CIPP For Large-Diameter Pressure Pipes

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NASSCO

WHAT TO EXPECT

- **CIPP for Pressure Pipes**
- **Case Study – Preliminary Condition Assessment**
  - Old Large Dia PCCP Force Main
  - Factors for Rehabilitation
- **Case Study – 48” FM Project Overview**
  - Access / Community
  - Bypass
  - Job Specifics & Challenges

PRESSURE CIPP

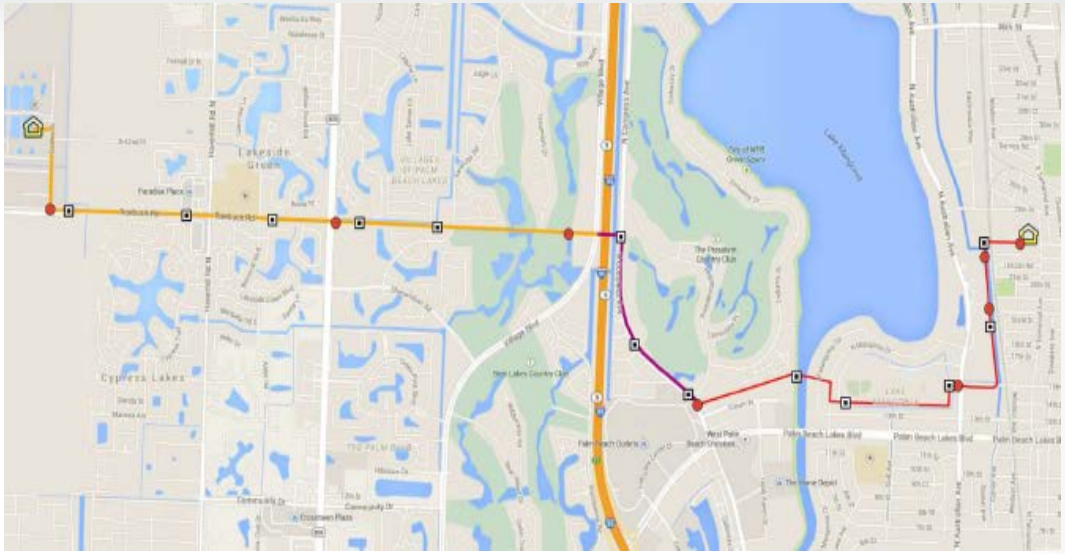
- **Reinforced Pressure CIPP History**
  - Successful installations date back to 1997.
  - Potable water, sanitary sewer force mains, industrial applications
  - Pressure CIPP not solely for small diameter
  - Advancements in tube construction
    - Higher pressures (up to 250 psi)
    - Larger diameters (up to 96”)

SUCCESSFUL PROJECT CASE STUDY

City Of West Palm Beach, FL
48” Force Main CIPP Rehabilitation

CONDITION ASSESMENT

- **Preliminary Condition Assessment**
  - City of WPB/Town of Palm Beach
    - Pure Technologies PipeDiver™
- **PCCP Wire Breaks**
  - Price Brothers LCP
  - Interpace ECP
- **12,000 LF of Problematic Pipe**



30,000 LF of 42”/48” PCCP Evaluated

Pure Technologies PipeDiver™

CONDITION ASSESMENT

- **48” FM is Only Artery to WWTP**
  - No redundancy

- **Failure would be catastrophic**
  - Loss of WW service
  - Localized contamination
  - Contamination of city’s raw water supply
  - Contamination of Intracoastal Waterway

- **<u>Priority for capacity</u>**

NOW WHAT?

