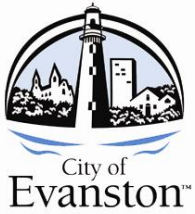


Evanston's Leak Detection Program

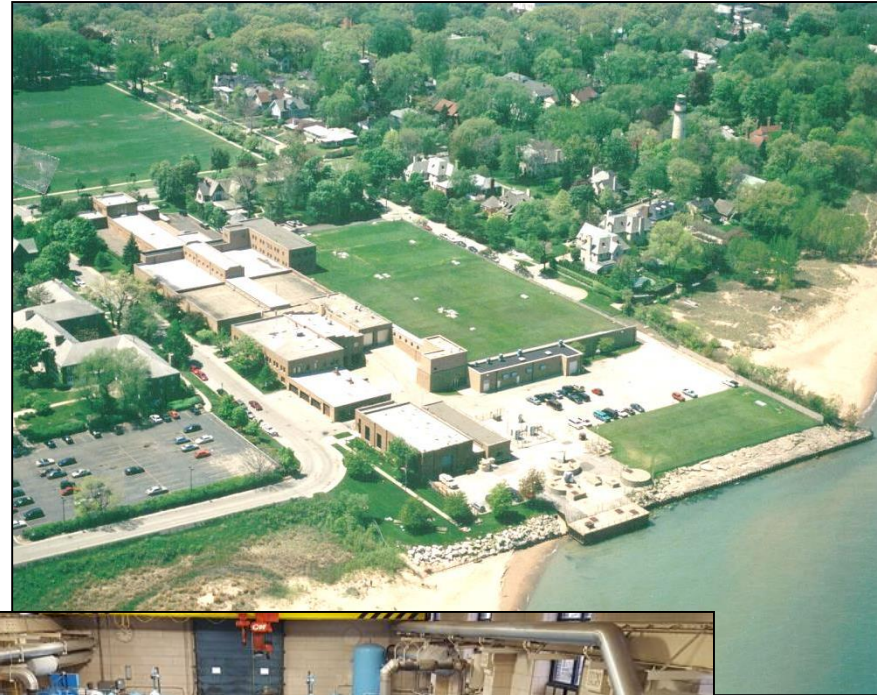
Cost Savings & Many Other Benefits

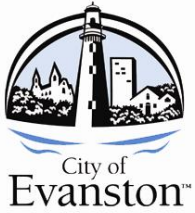




Evanston's Leak Detection Program

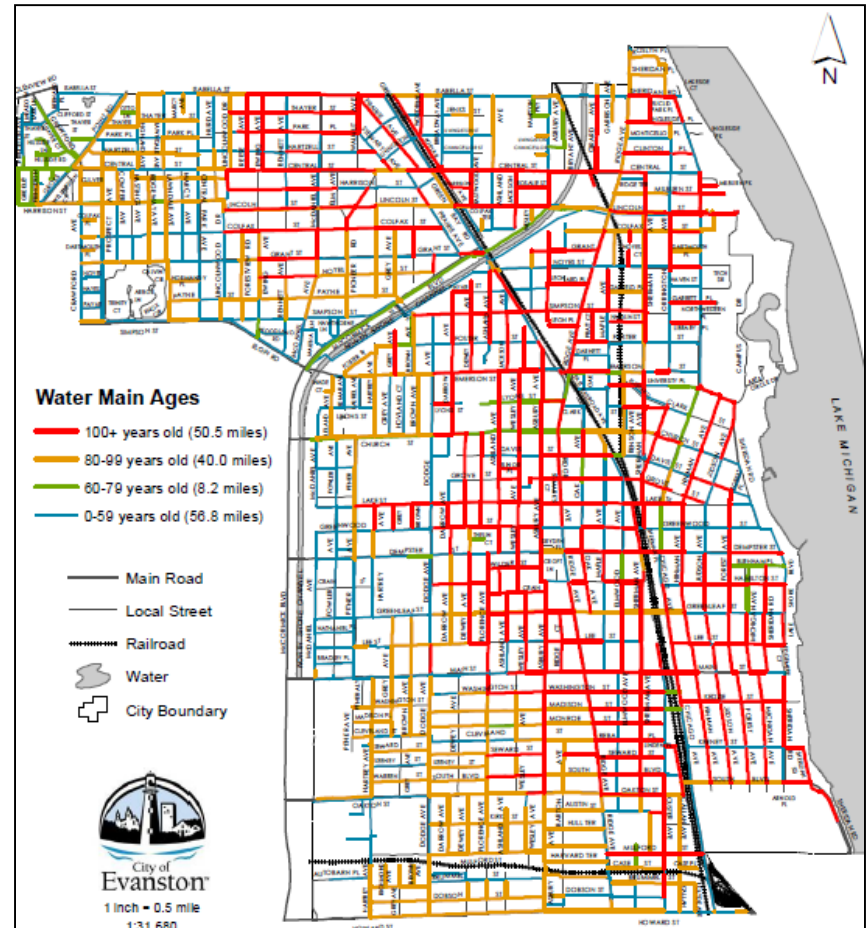
- Service Population 473,900
 - 74,900 retail
 - 399,000 wholesale
- Average Flow = 45.5 mgd
- Max Rated Cap = 108 mgd
- Treatment is conventional sand filtration.
- 3 intakes extending one mile into Lake Michigan

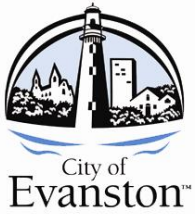




Evanston's Leak Detection Program

- One-third of City's water mains are over 100 years old (red).
- More than half of the water mains are over 80 years old (orange).
- We target replacing 1% of our system per year (equals 1-1/2 miles).

