

Department of Public Works Water and Sewer Division

Pre-Stressed Concrete Pipe Assessment and Inspection Program 2019



Pre-Stressed Concrete Cylinder Pipe from GLWA Break 14 Mile Main Break



PCCP Overview



- PCCP is commonly found in water mains
- PCCP can range in size from 16" to 20' diameter
- A prestressed wire is wrapped helically around the pipe providing resistance to internal pressure and external loads
- Designed to handle high pressures



Types of PCCP Failures

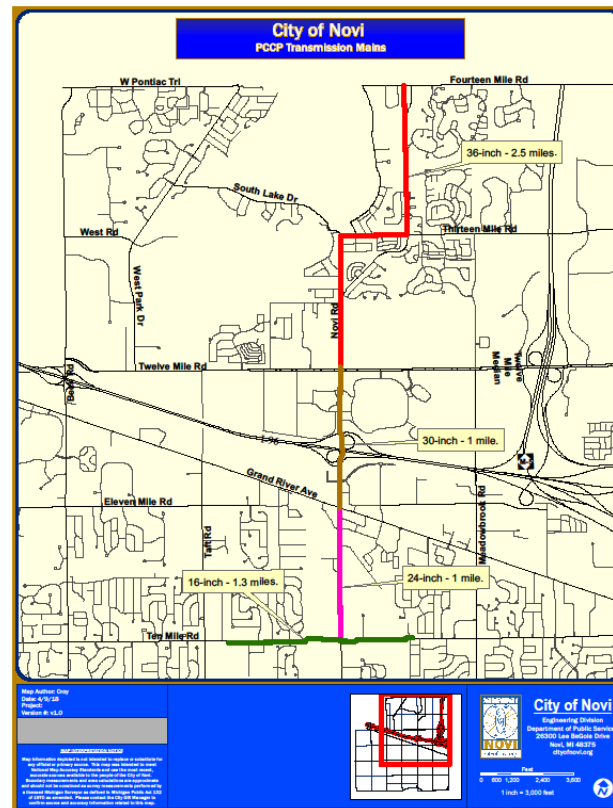
Corrosion



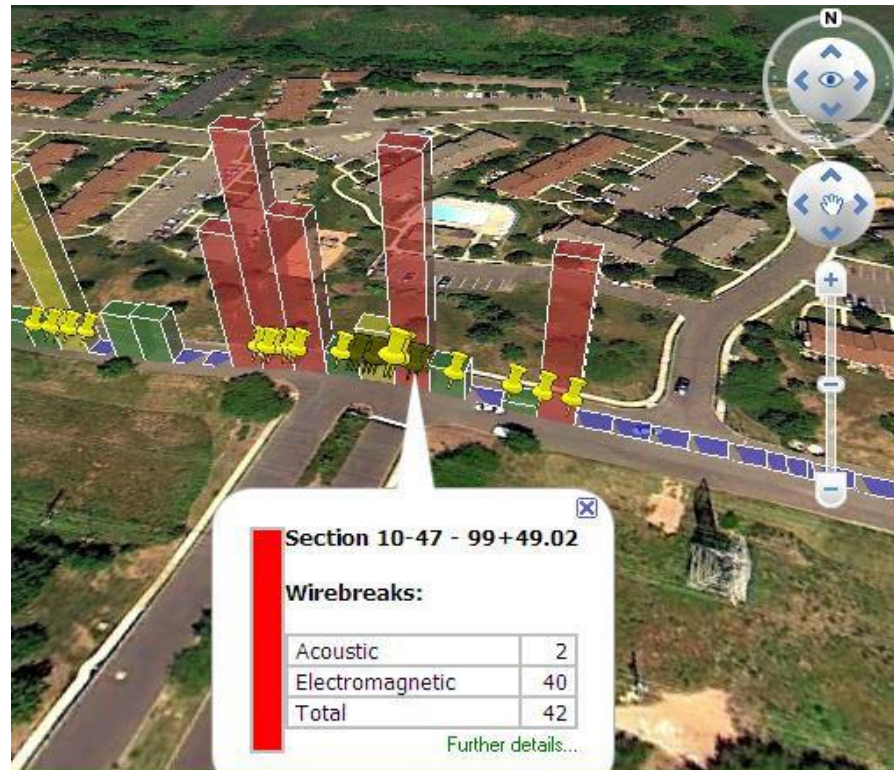
Hydrogen Embrittlement



City has 2.5 Miles of 36", 1 Mile of 30", 1 Mile of 24" and 1.3 Mile of 16" PCCP water main. This is the primary water service for the majority of Novi.

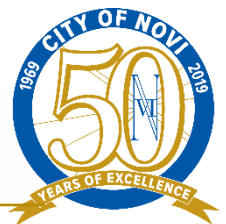


Our goal is to reduce your capital expenditures by focusing repair/rehab/replacement on bad pipe



PCCP Inspection Toolbox

- Transient pressure monitoring
- Leak and air pocket detection (Smart Ball)
- Structural pipe wall inspections - counting wire breaks (Pipe Diver)
 - Electromagnetics
 - Visual and Sounding
 - Forensic investigation and design review
 - Structural assessment
 - Remaining useful life
- Acoustic fiber optic (AFO) monitoring for wire breaks – (Option)



In-line Acoustic Leak & Gas Pocket Detection



- Free Swimming/
Non-Tethered
Hydrophone
- Technology
- Locates leaks and
gas pockets in
transmission or force
mains
- Launch and retrieve
in live flow through
- 4" openings

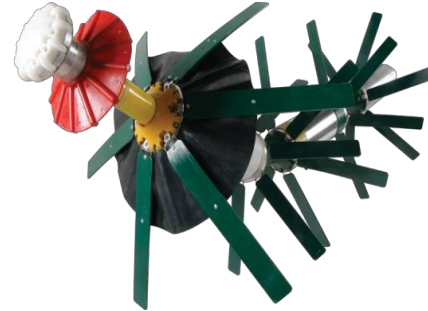
Structural Pipe Inspection

External



Diameter: Any
Pipe segments
excavated to
springline
Manned system

Free-Swimming



Diameter: 16"+
Pipeline In Service
Free swimming
*SONAR
*CCTV recording

PCCP Pipe Inspection Proposal

- SmartBall – Identification and location of any leaks and/or air pockets in the pipeline as well as ARV installation recommendations.
- PipeDiver - Identification and location of the estimated number of broken prestressing wire wraps within each PCCP pipe section inspected.
- Xylem will also provide transient pressure monitoring and structural modeling (FEA curves) to determine the significance of any defects detected.
- Pure Technologies typically provides a presentation summarizing draft results to stakeholders to facilitate review of the draft report.



Summary

- Budgeted in 2019-2020 FY
- Scheduled to start fall 2019
- Preventive and proactive maintenance with the goal to prevent a catastrophic failure
- Failures result in \$\$\$ and loss of service
- Projects can be planned and more cost effective with control of service maintained
- Same program GLWA just completed first phase of inspection