Post Condition Assessment Options:

Construction of
New Parallel FM

Construction of
2nd Alternate FM

Sliplining

Cured-in-Place Pipe

PROJECT PHASING

- **Rehabilitation Scope Split into Phases:**
  - **Phase 1**
    - Sequencing for golf course
    - Primarily in green spaces
    - High residential/private impact
  - **Phase 2**
    - Primarily in roadway
    - High commuter/vehicular impact

48” FORCE MAIN PROJECT – PHASE 1

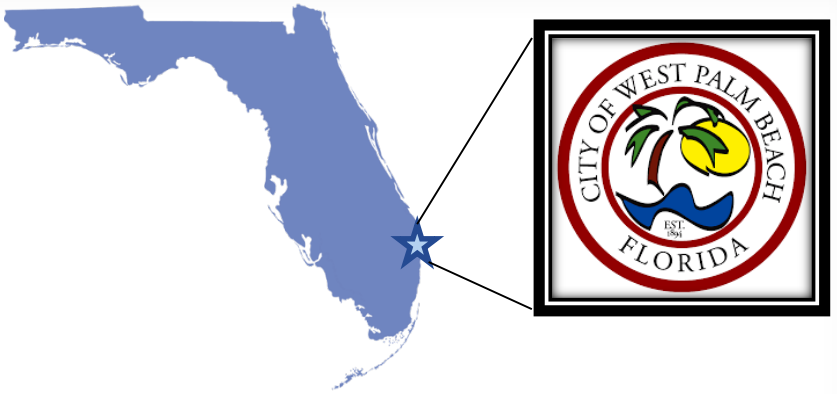
- 5,700 LF of 48” Interpace PCCP (ECP) Force Main
- Location – Country Club Golf Course / Canal / Condo Association
- High End Residential
- Operating Pressure – 25 psi
- 18mm Composite CIPP Liner
- AWWA Class IV – Fully Structural

PROJECT OVERVIEW

Project Aerial Video

CITY OF WEST PALM BEACH

- **Population of ~110,000**
- **East Central WWTP**
  - Handles 100% of WW flow from City of West Palm Beach and Town of Palm Beach
  - City's only plant
- **High Profile Municipal Govt.**
- **Affluent Residents**
  - Hank Aaron
  - Jimmy Buffet
  - Donald Trump



PRESSURE CIPP PROCESS OVERVIEW

- PIT CONSTRUCTION
- BYPASS / FLOW DIVERSION
  - HOT TAP / LINE STOP
- CLEANING / PIGGING
- CIPP LINING / CURING
- PRESSURE TESTING
- TERMINATION / CLOSURE
- BACKFILL / RESTORATION

CRITICAL PATH – BYPASS

24” HDPE:

- 3 primary lines
- 1 redundant line
- ARV’s installed on each

3 Fairway Crossings:

- 3 standard cart path
- 1 HD cart path

Environmental Concerns:

