Independent Verification and Validation of DC Water's Lead Free DC Lead Service Line Removal Plan: FINAL REPORT

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Submitted to Council of the District of Columbia
September 2022

EXECUTIVE SUMMARY

Safe Water Engineering, LLC completed a third-party assessment of the Lead Free DC Lead Service Line Replacement Plan[1] (LFDC Plan) to ensure that, as proposed, the plan will achieve both DC Water and the District's lead water service line replacement goals, including the removal and replacement of all lead water service lines by 2030, prioritization of vulnerable populations in any prioritization model, and fiscal responsibility. The Council of the District of Columbia added brass and galvanized service lines to its definition of lead service lines (LSLs) that require replacement in January 2021.

This report identifies challenges within the LFDC Plan that will make it difficult to achieve the District of Columbia's goals. Issues include not accounting for test-pitting all potential LSLs – or the replacement of verified brass and galvanized service lines. Additional concerns include unclear contract requirements, relying on individuals to initiate and fund their own lead service line replacements (LSLRs) and dividing LSLR programs by scope, time and space.

We strongly support DC Water's recommendation in the LFDC Plan to eliminate unnecessary bifurcation of programs and the distinction between funding options for partial lead service line replacements (PLSLRs) and full lead service line replacements (FLSLRs). The distinctions of funding sources, funding eligibility, and program administration decrease the efficiency of the LFDC Plan. Breaking down these distinctions and merging programs to function at the neighborhood scale will greatly improve efficiency and the timeline for removing all lead, galvanized, and brass service lines.

This report reviews practices and strategies in benchmarking cities and recommends approaches used elsewhere to improve the effectiveness of the LFDC Plan.

Summary of Recommendations

We provide the following recommendations to improve the effectiveness and efficiency of the LFDC Plan for the major decision-making points of the LFDC Plan:

Service Line Inventory

1. Clarify customer outreach, sampling strategies, and historical record-keeping;
2. Continue using current inventory dataset and excavation verification strategy; and
3. Consider statistical methods to identify areas with copper service lines that turn out to be lead, and brass service lines that turn out to be lead or brass.

Prioritization Criteria and Model Weights

1. Use Higher Resolution American Community Survey (ACS) data for children 5 and under;
2. Remove iron and chlorine sampling parameters; and
3. Use new recommended parameters and weights.

