Water to reduce lead levels and support the subsequent evaluation of the Lead Reduction Program in anticipation of an extension to the Variance request beyond three years.

The amount of performance data for the different elements of the Lead Reduction Program described in this quarterly report varies depending on the launch date of the different program elements (see Table 1).

¹ See Appendix REG-2 Copies of Letters for Compliance-Related Submissions (Second Quarter).

TABLE 1. WHAT TO EXPECT IN THIS QUARTERLY REPORT

Paragraph (and LRP Task)	What to Expect in this Quarterly Report and Status	
7.B.i CCT	This content includes a summary of results previously submitted in the three monthly reports ² for April, May and June 2020.	
7.B.ii LSL Inventory	Denver Water first published the LSL Inventory on its website on March 5, 2020. ² The map was updated on the Denver Water website on April 24, 2020 using data current up to April 24, 2020. Data included in the LSL Inventory described in this quarterly report are current up to June 30, 2020.	
7.B.iii LSL Replacements (aka ALSLR Program)	Denver Water’s own forces have been replacing lead service lines since January 1, 2020. Contractors started lead service line replacement on March 5, 2020. Summary of number and type of replacements completed.	
7.B.iv Filters (aka Filter Program)	Summary of filter distribution. Filter distribution started on February 12, 2020 with distribution to customers included in the ALSLR Program in year 1. Denver Water initiated broader filter distribution on March 28, 2020.	
7.B.v Compliance Metrics	The Equivalency Model will be updated using data collected for the program year and will be presented in the annual report.	
7.B.vi Communications, Outreach and Education	Continued implementation of the 2020 COE Plan with adjustments for COVID-19. Development and posting of public-facing dashboard on the program website.	
7.B.vii Health Equity and Environmental Justice	Continued update and implementation of COE Plan. Launch of partnerships with iNow and CREA Results, formation of the Stakeholder Advisory Committee and introduction of virtual community meetings. Translation of materials into Arabic as well as continued translation into Spanish.	
Additional Requirements and Miscellaneous Deliverables	Summary of submissions identified in the LRPP ² , including nitrification control plan, distribution system water quality modeling, and pipe rack testing.	
Appendices	CCT, LSL inventory, water quality results, LSL replacements, customer refusal lists, COE.	
ALSLR = Accelerated Lead Service Line Replacement CCT = Corrosion Control Treatment COE = Communications, Outreach and Education HE&EJ = Health Equity and Environmental Justice	LRPP = Lead Reduction Program Plan LSL = Lead Service Line	

² See Appendix REG-2 Copies of Letters for Compliance-Related Submissions (Second Quarter).

The reporting dates for the different program elements are shown in Table 2. In general, data shown for the second quarter continues from the data included in the first quarter with a few exceptions to either provide additional information not included in the first quarterly report (for example, detailed responses and time of in-person surveys of filter use following LSL replacement) or to align with other reporting timelines (for example, with LCR six-month reporting periods). Details are shown in Table 2.

TABLE 2. DATES FOR DATA INCLUDED IN THE SECOND QUARTERLY REPORT

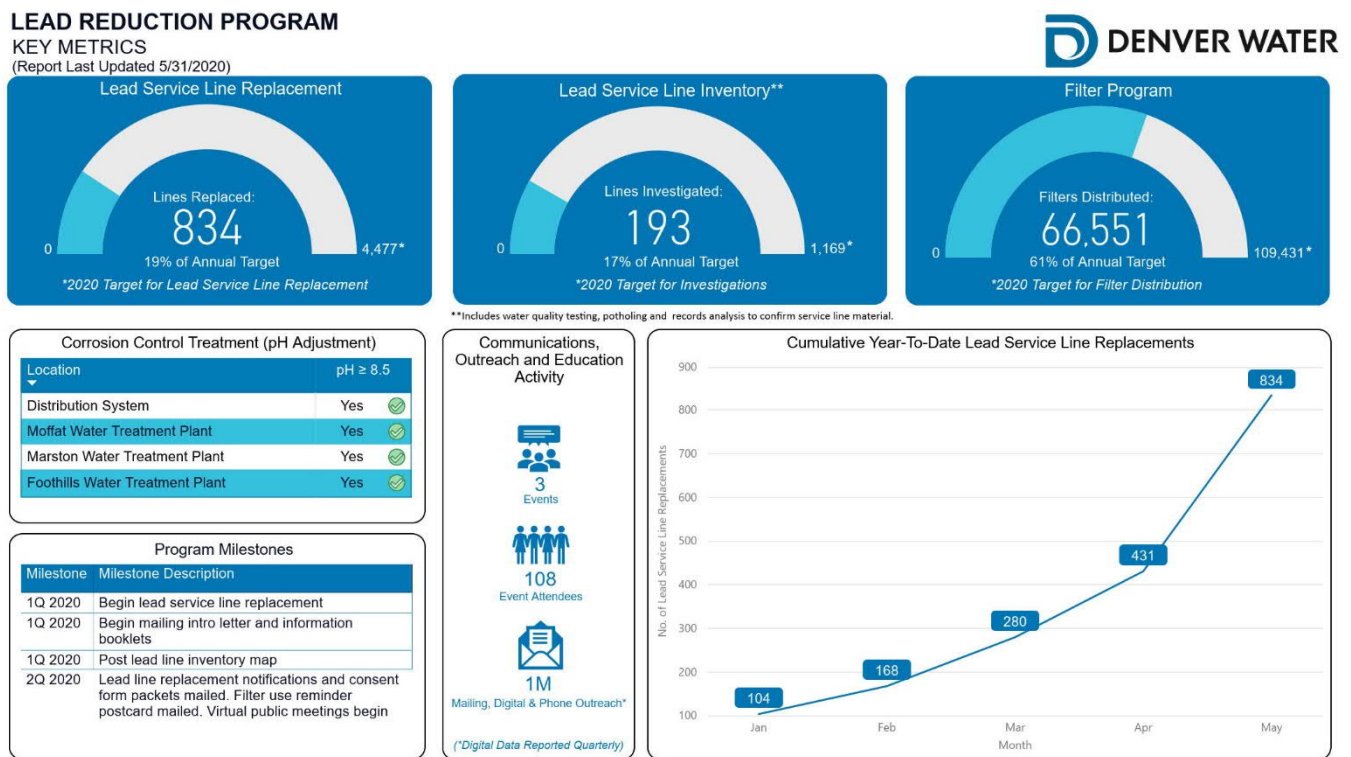
Description	First Quarterly Report	Second Quarterly Report
CCT pH/alkalinity adjustment Start-up	March 3 at the Marston WTP March 3 at the Foothills WTP	May 1 at the Moffat WTP
LCR 90th Percentile Lead Concentration based on Compliance and Customer Requested Samples	All samples reported in LIMS from January 1 to March 31	All LCR samples collected from January 1 to June 30. All customer requested samples reported in LIMS by July 6.
Elevated Lead Response Reporting	January 1 to March 31	January 1 to June 30
Inventory – Posting of Map to Denver Water’s Website	Data through March 3 Posted March 5	Data through April 23 Posted April 24
Inventory - Update	Data through March 29	March 30 through June 30
Investigations – Verification Potholing as Part of ALSLR Program	Not reported	January 1 to June 26
Investigations – Investigative Potholing Independent of ALSLR Program	January 1 to March 23	March 24 to May 31
Investigations – Water Quality Sampling as part of ALSLR Program (not included in 90th Percentile Calculation)	All results reported in LIMS from January 25 to March 31 (Sampling initiated January 25)	All results reported in LIMS from January 25 to June 30
Investigations – Water Quality Sampling Independent of ALSLR Program (not included in 90th Percentile Calculation)	Not applicable	All results reported in LIMS from June 4 to June 30 (Sampling initiated June 4)
Water Quality Sampling Post-LSL Replacement	Not applicable	All results reported in LIMS between January 1 and June 30 (Sampling initiated May 13)
ALSLR Program Replacements	January 1 to March 23 by T&D March 12 to March 23 by ALSLR	March 24 to June 26
ALSLR Program Consent Forms	January 1 to March 23	March 24 to June 26
Initial Filter Distribution	February 12 to March 31	April 1 to June 26
Replacement Filter Distribution	January 2 to March 23 by T&D	March 24 to June 26
Filter Program Occupancy Changes	January 1 to March 30	March 31 to June 26
Informal Filter Adoption Survey as Part of ALSLR Program	January 1 to March 31 (last survey collected on March 18)	January 1 to June 30 (presenting additional details that were not previously included)

Description	First Quarterly Report	Second Quarterly Report
Filter Testing in the Field	February 18 to March 16 sample collection dates, 26 locations (collected by Denver Water)	February 18 to June 2 sample collection dates (full data set per LCR sampling period)
COE Activities	March 5 through March 28	March 29 through June 30

Summary of Key Performance Indicators Year-to-Date

A dashboard is used to communicate key metrics to share the progress of the Lead Reduction Program with the public. The dashboard was posted and published on the Denver Water website on June 29, 2020, including data through May 31, 2020.³ The dashboard and associated content are being translated into Spanish and will be posted on the Denver Water website later in July.

FIGURE 1. DASHBOARD AS POSTED TO THE DENVER WATER WEBSITE (DATA TO MAY 31, 2020)



The dashboard can be accessed from the Denver Water website at:
<https://www.denverwater.org/your-water/water-quality/lead/dashboard>

³ See Appendix COE-E.2 Key Metrics Dashboard for an explanation of the metrics used in the dashboard.

PART 2: REQUIRED REPORTING

7.B.i CCT

A combination of water quality parameters and lead sampling results are used to report the performance of Corrosion Control Treatment. Information that was previously reported as part of the Monthly Reports for April, May and June 2020 are not included in this report with the exception of a summary of some of the data.

During this reporting period, Denver Water initiated operations with higher pH and alkalinity in treated water at the Moffat WTP and monitored performance at all three plants. Denver Water also submitted several miscellaneous reports to CDPHE and EPA as required in the LRPP as described in Table 3.

TABLE 3. OVERVIEW OF 7.B.I REQUIREMENTS

Paragraph Reference	Description	Refer to
7.B.i.a	Submit Elevated Lead Response Plan by March 30, 2020 per paragraph 2.B.iv.	Submitted as part of Implementation Plan. ⁴ (final submitted June 4, 2020).
7.B.i.b	Notify CDPHE of elevated lead levels and actions taken by Denver Water to reduce lead exposure.	See Table 4 and Appendix. ⁵
7.B.i.c	Lead sampling results per the Lead and Copper Rule and from customer requested sampling.	See Table 5 (90 th P to date). See monthly reports ⁴ for April, May and June 2020 submitted previously.
LRPP III.E (p 70)	Monthly trending of LCR compliance samples and customer requested samples.	See monthly reports ⁴ for April, May and June 2020.
7.B.i.d	CCT parameters for pH and alkalinity, reported monthly.	See Table 6. See monthly reports for April, May and June 2020. ⁴
LRPP III.E (p 70)	Install automated pH control loops at all three treatment plants by March 2020.	All active plants have feedback loops in place and functioning, including the Moffat Water Treatment Plant as of May 1, 2020.
7.B.i.e	All lead and water quality sampling results from investigations for LSLs. All lead and water quality sampling results from post-LSL replacement sampling. Note that lead results from investigations and post-LSL replacement sampling are not included in the calculation of the 90 th percentile lead concentration.	See monthly reports for April, May and June 2020. ⁴ See Table 8.
LRPP Executive Summary LRPP III.E (p 65)	Targeted communications for 1983-87 homes to self-identify expecting and existing families with formula-fed infants and children up to 2 years of age; offer water quality sampling; provide filter if lead measured > 3 µg/L.	Described with section 7.B.vi. Outreach materials under development.