- Canal Crossings
- Golf course ponds

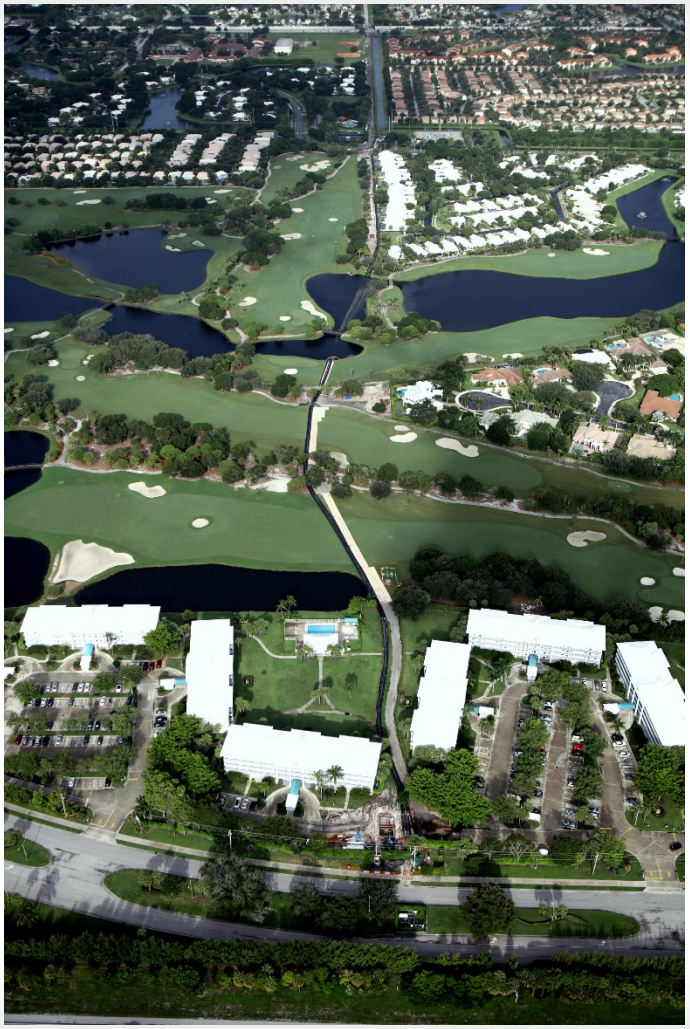
CRITICAL PATH – BYPASS

West Side – Pit 7

East Side – Pit 1

PROJECT CHALLENGES

- **Country Club – Golf Course**
- Condo Complex
- Access
- Flow Management
- Bypass Pumping
- Country Club Houses
- Canal
- Middle School
- Weather



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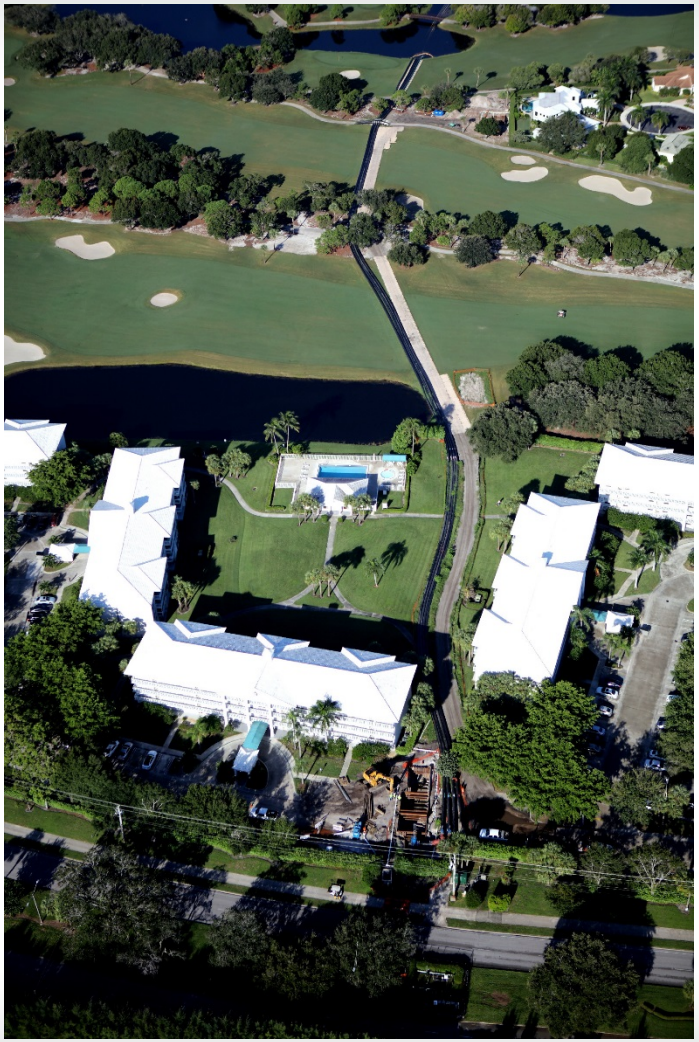