Removal Programs, Funding Sources, and Program Structure

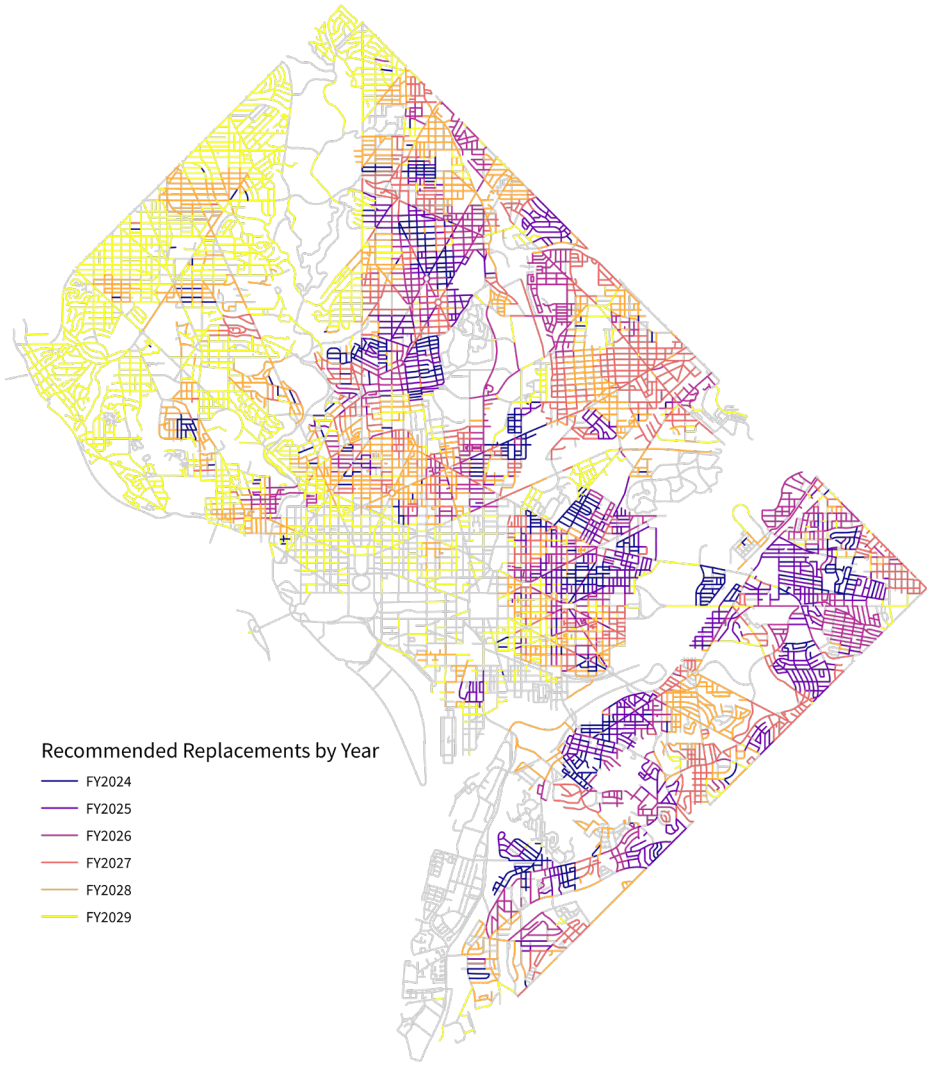
1. Pass an LSLR mandate and provide funding for all LSLRs.
2. Create a new DC Water-initiated Neighborhood Scale LSLR Program;
3. Create a new district-wide DC Water-initiated Individual High-Priority LSLR Program;
4. Group all LSLRs associated with water main replacements (WMR) together in the Capital Improvement Plan (CIP) to create the CIP Water Main Replacement LSLR Program; and
5. Continue the Voluntary Full Replacement Program (VFRP) program from the LFDC plan.

Program Timelines and Geographies

1. Schedule the majority of LSLRs using the prioritization model at the Census Block Group Scale;
2. Plan to complete all LSLRs in 6 years (2024-2029); and
3. Complete service line verifications and LSLRs at all day care centers during the first year.

Map ES.1 shows how the recommended programs and timelines would be distributed across the district.

MAP ES.1 Recommendation for LSLR Replacements by Year



Construction Costs

1. Include the cost of test pitting all unknowns, historic copper, and historic brass service lines;
2. Plan for replacing the 50% of unknowns, 20% of historic copper, and 47% of historic brass that are estimated to be lead, brass or galvanized service lines;
3. Plan for replacing all remaining non-historic brass and galvanized service lines;
4. Update other cost percentages;
5. Explore strategies for reducing the cost of LSLRs in the Neighborhood Scale LSLR Program;
6. Include the cost of providing certified lead reducing filters to all residents with potential LSLs; and
7. Consider policy changes to reduce paving costs.

Table ES.1 quantifies and summarizes the cost savings and additions identified through our analysis and recommendations.

Table ES.1: Costs of Recommended Revisions Compared to 2022 LFDC Cost Update

Corrections to 20220331 LFDC Revised Cost Estimate	Difference
Update AA12 to correct calculation error in applying 10% contingency	-$47,530,653
Remove Test pit charges for Service Lines that are determined to be Lead per contract specifications	-$60,628,934
Analysis of Recommendations	
Move all SDWM Replacement costs to CIP	-$169,318,277
Adjust restoration to most cost-effective method cost: full street paving or individual site restoration	-$148,394,279
Account for efficiencies of scale for neighborhood scale replacement for non-water main replacement projects	-$29,398,712
Adjust Design, Engagement, Management, and Data Costs	-$90,125,122
Adjust Service Line replacement costs per DC Water bids	$32,350,860
Account for test pitting all Unknowns and Historic Brass in addition to Historic Copper	$18,284,697
Add filters for all potential LSLs and 6 months post replacement	$24,145,432
Account for Individual High-Priority LSLR Program	$8,524,177
Account for replacing LSLs found from Historic Brass and Copper test pits	$143,822,464
Account for replacing all brass and galvanized service lines	$34,895,254

Table ES.2 provides the recommended LSLR plan cost as described in this report.