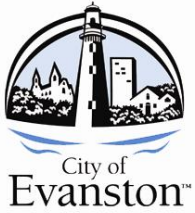




Previous Program: Correlator Only

- Correlator captures the sound of water escaping from a pipe
- Correlation is all-day work, can't multi-task
- Traffic, major water usage, other utilities can interfere
- ***Result: Proactive leak detection was limited to 3-4 miles per year, 2% of the distribution system***

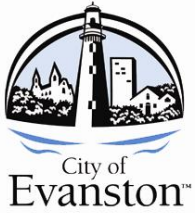




New Program: Loggers (First)

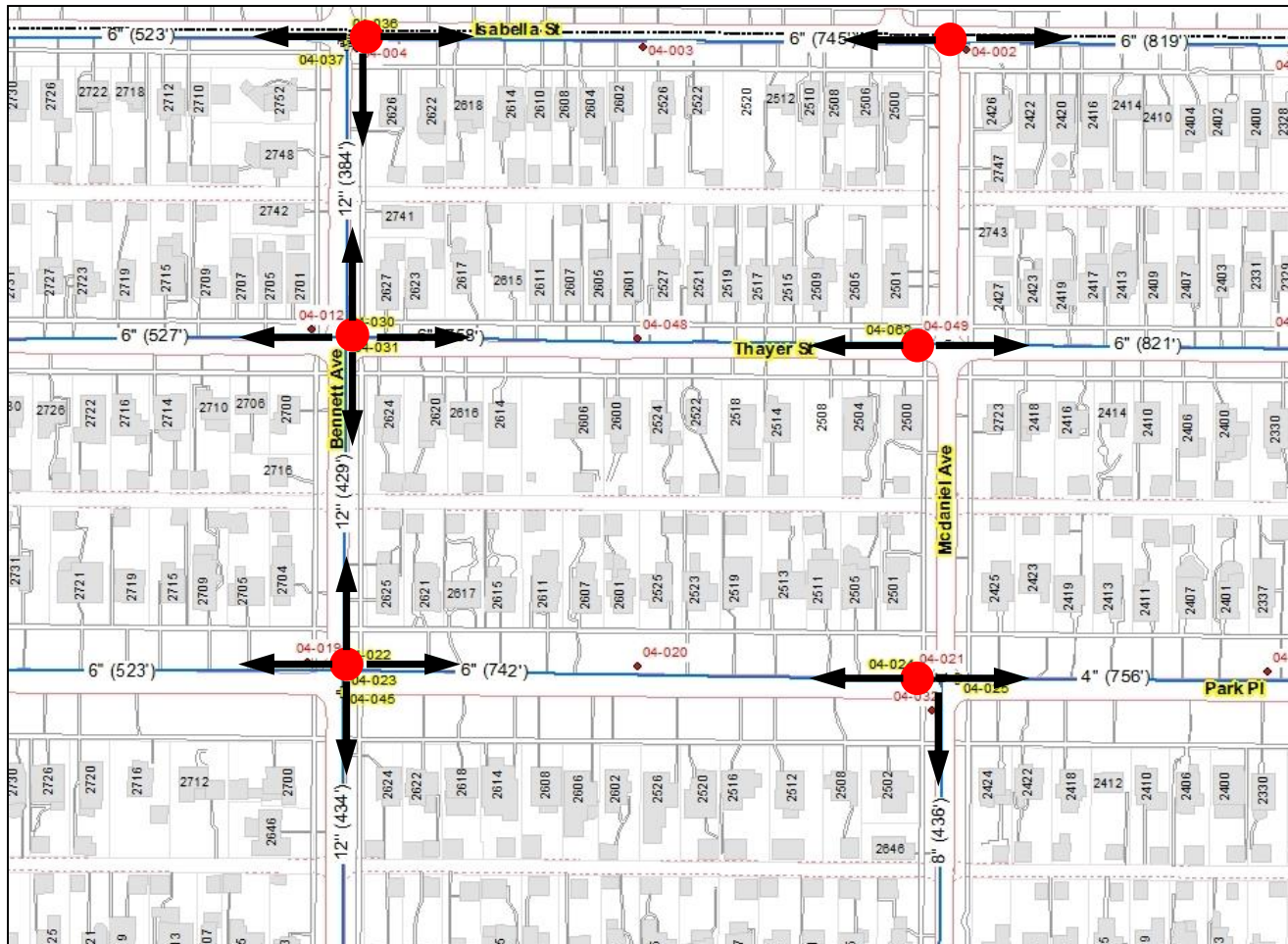
- Loggers only detect presence or absence of leak “noise”
- Logger deployment can be done in between other tasks
- Loggers fit in valve vaults and boxes, can be left overnight