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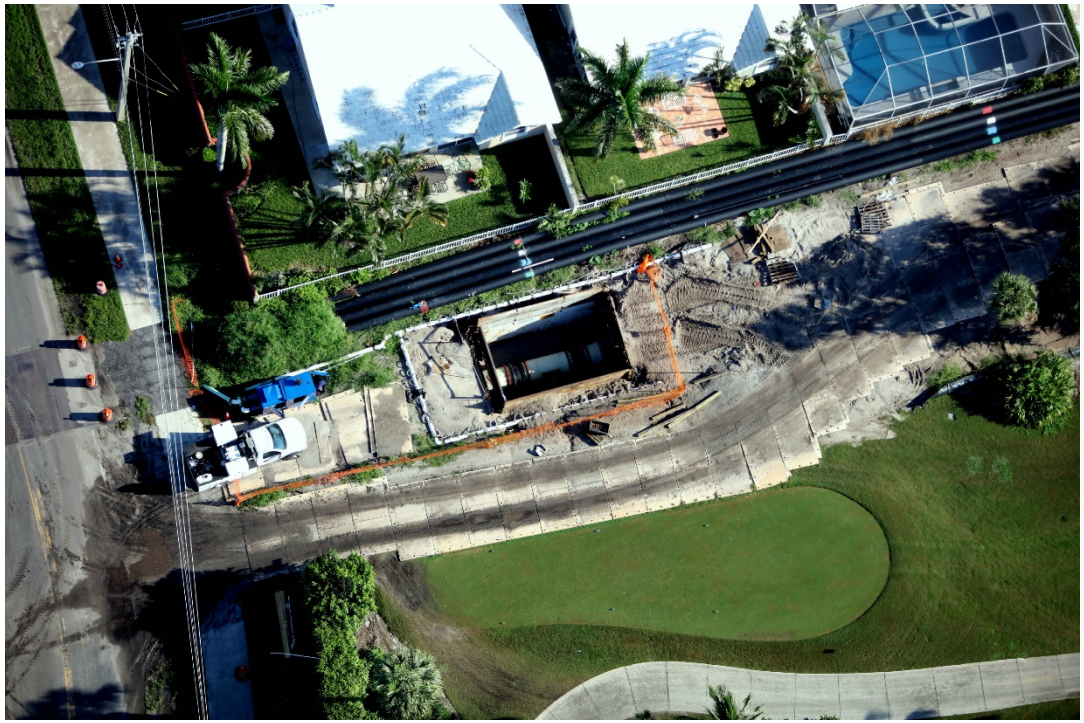

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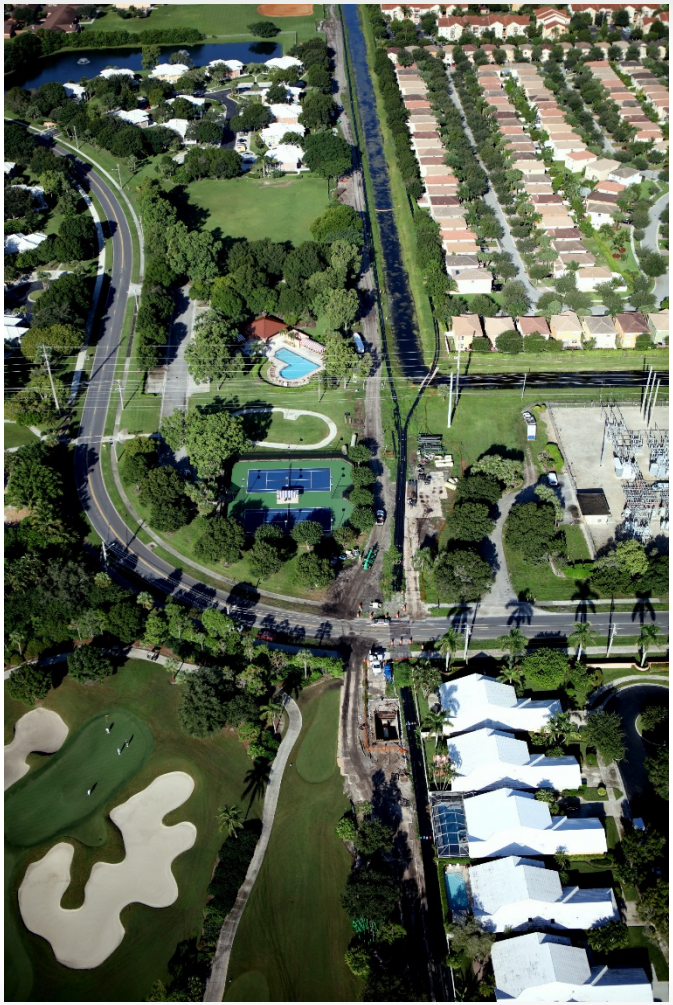

