INFORMATION REPORT

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	September 10, 2021
SUBJECT/REPORT NO:	Feasibility of 5-Year and 10-Year Accelerated Lead Water Service Line Replacement Options (PW19094(b)) (City Wide) **(Outstanding Business List Item) (REVISED)**
WARD(S) AFFECTED:	City Wide
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SUBMITTED BY: **SIGNATURE:**	Andrew Grice Director, Hamilton Water Public Works Department 

COUNCIL DIRECTION

At Council's meeting on October 28, 2020, Council approved a motion that directed staff to report back to the Public Works Committee on funding options for a 5-year and 10-year funding plan utilizing Water, Wastewater and Stormwater rates, general levy or any other level of government subsidy opportunities related to the capital and operating costs.

INFORMATION

At the November 18, 2019 Public Works Committee, staff presented an update regarding lead in drinking water in Report PW19094, which included updates on the lead water service line replacement program and the Corrosion Control Program. The report highlighted that private lead water service line replacements are completed through both the substandard water service replacement program, as well as coordinated with capital replacement projects. The substandard water service line replacement program is a citizen driven initiative and once a property owner has replaced the private portion of the lead water service line, the City of Hamilton (City) will replace the public portion of the water service line. The public portion of lead water service lines are also replaced during watermain and road rehabilitation capital construction projects. However, Report PW19094 highlighted that the partial

replacement of a lead water service does not provide the full benefit to the homeowner and in some cases, can temporarily increase the levels of lead in drinking water through the disturbance of lead particles during construction and the interaction of dissimilar metals.

Additionally, Report PW19094 highlighted the City's Corrosion Control Program. In 2015, Council approved a phosphate based chemical addition process to control lead in drinking water and the system was fully implemented in November 2018. Community lead sampling as per legislated requirements continues to occur, and the Corrosion Control Program has reduced the percentage of samples above the maximum allowable concentration of 10 µg/L for lead in drinking water. Hamilton Water is conducting a pipe analysis study that will provide further insight into the maturity of the program. It should also be noted that Health Canada has revised the guidelines for Canadian Drinking Water Quality with a new maximum allowable concentration for lead of 5 µg/L. The Ministry of Environment, Conservation and Parks, which regulates drinking water in Ontario has not made any changes to reflect the Health Canada guidelines.

In November 2019, Council directed staff to explore the feasibility of program changes to eliminate lead water services from the drinking water system. These measures would include by-law changes to mandate private lead water service line replacement if the public portion has been replaced or is to be replaced, increased accessibility to the lead water service line replacement loan program, as well as, options to accelerate the substandard water service line replacement program.

On August 21, 2020, Council approved the amendments to the Property Standards By-law (Report PED20121/FCS20060), requiring a property owner to replace the private portion of lead water service lines where the public portion of a lead water service line replacement has occurred or is to be replaced.

On October 19, 2020, at Public Works Committee, in Report PW19094(a) staff reported back with 10,15, and 20-year options to accelerate the replacement of the public portion of all known lead water services which indicated annual cost requirements ranging from approximately $6M – $13M per year, as well as, the associated staffing requirements.

The remainder of this report is focused on the feasibility of accelerating lead water service line replacements for five (5), 10, 15 and 20-year lead water service acceleration options:

1) Outreach, Education and Identification
2) Accelerated Program Costing Model
3) Staff and Equipment Requirements
4) Prequalified Contractor Model
5) Lead Water Service Replacement Loan Program

6) Financing Strategy

1) Outreach, Education and Identification

The City currently offers a number of resources related to lead in drinking water. These include a dedicated webpage for lead water service line replacements, video instruction for water service line material identification, as well as, offering free inspections to property owners to help identify water service line material type. The COVID-19 pandemic has resulted in enhancements to the level of service provided for lead water service verifications. Currently, lead water service verifications occur virtually, and it is anticipated that virtual lead water service identifications will continue in a post pandemic environment. This has been factored into the program estimates outlined in this report.

