

D.C. Lead Line Task Force Council Report

DRAFT

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Introduction:

The Lead Service Line Planning Task Force was established in October 2021 to “develop an interagency plan for the removal and replacement of all lead water service lines by 2030.” DC Code Section 34-2162(a). The Task Force consists of one representative each from the District Department of Energy and the Environment (DOEE), the District Department of Transportation (DDOT), the Department of Consumer and Regulatory Affairs (DCRA), and DC Water, and two public representatives appointed by the Council committee with oversight of DC Water. The Task Force held its first meeting on November 4, 2021, and generally met every two weeks through June 2022. All Task Force meetings were open to the public and the recordings, agendas, and minutes can be found on DOEE’s website.

Per the legislation, the Plan shall include:

- A.** An account of the role of each District agency, including agencies not part of the Task Force, in the removal and replacement of all lead water service lines by 2030, referred to below as “**Agency Roles**”;
- B.** An account of identified barriers to the District removing and replacing all lead water services lines by 2030, and proposed solutions to reduce or eliminate those barriers, referred

to below as "**Barriers and Solutions**";

C. An account of opportunities for interagency coordination or cooperation to accelerate or improve the efficiency and cost effectiveness of lead water service line replacements, referred to below as "**Interagency Coordination**";

D. An interagency spending proposal, referred to below as the "**Interagency Spending Proposal**";

E. Recommended Changes or Clarifications to DC Water's Lead Service Line Replacement Plan, released on June 14, 2021, referred to below as "**Recommended Changes or Clarifications to DC Water's Plan**";

F. A list of potential funding sources to support lead service line replacements, referred to below as "**Funding Sources**"; and

G. A list of legislative, regulatory, and policy changes to complete and fund lead line replacement work by 2030 effectively and efficiently, including draft language, when appropriate, referred to below as "**Recommendations**".

Requirements (D) above, also shall include:

- (i) Costs for recommendations identified for (B) "Barriers and Solutions" and (C) "Interagency Coordination", above;
- (ii) A separate list of unfunded agency costs identified in the spending proposal, including the number of unfunded FTEs, by agency and the FTEs' anticipated responsibilities.

The Task Force was required to make a draft report available to the Mayor, the Council, and the public by June 23, 2022. After a public comment period of at least four weeks, the Task Force is required to present its final report by August 23, 2022.

Note: This is a draft document that has not been approved in its entirety by the organizations and agencies of individual Task Force members. The Task Force has reached a general consensus on these significant recommendations highlighted in this report:

- Incentivizing homeowner participation and addressing homeowner refusal with a **District mandate for public and private lead service line replacement by 2030**, and a coordinated education campaign with equitable, timely outreach, etc (see pgs 5-6);
- **Simplifying project prioritization criteria** to better address priority communities and vulnerable populations (see pg 9);
- Funding and **minimizing costs for homeowner** (see pg 25); and
- Ensuring transparency and public participation as the District and DC Water implement the program, and also maintaining enough flexibility to adapt to evolving regulatory conditions and program needs.

The Task Force requests public comment and feedback on all areas of the report but specifically around:

- Equitable enforcement actions for a mandate
- A framework to ensure transparency and public participation during implementation and execution of the 2030 goal
- Whether there are District agencies not mentioned in this report that ought to be involved in these efforts; and

A. Whether there are opportunities to achieve equitable, safe, and complete lead service line replacement that are not in this report **Agency Roles**

District agencies will be involved in the planning, design, permitting, inspection, outreach and all other aspects of replacing lead services lines by 2030. Table 1 below provides a high level overview of these agencies and their level of involvement at different stages of this work. DC Water, DOEE, and DDOT

have drafted Memorandums of Agreement (provided in the Appendix) this year to facilitate ongoing work.

DC Water is also working with other agencies and utilities like DC Health, DCPS, LAB @ DC, Pepco, and Washington Gas to share data and work plans to improve the selection and prioritization of projects and leverage overlap of planned work.

Table 1. Overview of Some Agencies Involvement During Construction Process

Agency	Planning, Design, Project Selection	Permitting	Inspection	Inventory Data Collection	Education & Outreach
DC Water	HIGHEST	HIGHEST	HIGHEST	HIGHEST	HIGHEST
DOEE	LOWEST	HIGHEST	LOWEST	LOWEST	HIGHEST
DDOT	LOWEST	HIGHEST	LOWEST	LOWEST	LOWEST
DCRA	LOWEST	LOWEST	HIGHEST	HIGHEST	LOWEST
PEPCO	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST
Others?					

Level of Involvement
HIGHEST
LOWEST
NONE

Additional groups and agencies will need to be involved in this work. The Task Force recommends feedback from community groups about how best they can be involved in aspects of workforce development, community canvassing, outreach and education.

B. Barriers and Solutions

Barrier 1: Low Rate of Participation for Full Lead Service Line Replacement (LSLR) Program

With sufficient funding secured to replace all of the lead service lines in the District,¹ the most significant barrier to achieving the Lead Free DC goal to replace all lead service lines by 2030 is the low participation rate in the program. Though individual customers are not charged for the replacement because DC Water is initiating block-by-block lead service line replacements -- which is more efficient and less costly -- the participation rate during this first year of block-by-block projects has not surpassed 75% where full lead service lines exist. DC Water is only replacing full lead service lines where affirmative, written consent from the property owner has been received because it is DC Water's position that is required to replace the service line in private space (to achieve a full replacement). To date, about 25% of property owners do not participate in the block-by-block program, even though the replacement is free for the property owner. This is based on data from DC Water's first year of block-by-block projects. Blocks under construction have had a range of participation rate from 65%-75% which translates to a 35%-25% refusal rate. Although DC Water staff implement an outreach process with a minimum of thirteen touchpoints (including door-to-door engagements, mail notifications, phone calls, social media promotions, yard signs, presentations with ANCs and various other community groups, etc.) 20% of all property owners do not respond or engage in communication. In analysis of this first year of block-by-block projects, about 80% of premises are owner-occupied, and 20% are tenant-occupied. There is a gap of participation for those that return signed agreements to participate: about 70% of owner-occupied premises participate, and 60% of tenant-occupied premises participate. More analysis needs to be done to identify demographic factors related to participation, but tenant-occupied premises are less likely to return agreements signed by the property owner during work than owner-occupied premises. This has left a patchwork of lead, copper, and unknown pipe materials even in the areas where DC Water has conducted its block-by-block program. Addressing this barrier will secure the highest return.

¹ DC Water reports that as of July 2022, the proposed Capital Improvement Plan fully funds the Lead Free DC program. If the Board of Directors approves this plan, this will necessitate a rate increase in addition to any external funding.

Solution 1a: Mandate for lead service line replacement

- The District must follow in the footsteps of Newark and other jurisdictions and mandate that the District's LSLs be replaced by 2030. Please see the recommended legislative language for specific wording in "Recommendations" section. We recommend that Council require that by a date certain property owners either demonstrate they are not served by a LSL, or (1) replace the LSL on their own or (2) participate in the DC Water block-by-block program. Customers who do not wish to participate in the public block-by-block program should have the option to replace the LSL at their own expense within a designated, expedited timeline and an obligation to provide proof of a completed LSLR.
- Expand opportunities to give or affirm consent to access the property (see Recommendations on Communications and Outreach in Section H "Other Considerations").
 - Make it a condition of signing up for a new DC Water account
 - Allow tenants to provide consent
 - Expand opportunities to consent including by involving public health practitioners (such as identifying opportunities when customers may be educated about lead harms, such as ensuring that pipe replacement is available when a child's bloodwork shows the presence of lead)

Solution 1b: DC Water, DC government, the private sector, and advocates must continue to elevate public education campaign about lead

There is a lack of understanding in the general public about the dangers of lead and the urgency for lead service line replacement. Other DC Agencies and community groups must support, engage and amplify the communication of risks of lead-in-water. The Taskforce recommends public education on a whole-of-government approach. DC Water, advocates, and other government capacities must work together to elevate this issue in the public eye.

Solution 1c: Simplify communications materials

Simplify the materials and test with representative focus groups. Some best practices to consider:

- Following the District's language access protocols
- Using simple (maximum 5th grade reading level) language when possible
- Including a cover sheet that summarizes the material in plain language
- Show before and after pictures of replacements to assuage concerns about yard disruptions

- Being clear about the health damages of lead to all populations and at all exposure levels

Barrier 2: Identification of all lead services lines in the District

An accurate inventory is necessary to complete the replacement of LSLs in the District by the deadline. An accurate understanding of the pipe materials is necessary for an efficient block-by-block replacement program (this can be done contemporaneously, so long as it is complete).

Definition of LSL

In order for the inventory to fully capture all LSLs, the District and DC Water must base the inventory on a common, comprehensive definition of a LSL. The Task Force used the definition from the District Law:

A water service line containing any lead and including brass water service lines or galvanized water service lines.

DC Water notes that replacing all brass service lines was not included in the June 2021 Lead Replacement Plan and, therefore, the inclusion of brass replacements requires an engineering plan to determine feasibility, cost, and DDOT coordination to determine the achievable timeline.

