

Emergency Force Main Repair Using Pressure CIPP



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Regional Provider: Water, Wastewater, Solid Waste



BY THE NUMBERS

DID YOU KNOW?



Service area of 2,200 square miles in 10 counties

Serving 2 million people in one of the fastest-growing regions in the country



18

MAJOR RAW & TREATED WATER PUMP STATIONS

6

WATER TREATMENT PLANTS
876 MGD Capacity
(million gallons/day)

610+
MILES

WATER TRANSMISSION PIPELINES



226+
MILES

LARGE-DIAMETER WASTEWATER PIPELINES

13

WASTEWATER TREATMENT PLANTS

163+
MGD

WASTEWATER TREATMENT CAPACITY
MGD (million gallons/day)



3 TRANSFER STATIONS
up to 3,370 tons of solid waste/day

around
1 million
tons/year
accepted
at landfill



Rev. July 2022

UNDERGROUND CONSTRUCTION TECHNOLOGY

THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



NTMWD Vision, Mission, and Goals

VISION: Regional Service Through Unity – Meeting Our Region’s Needs Today and Tomorrow

MISSION: Provide high quality and dependable water, wastewater and solid waste services in a cost efficient manner

Goal 1: Service	Provide superior water, wastewater and solid waste services today and tomorrow.
------------------------	---

Goal 2: Stewardship	Responsibly manage public resources to ensure responsiveness, effectiveness and efficiency.
----------------------------	---

Goal 3: Partnership	Actively work with members, customers, partners, employees and stakeholders.
----------------------------	--

Goal 4: People	Build a talented, competent and committed team.
-----------------------	---

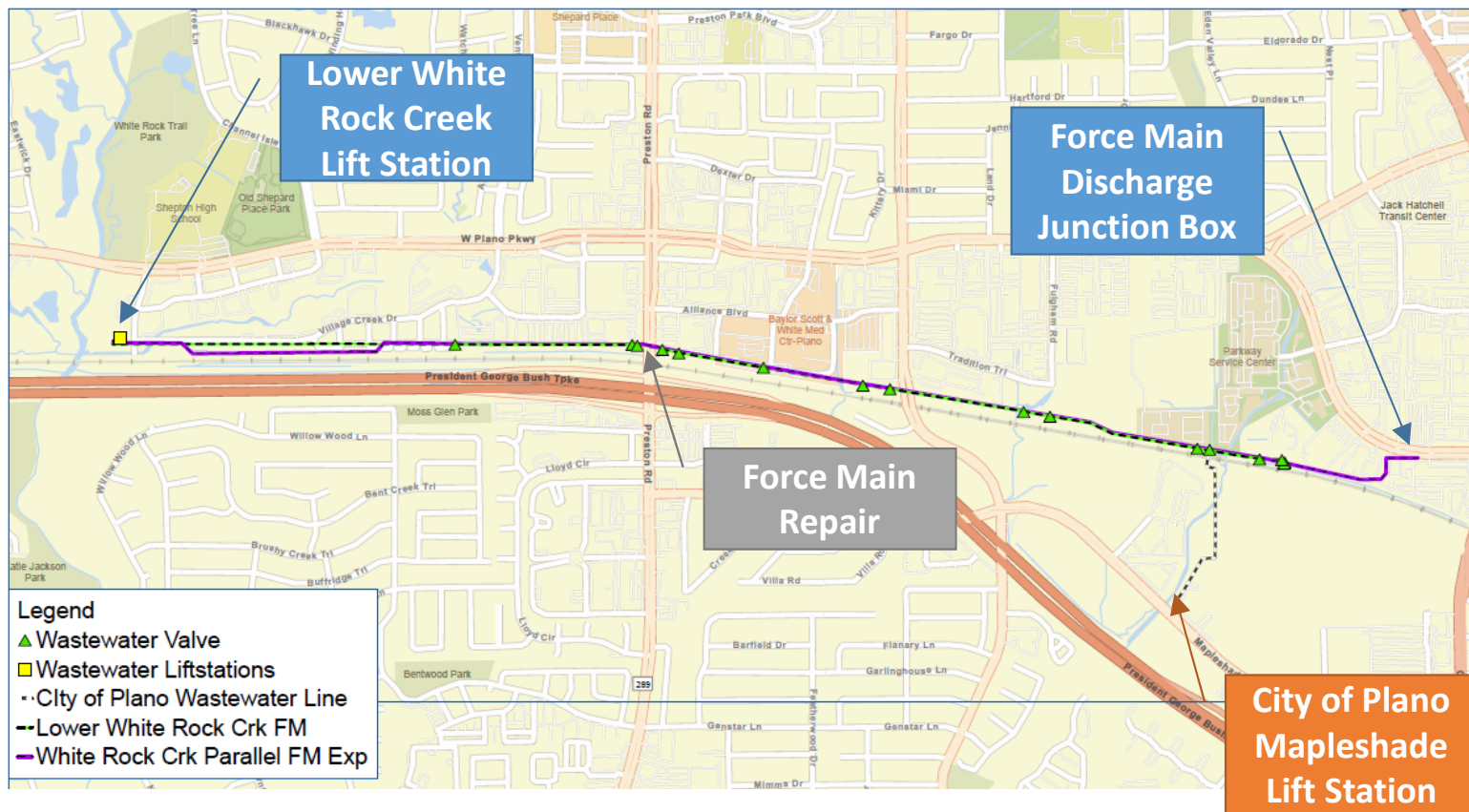
UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Emergency Force Main Repair Using Pressure CIPP