Developing a robust database of lead water service line locations is critical to accelerating the replacement program. It is generally accepted in the industry that homes built prior to 1955 were likely to have a lead water service line. This is a key statistic that has been and will continue to be utilized in outreach and education efforts (via water bill inserts, direct property mailings, community advertising, web material etc.), to notify property owners and occupants of the potential for their property to have a lead water service line.

Partial lead water services exist in the drinking water system as a result of the coordinated roads and watermain replacement program, or where the public lead water service has been replaced as the result of an emergency. Staff have identified gaps in the historical records for these situations and are currently working to validate addresses. Once data verification is complete, additional outreach and education efforts will be required with these properties.

2) Estimated Accelerated Program Costing Model

Based on annual averages, it will take 25 years to replace an estimated remaining 20,000 lead water service lines in the drinking water system at the current replacement rate. Staff have developed program costs for a five (5), 10, 15 and 20-year accelerated replacement strategy which is highlighted in Table 1 below. It should be noted that the program durations in Table 1 are contingent on securing the required proportion of contractors to achieve the required production rates.

Table 1 – Blended Contractor and In-House Estimated Cost Model

Accelerated Lead Water Service Replacement Program Duration (years)	Lead Water Service Replacement Costs	Municipal Law Enforcement Costs	Annual Cost ($/year)	Percentage of Services Replaced by in House Crew	Percentage of Services Replaced by Contractor's Crew
5	$136,833,297	$1,585,118	$27,683,684	17.7%	82.3%
10	$127,638,454	$1,319,891	$12,895,835	36.5%	63.5%
15	$119,803,110	$1,317,001	$8,074,675	56.5%	43.5%
20	$125,130,806	$1,276,793	$6,320,380	38.9%	61.1%
25 (Current) Program	$86,224,985	-	$3,448,999	49%	51%

The cost estimates in Table 1 above leverage a mix of internal staff and contractors to replace lead water service lines. The use of a blended contractor and in-house model was described in Report FCS19059(b), presented to the Audit, Finance and Administration Committee on December 5, 2019, that recommended annual savings of approximately $620K could be achieved by implementing one (1) substandard water service line replacement crew consisting of internal resources. Furthermore, this report noted the addition of a second internal staff crew for the five (5), 10, 15-year options to provide greater economic efficiency and assurance of replacement of the public portion of lead water services. By adding a second crew, additional savings of approximately $620K per year could be achieved bringing the total savings for two (2) crews to an estimated $1.2 M per year. Given the additional resources approved through the 2021 Rate Budget for an in-house lead water service replacement crew, the estimated costs for the 25-year program has been reduced to $86M from $103M, as previously noted in Table 1 – Blended Contractor and In-House Estimated Cost Model of Report PW19094(a). Both the 20-year and the 25-year programs included one (1) internal staff crew comprised of City staff and the costs are reflected in Table 1 above.

In addition to the costs identified in Table 1, it is also important to consider the requirement for cathodic protection of cast iron watermains. In cast iron watermains the connected lead water service lines act as sacrificial anodes and corrode at a faster rate than the watermain. Accelerated lead water service replacements will require the addition of cathodic protection control which is estimated at approximately $3M.

Should Council decide to proceed with any of the accelerated lead water service replacement program durations identified in Table 1 above, development of a lead water service location database may indicate that multiple road cuts along a particular street may be required. To preserve the asset life of the road surface by minimizing the

amount of road cuts, complete road resurfacing should be explored. This option has the potential to create additional efficiencies if it is possible to coordinate road cut restorations with previously programmed road resurfacing capital projects. In this scenario, there may be differing staffing requirements from what is indicated for road cut restorations in Table 2 below. The cost to restore roadcuts are accounted for in Table 1 above, as well as, the staffing requirements outlined in Table 2 below.