Current and Historic LSL Data

There is substantial uncertainty regarding the number of remaining LSLs in the District, and the numbers have changed substantially in recent years. DC Water's June 2021 Lead Service Line Replacement Plan estimates that approximately 21,600 service lines are made of lead, but also identifies about 14,700 service lines with unknown material and assumes that approximately half of those are lead.² DC Water is also concerned that some LSLs that have previously been identified as copper may actually contain lead. For example, DC Water's 2022 Cost Estimate³ added an additional cost for test pits to verify the material on 48,163 public-side service lines that were historically identified as copper or brass but may contain lead or galvanized pipe. DC Water roughly estimated that at least 10% of those lines could contain lead pipe.

² Plan at 2.

³ See section F. "Funding Sources" of this Report.

Beginning in the early 1900s, developers and DC Water would document the location of some service line taps, and sometimes pipe material, on a “tap card.” In the late 1980s, DC Water initiated a study that evaluated plumbers’ records and practices, home build dates, and other information to identify known and likely locations of lead service lines. This research, combined with tap card information and other engineering project data, comprise DC Water’s historic service line data. Since the early 2000s, DC Water has documented the service line materials when replacing, repairing, or observing service lines. These practices provide more accurate material data. When replacing, repairing, or observing service lines, DC Water has found that some of its historic data is inaccurate. Possible reasons for the inaccuracies could be incorrect material recorded on the tap card, such as cases where the meter setter pipe was recorded instead of the service line, data entry errors, past research estimates, and undocumented service line replacements. The inventory is roughly 50% historic data and 50% current information based on updated records.

The service line pipe material inventory is a “living dataset” and continually updated monthly. The EPA Revised LCR requires water systems to submit a service line inventory and make it publicly available on their website by January 2024 and submit annual reports to EPA. DC Water’s current website Map displays all the pipe material information that DC Water has, is routinely updated, and meets these new EPA requirements.

Resources for Updating LSL Inventory

Because the inventory update will require substantial resources, the Task Force recommends that DC Water create a team of staff (engineers, technicians, administrative staff, and interns) dedicated solely to updating the inventory. In its educational outreach on this topic, EPA has used the example of a LSL inventory in Montreal, Canada with a target completion date of 2023. In Montreal, a team of seven full-time staff (engineers, technicians and administrative staff), six telephone operators, and seventy-five summer interns worked solely on the LSL inventory, while other teams worked on LSL inspections and replacements.⁴ DC Water will have a Program Management contract that will be responsible for efficiently executing the service line identification to meet the 2030 goal. Many tasks can be completed synergistically by working geographically or by project areas (e.g., replacing lead lines block-by-block while also identifying service lines of unknown materials on that block).

⁴ EPA, Free Small Drinking Water Systems Monthly Webinar Series, “Lead Service Lines” (May 24, 2022) (citing “Service Line Material Identification Strategies: Experiences From North American Water Systems,” Liggett, J., Baribeau, H., Deshommes, E., Lytle, D., Masters, S., Muylwyk, Q., Triantafyllidou, S. JAWWA 114 (1):8-19, 2022, <https://awwa.onlinelibrary.wiley.com/doi/abs/10.1002/awwa.1841>).

In addition to non-physical identification methods such as using historical records, the primary physical verification methods are:

- Basic/visual
 - scratch test
 - magnet test
 - lead test (surface swab) kit
- Tap sampling
 - flushed
 - sequential
 - targeted
- Excavation
 - traditional
 - vacuum⁵

Alternative LSL identification methods are in various stages of development. Electrical resistance, acoustic wave, and eddy current technologies are in laboratory or field evaluation, and metal detectors and electrical conductivity are being explored. Cumulative passive samplers, using tap filters, are also being researched.⁶ However, these methods are not yet ready for field deployment.

As seen in the below table comparing the benefits and drawbacks of currently available service line identification methods, relevant factors DC Water can consider when evaluating methods include cost, accuracy, time, the amount of disturbance to the street and to homeowners, and the amount of skill and labor required.

Figure 2. Tools for Lead Service Line Identification

⁵ “Tools for Lead Service Line Identification,” Region 4 Lead and Copper Rule Workgroup Monthly Meeting, August 25, 2021.

⁶ *Id.*

LSL ID Method	Utility Cost			Disturbance		Impact to Homeowner			Utility Skills Required		Overall	
	Financial	Onsite time	Pre-/Post-time	Service line	Traffic flow	Water service disruption	Property damage	Homeowner involvement (includes pre-/post-time)	Technical interpretation	Labor	Time	Accuracy
Community Records Review	L or M (if digitized)	NA	M to H (L if digitized)	None	None	None	None	None	L to M	None	M	L to H
Basic/Visual Observations (on private-side)	L	L	L to M	None	None	None	None	L	L	L	L	M to H
Water Quality Sampling-Flushed	L	L	M to H	None	None	None	None	L	M	L	M	L to M
Water Quality Sampling-Sequential	M	L	M to H	None	None	M	None	M to H	M	L to M	M	L to H
Water Quality Sampling-Targeted	L	L	M to H	None	None	M	None	M to H	M	L to M	M	M
Excavation-Mechanical	H	H	M to H	H	M to H	H	H	L	L to M	H	H	H
Excavation-Vacuum	M to H	L to M	M to H	M	L to M	M to H	M to H	L	M	M to H	M	M to H

Source: “Tools for Lead Service Line Identification,” Region 4 Lead and Copper Rule Workgroup Monthly Meeting, August 25, 2021 (citing Hensley, Bosscher, Triantafyllidou, Lytle, 2021, AWWA Water Science)

Visual observations based on homeowner scratch tests, magnet tests, or surface swab tests, are cheap and easy to conduct if service lines are accessible.⁷ However, these tests are limited to the point-of-entry pipe being accessible and recognizing the pipe material could be different outside the building. Due to these limitations, the Task Force does not recommend that the point-of-entry pipe identification alone be used to rule out the presence of LSLs.

While individual water sampling techniques vary in accuracy, researchers describe a water sampling protocol that combines community-specific data with both flushed and sequential samples from homes with LSLs and homes with service lines of unknown material, has been found to be very accurate.⁸ The Task Force recommends that water sampling be used to only identify the presence of lead pipe and not the absence of lead pipe due to factors such as the possibility of the water not stagnating as required.

This 2021 study recommends the following four steps:

- (1) establish baseline threshold lead concentrations for fully flushed and sequential sample sets from homes that have never had LSLs, (2) collect fully flushed samples and sequential samples from homes with known LSLs, (3) collect fully flushed samples from homes with unknown and suspected LSLs, and

⁷ *Id.*

⁸ Schock, et al., “Rapid and Simple Lead Service Line Detection Screening Protocol Using Water Sampling,” AWWA Water Science (Sept. 2021).

(4) collect sequential profiles from homes with unknown or suspected LSLs if fully flushed samples do not clearly indicate the presence of an LSL.⁹

DC Water's current water sampling program utilizes a similar approach but using only the EPA LCR standard water stagnation protocol for collecting samples. Homes without pipe material information and built prior to 1970 are offered the sequential sampling study that includes ten 1-liter sample bottles. DC Water began the program in 2016 and has identified 226 of 578 to have lead pipe through the process. The Task Force recommends that DC Water continue this process until a more efficient method is identified.,

Due to the drawbacks and benefits associated with each identification method, EPA recommends that utilities use a combination of methods to complete their inventories.¹⁰ The Task Force agrees that a combination of methods will likely be required.

Solution 2a: Inventory Prioritization

The Task Force recommends that DC Water prioritize inventorying the approximately 62,863 service lines needing confirmation of pipe material by equity and areas with higher numbers of elevated blood level cases, but also recognizing the identification process will be integrated with the Lead Free DC program. For example, a block planned for water main replacement in 2026 will have all services identified as part of that project, so not considered for prioritized identification.

Solution 2b: Updating LSL Map

The current Service Line Material Map on DC Water's website has three color indicators for pipe material—green (copper, brass, and galvanized iron), gray (lead and galvanized iron preceded lead), and white (unknown). The Task Force recommends improving the color and/or symbol indicators of pipe materials to better alert customers to service lines that have greater potential of containing lead, which would include brass, galvanized iron, and the Unknowns. The Task Force recommends notifying customers and homeowners when there is a change of pipe material in DC Water's inventory.

Barrier 3: Confusing and inefficient patchwork of LSLR programs

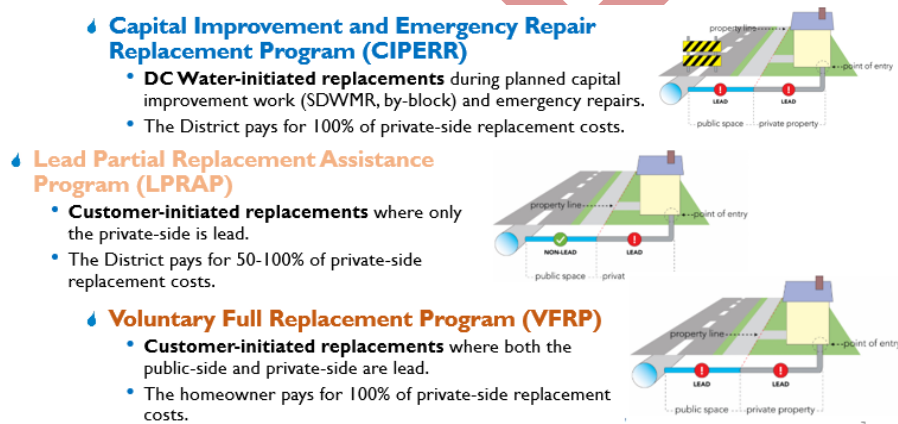
DC Water's June 2021 Lead Service Line Replacement Plan (the LSLR Plan) utilizes three programs, running in parallel, to execute LSLRs (see: Figure 3): 1) Capital Improve Project and Emergency Repair

⁹ *Id.*

¹⁰ EPA, Free Small Drinking Water Systems Monthly Webinar Series, "Lead Service Lines" (May 24, 2022).