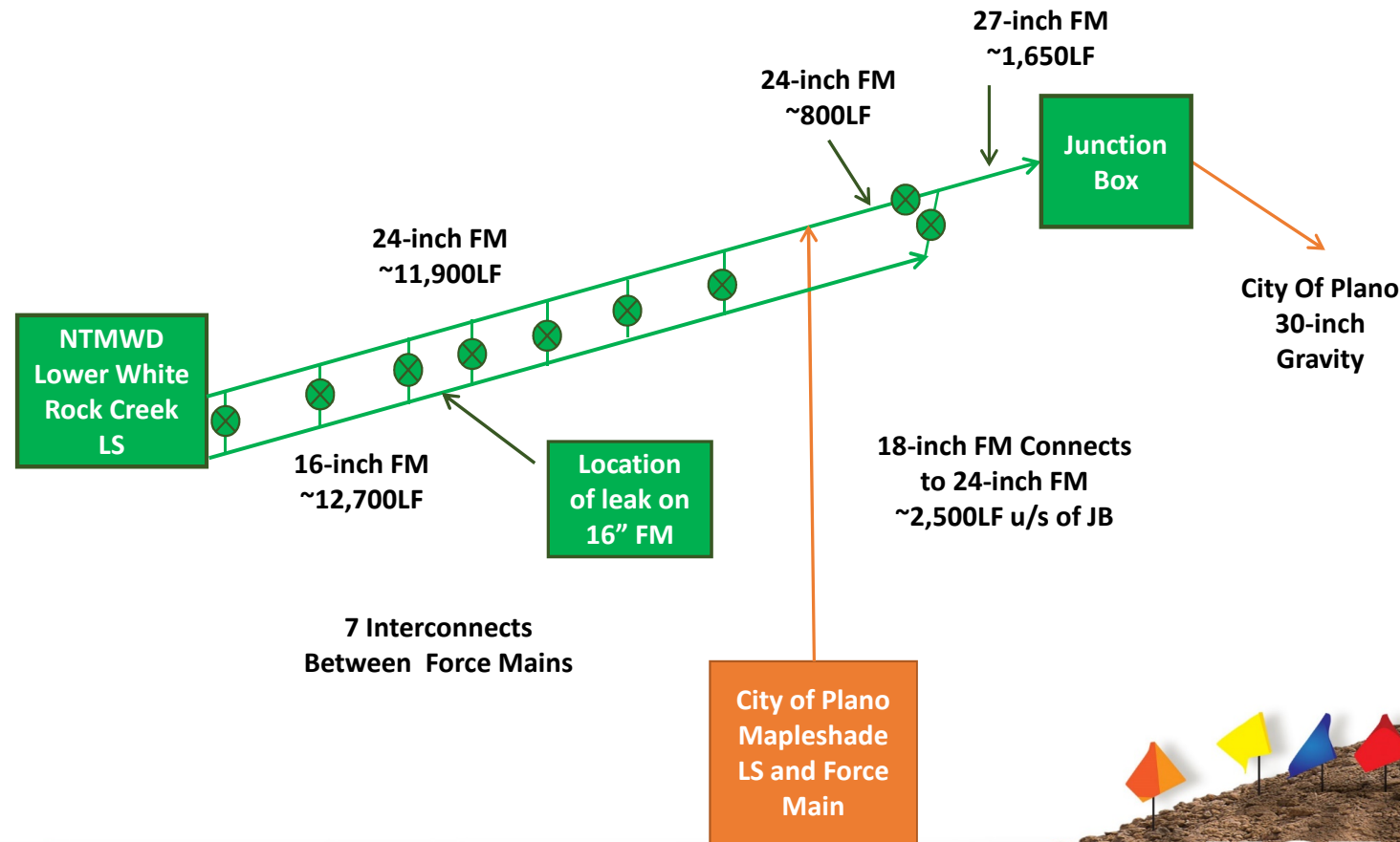
- **Lift Station and Force Main Background Information**
- Active SSO and Repair Approach
- Pressure CIPP and Repair
- Force Main Inspection
- Next Steps





