Corby Energy Services, Inc.

About Us

- WBENC Certified since 2012
- Detroit-based business since 2015
- Approx. 450 Employees (mostly Michigan-based)
    - All field employees are QEW-trained (Qualified Electrical Worker)
    - Most field employees are OQ Qualified (Operator Qualification)

METRO ENGINEERING SOLUTIONS

METRO CONSULTING ASSOCIATES

Overhead Lines, LLC

Certified WBENC Women's Business Enterprise

CES

Corby Energy Services, Inc.

PATRIOT MANUFACTURING

USA Utility Services Authority, LLC

Your Underground Solutions Specialists

Michigan Locations

2021 S. Schaefer Hwy., Detroit, MI 48217

6001 Schooner St., Belleville, MI 48111

45345 Five Mile Rd., Plymouth, MI 48170

7929 E. M-36, Whitmore Lake, MI 48169

Current Customers

Multi-year contracts with Michigan utilities:

DTE Energy (Electric/Gas/Streetlighting/Major Enterprise Projects)

- Blanket contracts which include joint service and commercial feeder work with numerous utilities including CMS Energy, AT&T, Comcast, etc.

AT&T

- Copper and fiber underground and aerial placing, repair and maintenance

CMS Energy

- Distribution operations – new business and rehabilitation

MDOT

- Directional drilling, lighting, communications and traffic control/signaling services

Various cities and municipalities

- Water and sewer services
- Streetlighting
- Pipeline rehabilitation and inspection (bursting, lining, CIPP, chemical grouting, cctv, etc.)

Service Offerings

CES is an infrastructure solutions provider, specializing in:

Trenchless Utility Construction

- Horizontal Directional Drilling
- Cured-in-Place-Pipe (CIPP)
- Slip Lining
- Pipe Bursting

Traditional Excavation and Site Work

- Infrastructure Construction/Rehabilitation/Renewal

Design/Build

- Complete EPC capabilities with our affiliated firms (includes engineering, survey, permitting, procurement, warehousing, construction)


Vermeer


VOLVO
CAT

Slope Restoration

Pipeline Renewal Methods

Critical Steps to Trenchless Pipe Projects

- Define the problem in the piping system via various methods or procedures
- Select alternatives that are considered appropriate for the repair the pipes (Cost + Quality = Value)
- Determine the method of procurement?

Trenchless Technologies

- Pipe bursting
- Cured-in-Place-Pipe
- Fold & Formed / UltraLiner
- Horizontal Directional Drilling
- Grouting / CCTV Inspection / Cleaning
- Engineering / Design Build
- Sliplining
- Large Diameter Pipe Rehabilitation
- Excavation / Open Cut

Pipebursting

Some Trenchless Project Owners

- City of Warren
- City Jacksonville
- City of Livonia
- City of Monroe
- City of Auburn Hills
- City of Grosse Pointe Woods
- City of Center Line
- Chesterfield Township
- City of Fraser
- City of Saint Clair Shores
- City of Traverse City
- City of Ann Arbor
- City of Ypsilanti
- City of Grosse Pointe Farms

Departments of Transportations

- **Michigan**
- **Indiana**
- **Alabama**
- **Arkansas**
- **New York**
- **Florida**

- City of Detroit
- Watertown Township
- City of St. Petersburg
- City of Live Oak
- City of Houston
- City of Austin
- City Jacksonville
- City Fort Oglethorpe
- City of Dallas
- City of Seattle
- City of San Antonio
- City of Atlanta
- City of South Lyon
- City of Lansing
- City of Orlando

Universities

- **Michigan State University**
- **University of Michigan**
- **University of Notre Dame**
- **University of Arlington**
- **Louisiana Tech**

Pipebursting: *Today vs. Then*

- Greater recent advancement providing wider application / project history
- More reliable today than five years ago
- More cost-effective
- Wider acceptance and more usage
- Better Equipment and Materials
- Increased knowledge of successful equipment, means, methods and materials
- Better understanding from the owner and engineering communities of benefits