Replacement (CIPERR), where DC Water initiates service replacements under planned project work such as water main replacements and emergency repairs and District funds cover 100% of private-side costs; 2) the Lead Pipe Replacement Assistance Program (LPRAP), where customers with lead service lines on the private-side only initiate the replacement and the District funds cover 50-100% of private-side costs; and (3) the Voluntary Full Replacement Program (VFRP), where customers with lead service lines on the public and private sides initiate the replacement and DC Water covers 100% of the public side LSL replacement cost and homeowners cover 100% of the private-side LSL replacement cost.¹¹ As discussed elsewhere in this Report,¹² these customer-initiated programs are significantly more expensive than the new block-by-block LSR program under CIPERR.

Figure 3. DC Water’s Lead Service Line Replacement Programs under Lead Free DC



Solution 3: Streamline programs and implement policy to facilitate DC Water-initiated replacements

The Task Force agrees the private-side only lead service lines could be more efficiently replaced during the By-Block projects than through the LPRAP. However, to accomplish the replacement of lead pipe that is only on private property under the By-Block projects, a policy/legislative change is needed. Currently the law only allows the use of District funds for the private side replacement when DC Water is repairing or replacing the water service line in public space. Therefore, we recommend adding a policy recommendation to accompany the change in the use of District funding, which would then

¹¹ See LSLR Plan, page 8 (of 28,000 total LSLs to be replaced by 2030, 10,800 will be replaced under the VFRP and LPRAP programs).

¹² [Citation to Cost Estimate Section]

authorize DC Water to include these properties in the By-Block LSRs completed through CIPERR, see Section G. "Recommendations".

DC Water anticipates additional recommendations from the team under the new Program Management contract regarding additional ways to structure the lead service line replacement programs to most efficiently and cost-effectively carry out the 2030 goal.

Barrier 4a: Customer lack of understanding of the risk of lead pipes

Barrier 4b: Customer acknowledging the risk of lead pipes and continuing to refuse replacement

Lead is a neurotoxin so potent that there is no known safe quantity. Experts estimate that it is the first lead exposure that has the greatest impact on lifetime earnings of the individual. However, many people are choosing to keep their lead water service line instead of having it replaced with copper pipe for free. This is likely due at least in part to a lack in understanding lead-in-water exposure (e.g. take false comfort in a single sample event that shows low or no lead; although lead particles could release into the water and get trapped on the faucet aerator at any time); complacency with their exposure they had to date without problems they know to be caused by lead; or misunderstanding of the regulatory program. Many senior residents communicate a hesitancy to disrupt their front yard or basement when they have not observed any issues related to lead risk despite using the water for decades in some instances.

Solution 4: Public education

In addition the coordinated education efforts the Task Force recommends in Solution 1b, the Task Force would like public feedback about additional ways to address this barrier.

Barrier 5: Concerns about property restoration

DC Water and other Task Force participants are finding that especially given the lack of understanding of the health damage of lead, customers are also reluctant to authorize any disturbance of their yards or inside the home which is necessary to replace the water service line to the first connection in the home. For example, some homes have finished basements with expensive finishings (e.g., paneling) that need to be disturbed for replacing the lead service line, and are beyond the scope of simple restoration, e.g., drywall repair.

Solution 5: TBD

The Task Force would like public feedback about ways to best address this barrier.

Barrier 6: The consent agreement is complex and intimidating

When the Task Force examined the reasons given for customer refusals as well as the materials that DC Water was sharing, it revealed a need for a simple-language document.

Additionally, tenant-occupied premises show a lower rate of participation than homeowner-occupied premises, which the Task Force addresses in Section G. "Recommendations".

Solution 6: TBD

The Task Force would like public feedback about ways to best address this barrier.

C. Interagency Coordination

To date, DC Water, DDOT, DOEE, and DCRA, with support from the Deputy Mayor of Operations and Infrastructure, have made tremendous headway to best plan and coordinate the execution of block-by-block lead replacement work this year. Many of these efficiencies can be reviewed in the draft Memorandums of Agreement (MOAs) for DC Water's three lead service line replacement programs in the Appendix ___ of this Report.

The Task Force has reviewed these MOAs and provided comment which were incorporated into the final draft (still in the process of signature). Below are additional recommendations the Task Force has developed related to efficient interagency coordination.

Recommendation 1: Review and execute annually a Memorandum of Agreement (MOA) outlining the roles, responsibilities, and program specific coordination efforts between District agencies and DC Water.

Recommendation 2: Implement annual review process of planned work to coordinate overlap. District utilities (including Pepco & Washington Gas), and District permitting agencies (DDOT, DCRA, DOEE). Review facilitated by Deputy Mayor of Operations and Infrastructure.

Recommendation 3: Streamlined permitting and inspections of work. See MOAs in Appendix ___.

Recommendation 4: Coordinate and share responsibility of work related-restoration. A significant cost identified for execution of this work is street repaving (as much as 25% of program costs). Without adequate controls, funding that could be used for lead replacement will instead be used for repaving.

Recommendation 5: Identify funding sources e.g. Bipartisan Infrastructure Law funding for street restoration, not specific to lead service line replacement that can achieve parallel goals. See specific transportation-related funding sources examples in the "Recommendations for Funding Sources" subsection of IV. Funding Sources.

Recommendation 6: To the extent that other funding is not available to cover District agencies' planning, inspection, and completion of lead service line replacement work, these costs should be funded from the District's budget.

D. Interagency Spending Proposal

Lead service line replacement activities require staging of construction equipment and excavation pits to access the service line. Sometimes, staging the equipment and/or performing the excavation will

require the use of public space. In February 2015, Mayor Bowser launched Vision Zero, joining with mayors across the country in response to U.S. Transportation Secretary Anthony Foxx's Mayors' Challenge for Safer People and Safer Streets. The goal of Vision Zero is zero fatalities or serious injuries on our roads. In order to support this goal, lead service line replacements that impact the public right of way must acquire approval from DDOT to ensure these replacements are performed in a manner that is not hazardous to walkers and bikers in the District. District laws and regulations require excavations of public space to be restored in accordance with DDOT's Standard Specifications for Highways and Structures and other adopted regulations and standards. Therefore, restoration of public space must be completed in adherence to these standards.

Additionally, the construction staging and excavation pits to complete lead service line replacements may impact the District's tree canopy. Urban tree cover provides dozens of environmental, economic, and aesthetic benefits to the District. Therefore, lead service line replacements must ensure adequate protection of the District's trees.

Figure 4. Estimated Construction Quantities per LSL Program and Estimated Number of Permits Required

Program Area	Quantities									
	Number of Lead Service Lines	Historic Copper to be Verified	Number of Test Pits*	Number of Blocks	Number of Premises	DDOT Construction Permit	DDOT Occupancy Permits - Replacement	DDOT Occupancy Permits - Restoration	DOEE ESC Permits	DCRA Postcard Permits
CIP										
BBB (Block-by-block)	10,086	48,163	116,498	1,096	10,086	1,096	1,096	1,096	1,096	10,086
Emergency/Vulnerable Pop	3,208	-	6,416	NA	3,208	3,208	3,208	3,208	NA	3,208
SDWMR Program	3,830	-	7,660	not in LFDC	3,830	not in LFDC	not in LFDC	not in LFDC	NA	3,830
VFRP	1,997	-	3,993	NA	1,997	1,997	1,997	1,997	NA	1,997
LPRAP	8,854	-	8,854	NA	8,854	2,214	8,854	8,854	NA	8,854
TOTAL	27,975	48,163	143,421	1,096	27,975	8,515	15,155	15,155	1,096	27,975

Required Permits & Inspections:

- **DDOT Construction Permit** = whenever there is a public-side excavation

Work will require 8,515 DDOT Construction Permits (assuming one Construction permit per block in CIPERR block-by-block project, one Construction permit for each CIPERR Emergency Replacement and VFRP replacement, assuming one Construction permit for 25% of LPRAP replacements that will require some public-side excavation).

The cost of a DDOT Construction Permit is \$150 per each excavation in public space and private property = number of test pits. Currently DDOT waives permit fees for LPRAP. Thus, as the programs

stand today, the cost of DDOT Construction Permits = CIP and VFRP test pits * \$150 = 134,567 * \$150 = \$20,185,050.

- **DDOT Occupancy Permit** – whenever a contractor is mobilized in an area for work

Work will require 15,155 DDOT Occupancy Permits for replacement (assuming one Occupancy permit per block in CIPERR block-by-block program, one Construction permit for each CIPERR Emergency Replacement, VFRP replacement, and LPRAP replacement) and 15,155 DDOT Occupancy Permits for restoration = 30,310 DDOT Occupancy Permits.