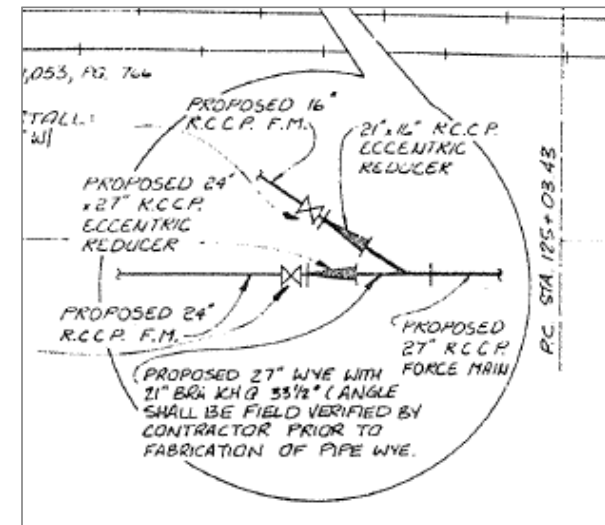
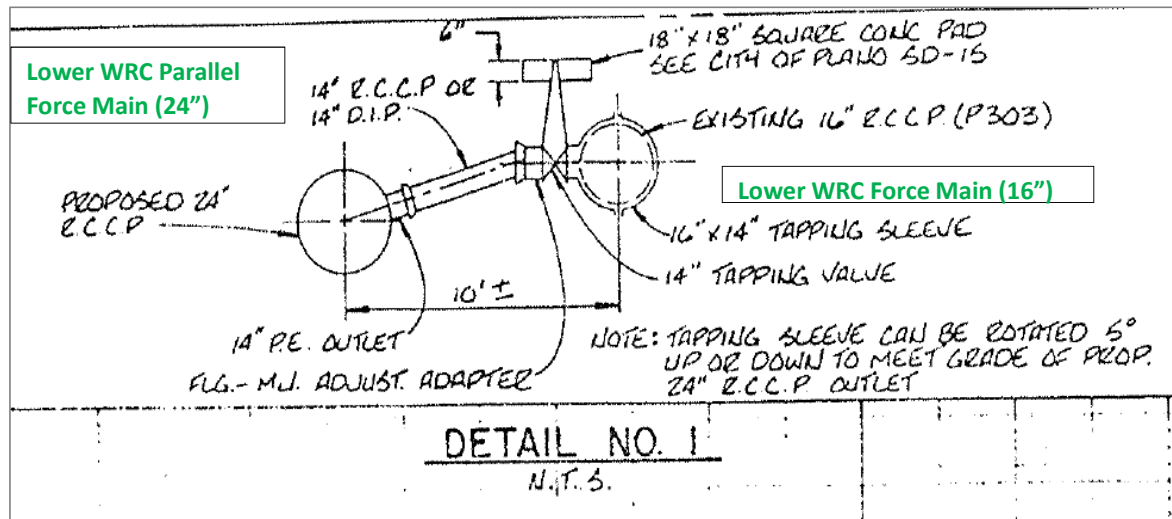
Lower White Rock Creek Force Mains

- **16" Lower White Rock Creek Force Main**
 - Constructed in 1978
 - Bar wrapped concrete pipe
- **24" & 27" Lower White Rock Creek Parallel Force Main**
 - Constructed in 1989
 - Bar wrapped concrete pipe
- **18" City of Plano Mapleshade Force Main**
 - Constructed in 2009
 - Ties into 24" Lower White Rock Creek Parallel Force Main



Force Main Interconnects

- Seven Interconnect between 16" force main and 24" force main
- Wye connection to connect the 16" and 24" force main to merge into one 27" force main

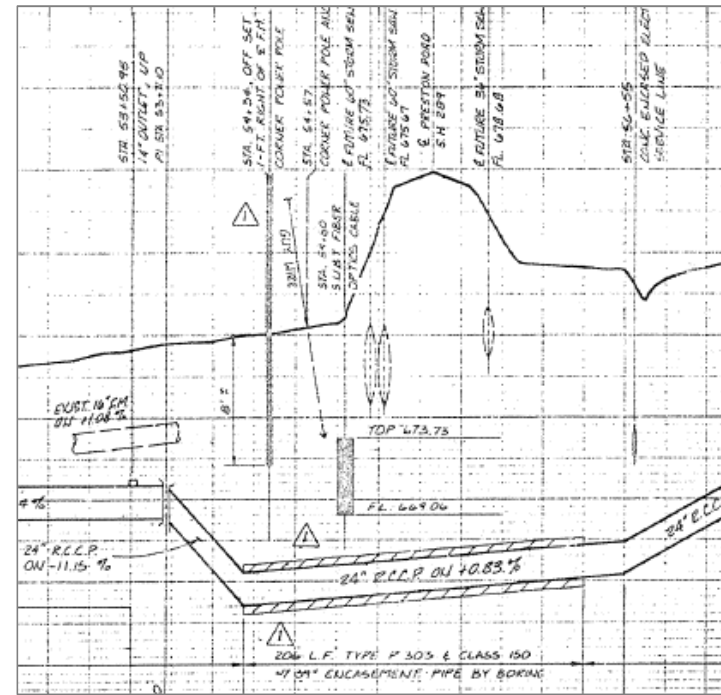


Emergency Force Main Repair Using Pressure CIPP

- Lift Station and Force Main Background Information
- **Active SSO and Repair Approach**
- Pressure CIPP and Repair
- Force Main Inspection
- Next Steps



A close-up photograph of a dark, circular object, possibly a lens or a small container, with a bright light source visible on the right side. The object has a dark, textured surface and a central, slightly raised area. The lighting creates a strong contrast between the dark object and the bright light source.