⁴ See Appendix REG-2 Copies of Letters for Compliance-Related Submissions (Second Quarter).

⁵ See Appendix CCT-3 Summary of Response to Elevated Lead Levels (Second Quarter).

Paragraph Reference	Description	Refer to
LRPP III.E (p 71)	Complete distribution system modeling, evaluating pH, disinfection by-products and water age by January 31, 2020. Submit nitrification control plan by June 30, 2020 to address sampling, monitoring and flushing.	Submitted July 6, 2020.
Voluntary	Results from continued operation of the pipe racks.	Submitted July 6, 2020.

All lead and water quality samples are managed via Denver Water’s Laboratory Information Management System (LIMS), with analysis performed by either the Denver Water Quality Lab or a contract lab. The sub-program under which the sample was collected will be reported in LIMS, including Lead and Copper Rule compliance samples, customer requested samples, customer requested samples from homes built between 1983-87 (self-identifying as a home with a formula-fed infant), and pre-LSL investigative water quality samples, and post-LSL replacement water quality samples.

Elevated Lead Level Response Summary

Denver Water set the elevated lead investigative response level at 15 and 25 µg/L in LCR compliance and customer requested samples, respectively. Denver Water provides a description in the monthly report of actions taken when this occurs.

All samples above 25 µg/L analyzed by month are listed in Table 4; a detailed summary of responses is provided in the monthly reports for all properties reviewed as part of the elevated lead response plan from April 1 through June 30, 2020.⁶ A lead result over 25 µg/L in the first sample bottle for a customer home will trigger investigative sampling, as outlined in the Corrosion Control Treatment Implementation Plan. Lead results over 5 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 listed.

TABLE 4. RESPONSE TO ELEVATED LEAD IN LCR AND CUSTOMER REQUESTED SAMPLES¹

Description	April 2020	May 2020	June 2020	Response
Number of Properties with Lead > 25 µg/L in <u>any</u> sample bottle	4	3	0	Reported to CDPHE in monthly report. See Appendix ⁶

¹ Based on sampling date.

⁶ See Appendix CCT-3 Summary of Response to Elevated Lead Levels (Second Quarter).

Lead Sampling Results from LCR Compliance and Customer Requested Sampling

Data for LCR compliance and customer requested sampling were provided in the individual monthly reports for April, May and June 2020. The cumulative 90th percentile lead concentration for January 1 through June 30, 2020 is presented in Table 5 for LCR compliance samples only. Data used to calculate the 90th percentile lead concentration reported in the first and third quarterly reports align with results reported in Denver Water’s LIMS by the end of those quarters and do not reflect the final 90th percentile lead concentration for the six-month LCR compliance periods. Data used to calculate the 90th percentile lead concentration for the second and fourth quarterly reports align with reporting requirements of the LCR: all samples collected between January 1 and June 30 and between July 1 and December 31 respectively. In response to the COVID-19 pandemic, on March 17, 2020 Denver Water staff discontinued collecting samples from inside the homes of customers included in LCR compliance sampling. Consistent with previous years, customers will be asked to collect LCR compliance samples from the tap with video instructions made available in early April.

TABLE 5. SUMMARY OF COMPLIANCE SAMPLING JANUARY 1 TO JUNE 30, 2020

Cumulative LCR Compliance Results for Lead – Spring 2020 ¹	Result	Number of Homes
LCR 90th Percentile Lead	10.3 µg/L	106
Overall 90th Percentile Lead Concentration using LCR Compliance + Customer Requested Samples	6.8 µg/L	1035 (106 + 929)
Lead Service Line Homes 90th Percentile Lead Concentration using LCR Compliance + Customer Requested Samples	6.7 µg/L	975
Copper Pipes with Lead Solder Homes 90th Percentile Lead Concentration using LCR Compliance + Customer Requested Samples	4.8 µg/L	60
Customer Requested Sampling Results for Lead – Spring 2020 ²	Result	Units
Total Number of Properties for which a Customer Requested Sample Kit was Received and Analyzed	929	Properties
Percentage of Lead Service Line Homes, LCR Compliance + Customer Requested		96%
Percentage of Copper Pipes with Lead Solder Homes, LCR Compliance + Customer Requested		4%

¹ Includes results for all LCR compliance and customer requested samples (from pre 1950 homes) collected between January 1 and June 30, 2020 and reported in LIMS by July 6, 2020. Data are provided to CDPHE as part of the monthly reports.

² Includes results from residential properties with lead service lines and copper pipes with lead solder (constructed between 1982 and 1987).

Corrosion Control Treatment Results

Chemical feed systems were brought into service for enhanced pH corrosion control treatment on March 3, 2020 at the Marston and Foothills Water Treatment Plants and on May 1 for the Moffat Water Treatment Plant. Trends for pH and alkalinity are included in the monthly reports since January 1, 2020; operating data with adjusted pH are included in the March 2020 report and subsequent reports. Data for pH in treated water from the active water treatment

plants and the distribution system are summarized in Table 6 based on the lowest daily average pH measured each month from each sampling point. Daily reports will be provided to CDPHE and EPA until equilibrium is established as determined by CDPHE.

TABLE 6. MONTHLY DAILY AVERAGE MINIMUMS FOR WATER QUALITY PARAMETERS¹

Description	April 2020	May 2020	June 2020
Variance Requirement	pH ≥ 8.5 in all parts of the system.		
Marston Water Treatment Plant Entry Point	8.81	8.78	8.76
Foothills Water Treatment Plant Entry Point	8.78	8.76	8.78
Moffat Water Treatment Plant Entry Point	Not in service	8.78	8.78
Distribution System	Not applicable until pH stabilization is achieved, however pH levels in the distribution have been above 8.5 since March 12, 2020.		

¹ See Monthly Reports submitted previously for detailed pH data.

Water Quality Sampling Results from Pre-LSL Investigations

Results from water quality sampling can provide an indication of lead at single-family residential properties and when reviewed with additional investigation methods, the status of a service line can be changed in the inventory (i.e., from possible lead to known lead⁷), the 3-bottle test is performed at properties in City and County of Denver and the distributors:

- Before LSL replacements to confirm the service line material included as part of the 2020 ALSLR Program Task Orders (with p-values between 0.5 to 0.7, as properties with a p-value of ≥ 0.8 are scheduled for replacement).
- To inform the inventory, the predictive model is used to identify properties in the City and County of Denver with a suspected or possible lead service line (i.e., p-value 0.5 to 0.8).
- At all single-family residential properties within a distributor boundary identified with a suspected or possible lead service (i.e., p-value of 0.5 or higher). For Wheatridge, the predictive model is used to further identify a subset of 500 addresses for each from the LSL inventory and this will be repeated with an additional 500 kits in Consolidated Mutual in late July as part of the next quarter.
- To validate customer comments on the presence (or absence) of a lead service line and requests to opt in or opt out of the LRP.
- To investigate high lead levels from customer requested and LCR samples.

⁷ See discussion in Section 7.B.ii LSL Inventory.

TABLE 7. SUMMARY OF WATER QUALITY RESULTS TO SUPPORT INVESTIGATION OF SERVICE LINE MATERIAL (PRE-LSL REPLACEMENT) AT SINGLE-FAMILY RESIDENCES USING THE 3-BOTTLE TEST

Water Quality Sampling for Investigation (pre-LSL Replacement)	Result for 2020 Year-to-Date	Unit
Total Number of Kits Mailed Out¹	1,905 + 2,696	Kits
Total Number of Kits Received and Analyzed to Investigate the Service Line Material²	1,081	Kits
Maximum Lead Concentration³	2,415	µg/L
Average Lead Concentration (in 2nd and 3rd bottle only)	8.9	µg/L

¹ The first number represents investigative kits shipped by Denver Water’s Water Quality Laboratory, starting January 25. The second number represents investigative kits shipped by the LRP contract laboratory starting June 4. If a sampling kit is re-sent to a property, it will be counted twice. This occurred at five properties.

² As reported in LIMS between January 1 and June 30, 2020 by either Denver Water or the LRP contract laboratory.

³ Measured in 3rd bottle from the 3-bottle test. This property will be re-sampled to investigate the elevated lead measured. This property is included in the 2020 ALSLR Plan.

Water Quality Sampling Results from Post-LSL Replacement

Water quality samples are offered to all customers following LSL replacement, with sampling kits distributed approximately four months after replacement. Historically, Denver Water offered post-replacement sampling four months after replacement for any customer that received a LSL replacement before December 31, 2019. Customers could then call Denver Water to request a sampling kit. This process was discontinued on April 2, 2020. For LSL replacements since January 1, 2020, sample kits are automatically distributed to all customers within four months of replacement. The first post-replacement sampling kits were mailed out on May 13, 2020. A summary of results from post-replacement sampling is provided in Table 8.

TABLE 8. SUMMARY OF WATER QUALITY RESULTS AFTER LSL REPLACEMENT

Water Quality Sampling after LSL Replacement	Result ²		
	April 2020	May 2020	June 2020
Total Number of Kits Mailed Out¹	2	121	14
Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality	1	14	18
Number of Properties with Lead > 15 µg/L in 1st Bottle (triggers additional investigation effort)	0	1	0
Number of Properties with Lead ≥ 5 and < 15 µg/L in the 2nd and/or 3rd Bottle (triggers additional investigation effort)	0	0	0
Number of Properties with Lead ≥ 5 and < 15 µg/L in 1st Bottle (triggers customer education)	0	0	0

¹ This excludes four post-replacement sampling kits were mailed out between January 1 and March 31, 2020 for LSL replacements completed in 2019. The numbers shown include kits mailed to customers with service lines replaced in 2020 that requested a post replacement sampling kit less than four months following replacement.

² Results are tabulated based on the month the sample was collected.

7.B.ii LSL Inventory

Denver Water submitted the initial LSL Inventory designating known, suspected, and possible LSLs on February 5, 2020.⁸ On March 5, 2020, Denver Water made the LSL Inventory publicly available on its lead website (<https://www.denverwater.org/your-water/water-quality/lead>) and the map was re-posted on April 24 with updates to the inventory made to April 23, 2020. An overview of the LSL Inventory reporting requirements is shown in Table 9.