The cost of a DDOT Occupancy Permit is \$75 = 30,310 * \$75 = \$2,273,250.

- **DDOT Inspections** – during and after active construction

See DDOT cost estimate below.

- **DCRA Postcard Permit** – whenever there is a private-side installation connecting a new service to the shut-off valve at the point-of-entry

Work will require 27,975 DCRA Postcard Permits (for each lead service line replacement).

The cost of DCRA Postcard Permits is \$55 each = 27,975 * \$55 = \$1,538,625.

- **DCRA Inspections** – for every new connection to private-side premise plumbing

Per DCRA recommendation detailed below, DCRA approved Third Party Inspectors cost about \$400 per inspection (based on experience from DC Water's LSR programs). Each replacement will require a DCRA certified inspection = 27,975 * \$400 = \$11,190,000.

- **DOEE Erosion and Sediment Control (ESC) Permit** – when a certain threshold of excavation occurs (block-level projects)

Work will require 1,096 DOEE Erosion and Sediment Control Permits (assuming one ESC permit per CIPERR block-by-block project).

DDOT Spending Plan

CONSTRUCTION PERMIT TECHNICIANS: 3

PSRD (Public Space Resource Division) estimates it will need **3 construction permit technicians** to process the volume of construction permits DC Water expects to submit to support its lead line replacement program.

In CY21, PSRD processed approximately **11,801 construction permit applications** of the type expected to be submitted with the lead line replacement programs as identified by DC Water (i.e., new applications for excavation and similar underground utility infrastructure work).

These applications were processed by **7 technicians**.

Therefore, **1 technician processes approximately 1,686 construction permit applications annually**.

Therefore, based on the numbers provided by DC Water (approximately 50-100 applications weekly = 3,000 to 5,000 applications annually), DDOT would need **3 construction permit technicians** to process these applications.

OCCUPANCY PERMIT TECHNICIANS: 5

PSRD estimates it will need **5 occupancy permit technicians** to process the volume of construction permits DC Water expects to submit to support its lead line replacement program.

DC Water will need **construction staging area occupancy permits** as well. DC Water will need a minimum of 2 occupancy permits for every 1 construction permit (1 each for excavation and for restoration). (We are excluding **renewals** since those typically can be processed much more quickly than the original permits, though they do take some time to process.)

Therefore, DC Water will require at least **6,000 - 10,000 construction staging area occupancy permits annually**.

In CY21, PSRD processed approximately **16,802 construction staging area permit applications**.

These applications were processed by **9 technicians**.

Therefore, **1 technician processes approximately 1,867 construction staging area permit applications annually**.

Therefore, extrapolating from the numbers provided by DC Water, DDOT will need **5 occupancy permit technicians** to process these applications.

PLAN REVIEWERS: 5

PSRD estimates it will need **5 Traffic Work Zone Technicians**.

Every construction permit application will require review by a Traffic Work Zone Technician (TWZT), resulting in approximately 5,000 reviews. In addition, the Traffic Work Zone technician will need to review the additional restoration construction staging area occupancy permit applications, requiring another 5,000 reviews for a total of **10,000 traffic work zone reviews**.

The **8 TWZTs** reviewed **16,522 applications** in CY21. Therefore, each TWZT reviewed **2,065 application last year**.

To perform 10,000 reviews, DDOT will need **5 TWZTs**.

PUBLIC SPACE INSPECTORS: 10

PSRD estimates it will need **10 Public Space Inspectors**.

Each of the 3,000 to 5,000 applications annually will require a minimum of 5 public space inspections. These include at least 1 inspection during the application review process; 1 inspection prior to the start of construction; 1 inspection while construction is underway; 1 inspection to establish the extent of restoration; and 1 inspection to confirm restoration was completed properly.

Therefore, there will be approximately **25,000 public space inspections**.

These inspections will be performed by Capital Improvement Projects inspectors within the Public Space Inspections team. These inspectors averaged a little over 2,000 permit inspections in CY21. Therefore, DDOT will need at least **10 Public Space Inspectors** to perform the required inspections annually to support this program.

DCRA Spending Plan

DCRA cannot accommodate the expected expanded program inspection-wise. It would require a full time inspector which is not feasible. **It is highly recommended that DC Water use the Third-Party Inspection Program** (see cost estimate above). Same-day inspections are difficult to achieve, as is the inspections themselves are sometimes scheduled late and utilize a lot of administrative time to manually schedule. As of now the inspections that are being called-in require around 2.5 hours/day to accommodate their needs. DCRA currently use between 1 and 2 inspectors, as work is spreading out.

If DCRA/DOB bring inspections in-house, this will require a FTE for the years of the program, which will require funding. Regarding the staffing hourly wage, DCRA/DOB believes an hourly rate from the agency is \$140 with fringes, i.e., fully loaded. A DCRA inspection is required for each private side replacement = 27,875 replacements * 2.5 hours inspection = 69,688 hrs/8 years = 8711 hrs per year/2080 hrs per FTE = 4.2 FTEs each year. Cost per FTE is \$140/hr * 2080 = \$291,200 * 4.2 FTE = \$1,223,040 per year. By comparison, DC Water's estimate of Third Party Inspections = \$1,398,750 per year.

Two additional types of properties take more time for inspections due to their complexities: historic district and flood hazard area properties. DC Water and DCRA will conduct an analysis of estimated work in these areas, though it should not be a significant impact to cost.

DOEE and other Agency Spending Plan

Per the FY23 budget, DOEE's cost proposal is two Grade 11 FTEs (\$68,870) x ~23% fringe rate = ~\$170K. These are union positions, so there will likely be a cost of living increase each year.

The stormwater permit team is paid for by permit fees and will not require additional funding.

E. Recommended Changes or Clarifications to DC Water's Lead Service Line Replacement Plan

The following section details recommendations related to planning and prioritization of lead service line projects to achieve the 2030 Lead Free goal. The Task Force members share goals around transparency, public participation, and flexibility to allow potentially changes prioritization in response to evolving regulatory conditions and program needs. **The Task Force is interested in comments and feedback from the public around how best to achieve these shared goals.**

DC Water's LSLR Plan uses a multi-tiered process to schedule LSL replacements. First, it assigns blocks various values based on measures of economic need (using an "Area Deprivation Index"), elevated health risks for customers with children, coordination with water main replacement, water quality issues related to water mains, and the service line material (i.e., whether lead is on the public and/or

private side).¹³ DC Water gives each of these elements a percentage weight from 5% to 27% of the total and scores each factor from one (negligible) to ten (extreme). Second, it uses this prioritization algorithm to schedule block-by-block replacement within three groups: (1) block-by-block primarily targeting old water mains in very poor condition; (2) block-by-block where the water main is not considered a high risk of failure; and (3) by-premise LSLs under the VFRP and LPRAP programs,¹⁴. Third, DC Water divides the replacement work into four phases: (1) the current programs through FY 2021); (2) block-by-block replacement of service lines only where little or no design work is required for water mains (FY 2022 through FY 2024); (3) LSLs replaced in conjunction with water main replacement (FY 2024 through FY 2029); and (4) service lines with unknown material not already included in block projects.¹⁵

The Task Force recognizes DC Water's prioritization efforts were a commendable step towards incorporating equity while planning the first year of block-by-block projects, and DC Water recognized that this planning process would be iterative and built a prioritization model that can be modified with improved inventory data and evolving equity factors.

Figure 5 below summarizes the Task Force recommendations laid out in this section and how they can be reflected in DC Water's prioritization model.

Figure 5. Task Force Recommendations to Improve DC Water's June 2021 Lead Free DC Prioritization Model

¹³ LSLR Plan, page 7.

¹⁴ LSLR Plan, page 8.

¹⁵ LSLR Plan, page 8.

Current Prioritization Criteria (June 2021)			
Category	Criteria	Weight %	Data source
Physical Condition	Main Breaks	5%	DC Water's Asset Data
Water Quality	Iron Concentration	14%	DC Water's Water Testing Data
	Chlorine Concentration	5%	DC Water's Water Testing Data
	Service Line Pipe Material	27%	DC Water's Service Line Inventory
Health and Social Equity	Area Deprivation Index	30%	U.Wisconsin
Vulnerable Population	Children under 18	10%	US Census American Community
	Daycares	10%	US Census American Community
Proposed Prioritization Criteria			
Category	Criteria	Weight %**	Data source
Water Quality	Service Line Pipe Material	40%	DC Water's Service Line Inventory
Vulnerable Population	Children under 5	15%	US Census American Community
	Blood Lead Levels*	15%	From DOEE/DOH
Health and Social Equity	Black/African-American Households	15%	US Census American Community
	Median Income	15%	US Census American Community
		100%	

*DC Water does not currently have access to this data but is working with DOEE on a Memorandum of Understanding to obtain available data set on blood lead levels.

**Sensitivity analyses have not been conducted because not all of this data is currently available. The percentage weights in the proposed prioritization may change.

The Task Force also notes that it is important to consider other factors related to planning and implementing projects like the White House Council of Environmental Quality's Climate and Economic Justice Screening Tool (CEJST) that defines "Disadvantaged Areas" that can be used to prioritize the allocation of funding to meet the Justice40 goal wherein 40% of spending or project impact fall within those defined "Disadvantaged Areas."

