



Hamilton Water's Proactive Water Distribution System Leak Detection Program

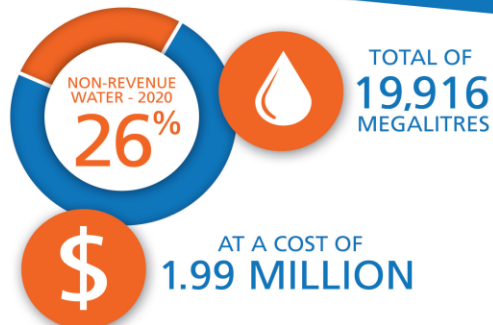
PUBLIC WORKS COMMITTEE
November 1, 2021

Presentation Overview

- 1) Non-Revenue Water (NRW) Review
- 2) Leak Detection Program – Prior to 2021
- 3) Proactive Leak Detection Program
 - Pilot Study (2019/2020)
 - Technology Procurement
 - Climate Change
 - Results to Date
 - Return on Investment
 - Private Infrastructure Leaks
- 4) Next Steps



CITY OF HAMILTON NON-REVENUE WATER



TOTAL OF
19,916
MEGALITRES

YEAR OVER YEAR NON-REVENUE WATER



NON-REVENUE PER SYSTEM - 2020



Non-Revenue Water

- Drinking water that is “lost” before it reaches the customer
- NRW - physical losses, unbilled authorized consumption, operational purposes
- Above average NRW
- NRW - \$1.99M in 2020
- Estimated savings \$820,000/year if NRW went from 26% to 15%

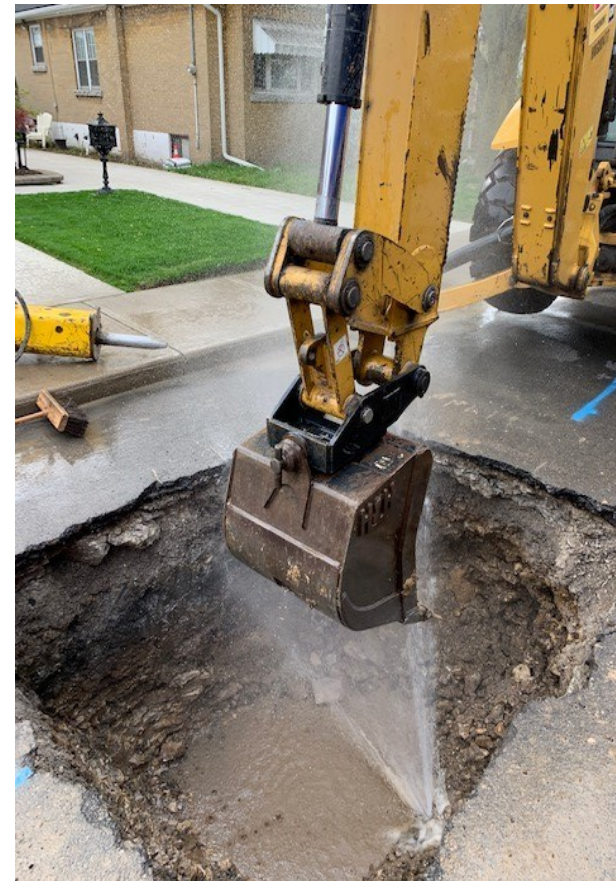


Leak Detection Program - Prior to 2021

- Reactive leak detection program
- Traditional geophone method
- Operator focused leak detection – day time
- Accuracy issues / dry holes
- Some leaks do not surface due to the unique geography and often rocky porous ground
- No robust proactive leak detection program due to technology and resources