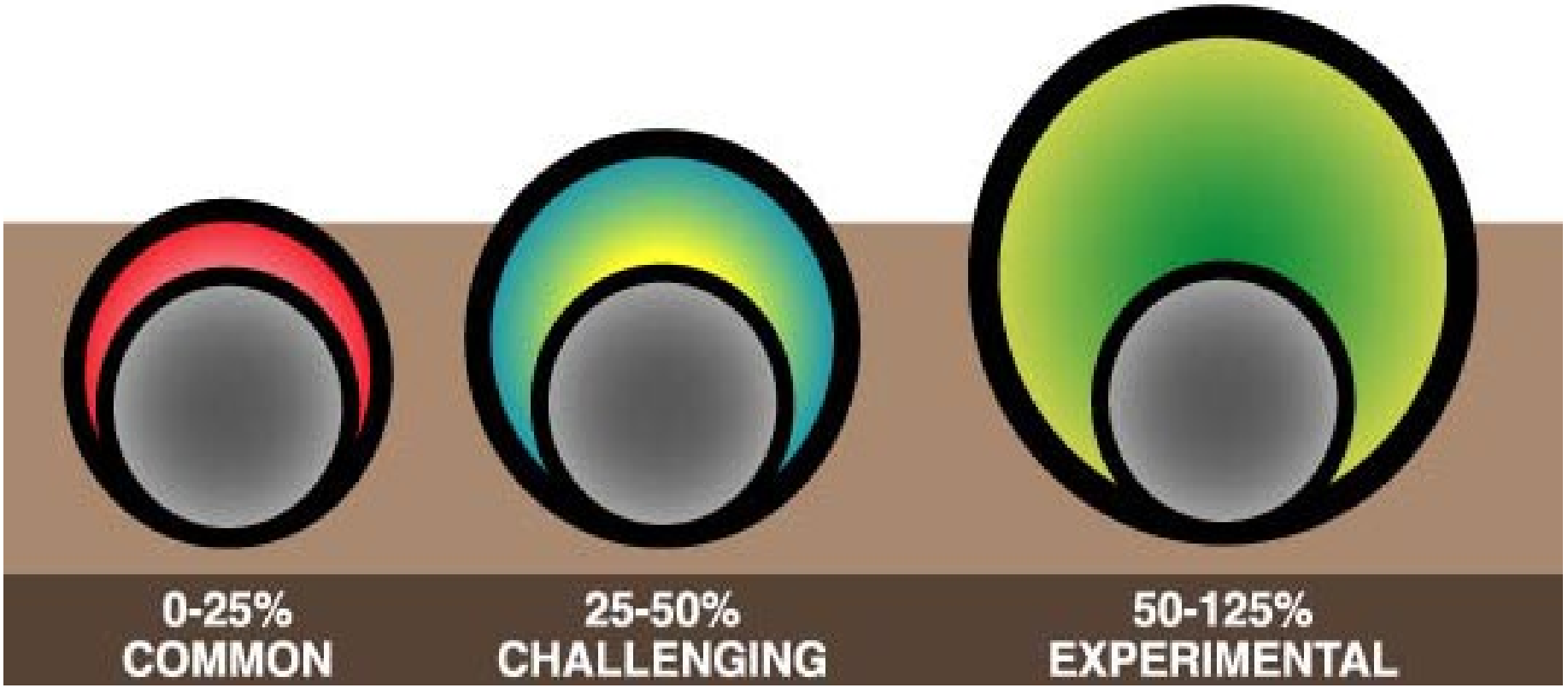
Advantages to Trenchless Technologies

- 85% less carbon footprint then open-cut
- **Pipe Bursting *"Green Technology"***
- Owner gets compliments instead of complaints from the public
- Cost savings average 30% less than open excavation
- Less public disruption then open-cut
- Utilizing existing conduit in easements
- Less risk to owner & contractor for safety issues.
- Normally change orders don't exist unless more work added
- Reduce project duration

Large Diameter Pipe Bursting Considerations

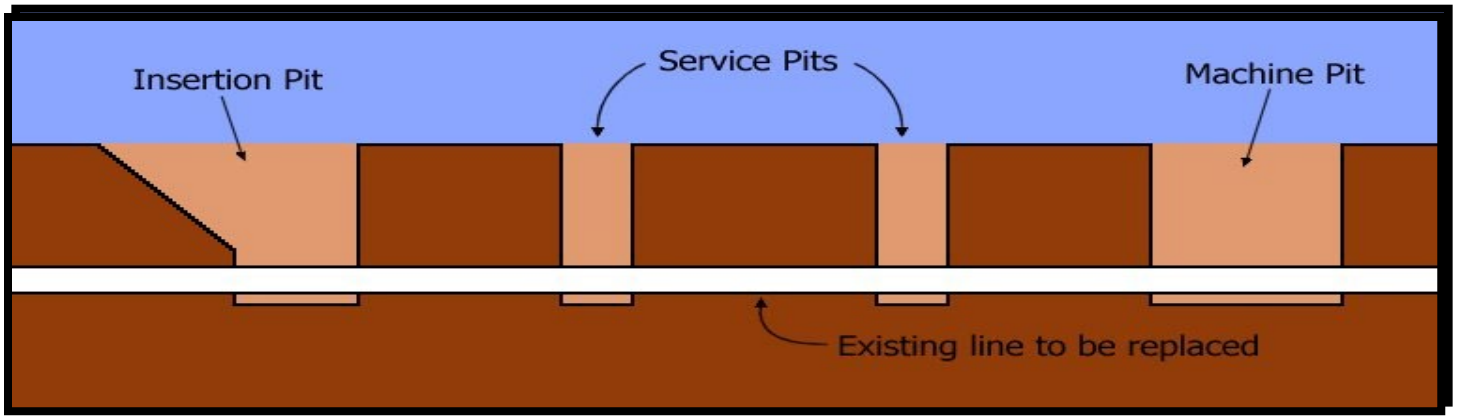
- Depth
- Existing pipe material
- Ground water
- Existing Soils
- Age of Construction
- Back fill materials
- Shoring and Bracing machine

Pipebursting Upsize Capabilities



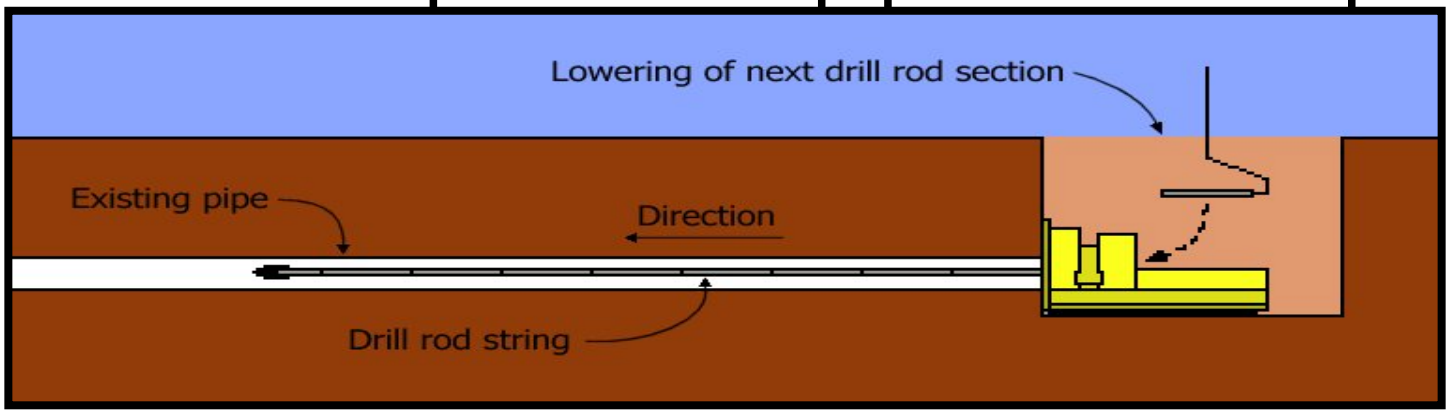
Static Pipe Bursting Step 1

- Inspect existing sewer by CCTV
- Excavate machine and new pipe insertion pits
- Excavate service pits if required
- All pits to be properly shored and maintained dry