Recommendation 1: Replace the Area Deprivation Index with other specific demographic data to better prioritize social equity

The Area Deprivation Index (ADI) is based on a measure created by the Health Resources & Services Administration (HRSA) and was refined, adapted, and validated to the Census Block Group neighborhood level by University of Wisconsin-Madison. It allows for rankings of neighborhoods by socioeconomic disadvantage including factors for the theoretical domains of income, education, employment, and housing quality with 17 socioeconomic and demographic factors drawn from 2014-

2018 US census data.¹⁶ Although this tool focuses on equity, it uses too many inputs that might not be meaningful or strongly associated with the lead in water issue. Each factor in the ADI is given a score to identify “least disadvantaged block groups” and “most disadvantaged block groups.” While this methodology appears to have a degree of precision, a close examination identifies several weaknesses.

A number of the ADI’s constituent elements — e.g., median family income, median monthly mortgage, percent of population below 150% of the poverty threshold, percent of families below the poverty level, and income disparity — are simply various ways of measuring income and provide little or no incremental information, particularly when they are based on outdated data. The ADI also includes factors that are not directly relevant in the DC LSL replacement context and could add noise to the model. For instance, the percent of occupied housing units without a telephone, the percent of housing units without a motor vehicle, crowding in the home, and the percent of occupied housing units without complete plumbing all indicate income disparity but might not be as relevant of an indicator for the District of Columbia. Finally, the ADI does not expressly consider the impact of historical disadvantages and systemic racism faced by communities of color, particularly Black residents. We know that Black Americans have the highest mean blood lead levels and that Black children are more likely than others to experience elevated lead levels.¹⁷ The past voluntary programs have not produced racially equitable results,¹⁸ and race is an appropriate consideration in the LSL replacement program.

Including these most relevant metrics directly, rather than relying on the ADI, would allow for a more efficient modeling scheme that will be more equitable and transparent to stakeholders.

¹⁶ LSLR Plan, page 7. The use of data from 2014-2018 may be questionable given the recent growth of the District and the changes in demographics as a result of gentrification.

¹⁷ White, B. M., Bonilha, H. S., & Ellis, C. (2016), “Racial/Ethnic Differences in Childhood Blood Lead Levels Among Children <72 Months of Age in the United States: A Systematic Review of the Literature,” *Journal of Racial and Ethnic Health Disparities*, 3(1), 145–153.

¹⁸ Baehler, K. J., McGraw, M., Aquino, M. J., Heslin, R., McCormick, L., & Neltner, T. (2022), “Full Lead Service Line Replacement: A Case Study of Equity in Environmental Remediation,” *Sustainability*, 14(1), 352.

Recommendation 2: Update children dataset, remove daycare centers, and explore using blood lead levels to better prioritize vulnerable populations

In an effort to prioritize vulnerable populations, DC Water's model considered the number of children ages 18 or younger and whether there is a licensed daycare facility within 200 feet of a block. It is certainly appropriate to give greater weight to LSLs that provide drinking water to children at a developmental stage, typically under age 5, but DC Water's approach to identifying this vulnerable population should be improved.

DC Water concluded that "the Census data of children under 5 did not provide sufficient variation across the District," and instead, it used data for children under 18, which it "considered representative of where families live in the District."¹⁹ Specifically, DC Water was concerned about the accurate representation at the census block level, not the ward level. Census data for children under age 5 is available,²⁰ however, and it shows a significant variation between wards. For instance, children under 5 represent 2.9% of the total population in Ward 2 compared to 9.7% in Ward 8. Moreover, the data indicates that there is not a direct correlation between the number of children under 18 and the number of children under 5. It is also unclear when the data on children were collected, and given demographic shifts throughout the District, whether the data are currently representative of where children live.

DC Water's use of proximity to daycare centers as a measure of vulnerable populations is likely to skew the priority toward more affluent neighborhoods where daycare is more readily available and produce inequitable results. Comparing the number of children under 5 in each ward²¹ with the number of spaces for pre-school children in licensed daycare centers²² demonstrates this disparity: Ward 1 — spaces for 23.4% of the under 5 population; Ward 2 — 68.9%; Ward 3 — 41.5%; Ward 4 — 25.6%; Ward 5 — 14.8%; Ward 6 — 22.3%; Ward 7 — 14.5%; Ward 8 — 21.3%. Thus, using proximity to daycare facilities as a factor in setting LSL replacements priorities will give an unwarranted advantage

¹⁹ LSLR Plan, page 5.

²⁰ See "Population by Age Group by Ward in the District of Columbia," Anne E. Casey Foundation, Kids Count Data Center. DC Water uses data from census tract level, not the individual block level. LSLR Plan, page 7.

²¹ "Population by Age Group by Ward in the District of Columbia."

²² Office of the State Superintendent of Education, District of Columbia, April 2022 "Child Development Facility Report."

to residents in Wards 2 and 3 and will disadvantage Wards 7 and 5, which have among the highest concentrations of children under age 5. The Task Force recommends that DC Water use only the number of children under age 5 in its prioritization model, not proximity to a daycare facility.

DC Water's LSLR Plan also contemplates that "high risk homes, such as those with pregnant people and children under six . . . will be addressed individually at the time of notification."²³ While these groups certainly warrant special consideration, it may not be feasible to replace them ahead of the planned work. Further evaluation of options to enable full and private-side only replacements for this critical population is needed.

DC Water is working with DOH to obtain their children-health data they developed for 51 delineated areas of the District. DC Water is also currently working with DOEE to obtain blood lead level data to begin analysis in how available data can be used in prioritization model. If a geographic area has higher blood lead levels, then removing a source of lead for that group should be prioritized.

Recommendation 3: Remove water quality and water main factors in prioritization model

DC Water gives a relatively small preference to replacing LSLs where there have been historic water main failures. It is reasonable and efficient to replace all LSLs connected to a water main that is in poor condition. This priority would apply only when all other factors are equal.²⁴

DC Water's LSLR Plan gives a larger preference, however, where its water testing identifies a water quality risk based on iron or chlorine concentrations that are markers for deterioration of unlined cast iron water mains. DC Water justified using these criteria in the prioritization because low chlorine and elevated iron in water can increase lead release. The Task Force recommends removing these criteria to focus on the equity and vulnerable populations with more directly related datasets than the potential for chlorine or iron to cause increase lead release (e.g., elevated blood lead level case data could be considered a primary indicator while chlorine and iron are secondary and influence blood lead levels).

²³ LSLR Plan, page 8.

²⁴ LSLR Plan, page 7.

Recommendation 4: Score private-only lead service lines the same as full lead service lines in prioritization model

DC Water's LSLR Plan gives greatest weight to blocks with the highest concentrations of LSLs.²⁵ The Plan gives greater weight, however, to replacing public side LSLs and lesser weight to replacing private-side only lead service lines. The Task Force agrees that the presence of lead pipe poses a risk and, in consideration to improving LSR efficiencies, recommends that all service lines with any amount of lead pipe be given the same score for prioritization model.

Recommendation 5: Redistribute relative weights of each factor in prioritization model

DC Water assigned the following weights to each of the factors in its model based on its "engineering judgment" rather than any objective, quantifiable criteria: (1) ADI — 25%; (2) children under 18 — 10%; (3) licensed daycare facility — 15%; (4) water main failures — 5%; iron concentration — 14%; (5) chlorine concentration — 5%; and (6) service line material — 27%.²⁶ Based on the previous analysis, the Task Force recommends several changes.

The Task Force recommends the following three factors should be prioritized with example weights. The model will change over time, so analysis of data inputs and outputs to achieve the desired prioritization will be executed. The Task Force recommends DC Water to publicize the prioritization model with each planning year in advance of execution.

- 1) Presence of lead service lines to give priority to areas with a high density of LSLs. The Taskforce suggests evaluating a weight of 40%.
- 2) Social equity – The Task Force suggests evaluating a weight of 35%.
- 3) Vulnerable population – The Task Force suggests evaluating a weight of 25%

²⁵ LSLR Plan, page 7.

²⁶ LSLR Plan, page 7. (The Plan does not explain why these weighting factors add up to 101%.)

F. Funding Sources

Available federal funding opportunities will vary over time, and it is DC Water’s obligation to stay current on potential funding sources each year. The Task Force has identified a sampling of some currently available sources of federal and private funding for LSL replacements.

Recommendation 1: Pursue Federal Funding

First, two recent federal acts provide the best funding opportunities for LSL replacement in the District.

American Rescue Plan Act of 2021 (ARP), Public Law No: 117-2, 117th Congress (2021-22)

Funds can be used “to make necessary investments to water, sewer, or broadband infrastructure.” H.R. 1319 9901 § (c)(1)(D). The District will receive at least \$3.3 billion in direct federal relief funds, including nearly \$2.4 billion in flexible relief funds. These flexible funds include \$107 million for capital projects—including construction or other durable infrastructure—and can be used in fiscal years 2021 through 2024. The District should make available and DC Water should use available ARP funds for LSL replacement.

Infrastructure Investment and Jobs Act of 2021 (IIJA), Public Law No: 117-58

The District will expect to receive \$355 million over five years to improve water infrastructure across the District, including but not limited to the replacement of LSLs. The amount dedicated to LSL removal in the District is unclear at this time. The District should make available and DC Water should use available IIJA funds for LSL replacement.