Soil Conditions - Non-Surfacing Leaks



Non-Surfacing Leaks

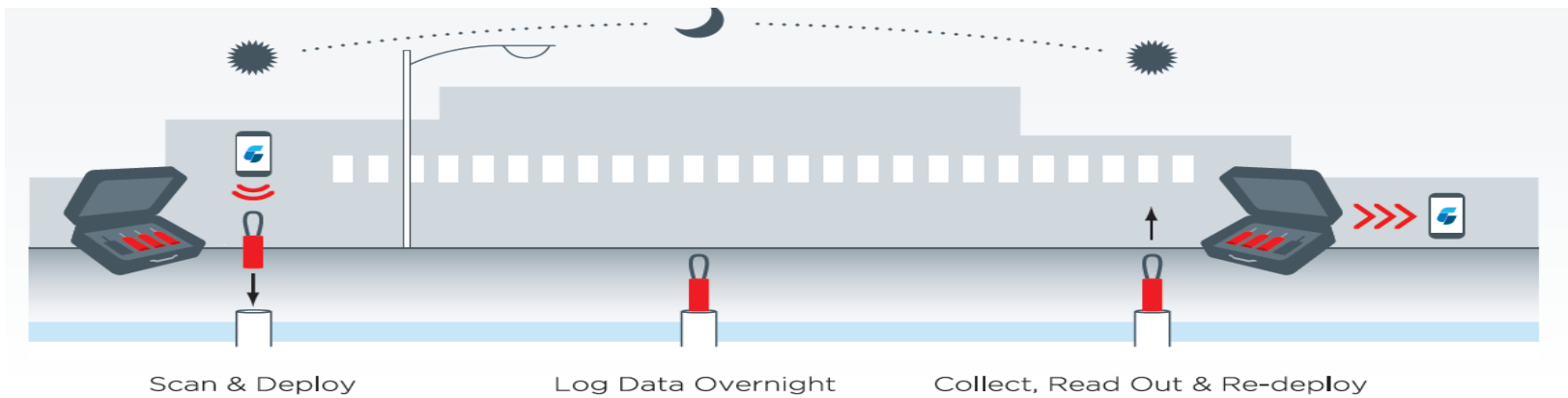
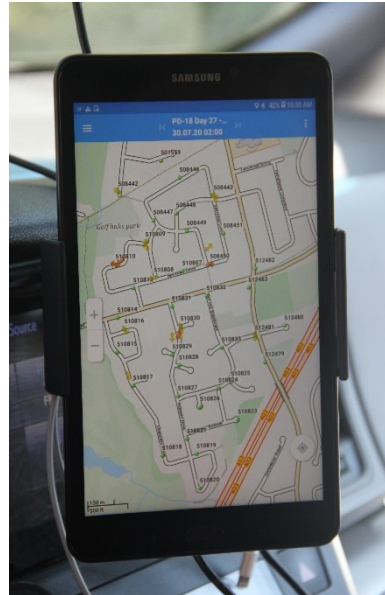


Proactive Leak Detection - 2019 / 2020 Pilot Study



- Test technology in the field
- Develop a cost/benefit analysis to support the procurement of technology
- Minimize NRW, energy consumption and risk
- Leak detection of 400 km of watermain
- 177 public & private leaks found
- Accuracy of the technology 95.5%