Sometimes where the leak surfaces, is not
always where the leak is



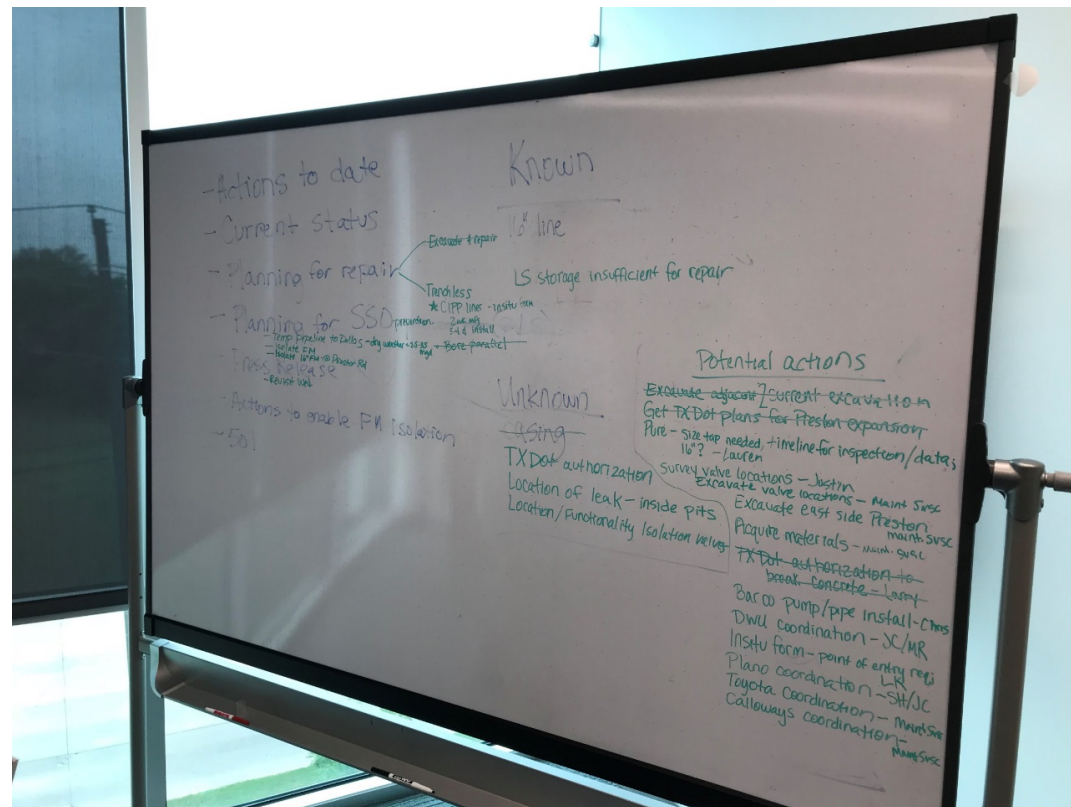
UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



NTMWWD Set up stilling well and pumped to a near by City of Plano manhole



Back to the drawing board



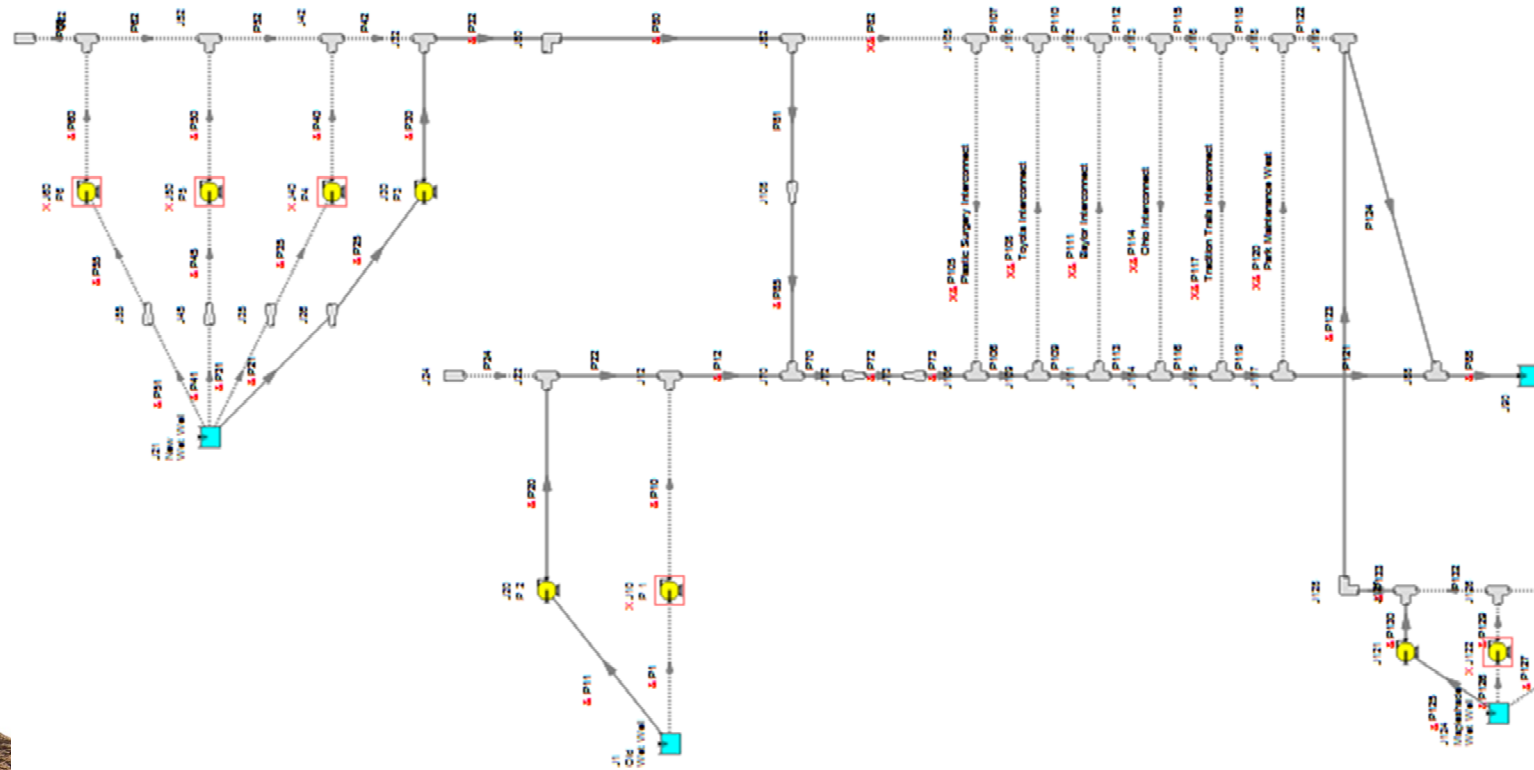
Survey to isolate force main and locate all interconnects



