DENVER WATER LEAD REDUCTION PROGRAM

QUARTERLY REPORT – Q4 2020

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Presented by: Denver Water

DENVER WATER

ISSUE AND REVISION RECORD

Version	Date	Originator	Checker	Approver	Description
1	1/8/2021	LRP Team	Quirien Muylwyk	Alexis Woodrow & Steve Ravel	Formal submission

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PART 1: INTRODUCTION

Denver Water continued to adapt and adjust strategies in the face of the COVID-19 pandemic throughout 2020. To protect public health and help prevent the spread of COVID-19, Denver Water and its contractors took precautions to limit the risk of exposure among employees and to customers while performing lead service line replacements by wearing face coverings and maintaining a minimum of 6 feet of separation when interacting with the public. We asked our customers to also wear face coverings and maintain a minimum of 6 feet of separation when interacting with us during this work. Denver Water also accelerated its use of digital and virtual media strategies to educate and engage the public.

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 fourth quarter of 2020 for the period of October 1 through December 31, 2020. During this time period, Denver Water has provided three monthly reports for October 2020, November 2020 and December 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 performance data included for the different elements of the Lead Reduction Program described in this quarterly report vary depending on the launch date of the different program elements (see Table 1).

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 section includes a summary of results previously submitted in the three monthly reports[1] for October, November and December 2020.
7.B.ii LSL Inventory	Denver Water first published the LSL Inventory on its website on March 5, 2020. The map was updated on the Denver Water website on December 24, 2020 using data current up to December 4, 2020.
7.B.iii LSL Replacements (aka ALSLR Program)	This section summarizes the number and type of replacements completed. 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 and ended on December 18, 2020.
7.B.iv Filters (aka Filter Program)	This section summarizes filter distribution. Initial filter distribution was completed by September 21, 2020. Replacement filter distribution was initiated on July 1, 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	This section describes Denver Water's efforts to develop the 2021 COE Plan, continue engagement with the Stakeholder Advisory Committee and develop new customer resources and materials.
7.B.vii Health Equity and Environmental Justice	This section summarizes Denver Water's implementation of the COE Plan, updates on partnerships with iNow and CREA Results,[2] and outreach to leasing offices to support tenant participation in the program.
Additional Requirements and Miscellaneous Deliverables	This section summarizes submissions to EPA and CDPHE identified in the LRPP.[1]
Appendices	Appendices include CCT, LSL inventory, water quality results, LSL replacements, customer refusal lists, COE and HE&EJ.

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] iNOW, formerly the Colorado African Organization, is a community organization that specializes in supporting refugee and immigrant populations from Africa and Asia. CREA Results is a community organization that specializes in the Latinx community.

The reporting dates for the different program elements are shown in Table 2. In general, data shown for the fourth quarter continues from the data included in the third quarter with a few exceptions to either provide additional information not included in previous quarterly reports or to align with other reporting timelines (for example, with Lead and Copper Rule six-month reporting periods).

[1] See Appendix REG-4 Copies of Letters for Compliance-Related Submissions (Fourth Quarter).

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

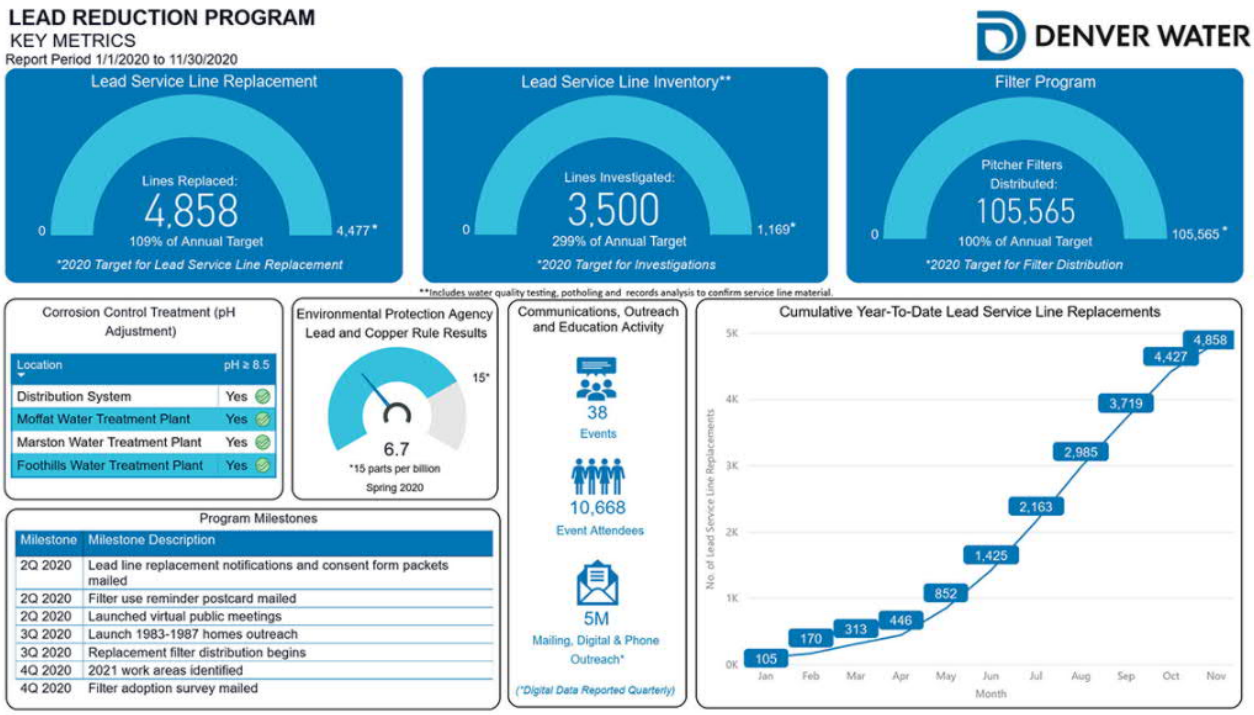
Description	Third Quarterly Report	Fourth Quarterly Report
CCT pH/alkalinity Adjustment Start-up	All three WTPs have the capability to adjust pH	All three WTPs have the capability to adjust pH
LCR 90th Percentile Lead Concentration based on Compliance and Customer Requested Samples	No LCR samples were collected between July 1 to September 18. All customer requested samples in LIMS[1] between July 7 and September 18.	All LCR samples collected from July 1 to December 31. All customer requested samples reported in LIMS between September 19 and December 4.
Elevated Lead Response Reporting	July 1 to September 18	September 19 to December 4[2]
Water Quality Sampling from Select Households (1983 to 1987 Homes)	July 1 to September 18 Outreach launched on August 21.	September 19 to December 4
Inventory – Posting of Map to Denver Water's Website	Data through September 18 Posted September 29	Data through December 4 Posted December 24
Inventory – Update	July 1 to September 18	September 19 to December 4
Investigations – Verification Potholing as Part of ALSLR Program	June 27 to September 18[2]	September 19 to December 4[3]
Investigations – Investigative Potholing Independent of ALSLR Program	None performed	None performed
Investigations – Water Quality Sampling as part of ALSLR Program (not included in 90th Percentile Calculation)	All results reported in LIMS from January 25 to September 18 (to present data year-to-date)	All results reported in LIMS from January 25 to December 4 (to present data year-to-date)
Investigations – Water Quality Sampling Independent of ALSLR Program (not included in 90th Percentile Calculation)	All results reported in LIMS from June 4 to September 18 (to present data year-to-date) (Sampling initiated June 4)	All results reported in LIMS from June 4 to December 4 (to present data year-to-date)
Water Quality Sampling Post-LSL Replacement	All results reported in LIMS from May 13 to September 18	All results reported in LIMS from May 13 to December 4
ALSLR Program Replacements	June 27 to September 18	September 19 to December 4
ALSLR Program Consent Forms	June 27 to September 18	September 19 to December 4
Initial Filter Distribution	June 27 to September 21	September 22 to December 4
Replacement Filter Distribution	June 27 to September 18	September 19 to December 4
Filter Program Occupancy Changes[4]	June 27 to September 18	September 19 to December 4
Informal Filter Adoption Survey as Part of ALSLR Program	July 1 to September 18	September 19 to December 4
Filter Testing in the Field	No samples collected	September 22 to November 20
COE Activities	July 1 to September 18	September 19 to December 4

[1] LIMS is the Laboratory Information Management System used by Denver Water.
[2] For samples collected and reported in LIMS by December 4 and follow-up response by December 18.
[3] Includes verification potholing during the fourth quarter at three critical customers that resulted in a replacement.
[4] Includes occupancy changes at ALSLR properties by definition.

Summary of Key Performance Indicators Year-to-Date

Denver Water uses a dashboard to communicate key metrics to share the progress of the Lead Reduction Program with the public. The dashboard was posted on the Denver Water website on December 15, 2020 in both English and Spanish, including data through November 30, 2020.[2] The dashboard can be accessed from the Denver Water website at: https://www.denverwater.org/your-water/water-quality/lead/dashboard

FIGURE 1. DASHBOARD AS POSTED TO THE DENVER WATER WEBSITE (DATA TO NOVEMBER 30, 2020)



[2] See second quarterly report for an explanation of the metrics used in the dashboard.

PART 2: REQUIRED REPORTING

7.B.i CCT

Denver Water uses a combination of water quality parameters and lead sampling results to report the performance of Corrosion Control Treatment. Information that was previously reported as part of the Monthly Reports for October, November and December 2020 are not included in this report with the exception of a summary of some of the data.

During this reporting period, Denver Water continued to operate at or near a pH of 8.8 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. Approved July 17, 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.[3]
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 October, November and December 2020 submitted previously.
LRPP III.E (p 70)	Monthly trending of LCR compliance samples and customer requested samples.	See monthly reports[4] for October, November and December 2020.
7.B.i.d	CCT parameters for pH and alkalinity, reported monthly.	See Table 6. See monthly reports for October, November and December 2020.[4] Daily reporting to CDPHE was discontinued on August 14, 2020.
LRPP III.E (p 70)	Install automated pH control loops at all three treatment plants by March 2020.	All three plants have feedback loops in place and are functioning.
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 Table 7 and monthly reports for October, November and December 2020.[4] See Tables 8 and 9.
LRPP Executive Summary LRPP III.E (p 65)	Targeted communications for select households built between 1983 to 1987 that self-identify as expecting or existing families with formula-fed infants and children up to 2 years of age.	Described with section 7.B.vi. Outreach materials launched August 21, 2020. See Table 10.

[3] See Appendix CCT-9 Summary of Response to Elevated Lead Levels (Fourth Quarter).
[4] See Appendix REG-4 Copies of Letters for Compliance-Related Submissions (Fourth Quarter).

Paragraph Reference	Description	Refer to
	Offer water quality sampling; provide filter if lead measured > 3 µg/L (as described in paragraph 5.D).	
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.

Denver Water manages lead and water quality samples via its Laboratory Information Management System (LIMS), with analysis performed by either the Denver Water Quality Lab or a contract lab. The sub-program under which the sample was collected is reported in LIMS, including Lead and Copper Rule compliance samples, customer requested samples, customer requested samples from select households built between 1983 to 1987 (self-identifying as a home with a formula-fed infant), pre-LSL replacement investigative water quality samples and post-LSL replacement water quality samples.

Elevated Lead Level Response Summary [7.B.i.a and b]

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 customer requested 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.[5] A lead result over 25 µg/L in the first sample bottle for a customer home will trigger follow up and 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. Lead was measured above 25 µg/L in four customer requested samples during the fourth quarter reporting period.

TABLE 4. COUNT OF PROPERTIES WITH ELEVATED LEAD CONCENTRATIONS IN LCR AND CUSTOMER REQUESTED SAMPLES[1]

Description (Based on Sampling Date)	October 2020	November 2020	December 2020	Response
Properties with Lead > 25 µg/L in <u>any</u> sample bottle	3	0	1	Reported to CDPHE within 10 days and again in monthly report. See Appendix.[5]

[1] Although the Elevated Lead Response Plan applies only to LCR and customer requested samples, the features of the plan are applied to results generated from investigative and verification water quality samples obtained from properties included in the LRP for a consistent customer experience. Data reflect samples collected through December 4, 2020 (with actions updated through December 18, 2020.

Lead Sampling Results from LCR Compliance and Customer Requested Sampling [7.B.i.c]

Data for LCR compliance and customer requested sampling were provided in the individual monthly reports for October, November and December 2020.[6] 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.