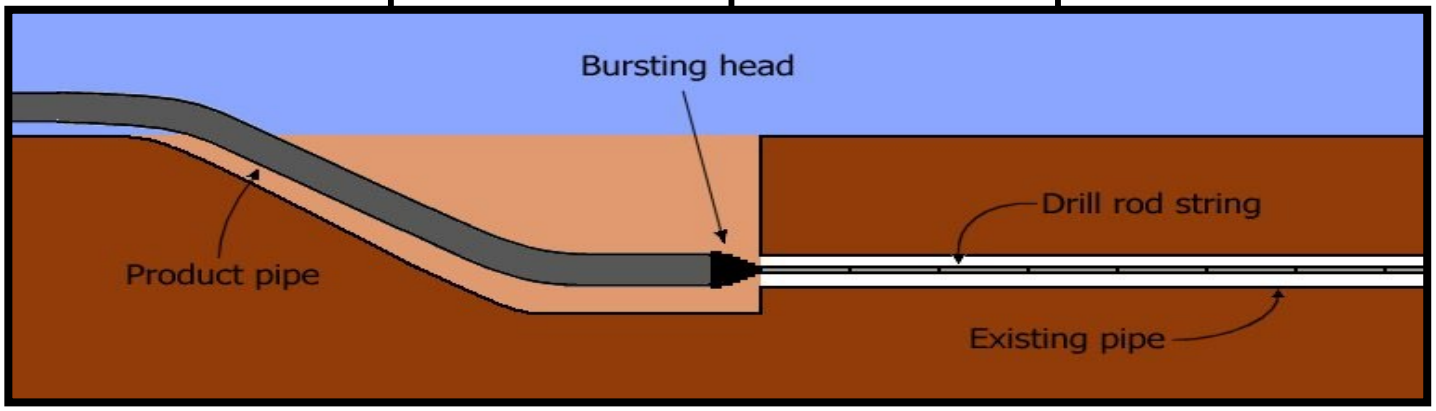
Static Pipe Bursting Step 2

- Prepare machine pit
- Set up Static pipe bursting machine in pit
- Push rod string through host pipe (existing sewer)
- From machine pit to new pipe insertion pit



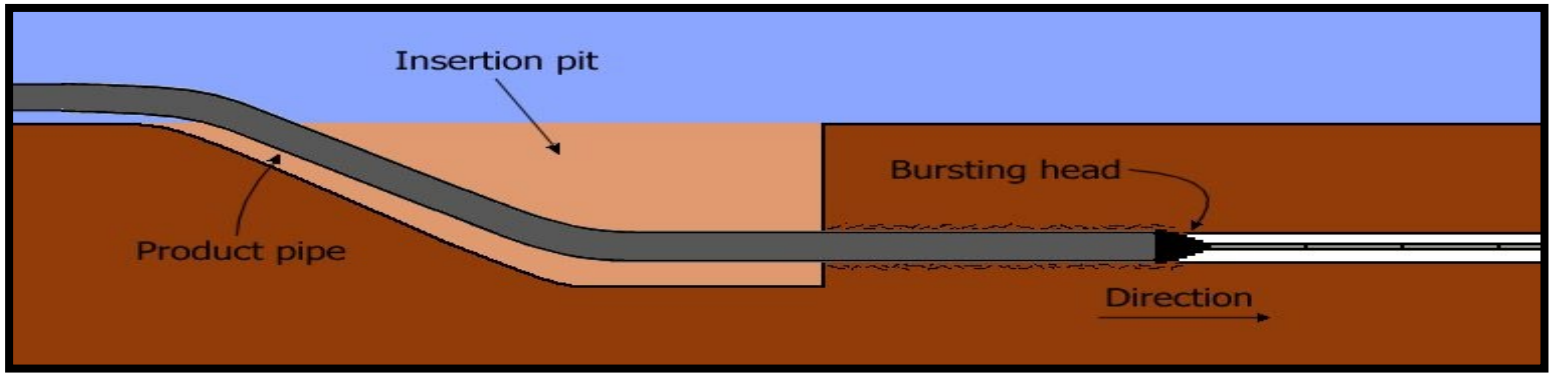
Static Pipe Bursting Step 3

- The rod string emerges at new pipe insertion pit
- Attach pipe bursting head and new replacement pipe to
- The rod string
- In this case HDPE pipe already fused into a single
- Continuous length is shown and the set up is ready for
- The actual pull back replacement process



Static Pipe Bursting Step 4

- Static pipe bursting machine in machine pit is
- Set up for pull back operation
- The rod string pulls the bursting head towards the
- Machine pit
- The bursting head breaks the existing sewer and
- Pushes the broken pieces into the surrounding
- Ground, away from the center and creating a new
- Tunnel
- The bursting head advances towards the machine pit
- And installs the new HDPE pipe in-place



Pipe Bursting Case Study

University of Notre Dame

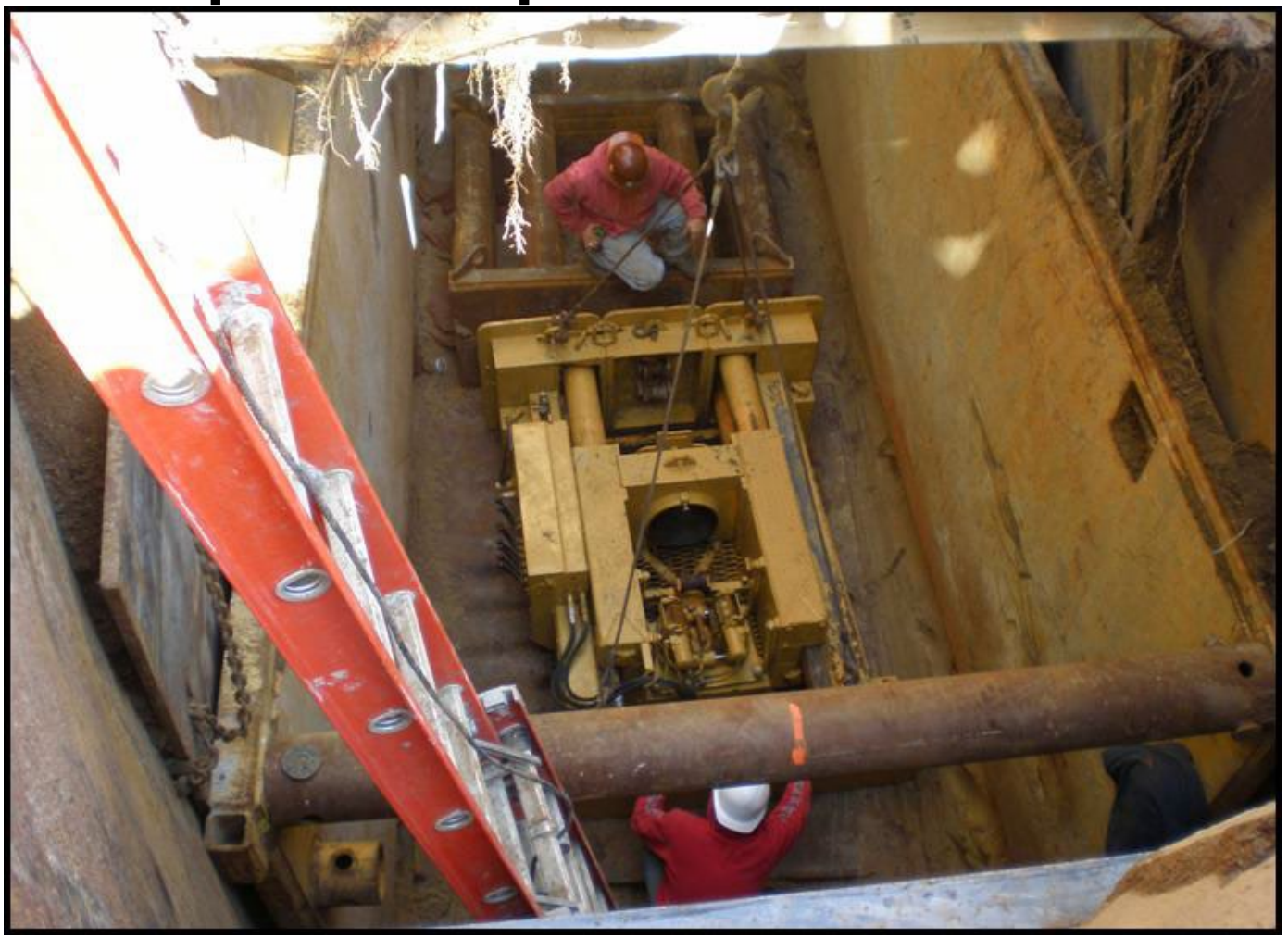
- Bursting 7,000 ft of 12” VCP existing VCP upsizing to 18” HDPE SDR 17.
- Depth 25’ to 35’
- 1,200’ pulls thru existing manholes
- 225-Ton Static Pipe Burst Machine