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL

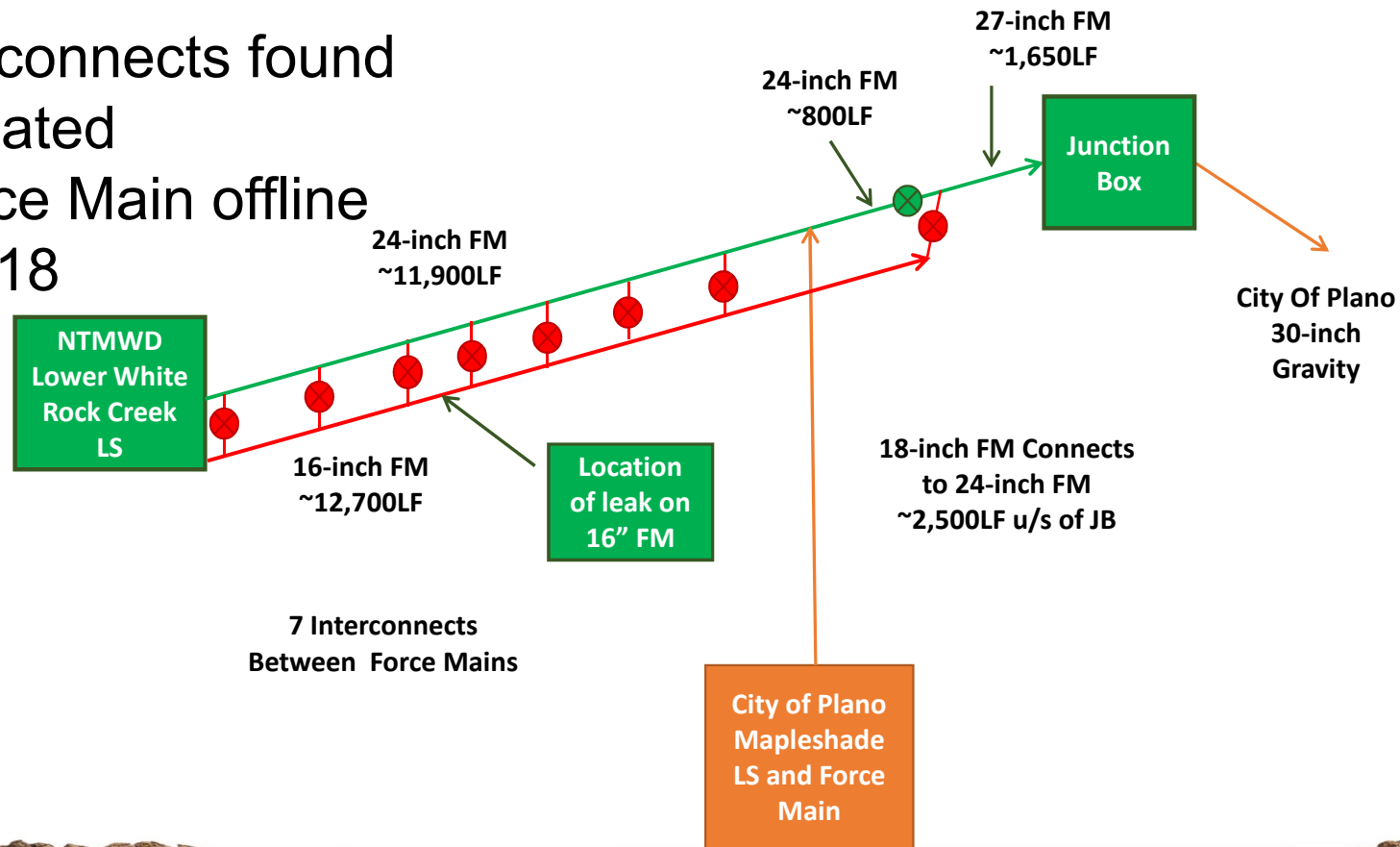


Fathom Model to estimate flow with interconnects open/closed



Lower White Rock Creek Force Mains

All interconnects found
and isolated
16" Force Main offline
9/19/2018



Added valves to isolate the leak



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



CCTV & Measurements

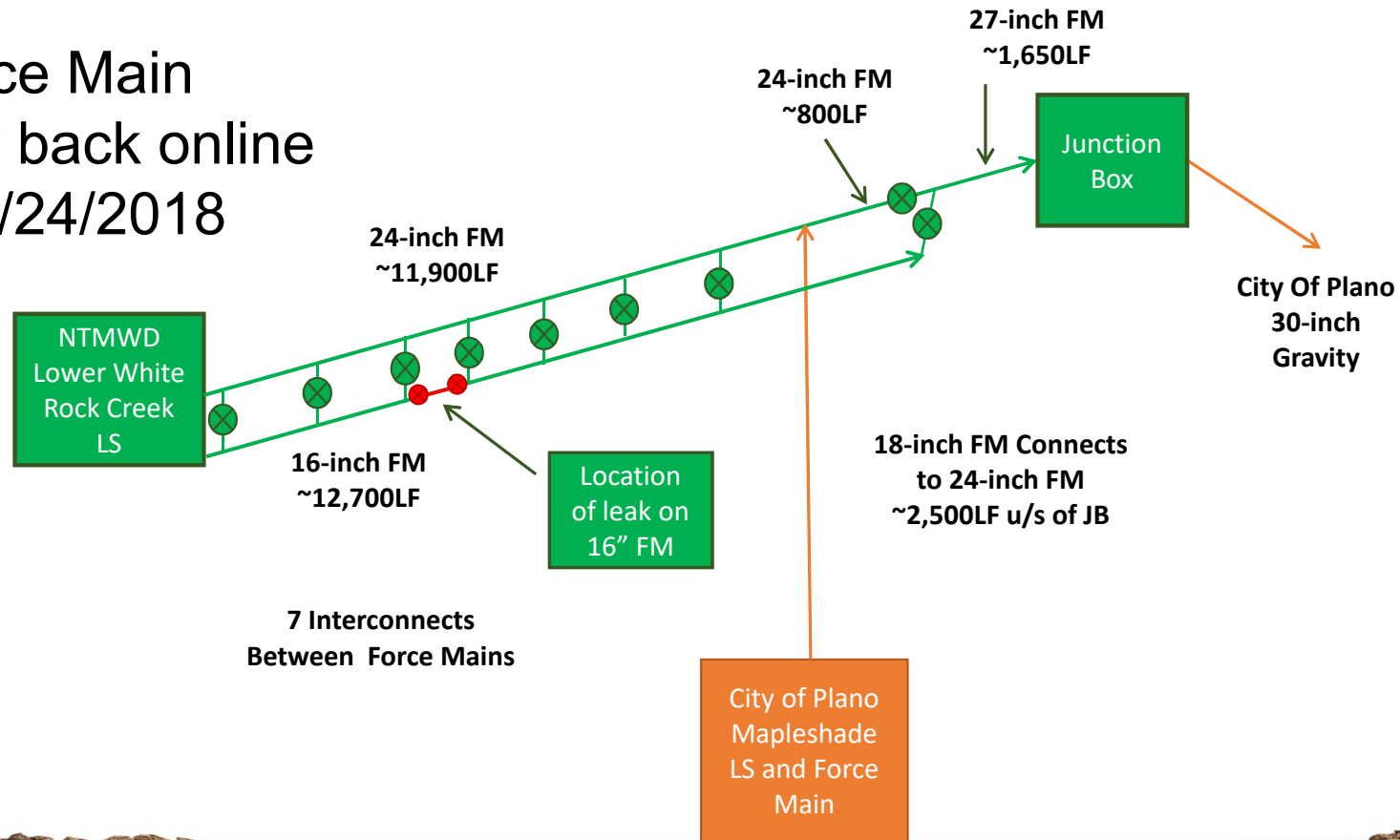


UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Lower White Rock Creek Force Mains

16" Force Main
partially back online
after 10/24/2018



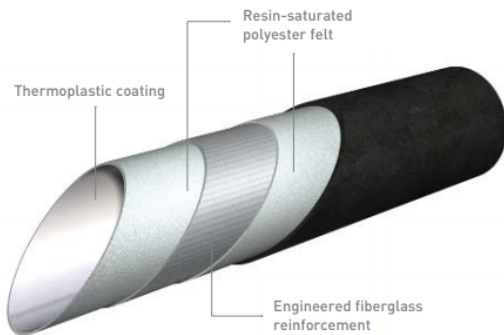
Emergency Force Main Repair Using Pressure CIPP

- Lift Station and Force Main Background Information
- Active SSO and Repair Approach
- **Pressure CIPP and Repair**
- Force Main Inspection
- Next Steps



Pressure CIPP (InsituMain®)

- Resin impregnated glass reinforced CIPP
- Structural AWWA Class IV lining system
- First generation product has been utilized for over 20 years
- Technical Envelope
 - Diameter = 6" to 72"
 - Max Operating Pressure = 250 psi (dependent on pipe diameter)
 - Bends = up to 45°
 - Physical properties exceed ASTM F1216/AWWA M28



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Pressure CIPP (InsituMain®)

Design Information

- Liner thickness 8.5 MM
- 2 layers of glass reinforcement
- 150 psi pressure rating

Install Process/Dates

- Contract with NTMWD 10/31/2018
- Measurements & tube order 11/6/2018
- Wetout 12/10/2018
- Install 12/11-13/2018
- Pressure test & tie-in's 12/14/2018



Installation Week 12/10/2018



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Installation Week 12/10/2018