3) Additional Staff and Equipment Requirements

This section details the staff and equipment costs associated with an accelerated substandard water service line replacement program. Note that Table 2 does not reflect the 25-year program as there are no incremental staffing and equipment impacts for this time period. The additional staffing resources are highlighted in Table 2 and are required to provide the following services:

- Outreach and Education
- Administration (permits, scheduling, customer service)
- Construction (size and type inspection, replacements, replacement inspections)
- Enforcement

Table 2 - Staffing Requirements by Accelerated Program Duration

Staff Requirements	5 Year Accelerated Program Duration	10 Year Accelerated Program Duration	15 Year Accelerated Program Duration	20 Year Accelerated Program Duration
	Quantity	Quantity	Quantity	Quantity
Contract Inspector	8.00	2.00	0.00	0.00
*Water Distribution Operator	5.00	4.00	4.00	3.00
*Backhoe Operator	2.00	2.00	2.00	1.00
*Truck Driver	2.00	2.00	2.00	1.00
*Labourer/Truck Driver	2.00	2.00	2.00	1.00
Hydro Excavator Operator	2.00	1.00	1.00	1.00
Hydro Excavator Labourer	2.00	1.00	1.00	1.00
Project Manager - Outreach and Education	1.00	1.00	1.00	1.00
Admin/Scheduler/Dispatcher	2.5	2.00	1.00	1.00
Road Cut Restoration Project Manager	1.00	1.00	1.00	1.00
Road Cut Restoration Inspector	3.00	2.00	2.00	0.00

Road Cut Restoration Technologist	1.00	1.00	0.00	0.00
Municipal Law Enforcement Officer	1.18	0.51	0.33	0.24
Municipal Law Enforcement Admin Support	0.71	0.31	0.20	0.15
Prosecutor (Tribunal)	0.47	0.21	0.13	0.10
Total Additional Staff Requirements	33.36	21.53	17.16	10.99

Notes to table above:

1. Staffing numbers in this table indicate the total staffing resource requirements for the accelerated program durations.
2. *Four (4) staffing resources for one (1) in-house construction crew were acquired through the 2021 Rate Budget. These positions include one (1) Water Distribution Operator, one (1) Backhoe Operator, one (1) Truck Driver and one (1) Labourer/Truck Driver. Note that all other staffing resources in this table would be additional resource requests for future Council approval.

For each of the five (5), 10, 15 and 20 year accelerated program durations, varying levels of staffing increases are required. At a high-level, Water Distribution Operators, Contract Inspectors, Backhoe Operators, Truck Drivers, Labourers, and Hydro Excavator Operators are required for the physical installation and inspection of new water service lines. From an administrative perspective a Scheduler/Dispatcher is required to coordinate appointments with homeowners and process/organize locate requests. A portion of a Project Manager role is needed to promote the program to increase participation to meet the accelerated delivery model. Administrative support is also required for processing an increase in permits required for replacement of lead water services. Furthermore, Municipal Law Enforcement requires staffing for administration and response to non-compliances by property owners.

Municipal Law Enforcement efforts were developed on the assumption of a 20% non-compliance rate that would require a mandatory private lead water service line replacement, with a portion of these being appealed to the Property Standards Committee. Municipal Law Enforcement costs were developed under a full cost recovery model where enforcement would be guided by Public Works staff on a case by case basis.

In addition to staffing requirements, an accelerated lead water service line replacement program requires additional fleet and construction equipment. The addition of equipment, such as an excavator, dump trucks, hydro excavator, float trailer, inspector/operator vehicles, enforcement and construction vehicles, amount to approximately $5.5M - $9.2M in one-time capital costs depending on the program

duration. Note that these costs are included in Table 1 totals under lead water service replacement costs.

4) Prequalified Contractor Model

When considering an accelerated substandard water service line replacement program, the City is exploring the creation of a roster of qualified contractors to perform the private portion replacement of the lead water service line. This roster could be provided to property owners to assist them with the identification and selection of a contractor, and it may reduce the lead time associated with permit application review and approval. This prequalified contractor model is already employed within Hamilton Water to support the Protective Plumbing Program (installation of backwater valves, sump pumps and/or disconnection of downspouts from weeping system), and the Sewer Lateral Management Program (sewer lateral lining).

There are some complexities in developing a fixed price prequalified contractor model for water service line replacements as the prices vary significantly from property to property. Property size, exterior surface features (e.g. grass, asphalt, trees, gardens, fences, and porches/patios), and interior features (e.g. finished or unfinished spaces) impact the cost of a water service line replacement. A variable price prequalified contractor model will be explored.