By-pass

Female Dorm

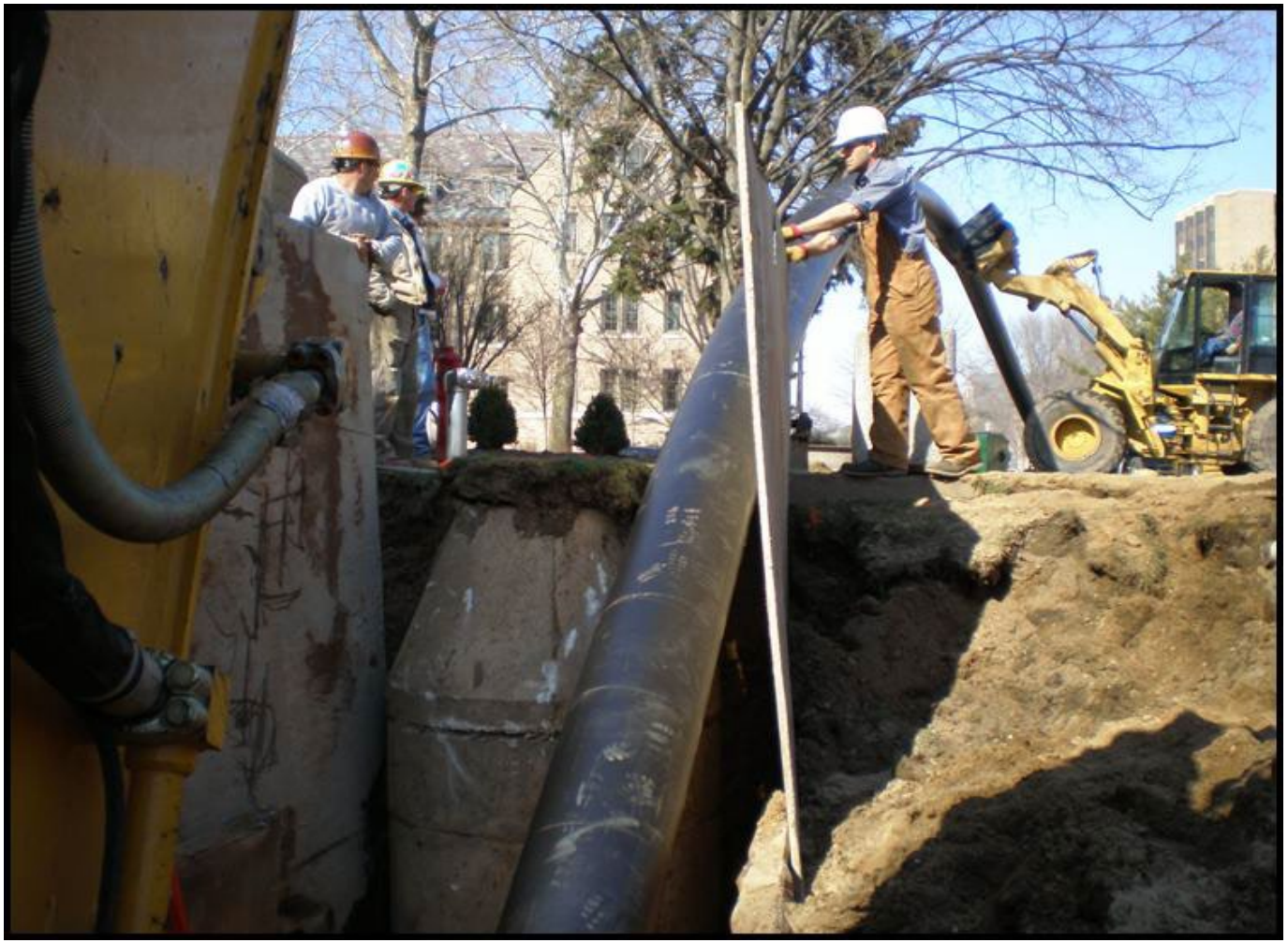
Support of Main Electric Conduit

Set-up of Pipe-Burst Machine



Pipe Fused Across Campus

Entry Pit



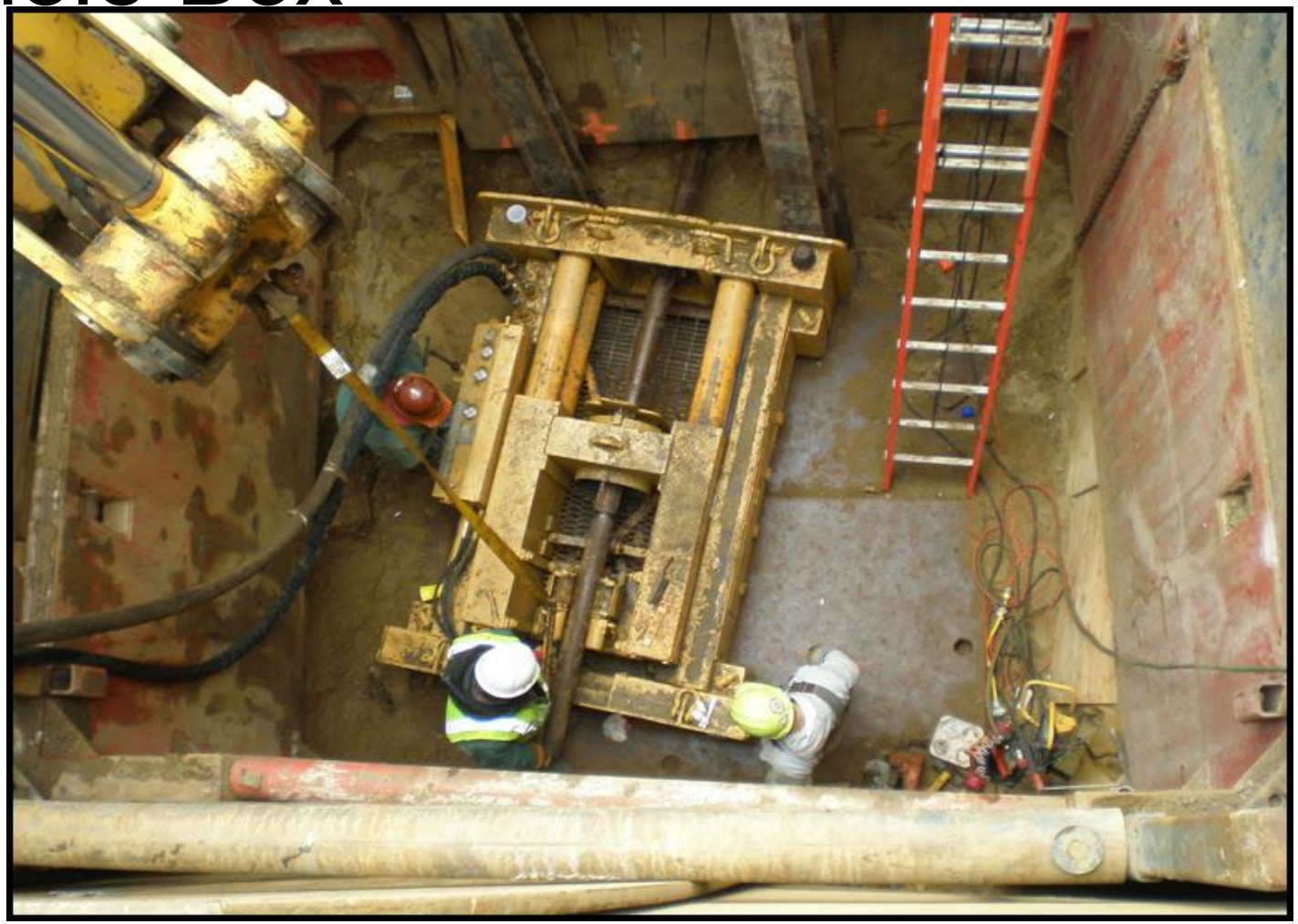
Supporting Pipe at Entry Pit

Supporting Pipe at Entry Pit

Entry Existing 12” VCP OD 22” Expander

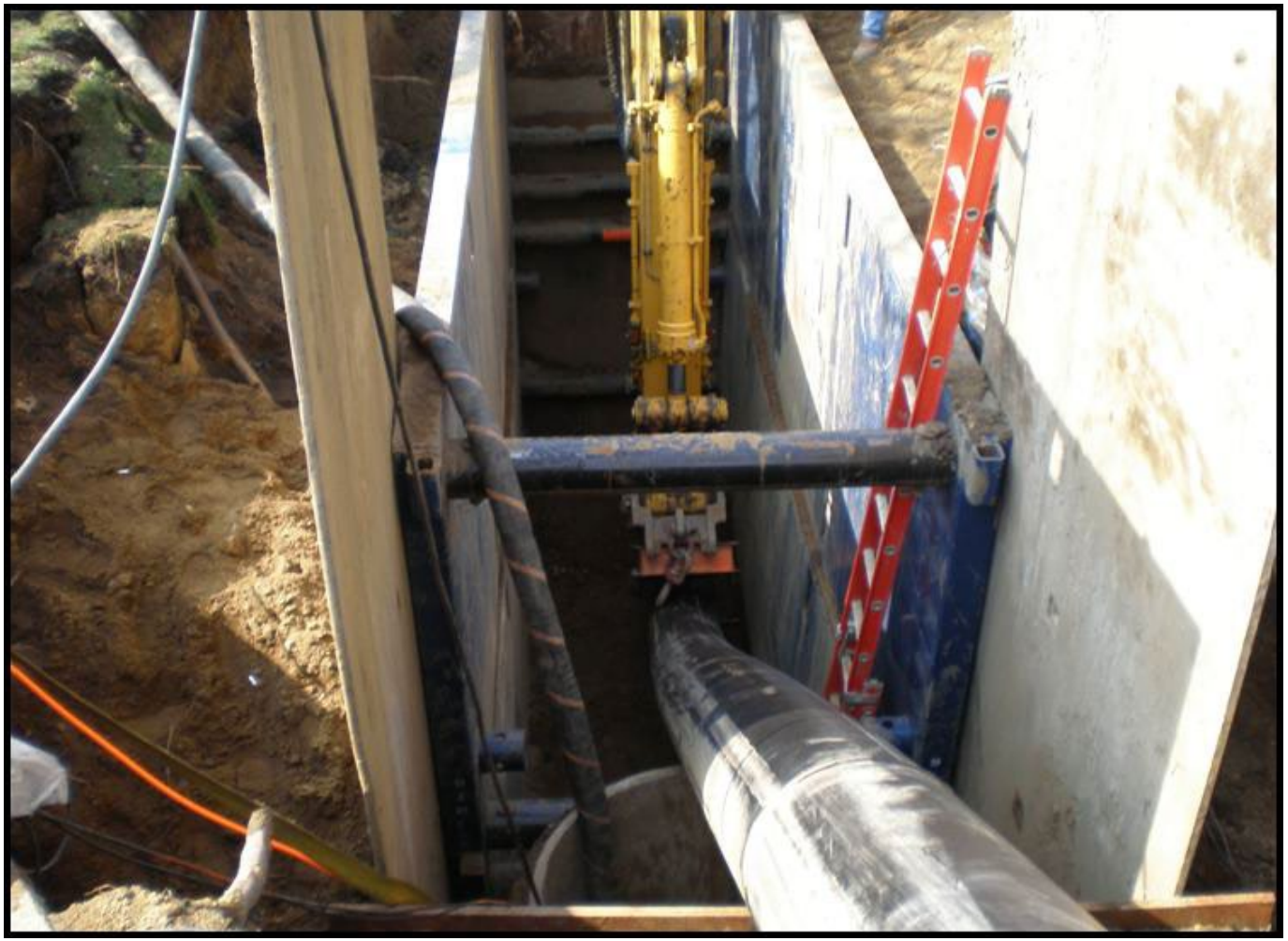
Pushing Down on Pipe to Maintain Grade

Bursting Machine Inside 12'X12' Manhole Box

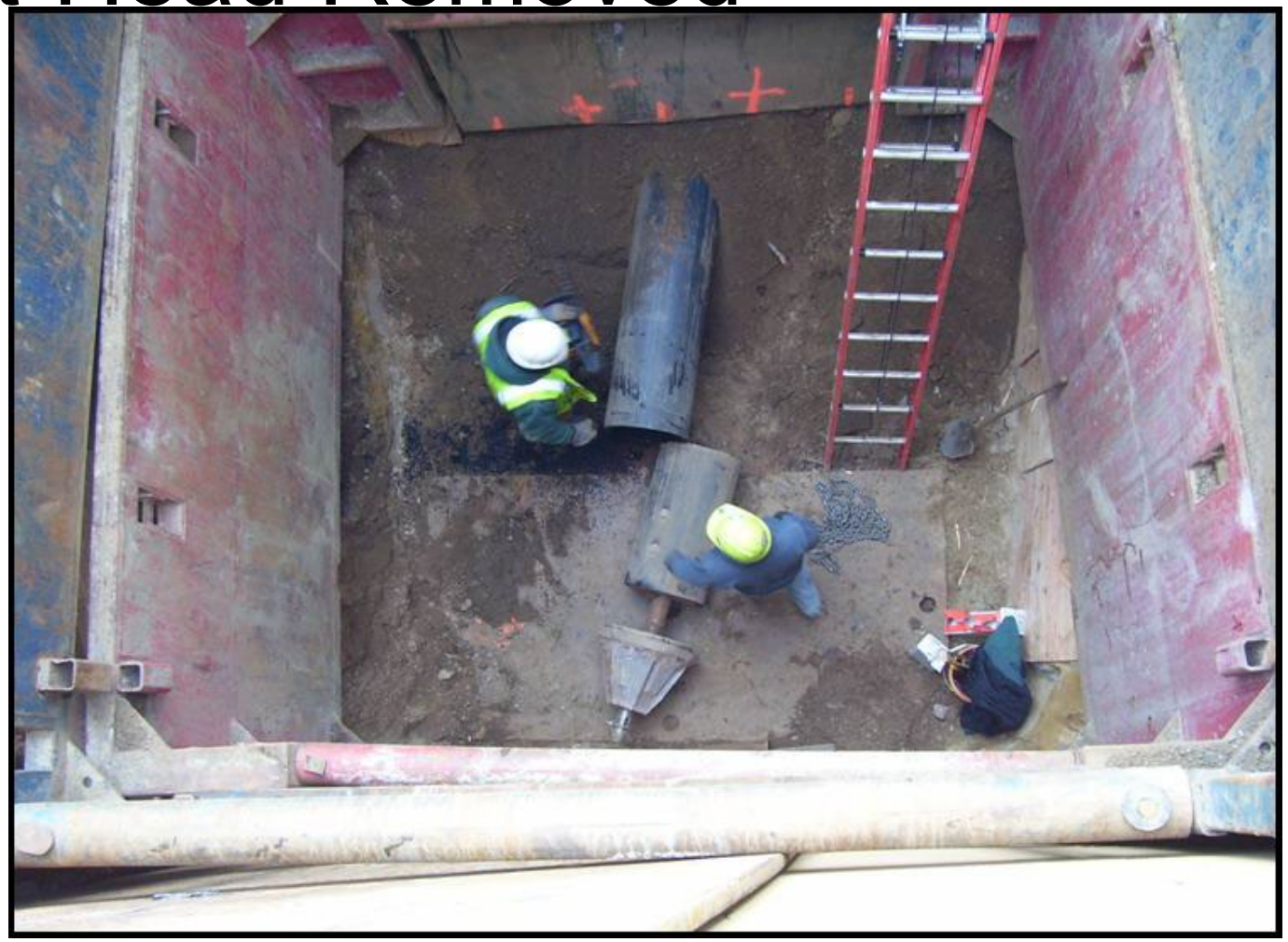


Pipe Exit

Entry pit



Burst Machine Removed