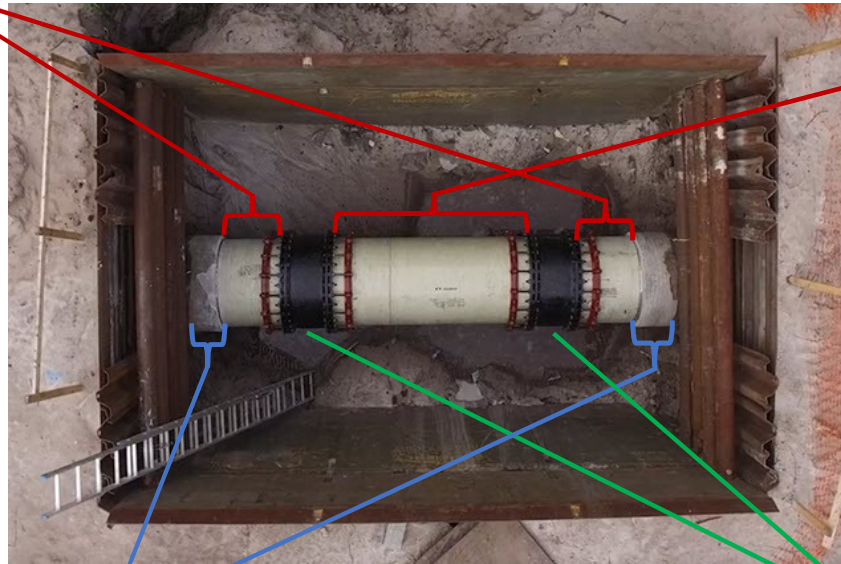
UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Install Pit – Typical Fittings/Details

**FRP
Termination
Piece**

**FRP/PVC
Spool Piece**



**PCCP Host
Pipe**

**Mechanical Joint
with MEGALUG**

UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



End Terminations



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Pressure Test of Liner



Closure Pipe

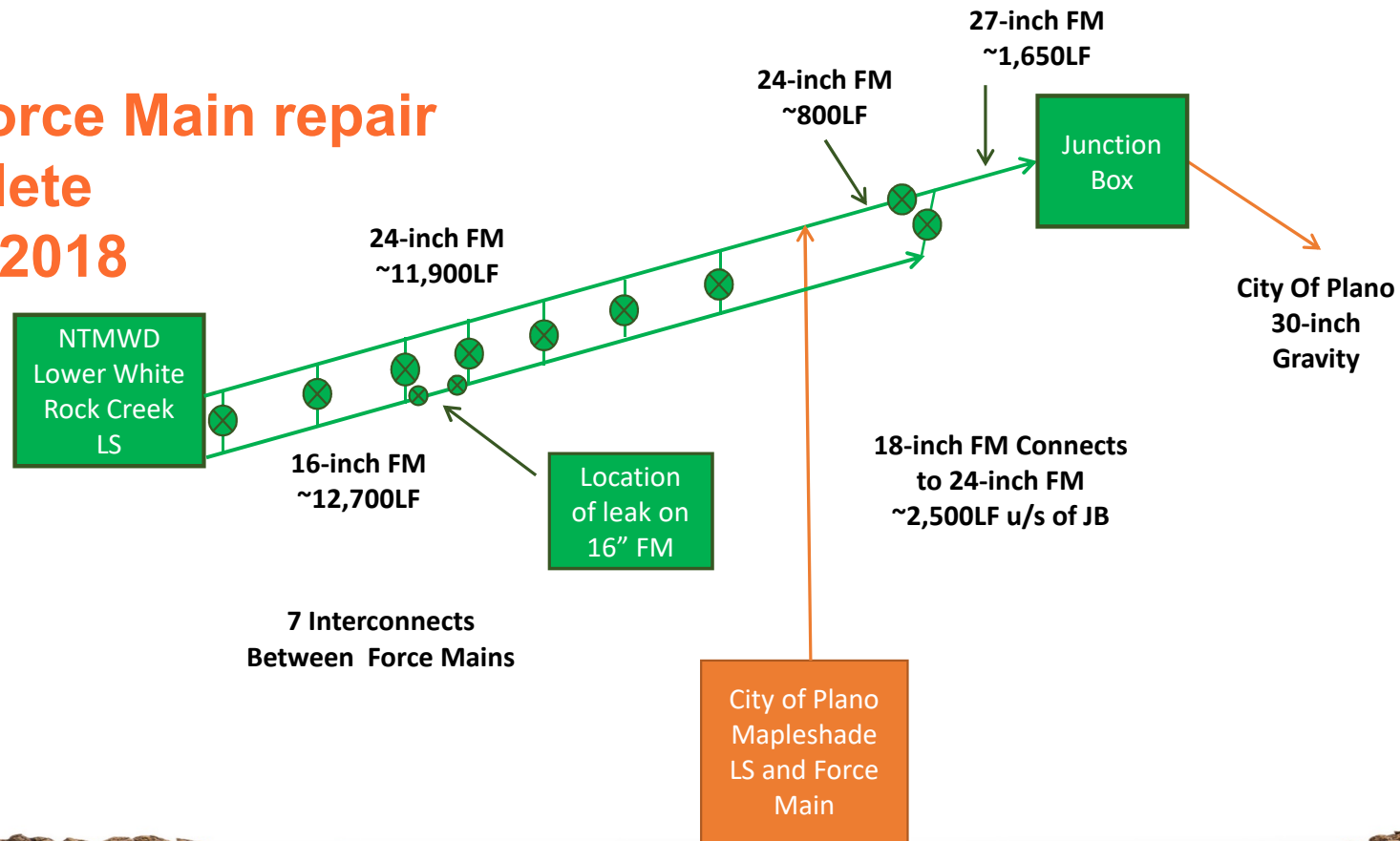


UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Lower White Rock Creek Force Mains