TABLE 9. OVERVIEW OF 7.B.II REQUIREMENTS

Paragraph Reference	Description	Refer to
3.A	Complete initial LSL Inventory no later than 35 days after the effective date.	Submitted February 5, 2020. ⁸
3.C	Publication of LSL Inventory no later than 70 days after the effective date.	Re-posted to Denver Water website on April 24 using date through April 23, 2020.
7.B.ii.a	Total number of LSLs.	Refer to Table 10. See Appendix. ⁹
7.B.ii.b	Total number of replaced LSLs during the Variance.	Refer to Table 11.
7.B.ii.c	Total number of known, suspected and possible LSLs.	Refer to Table 10.
7.B.ii.d	Total number of unlikely lead.	Refer to Table 10.
7.B.ii.e	Total number of non-lead service lines. Total number of non-lead determined solely by statistical methods.	Refer to Table 10. Described after Table 10.
7.B.ii.f 3.D	Number of investigations that result in a change in the status of the service line in the LSL Inventory (and that are performed independently of a LSL replacement).	Refer to Table 12.
LRPP III.B (p 51)	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.
7.B.ii.g	Updated LSL Inventory Map.	https://www.denverwater.org/your-water/water-quality/lead
7.B.ii.h	Rationale for change to status of the service line in the LSL Inventory.	See Appendix. ¹⁰

Current LSL Inventory

Denver Water updated the base LSL Inventory using additional information and further analysis of the data presented in the September 2019 LRPP (see Table 10). The updates resulted in the removal of service lines used for irrigation instead of drinking water, for structures no longer existing or for structures replaced by redevelopments. Service lines were added if they were confirmed to be active drinking water lines. Adjustments to the status of a service line (i.e.,

⁸ See Appendix REG-1 Copies of Letters for Compliance-Related Submissions.

⁹ See Appendix INV-3 Summary of Service Line Status and p-Value (Second Quarter).

¹⁰ See Appendix INV-4B Line by Line p-Value Changes by Status (Second Quarter).

lead or non-lead) were made based on a desktop assessment completed with Denver Water records, customer records, and individual distributor records (i.e., total service, read and bill, and master meter); potholing results; and water quality sampling results.

TABLE 10. LEAD SERVICE LINE INVENTORY AS OF JUNE 30, 2020

Status of Service Line	September 6, 2019 Submittal (August 8 Data)	February 5, 2020 Submittal (January 28 Data)	April 10, 2020 Submittal (March 29 Data)	July 10, 2020 Submittal (June 30 Data)
	BASE INVENTORY ¹			CURRENT INVENTORY ²
Known Lead	1,066	1,149	1,659	1,851
Suspected Lead	61,374	60,549	59,994	58,758
Possible Lead	22,106	21,788	20,311	20,961 ³
Unlikely Lead	89,388	90,745	89,664	88,386
Non-lead	145,766	146,528	145,683	150,800
Total Number of Services	319,700	320,759	317,311 ⁴	320,756 ⁴
TOTAL ESTIMATED Number of Lead Service Lines	63,955	63,195	62,510	62,044

¹ The “base inventory” is the basis for the 7 percent LSL replacements per year.

² The “current inventory” is the basis of enrollment in the Filter Program.

³ “Possible lead” as defined in the Variance includes service lines where $0.5 \leq p < 0.8$. In the first quarterly report, 184 of these service lines were previously included as “suspected lead.”

⁴ The 20 percent contingency for inactive taps described in the LRPP (see Appendix III.B.2, Preliminary Identification of Lead Service Lines) was not included in the first quarterly report. Subsequently 4,185 active drinking water taps were added back in, replacing this placeholder contingency and increasing the total count.

On April 24, 2020, Denver Water updated the publicly available map, which incorporated the April 23, 2020 LSL Inventory information. The LSL Inventory is updated daily and an updated inventory summary table is provided with each quarterly report. The website map will be updated quarterly to reflect these changes to the LSL Inventory.

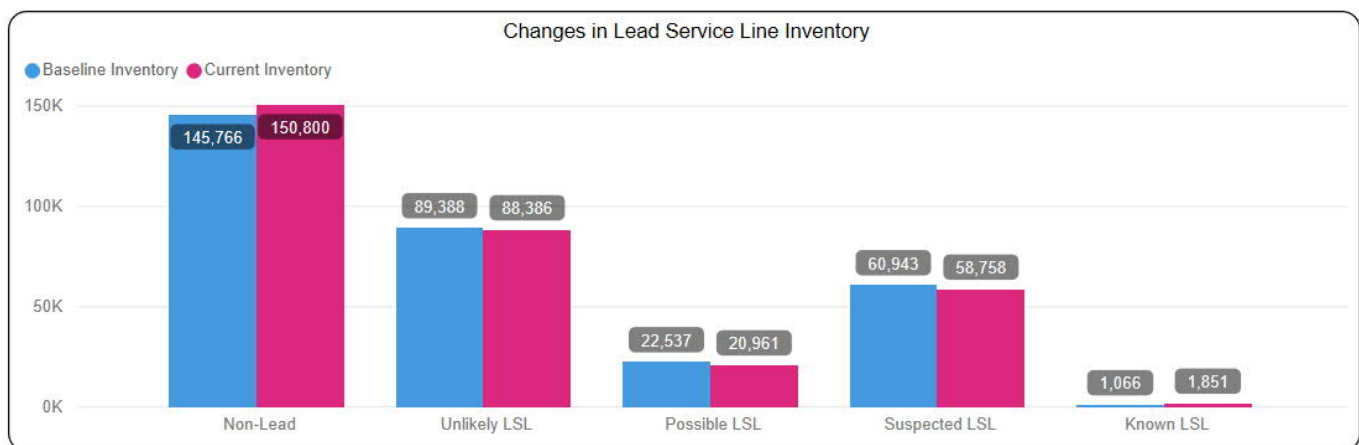
Of the 150,800 service lines identified as non-lead in Table 10, 137,584 are included in this category based solely on statistical assumptions¹¹ such as the age of the house, history of development in the Denver Water service area, operating rules requiring copper at post-1971 properties, water main tap date, etc. Properties built or connected between 1950 and 1971 are considered “unlikely lead” based on historical records and evidence of non-lead materials.

¹¹ This is the number which retains the original number of non-lead properties ($p=0$) from the LRPP (see Appendix III.B.2, Preliminary Identification of Lead Service Lines). Subsequent changes to the LSL Inventory did not result in a change to the number of non-lead properties ($p=0$).

Summary of Changes to the LSL Inventory

Between March 30 and June 30, 2020, updates to the LSL Inventory continued as additional data were gathered and reviewed. During this period, 9,216 changes were made to the LSL Inventory of which 4,302 were changes to the status of the service line (i.e., p-value).¹² This included changes based on confirmation from Denver Water, customers, distributors, review of historical data, direct evidence (including water quality and/or potholing) and replacements. In addition to material status changes, irrigation lines were removed (729 service lines) and 4,185 active drinking water lines were added to replace the placeholder included as a contingency in the base inventory¹³. These changes are shown in Figure 2 and accounted for in Table 10.

FIGURE 2. CHANGES IN THE BASE AND CURRENT INVENTORY (AUGUST 8, 2019 AND JUNE 30, 2020)



Number of LSL Replacements Completed and Incorporated into the Inventory

The total number of lead services lines replaced by Denver Water and the ALSLR contractors between March 24 and June 26, 2020 is shown in Table 11.

TABLE 8. NUMBER OF LSL REPLACEMENTS BETWEEN MARCH 24 AND JUNE 26, 2020

Description	Count
Number of LSLs Replaced in April 2020 ¹	155
Number of LSLs Replaced in May 2020	399
Number of LSLs Replaced in June 2020	477
Total Number of LSLs Replaced Second Quarter 2020	1,031
Total Number of LSLs Replaced in Year 1^{2,3}	1,312

¹ April LSL replacement count is inclusive of replacements from March 24, 2020 through the end of April 2020.

² LSL count in Year 1 is a year-to-date count from January 1, 2020 to June 26, 2020.

³ These totals do not match the number of LSL replacements identified in Appendix INV-4B Line by Line p-Value Changes by Status (Second Quarter) due to a time lag between reporting of LSL replacements completed in the field (as shown in this table) and the data added to the LRP database after data retrieval, review, and confirmation.

¹² See Appendix INV-4B Line by Line p-Value Changes by Status (Second Quarter).

¹³ Identified by category A.3.5 in Appendix III.B.2 - Preliminary Identification of Lead Service Lines.

Investigations that Resulted in a Change to the Status of a Service Line

Investigations are performed at properties to improve the assumptions that were used to develop the LSL Inventory. A completed investigation at a property may include desktop evaluation of available data from Denver Water, 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 suspected or possible lead and all known LSLs should be replaced.

The number of properties which are investigated and result in a change in status to known lead or non-lead are counted toward the required 1.4 percent of the LSL Inventory investigated each year. Investigations as part of the ALSLR Program, such as potholing before replacing a LSL, do not count toward the 1.4 percent investigations required each year.

A property at which the status (i.e., p-value) of a service line is changed is counted as a completed investigation if all the following conditions apply:

- 1) The property is originally classified as a suspected or possible lead service (see paragraphs 3.B and 3.D in the Variance).
- 2) The investigation was performed independently of LSL replacement and not as part of the 2020 ALSLR Plan (see paragraph 3.D in the Variance).
- 3) The investigation results in a change in status of a service line to either a known lead ($p = 1$) or unlikely lead ($p = 0.02$) or non-lead ($p = 0$) (see paragraphs 7.B.ii.f and h in the Variance). For example, a water quality result with lead measured above 5 $\mu\text{g/L}$ in the second or third sample bottle in the 3-bottle test would result in an adjustment to the p-value to 1.
- 4) "Investigation(s)" that result in a status change can involve one or more methods including water quality samples, pothole, visual inspection, or other methods.

A three-point verification is used to pothole the status of a service line: from the main to water meter, from the water meter to the building, and inside the building where the service line enters. To confirm "known lead", lead must be visually confirmed in at least one location and the investigation is considered complete and "counted" for compliance purposes. Potholing on its own is not conclusive for "non-lead" but it can be used to determine a property as "unlikely" to have a lead service (i.e., p-value of 0.02). To confirm "unlikely lead", there can be no lead or galvanized present in any of the three points used for potholing and there can be no contradiction with the desktop records review and/or water quality sampling.

Results from verification potholing are presented in Table 12 and results from investigative potholing are presented in Table 13 along with the next steps to either replace confirmed lead or pursue additional investigative methods to conclusively determine the status of the service line.^{14,15}

TABLE 12. OUTCOMES FROM VERIFICATION POTHOLING¹ AS PART OF THE 2020 ALSLR PLAN FROM JANUARY 1 TO JUNE 26, 2020

Service Line Status before Potholing	Potholing Outcome ²	Update Inventory and Follow-up Action
Initial Status $p \geq 0.8$ (total 1,254)	839 confirmed lead (lead observed at least one of three points)	Property is confirmed for 2020 ALSLR Plan.
	52 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	363 incomplete (could not pothole all three points)	Return to property or find a way to obtain third point. Or proceed with other investigation to confirm status.
Initial Status $0.5 \leq p < 0.8$ (total 137)	39 confirmed lead (lead observed in at least one of three points)	Property is confirmed for 2020 ALSLR Plan.
	15 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	83 incomplete (could not pothole all three points)	Return to property or find a way to obtain third point. Or proceed with other investigation.
Total Number of Properties Potholed and Included in the 2020 ALSLR Program (Verification Potholing)		1,391

¹ Potholing to verify the material of the service line at properties included in the 2020 ALSLR Plan do not contribute to the required 1.4 percent investigations. Potholing outcomes on their own do not necessarily result in a status change of a service line and additional investigative steps may be necessary.

² The number of potholes completed as described in Appendix INV-4B Line by Line p-Value Changes by Status 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.

¹⁴ See Appendix INV-5A Results from Potholing for Verification as Part of the 2020 ALSLR Program.

¹⁵ See Appendix INV-5B Results from Potholing for Investigations not part of the 2020 ALSLR Program.