It is clear that both Acts can be used for LSL replacement, and the Mayor is responsible for allocating the funds. These Acts can and should be used to cover the entire project, making the use of rates unnecessary.

Second, the White House recently prepared a “Lead Pipe Replacement Funding Inventory” with an incomplete list of currently available federal agency programs that could be used to fund the replacement of LSLs. This inventory is available at: https://www.whitehouse.gov/wp-content/uploads/2022/03/lead_pipe_funding_fy2023.xlsx, and a list of the federal agency programs is copied below here:

EPA: Drinking Water State Revolving Fund – Base Program

EPA: Drinking Water State Revolving Fund - IJJA Enacted "General Supplemental" Funds

EPA: Drinking Water State Revolving Fund - IJJA Enacted "Lead Service Line Replacement and Associated Activities Supplemental" Funds

EPA: Water Infrastructure Finance and Innovation Act (WIFIA)

EPA: Small and Disadvantaged Communities Program Grants

EPA: Lead Testing in Schools and Childcare Facilities Drinking Water Grants

EPA: Reducing Lead in Drinking Water Grant

USDA: Water & Environmental Programs (WEP)

USDA: Rural Housing Repair Loans and Grants

HHS/CMS: Children's Health Insurance Program Health Services Initiatives - Lead Abatement

HHS/ACF: Head Start Program

Denali Commission: Sanitation

BIA: Other Program Construction, Water Safety and Sanitation

BIA: Water Sanitation

BIA: Facilities Infrastructure and Repair: Environmental Projects

NPS: Federal Lands Enhancement Recreation Act fees

NPS: Line Item Construction

NPS: Asset Management

HUD: Lead Hazard Reduction Healthy Homes Supplements

HUD: Healthy Homes Production Grant Program

HUD: Section 202 Housing for the Elderly Capital Advance

HUD: Section 811 Housing for the Persons with Disabilities Capital Advance

HUD: Housing Trust Fund (HTF)

HUD: Community Development Block Grant (CDBG)

HUD: HOME Investment Partnerships Program (HOME)

HUD: Public Housing Fund – Healthy Homes Set-Aside

HUD: Capital Fund Formula Grants

The Task Force recommends that DC Water review all of these potential federal funding sources and identify which programs could be used to fund LSL replacement in the District. While the CDBG, DWSRF, and WIFIA funds are likely the most well-known of the funding programs listed above, many of the other named programs also present promising sources of funding for the District and should not be overlooked.

In addition to the above-listed programs, two other federal agency programs could be used to fund LSL replacement in the District:

EPA’s Water Infrastructure Improvements for the Nation Act (WIIN Act)

This program assists disadvantaged communities with removing sources of lead in drinking water from drinking water systems and schools. Reduction in Lead Exposure via Drinking Water grants, a subtype of WIIN grant, funds LSL replacement. The District Department of Energy and Environment (DOEE) received \$2.3 million in Fiscal Year 2021 to support their child care center and school lead reduction program.

U.S. Department of Commerce’s Economic Development Administration (EDA), Public Works and Economic Development Program

The U.S. Department of Commerce Economic Development Administration (EDA) provides strategic investments to support economic development, foster job creation, and attract private investment in economically distressed areas of the country. The Public Works Program supports physical infrastructure improvements, including water system improvements, in economically distressed communities. Funding ranges from \$600,000 to \$3,000,000, with an average of \$1,400,000. Applications are accepted on a rolling basis.

DC Water should work with the District to apply for all available federal funds utilizing the above programs during each federal funding cycle until all lead service lines in the District are replaced.

DDOT should investigate additional funding sources that are available for transportation projects that can be used to fund restoration and street repaving costs in conjunction with LSL replacement so that funding available for LSL replacement is used for that purpose. See examples below:

Roads, Bridges and Major Projects	National Highway Performance Program	Department of Transportation	\$	148,000,000,000.00
Roads, Bridges and Major Projects	Surface Transportation Block Grant Program	Department of Transportation	\$	72,000,000,000.00
Roads, Bridges and Major Projects	Local and Regional Project Assistance Grants (RAISE)	Department of Transportation	\$	7,500,000,000.00
Roads, Bridges and Major Projects	Grants for Planning, Feasibility Analysis, and Revenue Forecasting (Bridge Investment Program Set-aside)	Department of Transportation	\$	100,000,000.00
Roads, Bridges and Major Projects	On-the-Job Training Program	Department of Transportation	\$	50,000,000.00

Recommendation 2: Pursue Private Funding

Finally, if federal funding does not cover all LSL replacement costs (which it should), DC Water should seek funding from private foundations. For example, DC Water has previously named the following foundations as potential sources of LSL replacement funds: Walton Foundation, Rockefeller Foundation, Lilly Foundation, and Bloomberg Foundation. For LSL replacement in schools and child care centers, DC Water should apply for funding from programs recommended by EPA in a 2019 report, available at: https://www.epa.gov/sites/default/files/2019-10/documents/3ts_funding_document_2019.pdf. This report includes state-specific recommendations, and EPA recommends that the District pursue funding from Kaiser Permanente Foundation, the Greater Washington Community Foundation, and the Morris and Gwendolyn Cafritz Foundation.

Recommendation 3: Continue to monitor costs and update cost estimate

Because any cost estimate will be subject to change and cannot always accurately predict actual costs, DC Water will need to collect data on costs actually incurred to update the estimate, to assess the efficiency of the LSL replacement work, and to identify ways to reduce future costs. In order to keep the Council and the public informed about progress on the project, DC Water will need to make its cost data available and transparent on a dedicated website. The cost data should be broken out in sufficient detail so that it can be analyzed to determine how cost performance compares with the cost estimates and the causes for cost that deviate from the cost estimate.

Any cost estimate at this early stage in a multi-year project will be subject to multiple uncertainties. The function of a prudent cost budget, however, is to gather data on comparable, well-managed projects that can be used as benchmarks, to specify necessary assumptions that may be subject to

change, to identify efficiencies that can reduce costs, and to provide a baseline to measure performance during the project. Not surprisingly, DC Water's cost estimate has evolved and will undoubtedly be refined as the agency learns more and gains actual field experience. This section of the Report examines the two estimates that DC Water has provided to the Task Force and the variables that will impact actual costs. The Task Force then provides recommendations for refining and using the estimate going forward.

DC Water's June 2021 Lead Service Line Replacement Plan (the LSLR Plan) includes a "planning level" cost estimate of between \$944 million and \$1.139 billion to replace all LSLs in the District by 2030 (the 2021 Estimate) which included all funded costs in the Capital Improvement Plan and unfunded costs.¹ The 2021 estimate was based on DC Water's historic costs "adjusted to reflect the faster pace and some more difficult-to-construct areas remaining." This estimate assumed that LSLs will continue to be replaced through the three existing programs: (1) the Lead Pipe Replacement Assistance Program (LPRAP) (wherein District funds cover 50-100% of the cost of private side LSL replacement), (2) the Voluntary Full Replacement Program (VFRP) (wherein DC Water covers 100% of the cost of public side LSL replacement), and (3) the Capital Improvement Plan and Emergency Repair Replacement (CIPERR) program (wherein DC Water/District funds cover 100% of the cost of public and private side LSL replacement). The Plan separately estimated costs for the public side and private side and identified costs that were currently funded and currently unfunded.

In the spring of 2022, DC Water revised its cost estimate to incorporate the latest bid information from its contractors, updated information about the scope of the work, and provided more detailed information about permitting and restoration work (the 2022 Estimate). After calculating the quantities and expected unit costs, the 2022 Estimate added a 10% contingency to account for uncertainties and a percentage factor for additional non-construction costs — 3% for planning and permitting, 10% for design, 10% for program management, 10% for outreach and stakeholder engagement, 5% for construction management, and 5% for data management. After all of these adjustments, DC Water's 2022 Estimate of total costs is \$598 million.²

In reviewing the cost estimate, the Task Force has considered DC Water's recent commitment to fully fund the costs to replace all LSLs (i.e., including the public and private sides) by 2030, either through federal and District appropriations³ or by customers through DC Water's rates.⁴ While the accuracy of DC Water's cost estimates remain a concern,⁵ the Task Force defers to the detailed review commissioned by the District Council and conducted by Safe Water Engineering.⁶ Instead of trying to improve the accuracy of the estimate, the Task Force focused its cost review on how actual costs can be reduced so that federal and District funds are used effectively and customers pay only the minimum amount required in rates for LSL replacement.

For purposes of this report, the Task Force uses the 2022 Estimate as DC Water’s most recent and most comprehensive estimate of costs.⁷ As DC Water compiled it, this estimate depends on a number of key variables that will determine the actual costs that will be required for LSL replacement. By managing and controlling those variables, DC Water can reduce the actual costs that will be incurred.

G. Recommendations

This section includes recommended legislative and policy language. The Task Force has reached consensus on many important themes (e.g., mandate for replacement).

See files:

- “20220708 Legislative Language draft.docx”
- “20220708 Legislation chart draft.docx”

H. Other Considerations

This section contains additional items to consider that did not fit into the scope of the sections as they were defined in the BSA.

In addition, there are sound policies reflected in the draft legislative language that the Task Force wishes to note here.