The cumulative 90th percentile lead concentration for LCR compliance samples for the Fall 2020 compliance period (July 1 through December 31, 2020) is presented in Table 5. 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. Denver Water staff resumed collecting LCR compliance samples for the Fall 2020 compliance period.

TABLE 5. SUMMARY OF LCR 90TH PERCENTILE LEAD CONCENTRATIONS JULY 1 TO DECEMBER 4, 2020

LCR Compliance Results for Lead – Fall 2020 Compliance Period	Result	Number of Homes
LCR Compliance 90th Percentile Lead[1]	6.1 µg/L	111
Overall 90th Percentile Lead Concentration using LCR Compliance + Customer Requested Samples[2]	4.1 µg/L	848 (111 + 737)

[1] Includes results for all LCR compliance samples (from 1951 and older homes plus 1983 to 1987 homes with copper piping and lead solder) and reported in LIMS for the July 1 and December 31, 2020 compliance period.
[2] Includes results from customer requested sample in LIMS between September 19 and December 4, 2020. Data are provided to CDPHE as part of the monthly reports. Water quality sampling conducted to support the ALSLR Program are excluded from the compliance calculation by definition.

[5] See Appendix CCT-9 Summary of Response to Elevated Lead Levels (Fourth Quarter).
[6] See Appendix REG-4 Copies of Letters for Compliance-Related Submissions (Fourth Quarter).

Results from customer requested samples are available for 98 properties built between 1983 and 1987 and assumed to have copper piping with lead solder (reported in LIMS as of December 4, 2020). Lead concentrations ranged from 0 to 5.7 µg/L and the 90th percentile lead concentration for these properties was 1.4 µg/L. These properties are also included in the overall 90th Percentile Lead Concentration reported in Table 5.

Corrosion Control Treatment Results [7.B.i.d]

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, 2020 at the Moffat Water Treatment Plant. Trends for pH and alkalinity are included in monthly reports since January 1, 2020; operating data with adjusted pH are included in the March 2020 report and subsequent monthly 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. On August 13, 2020, Denver Water wrote to CDPHE that steady state performance of corrosion control treatment was achieved in the distribution system. In response, CDPHE indicated that daily submissions with pH results no longer needed to be provided to CDPHE.

TABLE 6. MONTHLY DAILY AVERAGE MINIMUMS FOR WATER QUALITY PARAMETERS[1]

Description	October 2020	November 2020	December 2020
Variance Requirement	pH ≥ 8.5 in all parts of the system.		
Marston Water Treatment Plant Entry Point	8.79	N/A[2]	8.79
Foothills Water Treatment Plant Entry Point	8.79	8.80	8.79
Moffat Water Treatment Plant Entry Point	8.74	8.78	8.81
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.
[2] The Marston Water Treatment Plant was out-of-service during the month of November.

Water Quality Sampling Results from Pre-LSL Investigations [7.B.i.e]

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 lead[7]). The 3-bottle test is performed at properties in the City and County of Denver and the distributors:

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

- Before LSL replacement to confirm the service line material included as part of the 2020 ALSLR Program Task Orders at properties where lead has not been confirmed (i.e., p-value < 1[8]).
- To inform the inventory, the predictive model is used at properties in the City and County of Denver with a suspected or possible lead service line (i.e., p-value of 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).
- 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.

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 Out[1]	9,672	Kits
Total Number of Kits Received and Analyzed to Investigate the Service Line Material[2]	4,256	Kits
Maximum Lead Concentration Measured Year-to-Date[3]	1,148	µg/L
Average Lead Concentration (in second and third bottle only)	4.1	µg/L

[1] 1,909 kits were shipped by Denver Water's Water Quality Laboratory starting January 25, 2020. An additional 7,763 kits were shipped by the LRP contract laboratory starting June 4, 2020. If a sampling kit is re-sent to a property, it will be counted twice.
[2] As reported in LIMS between January 1 and December 4, 2020.
[3] The highest value measured in the fourth quarter reporting period was 639 µg/L (measured in the first bottle, based on all samples collected since September 3 and reported in LIMS by December 4); this property had the service line replaced on September 23, 2020. The maximum value measured of 1,148 µg/L occurred during a previous quarterly reporting period.

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

Denver Water offers water quality sampling to all customers approximately four months after LSL replacement. Historically, Denver Water mailed letters to offer post-replacement sampling four months after LSL replacement, regardless of property type, for replacements completed before December 31, 2019. Customers could then call Denver Water to request a sampling kit. This process was discontinued on April 2, 2020.

[8] Prior to July 22, 2020, kits were only sent to properties with p-values of 0.5 to 0.7. Since then, kits are sent to all properties with a p-value of 0.5 to 0.9. Any property with a p-value < 1 undergoes verification by field investigation(s) before initiating replacement of the service line, such as a visual inspection of materials in the building interior and/or potholing on the exterior.

For LSL replacements completed since January 1, 2020, single-family residential property customers are automatically mailed a 3-bottle sampling kit approximately four months after replacement. Customers in multi-family and commercial properties are mailed a letter to offer post-LSL replacement sampling approximately four months after replacement. These customers can request a 1-bottle sampling kit if they elect to participate. This letter is sent to every unit in a multi-family or commercial property.

The 3-bottle post-LSL replacement sampling kits for single-family residential customers were mailed as of May 13, 2020. Letters to offer the 1-bottle post-LSL replacement sampling kit to multi-family and commercial properties were mailed as of August 1, 2020. Summaries of post-LSL replacement sampling from single-family residential properties as well as from multi-family and commercial properties are provided in Tables 8 and 9, respectively.[9]

TABLE 8. SUMMARY OF WATER QUALITY RESULTS AFTER LSL REPLACEMENT AT SINGLE-FAMILY RESIDENTIAL PROPERTIES

Water Quality Sampling after LSL Replacement	Count[1]		
	October 2020	November 2020	December 2020
Total Number of Kits Mailed Out[2]	502	718	1
Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality	212[3]	154	0
Number of Properties with Lead > 15 µg/L in First Bottle (triggers additional investigation effort)	0	1[4]	0
Number of Properties with Lead ≥ 5 and < 15 µg/L in the Second and/or Third Bottle (triggers additional investigation effort)	1	5	0
Number of Properties with Lead ≥ 5 and < 15 µg/L in First Bottle (triggers customer education)	4	10	0

[1] Counts are based on the month of sample collection; the number analyzed refers to results in LIMS by December 4, 2020. This note does not apply to the "Total Number of Kits Mailed Out", which is categorized based on the date the sample kit was mailed.

[2] If a duplicate sampling kit was sent to a property, it is counted twice.

[3] Includes 81 results reported in LIMS between September 19 and October 31.

[4] This result is under review.

[9] See Appendix CCT-8 Post LSL Replacement Water Quality Results (Year-to-Date).

TABLE 9. SUMMARY OF WATER QUALITY RESULTS AFTER LSL REPLACEMENT AT MULTI-FAMILY AND COMMERCIAL PROPERTIES

Water Quality Sampling after LSL Replacement	Count[1, 2]		
	October 2020	November 2020	December 2020
Total Number of Letters Mailed to Offer Post-LSL Replacement Sampling[3]	151	147	0
Total Number of Properties (or Primary Addresses) Associated with Offer Letters	65	78	0
Total Number of Kits Requested by Customers[3]	4	0	6
Total Number of Kits Received and Analyzed to Confirm Post-LSL Replacement Water Quality	4[4]	3	0
Number of Properties with Lead > 15 µg/L in First Bottle (triggers additional investigation effort)	0	0	0
Number of Properties with Lead ≥ 5 and < 15 µg/L in First Bottle (triggers customer education)	0	0	0

[1] Counts are tabulated based on the month the sample was collected. Total number of kits analyzed refers to results available in LIMS between September 19 and December 4, 2020.

[2] The total number of letters mailed to offer post-LSL replacement sampling, the total number of properties (or primary addresses) associated with offer letters, and the total number of kits requested by customers are tabulated based on the mailing date of the offer letter and the subsequent mailing date for the sampling kit (if requested by the customer).

[3] If a duplicate letter or kit was sent to a property, the property is counted twice.

[4] Includes results in LIMS between September 19 and October 31.

During the fourth quarter reporting period, one property did not receive a sampling kit from Denver Water following lead service line replacement. To understand why this occurred, Denver Water reviewed its engagement with the property.[10]

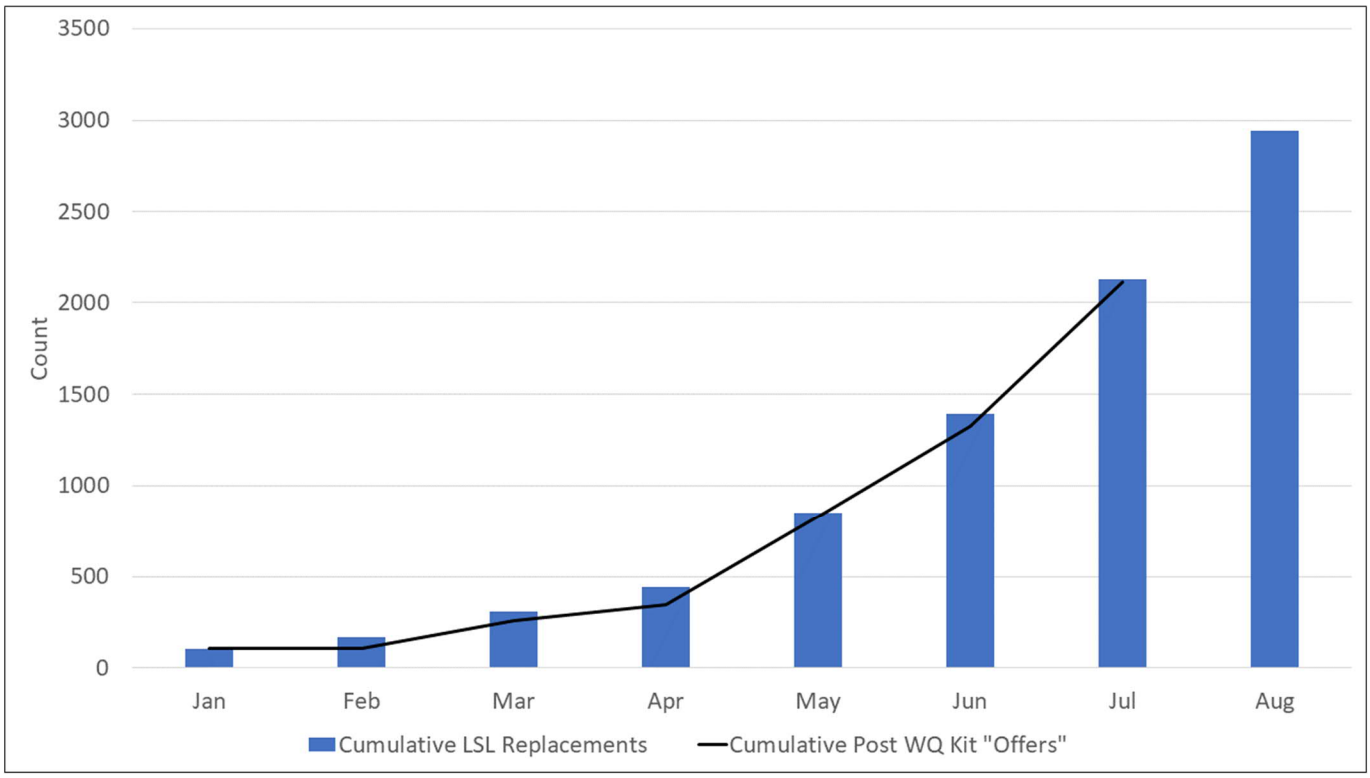
Figure 2 shows the timing of post-LSL replacement sampling relative to the timing of LSL replacement as reported in the previous quarterly reports. Results are presented using the cumulative number of service lines replaced with the cumulative number of post-LSL replacement samples distributed. Because the post-LSL replacement sample is collected within six months of LSL replacement, data for sampling lags replacement. Post-LSL replacement sampling kits for single family properties have not been mailed for replacements completed since August 1; offer letters for these properties will be mailed on January 7, 2021 and therefore are not shown in Figure 2.

Since post-LSL replacement sampling has been offered through the LRP, three properties were excluded due to their tap status in the inventory (i.e., inactive or irrigation and therefore ineligible) or an error in the mailing address. This includes the one property referenced above in the fourth quarter. Nine properties were described in the third quarterly report as having not received a post-LSL replacement sampling kit: of these, seven received letters to offer post-LSL

[10] See Appendix CCT-10 Post LSL Replacement Sampling – Summary of Incomplete Offer to Test (Year-to-Date).

replacement sampling during the fourth quarter by mail or hand delivery. By December 4, 2020, 2122 sample kits or offers to sample were made to 2125 properties following LSL replacement.