TABLE 13. OUTCOMES FROM INVESTIGATIVE¹ POTHOLING INDEPENDENT OF THE 2020 ALSLR PLAN FROM MARCH 24 TO MAY 31, 2020

Service Line Status before Potholing	Potholing Outcome ²	Update Inventory and Follow-up Action
Initial Status 0.5 ≤ p < 0.8 (total 140)	47 confirmed lead (lead observed at least one of three points)	Add property to list for LSL replacement.
	1 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	92 incomplete (could not pothole all three points)	Return to property or find a way to obtain third point. Or proceed with other investigation.
Initial Status p < 0.5³ (total 7)	6 confirmed lead (lead observed at least one of three points)	Add property to list for LSL replacement.
	0 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	1 incomplete (could not pothole all three points)	Return to property or find a way to obtain third point. Or proceed with other investigation.
Total Number of Properties Potholed Independent of the 2020 ALSLR Program (Investigative Potholing, Second Quarter Only)		147

¹ Potholing to investigate the material of the service line that is not part of the 2020 ALSLR Plan contributes to the count of the required 1.4 percent investigations. Potholing outcomes on their own do not necessarily result in a status change of a service line and additional investigative steps may be necessary.

² The number of potholes completed as shown in Appendix INV-4B Line by Line p-Value Changes by Status 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 program database.

³ This includes Denver Public Schools (DPS) that were originally assigned a p-value < 0.5. Upon further review of data provided by DPS it was decided that further investigation was required. These seven properties do not count toward the 1.4 percent investigations required because the initial p-value is less than 0.5. DPS properties with an initial p-value of ≥ 0.5 do count toward the 1.4 percent investigations required.

The total number of investigative water quality samples reported in LIMS by June 30, 2020 is shown in Table 14. A description of how the investigative water quality samples are used to inform the inventory is presented in Table 15. It should be noted that no updates were made to the inventory based on results from water quality investigations in this quarterly reporting period. Water quality results with lead measured above 5 µg/L in the second or third draw are conclusive for a lead service line. Lead measured below this threshold at properties with an initial status of possible or suspected lead (i.e., $p \geq 0.5$) 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 of unlikely lead (i.e., $p < 0.5$) is considered conclusive for non-lead and no additional investigations are undertaken and the property is removed from the LRP.

TABLE 14. OUTCOMES FROM WATER QUALITY INVESTIGATIONS¹ AS PART OF THE 2020 ALSLR PLAN JANUARY 25 TO JUNE 30, 2020

Service Line Status in Baseline Inventory	Water Quality Sampling Outcome	Update Inventory and Follow-up Action during Third Quarter ²
Initial Status 0.5 ≤ p < 0.8 (total 179)	45 confirmed lead (lead measured > 5 µg/L in the second or third sample bottle from the 3-bottle test)	Add property to list for LSL replacement.
	134 inconclusive (lead measured ≤ 5 µg/L in the second or third sample bottle from the 3-bottle test)	Review historical and potholing data to confirm status Or proceed with other investigation.

¹ Water quality sampling kits for investigations starting January 25 at properties that are included in the 2020 ALSLR Plan are presented in this table; customer requested sample results are not included. These samples were collected at 2020 ALSLR properties and therefore do not count toward the required 1.4 percent investigations.

² As of June 30, 2020 the LSL Inventory has not been updated to address water quality sampling results from investigations. The results of this table do not apply to Table 15.

The status of 171 properties was changed from either a suspected or possible LSL to a known lead service due to potholing as shown in Table 15. This is reflected in the June 30, 2020 LSL Inventory in Table 10. All other changes to the status of a service line were made using desktop methods.

TABLE 15. NUMBER OF INVESTIGATIONS COMPLETED (MEETING CRITERIA OF “INVESTIGATION”)

Number of Properties Investigated	Count
Required Number of Investigations	1,168 (1.4% of all suspected and possible lead services from the September 2019 inventory)
Number of Investigations Completed by Investigative Potholing Alone ¹ in the Second Quarter (between March 24 and May 31, 2020) as reported in the LRP database	171 ¹
Number of Investigations Completed by Investigative Water Quality Sampling Alone in the Second Quarter as reported in the LRP database	0 ²
Number of Investigations Completed by Desktop Methods Alone in the First and Second Quarter ³	556 in first quarter 614 in second quarter
Total Number of Investigations Completed in Second Quarter¹	785
Total Number of Investigations Completed in Year 1¹	1,341

¹ Numbers are derived from LRP database. Second quarter desktop investigations match Appendix INV-4B and due to the time lag in data transfer to the LRP database do not match the ALSLR Program data presented in Table 13.

² As of June 30, 2020 the LSL Inventory has not been updated to address water quality sampling results from investigations; results from water quality investigations will be incorporated into the inventory during the third quarter.

³ Desktop investigation requires both water quality and pothole results to decrease a p-value. Only results from potholing that are conclusive for lead or galvanized (i.e., the p-value is increased to 1) are included in this table. The total number of lead services is reduced by subsequent replacements.

7.B.iii LSL Replacements

Denver Water continues to replace LSLs as part of water main replacements and in response to service line leaks. Replacements under the ALSLR Program started on March 5, 2020 and continued through the second quarter. An overview of the LSL replacement requirements is shown in Table 16.

TABLE 16. OVERVIEW OF 7.B.III REQUIREMENTS

Paragraph Reference	Description	Refer to
4.A	Implement accelerated LSL replacement within 90 days of the effective date.	Contractors were given Notice to Proceed on March 5, 2020.
4.E	Offer post-LSL replacement sampling within six months.	Ongoing.
7.B.iii.a	Address and date of all replacements.	See Appendix. ¹⁶
7.B.iii.b	Type of replacement.	See Table 17 and Appendix. ¹⁶
7.B.iii.c 4.H	Refusal list with service point id and documented attempts for customer contact. Track changes in customer account holders against Service Line Refusal List.	See Appendix. ¹⁷
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.
7.B.iii.d	Number of properties where an emergency repair was performed using a partial LSL replacement and consent was not granted by the property owner to replace a lead service line in full.	See Table 17 and Appendix. ¹⁸
LRPP III.D (p 57)	Replace LSL at properties with consistently high lead release and critical care 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 12.
LRPP III.D (p 60)	Property owners will be reminded via signage placed at the limits (ends of streets) within geographic work areas four to five weeks in advance of construction.	Planning underway.
LRPP III.D (p 60)	Provide flushing instructions following LSL replacement.	Provided to all customers as part of the post-LSL replacement education package. ¹⁹

¹⁶ See Appendix LSL-4 Addresses and Types of Replacement (Second Quarter).

¹⁷ See Appendix LSL-5 LSL Replacement Refusal List (Second Quarter).

¹⁸ See Appendix LSL-6 Properties with Emergency Repairs Resulting in a Partial Replacement (Second Quarter). To date, consent has been granted for LSL replacement for all emergency repairs. The partial replacement occurred due to constraints accessing the shutoff valve inside the property.

¹⁹ See Appendix COE-A.20 Post Service Line Replacement Flushing Instructions.

With the onset of the COVID-19 pandemic in early March 2020, Denver Water and its contractors were unable to fully implement the ALSLR Program due to the need to social distance. As additional health and safety protocols were developed and deployed, Denver Water and the ALSLR contractors have continued to ramp up their production rates to meet the annual LSL replacement goal. By May 1, 2020, all ALSLR contractors were fully mobilized to replace lead service lines in their respective geographic task order work areas. Denver Water adjusted the prioritization of replacements performed as part of the ALSLR Program to focus on geographic residential neighborhood areas while Denver Water crews continue performing work on Denver Public Schools, critical customers such as childcare facilities and commercial customers that remain closed.

Protocols to manage the health and safety concerns of COVID-19 were put in place including the use of masks by field crews and customers along with physical distancing protocols to allow work to continue. To date, customers have complied and protocols are being followed with limited disruption to the progress of the ALSLR Program. The 2020 ALSLR Plan construction schedule continues to be reviewed and adjusted to recover from the delay, based on different dates for the re-start (May 1 and June 1, 2020) and variables such as the production rates, workdays, resources, and number of concurrent task orders to achieve the regulatory compliance target of 4,477 annual LSL replacements. The outcomes from the recovery scenarios cannot be predicted at this time due to the uncertainty surrounding the COVID-19 pandemic and evolving requirements related to health and safety protocols.

In addition to the ALSLR field crews, Denver Water T&D completes LSL replacements as part of water main work and emergency repairs. Denver Water T&D crews assist with individual and geographic area LSL replacements including replacements required within 24 hours at properties where lead is measured above 150 µg/L and within approximately two months at properties where lead is measured above 25 µg/L.

Learning by Doing meetings were conducted with each of the ALSLR contractors in June 2020 and a number of mechanisms were identified to increase production rates and accelerate the recovery from the shutdown. Examples include expanding the inventory provided to each ALSLR contractor to increase the number of LSLs replaced, extending the work week to include Saturdays, and increasing the number of ALSLR contractor field crews working. Approximately 1,400 properties were added to the geographic task orders (for execution in late June), to bring the total year-to-date properties included in the geographic task orders to 3,900. Additional geographic task orders are being developed to increase the total number of properties visited in 2020 by the ALSLR contractors to approximately 5,400. The annual requirement for LSL replacements is expected to be achieved in Year 1, again barring any unforeseen complications created by the COVID-19 pandemic.

Number of LSL Replacements Completed during this Reporting Period

The ALSLR contractors received a third wave of geographic task orders with Conditional Notice to Proceed during this reporting period. Each task order includes approximately 200 properties. Notifications were mailed to all properties included in the task orders, after which multiple efforts were undertaken to obtain signed consent forms.²⁰ Reconnaissance or pre-construction meetings are conducted with each property owner to plan the LSL replacement work and schedule the replacement.

The types of replacements completed between March 24 and June 26, 2020 are summarized in Table 17. A detailed list of the addresses where LSL replacements are completed is maintained²¹ by Denver Water. To date the ALSLR Program and Denver Water T&D crews have performed a partial replacement at only one property (i.e., some lead remains in the ground). Although the property granted consent for a full LSL replacement during an emergency repair, the service line shutoff valve inside the property was not accessible and Denver Water was not able to complete the full replacement. The property owner was asked to provide access to the shut-off valve within 14 days in order to complete the full replacement.

TABLE 17. TYPE AND SOURCE OF LSL REPLACEMENT FROM MARCH 24 TO JUNE 26, 2020

Type of LSL Replacement March 24 through June 26, 2020	ALSLR Program ²	Emergency Repairs	Water Main Replacements ³	Developments and Scrape-off ⁴	Third Parties as Inspected by Denver Water	Total ⁵
Full Lead Replacement	417	66	106	N/A	4	593
Partial Lead Replacement, such that no Lead Remains After Replacement	244	28	48	N/A	0	320
Full Galvanized Replacement	11	1	1	N/A	0	13
Partial Galvanized, such that no Lead or Galvanized Remains After Replacement	89	10	6	N/A	0	105
TOTAL REPLACEMENTS, with no Lead Remaining After Replacement	761	104	162	N/A	4	1,031
Emergency Repair, Partial Replacement (i.e., where consent was NOT granted and lead remains in the ground)¹	0	1	0	N/A	0	1

¹ One emergency repair resulted in a partial replacement because access could not be gained despite having consent.

² Includes 16 LSL replacements by T&D at critical customer facilities during COVID-19.