Burst-Head Removed



Manhole Set to Connect Two Pipe-Burst Installations

Removing Invert to Burst Through Existing Manhole

Pipe-Rammed Under Discovered Fiber-Optic Vault

Pipe Through Rammed Casing

Burst Entering Through Existing Manhole - 1,000’ pull.

Ready to Begin Burst

Pipe Train

Entry Pit 25’ Deep

Pipe Bursting Case Study

- Pipe Bursting existing 3 layer 30” brick sewer upsizing to 36” HDPE SDR 17.
- Depth 20’ to 25’ in deep
- 800’ pulls thru existing manholes
- 225-Ton Static Pipe Burst Machine

Burst Head Attached

Pipe Train

Burst Machine Pit

Burst Head Entering Existing 30” RCP

Entering Existing Pipe

Bursting Through Manhole in Road

Entering Exit Pit

Burst complete

Fort Oglethorpe, Georgia

Design Build

- **Pipe Burst and CIPP 9,000 LF of 24” RCP Sanitary Sewer**
- **CCTV/Cleaning**
- **Static Burst System**

Pipe-Burst Equipment

Pipe-Burst Head

HDPE Pipe Entry Pit

HDPE Pipe Entry Pit

Pipe Bursting-Case Study

MDOT Project on I-94 East bound lanes, at Sprinkle Road Exit.