FIGURE 2: 2020 LSL REPLACEMENT AND DISTRIBUTION OF POST REPLACEMENT SAMPLE KITS (TO SINGLE-FAMILY PROPERTIES) AND LETTERS (TO MULTI-FAMILY AND COMMERCIAL PROPERTIES)



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

Outreach to customers residing in all households built between 1983 and 1987 was launched in August 2020. “Select households” are defined as homes built between 1983 to 1987 with copper piping and lead solder with customers that self-identify as having a formula-fed infant under the age of 24 months. If a customer from a 1983 to 1987 home requests a water quality sampling kit, Denver Water will mail a kit whether or not a formula-fed infant resides at the property. If lead is measured above 3 µg/L, and the customer self-identifies as having a formula-fed infant, the customer is invited to enroll into the Filter Program. Water quality sampling at 1983 to 1987 homes was initiated on September 8, 2020 with results available in LIMS between September 19 and December 4, 2020 presented in Table 10. Requests for water quality sampling under this program were received from 91 customers: lead was measured greater than 3 µg/L in four samples. Of these four households, only one has a formula-fed infant and requested a pitcher filter and was enrolled in the Filter Program.

TABLE 10: SUMMARY OF WATER QUALITY RESULTS FROM SELECT HOUSEHOLDS

Water Quality Sampling at 1983 and 1987 Households (whether or not there is a Formula-fed Infant)	Result			
	October 2020	November 2020	December 2020	TOTAL
Total Number of Kits Requested and Mailed Out	108	57	54	219
Total Number of Kits Received and Analyzed for Lead	20	59	11	90
Number of Properties with Lead > 3 µg/L in any Bottle (triggers enrollment in the Filter Program)	1	2	1	4
Number of Properties Self-identified with Formula-fed Infant and Requested Enrollment in the Filter Program	1	N/A	N/A	1
Number of Properties with Lead > 3 µg/L for which No Request for Enrollment in the Filter Program has been Received	0	2	1	3

7.B.ii LSL Inventory

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

TABLE 11. 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.[11]
3.C	Publication of LSL Inventory no later than 70 days after the effective date.	Re-posted to Denver Water website on December 24 using data through December 4, 2020.
7.B.ii.a	Total number of LSLs.	Refer to Table 12. See Appendix. [12]
7.B.ii.b	Total number of replaced LSLs during the Variance.	Refer to Table 13.
7.B.ii.c	Total number of known, suspected and possible LSLs.	Refer to Table 12.
7.B.ii.d	Total number of unlikely lead.	Refer to Table 12.
7.B.ii.e	Total number of non-lead service lines. Total number of non-lead determined solely by statistical methods.	Refer to Table 12. Described after Table 12.
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 17.
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.[13]

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

Denver Water submitted the initial LSL Inventory designating known, suspected, and possible LSLs on February 5, 2020. [11] Denver Water updated the base LSL Inventory using additional information and further analysis of the data presented in the September 2019 LRPP (see Table 12). Adjustments to the status of a service line (i.e., lead or non-lead) are 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. The information presented in Table 12 is used to

[11] See Appendix REG-1 Copies of Letters for Compliance-Related Submissions included with the first quarterly report.
[12] See Appendix INV-11A Line by Line p-Value Changes: Status Descriptions and Notes (Fourth Quarter).
[13] See Appendix INV-11B Line by Line p-Value Changes by Status (Fourth Quarter).

compare the current understanding of the inventory with the original base inventory submitted in September 2019. The inventory is used to establish the total number of estimated lead services and the mandated annual number of replacements. Therefore, the total "known lead" service lines includes the number of properties with a known lead service that remain in the ground and those that have been replaced by the LRP.

TABLE 12. LEAD SERVICE LINE INVENTORY AS OF DECEMBER 4, 2020

Status of Service Line	Sept 6, 2019 Submittal (Aug 8 Data) BASE INVENTORY[1]	Feb 5, 2020 Submittal (Jan 28 Data)	Apr 10, 2020 Submittal (Mar 29 Data) First Quarterly Report	Jul 10, 2020 Submittal (Jun 30 Data) Second Quarterly Report	Oct 10, 2020 Submittal (Sept 18 Data) Third Quarterly Report	Jan 10, 2021 Submittal (Dec 4 Data) CURRENT INVENTORY[2]
Known Lead	1,066	1,149	1,659	1,851	5,605[4]	7,102[4]
Suspected Lead	61,374[3]	60,549[3]	59,994[3]	58,758	56,109	54,364[4]
Possible Lead	22,106[3]	21,788[3]	20,311[3]	20,961	20,227	19,926[4]
Unlikely Lead	89,388	90,745	89,664	88,386	88,702	88,610[4]
Non-lead	145,766	146,528	145,683	150,800	150,107[5]	150,692[4,5]
Total Number of Services	319,700	320,759	317,311	320,756	320,750	320,694
TOTAL ESTIMATED Number of Lead Service Lines	**63,955**	**63,195**	**62,510**	**62,044**	**63,136**	**62,980[6]**

[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 (calculated as the sum of the properties with a known, suspected and possible lead service line, plus distribution of additional filters to multiple units at the same property and less the number of vacant properties).

[3] "Possible lead" as defined in the Variance includes service lines where $0.5 \leq$ p-value < 0.8. In the Base Inventory, Feb 5, 2020 Submittal, and first quarterly report, service lines with p-value = 0.7 were included as "suspected lead." This is corrected in Table 12 for data presented for the second quarterly report and thereafter including the current inventory. For the Base Inventory numbers shown in Figure 3, this affected 431 service lines with a p-value = 0.7 included as "possible lead". This does not affect the calculation used for the total estimated number of lead services.

[4] The third and fourth quarter counts for "known lead" include properties that are either known to be lead or that have had a lead service line replaced. 4,858 properties categorized as "known lead" in the current inventory were replaced in 2020 (see Tables 13 and 19). The values from previous submittals identified in this table presented replacements of "known lead" in the "non-lead" category. Due to ongoing data integration and QC processes, 309 of the 4,858 properties identified as replacements remain to be integrated into the LRP database to drive a p-value change to 0. Of these 309, five remain as "unlikely lead", 17 as "possible lead", 199 as "suspected lead", eight as "known lead", and 80 are described as non-active or non-potable (coded as NULL). The counts for these categories in the current inventory (most right column) have been reduced accordingly.

[5] The third and fourth quarter counts for "non-lead" do not include the properties at which the LSL was replaced as part of the LRP (see Tables 13 and 19).

[6] See Appendix INV-10 Summary of Service Line Status and p-Value (Fourth Quarter) for details on how this was calculated.

Of the 150,692 service lines identified as non-lead in Table 12, 106,079 are included in this category based solely on statistical assumptions[14] 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 1951 and 1971 are considered "unlikely lead" based on historical records and evidence of non-lead materials.[15]

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

The total number of lead services lines replaced by Denver Water and the ALSLR contractors between September 19 and December 4, 2020 is shown in Table 13.

TABLE 13. NUMBER OF LSL REPLACEMENTS BETWEEN SEPTEMBER 19 AND DECEMBER 4, 2020[1]

Description	Count
Number of LSLs Replaced in October 2020[2]	1,031
Number of LSLs Replaced in November 2020	443
Number of LSLs Replaced in December 2020	45
Total Number of LSLs Replaced Fourth Quarter 2020	1,519
Total Number of LSLs Replaced in Year 1[3,4,5]	4,858

[1] Monthly, fourth quarter, and Year 1 counts are not final and may be revised upward for inclusion in the Annual Report and application of the equivalency model as data review processes are completed for additional replacements completed by third parties and/or by Denver Water after the data cut-off date used to prepare the fourth quarterly report.

[2] October LSL replacement count includes replacements completed from September 19 through the end of October 2020.

[3] LSL count in Year 1 is a year-to-date count from January 1, 2020 to December 4, 2020.

[4] The number of replacements identified in the "Lead Replacement" column of Appendix INV-11B Line by Line p-Value Changes by Status (Fourth Quarter) do not match the number of lead service line replacements shown in Table 13 due to a lag in the quality assurance review during data integration from field replacements to LRP database.

[5] This includes five LSL replacements not reported in the third quarterly report and does not include five LSL replacements that were found to be duplicates between Denver Water and ALSLR contractors. The duplicates were identified in each of the four quarterly reports. All the properties are listed in Appendix LSL-14.

Denver Water does not count the replacement of copper service lines (i.e., non-lead) toward the total number of lead service line replacements for compliance purposes.[16] The first and second quarterly report data were reviewed, and any copper service line replacements found to be lead were adjusted and reported in the third quarterly report and shown in the year-to-date numbers in Table 13.[17]

[14] This is the number which retains the original number of non-lead properties (p-value = 0) from the inventory in the Lead Reduction Program Plan (see Appendix III.B.2, Preliminary Identification of Lead Service Lines). Subsequent changes to the inventory did not result in a change to the number of non-lead properties (p-value = 0). Following submission of the third quarterly report, 34,638 service lines with previous distributor feedback and direct evidence were excluded from this count.

[15] See Appendix II.B.2 of the Lead Reduction Program Plan for details and assumptions.

[16] See paragraph 4.B of the Variance Order.

[17] See Appendix LSL-14 Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (from Previous Quarters).

Investigations that Resulted in a Change to the Status of a Service Line [7.B.ii.f]

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 µg/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) An “investigation” that results 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. Potholing on its own is not conclusive for “non-lead” but it can be used in combination with other investigative methods to determine that a property is “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 contradictions with the desktop records review and/or water quality sampling results. “Verification” potholing is used at properties included in the 2020 ALSLR Plan to confirm the material of the service line before replacement. “Investigative” potholing is used at properties to improve the knowledge of the inventory at properties that are not included in the 2020 ALSLR Plan.

Results from verification potholing are presented in Table 14 along with the next steps to either replace a service line that is confirmed to be lead or to pursue additional investigative methods. If copper is observed at all three points used for verification (i.e., COPP-COPP-COPP

is observed at two exterior potholes and one interior location), the service line is not categorized and the p-value is not adjusted; rather, the property is subjected to additional investigation efforts (i.e., water quality sampling, data review, additional potholing) to help identify the service line material.

As of August 10, 2020, all properties are verified prior to replacement, either by potholing or water quality sampling, for all properties with a p-value ≥ 0.5 to reduce the likelihood of replacing a non-lead service line.

TABLE 14. OUTCOMES FROM VERIFICATION POTHOLING[1] AS PART OF THE 2020 ALSLR PLAN (SEPTEMBER 19 TO DECEMBER 4, 2020)[2]

Service Line Status before Potholing	Potholing Outcome[3]	Update Inventory and Follow-up Action
Initial Status p ≥ 0.8 (total 1,378)	951 confirmed lead (lead observed at least one of three points)	Property is confirmed for 2020 ALSLR Plan.
	109 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	318 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 ≤ p < 0.8 (total 164)	58 confirmed lead (lead observed in at least one of three points)	Property is confirmed for 2020 ALSLR Plan.
	50 inconclusive (copper observed at all three points)	Review historical and water quality data to confirm status.
	56 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)		1,590

[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.[18]
[2] Includes the earlier recorded data when lead or galvanized is confirmed, or the latest date when following investigation if inconclusive or incomplete.
[3] Denver Water investigated critical customer properties in advance of replacement: if lead was found, the property was scheduled for replacement in 2020 and therefore the investigation is considered a verification pothole. This occurred at three properties included in this table.

During the fourth quarter reporting period Denver Water did not complete any additional investigative potholing independent of the 2020 ALSLR Plan.

Table 15 (investigations performed as part of the 2020 ALSLR Plan) and Table 16 (investigations performed independent of the 2020 ALSLR Plan) present the total number of investigative water quality samples reported in LIMS as of December 4, 2020. Water quality

[18] See Appendix INV-12 Results from Potholing for Verification as part of the 2020 ALSLR Program.

results with lead measured above 5 µg/L in the second or third bottle of the 3-bottle test 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-value ≥ 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. Finally, lead measured below the detection limit of 1 µg/L is also considered indicative of non-lead when no contradictions with other data sources exist.