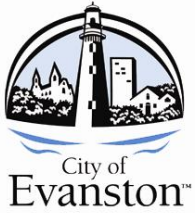




Leak Surveying with Loggers

Step 1: Deploy in grid pattern for efficiency

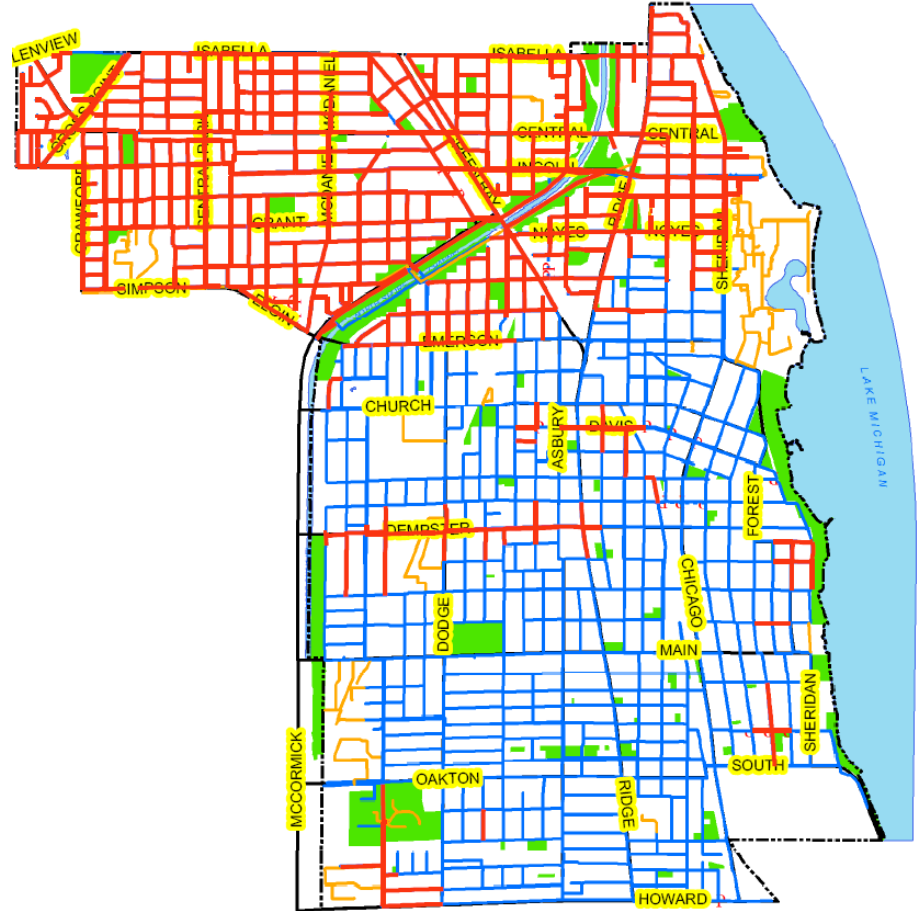
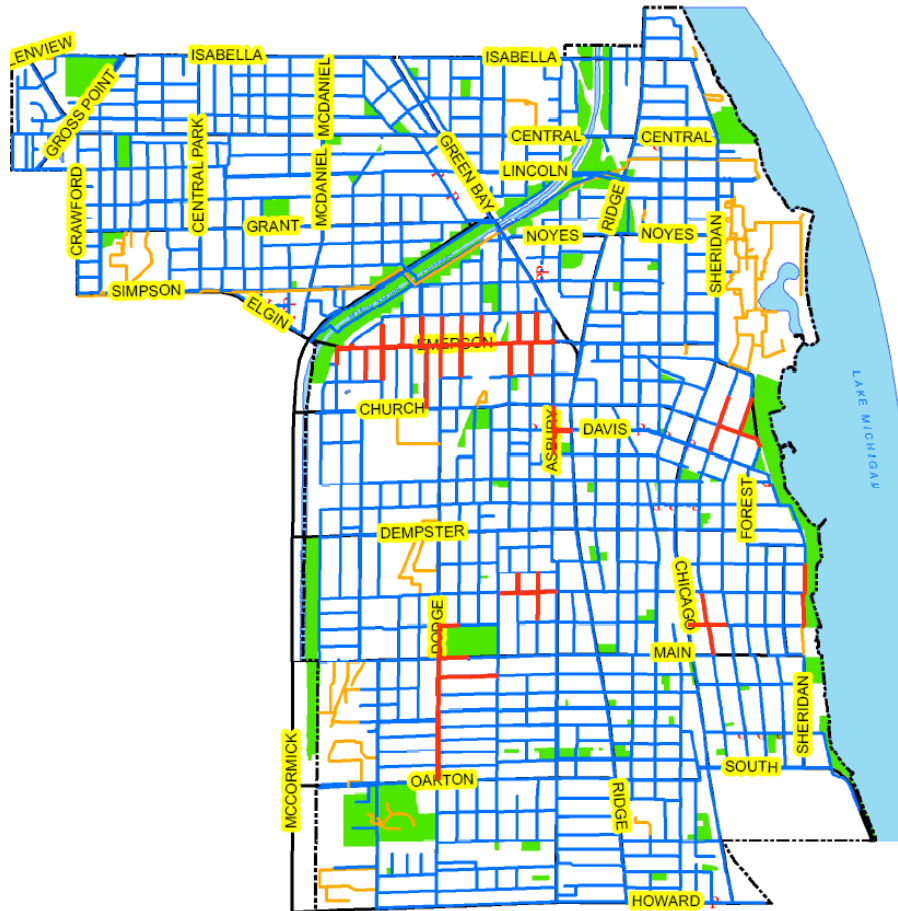