³ Includes nine LSL replacements by T&D for the ALSLR Pilot Program (ended in March 2020).

⁴ Replacements by developments and scrape-offs are under review and will be included in the third quarterly report.

⁵ Appendix INV-4B Line by Line p-Value Changes by Status replacement numbers differ due to a time lag between replacements occurring in the field and the data collected, reviewed, confirmed, and added to the program database.

²⁰ See Appendix LSL-5 LSL Replacement Refusal List (Second Quarter).

²¹ See Appendix LSL-4 Addresses and Types of Replacement (Second Quarter).

Customer Consent for LSL Replacement

Denver Water started distribution of notification letters including consent forms on January 21, 2020 to property owners. Since then properties identified in three waves of geographic task orders have been contacted.

A summary of the number of property owners contacted and number of signed consent forms returned is presented in Table 18. Between March 24 and June 26, 2020, 15 property owners refused to participate in the ALSLR Program. Denver Water attempts to obtain voluntary consent from a property owner before work can start to replace the lead service line.

A range of outreach methods were used to contact property owners.²² Denver Water maintains a database to track attempted contacts at properties where consent to replace the LSL has not been provided.²³ At least two attempts at contact by mail plus one attempt at contact in person is made before a property is considered non responsive. If an owner refuses to participate in the ALSLR Program, the property is added to the LSL Replacement Refusal List, as well as an explanation for refusal if available. When a property owner declines to participate, Denver Water is committed to continue engagement with the property owner to encourage participation. While the ALSLR crew is an area with active construction activity, the ALSLR crews may make additional attempts to contact the property owner to seek consent. Denver Water is committed to follow-up with the property owner at least once a year to encourage participation. Additionally, any change in the water account holder will be used to trigger additional outreach to obtain consent to replace the LSL.

TABLE 18. SUMMARY OF CONSENT AND LSL REFUSAL LIST (MARCH 24 TO JUNE 26, 2020)

Description	Consent Form Signed	Customer Refused ¹
Total Number of Properties who have yet to Respond Year to Date =	578	
Number of Properties Responding after First Mailed Attempt	66	0
Number of Properties Responding after Second Mailed Attempt	505	12
Number of Properties Responding after In-person Contact	157	3
Total Number of Properties for which Consent was Given or Refused during the Second Quarter	728	15
Total Number of Properties for which Consent was Given or Refused Year-to-Date	1,985	32

¹ Where a customer refuses, the service point ID is provided to the COE team for follow-up. See explanations in Appendix LSL-5 LSL Refusal List (Second Quarter).

²² See Appendix COE-C.1 Strategy Denver Water LRP 2020 Communications Plan.

²³ See Appendix LSL-5 LSL Replacement Refusal List (Second Quarter).

There are circumstances where consent has been given, but an inspection of the property reveals a safety 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 time frame, the property is treated as not responding and is added to the list of “non response” until the issue is resolved and the lead service line can be replaced.²⁴

²⁴ See Appendix COE-D.12 for Safety or Repairs Needed Notification Letter

7.B.iv Filters

The Filter Program targets properties with known, suspected, and possible LSLs (i.e., with p-values 0.5 and higher). The Filter Program includes the distribution of pitcher filters, on-going outreach and education to encourage pitcher filter use and the distribution of filter replacements. Using the current LSL Inventory, it is estimated that Filter Program participants consist of approximately 110,000 Denver Water household units.

This section summarizes the milestones of the Filter Program to date, including the initial distribution of pitcher filters with a six-month supply of replacement filters, filter refusals/opt outs, six-month supply of replacement filters distributed post-LSL replacement, filter survey results from the ALSLR Program, and filter sampling in the field. An overview of the filter reporting requirements is shown in Table 19.

TABLE 19. OVERVIEW OF 7.B.IV REQUIREMENTS

Paragraph Reference	Description	Refer to
7.B.iv.a	Address of all customers enrolled in the Filter Program and provided with filters and cartridges. Certification of number of customers with a known, suspected or possible LSL that use their own filter or bottled water.	See Appendix. ²⁵
7.B.iv.b	Total number of filters and cartridges distributed per year.	See Annual Report.
7.B.iv.c	Percent filter adoption rate per year. Description of method used to determine the filter adoption rate.	See Annual Report.
7.B.iv.d	Maintain list of addresses and Service Point Identification that use a filter or bottled water and any changes to the list.	See Appendix. ²⁶
7.B.iv.e 5.A	Maintain Filter Refusal or Opt Out List. Maintain list of addresses and SP IDs that have refused enrolment in the Filter Program or opted out.	See Appendix. ^{26, 27}
7.B.iv.f 7.B.iv.g 5.F.ii	Confirmation of filter performance in the field (50+ locations included in the LCR compliance sampling). Collect samples using a protocol approved by EPA and CDPHE. Collect additional information regarding the use and operation of the filter.	See Figure 1 and Appendix ²⁸ for sample results from February 18 to June 2, 2020. EPA reviewed the protocol as part of the Implementation Plan previously submitted. Included in this section.
7.B.iv.h	Notify CDPHE and EPA within 10 days of receiving sample results indicating measurable lead in filtered samples and provide data for same.	See Figure 1 and Appendix. ²⁸

²⁵ See Appendix FIL-7 Filter Delivery Addresses (Second Quarter).

²⁶ See Appendix FIL-13 Filter Program Opt Outs.

²⁷ See Appendix FIL-9 Filter Program Refusals (Second Quarter).

²⁸ See Appendix FIL-12 Confirmation of Filter Performance in Field Results (First and Second Quarter).

Paragraph Reference	Description	Refer to
5.A	Begin distribution of education materials, filters and replacement cartridges within 90 days of the effective date. Complete distribution of first six monthly supply within 270 days of the effective date.	Distribution began February 12, 2020. See Section 7.B.vi.
5.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. Distribution by T&D from January 2 to March 23. Distribution as part of Filter Program since March 24.
5.C	Provide education materials within two weeks of a change in customer account. Provide filters and replacement cartridges within 35 days of a change in customer account.	See Appendix. ²⁹ See Appendix. ³⁰
5.D	Offer filters to 1983-87 households with formula-fed infants and children under 2 and lead > 3 µg/L in the 1 st L. Develop COE plan to focus on this audience.	Not applicable for this reporting period. See plan in first quarterly report.
5.E.i	Survey enough customers enrolled in the Filter Program to receive 1,059 responses. Seek approval from CDPHE and EPA for the filter adoption survey questions prior to distribution.	Not applicable for this reporting period. Submitted on February 21, 2020. ³¹
5.F.i	Confirmation of filter performance before distribution within 90 days of the effective date.	Submitted February 13, 2020. Approved April 1, 2020. See first quarterly report.
5.G	Document contact to provide lead outreach and education materials to at least 95% of customers enrolled in the Filter Program each year.	See Section 7.B.vi.
LRPP Executive Summary (p 9) and III.C (p 56)	If the localized filter adoption rate is less than 75%, additional outreach and education will be provided to that area.	Not applicable for this reporting period.
LRPP III.C (p 55)	Survey filter use as part of ALSLR Program following LSL replacement.	See this section and Appendix. ³²

Filter Distribution

Denver Water began filter distribution on February 12, 2020 with distribution to customers included in the ALSLR Program in year 1. Denver Water initiated broader filter distribution on March 28, 2020 and all 110,000 filters are expected to be distributed by August 21, 2020. During the second reporting period, 84,523 pitcher filters and a six-month supply of replacement filters were distributed to 84,523 households (see Tables 20 and 21). The first quarterly report had 3,635 filters distributed between January 1 and March 31, however this did not account for

²⁹ See Appendix FIL-16 Occupancy Changes - COE Distribution

³⁰ See Appendix FIL-15 Occupancy Changes - Pitcher Filter Distribution

³¹ See Appendix REG-1 Copies of Letters for Compliance-Related Submissions.

³² See Appendix FIL-11 Filter Adoption Survey Results Summary (First and Second Quarter)

returns. From January 1 through June 26, 2020 a total of 88,064 pitcher filters with a six-month supply of replacement filters were successfully distributed to 88,064 households. Customers in ALSR Wave 1 who previously received a ZeroWater filter from Denver Water and who still have a lead service line will be provided with a new Brita filter by July 24, 2020. Distribution of ZeroWater filters will be discontinued after July 24, 2020 to limit fluoride removal from water passed through the filter.

TABLE 20. SUMMARY OF FILTER DISTRIBUTION

Description	Count	Comment
Number of Households Provided with a Filter Kit between January 1 and March 31, 2020	3,635	See first quarterly report.
Number of Households Provided with a Filter Kit between April 1 and June 26, 2020	84,523	See Appendix. ³³
Total Number of Households Provided with a Filter Kit between January 1 and June 26, 2020	88,064	Accounts for returns from first quarterly report.
Number of Households that Use their own NSF-Certified Filter or Bottled Water	8	See Appendix. ³⁴
Number of Households that Declined to Use a Filter or Bottled Water between January 1 and June 26, 2020	13	See Appendix ³⁵ and see first quarterly report.

TABLE 21. SUMMARY OF SIX-MONTH SUPPLY OF FILTERS DISTRIBUTED POST LSL REPLACEMENT

Description	Count	Comment
Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between January 1 and March 23, 2020	280	See first quarterly report.
Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between March 24 and June 26, 2020¹	150	This includes Emergency Repairs and replacements performed by Denver Water. See Appendix. ³⁶
Total Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between January 1 and June 26, 2020	430	Sum of first and second quarter.

¹ Other properties with a completed LSL replacement received their initial pitcher filter with a six-month filter supply and will receive their replacement filter in the next quarter.

During the distribution of the filter kits, some may be “returned-to-sender” due to an incorrect mailing address despite the review process employed to vet addresses before mailing. There were 1,689 returns³⁷ in the second quarter and there were 29 returns in the first quarter. An unsuccessful delivery prompts an investigation and if the address is reconciled a filter kit is re-sent to the correct address.

³³ See Appendix FIL-7 Filter Delivery Addresses (Second Quarter).

³⁴ See Appendix FIL-13 Filter Program Opt Outs.

³⁵ See Appendix FIL-9 Filter Program Refusals (Second Quarter).

³⁶ See Appendix FIL-8 Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (Second Quarter).

³⁷ See Appendix FIL-10 Filter Program Pitcher Returns (Second Quarter).

Occupancy changes that occurred between March 31 and May 7, 2020 were treated as new Filter Program participants, as they occurred while pitcher filter distribution was in progress. COE materials were delivered to properties with new occupants in June 8, 2020 and the property was added to the regular distribution of pitcher filters delivered on June 15, 2020. After May 8, 2020 the process to identify and address occupancy changes was streamlined, and pitcher filters were added to weekly distribution batches to allow new occupants to receive a filter within 35 days of new occupancy. Daily files were created 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.

The number of properties that choose to opt out of the Filter Program to date has been relatively small. Customers that have opted out of the Filter Program are contacted by Denver Water to understand the reason for opting out: of the 25 customers that have opted out since the launch of the Filter Program, four use bottled water as an alternative to the filter and four use their own filter certified to NSF 53. For 17 of the remaining customers, Denver Water was unable to confirm if the customer was using an NSF 53 certified filter. Denver Water will continue to contact the customers that opt out later this year as part of an annual reminder to customers that have opted out or refused to participate in the Filter Program.

