

GLWA

Great Lakes Water Authority



LINEAR SYSTEM
INTEGRITY PROGRAM

2025 ANNUAL REPORT

WELCOME

As we continue to implement the Linear System Integrity Program, it is important to reflect on the significant investment that the Great Lakes Water Authority (GLWA) has made in the management of its water and wastewater infrastructure. This investment has had a significant impact on the surrounding communities and delivers on our goal to provide water of unquestionable quality to our Member Partners.

Linear System Integrity Program Goals

The Linear System Integrity Program will provide a management structure for GLWA's linear assets to improve overall system reliability, reduce failures, and maximize the life of the water transmission system.

To accomplish this work, six program goals were identified.



01

Develop a framework to proactively manage linear assets.

02

Increase system reliability to meet service levels.

03

Limit transmission main failures on high-consequence assets.

04

Reduce the overall risk of water main failures.

05

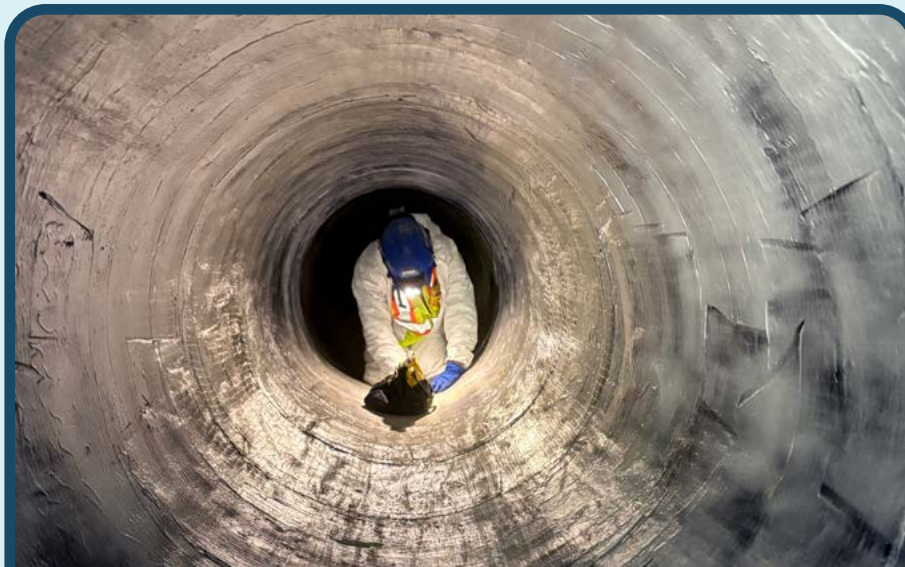
Maximize the useful life of GLWA's transmission mains.

06

Implement consistent and effective data management protocols.