5) Lead Water Service Replacement Loan Program

On August 21, 2020, Council approved a new Water and Wastewater Infrastructure Support Community Improvement Project Area and Plan (Report PED20120 / FCS20055 / PW20047) that incorporates the Lead Water Service Replacement Loan Program. By doing so, loans under this program can be expanded to residential rental properties. This extension of the program supports the replacement of more private lead water service lines, which provides greater accessibility to decrease the presence of lead in drinking water at the tap.

In May 2020, Council approved amending the Lead Water Service Replacement Loan Program to provide access to interest free loans for eligible low-income residential property owners (Report FCS19025(a)). Interest free loans would be granted to property owners of owner-occupied dwellings who have qualified for low-income energy customer programs such as the Low-Income Energy Assistance Program or the Ontario Electricity Support Program.

6) Financing Strategy

In order to develop a financing strategy for an accelerated lead water service line replacement program, it is assumed that all rate payers would contribute to fund the

program notwithstanding that the estimated remaining 20,000 lead water service lines represent approximately 13% of the total active water service lines in the water distribution system. As such, a temporary charge has been considered that could be applied to all water customers likely in the form of increasing the daily fixed water charge. There are some examples of water utilities whereby a temporary charge/surcharge has been enacted to fund water main replacement programs for a specified duration.

Table 3 of Report PW19094(b) outlines what the year one impact to the average residential rate payer would be under the various lead water service replacement program timelines. The annual impact would continue until the program is completed. Note that Table 3 does not reflect the 25-year program as there are no incremental rate impacts for this time period. For comparison purposes, over the past five (5) years, the average combined rate increase is 4.48% with an average $31 annual impact to the average residential consumer. Hence, in all scenarios the annual cost increases combined with the annual combined rate increases may create affordability challenges for many Hamilton residents.

For older municipalities like Hamilton, accelerating lead water service replacements do present a very significant funding challenge. As reflected in Table 3 below, in the absence of senior government grant funding, it would be extremely difficult for Hamilton to accelerate lead water service replacements without raising water rates dramatically. Furthermore, the rate impacts noted in Table 3 are not inclusive of other rate pressures that may exist during the various timelines.

Funding incentives from senior levels of government, such as subsidy programs or personal tax credits to assist homeowners with the cost of removing private lead water service lines, would be a significant step forward to complement financial assistance available from the City's lead service replacement loan program. Staff have engaged in conversations with the local federal representatives to discuss the value of a municipal grant program to support municipalities with the significant cost of replacing public lead water service lines. The introduction of such a grant program could offset the need to raise Water, Wastewater and Stormwater rates should an accelerated lead service replacement program be approved. At this time, there are no funding programs available to support lead water service line replacements, but staff will pursue opportunities should they become available.

Table 3 – Lead Replacement Program Financing Scenarios

Lead Water Service Replacement	Incremental	Equivalent	Avg Res Impact (200m3)	
Program Duration	Annual Cost	Rate Increase	$ Increase	Total Bill
2021 Approved Budget		4.28%	$32.20	$784.80
5 years	$27,683,684	18.46%	$144.84	$929.64
10 years	$12,895,835	8.60%	$79.92	$864.72
15 years	$8,074,675	5.38%	$46.55	$831.35
20 years	$6,320,380	4.21%	$35.03	$819.83

Lead in drinking water is a major concern for older cities across North America, including cities such as Hamilton. The City of Hamilton has robust strategies to control lead in drinking water including an active lead replacement program and a chemical based Corrosion Control Program. As identified previously in this report, Hamilton Water is conducting a pipe analysis study to determine the maturity and effectiveness of the Corrosion Control Program. Additionally, early stages of the Corrosion Control Program have demonstrated reductions in the percentage of lead samples above the maximum allowable concentration of 10 µg/L for lead in drinking water. While lead in drinking water and the health of our residents are a top priority for the City, at this time, the significant operating and capital costs required to accelerate an already successful lead water service replacement program may be better suited for other priorities areas, such as the replacement of critical and aging water and wastewater infrastructure.

APPENDICES AND SCHEDULES ATTACHED

N/A