TABLE 15. OUTCOMES FROM WATER QUALITY INVESTIGATIONS[1] AS PART OF THE 2020 ALSLR PLAN (SEPTEMBER 19 TO DECEMBER 4, 2020)

Service Line Status in Baseline Inventory	Water Quality Sampling Outcome	Update Inventory and Follow-up Action during Fourth Quarter
Initial Status 0.5 ≤ p <0.9 (total 621)	183 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.
	438 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] Excludes customer requested sampling. These samples were collected at properties included in the 2020 ALSLR Plan and therefore do not count toward the required 1.4 percent investigations.

TABLE 16. OUTCOMES FROM WATER QUALITY INVESTIGATIONS[1] INDEPENDENT OF THE 2020 ALSLR PLAN (SEPTEMBER 19 TO DECEMBER 4, 2020)

Service Line Status in Baseline Inventory	Water Quality Sampling Outcome	Update Inventory and Follow-up Action during Fourth Quarter
Initial Status 0.5 ≤ p <0.9 (total 493)	13 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.
	480 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] Excludes customer requested sample results. These samples were collected at properties independent of the 2020 ALSLR Plan and therefore do count toward the required 1.4 percent investigations if they result in a completed investigation.

The status of 169 properties was changed during the fourth quarter reporting period from either a suspected or possible LSL to a known lead service due to water quality; only 128 properties comply with the definition for an investigation are therefore included in the counts reported in Table 17. This is reflected in the December 4, 2020 LSL Inventory in Table 12. All other changes to the status of a service line were made using desktop methods.

TABLE 17. 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 in the Fourth Quarter as reported in the LRP database	0
Number of Investigations Completed by Investigative Water Quality Sampling Alone in the Fourth Quarter as reported in the LRP database	128
Number of Investigations Completed by Desktop Methods Alone in the Fourth Quarter	99
Total Number of Investigations Completed in Fourth Quarter (by one or more methods)	229
Number of Investigations Not Previously Reported[1]	182
Total Number of Investigations Completed in Year 1	3,326

[1] The total number of investigations year-to-date reported in the third quarter report was 2,915. The increase in the year-to-date total number of investigations for the fourth quarterly report includes 229 completed during the fourth quarter reporting period and 182 not previously reported. The 182 not previously reported investigations are a result of improvements in database queries which analyze records based on their p-value change history, counting those service lines which conform with the definition of investigations as outlined in the Variance Order. The LRP database is arranged so that multiple investigative efforts or re-evaluation can be described for a given property and therefore, re-evaluations do not increase the total count of investigations for the program year.

Updated LSL Inventory Map [7.B.ii.g]

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).

On December 24, 2020, Denver Water updated the publicly available map, which incorporated the December 4 LSL Inventory information and an updated inventory summary table is provided with each quarterly report.[19] The website map is updated quarterly to reflect these changes to the LSL Inventory.

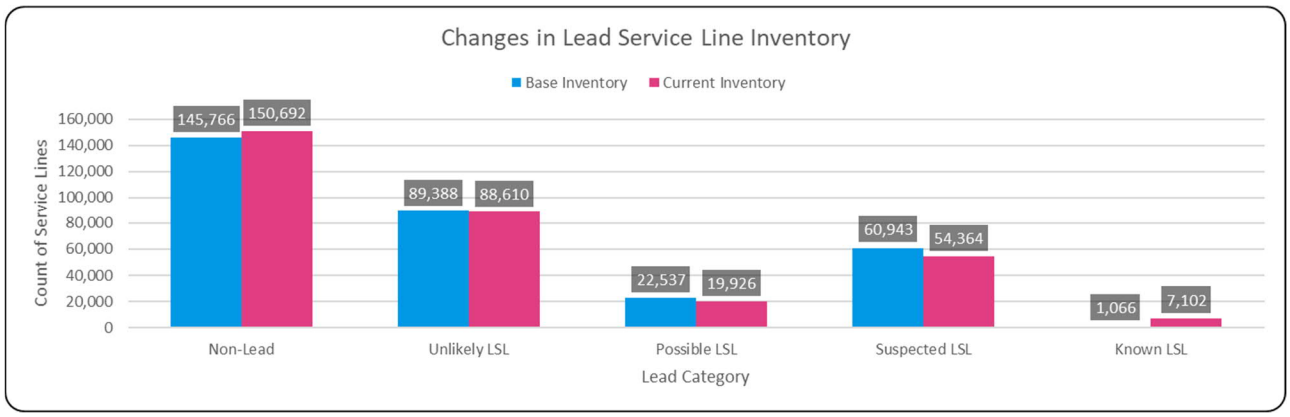
Summary of Changes to the LSL Inventory [7.B.ii.h]

Between September 19 and December 4, 2020, updates to the LSL Inventory continued as additional data were gathered and reviewed. During this period, 2,051 changes were made to the LSL Inventory of which 1,980 were changes to the status of the service line (i.e., p-value).[20] This included changes based on confirmation from Denver Water, customers and distributors; review of historical data; direct evidence such as water quality and/or potholing; and replacements. In addition to material status changes, 68 service lines were removed from the inventory as tap cuts.[21] Three service lines previously deemed inactive were added back to the

[19] See Appendix INV-10 Summary of Service Line Status and p-Value (Fourth Quarter).
[20] See Appendix INV-11B Line by Line p-Value Changes by Status (Fourth Quarter).
[21] See Appendix INV-13 Addresses of Disconnected Properties (Cut Taps, Fourth Quarter).

inventory upon review of the data. These changes are shown in Figure 3 and are accounted for in Table 12.

FIGURE 3. CHANGES IN THE BASE[1] AND CURRENT INVENTORY (AUGUST 8, 2019 AND DECEMBER 4, 2020 USING DATA FROM COLUMNS 2 AND 7 FROM TABLE 12)



[1] "Possible lead" as defined in the Order includes service lines with 0.5 ≤ p-value < 0.8. In the Base Inventory, Feb 5, 2020 Submittal, and first quarterly report shown in Table 12, service lines with p-value = 0.7 were included as "suspected lead." For the Base Inventory shown here, 431 service lines at p-value = 0.7 are included under "possible lead".

7.B.iii LSL Replacements

Replacements under the ALSLR Program started on March 5, 2020 and results through December 4, 2020 are described in this section. An overview of the LSL replacement requirements is shown in Table 18.

TABLE 18. 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.[22]
7.B.iii.b	Type of replacement.	See Table 19 and Appendix. [22]
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.[23]
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.[1]
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 19 and Appendix.[24]
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 17.
LRPP III.D (p 60)	Property owners will be reminded via English and Spanish signage placed at the limits (ends of streets) within geographic work areas four to five weeks in advance of construction.	Implemented July 20, 2020.
LRPP III.D (p 60)	Provide flushing instructions following LSL replacement.	Provided to all customers as part of the post-LSL replacement education package.[25]

[1] Note that two multi-family properties signed a letter in August 2020 declining enrollment in the LRP that were not previously reported.

[22] See Appendix LSL-11 Addresses and Types of Replacement (Fourth Quarter).
[23] See Appendix LSL-12 LSL Replacement Refusal List (Fourth Quarter).
[24] See Appendix LSL-13 Properties with Emergency Repairs Resulting in a Partial Replacement (Fourth Quarter).
[25] See second quarterly report.

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

Denver Water Transmission and Distribution (T&D) and ALSLR contractors surpassed the mandated number of replacements the week of November 2, 2020. The ALSLR contractors averaged an estimated 145 LSL replacements per week, focusing primarily on geographic task order work areas. A total of 28 geographic task orders each with approximately 200 properties have been developed, distributed, and completed by the ALSLR contractors except for three task orders currently being closed out in the field. A list of addresses and dates for each replacement can be found in the appendices.[26]

Denver Water T&D completed LSL replacements as part of water main replacement work and emergency repairs as well as assisting with individual and geographic area LSL replacements. Denver Water T&D crews continue to target critical customers (a total of 176 customers that are schools, daycare centers, and child care facilities) within City and County of Denver to confirm the status of the service line and replace lead where found. Individual replacements are completed within approximately two weeks 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 if the property is not already scheduled for replacement as part of the 2020 ALSLR Plan.

Protocols to manage the health and safety concerns of COVID-19 are reinforced with mask usage 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.

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

The types of replacements completed between September 19 and December 4, 2020 are summarized in Table 19. Denver Water maintains a detailed list of the type of LSL replacements have been completed and the associated addresses.[27]

[26] See Appendix LSL-11 Addresses and Types of Replacement (Fourth Quarter).
[27] See Appendix LSL-11 Addresses and Types of Replacement (Fourth Quarter).

TABLE 19. TYPE OF LSL REPLACEMENTS (SEPTEMBER 19 TO DECEMBER 4, 2020)

Type of LSL Replacement September 19 through December 4, 2020	Denver Water (Watermain, Emergency, & ALSLR)[1]	Third Party (Developer, Homeowner, & Other)[2]	Total[3]
Full Lead Replacement	661	60	721
Partial Lead Replacement, such that no Lead Remains After Replacement	696	1	697
Full Galvanized Replacement	2	0	2
Partial Galvanized, such that no Lead or Galvanized Remains After Replacement	98	1	99
TOTAL REPLACEMENTS, with no Lead Remaining After Replacement	1,457	62	1,519
Emergency Repair, Partial Replacement (i.e., where consent was NOT granted and lead remains in the ground)	7[4]	0	7

[1] Denver Water includes LSL replacements completed as part of water main replacements, emergency repairs, scheduled replacements, and ALSLR individual and geographic replacements completed by Denver Water or its contractors. This is consistent with previously submitted quarterly reports of 2020.
[2] Third party includes LSL replacements completed by developers, property owners and other government agencies as identified in Appendix LSL-11. This is consistent with previously submitted quarterly reports of 2020.
[3] The number of replacements identified in the "Lead Replacement" column of Appendix INV-11B (Line by Line p-Value Changes by Status, Fourth Quarter) is less than the number of lead service line replacements shown here due to a lag in the quality assurance review during data integration from field replacements to LRP database. The p-value changes that result from replacements completed by ALSLR contractors (denoted by disposition Code "LSLR" in Appendix INV-11B) and replacements completed by Denver Water (denoted by disposition Code "DWSLR" in Appendix INV-11B) exceed the total number of lead service line replacements shown here for the fourth quarter because some of the records included in Appendix INV-11B have a previous p-value of < 0.5 and lead and/or galvanized as prior material has not been confirmed.
[4] Of the seven partial replacements reported during the fourth quarter that occurred as a result of emergency repair or watermain work, three were because the owner was non-responsive, two were due to pandemic-related restrictions and/or interior plumbing concerns and two were the result of emergency repairs not previously reported (one had no contact information available and the property owner of the other emergency repair denied access to the interior; both are identified as occurring in the second quarter in Appendix LSL-13). Attempts to obtain consent to complete replacement in full were made and Denver Water continues to reach out to these customers and offer opportunities to address any safety issues that currently bar Denver Water from the property.

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

Denver Water started distribution of notification letters including consent forms on January 21, 2020 to property owners. Since then all properties identified in the 2020 geographic work areas have been contacted. Notifications were mailed to all properties included in the 2020 geographic task orders, after which multiple efforts were undertaken to obtain signed consent forms.[28] Reconnaissance or pre-construction meetings are conducted with each property owner to plan the LSL replacement work and schedule the replacement.

A summary of the number of property owners contacted and number of signed consent forms returned is presented in Table 20. Between September 19 and December 4, 2020, a total of 22 property owners refused to participate in the ALSLR Program or were non-responsive

[28] See Appendix LSL-12 LSL Replacement Refusal List (Fourth Quarter).

following multiple attempts at contact. Denver Water attempts to obtain voluntary consent from a property owner before work can start to replace the lead service line.

TABLE 20. SUMMARY OF CONSENT AND LSL REFUSAL LIST (SEPTEMBER 19 TO DECEMBER 4, 2020)

Description	Consent Form Signed[1]	Customer Refused[2,3]
Number of Properties Responding after First Attempt (Mailed or Door Visit)	41	0
Number of Properties Responding after Second Attempt (Mailed or Door Visit)	51	3
Number of Properties Responding after Third Attempt (Mailed or Door Visit)	310	2
Total Number of Properties for which Consent was Given or Refused during the Fourth Quarter	402	22[4]
Total Number of Properties for which Consent was Given or Refused Year-to-Date	4,753	39[5]

[1] Consent form signed totals are representative only of the ALSLR contractor results and do not include attempts at properties identified for replacement by Denver Water T&D crews.

[2] Where a customer refuses, the service point ID is provided to the COE team for follow-up. See explanations in Appendix LSL-12 LSL Replacement Refusal List (Fourth Quarter).

[3] Denver Water refusals as part of the geographic task order work are tracked under Customer Refused.