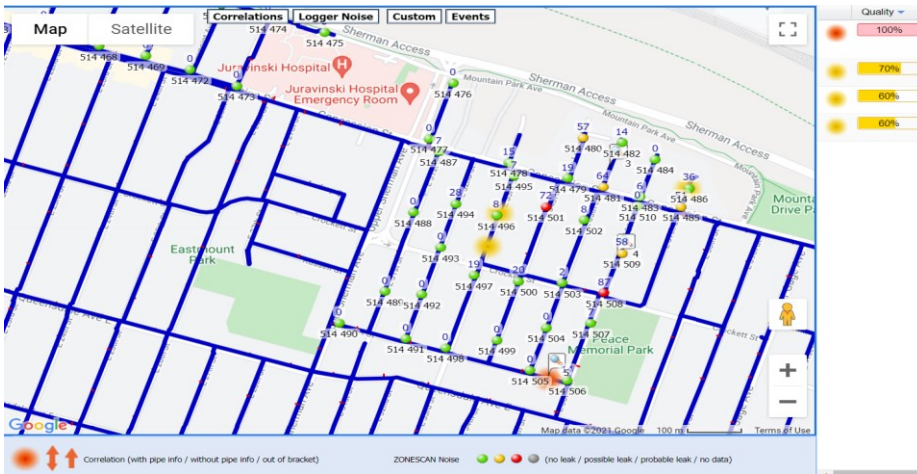
Proactive Leak Detection Process



Proactive Leak Detection Watermain Leak Example – East 36th St



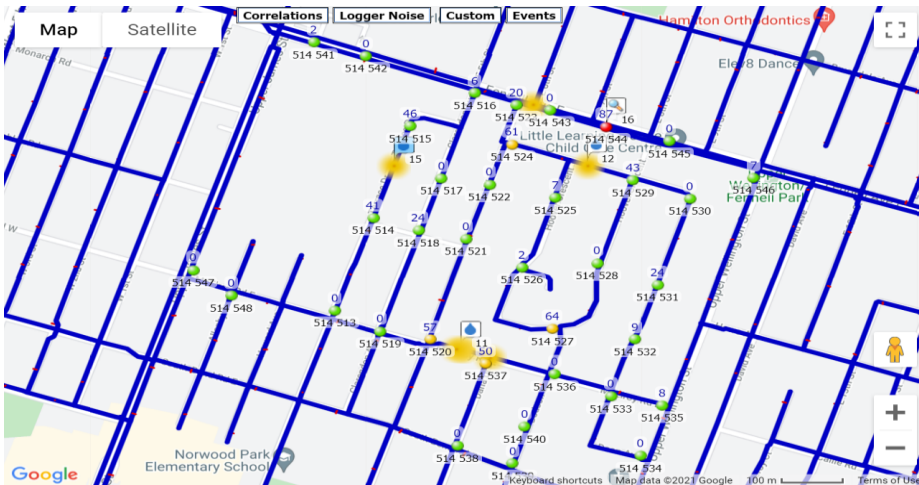
- Leak detection completed - April 28, 2021
- Leak confirmed - 6" watermain break
- Leak repaired - May 2, 2021
- Estimated daily NRW - 508 m³
- Estimated daily cost of NRW - \$50.80
- Total Volume NRW Eliminated (May 3 to Sept 1) – 61,976 m³ (\$6,197)



Proactive Leak Detection Leak Example – Private Water Service Leak



- Leak detection completed - April 28, 2021
- Leak confirmed - ½" lead water service
- Leak repaired – September 8, 2021
- Estimated daily NRW - 66 m³
- Estimated daily cost of NRW - \$6.60



Climate Change Emergency – Energy Reduction

Hamilton

Hamilton declares a climate change emergency



'We're urging you to step it up,' says Lynda Lukasik. 'I don't know how else to put it'



Samantha Craggs · CBC News · Posted: Mar 18, 2019 4:58 PM ET | Last Updated: March 19, 2019



Students in B.C. protested this month, urging decision makers to take bigger actions around climate change. (Rafferty Baker/CBC)

17 comments

The city of Hamilton has joined a handful of Canadian municipalities by declaring a climate emergency.

Pending a final city council vote, the city has vowed to treat climate change as an existential crisis. It will establish a task force across numerous departments and try to achieve net zero carbon emissions by 2050.