Our LFDC Plan Recommendations are designed to achieve the following:

- Account for identification and removal of all potential lead, brass and galvanized service lines;
- Prioritize critical customers and equity;
- Consolidate programs and timelines to generate cost efficiencies;
- Provide certified lead reducing filters to all potential LSL locations to provide an immediate source of safe drinking water for all residents; and
- Encourage and increase public participation through lower costs, fewer participation barriers, and increased public engagement.

TABLE ES.2: Recommended LSLR Plan Cost

Program	Number of Test Pits	Number of LSLRs	Recommended Program Cost	Miles of WMR	WMR Cost
Neighborhood Scale LSLR program	77,809	31,319	$386,000,000	-	$0
CIP Water Main Replacement LSLR Program	8,875	6,771	$45,000,000	97	$338,000,000
Individual High-Priority LSLR Program	-	4,232	$49,000,000	-	$0
Total:	86,684	42,323	$480,000,000		

Grand Total Low Estimate*		**$480,000,000**
Grand Total High Estimate*		**$628,000,000**

**The low and high estimates are calculated using optimized street paving versus street paving as suggested by District of Columbia Department of Transportation regulations.*

The cost estimate for the LFDC Plan is $680 million (Appendix G), which includes $540 million for LSLR and $141 million for WMR. An additional $193 million for currently planned WMR, $15 million for future planned WMR, and $201 million for future estimated WMR is presented separately but included with the LFDC Plan cost estimate.

Our recommendations for the LFDC Plan using our analysis and recommended strategies have a total cost estimate between $480 and $628 million. **The recommended changes to the LFDC Plan provide for the replacement of all LSLs by 2030, and they account for the replacement of 14,348 more LSLs than the original LFDC Plan.** In addition to a subset of unknown and copper service lines, this includes brass and galvanized service lines that the Council of the District of Columbia added to its definition of LSLs that require replacement. The recommendations include service line verification for all unknowns and unverified historical records, addressing a total of 8,867 more potential LSLs compared to the LFDC Plan (number of LSLRs plus services planned for test pitting). Our recommendations add the provision of certified lead reducing filters to provide an immediate source of safe drinking water to all residents with potential LSLs until LSLs are removed. Further, our recommended programs continue the essential test pitting, outreach, and program and data management practices included in the LFDC plan that are critical for project success.

While we recognize the $349 million need DC Water has included for currently identified WMRs ($141 million for poor quality main WMR, $193 million for currently planned WMR, and $15 million for future planned WMR), we recommend that these WMRs be included in the CIP budget rather than the LFDC budget. These replacements are necessary for maintaining water quality and infrastructure integrity, and LSLR will be least expensive if completed at the same time. However, these are expenses DC Water must plan for even in the absence of a LFDC Plan. Therefore, we recommend funding the WMRs that DC Water identifies as necessary, but we do not include WMR costs in the recommended LFDC Plan cost estimates presented here.

To successfully implement the recommended program, the Council of the District of Columbia will need to eliminate the bifurcation of LSLR programs and the distinction between funding options for partial LSLs and full LSLs. The current LFDC distinctions of funding sources, funding eligibility, and program administration decrease the efficiency of the LFDC plan. DC Water will need new funding for removing private side LSLs and policy support to implement these recommendations. Breaking down programmatic boundaries and merging programs to function at the neighborhood scale will greatly improve efficiency and the timeline for removing all LSLs.