INFORMATION REPORT

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	March 22, 2021
SUBJECT/REPORT NO:	Annual Watermain Break Report - 2020 (PW21011) (City Wide)
WARD(S) AFFECTED:	City Wide
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SUBMITTED BY: **SIGNATURE:**	Nick Winters Director, Water and Wastewater Operations Public Works Department 

COUNCIL DIRECTION

On January 23, 2019 Council directed staff to provide the Public Works Committee with an annual report on watermain breaks, the total number, cause and cost of each break, as well as the distance of water mains relined with total cost and overall report on sustainability.

INFORMATION

Total Number, Cause and Cost of Watermain Breaks

In 2020, Hamilton Water experienced a total of 267 watermain breaks resulting in a total repair cost of approximately $3.92M. The total repair cost is the summation of repair cost valued at $3.12M (including excavation, repair, and temporary restoration), and permanent restoration valued at approximately $0.80M. Approximately 43% of the watermain breaks were caused by corrosion, 56% were caused by ground movement, and 1% were the result of displaced pipe joints. A summary of watermain breaks by cost and mode of failure is provided in Appendix “A” attached to Report PW21011. A detailed report of the cost and mode of failure of each watermain break is provided in Appendix “B” attached to Report PW21011.

On average, from 2012 to 2020, the City of Hamilton (City) experienced approximately 314 watermain breaks per year. However, this average is affected by significantly higher numbers of watermain breaks in 2014 (440) and 2015 (433). The increased number of watermain breaks in 2014 and 2015 were the result of abnormally low winter temperatures caused by polar vortex events. A summary of total watermain breaks by year is provided in Appendix "C" attached to Report PW21011.

Distance and Cost of Watermain Relining Program

The Engineering Services Division monitors and tracks the length and cost of watermains that are replaced and rehabilitated (relined). Since 2003 Engineering Services has lined 79km of watermain at a cost of approximately $63.4M. In 2020 the length of watermains rehabilitated (relined) was 5.6km at an approximate cost of $6.2M. The length of watermains replaced was 5.1km at an approximate cost of $9.5M. A 10-year summary of watermain replacements and rehabilitation is provided in Appendix "D" attached to Report PW21011 and the same information is contained in Table 1 below.

	Replaced		Rehabilitated	
Year	Pipe (Km)	$ (Millions)	Pipe (Km)	$ (Millions)
2010	5.7	$8.4	6.2	$3.4
2011	8.9	$6.8	6.3	$2.8
2012	9.1	$17.6	3.3	$2.7
2013	6.3	$11.5	3.9	$4.3
2014	10.5	$16.1	6.4	$5.4
2015	9.0	$10.5	6.3	$5.5
2016	5.0	$7.0	4.2	$5.5
2017	6.6	$8.7	7.3	$6.5
2018	5.2	$6.0	5.3	$4.6
2019	3.7	$5.0	6.0	$5.5
2020	5.1	$9.5	5.6	$6.2
Total	75.0	$107.1	60.8	$52.4
% of Overall Inventory	3.54%	-	2.87%	-

Table 1 - Length and Cost of Watermain Replacement and Rehabilitation

From 2021 through 2029, the City plans to spend $136.45M on watermain replacement and rehabilitation projects. A summary of the projects that have been approved in principle as part of the 10-year Water, Wastewater and Storm Rate Budget is provided in Appendix "E" attached to Report PW21011.

Management of the City's Watermain Inventory

The Engineering Services Division, Asset Management Section is responsible for managing the asset lifecycle for City-owned infrastructure that exists within the municipal road allowance including the City's watermains. The strategic asset management program for watermains is currently in progress to comply with O.Reg. 588/17 under the Infrastructure for Jobs and Prosperity Act that requires an Asset Management Plan (AMP) for all core assets, including watermains, to be approved by Council by July 1st, 2021. Sustainability of the watermain network has been previously analysed through State of the Infrastructure reporting iterations and a provincially required AMP, completed in 2014 (Report PW14010).

The Hamilton Water Division, Water Distribution & Wastewater Collection Section is responsible for maintenance and repairs of the City's watermains throughout the asset lifecycle. This work adheres to the strict legislative requirements surrounding potable water in municipal distribution networks, issued by the Ministry of the Environment, Conservation, and Parks (MECP).

The primary objective of the City's asset management, maintenance, and repair programs for watermains are to ensure the uninterrupted supply of high quality potable water to the City's residents and industrial, commercial and institutional customers. It is very important to note that the City's water distribution systems are designed with a significant amount of redundancy, such that sections of watermain can be isolated for maintenance and repairs to be completed with minimal to no disruption to the supply of potable water to our customers.

The City has 185 kilometers of transmission mains (>=450mm) and 1938 kilometers of local watermains for a total of 2123km of watermains.

Transmission mains are large watermains which allow for large volumes of water to be transported across the City to fill potable water storage facilities (reservoirs and towers), to supply water pumping stations, and to supply local watermains. Transmission mains carry the largest risk for the City in terms of ensuring that the supply of potable water remains uninterrupted.

Local watermains, or distribution mains, are smaller (400mm or less), and they supply potable water to the serviced properties within the City. As mentioned previously, the distribution network for local watermains includes a significant amount of redundancy, such that sections of watermain can be isolated for maintenance and repairs to be completed with minimal to no disruption to the supply of potable water to our customers.

Approximately 35% of the City's transmission watermains, and 20% of the distribution watermains are 68 years old, or older. Similarly, approximately 38% of the transmission watermains, and 30% of the distribution watermains are 38-years-old, or older. A summary of the City's transmission and distribution watermain inventory by age is provided in Appendix "F" attached to Report PW21011.

APPENDICES AND SCHEDULES ATTACHED

Appendix "A" to Report PW21011 - Summary of Watermain Breaks by Cost and Mode of Failure

Appendix "B" to Report PW21011 - Detailed Watermain Break Mode of Failure and Cost Data

Appendix "C" to Report PW21011 - Summary of Total Watermain Breaks by Year

Appendix "D" to Report PW21011 - 10-Year Summary of Watermain Replacements and Rehabilitation

Appendix "E" to Report PW21011 - Summary of Approved in Principle, Watermain Replacement and Rehabilitation Projects in 10-year Water, Wastewater and Storm Rate Budget

Appendix "F" to Report PW21011 - Summary of the City's Transmission and Distribution Watermain Inventory by Age