[4] Includes 17 properties described as “non-responsive” after three attempts to obtain consent for Denver Water T&D geographic task order work.

[5] Year-to-Date refusals do not include ALSLR contractor properties described as “non-response”.

A range of outreach methods is used to contact property owners.[29] 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 contractors are in an area with active construction activity, additional attempts may be made to contact the property owner to seek consent. Denver Water maintains a database to track attempted contacts at properties where consent to replace the LSL has not been provided.[30] 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.

[29] See Appendix COE-C.1 Strategy Denver Water LRP 2020 Communications Plan included with the first quarterly report.

[30] See Appendix LSL-12 LSL Replacement Refusal List (Fourth 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.[31]

Notification letters have been mailed to 2021 addresses targeted in the first six task orders.

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

During this reporting period, the ALSLR contractors and Denver Water T&D crews performed partial replacements at five properties (i.e., some lead remains in the ground), for a year-to-date total of 13 partial replacements.[32] Two additional partial replacements not previously accounted for in the second quarterly report, were identified and included in Appendix LSL-13. In addition, five properties, not in previously quarterly reports, were identified and added in the year-to-date LSL replacements between Denver Water and ALSLR contractors, shown in Appendix LSL-14. Furthermore, three properties were removed from the year-to-date LSL replacements due to duplication or double counting of LSL replacements. Two duplicate LSL replacements were due to records maintained by both Denver Water and ALSLR contractors, and the other was due to an error in the address format. All adjustments were made to the year-to-date results in Table 13 and no impacts to the replacements completed during the fourth quarter results of Table 19.[33]

[31] See second quarterly report (Appendix COE-D.12 Safety or Repairs Needed Notification Letter).
[32] See Appendix LSL-13 Properties with an Emergency Service Line Repair Resulting in a Partial Replacement (Fourth Quarter).
[33] See Appendix LSL-14 Addresses and Types of Replacements for Properties not Previously Counted and Duplicates (from Previous Quarters)

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 from Table 12, it is estimated that Filter Program participants consist of approximately 102,130 Denver Water household units.

This section summarizes the milestones of the Filter Program to date, including filter refusals/opt outs, six-month supply of replacement filters distributed post-LSL replacement, filter survey results from the ALSLR Program and formal filter adoption survey, and filter performance testing in the field. An overview of the filter reporting requirements is shown in Table 21.

TABLE 21. 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.[34]
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 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.[35]
7.B.iv.e **5.A**	Maintain Filter Refusal or Opt Out List. Maintain list of addresses and SP IDs that have refused enrollment in the Filter Program or opted out.	See Appendix.[35,36]
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 4 and Appendix[37] for sample results from September 22 to November 20, 2020. Protocol for filter sample collection approved July 17, 2020 by EPA. 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.	See Figure 4 and Appendix.[37]
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 completed September 21, 2020 as described in third quarterly report. See Section 7.B.vi.

[34] See Appendix FIL-31 Filter Delivery Addresses (Fourth Quarter).
[35] See Appendix FIL-34 Filter Program Opt Outs (Fourth Quarter).
[36] See Appendix FIL-33 Filter Program Refusals (Fourth Quarter).
[37] See Appendix FIL-42 Confirmation of Filter Performance in Field Results (Third and Fourth Quarters)

Paragraph Reference	Description	Refer to
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. See Appendix. [38]
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.[39] See Appendix.[40]
5.D	Offer filters to 1983 to 1987 households with formula-fed infants and children under 2 and lead > 3 µg/L in the first bottle of the 3-bottle test. Develop COE plan to focus on this audience.	See this section and results in section 7.B.i CCT. 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.	See this section and first annual report. Approved on September 10, 2020.[41]
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 third quarterly report.[42]
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.[43]

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

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 to all 102,130 customers currently enrolled in the Filter Program as identified in the current inventory of Table 12.[44] During the fourth reporting period, pitcher filters and a six-

[38] See Appendix FIL-38 Replacement Cartridge Distribution Addresses (Fourth Quarter).
[39] See Appendix FIL-41 Occupancy Changes - COE Distribution (Fourth Quarter).
[40] See Appendix FIL-40 Occupancy Changes - Pitcher Filter Distribution (Fourth Quarter).
[41] See third quarterly report (Appendix FIL-29 OMB Approved Filter Adoption Survey Questions).
[42] See third quarterly report (Appendix FIL-30 COE Materials Distribution to Customers Enrolled in Filter Program).
[43] See Appendix FIL-36 Filter Adoption Survey Results Summary (Fourth Quarter).
[44] See Appendix FIL-31 Filter Delivery Addresses (Fourth Quarter).

month supply of replacement filters were distributed to 2,506 households; see Table 22 for initial distribution and Table 23 for a summary of distribution of post-LSL replacement filters.

TABLE 22. SUMMARY OF INITIAL 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 second quarterly report.
Number of Households Provided with a Filter Kit between June 27 and September 21, 2020	16,051	See third quarterly report.
Total Number of Households Provided with a Filter Kit between September 22 and December 4, 2020	2,506	See Appendix.[44]
Number of Households that Use their own NSF-Certified Filter or Bottled Water between January 1 and December 4, 2020	63	See Appendix[45] and see first, second and third quarterly reports.
Number of Households that Declined to Use a Filter or Bottled Water between January 1 and December 4, 2020	30	See Appendix[46] and see first, second and third quarterly reports.

TABLE 23. SUMMARY OF SIX-MONTH SUPPLY POST-LSL REPLACEMENT FILTER DISTRIBUTION

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, 2020	150	See second quarterly report.
Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between June 27 and September 18, 2020	1,658	See third quarterly report.
Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between September 19 and December 4, 2020[1,2]	1,005	This includes emergency repairs and replacements performed by Denver Water and third parties. See Appendix.[47]
Total Number of Households Provided with Six-month Supply of Filter Replacements Post Lead Service Line Replacement between January 1 and December 4, 2020[2]	3,093	Sum of first, second, third, and fourth quarters.

[1] This value may not match the number of lead service line replacements completed during the fourth quarter: for example, if a customer received their initial filter pitcher and replacement filters within two months of having their lead service line replaced, additional replacement filters are provided on the six month replacement schedule and not as part of the lead service line replacement activities.
[2] This value includes filter distribution to properties where the lead service line replacement was completed by a third party, as identified in Table 19.

[45] See Appendix FIL-34 Filter Program Opt Outs (Fourth Quarter).
[46] See Appendix FIL-33 Filter Program Refusals (Fourth Quarter).
[47] See Appendix FIL-32 Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (Fourth Quarter).

Total Number of Filters and Cartridges Distributed Year-to-Date [7.B.iv.b]

Attempts were made to distribute pitcher filters with a six-month supply of replacement filters to 106,147 customers between January 1 and December 4, 2020. During this time, the inventory improved and some customers were removed from the Filter Program.

As of December 4, 2020, Denver Water confirmed that pitcher filters were successfully distributed to 100,886 customers (see Table 24). During the distribution of the filter kits, some were "returned-to-sender" despite the review process employed to vet addresses before mailing.[48] There were 1,195 returns in the third quarter[49] and an additional 216 returns in the fourth quarter.[50] An unsuccessful delivery prompts an investigation and upon reconciliation a filter kit is re-sent to the correct address or if vacant, the property is removed from the LSL Inventory and Filter Program.

TABLE 24. INITIAL FILTER DISTRIBUTION ANALYSIS INCLUDING RETURN-TO-SENDER (JANUARY 1 TO DECEMBER 4, 2020)[1]

Row	Description	Number	Notes
1.	Number of filters distributed	**106,147**	Total number of filters distributed.
2.	Vacant properties	1,145	Filter sent and returned for vacant lot.
3.	Number of non-lead service confirmed	4,017	p-value changes at properties confirmed non-lead.
4.	**Number of participants enrolled in Filter Program**	**102,130**	**Remaining Filter Program participants based on updated LSL Inventory with p-value ≥ 0.5 minus vacant properties.**
5.	No such address	(908)	Filter mailed and returned due to no such address.
6.	Customer refused mail	(15)	Filter mailed and refused by customer.
7.	Customer opted out of Filter Program	(1)	Filter mailed and customer opted out of Filter Program.
8.	Unclaimed mail by customer	(30)	Filter mailed and unclaimed by customer.
9.	Insufficient address	(224)	Filter mailed and address insufficient – additional research underway to confirm address.
10.	Non-delivered	(425)	Not enough information from tracking information – must call to see if there is a better address for mailing.
11.	No access to delivery location	(143)	Filter mailed and delivery was attempted but not completed – additional research underway to confirm address and delivery.
13.	Ordered, not confirmed delivery status	(271)	No confirmation of successful delivery to customer.
14.	Shipped, not confirmed delivery status	(2,099)	No confirmation of successful delivery to customer.
15.	Total number of distributed, but unconfirmed delivery, of filters	**(4,116)**	Total of Rows 5 through 14
16.	**Filters with confirmed delivery status**	**100,886**	**Data as of 12/4/2020 (Row 1 - Row 2 - Row 15)**

[48] See section 7.B.iv in the first quarterly report.
[49] See third quarterly report (Appendix FIL-21 Filter Program Pitcher Returns).
[50] See Appendix FIL-35 Filter Program Pitcher Returns (Fourth Quarter).

Row	Description	Number	Notes
17.	% confirmed delivery	99%	Percentage of filters with confirmed delivery status (Row 16 ÷ Row 4)
18.	% distributed	100%	Percentage of filters distributed to customers enrolled in the Filter Program

[1] Refer to third quarter report for a detailed discussion of return-to-sender analysis.

Replacement Filter Distribution to Customers Enrolled in the Filter Program

Since January 1, a total of 87,748 replacement filters have been distributed to customers currently enrolled in the Filter Program within six months, per the manufacturer's recommendation.[51] Replacement filters mailed to 2,199 properties were returned-to-sender. An unsuccessful delivery prompts an investigation and upon reconciliation a replacement filter is re-sent to the correct address or if vacant, the property is removed from the LSL Inventory and Filter Program.

Occupancy Changes

Occupancy changes that occurred between September 19 and December 4, 2020 were added to weekly filter distribution batches to allow new occupants to receive a pitcher filter within 35 days of new occupancy. Occupancy changes are tracked on a daily basis 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.

Filter Distribution to Formula-fed Infants in Select Households

As described in Table 10, only one 1983 to 1987 household with a formula-fed infant requested enrollment in the Filter Program during the fourth quarter reporting period, i.e., a select household as identified in paragraph 5.D of the Variance.[52]

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

The questionnaire for the formal Filter Adoption Survey was approved by EPA on September 10, 2020. Denver Water mailed the survey questionnaire to 20,000 properties or approximately 20 percent of customers enrolled in the Filter Program in the first week of October.[53] The Filter Adoption Survey participants submitted survey responses online or mailed in hard copy responses. Survey respondents had to answer questions one through three (regarding filter adoption for filtered water used for drinking, cooking, and infant formula) to be included in the analysis and calculation of the overall percent adoption. A total of 3,987 survey responses were received between October 8 and November 23, 2020 (Table 25). The percentages of survey respondents using filtered water or bottled water for drinking, cooking,

[51] See Appendix FIL-38 Replacement Cartridge Distribution Addresses (Fourth Quarter).
[52] See Appendix CCT-11 Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Fourth Quarter).
[53] See third quarterly report (Appendix FIL-29 OMB Approved Adoption Survey Questions).

and infant formula for customers with infants is similar to what has been seen from informal surveys conducted during ALSLR pre-construction meetings and during the virtual meetings.

TABLE 25. SUMMARY OF FORMAL FILTER ADOPTION SURVEY RESULTS

Question	Count		Percent	
	Yes	No	Yes	No
Filtered or bottled water used for drinking water	3,715	272	93%	7%
Filtered or bottled water used for cooking or participant does not cook	2,700	1,287	68%	32%
Survey participant has an infant in household or is expecting and uses filtered water or bottled water for infant formula preparation	99	3	97%	3%

Responses to the formal Filter Adoption Survey are provided in an appendix[54] and an in-depth analysis of the survey data will be included in the first semi-annual report in 2021. The numbers included in Table 25 reflect the responses to specific questions asked in the survey; the average filter adoption rate as defined in the Variance by paragraph 5.E.ii to evaluate the performance of the LRP will be presented in the annual report.