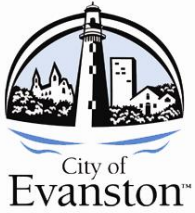


Evanston's Leak Detection Program

Previous Program

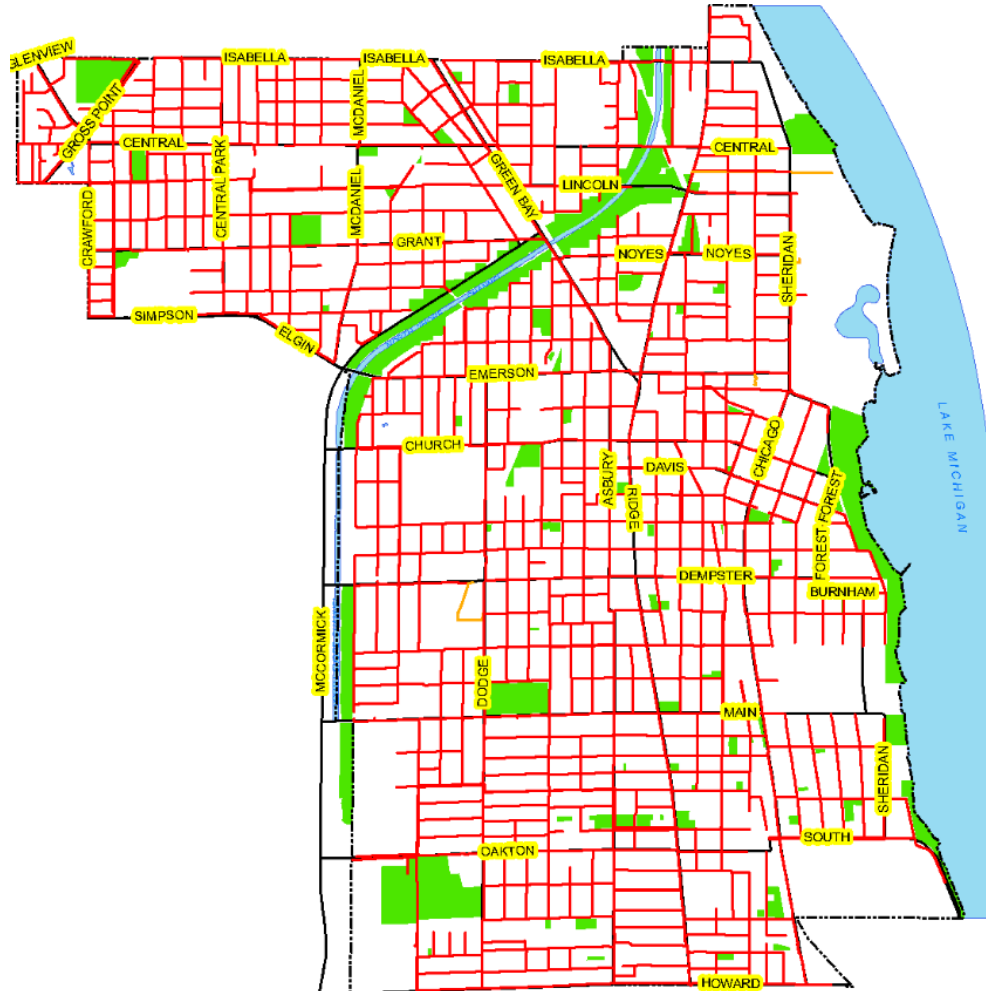
2013-2014 Program

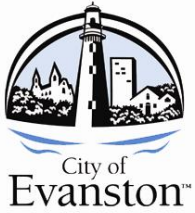




Evanston's Leak Detection Program

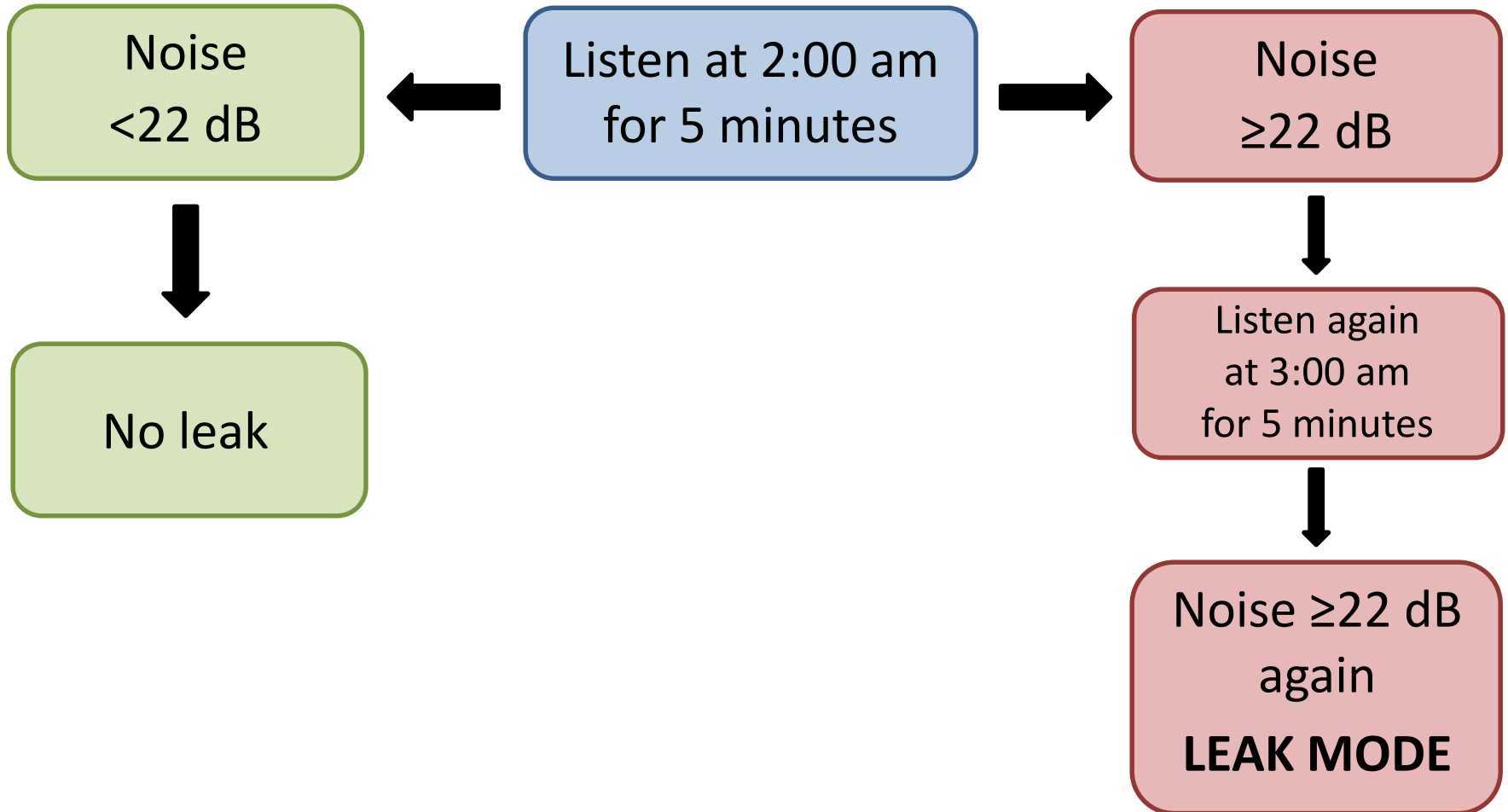
2018

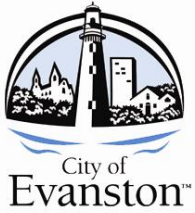




Leak Surveying with Loggers

Step 2: Loggers listen for leak noise

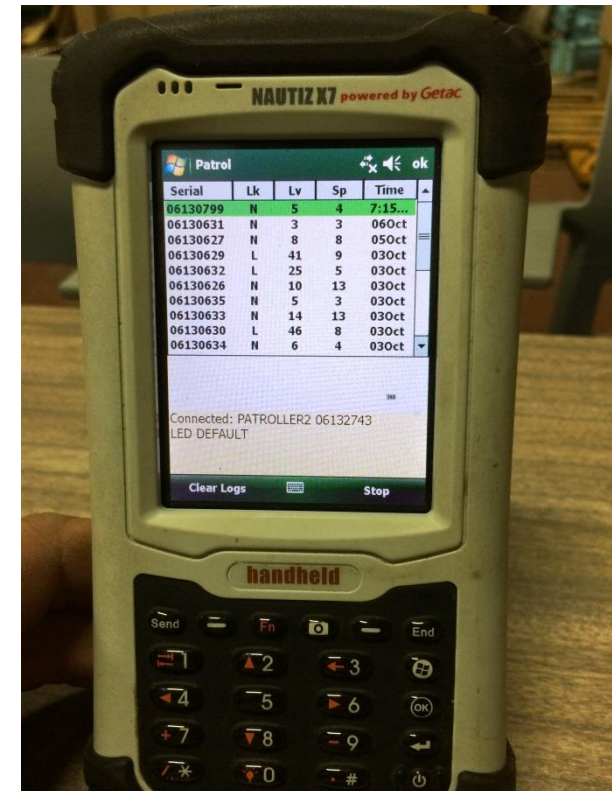


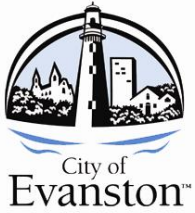


Leak Surveying with Loggers

Step 3: Obtain logger readings

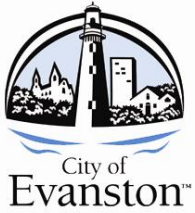
- Loggers transmit readings from 8 am – 12 noon daily
- Readings upload to a handheld device
- Loggers are then moved to the next deployment location