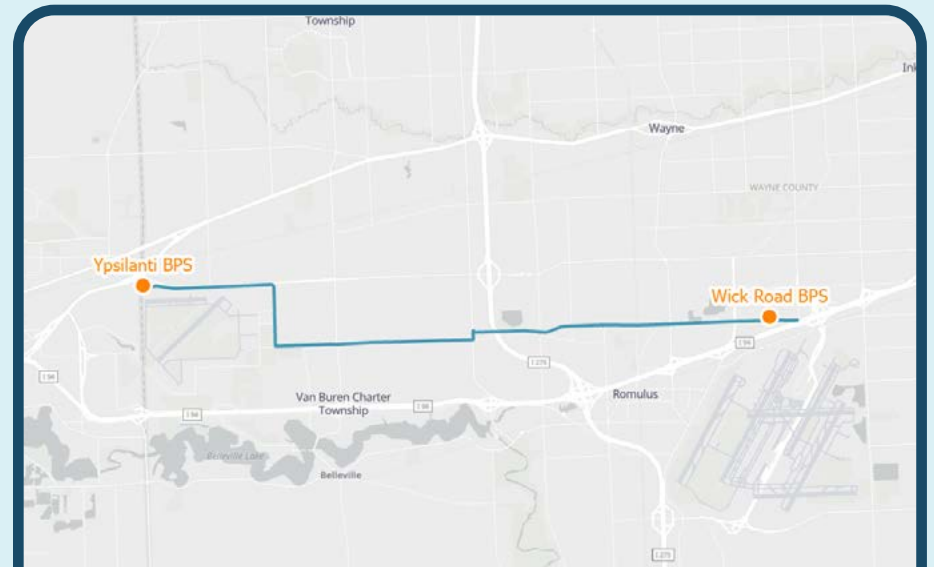
Accomplishments and Milestones

As GLWA developed the management structure for the Linear System Integrity Program, opportunities for proactive renewal and assessment were determined. In 2025, the following projects were completed in collaboration with GLWA's Research and Innovation, Resiliency, Water Transmission, Water Engineering and Wastewater Engineering groups, Conveyance and CSO, and Enterprise Asset Management.



24-Mile Road Transmission Main Renewals

Following the 24-mile transmission main inspections completed in 2024, 121 pipes were repaired using carbon fiber reinforced polymer (CFRP) and 2 pipes were replaced.



Wick Road Condition Assessment

Planning for the condition assessment of approximately 10.5 miles of the 42-inch transmission main that delivers water from the Wick Road Booster Pump Station to the Ypsilanti Booster Pump Station has begun. The inspections are anticipated to be completed in 2026.

Accomplishments and Milestones

In 2025, the 120-inch Metcalf, Fort Gratiot Transmission Main underwent a free swimming electromagnetic inspection. This high resolution inspection has provided valuable information which will be used to inform decisions to help improve the reliability of the pipeline, minimize breaks, and improve overall system resiliency.

The 120-inch Metcalf, Fort Gratiot Transmission Main delivers water from the Lake Huron Water Treatment Plant westward more than 26 miles to the Imlay City Booster Pumping Station. Electromagnetic inspection was performed using a free-swimming tool in April 2025. This inspection collected high-resolution data while the 120-inch transmission main remained in service, thereby allowing GLWA to maintain high levels of service to Member Partners during the inspection.

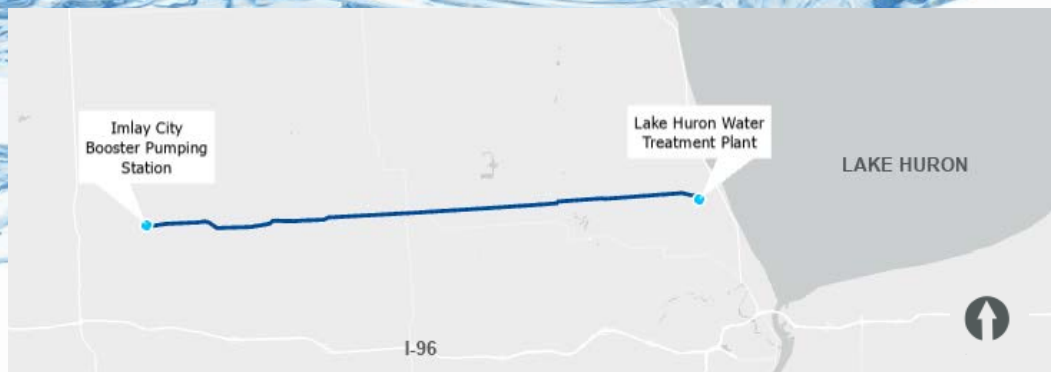
The data collected will help GLWA prioritize repairs and reduce the likelihood of future failures along the pipeline. To date, this has been the longest consecutive inspection performed as part of the LSIP and will be used to drive rehabilitation and renewal decisions in the coming years.



Inspection Tool Removal at Imlay City Booster Pump Station



Installation of Inspection Tool Removal Net



Opportunistic Accomplishments

“Investigating Failure Helps Prevent It”

In 2025, the emergency response team worked diligently to quickly and efficiently perform investigations to understand the root causes of these water main facilities. Opportunistic inspections and repairs have been performed, which will ultimately reduce the likelihood of future failures.