- Materials: lead, brass, and galvanized pipes (or pipe components such as pigtails and goosenecks) ought to remain eligible for replacement and ought to be included within the definition of “lead”
- Safety protocol: DC Water must use the best flushing and filtration protocol available.

Finally, although they are not raised as barriers in this report, two additional barriers to lead service line replacement are worth noting here. First, funding lead service line replacement without raising water rates has been a barrier in the past. This highlights the urgency to accelerate, where possible, LSLR to match the timeline of the largest federal funding streams to obviate the need for DC Water to

raise rates (although its board has already consented to future rate increases for this purpose) and to ensure that the District realizes the full benefit of the time-limited federal funds available to conduct full LSLR. Second, it is a challenge to communicate to customers that existing federal regulations are not designed to be fully health protective and are insufficient to protect human health.

Variables Affecting Costs

The number of LSLs

DC Water relies on its current service line inventory to estimate the number of LSLs that must be replaced, but errors will be discovered as the program proceeds. In addition to about 22,600 service lines that DC Water currently believes are lead, its inventory identifies about 14,700 service lines with unknown material and assumes that half of those are lead.⁸ Actual costs will depend on the final number of service lines that are determined to be lead.

As noted in Section ___ of this Report, it will be important to complete an accurate inventory as soon as possible so that the block-by-block replacement program can be optimized. Inaccuracies in the inventory or delays in completing it will cause inefficiencies in planning replacements and will increase costs.

The number of service lines that require material identification or verification

The 2022 Estimate added an additional cost for test pits to verify the material on 48,163 public-side service lines that were historically identified as copper but may contain lead (e.g., brass or galvanized pipe). DC Water believes that less than 10% of those lines may need to be added to the LSL inventory and replaced. As with the overall inventory, it will be important to complete these verifications quickly so that they can be included in the block-by-block planning.

The methodology used to determine service line materials

The 2022 Estimate assumes that each service line in the VFRP and the CIPERR programs will require two test pits to identify or verify the material and one test pit for the private-side only LFRAP program. Test pits require digging to expose five to ten feet of the service line to physically verify the material used. The 2022 Estimate includes more than \$66 million for material verification, assuming that this test pit methodology will be used.

Other water utilities face a similar problem identifying the service line material, and the Environmental Protection Agency (EPA) reviewed alternative methodologies in an August 2021 paper.⁹ According to this paper, the test pit methodology is considered reliable but is “costly,” requires more time, and

creates disturbance to dig up service lines that are not lead. One currently available alternative is vacuum excavation, i.e., a hydro-vacuum truck uses a high-pressure water jet and industrial vacuum to loosen the soil while a vacuum removes it into a holding tank until the service line is exposed. This methodology creates a smaller hole, is less expensive, and causes less disturbance, but for a heterogeneous service line, it may miss lead segments. Due to this potential for false negatives, the Task Force does not recommend vacuum excavation as a cost-saving measure at this time.

Alternative LSL identification methods are in various stages of development. Electrical resistance, acoustic wave, and eddy current technologies are in laboratory or field evaluation, and metal detectors and electrical conductivity are being explored. Given the estimated \$66 million for test pits, it would be a sound investment for the DC Water to consider one of these less costly methodologies should it become mature, provided they prove capable of accurately detecting any lead segments in service lines and the costs of developing such methodologies does not exceed the savings expected from their use.

The amount of street restoration work that will be required

DC Water's estimate assumes that the block-by-block replacement program will require "curb-to-curb restoration" of every street where public-side LSLs are replaced. DDOT's regulations require a street to be completely repaved if the cumulative cuts in the pavement exceed 30 linear feet on a block.¹⁰ DC Water has assumed that every street in the CIPERR block-by-block program will have to be fully repaved, and the 2022 Estimate includes \$83 million in these restoration costs.

The Memorandum of Agreement between DC Water and DDOT¹¹ provides that "[i]f there are streets that overlap with DC Water CIPERR, DDOT's annual Paving Plan or other similar projects, coordination should be conducted, to the extent reasonably practical and based on both parties' independent priorities, to mobilize DDOT paving crews after DC Water CIPERR crews."¹² This coordination will reduce restoration costs, and both parties should take full advantage of such overlaps. In addition, DDOT could consider modifications to its regulations that could reduce the instances when LSL replacements will necessitate curb-to-curb restoration without jeopardizing the integrity of the street. For instance, DDOT's moratorium on non-emergency excavation on streets that were reconstructed or resurfaced within the previous five years should be waived for LSL replacements.¹³

The amount of small diameter water mains that will require replacement because of LSL replacement

The 2022 Estimate assumes that the block-by-block LSL replacement will affect the integrity of about 21 miles of poor-condition small diameter water mains that will need to be replaced. Another 152 miles of small diameter water mains will be replaced as part of DC Water's ongoing water main replacement

program, not attributable to LSL replacement. LSLs connected to those small diameter water mains will be replaced in connection with that separate program.

Funds that are earmarked for LSL replacement should not be used to replace small diameter water mains (or any water mains, for that matter), regardless of whether they are planned as part of DC Water's ongoing water main replacement program or incidental to the LSL replacement program. In either case, the water mains are part of DC Water's capital infrastructure that it must maintain, regardless of any LSL replacements. The Task Force agrees that poor-condition water mains will have to be replaced to assure water quality, but that work should not be attributed or charged to LSL replacement since it would be required in any case. Similarly, it may make sense to upgrade water mains at the same time as LSLR, but that does not make water mains a LSL cost, and it should not be counted as such.

The efficiencies that can be achieved where a backlog of approved replacements can be secured

The block-by-block LSL replacement program is the least-cost and most equitable option. The current customer-initiated LPRAP and VFRP programs are performed by smaller businesses/plumbers at a higher unit cost than the DC Water-initiated CIPERR block-by-block program. The block-by-block program will realize the greatest efficiency when all LSLs on a block or group of blocks have been definitively identified in advance and DC Water has all required authorizations — e.g., permits and authorizations for work on the private side. Costs will increase if all of the LSLs on a block cannot be replaced together and some must be handled as one-offs at a later time.

Lower costs can accordingly be achieved by focusing on the block-by-block program and expeditiously phasing out the more expensive and less equitable LPRAP and VFRP programs. These separate resident-initiated programs, which in many cases rely at least partially on resident funding of LSL replacement, were developed before the influx of federal funding that enabled DC Water's recent commitment to fully fund the costs to replace all LSLs by 2030 (through federal and District appropriations¹⁴ or, if needed, by customers through DC Water's rates).¹⁵ DC Water's Memoranda of Understanding with DDOT and DCRA (DOB) should facilitate the timely permits and inspections that will be essential on the block-by-block program.¹⁶

Moreover, an effective mandate to replace private-side LSLs is also essential to minimize costs and to complete all LSL replacements by 2030.¹⁷ Any delays in obtaining authorization to conduct work on private property will lead directly to increased costs.¹⁸ A mandate that explicitly requires LSLR and, among other things, allows for entry on private property will avoid these delays and the associated increased costs. This mandate will further facilitate the phasing out of the more expensive LPRAP and

VFRP programs because such resident-initiated programs would be obsolete after DC Water has explicit statutory authority to enter private property to replace private-side LSLs.

The impact of inflation on the costs of materials and labor

The 2022 Estimate does not include an express allowance for expected inflation, though the costs of materials and labor will increase over the eight years of the LSL replacement project. It would be prudent to include an inflation allowance of about 3% for each year of the estimate. Because materials and labor costs are continuing to rise, all other things being equal, costs will be lower if the project can be completed sooner. Thus, earlier completion is not only important from a health and safety standpoint, but it could help to reduce costs by avoiding some price inflation and taking advantage of federally available funds that will expire before 2030.

The ability of program management to control and reduce costs

The 2022 Estimate includes 10% of construction costs — about \$34 million — for “program management.” DC Water has indicated that it is in the process of contracting with a program manager for the entire project. The program manager can and should take steps to meet or exceed cost expectations. In addition to overall management of the project to assure efficient execution of the Plan, the program manager should apply value engineering techniques to reduce costs. Value engineering “is a creative, organized effort, which analyzes the requirements of a project for the purpose of achieving the essential functions at the lowest total costs (capital, staffing, energy, maintenance) over the life of the project.”¹⁹

The program manager should have incentives to control and reduce costs consistent with maintaining quality and schedule requirements. Financial incentives are typically included in the project manager’s contract in the form of bonuses or penalties related to cost and schedule.

The economies that should be realized over time as a result of experience

The 2022 Estimate is based on a combination of limited experience in replacing LSLs on a piecemeal basis and bids from construction contractors for the initial phases of the block-by-block program. Experience in other cities has shown, however, that “even if LSLR costs start high with the launch of a new program, they are likely to reduce quickly as cost-efficient strategies become apparent.”²⁰ The 2022 Estimate does not account for any improved efficiency over time. If properly managed to take advantage of the learning process and as contractors and inspectors become accustomed to LSL replacement on a block-by-block basis, the actual costs should be less than the current estimate.

Recommendations on Communications and Outreach

DC Water presented to the Task Force the Communications and Outreach Playbook detailing tactics and processes from this first year of block-by-block projects. See Appendix file "'17 – 20220525 LFDC By-Block Communication and Outreach Playbook DRAFT.pdf." The Task Force encourages public feedback.