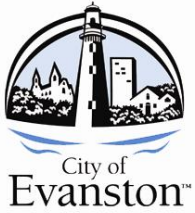
Evanston's Leak Detection Program

Year	Miles Surveyed	Main Breaks	Service Leaks	Water savings after repairs (MG/YEAR)	Savings (Using water rate of \$2.74 per 100 CF)	Savings (Combined water & sewer rate of \$6.13 PER 100 CF)
2013	57	2	1	8.85	\$32,418.45	\$72,527.41
2014	100	1	4	6.26	\$22,931.02	\$51,301.87
2015	157	2	3	9.9	\$36,264.71	\$81,132.35
2016	149	3	2	13.534	\$49,576.42	\$110,913.66
2017	156	2	3	9.9	\$36,264.71	\$81,132.35
2018	143	3	3	14.5	\$53,114.97	\$118,830.21
TOTAL	762	13	16	62.9	\$231,000	\$516,000



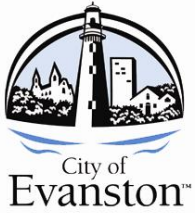
Benefits

- Verify valve locations and correct GIS
- Improve valve accessibility
- Eliminate illicit discharge to sewers proactively
- Identify private irrigation systems



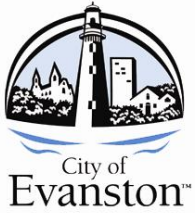
Benefits

- Existing staff have incorporated leak detection into their routines with no resulting overtime
- Improved maintenance of valves
- Evanston has already recouped the cost of the equipment during the initial 3 years