- There was a collapse in the center of the east bound lanes.
- Existing pipe was 16” RCP. Stayed with same size HDPE as end product.
- Burst was completed in one night never closing I-94.
- Using static burst system.
- 225 Ton Static Pull

Sink Hole in Fast Lane

Sink Hole

Burst Machine Set

Maintained Traffic Flow

Fused HDPE on Shoulder

Burst Head

Entry Pit

Bursting Through Existing Catch Basin

Pipe-Burst Head Reaching Machine

Pipe-Burst Case Study

Michigan Department of Transportation Project on M-13

- **Failing 30” Reinforced Concrete Pipe Burst 30” HDPE**
- **Bay City, Michigan**

Setting-Up

Inside Existing 30” RCP

Driving I-Beams

During Pipe-Burst Pull Back

Above Pipe

Pipe Train

May 10, 2022

Burst Head Enters Burst Pit

Pipe Bursting-Case Study

42” Culvert Metal Pipe

- **Wolverine, Michigan**
- **Existing 42” CMP 35’ in depth**
- **TRS-225 Ton pipe bursting machine**


PRIVATE PROPERTY
AUTHORIZED PERSONNEL
ONLY
Wildwood Valley Property
Owners Association & Club
21 12:24 PM


21 12:40 PM


21 12:34 PM

Outfall Pipe – Tar Lined CMP


453

Burst Machine Set Back to Allow Pipe to Enter Pit

Case Study
48 in. CMP Pipe Burst

- Emergency 48 inch Collapse under Michigan Department of Transportation Highway M-106

Sink hole on upstream side

Pipe Collapse in shoulder

Upstream end

Down stream end of pipe


NO
PASSING
ZONE
DEERE

Pull head fused on


DEERE
270C LC


DEERE


DEERE
270C LC

Notice gas pipeline marker for 12 high pressure steel


270C LC

Pipe installed exit side

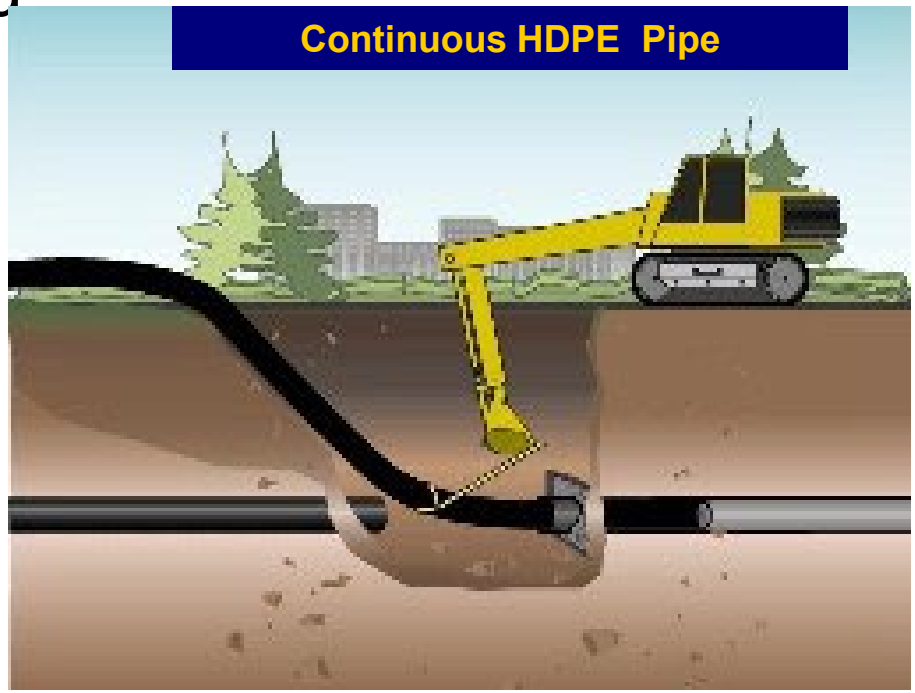
Machine side pipe installed

Completed

Sliplining

Sliplining

- 4” thru 120” diameters
- Continuous or segmental
- With flow or by-passed
- HDPE Pipe
- Bulk Head
- Grout annulus