Note: the draft section below was provided 7/14 and most Task Force members have not reviewed and provided comments or feedback.

STAKEHOLDER ENGAGEMENT AND COMMUNITY OUTREACH

The Task Force believes that complete, accurate, thorough, and transparent communications as well as equitable and robust community partnership are essential for the successful implementation of the Lead Service Line Replacement (LSLR) Program. Such implementation requires that:

- Residents appreciate the health benefits of full LSLR and recognize the importance of the LSLR Program, and
- Have ongoing opportunities to shape and reshape the LSLR Program, as the program unfolds and areas for improvement become clear.

Central to achieving the above requirements will be a justice-centered LSLR Program that ensures, with continuous resident input:

- **Equitable LSLR** (i.e., that prioritizes historically disadvantaged neighborhoods and neighborhoods living with partially replaced LSLs)
- **Recognition of the diversity of knowledges, concerns, experiences, and needs among District residents** and mechanisms for addressing these knowledges, concerns, experiences, and needs
- **Equitable and robust resident participation in the LSLR program**, including at a minimum a) the creation of key focus groups for initial information gathering and guidance on the LSLR Program design, and b) paid resident ambassadors from every Ward who will serve as liaisons between residents and DC Water for the duration of the LSLR Program.

The stakeholder engagement and community outreach strategy should include focus groups, paid resident ambassadors, advertising to publicize the program, regular public meetings, educational materials, filter distribution programs, and mechanisms to collect customer feedback throughout the implementation of the LSLR.

Outreach Objectives and Best Practices

- Inform customers about the history of lead in water in the District - including the history of scientifically documented health harm and the scientifically documented health risks of the District's LSLs, as well as the public health benefits of lead service line replacement.

- Inform customers about the LSLR Program and conduct multiple focus groups, centering key stakeholders (e.g., residents in disadvantaged neighborhoods, members of neighborhoods with historic problems with lead in water, members of neighborhoods with a high concentration of partial LSLs, tenants, landlords) to understand resident questions, concerns, and recommendation and, by extension, how best to design/improve the LSLR Program.
- Inform customers about their service line material(s) as well as all uncertainties/limitations pertaining to the identification of those materials and any potential components that may contain lead but that do not meet DC Water's LSL definition and will not be replaced.
- Develop a Q&A document that is posted online and distributed to customers addressing key elements of the LSLR Program and common resident questions and concerns (e.g., parking disruptions, property disturbances, repair/restoration of yards, fences, landscaping).
- Inform customers of their service line replacement options and rights under the law.
- Publicize information that is reviewed and approved by focus group members, Ward-specific ambassadors, and ANC commissioners spelling out in a complete, accurate, and user-friendly way all components of the LSLR Program (e.g., assistance funding, service line map, service line materials identification guides, water filtration program, etc.). For all written materials, follow the District's language access protocols.

Outreach Tactics

Stakeholder Engagement

First, the Task Force recommends that DC Water work with external stakeholders to report on the progress of the LSLR Program and solicit guidance on how to improve program outcomes. Deliverables from DC Water must include:

- Equity Plan to prioritize vulnerable/at-risk residents in the planning, communication, and implementation of LSLR Program activities.
- Improved outreach materials about lead risk mitigation, flushing and filtering.
- Tailored outreach activities to promote lead replacement including door-to-door canvassing, faith-based outreach, and ANC representation.
- Improved coordination and communication between residents, elected officials, advocacy groups, District agencies (holistic approach to addressing lead and lead inspections).
 - Feasible outside funding sources.
 - Identified opportunities for community and workforce development.
 - Identified ideas and champions for lead replacement/disclosure legislation and policy.

DC Water is also encouraged to work with external partners in other capacities including:

- Industry groups.
- Plumbers and contractors.
- Faith-based organizations and other non-profits, such as the Greater Washington Urban League and AARP, to distribute information and to co-host workshops to share information with customers and help them apply.

- DC Office on Religious Affairs, DC Office on Aging and other District government agencies to help reach customers and disseminate information.

Second, the Task Force recommends that DC Water and DOEE schedule biannual public meetings to update the public on the progress of the Lead Service Line Replacement Program and to solicit public input on needed program modifications. These public hearings should be held in-person with a virtual/web-access component and should be advertised in local newspapers, on DC Water's and DOEE's websites, and in all written educational materials that are distributed to the public. In addition, DC Water should attend ANC meetings to provide updates on the LSLR program, and advertise the biannual LSLR program public hearings at these ANC meetings.

Direct Engagement

First, the Task Force recommends that DC Water and the District implement a Filter Program, pursuant to the terms of the draft legislative language we are concurrently proposing. As specified in the draft legislative language, the District should supply pitcher-style or point-of-use filters to all buildings with lead or unknown service line materials within fourteen days of providing notice to those properties regarding the presence of a lead service line or a service line with unknown material.

Second, the Task Force recommends that DC Water improve its educational materials in the following ways.

- DC Water must provide written notice to all buildings with a lead service line or a line of unknown material within six months of the effective date of the Task Force's proposed legislation, or within six months of DC Water's determination that a building is serviced by a lead service line.
- As recommended in part X of this report, DC Water must make improvements to its online map of service lines, including updating the information on the map and correcting confusing and misleading color codes for buildings. The Task Force's specific recommendations regarding the map improvements are made in section X of this report.
- DC Water must edit all of its written handouts, brochures, flyers, emails, letters, and webpage materials to better explain the health threats posed by any amount of lead in service lines, even when DC Water is in compliance with all lead regulatory requirements. This science-based health information must include the risks to all age groups, as well as the risks from taps that have previously tested negative for lead. All written materials must be reviewed and approved by focus group members, Ward-specific ambassadors, and ANC commissioners.
- DC Water must also address disruptions to street parking and damage to lawns, landscaping, fences, and other property concerns in all of its written educational materials. Based on preliminary, informal survey data, the Task Force believes that property damage and inconveniences are major barriers to current LSLR program participation. DC Water must make all reasonable assurances regarding the minimization of disruptions and property damage, as well as repairs to damaged property and landscaping.

- DC Water must also target property owners, as opposed to tenants, in its outreach about the LSLR program. This is especially critical because property owners will be the individuals receiving notice of the lead service line or service line of unknown material and will be responsible for signing the right of entry form, pursuant to the Task Force's proposed legislative language.
- DC Water must abide by all language access protocols in the district and provide educational materials in multiple languages. DC Water must also use simple language that is at a maximum fifth-grade reading level whenever possible.
- Finally, DC Water should implement a complaint system that provides an outlet for the public to comment and raise concerns. This complaint system should be accessible on DC Water's website, and advertised in all written materials about the LSLR program.

DC Water should leverage engagement activities that have proven effective and successful in previous authority outreach campaigns like the promotion of the Customer Assistance Programs (CAP). This includes attending community meetings, hosting and participating in outreach events, and creating other opportunities to engage directly with customers, disseminate information and help eligible customers sign up for the programs.

Specifically, to promote the LSLR program DC Water should:

- Continue to staff a lead hotline and designated email inbox for lead inquiries.
- Distribute lead test kits and provide 10-L bottle sampling.
- Host public pop-ups such as outside Metro stations or other high-traffic public locations in the District to hand out information and engage with customers.
- Engage in door-to-door canvassing in targeted neighborhoods.
- Visit Senior Wellness Centers to hand out information about programs and engage with seniors who are DC Water customers.
- Attend Advisory Neighborhood Commission and Civic Association Meetings to offer presentations to share information and explain the application process. DC Water will also continue its practice of outreach before planned projects to ensure participation for
- free replacements.
- Coordinate with EOM and Council Offices to distribute information to constituents.
- Provide bill inserts and Lead Free DC bill envelopes and create and distribute semiannual bill inserts about programs.
- Distribute email blasts and engage community listservs.
- Expand website and digital resources.
- Implement social media campaigns.
- Create "hubs" for information about lead at DC libraries and recreation centers.
- Produce captioned video resources in multiple languages.

Promotion

In addition to the above stakeholder and direct engagement recommendations, DC Water and our partners should, in partnership with focus group members, Ward-specific ambassadors, and ANC commissioners, pursue traditional means of promotion and advertising to disseminate Lead Free DC messaging and initiatives.

- Media campaign: Paid exposure to broader audiences, creating high visibility messaging to customers and stakeholders.
- Outdoor advertising: Use transit shelter ads along select bus routes and outdoor placement at Metrorail stations and on Metrobuses.
- Digital advertising: Use targeted digital advertising to reach customers with known lead service lines and vulnerable populations.
- Print advertising: Place large advertisements in local print publications including the Hill Rag, Informer, etc.
- Earned media: Press releases and announcement of media-related events; contact local
- TV and radio news outlets, blogs and DC TV to generate news stories and on-set interviews to publicize opportunities.

I. Appendix

Files include:

- "C1 – 20220624 CIPERR MOA Addendum – For Signature.docx"
- "C1 – 20220624_LPRAP VFRP MOA – For Signature.docx"
- "I7 – 20220525 LFDC By-Block Communication and Outreach Playbook DRAFT.pdf"
- 20220708 Legislative Language draft.docx"
- "20220708 Legislation chart draft.docx"
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