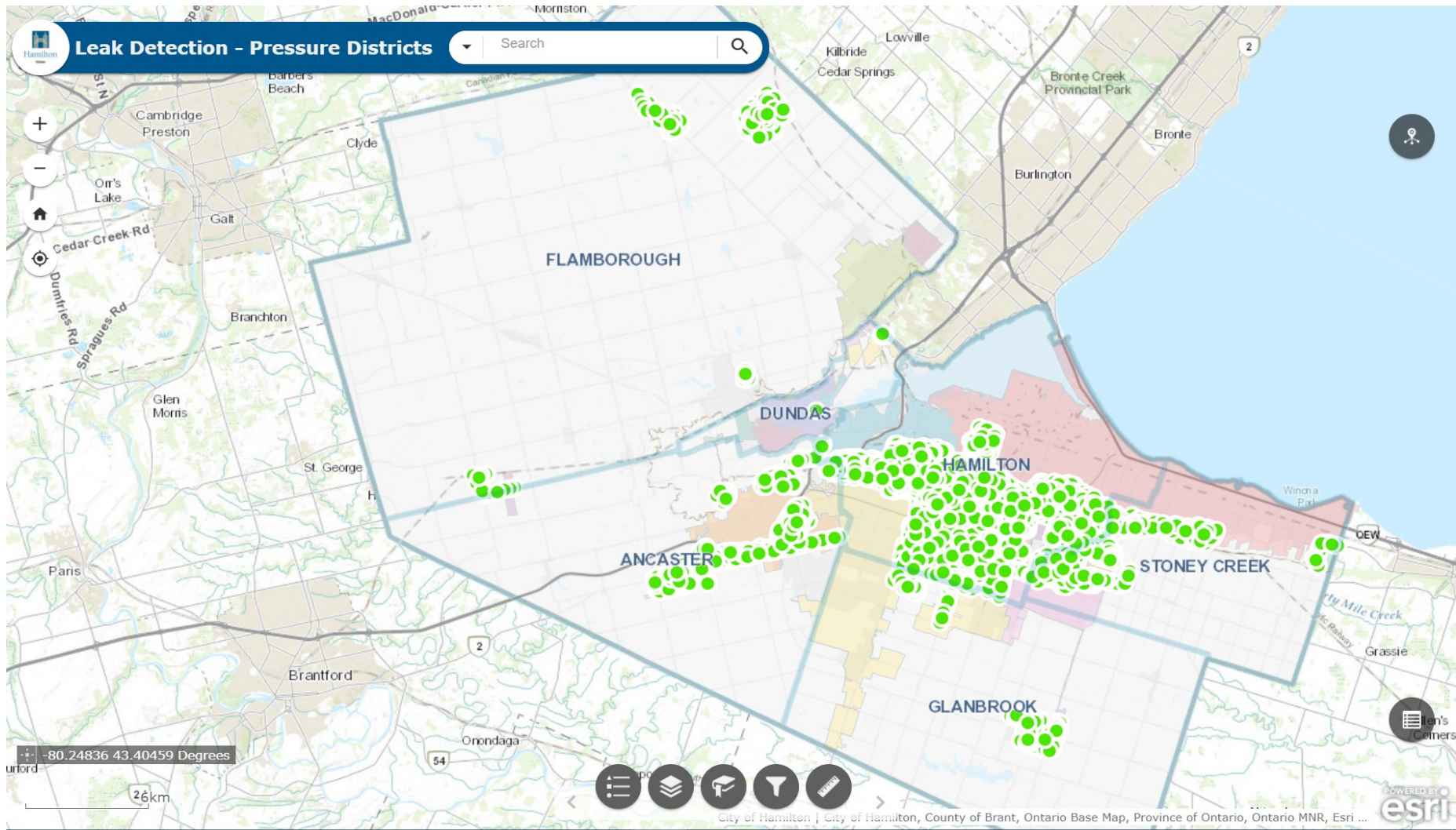
- March 27, 2019, Hamilton declared a climate change emergency
- Hamilton Water is the largest energy users in the City of Hamilton
- 0.20 kWh to produce 1m³ of water
- Unit Rate of electricity-\$/kWh - \$0.10

Proactive Leak Detection – Results to Date

| Year | # of Possible Leaks | # of Verified Leaks | # of Public Leaks | # of Private Leaks | % Success Rate |
|---------------------------|---------------------|---------------------|-------------------|--------------------|----------------|
| 2019 | 114 | 110 | 96 | 14 | 96.5% |
| 2020 | 71 | 67 | 57 | 10 | 94.4% |
| 2021 (Jan 1 to Sept 1) | 78 | 75 | 62 | 13 | 96.1% |
| Total | 263 | 252 | 215 | 37 | 95.8% |