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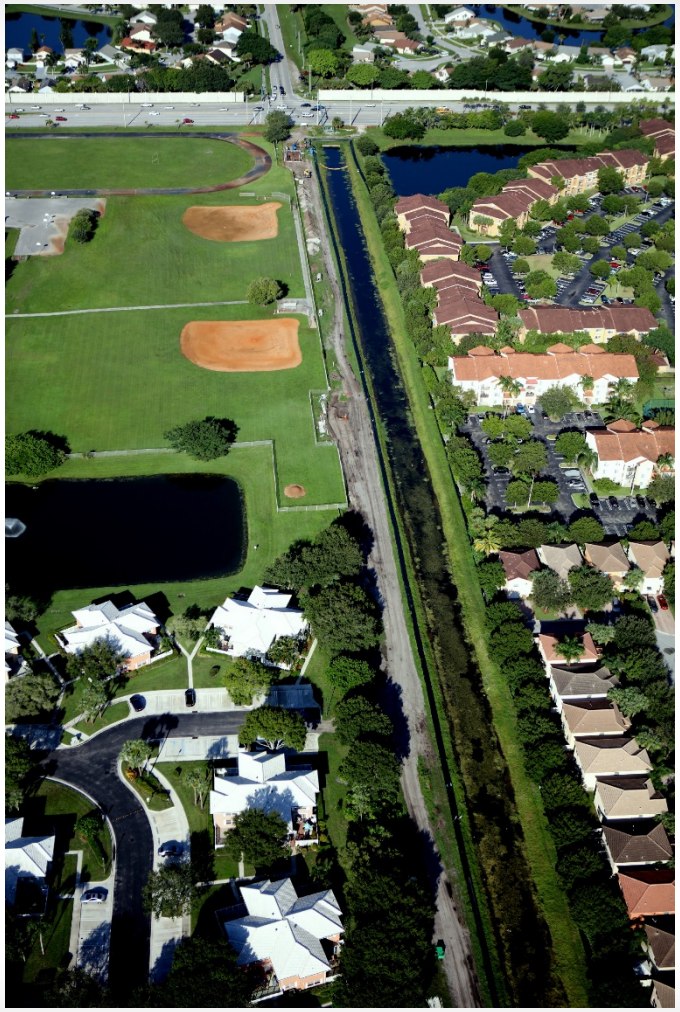