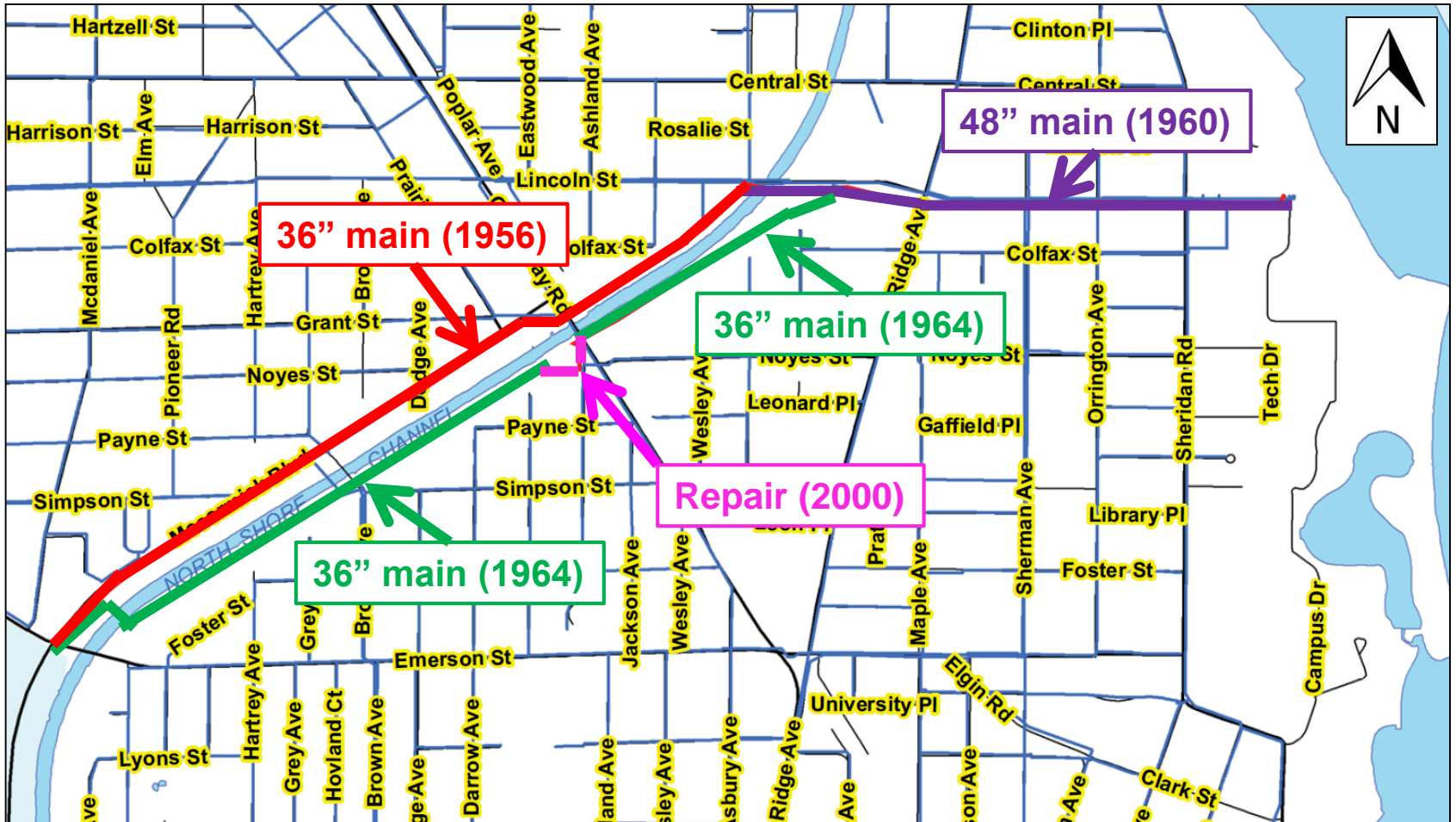


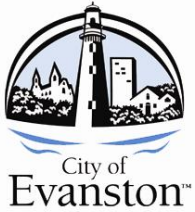
Evanston's Leak Detection Program

PCCP Large Diameter Water Main Inspection



Evanston's Leak Detection Program





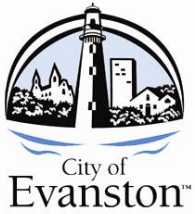
Evanston's Leak Detection Program

1. Limited In Trench Inspection and Dissection

- Cost: ~\$15K

2. Non-Destructive Internal Evaluation

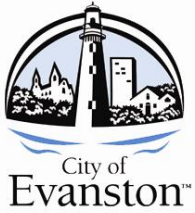
- Cost: ~460K



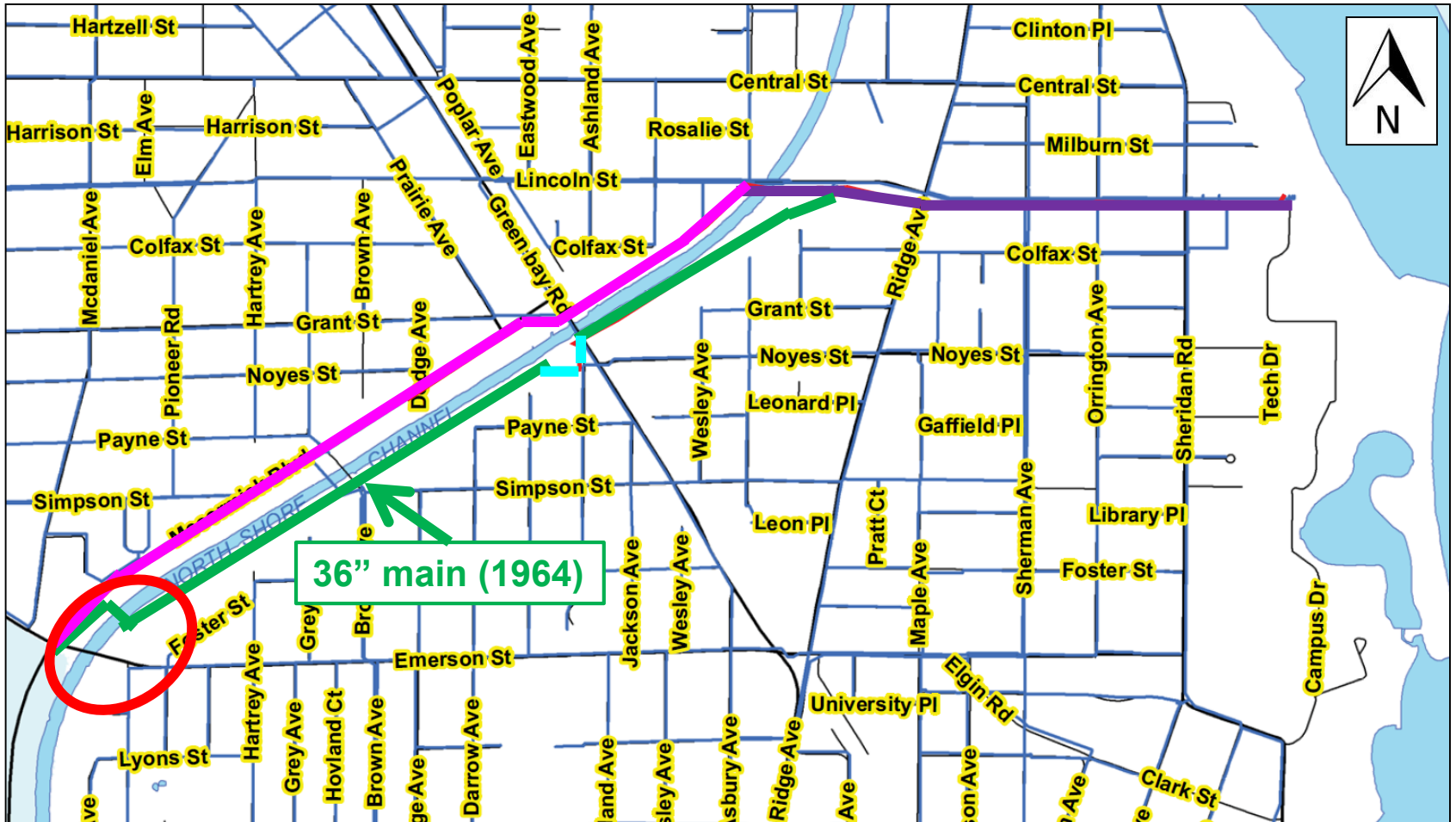
1. Limited In Trench Inspection and Dissection



- Inspected 16 foot long section (0.2%)



Evanston's Leak Detection Program



Findings

- Good condition for its 50+ years of age

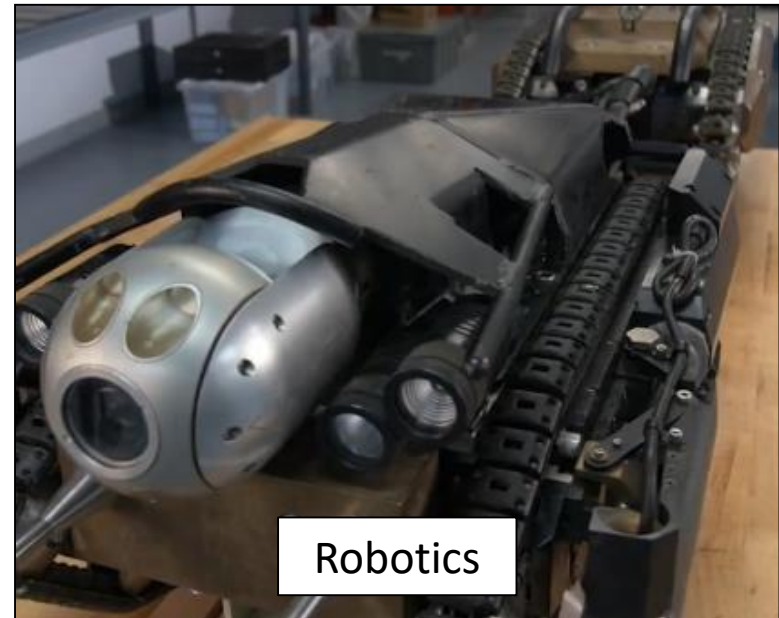
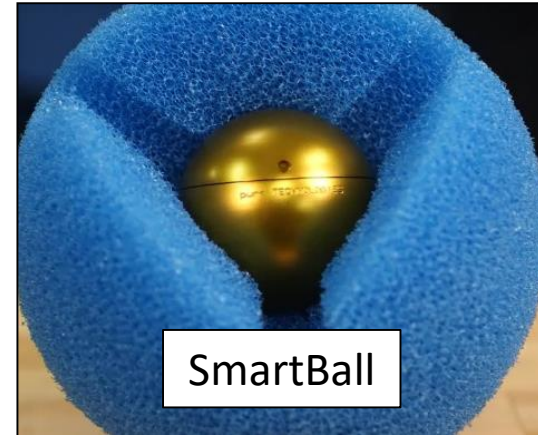