**16" Force Main repair
complete
12/14/2018**

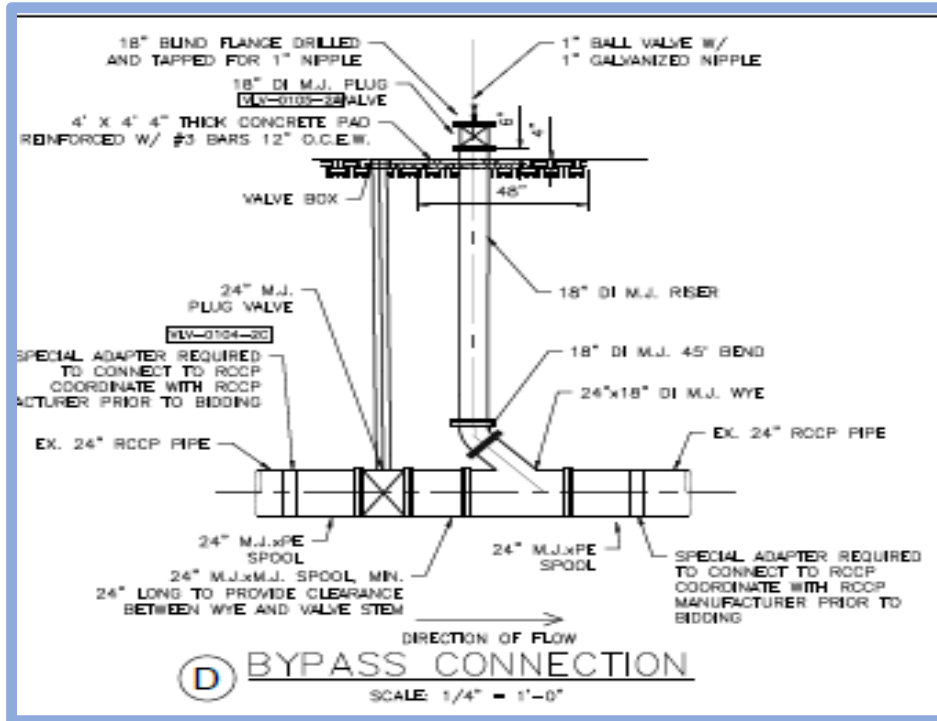


Emergency Force Main Repair Using Pressure CIPP

- Lift Station and Force Main Background Information
- Active SSO and Repair Approach
- Pressure CIPP and Repair
- **Force Main Inspection**
- Next Steps



Pre-Inspection Construction



Added insertion point for PipeDiver access



Force Main Inspection March 2020

Inspection Schedule			
	16-inch	24-inch	27-inch
March 3	Acoustic		
March 4		Acoustic	Acoustic
March 5	EM - bars		
March 6, 26	EM - cylinder		
March 9		EM - bars	EM - bars
March 10, 11		EM - cylinder	
March 24			EM – cylinder 2x

PipeDiver Results

- 2 Pipe Segments with suspected wall loss
- 2 Pipe Segments with broken bar wraps

Smart Ball Results

- No Leaks
- 5 Gas Pockets
- 5 Gas Slugs
- 12 Migratory Air Events



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



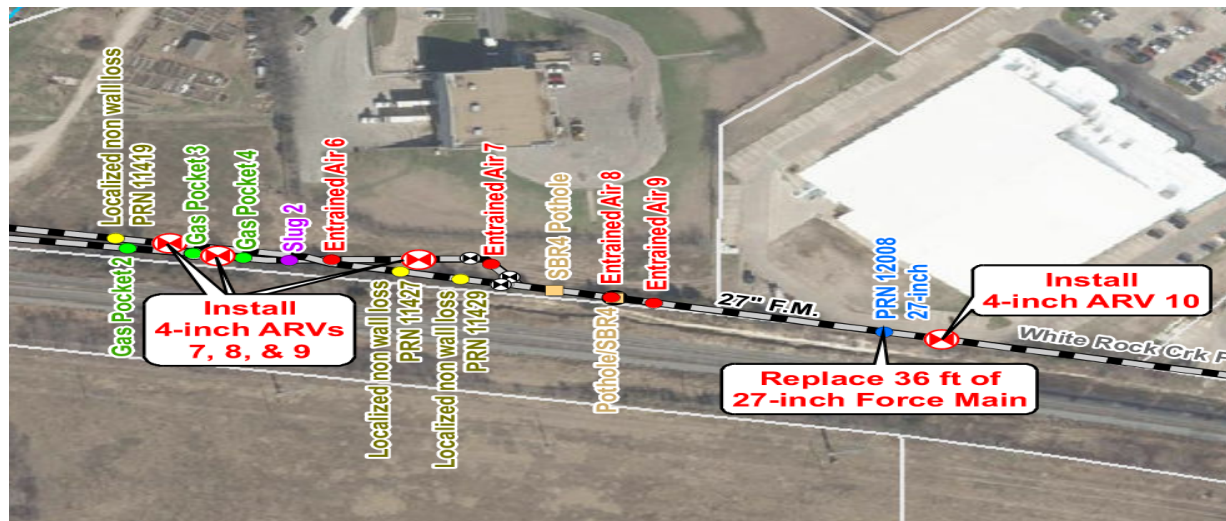
Emergency Force Main Repair Using Pressure CIPP

- Lift Station and Force Main Background Information
- Active SSO and Repair Approach
- Pressure CIPP and Repair
- Force Main Inspection
- **Next Steps**



Force Main Repair Recommendations in Design

- Identified ARV and rehab locations
- NTMWD budgeting and planning rehab projects



Acknowledgements



Maintenance, Operations, Public Relations, and Environmental Services



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL