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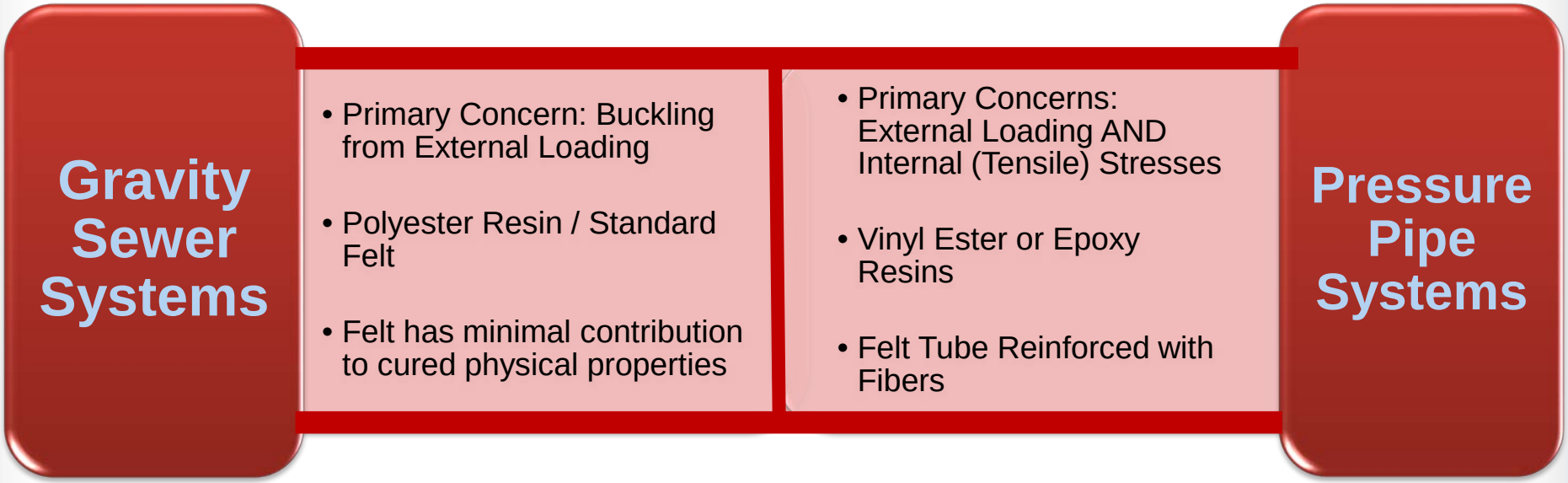
STANDARD VS. GLASS REINFORCED CIPP

CIPP Liners are Primarily Comprised of:

1. **Felt Tube**
2. **Thermoset Resin**
3. **Coating**



Emphasis on Resin **Emphasis on Resin AND Tube**

REINFORCED TUBE CONSTRUCTION

Reinforced Tube:

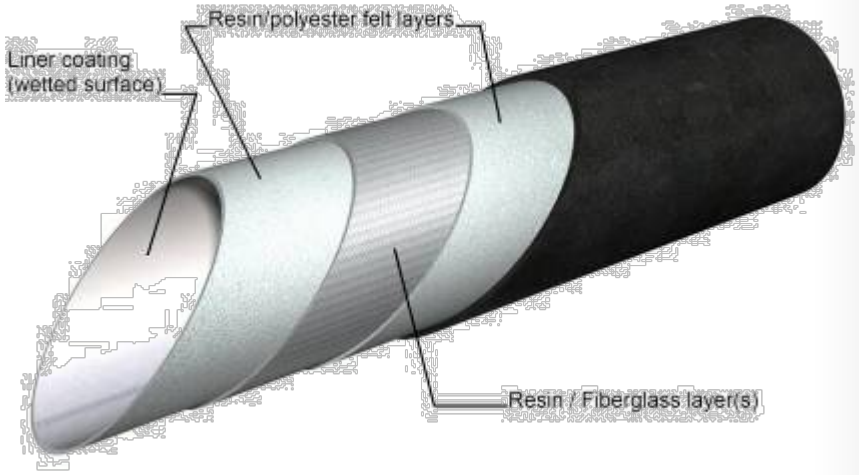
Greater resistance to hydrostatic loading and internal operating & surge pressures

Custom Engineered:

- Felt and fiberglass layers are project specific

48” FM – Phase 1 Project:

- 18 mm total liner thickness
  - <1.5” Diameter Loss
- 2 layers of fiberglass
- Shot lengths 840 - 1160 LF



Glass Reinforced Composite Felt

PRESSURE TESTING

ASTM
F1216-16

…recommended pressure and leakage test would be at twice the known working pressure or at the working pressure plus 50 psi, whichever is less.