2. Non-Destructive Internal Evaluation

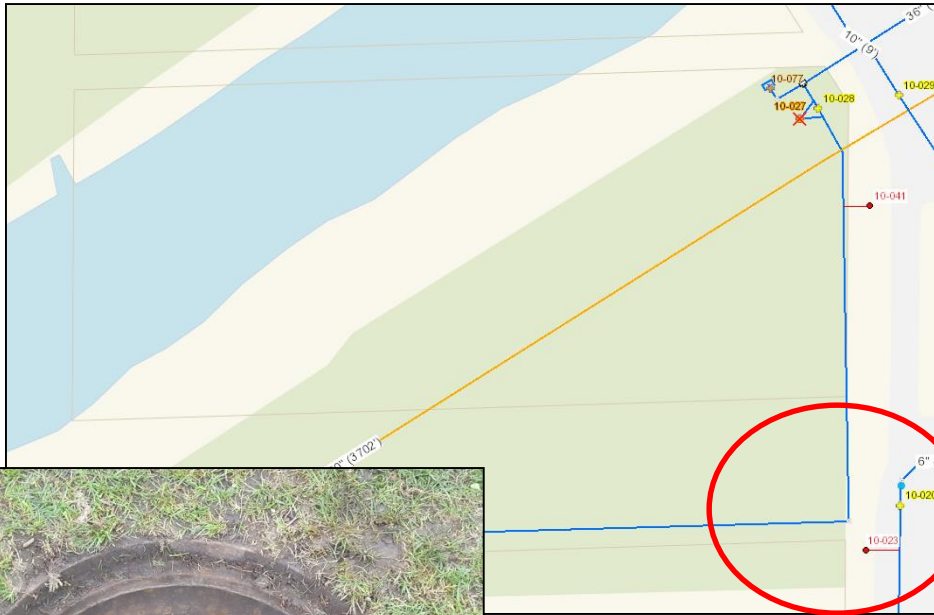


- Inspected ~12,954 ft. (71%)