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

The number of properties that choose to opt out of the Filter Program to date is relatively small. Customers that opt out of the Filter Program are contacted by Denver Water to understand the reason for opting out. Of the 63 customers that have opted out since the launch of the Filter Program, six use bottled water as an alternative to the filter and nine use their own filter certified to NSF 53 for lead removal. For the 48 remaining customers, Denver Water was unable to confirm if the customer was using an NSF 53 certified filter.[55] Denver Water will continue to attempt contact with customers as part of an annual reminder to customers that have opted out or refused to participate in the Filter Program.

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

From September 19 to December 4, 2020, notice of refusal to participate in the Filter Program was received for six properties. The reasons given for refusal include the pitcher is too heavy to use or the resident had a water quality test and is not concerned about the low level of lead in their water. This brings the total number of refusals to 30 year-to-date.

[54] See Appendix FIL-43 Detailed Responses from Formal Filter Adoption Survey.
[55] See Appendix FIL-34 Filter Program Opt Outs (Fourth Quarter).

Summary of Data to Document Filter Distribution and Filter Program Participation

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

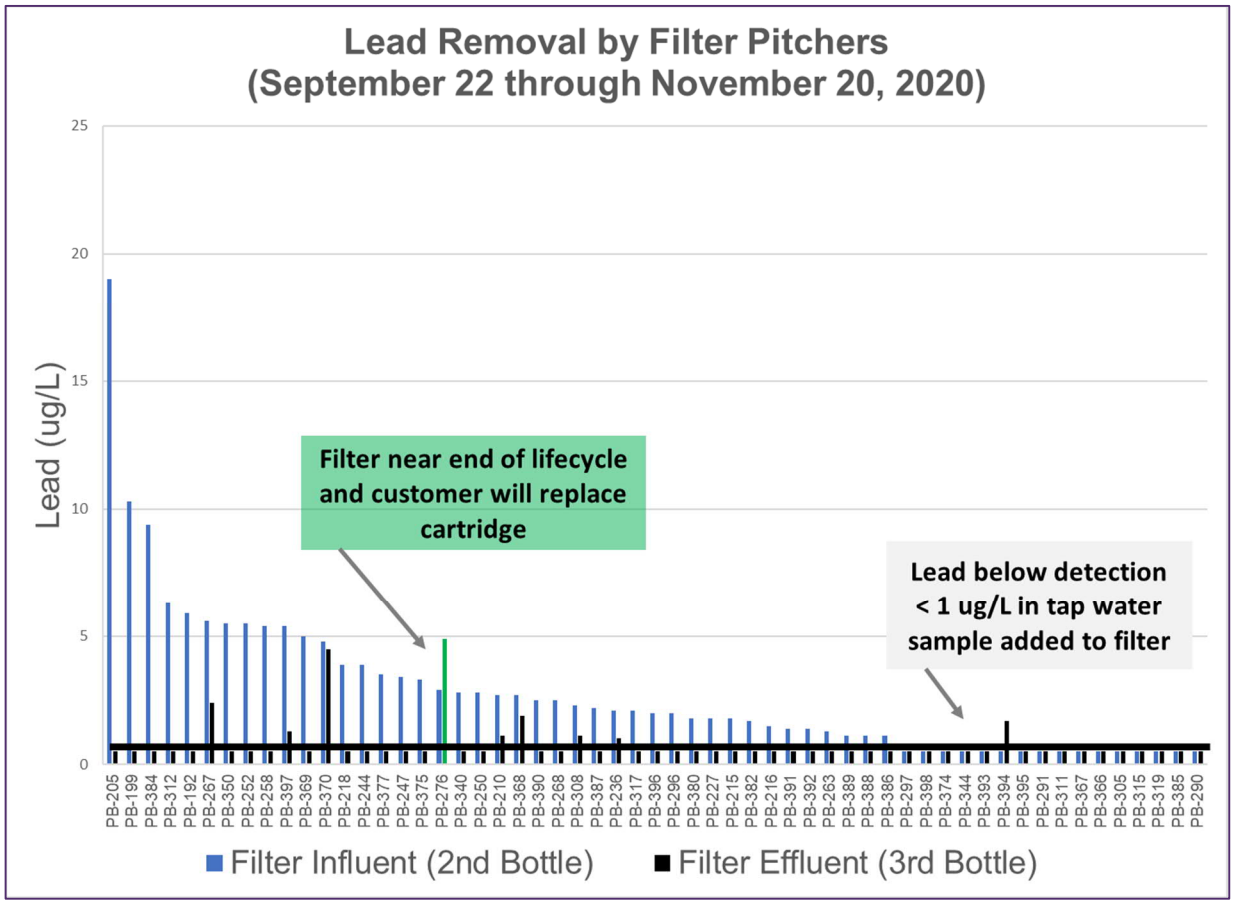
- List of premise addresses for all households where filter kits were provided.[56]
- List of six-month supply of replacement filters provided after lead service line replacement.[57]
- List of premise addresses and service point IDs for all households that refuse to participate in the Filter Program.[58]
- List of premise addresses that have returned filter kits to sender.[59]
- List of premise addresses that have returned replacement cartridges to sender. [60]
- Filter adoption survey results summary from informal filter use surveys conducted in the field as part of LSL replacement and virtual meeting filter survey summary.[61]
- Detailed responses from the informal filter use field survey responses collected as part of lead service line replacement activities.[62]
- Confirmation of pitcher filter performance in the field from the third and fourth quarters.[63]
- List of premise addresses and service point identification numbers for all households that opt out 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.[64]
- Replacement filter distribution.[65]
- Occupancy changes for pitcher filter distribution.[66]
- Occupancy changes for filter education information – LRP Introductory Letter and LRP Overview Booklet.[67]

[56] See Appendix FIL-31 Filter Delivery Addresses (Fourth Quarter).
[57] See Appendix FIL-32 Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (Fourth Quarter).
[58] See Appendix FIL-33 Filter Program Refusals (Fourth Quarter).
[59] See Appendix FIL-35 Filter Program Pitcher Returns (Fourth Quarter).
[60] See Appendix FIL-39 Filter Program Replacement Cartridge Returns (Fourth Quarter).
[61] See Appendix FIL-36 Filter Adoption Survey Results Summary (Fourth Quarter).
[62] See Appendix FIL-37 Filter Adoption Survey Detailed Responses (Fourth Quarter).
[63] See Appendix FIL-42 Confirmation of Filter Performance in Field Results (Third and Fourth Quarters).
[64] See Appendix FIL-34 Filter Program Opt Outs (Fourth Quarter).
[65] See Appendix FIL-38 Replacement Cartridge Distribution (Fourth Quarter).
[66] See Appendix FIL-40 Occupancy Changes - Pitcher Filter Distribution (Fourth Quarter).
[67] See Appendix FIL-41 Occupancy Changes - COE Distribution (Fourth Quarter).

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

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 second six-month compliance period of 2020 are included in this reporting period (see Figure 4). Denver Water collected samples from 57 properties between September 22 and November 20, 2020. After March 16, 2020, in-home sample collection by Denver Water staff was temporarily suspended as part of Denver Water's COVID-19 response and customers were asked to collect the pitcher filter samples in addition to the LCR compliance samples. Denver Water resumed sample collection on September 22, 2020 using an updated protocol with three samples to differentiate between lead measured in the first draw LCR compliance sample and lead measured in water used in filter testing and referred to as the filter influent sample. The third sample is collected from filter effluent and used with the filter influent sample to calculate the percent lead removal.

FIGURE 4. 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.

There continue to be some customers who are identified for inclusion in the filter performance testing in the field that do not use their filter and when this occurs, a sample is not collected from the filter.[68] Lead was measured below the detection limit in filtered water at 48 of the 57 properties and below 5 µg/L at all 57 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 no properties with lead measured above 15 µg/L in the tap water sample.[69] 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 effluent samples collected from the field during the fourth quarter reporting period.

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

Observations of filter use during filter performance testing in the field are reported with sampling results. Five customers indicated that they did not use the filter provided by Denver Water: three use a fridge filter, one uses tap water, and one did not provide an explanation.[70]

Informal surveys have been performed by ALSLR contractors during pre-construction meetings asking customers about filter adoption and use. Between September 19 and December 4, 2020, 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 454 participants were captured in the LRP database.[71] This accounts for 10 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 454 locations participated in the filter adoption survey informally conducted during pre-construction meetings before their LSL was replaced.
- Of these, the majority of customers responded that they used filtered or bottled water for drinking (92 percent) and cooking (74 percent).
- All households with a formula-fed infant indicated that they used filtered water when preparing formula, except three.

[68] See Appendix FIL-42 Confirmation of Filter Performance in Field Results (Third and Fourth Quarters).
[69] When lead is measured above 15 µg/L in the first draw sample, the property is scheduled for LSL replacement within two months.
[70] See Appendix FIL-42 Confirmation of Filter Performance in Field Results (Third and Fourth Quarters).
[71] See Appendix FIL-36 Filter Adoption Survey Results Summary (Fourth Quarter).

Informal surveys using the same questions about filter use were conducted as part of virtual community meetings launched in June 2020. In the fourth quarter, Denver Water hosted one virtual community meeting for Consolidated Mutual customers. 144 customers participated, including a mix of customers enrolled and not enrolled in the LRP. Of those who said they had received a filter, results were consistent with other distributor areas from the third quarter meetings where a majority reported using filtered water for drinking and cooking. No participants reported having an infant.[72]

[72] See Appendix FIL-36. Informal Filter Adoption Survey Results Summary (Fourth Quarter).

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 26.

TABLE 26. SUMMARY OF COMPLIANCE

Paragraph	Description	Comment
2.C	**C. Corrosion Control Treatment Metric.** Denver Water must consistently maintain in all parts of the System a minimum target pH of 8.5 during the first year of operation under this Variance. 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.	**See Section 7.B.i**
3.D	**D. LSL Inventory Compliance Metric.** Denver Water 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. These investigations are performed independently of the LSL replacements.	**See Section 7.B.ii**
4.I	**I. Accelerated LSL Replacement Compliance Metric.** Denver Water must annually achieve at least a 7.0% cumulative average Program Year LSL replacement rate as determined based on reporting required in paragraph 7.B.	**See Section 7.B.iii**
5.G	**G. Filter Communication Compliance Metric.** Denver Water must make direct contact with lead outreach and education materials to 95% of all customers enrolled in the Filter Program in every Program Year. . . 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.	**See Section 7.B.vi**
6.B	**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 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. Denver Water may account for the CCT optimization period in this demonstration.	**To be provided in Annual Report for Year 1**

7.B.vi Communications, Outreach and Education

During the fourth quarter of 2020, Denver Water continued to implement public outreach and engagement strategies as described in the LRPP and 2020 COE Plan. This included convening the Stakeholder Advisory Committee for a third time, developing new customer resources and creating the 2021 COE Plan. COE efforts specific to each program element are also included in those element sections of this report and reporting requirements are identified in Table 27.

TABLE 27. OVERVIEW OF 7.B.VI REQUIREMENTS

Paragraph	Description	Comment
7.B.vi	2020 COE Plan 2021 COE Plan	See first quarterly report. See Appendix.[73]
7.B.vi.a	Description of COE activities conducted. Copy of materials.	Discussed in this section. See Appendices for copies of materials included.[74]
7.B.vi.b	Ambassador Program Overview.	See first quarterly report and section 7.B.vii.
7.B.vi.c	Response, date and time of in-person surveys of filter adoption and use.	See section 7.B.iv. See Appendix.[75]
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.	Discussed in this section. See first and third quarterly reports.
LRPP III.F (p 74)	Stakeholder Advisory Committee	Discussed in this section.

Outcomes of COE Activities between September 19 and December 4, 2020 (unless otherwise noted) [7.B.vi.a]

- Denver Water partnered with Consolidated Mutual to host a bilingual, one-hour virtual community meeting in the fourth quarter for all Consolidated Mutual customers enrolled in the LRP. 144 customers participated in this meeting. Combined with participation from the first distributors virtual meeting in the third quarter, 1,291 customers from distributor areas participated via phone or computer in a virtual meeting this year.
- In addition, Denver Water received requests for presentations on the LRP from seven local, state and national organizations and held these presentations in the fourth quarter.

[73] See Appendix COE-H.1 2021 COE Plan.
[74] See Appendices COE-H.2, H.3, H.10, H.13 and H.14 for a copy of materials.
[75] See Appendix FIL-28 Filter Adoption Survey Detailed Responses (Fourth Quarter).