From April 1 through June 26, 2020, refusal to participate in the Filter Program was received for 12 properties. The reasons given for refusal were obtained where possible and found to be due to a vacant property, a property under renovation where no one was using the water for consumption, or the resident thought their service line was previously replaced or did not exist (i.e., removed during potholing).³⁸ There was one Filter Program refusal received during the first quarter reporting period.

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

- List of premise addresses for all households where filter kits were provided.³⁹
- List of six-month supply of replacement filters provided post lead service line replacement.⁴⁰
- List of premise addresses and service point IDs for all households that refuse to participate in the Filter Program.⁴¹
- List of premise addresses that have returned filter kits to sender.⁴² This is a list of 1,689 returns.

³⁸ See Appendix FIL-11 Filter Adoption Survey Results Summary (First and Second Quarter).

³⁹ See Appendix FIL-7 Filter Delivery Addresses (Second Quarter).

⁴⁰ See Appendix FIL-8 Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (Second Quarter).

⁴¹ See Appendix FIL-9 Filter Program Refusals (Second Quarter).

⁴² See Appendix FIL-10 Filter Program Pitcher Returns (Second Quarter).

- Filter adoption survey results summary⁴³ from informal filter use surveys conducted in the field as part of LSL replacement.
- Confirmation of pitcher filter performance in the field from the first and second quarters.⁴⁴
- List of premise addresses and service point IDs for all households that opt out⁴⁵ of the Filter Program and for whom it has been certified that the household is using their own filter (NSF-certified to remove lead) or bottled water.
- Replacement filter distribution for heavy users who need a replacement filter sooner than six months.⁴⁶
- Occupancy changes for pitcher filter distribution.⁴⁷
- Occupancy changes for COE information - Intro Booklet and introductory letter.⁴⁸
- Detailed responses from the filter adoption ALSLR MMFIT field surveys.⁴⁹

Filter Adoption Survey and Results

The questionnaire for the Filter Adoption Survey has been finalized and provided to EPA for the purpose of providing public notice under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The questionnaire is anticipated to be approved in September 2020. There will therefore be no formal reporting for filter adoption rate until the fourth quarter.

Informal surveys have been performed by ALSLR field crews during pre-construction meetings asking customers about filter adoption and use. Between January 1 and June 26, pre-construction meetings were conducted at properties included in the 2020 ALSLR Plan. During the pre-construction meetings, residents were informally asked about their filter use practices. Responses from 622 participants were captured in the LRP database.⁴⁹ This accounts for 14 percent of the total customers who are expected to have their LSLs replaced in 2020 and suggests that the majority of customers are using filtered or bottled water for drinking, cooking and infant formula:

- Customers at 622 locations participated in the filter adoption survey informally conducted during pre-construction meetings and before their LSL was replaced.

⁴³ See Appendix FIL-11 Filter Adoption Survey Results Summary (First and Second Quarter).

⁴⁴ See Appendix FIL-12 Confirmation of Filter Performance in Field Results (First and Second Quarter).

⁴⁵ See Appendix FIL-13 Filter Program Opt Outs.

⁴⁶ See Appendix FIL-14 Replacement Cartridge Distribution.

⁴⁷ See Appendix FIL-15 Occupancy Changes - Pitcher Filter Distribution.

⁴⁸ See Appendix FIL-16 Occupancy Changes - COE Distribution.

⁴⁹ See Appendix FIL-17 Filter Adoption Survey Detailed Responses. This appendix includes details for the date and time of the in-person survey and individual responses collected between January 1 and June 26, 2020. These details were not included in the first quarterly report.

- Of these, the majority of customers responded that they used filtered or bottled water for drinking (87.6 percent) and cooking (76.8 percent).
- All households with a formula-fed infant indicated that they used filtered water when preparing formula.

Informal surveys using the same questions about filter use were conducted as part of virtual community meetings launched in June 2020; an analysis of survey responses will be included in a future quarterly report.

Confirmation of Filter Performance and Usage in the Field

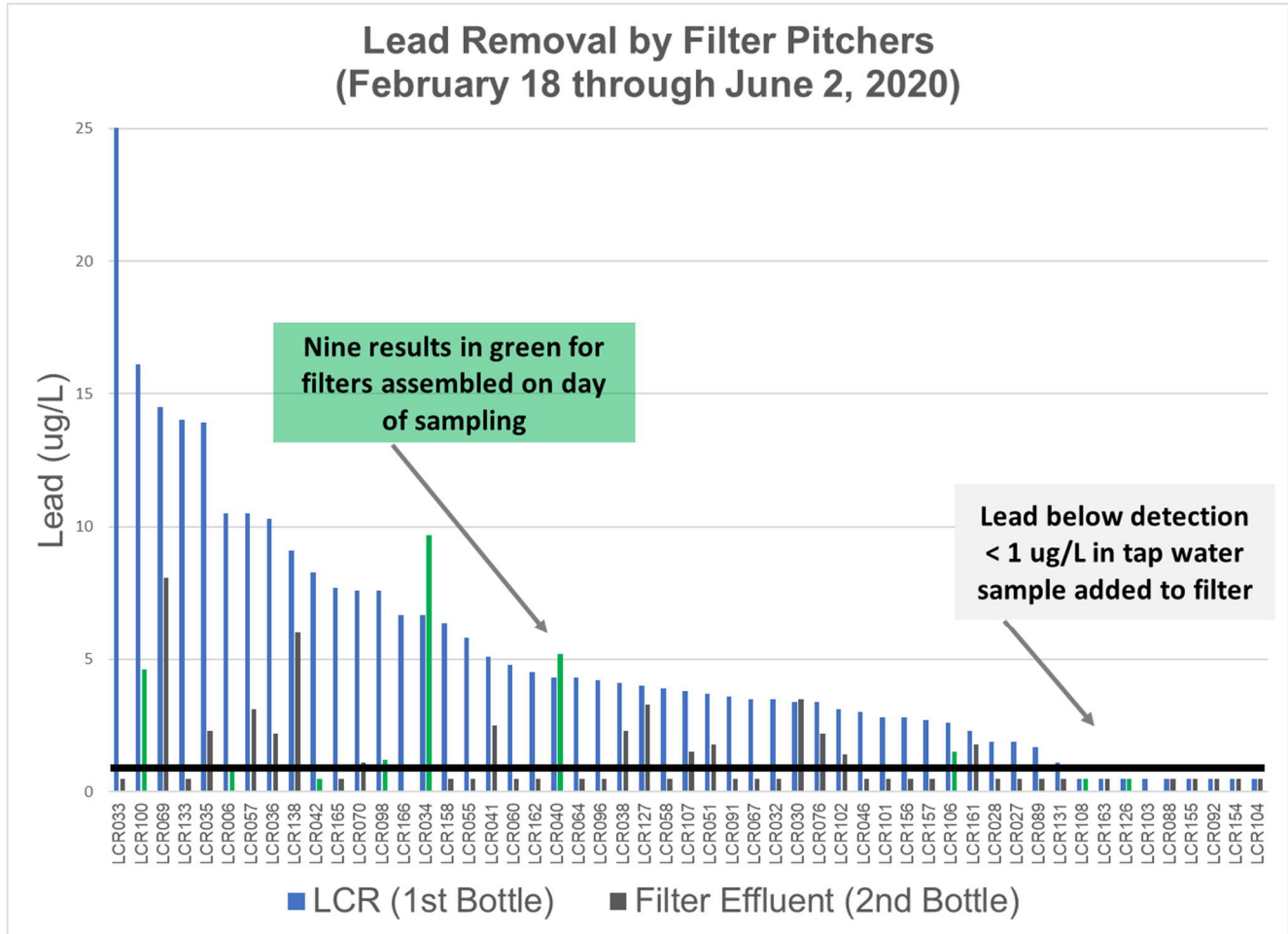
Field sampling is conducted by Denver Water in conjunction with LCR compliance sampling (see section 7.B.i). All samples collected to meet this requirement for the first six-month sampling period of 2020 are included in this reporting period. Denver Water collected 26 samples until March 16, 2020; customers collected the remaining 27 samples collected after March 16, 2020. After collecting 26 samples, in-home sample collection by Denver Water staff is temporarily suspended as part of Denver Water's COVID-19 response and customers are being asked to collect the pitcher filter samples in addition to the LCR compliance samples.

The field filter sampling protocol uses the 1st L bottle for LCR compliance sampling and the second or "intermediate" bottle to supply the pitcher filter and generate a filtered water sample. It is noted that the lead measured in the 1st L is only an approximation of the lead available in the 2nd L that is used to fill the pitcher filter. As a result, lead removal through the pitcher filter is only an approximation (see Figure 3). In some homes the lead concentration in the 1st 1 L sample can be higher than in the 2nd or intermediate sample, or vice versa.

There were no reports from customers that the filter had not been used prior to sampling during the second quarter reporting period compared with nine properties during the first quarter. Lead was measured below the detection limit in filtered water at 30 of the 53 properties and below 5 ppb in 49 out of 53 properties.

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 two properties with lead measured above 15 µg/L in the tap water sample and the lead service line at both properties is scheduled for replacement within two months. Using the testing criteria of NSF 53, 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 control loop from the pipe rack). Lead was not measured above 10 µg/L in any of the filter samples collected from the field during the first and second quarter reporting periods.

FIGURE 3. RESULTS FROM FILTER TESTING IN THE FIELD



Note: When calculating the percentage lead removal, a value of 0.5 µg/L is used for results measured below the detection limit of 1.0 µg/L.

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

A summary of the performance metrics that will ultimately be used to evaluate the overall performance of the LRP is presented in Table 22.

TABLE 22. SUMMARY OF COMPLIANCE

Paragraph	Description	Comment
2.C	<p>C. Corrosion Control Treatment Metric. Denver Water must consistently <u>maintain in all parts of the System a minimum target pH of 8.5 during the first year of operation</u> under this Variance.</p> <p>In the future, Denver Water must maintain pH and alkalinity within the ranges designated by CDPHE in its modification decision under Section 11.26(3)(d)(ii) of 5 CCR 1002-11.</p>	See Section 7.B.i
3.D	<p>D. LSL Inventory Compliance Metric. Denver Water <u>must investigate a minimum of 1.4% of the total estimated number of suspected and possible LSLs in the LSL Inventory each Program Year (based on a subset of Y as described in paragraph 3.A above), as adjusted.</u></p> <p>These investigations are performed independently of the LSL replacements.</p>	See Section 7.B.ii
4.I	<p>I. Accelerated LSL Replacement Compliance Metric. 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.</p>	See Section 7.B.iii
5.G	<p>G. Filter Communication Compliance Metric. Denver Water <u>must make direct contact with lead outreach and education materials to 95% of all customers enrolled in the Filter Program in every Program Year.</u> . . . Compliance shall be documented by mailing lists and mail receipts, lists of customer email addresses for customers who elect to receive email communication, or other forms of documentation approved by CDPHE.</p>	See Section 7.B.vi
6.B	<p>B. Comprehensive LRPP Performance Metric. Denver Water must demonstrate to EPA's satisfaction, using the updated equivalency model results as reported under paragraph 7.C, that the <u>combined actual performance of the LRPP as implemented continues to be "at least as efficient as" orthophosphate treatment in reducing lead exposure on an annual basis.</u> Denver Water may account for the CCT optimization period in this demonstration.</p>	To be provided in Annual Report for Year 1

7.B.vi Communications, Outreach and Education

During the second quarter of 2020, Denver Water began the implementation of additional public outreach and engagement strategies as described in the LRPP and 2020 COE Plan. This included the launch of the Ambassador Program, conducting virtual community meetings and the formation of the Stakeholder Advisory Committee. In addition to these new strategies, efforts to communicate with customers, distributors and elected officials through mailings and digital channels continued from the first quarter. COE efforts specific to each program element are also included in those element sections of this report and reporting requirements are identified in Table 23.