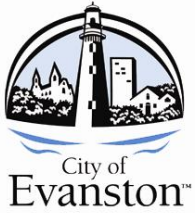
Evanston's Leak Detection Program



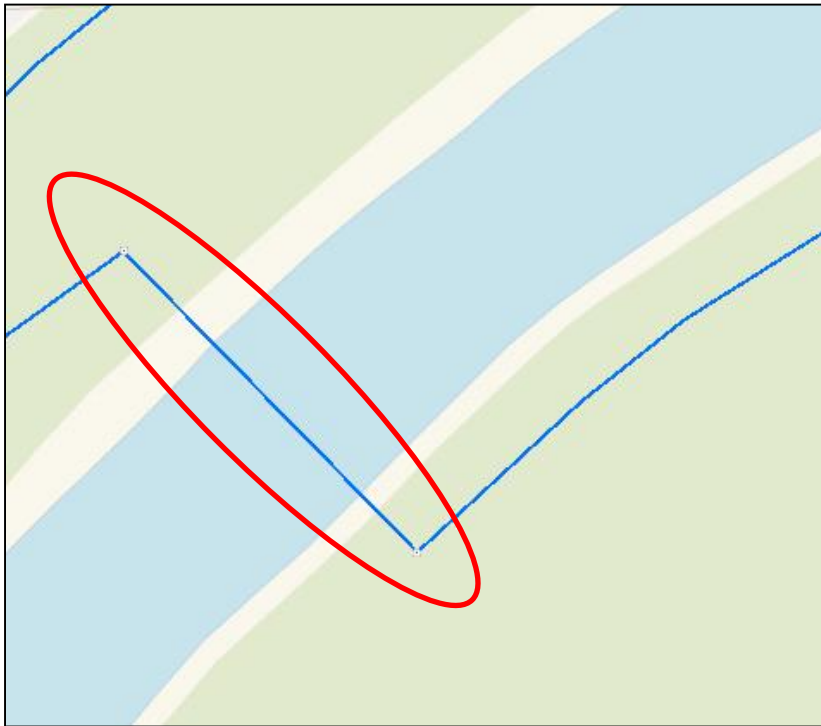
Challenges to Inspection



- Bends and valves
- Insertion points

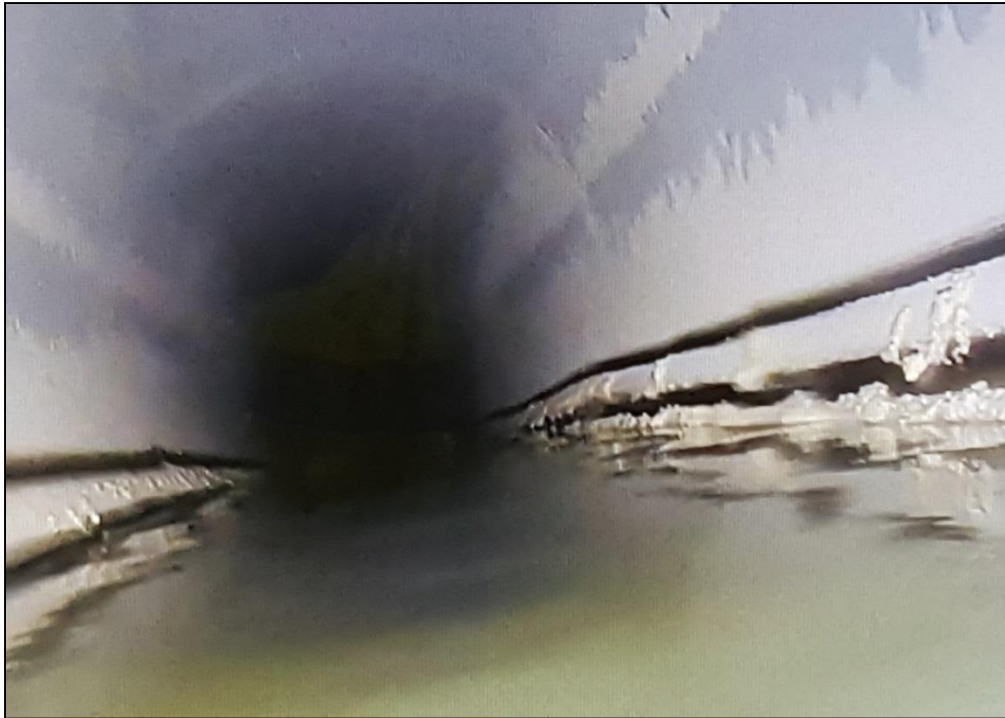


Challenges to Inspection



- Changes in elevations
- Pipeline hydraulics

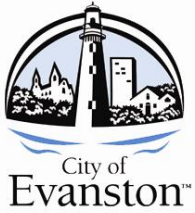
Challenges to Inspection



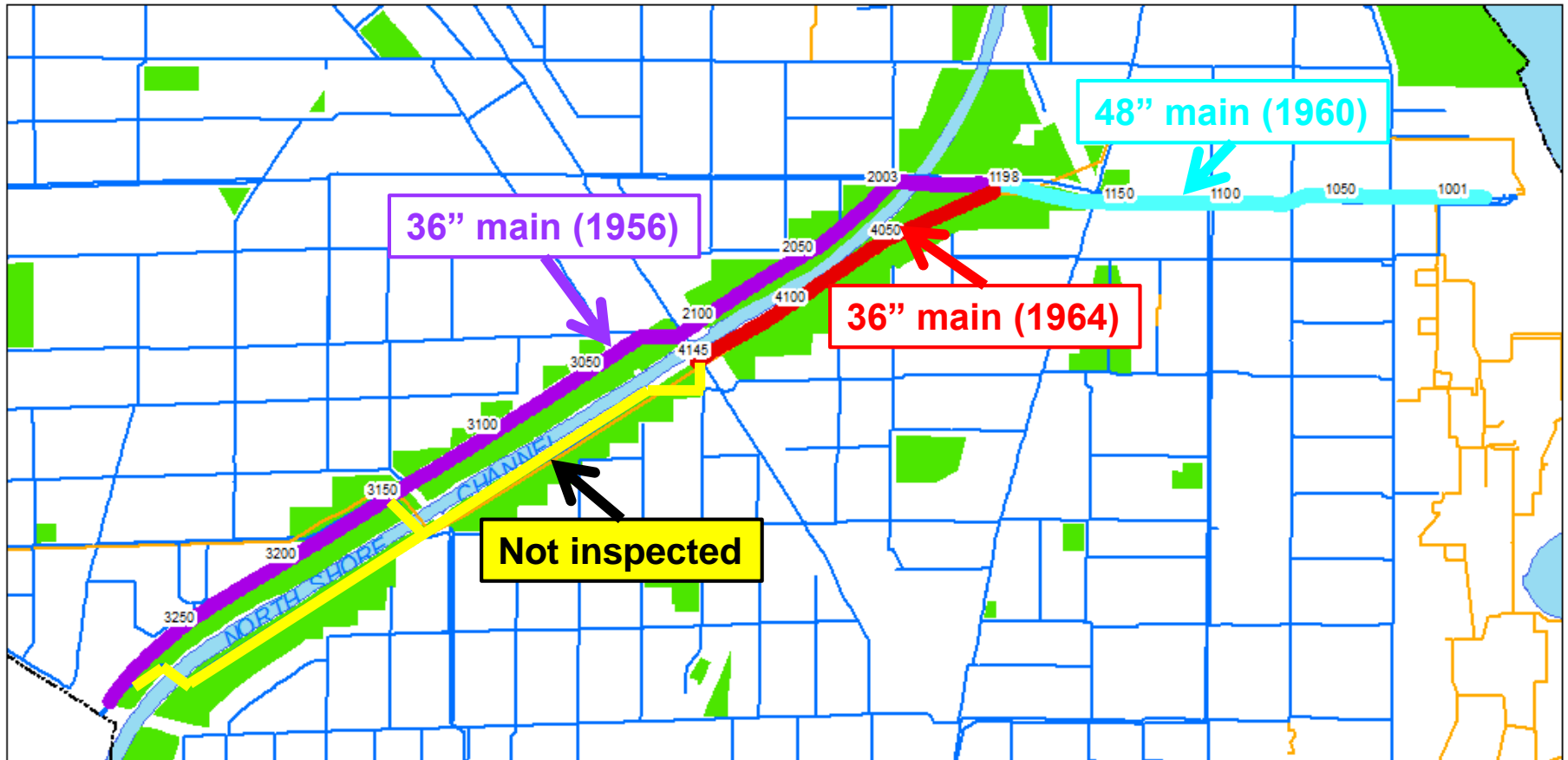
- Control of water
- Phosphate disturbance

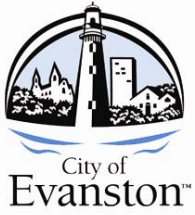
Actual Approach - Robotics



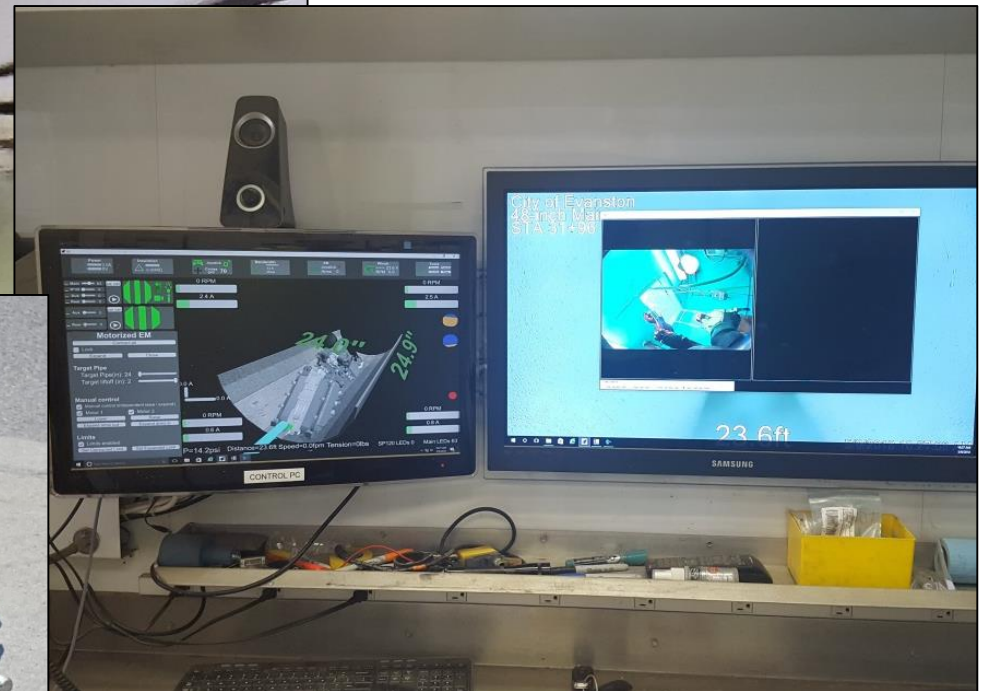


Location of Inspection





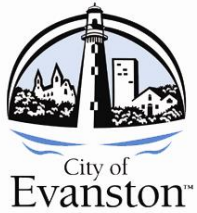
Visual Inspection



Findings

Overall good condition





Other Benefits to Evanston

- Crews are now more open to using new technology to improve productivity and safety
- Loggers are compatible with AMI – can use to continuously monitor critical mains
- Demonstrates that Evanston is actively working to comply with IDNR rules on water loss (2018 Non-revenue water = 5.2%, 2015 NRW = 19.1%)

An aerial photograph of a coastal city, likely Miami, showing a dense urban grid, a large stadium-like structure, and a coastline bordering a large body of water. The water transitions from a shallow turquoise near the shore to a deep blue further out. The city is characterized by a grid of streets and various green spaces.

QUESTIONS?