- The Stakeholder Advisory Committee met for the third time on September 24, 2020, to receive an update on the LRP and an overview of how Denver Water determines work areas. The next meeting will be held virtually on January 14, 2020.
- 31 points of contact were made with Denver City Council and Mayor's Office, officials in suburban jurisdictions and state legislators to share program information and updated for the LRP. Denver Water published an interactive 2021 work areas map capturing all planned and completed construction work for the LRP.[76]
- 162,622 unique page views to the program website since the launch of comprehensive LRP information on March 5, 2020.[77]
- 1,039 views of LRP TAP stories published on denverwaterTAP.org. [78]
- 497,216 individuals reached through Denver Water social media activity.[79]
- 26 mentions of the LRP in news media stories, with a potential aggregate readership of 294,964,198.[80]
- In addition to these outreach activities, Denver Water developed its 2021 COE Plan. The plan identifies goals, target audiences and strategies/tactics that will guide COE outreach efforts in the second year of the LRP.[81]
- Copies of new outreach materials and the 2021 COE Plan are provided in the appendices.[82]

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

Public Outreach

Overview of public outreach activity grouped by program component:

- Virtual Meetings
    - Denver Water partnered with Consolidated Mutual to host a bilingual, one-hour virtual community meeting in the fourth quarter for all Consolidated Mutual customers enrolled in the LRP.
    - The meeting was an opportunity to inform these customers about the relationship between Denver Water and Consolidated Mutual, the LRP and encourage filter use.

[76] The interactive construction map is available at denverwater.org/pipes.
[77] See Appendix COE-H.15 Website Traffic.
[78] See Appendix COE-H.13 TAP Stories Published.
[79] See Appendix COE-H.11 Earned Media Report.
[80] See Appendix COE-H.11 Earned Media Report.
[81] See Appendix COE-H.1 2021 COE Plan.
[82] See Appendices COE-H.2, H.3, H.10, H.13 and H.14 and COE-H.1 2021 COE Plan.

- To promote the meeting, 1,876 outbound calls were made to customers enrolled in the LRP in neighborhoods served by Consolidated Mutual. As part of these outbound calls, voicemails were left with those who did not answer. 1,304 customers received a voicemail providing information about why they were receiving the call, where to learn more about the LRP and how to contact Denver Water Customer Care. Voicemails were recorded in both English and Spanish.
- Denver Water also presented to organizations on request to provide an overview of the LRP, gather feedback and identify areas for potential coordination. These meetings included:
    - Colorado Special District Association Conference (September 24)
    - Colorado Water Utility Council (October 2)
    - Denver Head Start (October 16)
    - Rocky Mountain Water Conference (October 29)
    - American Water Resources Association-Colorado Lunch Talk (November 17)
    - Denver Hispanic Chamber of Commerce (November 24)
    - Lead Service Line Collaborative (December 3)

- Stakeholder Advisory Committee
    - The Stakeholder Advisory Committee met for the third time on September 24, 2020. Representatives reflected a diverse group of organizations including health care, education, nonprofit, government and Registered Neighborhood Organizations (specifically neighborhoods identified for lead service line replacements this calendar year).
        - Denver Water provided an overview of progress to date on the LRP and offered an introduction into how Denver Water is determining work areas for lead service line replacement, including a conversation on the lead service line inventory, equity and logistics considerations.
    - Denver Water will host the next Stakeholder Advisory Committee meeting in mid-January and will offer new member/alternate on-boarding as needed.

- Government Relations
    - Denver Water made 31 proactive contacts with local government officials and staff, including Denver City Council and Mayor's Office, officials in suburban jurisdictions and state legislators to share program information and updates for the LRP.
        - These contacts included annual meetings with members of Denver City Council and state legislators addressing the program, as well as updates on what constituents can expect for 2021.
    - Staff also met with state and local staff from the Women, Infants and Children program (WIC), the Denver Early Childhood Council and the City of Denver's Office of Children's Affairs and presented proposed work areas for the 2021 ALSLR plan to CDPHE and DDPHE.
- Distributor Communications
    - Denver Water provided updates on the program at distributor forum meetings on September 29 and November 17.
    - Updates on the LRP were published in the September monthly distributor newsletter.
    - Denver Water held a virtual community meeting for Consolidated Mutual customers on October 13, 2020. 144 customers attended. To inform distributor customers of the meeting, a direct mailing was sent the week of September 1 and outbound calls were made on October 12 and October 13.
    - Denver Water sent notification letters to distributor customers sharing information on the 1983-1987 homes program and encouraging them to request a water quality test.[83]
    - Denver Water continues to provide requested water quality test kits and filter kits to distributor customers.
    - Denver Water continues to provide water quality sampling results to distributors customers.
- Paid Media
    - A paid media strategy focused on priority neighborhoods within the City and County of Denver was launched to promote the LRP and encourage customers to use their water pitchers and filters before cooking and preparing infant formula.

[83] See Appendix COE-H.9 1983-1987 Homes Notification Mailing List.

- The campaign ran from September 28 through October 25, 2020.[84]
    - 4,307,129 total impressions were generated through digital media.
    - Posters were circulated in targeted community newspapers and magazines with a combined circulation of 263,073.

- Earned Media
    - The LRP was covered in digital, print and broadcast news, including CBS Denver, FOX31 Denver, 9 News, Noticias Ya/News Now and MSN Online.[85]
    - There were 102 posts about the LRP on social media channels in this reporting period, resulting in 497,216 impressions. Ambassador Program partners also shared Denver Water social media posts on their own networks.

- Digital Communications
    - Denver Water distributed emails on October 15, October 29 and December 3 to a growing database of 9,298 subscribers who have opted in for program news. These emails were also sent to 62,692 customers who had been contacted to participate in this year's virtual community meetings. Emails promoted engagement opportunities, encouraged proper filter use and provided an overview of ongoing program activities. [86]
    - Denver Water posted four TAP stories on denverwaterTAP.org which included content related to the LRP. One of these stories was published in Spanish. As of December 4, these stories received a total of 1,039 views. Most recently, Denver Water published "2020 Lead Reduction Program by the numbers" that provided an overview of the key metrics Denver Water met in the first year of the LRP. This article also included a video highlighting the milestones reached during the first program year. [87]
    - Denver Water also published a video demonstrating Denver Water rates at work that included a brief overview of the Lead Reduction Program. [88]
    - The LRP website, denverwater.org/Lead, was updated with the recordings of the distributor virtual community meetings, program dashboards and updated lead service line inventory. Since the launch of the program, the LRP website has received 162,622 unique visitors.[89]

[84] See Appendix COE-H.12 Paid Media Campaign Overview.
[85] See Appendix COE-H.11 Earned Media Report.
[86] See Appendix COE-H.10 September, October and November Subscriber Emails.
[87] See Appendix COE-H.13 Tap Stories Published.
[88] See Appendix COE-H.14 Videos Published.
[89] See Appendix COE-H.15 Website Traffic and Figure 1.

- Denver Water provided updates to stakeholders including Denver City Council members, distributors, Stakeholder Advisory Committee members, RNOs and government agencies on what they and their constituencies should expect for 2021.
- Most recently, an interactive 2021 work areas map was added to the pipe replacement page on the website. This is intended to provide customers easy access to an overview of all construction efforts related to the LRP.[90]

- 1983 to 1987 Homes (Select Households)
  - In October and November, notification letters were sent to distributor customers encouraging those who are expecting or have a formula-fed infant under 24 months to request a water quality test kit.[91]
    - If this test kit shows lead results above 3 µg/L, the customer is offered a filter kit containing a water pitcher and filter.
    - The filter kit is followed by a two-year supply of replacement filters to use until formula-fed infants in the home reach 24 months.

Material Development [7.B.vi.a]

The following materials were developed in the fourth quarter:

- Denver Water developed the 2021 COE Plan in coordination with program element leads to capture efforts for the next program year. The Plan builds on lessons learned from 2020 and opportunities to further expand outreach and engagement efforts.[92]
- The public-facing dashboard was updated to share progress and key metrics for the LRP through November 30, 2020. The updated dashboard is posted monthly to denverwater.org/Lead and is available in both English and Spanish.[93]
- ALSLR Outreach
  - A notification letter was distributed to customers who have been removed from the program based on investigation determining their service line does not contain lead and subsequent inventory updates.[94]

[90] The interactive construction map is available at denverwater.org/pipes.
[91] See Appendix COE-H.9 1983-1987 Homes Notification Mailing List.
[92] See Appendix COE-H.1 2021 COE Plan.
[93] See Figure 1.
[94] See Appendix COE-H.2 Program Removal Letter and COE-H.7 Program Removal Mailing List.

- A program exit brochure was distributed to customers approximately six months after their service line was replaced notifying them that they have completed their participation in the program and reminding them of other potential sources of lead.[95]

- Filter Adoption Survey Reminders
  - Following mailing of the filter adoption survey, Denver Water sent a reminder email to survey recipients promoting the survey and providing a link to the digital survey for completion.[96]
  - Additionally, Denver Water mailed a reminder postcard to survey recipients encouraging them to complete the survey.[97]

- Water Quality Testing and Sampling
  - Denver Water developed and began distribution of a water quality test notification letter targeted to customers identified for upcoming lead service line replacement who have also been identified for water quality testing. The letter provides customers with advanced notice that they will be receiving a test kit and emphasizes the importance of collecting and returning water samples for testing.[98]

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 by all.

In the fourth quarter, the following talking points and processes were developed for Denver Water Customer Care regarding the LRP:

- LRP Investigations Process
  - A process flow and talking points were developed to guide external-facing Customer Care representatives on how a customer may be removed from the Lead Service Line Inventory and LRP based on the outcome of investigations.

[95] See Appendix COE-H.3 Program Exit Brochure.
[96] See Appendix COE-H.4 Filter Adoption Survey Email Reminder.
[97] See Appendix COE-H.5 Filter Adoption Survey Postcard Reminder.
[98] See Appendix COE-H.6 Water Quality Test Notification Letter.

- Filter Adoption Survey
    - New frequently asked questions were developed in anticipation of customer needs stemming from the distribution of the filter adoption survey.
- Leasing Offices Outreach
    - Talking points and frequently asked questions were developed for Customer Care prior to the distribution of an email and survey to leasing offices (25 units or more) to prepare for inquiries.

Above and Beyond Stories

In October, a customer who had just had their lead service line replaced contacted Denver Water Customer Care and shared the following:

> *"I would like to thank everyone involved at both Denver Water and the contractor. Before pipe replacement, Denver Water contacted me by phone and email to explain what was going to happen when my lead pipe was replaced and answered all my questions and answered questions I hadn't even thought of. On the day leading up to and day of pipe replacement, Denver Water was very informative - letting me know what was going to happen and what I needed to do after the pipe replacement. I should also add that I attended the online Zoom meetings by Denver Water open to the community last spring, early summer about the lead pipe replacement which were also very helpful. The contractor crews were great! They explained what they were going to do both inside and outside of my home. They were all professional and courteous and answered all my questions. They were efficient, respected my space, cleaned up and did a great job."*

While completing a lead service line replacement in November, a contractor noticed that one of the property owners' cars had broken down on the wrong side of the road. The contractor got the car back up and running for the customer. This customer also has a disability and called Denver Water Customer Care to share the story and stated that the whole crew had been more than accommodating with her handicap and she is very thankful.

7.B.vii Health Equity and Environmental Justice

A commitment to health equity and environmental justice (HE&EJ) informs all aspects of the LRP. Integration of HE&EJ principles throughout program activities and planning supports accessibility, awareness and equitable participation for all customers.

An overview of HE&EJ reporting requirements is presented in Table 28.

TABLE 28. 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: • ALSLR Program. • Filter Program. • COE Plan.	See first quarterly report and updates in this section.
7.B.vii.b	Socioeconomic and demographic data collected through the filter adoption survey.	See Appendix.[99]
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 this section for how data informed COE activities.
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 third quarterly report.[100]
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.	See this section.
LRPP V (p 79)	Collaborate with other agencies to address lead exposure from all sources.	Described in this section.

This section reviews how Denver Water has implemented HE&EJ principles into the various program components for communications, outreach and education; 2021 ALSLR planning; and continued filter distribution.

[99] See Appendix FIL-43 Detailed Responses from Formal Filter Adoption Survey.
[100] See third quarterly report (Appendix FIL-30 COE Materials Distribution to Customers Enrolled in Filter Program).

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

As part of the LRP Ambassador Program, Denver Water continues to contract with two community partners to inform and engage non-English and/or non-Spanish speaking LRP customers in priority neighborhoods.

- iNOW, formerly the Colorado African Organization, is a community organization that specializes in supporting refugee and immigrant populations from Africa and Asia.
- CREA Results is a community organization that specializes in the Latinx community.