TABLE 23. OVERVIEW OF 7.B.VI REQUIREMENTS

Paragraph	Description	Comment
7.B.vi	2020 COE Plan	See first quarterly report.
7.B.vi.a	Description of COE activities conducted. Copy of materials.	Discussed in this section. See Appendix for copies of materials included. ⁵⁰
7.B.vi.b	Ambassador Program Overview.	See first quarterly report.
7.B.vi.c	COE Plan for 1983-87 homes to self-identify formula-fed infants and children under 2 years.	Discussed in this section. See first quarterly report.
8.G	Notify customers enrolled in Filter Program of LRP and launch multi-media campaign.	Multi-media campaign launched March 23, 2020.
LRPP III.E (p 64)	Targeted messaging to homes with copper piping and lead solder to flush the tap after periods of non-use.	See first quarterly report.
LRPP III.F (p 74)	Stakeholder Advisory Committee	Discussed in this section.

Outcomes of COE activities between April 1 and June 30, 2020 (unless otherwise noted)

- A total of five virtual community meetings were conducted to provide an overview of the LRP to customers in areas included in the filter program. As of June 30, 2020, 3,634 customers participated via phone or video with another 62,717 customers invited to participate in at least six future meetings.
- In addition, Denver Water received requests for presentations on the Lead Reduction Program from eight local, state and national organizations and held these presentations in the second quarter.
- Denver Water signed contracts with two community partners, iNOW and CREA Results, initiating targeted outreach to support health equity and environmental justice.

⁵⁰ See Appendix COE-D.1 through D.12 for a copy of materials.

- The Stakeholder Advisory Committee was formed with 17 representatives from diverse industries and impacted communities, and met on May 7, 2020, to introduce the program and role of the group.
- 87 points of contact were made with local government officials and staff, including Denver City Council and elected officials in suburban jurisdictions.
- Denver Water contacted 80% of customers enrolled in the Filter Program by June 27, 2020.⁵¹
- 68,694 unique page views to the program website since the launch of comprehensive LRP information on March 5, 2020.
- The program dashboard, reflecting progress through May 31, 2020, was posted to the program website on June 29, 2020.
- 5,251 views of TAP stories published on denverwaterTAP.org from March 29 to June 30, 2020.
- 349,601 individuals reached through Denver Water social media activity from March 31 to June 30, 2020.
- 29 mentions of the LRP in media stories, with an aggregate readership of 181,726,836.
- Copies of new outreach materials are provided in Appendix COE-D.

The following section highlights COE program activities carried out during the second quarter of the program year, organized by strategy type.

Public Outreach

Due to the COVID-19 pandemic, public outreach strategies were adapted to virtual, electronic and telephone communications.⁵²

- Ambassador Program
 - As part of the Ambassador Program, Denver Water engaged with two community organizations to become partners for the LRP. Contracts were signed with two community outreach partners, iNOW and CREA Results, in May 2020. iNOW, a project within the Trailhead Institute, is a community organization that specializes in supporting refugee immigrants. CREA Results is a community organization that specializes in supporting the Latinx community. The scopes of work for these organizations focus on

⁵¹ Details and mailing lists are included in the Filter Program section of this report.

⁵² See Appendix COE-F.1 COVID-19 Adjustment Strategy.

participation in the ALSLR and Filter Programs and were adapted to virtual community engagement during the COVID-19 pandemic.

- A virtual LRP training was provided to iNOW and CREA Results to arm them with the program knowledge to conduct community outreach activities.⁵³
- Social media training was also provided to iNOW and CREA Results, including a review of Twitter examples, Denver Water online resources and videos to support partners' ability to follow consistent and accurate program messaging on their social media platforms.
- Virtual Meetings
 - As part of the COVID-19 adjustment strategy, Denver Water scheduled and began to host 11 bilingual, one-hour virtual community meetings in June and July for approximately 70 neighborhoods and distributor areas impacted by the LRP.⁵⁴ The meetings are an opportunity to inform customers about the program, encourage filter usage and answer questions. As of June 30, a total of 3,634 customers have participated via phone or computer, with another 62,717 customers invited to participate in upcoming meetings.
 - In order to gather participants for the virtual meetings, outbound calls are made to Denver Water customers in the specific neighborhoods addressed with each meeting. As part of these outbound calls, voicemails are left with those who do not answer. This voicemail provides information about why they are receiving the call, where to learn more about the LRP and how to contact Customer Care. These voicemails are recorded in both English and Spanish.
 - Presentations for Registered Neighborhood Organizations (RNOs) in priority communities, based on the analysis described in the first quarterly report, were limited due to the pandemic. The pandemic affected RNOs in different ways and, thus, Denver Water garnered a variety of responses from its requests to present. Some RNOs did not respond, others were not hosting virtual community meetings or still others were trying to determine how best to continue business during the pandemic. Denver Water conducted the following RNO presentations in the second quarter:
 - FANS of Washington Park | Washington Park East Neighborhood Association (May 6, 2020)
 - Cole Neighborhood Association (May 21, 2020)

⁵³ See Appendix COE-F.2 Ambassador Training Program.

⁵⁴ See Appendix COE-D.10 Virtual Community Meeting Schedule for a schedule of these meetings, including neighborhoods addressed at each meeting.

- Denver Water also presented to a variety of organizations on request to provide an overview of the LRP, gather feedback and identify areas for potential coordination. Meetings included:
 - Lead Service Line Replacement Collaborative (April 22, 2020)
 - RE/MAX of Cherry Creek (April 29, 2020)
 - NJ Futures (May 12, 2020)
 - DC Water Lead Service Line Replacement Program (May 14, 2020)
 - Wheat Ridge City Council Special Study Session (May 18, 2020)
 - Tri-County Health Department (May 21, 2020)
 - Aquarion Water Lead Service Line Replacement Program (June 2, 2020)
 - Kettering University (Flint, MI) (June 10, 2020)
- Stakeholder Advisory Committee
 - The Stakeholder Advisory Committee⁵⁵ kickoff meeting was held virtually on May 7, 2020. A total of 32 organizations were invited to participate. 17 representatives attended the kick-off meeting, reflecting a mix of perspectives, including health care, education, nonprofit, government and RNOs (specifically those impacted in this calendar year). The next meeting will be held virtually in July.
 - Following the first Stakeholder Advisory Committee, Denver Water began developing a charter using input from the committee to determine the role and responsibilities of the group. This charter will be finalized and shared with the committee in July 2020.
- Government Relations
 - To keep elected officials up to date with the LRP and support their ability to accurately answer questions they receive from constituents, Denver Water made 87 proactive contacts with local government officials and staff, including Denver City Council and elected officials in suburban jurisdictions. Discussions included an explanation of the program for suburban local government officials, updates regarding the program inside Denver (including filter distribution and use) and an explanation of community outreach, such as the virtual community meetings.

⁵⁵ See first quarterly report (Appendix COE-C.1) for details on the vision and goals of this group.

- In addition, eight Denver City Council districts were added to the monthly LRP email update distribution list, including three Council members.
- Council members used the information provided to inform program updates in their newsletters to constituents.
- Distributor Communications
 - To keep Denver Water distributors informed of the latest messaging, information and materials for the LRP, as well as collaborate on communications to their customers, the following activities took place:
 - Provided LRP updates at distributors' forum meetings in April and June 2020. The May meeting was cancelled due to the COVID-19 pandemic.
 - Published LRP updates in monthly distributor newsletters in April and May 2020.
 - Reached communication branding agreements with each distributor.
 - Mailed introduction letters with FAQs to distributor single-family residences included on the inventory lists. Remaining letters will be sent in the third-quarter reporting period.
 - Mailed water quality test kits to distributor single-family residences included on the inventory lists. Remaining kits will be sent in the third-quarter reporting period.
 - Made preparations to send Filter Program kits to distributor customers with known, suspected or possible LSLs in July and August.
 - Denver Water assisted distributors by completing an initial inventory review of distributor area customers to improve the understanding of the inventory.
- Earned Media
 - The LRP was covered in digital, print and broadcast news, including The Denver Post, FOX31, 7News, Denver North Star, 5280 Magazine and more.⁵⁶
 - Denver Water made 44 posts about the LRP on its social media channels, resulting in 349,601 impressions. Ambassador Program partners also shared Denver Water social media posts on their own networks.

⁵⁶ See Appendix COE-E.3 Traditional Media Report for an overview of news coverage achieved during the second quarter.

- Denver Water planned a paid media strategy that will run through July 2020. The aim of this neighborhood-based campaign is to generate awareness for the LRP and encourage proper filter use through print and out-of-home (billboard) advertisements, as well as digital advertising.
- Digital Communications
 - Denver Water distributed emails on April 14, May 28 and on June 29, to a growing database of 8,448 customers who have opted in for program updates, encouraging filter use, promoting engagement opportunities and providing an overview of ongoing program activities.⁵⁷
 - Denver Water posted five TAP stories on denverwaterTAP.org providing updates on the LRP and information on proper filter usage. Three of these stories were published in Spanish.⁵⁸
 - Denver Water created four videos for the LRP including a program overview and filter use instructions. Two of these videos were published in Spanish.⁵⁹
 - The LRP website, denverwater.org/Lead, was updated with the schedule for virtual community meetings, program dashboard and refined inventory.
 - The LRP website provides customers and visitors with information on all the virtual meetings Denver Water is conducting with details on how to join, as well as recordings of past meetings.

Material Development

The following materials were developed in the second quarter in support of the various program components as outlined below:

- Program Dashboard
 - Developed public-facing dashboard to share progress and key metrics for the LRP through May 31, 2020. The dashboard was posted to the LRP website, denverwater.org/Lead, on June 29, 2020, with additional links to more information about each program element. The dashboard will also be translated into Spanish.
- Water Quality Testing and Sampling

⁵⁷ See Appendix COE-E.6 April, May, June Subscriber Email.

⁵⁸ See Appendix COE-E.5 Number of TAP Articles and Views for an overview of TAP stories published.

⁵⁹ See Appendix COE-E.7 Videos.

- Developed investigative water quality test results letter, which informs customers if their property likely has a lead service line and provides next steps.⁶⁰
- Developed notification⁶¹ and result letters⁶² for water quality kits that will be delivered to customers within four to six months following replacement of their lead service line.
- ALSLR Outreach
 - Developed prioritization model fact sheet to explain how Denver Water will be selecting work areas for lead service line replacements.⁶³
 - Developed an updated guide for post-replacement flushing instructions at single-family residences.⁶⁴
- 1983-1987 Homes Strategy and Implementation
 - Created a tailored communications, outreach and education strategy focused on expecting and existing families with formula-fed infants/children up to age 24 months, at homes with copper piping with lead solder built between 1983-1987.⁶⁵
 - Denver Water began development of materials in support of this group. These materials include:
 - A notification letter for Denver Water customers built in 1983-1987 homes who self-identify as a household with formula-fed infants and children up to age 2. This notification encourages customers to request a water quality test kit to determine if lead is present in their water.
 - A water quality test results letter for customers in homes built between 1983-1987. This letter encourages customers with a lead result of 3 ppb or above to request a free water pitcher and filter.
- Early Childhood Development Outreach
 - Identified which day care centers (in-home and commercial centers) are enrolled in the LRP in order to target COE efforts for this group. Recognizing the ability of these facilities to help reach a vulnerable population, an Early Childhood Development Service Provider COE strategy was developed as

⁶⁰ See Appendix COE-D.2 Investigative Water Quality Test Result Letter.