Proactive Leak Detection – Results to Date

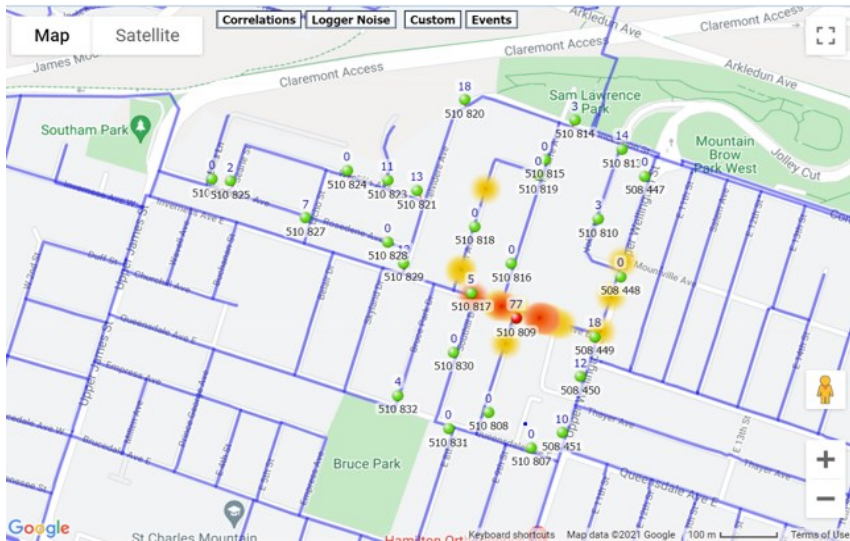


Proactive Leak Detection – Return on Investment



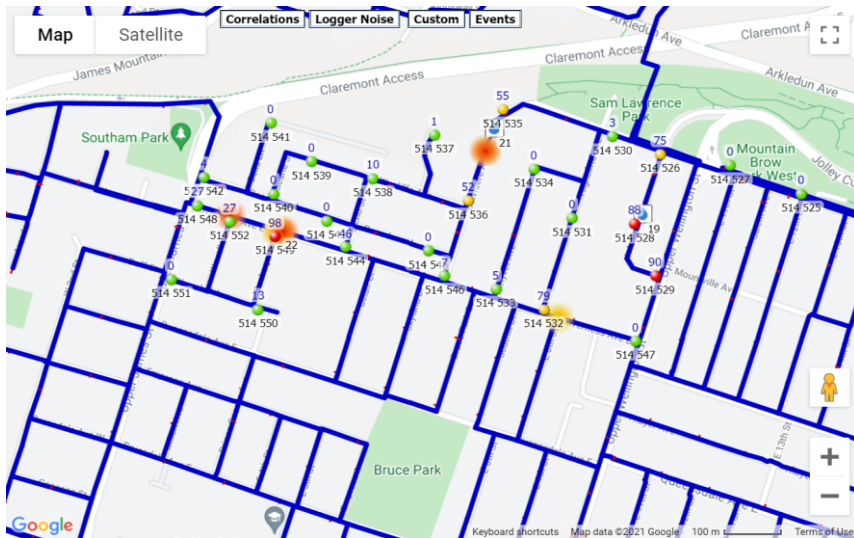
| Proactive LD Program Resources | Costs |
|--------------------------------------|---------------------|
| Proactive LD Equipment (1 time cost) | \$123,000.00 |
| 1.65 FTE (annual cost) | \$165,000.00 |
| Total Costs | \$288,000.00 |

| Return on Investment Calculation | |
|-------------------------------------|----------------------------|
| Average NRW per watermain break | 500 m3 / day |
| Cost of NRW / m3 | \$0.10 |
| Average daily cost of NRW | \$50.00 |
| Total watermain leaks repaired | 61 |
| Total Volume of NRW Eliminated | 3,403,500 m3 |
| Estimated NRW saved to Sept 1, 2021 | \$340,350.00 |
| Return on investment | 8 months (Aug 2021) |



Proactive Leak Detection - Annual Scan

- Proactive leak detection in the Centremount neighbourhood (Ward 8)
- Completed proactive leak detection in 2019 and 2021.
- 2 leaks found in October 2019
- 4 leaks found in May 2021
- Annual proactive leak detection scan across entire City



Proactive Leak Detection – Private Infrastructure leaks



City of Hamilton - Hamilton Water
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Hamilton, Ontario L8L 5W2
P: 905.546.2489
www.hamilton.ca

May 6, 2021



Re: Confirmed Private Water Service Leak

During a recent leak detection investigation, a leak was identified by City staff on the water service line at this address. Further investigation has confirmed that the leak is located on the private portion of the water service line. The private portion of the water service line is located between the property line and the water meter. Since the leak is located on the privately-owned asset, the repair or replacement of this water service line is the responsibility of the homeowner.

The City is notifying you of the following:

- The leak from your private side water service may cause damage to your property, neighbouring properties, city infrastructure, and other underground utilities.
- The Property Standards By-law 10-221, Sec 14(1) states that "*the private plumbing system and every plumbing fixture shall be maintained and free from leaks and defects.*" If repairs are required and they are not completed in a timely manner, an investigation by Municipal By-law Enforcement could result in a Property Standards Order.
- **The water leak needs to be repaired, at the homeowners' expense within 6 months of receiving this letter.**
- If the leak has not been repaired within the 6-month period, the City of Hamilton will turn off the water to the property until the City is able to complete the repair on the private property. Under the Property Standards By-law the cost of the repair + 33% will be added to your tax bill.
- If the water service line at this address is substandard (alloy/lead) you qualify for the Lead Water Service Replacement Loan Program.

If you have any questions or require any additional information, please contact us at 905-546-2489.

Hamilton Water
Water Distribution & Wastewater Collection



Next Steps



- FTEs included in 2022 Water, Wastewater & Storm Rate Budget for consideration by Council
- Annual proactive leak detection scan across entire City
- Review and investigate other sources of minimizing non-revenue water
- Complete a process improvement to improve on the proactive leak detection program



Hamilton