As discussed in the third quarter report, both partners shifted much of their in-person outreach to virtual engagement due to the COVID-19 pandemic. This shift has put a greater emphasis on the use of social media platforms and virtual meeting applications such as Zoom. Whenever possible, and it is safe to do so, some outreach activities were conducted in-person to coincide with food distribution events, COVID-19 testing sites and to drop off bilingual program flyers at targeted neighborhood businesses. As the LRP continues to evolve and the pandemic continues to limit gatherings, Denver Water and its partners have continued to find new ways to engage in a virtual world.

During the fourth quarter, CREA Results engaged in the following work:

- Filter Use Insights
    - Identified 33 participants from target communities to answer questions included on the filter adoption survey, often with a CREA representative talking through the questions to support understanding in a community member's primary language and ease of completion. Participants were engaged either online through Facebook or in-person.
    - Held two virtual focus group sessions with a total of 19 Spanish speaking LRP customers to gain additional feedback on the proper use of water pitchers and filters.
    - Results from both efforts are being analyzed to provide additional insights into filter use alongside the filter adoption survey.
- Digital Communications
    - Made 22 posts on CREA's Facebook page regarding the LRP, generating 6,326 total impressions.
    - Participated in 3 radio interviews on KNRV 1150 am, a Spanish language radio show, on October 16, October 30 and November 13.

- Made 28 public service announcements (PSAs) through Facebook between October 1 and December 4.
- Reposted 18 Denver Water social media posts on Facebook.

- Earned Media
  - Placed five feature articles in El Comercio de Colorado and two feature articles in El Pueblo Catolico. Both are Spanish language newspapers and El Pueblo Catolico is the official Spanish language newspaper for the Archdiocese of Denver. The articles reached approximately 35,000 people.

- Grassroots (Neighborhood Outreach)
  - Identified 100 partners in priority neighborhoods to help share program information.
  - Attended 17 neighborhood events.
  - Attended three city-wide events.
  - Hosted three unique activities consisting of: 1) a podcast on EDUCA Radio 2) TV interview on Estrella TV, a Spanish language television network; and 3) a Facebook Live event to promote the LRP.

During the fourth quarter, iNOW engaged in the following work:

- Filter Use Insights
  - Identified 24 participants from target communities to answer questions included on the filter adoption survey, often with an iNOW representative talking through the questions to support understanding and ease of completion.
  - Held follow up conversations with 11 non-English/non-Spanish speaking LRP customers about the proper use of water pitchers and filters.
  - Results from both efforts are being analyzed to provide additional insights into filter use alongside the filter adoption survey.

- Grassroots (Neighborhood Outreach)
  - Prepared five iNOW navigators to provide assistance through a virtual help desk for customers who speak the following languages:
    - Amharic
    - Arabic
    - French
    - Nepali

        - Somali
    - Identified 38 community partners to assist in the promotion of the LRP to immigrant and refugee populations.
    - Assisted in the development of a virtual help desk flyer to promote free LRP assistance to non-English/non-Spanish speakers enrolled in the program.
- Digital Communications
    - Re-voiced Denver Water program videos into multiple languages and posted on Facebook and Vimeo.
    - Five iNOW navigators began using their own and their program's New American Neighbors' social media platforms in October to inform and engage customers, with a primary focus on identifying participants for the filter adoption survey. In the fourth quarter, iNOW shared information about proper filter use with 3,428 customers in Amharic, Arabic, French, Nepali and Somali on Vimeo and Facebook.
    - Began using short videos in October on social media platforms to educate customers about the importance of filtering water before cooking, drinking and making infant formula.

Beyond the Ambassador Program, Denver Water implemented HE&EJ principles into the following program components [7.B.vii.a]:

- Early Childhood Development Outreach
    - Through discussion with Denver Water, the CDPHE State WIC office staff provided training to local Denver area WIC program staff in late October to educate them on various sources of lead exposure for young children, which included an explanation of the LRP.
    - The goal of this training was for local WIC staff to share information about lead exposure including the LRP during initial and periodic screenings with the families on their caseload, including verifying whether or not they are in the LRP.
    - This training was provided to 35 Denver WIC staff members and 21 Jefferson County WIC staff members. Training for WIC staff in the Tri-County Health Agency office is currently being scheduled. If a client is in the program, they will be provided information about the LRP, which has been vetted by Denver Water and shared with WIC for this particular educational opportunity.

- Denver Water was awarded a grant ($25,000) from Healthy Babies Bright Futures to support outreach efforts to early childhood service providers. Goals of the grant include the development and implementation of train-the-trainer workshops for service providers so they in turn can talk with families about the LRP; sponsorship of and a presentation at the 2020 Rocky Mountain Early Childhood Conference; ongoing support for increased LRP communications to those in the early childhood community via the Denver Early Childhood Council as well as the creation and deployment of LRP promotional drop kits that will be shared with families enrolled in various city based early childhood programs.

- Paid Media
  - A paid media campaign building on the successes from the third quarter campaign ran from September 28 through October 25 to target priority neighborhoods to promote the LRP and encourage proper filter use.

- Critical Customer Outreach
  - In the fourth quarter, Denver Water continued outreach efforts to critical customers, such as child care facilities and schools, of which many have been closed due to COVID-19, to encourage the return of their consent forms and scheduling of their lead service line replacement. These outreach efforts included additional phone calls, door-knocking and mailings. Water quality sampling continues to be offered to critical customers upon request.

- Virtual Community Meetings
  - Spanish interpretation has been available for every virtual community meeting conducted through 2020, including the Consolidated Mutual distributor customer meeting held in the fourth quarter. All meetings were fully bilingual, from the initial meeting promotion to the meeting presentation, poll questions and Q&A responses. The meeting recordings are also available in both Spanish and English at denverwater.org/Lead.

- Materials
  - All customer-facing materials produced in the fourth quarter were translated into Spanish.
  - All virtual community meetings presentations, promotional materials and follow-up communications are provided in both Spanish and English.
  - All monthly program dashboards are available in Spanish and English at denverwater.org/Lead.

- Tenant Outreach
    - A letter was sent to leasing offices for multi-family properties with over 25 units enrolled in the LRP asking them to partner with Denver Water to support distribution of filter kits and program introductory booklets to new tenants upon move in. The letter directs leasing office representatives to complete a survey providing Denver Water with the information it needs to distribute materials to these partners.[101]

HE&EJ Principles Applied to ALSLR Program

Denver Water uses two key tools to integrate principles of health equity and environmental justice as a foundation for program work including the ALSLR. The first is a prioritization model, which serves as a basis for the methodology used to identify specific neighborhoods and non-English speaking groups in ALSLR planning and activities. The prioritization model employs several datasets to describe socioeconomic, language and demographic factors by neighborhood. In preparing for 2021, the outputs of the prioritization model were compared against the City and County of Denver's neighborhood equity index, allowing the team to make adjustments in light of increased inequity faced by some neighborhoods and gain further confidence in planned work. Details on how the prioritization model was used to inform 2020 ALSLR program activities are described in the first quarterly report.[102] The second tool is a language analysis of the Denver metro area, which produced insights to influence translation, interpretation, community partnering strategies and outreach efforts as described in the first and subsequent quarterly reports.[103]

Activities undertaken in 2020 that were used in 2021 ALSLR planning are described in this section, including the role of training, critical customers, a review of the 2020 ALSLR program and updates to the model to prioritize the work areas of the 2021 ALSLR Program.

Supporting the 2020 ALSLR Program Denver Water updated the multicultural training program[104] and delivered it to ALSLR field observers and contractors on June 20 and July 28, 2020. The trainings were recorded for future use by field staff and included the following topics:

- Denver Water customer journey.
- Multicultural awareness.
- Implicit bias training.
- Self-awareness and working across cultures.

[101] See Appendix HEJ-3 Leasing Office Outreach Letter and COE-H.8 Leasing Office Mailing List.
[102] See first quarterly report (Appendices HEJ-1 ALSLR Prioritization and HEJ-2 Filter Distribution Prioritization).
[103] See first and second quarterly reports.
[104] See first quarterly report (Appendix COE-C.5 COE Section of Field Observer Training Manual).

- Audience language discussion.
- Working with those when English is not a first language and protocol for interpretation.
- Managing behaviors when working in the public sector (in the field and in homes).
- COVID-19 safety precautions.
- Key program messages.
- Review of materials customers receive, including new documents launched since the original training in February 2020.

Training continues with the next session planned for the first quarter of 2021.

Managing Lead Exposure for Critical Customers Denver Water continued to find and replace lead service lines at properties occupied by critical customers.[105] This includes schools and child care facilities. As described in past quarterly reports, Denver Water developed an Early Childhood Development Service Providers COE plan to address the special considerations that public/private schools, after-school programs and child care facilities pose as they move through the LRP, including the ALSLR Program.[106] This continued to be used in the fourth quarter.

Reviewing the 2020 ALSLR Program The experience gained from executing the 2020 ALSLR Program was reviewed to inform planning and execution of the 2021 ALSLR Program. Examples of observations and associated program enhancements are described below:

- Increase the transparency of how the prioritization model is used to arrive at decisions that are in alignment with the expectations of the LRP. This can support how the model output (i.e., prioritized work areas) are communicated with all stakeholders. For example, a map showing all construction activities, including LSL replacements, water main work and paving work is now shared on the Denver Water website.
- Adapt to both the challenges and opportunities of the pandemic when engaging with the public to find and replace lead service lines. Although some customers denied access to their property due to health and safety concerns related to the pandemic, the pandemic also eased access to critical customers such as schools during shutdown orders.
- Engage regularly with LRP team and contractors to provide the latest information and materials for customer outreach. This includes obtaining feedback from different program elements to inform updates to materials, messaging and training.

[105] See section 7.B.iii of this report and previously quarterly reports.
[106] See first quarterly report (Appendix COE-C.4 LRP Early Childhood Development COE Plan).

2021 ALSLR Planning Results from the prioritization model are used with demographic and socioeconomic data to identify neighborhoods (aligned with census tracts) to prioritize LSL replacements. As part of 2021 ALSLR planning, the prioritization model was updated to include new data from 2020 efforts related to the LSL Inventory to describe the likelihood of finding lead. Workshops were used to review 2020 ALSLR prioritization and results in anticipation of 2021 ALSLR planning. Datasets used to evaluate prioritization in 2020 were augmented by the CDPHE's Women, Infants and Children dataset as well as income and minority considerations. The weighting factors applied to the critical factors were adjusted to understand how the dataset affects the risk scores of each neighborhood. The goal was to evaluate how adjusting critical factors and relative weights impacted the model output when ranking and selecting the potential work areas for 2021. The 2021 ALSLR prioritization approach relied on a higher weighting of socioeconomic and demographic criteria relative to health impacts to generate risk scores. The risk scores generated for each neighborhood were then ranked to develop the 2021 ALSLR Plan.[107]

The potential 2021 work areas identified from the prioritization model were compared to the City and County of Denver's published neighborhood equity index to evaluate alignment with the prioritization model outputs and to address any differences if identified. Potential 2021 work areas were presented to the state and city health departments and equity offices to gain understanding and feedback on the prioritization approach. Finally, the potential work areas were reviewed for constraints or synergies associated with planned construction activities in 2021.

A comprehensive list of geographic areas and individual properties with a high risk of lead exposure was generated and a focused, targeted list for the 2021 ALSLR Plan was generated by integrating information about other construction projects (including paving) to identify synergies for construction while managing potential disturbances to neighborhoods.

HE&EJ Principles Applied to Filter Program

All customers enrolled in the Filter Program received their initial filter kit in 2020 with enough replacement filters to last approximately six months. Additional replacement filters are now being distributed on an approximate six month cycle following the same schedule used for the initial filter distribution. Outreach was undertaken with leasing offices to support providing filter kits and program materials to new tenants on move-in. Following an initial focus group with leasing office representatives to gather feedback on engagement opportunities, a letter was sent to leasing offices for multi-family properties with over 25 units to initiate coordination for filter kit and program material distribution and tracking.

Responses from the filter adoption survey are included with this report.[108] A detailed analysis of socioeconomic and economic data from the filter adoption survey will be provided in the first semi-annual report in 2021.

[107] See Appendix HEJ-4 2021 ALSLR Planning.
[108] See Appendix FIL-43 Detailed Responses from Formal Filter Adoption Survey.

Learning by Doing

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

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. An overview of the Learning by Doing approach was provided in the second quarterly report. During the fourth quarter, Denver Water continued to identify potentially more efficient or effective ways to implement the program in the Learning by Doing log. The outcomes tracked in the Learning by Doing log will be presented in the annual report.

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

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