⁶¹ See Appendix COE-D.3 Post LSLR Water Quality Notification Letter.

⁶² See Appendix COE-D.4 Post LSLR Water Quality Test Result Letter.

⁶³ See Appendix COE-D.6 Prioritization Fact Sheet.

⁶⁴ See Appendix COE-D.7 Updated Guide for Post Replacement Flushing Instructions.

⁶⁵ This program strategy was shared in the first quarterly report. See Appendix COE-C.2.

described in the first quarterly report. Materials are now in development for these customers, including:

- FAQs.
- Links to additional resources.
- Virtual Meetings Support Materials
 - Developed virtual community presentation⁶⁶ for neighborhoods with residents enrolled in the LRP.

Internal Communications and Coordination

The following summarizes efforts made by Denver Water to continue to educate its 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 program accessible for all.

- Training
 - To provide continued education to Denver Water staff on the LRP, four internal trainings were conducted during the second-quarter reporting period for staff in Water Quality Operations, Construction Management, Water Resource Strategy and Administrative Services.
 - Talking points were developed for call center management to use in preparing staff to respond to customer inquiries as well as protocols for channeling information and feedback to the broader program. Talking points are updated on an ongoing basis based on trends in customer inquiries and program progress.
 - ALSLR contractors previously trained in February 2020 on the components and messaging of the LRP were given a half-day refresher training on June 20, 2020. Feedback was gathered from this session to further improve and update training materials.
 - As part of their training, contractors were encouraged to document unique customer interactions to demonstrate Denver Water's commitment to removing barriers that prevent the full participation of all customers enrolled in the LRP. These "Above and Beyond" stories will be reported annually and used to improve LRP outreach to customers who face unique physical, cultural or special circumstances that require customized or additional customer service support.

⁶⁶ See Appendix COE-D.11 Virtual Community Presentation Deck.

Above and Beyond Stories

- In April, a Denver Water contractor encountered an elderly, deaf couple while working to gather consent forms. Crews worked with the couple on the spot to share information about the program through smart phones. One member of the couple was also able to read lips and share information with their partner.
- While completing a lead service line replacement in May, a contractor encountered over \$3,000 in cash hidden behind a wall while accessing the water shut off. The contractor immediately notified the property owner. Later in the day, the contracting team received a call from the same property owner that a wedding ring was missing from a room where the crew had been working. The crew returned to the property, emptied out the vacuum that was used for clean-up and found the ring.
- In June, a contractor was working on a street that had experienced significant wind damage during a summer thunderstorm. While replacing lead service lines, the crews encountered a large, fallen tree. They assisted the property owner by helping to dig the root out and filled in the hole left by the removed root with backfill from line replacements.

7.B.vii Health Equity and Environmental Justice

Health equity and environmental justice (equity) principles have been integrated into every aspect of the LRP, including COE activities. This commitment creates a holistic mindset that allows the principles of equity to shape when and how Denver Water invites and involves community members in the program. This approach positions Denver Water to overcome potential barriers to establishing awareness, understanding and behavior change among these important populations.

An overview of HE&EJ reporting requirements is presented in Table 24.

TABLE 9. Overview of 7.B.vii Requirements

Paragraph Reference	Description	Refer to
7.B.vii LRPP V (p 77)	Summary of activities conducted and designed to address HE&EJ principles.	See first quarterly report. See LRPP (p 77).
7.B.vii.a	Description of how HE&EJ principles were incorporated into the implementation of the: <ul style="list-style-type: none"> • ALSLR Program. • Filter Program. • COE Plan. 	See first quarterly report. See first quarterly report. See first quarterly report and updates in this section.
7.B.vii.b	Socioeconomic and demographic data collected through the filter adoption survey.	Annual Report.
7.B.vii.c	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 Filter Program section. Socioeconomic and demographic data will be collected pending approval from EPA and CDPE but have not been collected as part of the informal surveys to date.
7.B.vii.d	Documentation that outreach and education materials have been provided to at least 95% of the households enrolled in the filter program.	See Section 7.B.vi.a. See Appendix. ⁶⁷
LRPP V (p 77)	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.	Annual Report.
LRPP V (p 79)	Collaborate with other agencies to address lead exposure from all sources.	Annual Report.

The following section describes how the principles of equity were used to inform Denver Water's COE approach to promote the LRP during the second-quarter reporting period, organized by component:

⁶⁷ See Appendix FIL-7 Filter Delivery Addresses.

Ambassador Program

- In June, Denver Water’s partnership with iNOW and CREA Results was announced. These trusted community voices will use their platforms and partnerships to educate non-English speaking communities about the LRP in five languages including:
 - Spanish.
 - Arabic.
 - French.
 - Amharic.
 - Somali.
- Updated iNOW and CREA Results’ scopes of work due to the COVID-19 pandemic to convert in-person grassroots activities to virtual engagements, including:
 - Re-posting, re-tweeting and tagging Denver Water across all of their social media platforms to deepen and widen the reach of LRP messaging in multiple languages.
 - Conducting virtual focus groups about proper filter use.
 - Promoting opportunities to provide feedback to Denver Water.
 - Identifying and participating in virtual events where LRP messaging can be shared.
- iNOW's specific tasks:
 - Conduct outreach in communities that speak Arabic, French, Amharic and Somali, in the following neighborhoods:
 - East Colfax.
 - University Park.
 - Cheesman Park.
 - Lincoln Park.
 - Park Hill.
 - Valverde.
 - Convert community forums into virtual engagements, such as webinars and virtual focus groups.

- Target schools, family liaisons, clinic patient navigators, immigrant-owned businesses and faith communities.
- Convert in-home visits to virtual help desk assistance to conduct filter demonstrations with phone support.
- Collaborate with immigrant-owned businesses and faith organizations to share information, such as posters and flyers, and use their social media channels to promote the LRP.
- Coordinate with property management/leasing offices to distribute program materials to renters.
- Repurpose existing Denver Water content and videos in multiple languages to place on social media channels.
- CREA Results' specific tasks:
 - Conduct outreach in communities with Spanish-speaking customers, including:
 - Barnum.
 - Clayton.
 - Cole.
 - Park Hill.
 - Sunnyside.
 - Whittier.
 - Plan and organize focus groups (in English and Spanish) to discuss filter adoption.
 - Conduct one-on-one interviews with stakeholders to provide input about the program's effectiveness in creating behavior change.
 - Coordinate online events using social media platforms to educate Spanish speakers about the LRP.
 - Engage retail, faith-based and neighborhood organizations to distribute digital and hard copies of program information.
 - Coordinate online events to promote the LRP.
 - Produce original radio scripts and public service announcements for biweekly Spanish radio show.

- Create partnerships with community members to feature in media efforts to promote the LRP.
- Secure media coverage in Spanish publications to promote the LRP.

Stakeholder Advisory Committee

- The Stakeholder Advisory Committee is an important commitment of Denver Water’s equity strategies and is comprised of representatives from a variety of organizations that allow us to better connect with harder to reach populations. Representation includes:
 - Baker Historic Neighborhood Association.
 - City and County of Denver – Mayor’s Office, Director of Public Affairs.
 - Clayton United.
 - Clean Water Action.
 - Cole Neighborhood Association.
 - Colorado Department of Public Health and Environment.
 - Denver Health.
 - Denver Immigrant and Refugee Commission.
 - Denver Office of Financial Empowerment & Protection.
 - Denver Public Schools.
 - Denver Water Citizens Advisory Committee.
 - Denver Water Distributor Representative.
 - Environmental Defense Fund.
 - Environmental Protection Agency.
 - Greenway Foundation.
 - Metro Wastewater Reclamation District.
 - Tri-County Health Department.

Virtual Community Meetings

- All virtual community meetings are promoted and offered in both English and Spanish. This includes all promotional and meeting materials, such as the presentation and LRP overview video, in both languages. Spanish-speaking participants are able to join through both dial-in and video links where they can see the presentation in Spanish and listen and ask questions through an interpreter.

- Meetings are fully accessible by either telephone or computer, allowing greater opportunity for those who may not have a personal computer to participate.

Materials

- In addition to developing materials in Spanish, insights from Denver Water's language analysis served as a guide for Denver Water to create program materials in Arabic, the third most spoken language across the City and County of Denver. Materials translated into Arabic include: the LRP overview booklet, consent form, acceptance form, flushing instructions, sources of lead in drinking water infographic and the language identification card.
- Informational videos were created in Spanish and posted on Denver Water's website. These videos include an overview of the LRP and instruction on proper filter use.

Tenant Outreach

- Recognizing that some multi-family housing units at properties enrolled in the LRP may frequently change tenants, Denver Water is reaching out to leasing offices to support providing new tenants with program information, a pitcher and a filter upon moving in.
- Planning is underway to conduct focus groups consisting of representatives from leasing offices in filter distribution areas. This group will be gathered in the third-quarter reporting period to test messaging, materials and a proposed process for filter distribution to new tenants.

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 is a strategy, and not an outcome in itself, and quantitative performance metrics were not identified in the Variance Order.

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

- Evaluate the performance of the Lead Reduction Program to improve outcomes.
- Establish an Advisory Committee to inform Denver Water on more efficient and effective ways to implement the Lead Reduction Program to achieve the variance goals.

This means that Denver Water incorporates the Learning by Doing approach to improve outcomes during the life of the Lead Reduction Program.

Overview of the Learning by Doing Approach

The Learning by Doing approach uses data in collaborative reoccurring cycles of collective inquiry and action to achieve improved LRP results. The process used in the Learning by Doing approach involves the following steps:

1. Gather evidence of current results and collaboratively evaluate with stakeholders.
2. Develop strategies and ideas to build on strengths and improve results in challenging areas.
3. Implement the strategies and ideas.
4. Analyze the impact of the changes to discover what was effective and what was not.
5. Apply new knowledge in the next cycle of continuous improvement.

A Learning by Doing Log is maintained to document the performance of the LRP by identifying more efficient and effective ways to implement the program. This approach required collection of data by the Lead Reduction Program Team and Denver Water staff to examine what elements of the program are working or need refinement. The outcomes tracked in the Learning by Doing Log will be presented in the annual report, with preliminary ideas presented in this section.

Additionally, the LRP Advisory Committee uses external stakeholders to apply the Learning by Doing approach programmatically.

Examples of Learning by Doing from the Second Quarter

Through Learning by Doing meetings with contractors, Denver Water learned that crews were seeing a need for greater on-site visibility for the Lead Reduction Program and that some areas of the City needed additional communication strategies to reach higher rental populations.

Crews are helping to ensure that interpretation services and translated materials are made available to customers as they are performing work.

Preliminary results from informal filter adoption surveys suggest that the use of filtered water for cooking lags the use of filtered water for drinking. Outreach efforts have been adjusted to reflect this.

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