25psi x 2 = 50psi

~~25psi + 50psi = 75psi~~

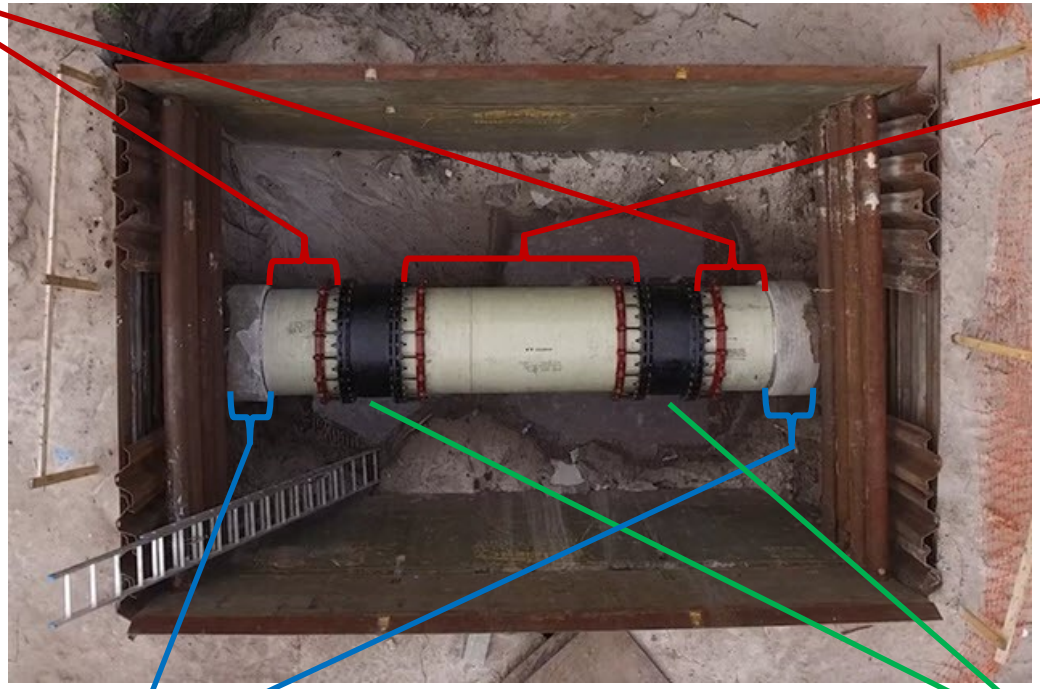
PRESSURE TESTING

Pressure Test Specifics

- 55 psi for 1 hour
- Each segment tested individually
- Entire rehabilitated line tested
- Thrust challenges
- 100,000 lbs. of force

CLOSURE DETAILS

GRP Termination Piece



GRP Spool Piece

PCCP Host Pipe

Mechanical Joint with MEGALUG

PHASE 1 – FINAL STATS

- 22,000 LF of 24” HDPE Bypass
- 5,700 LF of Class IV CIPP Lining
- 6 installations – longest 1160 LF
- 6 months – Project duration
- 7 weeks – Liner Install time
- 55 psi pressure tests – all passed
- ?? Rounds of golf
- 1 Extremely Happy Client

Trenchless TECHNOLOGY

2017 Trenchless Technology POY Winner

PHASE 2

- **48” FM Phase 2:**
  - 6,500 LF – 48” PCCP (ECP)
  - Successfully completed late 2017
- **OTH vs. Trucked Shots**
- **Contractor flexibility**
  - Resin Systems
  - Install Method
  - Means & Methods

FINAL THOUGHTS

- **Large Diameter CIPP Projects**
  - Increased comfort level
  - Proven products/installers
  - Experience requirements are key
  - Contractor flexibility for means/methods
  - Consult the experts….early and often

QUESTIONS?

THANK YOU!

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