14-Mile Road 42-inch PCCP Emergency Response

Following a 42-inch water main break on 14-Mile Road and Kingswood Boulevard, 3.8 miles of opportunistic electromagnetic and visual and sounding inspection was performed. Additionally, planning for the installation of Acoustic Fiber Optic (AFO) began for pro-active monitoring of the pipeline. In addition to the replaced pipe at the failure site, multiple pipe segments were renewed using CFRP.



Electromagnetic Inspection and CFRP Repair

Beard Street 54-inch Steel Emergency Response

An in-situ investigation and metallurgical analysis was performed to infer the potential cause(s) of the failure on the 54-inch steel transmission main in February. This emergency response has emphasized a need for inspection of steel pipes, and has helped to evolve the trajectory and goals of the LSIP. The failed steel main section was removed, and a new steel pipe was welded in place to restore integrity to the line.



Forensic Evaluation and Welded Steel Repair

Gratiot Ave. 36-inch PCCP Emergency Response

Following a reported leak on a 36-inch PCCP segment at Gratiot Ave and Hickey Road, a forensic evaluation and opportunistic visual and sounding inspection was performed on the pipes surrounding the failed pipe. The failed pipe section was removed and a new PCCP segment and a steel coupling was welded in place to restore the watermain.



Forensic Evaluation and New PCCP and Steel Coupling

By the Numbers

Development and implementation of the Linear System Integrity Program began in 2021. These statistics provide a snapshot of the magnitude of work completed in 2025.



Electromagnetic Inspection in the 14-Mile Road Transmission Main



Failures Averted To-Date:

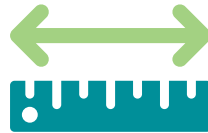
77 pipes have been identified as an “effectively failed” pipe due to observed damage. These pipes have undergone proactive renewal to prevent future failures.

LSIP Achievements This Year:



3.8

miles of visual and sounding inspection



29.3

miles of high resolution electromagnetic inspection completed



123

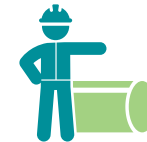
pipes (0.5 miles) have undergone proactive renewal, including CFRP repairs

LSIP Achievements To-Date:



20.4

miles of visual and sounding inspection condition assessment deployment



55.8*

miles of high-resolution condition assessment deployment



196

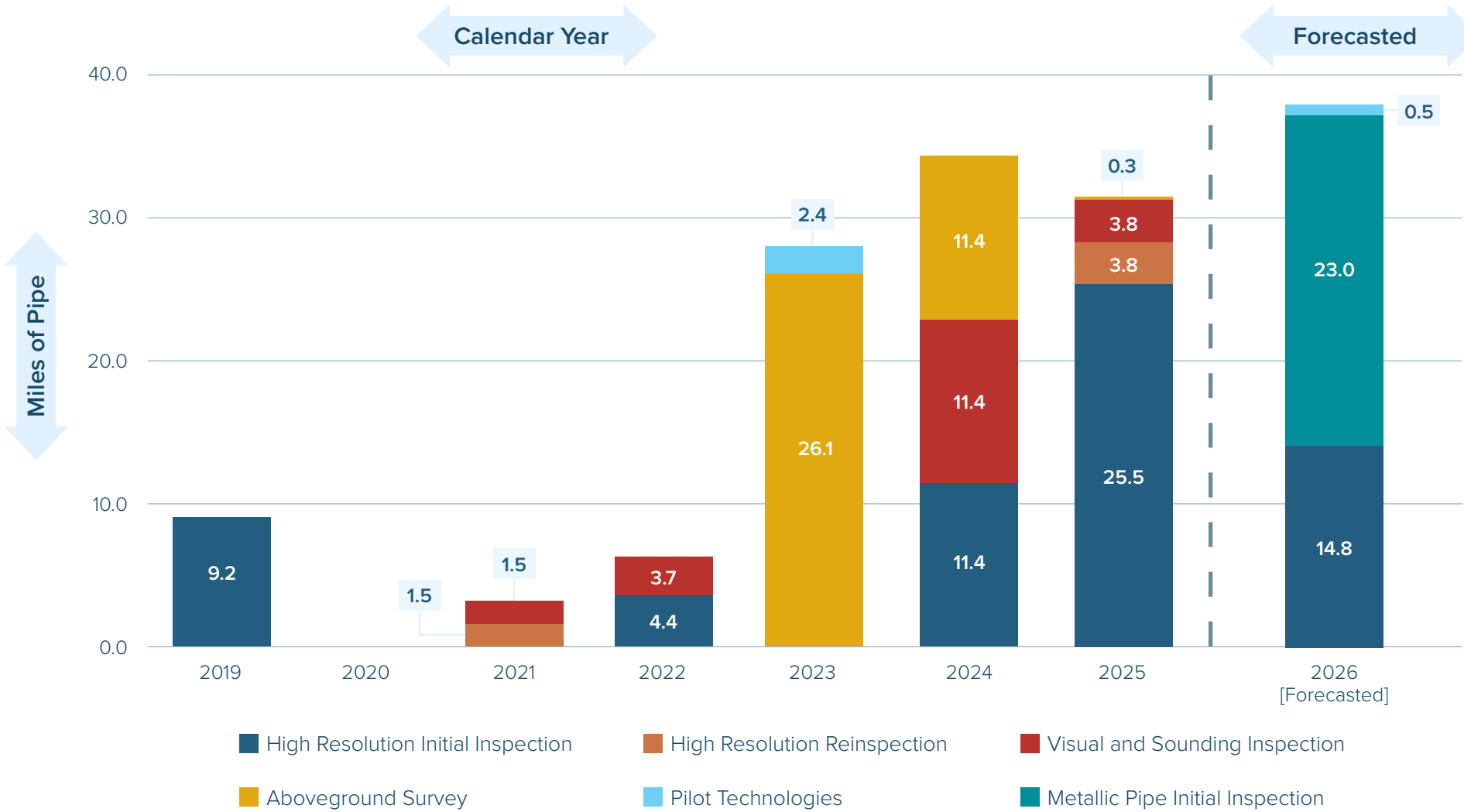
pipes (0.7 miles) have undergone proactive renewal

*This total includes 9.2 miles of high-resolution condition assessment completed in 2019.

The Future

Multiple pipelines have been inspected as part of the Linear System Integrity program, including the 36-inch transmission main located on 24-mile road, the 120-inch water main (Lake Huron WTP to Imlay City BPS), and emergency condition inspections. The LSIP annual inspection progress is outlined below, including our forecasted plan for 2026.

High resolution inspection techniques, which include electromagnetic inspection, offer the best available data quality to make the most detailed management decisions.



The Future

Since inception in 2021, the LSIP has grown to more effectively manage water and wastewater infrastructure for the betterment of the surrounding communities. Below are several examples of how GLWA is evolving the LSIP.



GLWA is expanding the LSIP to further incorporate the inspection of metallic mains in their program.



The development of a more comprehensive wastewater program under LSIP will allow GLWA to more proactively manage wastewater assets.



As the number of condition assessment projects increase, GLWA will be able to identify damage and increase the rate of proactive pipe repair and renewal projects, increasing system resiliency.



The LSIP is increasing the number of condition assessment projects with the goal of continued proactive asset management.



GLWA is investing in AFO monitoring on key transmission mains and Pilot Projects to expand the number of available inspection technologies and provide real-time monitoring data for assets.

The Future

The maps below provide a visual summary of the transmission mains that have undergone inspection, as well as the transmission mains that are currently being evaluated for inspection as part of LSIP. The map on the left shows the completed condition assessment projects to date, and the map on the right shows the pipelines that are being considered for condition assessment.



Transmission Mains with Completed Condition Assessment Projects



Transmission Mains with Planned or Proposed Condition Assessment Projects