Slip-Line Case Study

Tanner Creek 84” Culvert

- **520’ Slip-line with 72” HDPE**
- **60’ under 1-94 mile marker 16**

BERRIEN COUNTY DRAIN COMMISSION
Michigan Department of Transportation

Existing Outfall

Downstream End 84” CMP Bottom Rotted Out

Up-stream – Bend in Pipe

I-94 60’ Above

Adding Sections of Pipe
By-Pass Run Through Pipe

Adding 50’ Section of Pipe

Aligning Pipe for Welding

Extrusion Welding Pipes Together

Pipe Installed - Grout Tubes

Bulk Head Complete and Grouted Rip-Rap Installed

Complete

Slip-Line Case Study

42”” Culvert

- **485’ Slip-line**
- **30’ under US-127 and M-10**

Michigan Department of Transportation


330D

Sliplining Existing 42” Culvert

Pipe laid out


CAT


Rockcrete

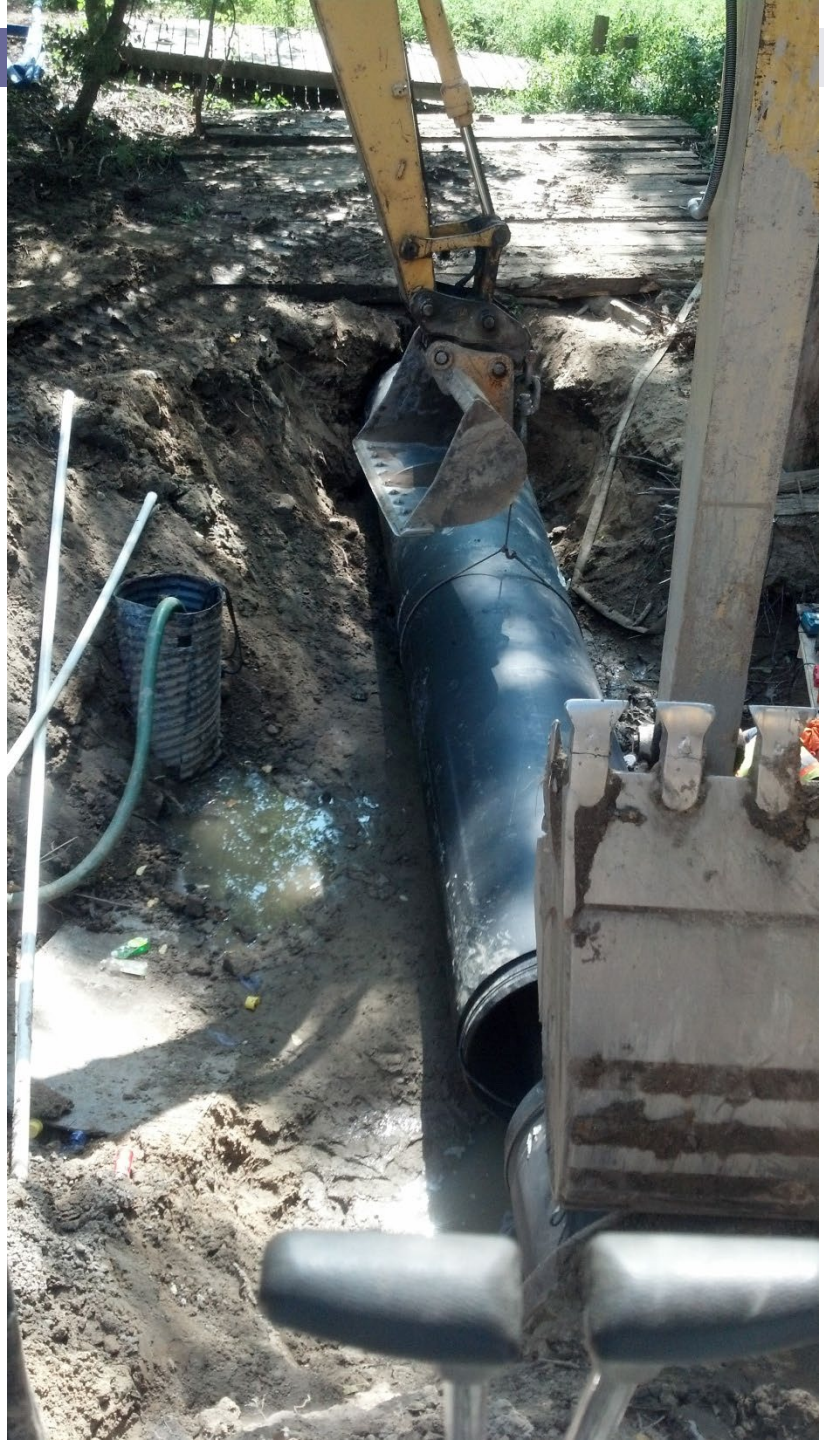
Slip-Line Case Study

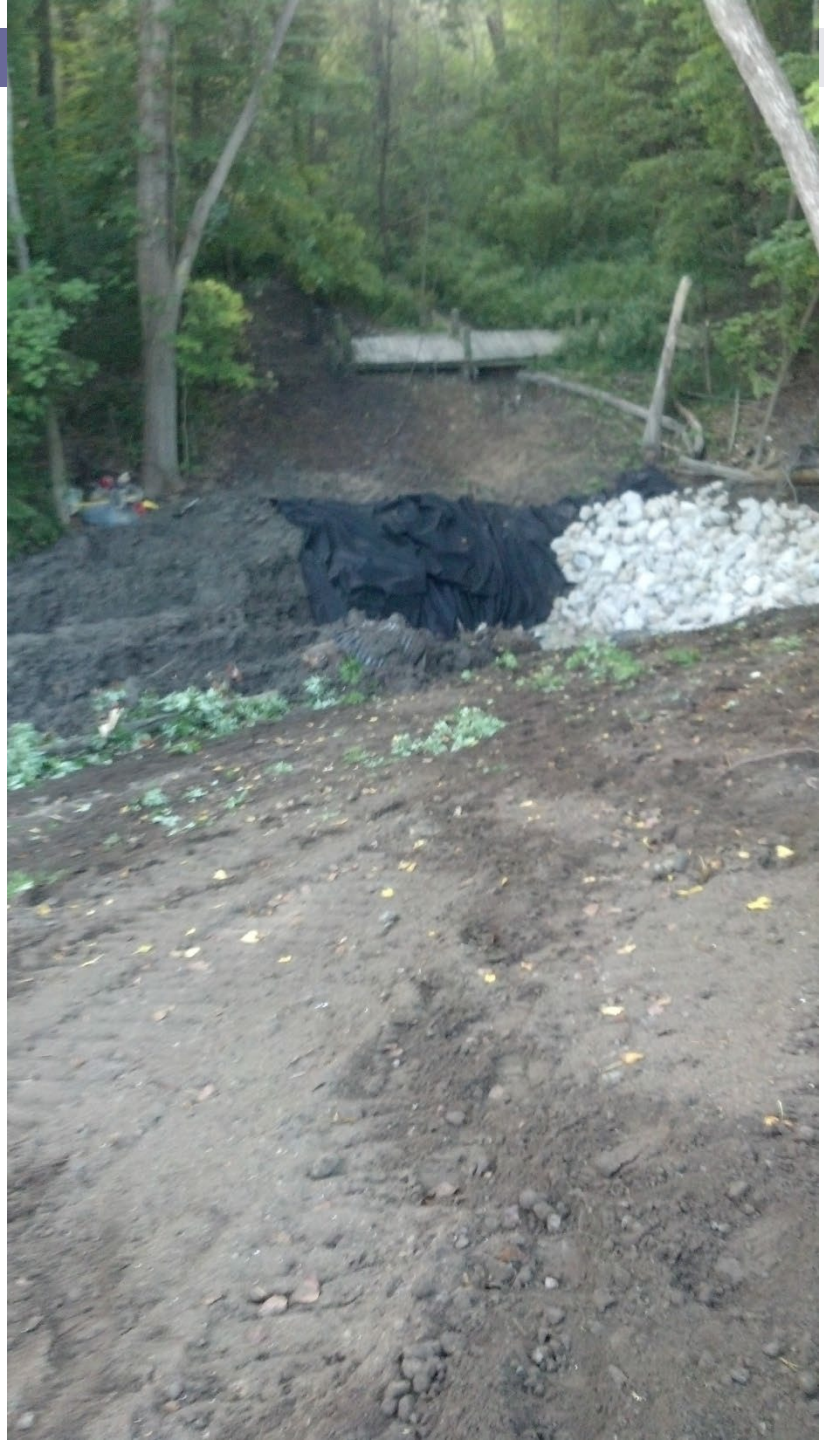
66” Culvert

- **360’ Slip-line**
- **70’ under I-196**

Michigan Department of Transportation


DEERE





Case History 1

Existing Structure:

140’ - 7’-8”x 5’-5” MULTI-PLATE Pipe-Arch, 10 gage

Reline

- 73”x55”, Aluminum, 10 gage, Ultra Flo
- Mannings “n”=0.012
- Service Design Life 100 years plus
- Supplied with 3 stage grout ports, skid rails, leveling rods, internal 10-C bands and flat gaskets, zinc chromate primer exterior.
- Match marked sections

Pulling block

Internal bands w/ flat gasket

Day 2

Bypass piping

Day 3

Flotation bracing

Day 4

Bracing to through 12 o’clock grout port

Vent through Bulkhead

Grout

Grout Port

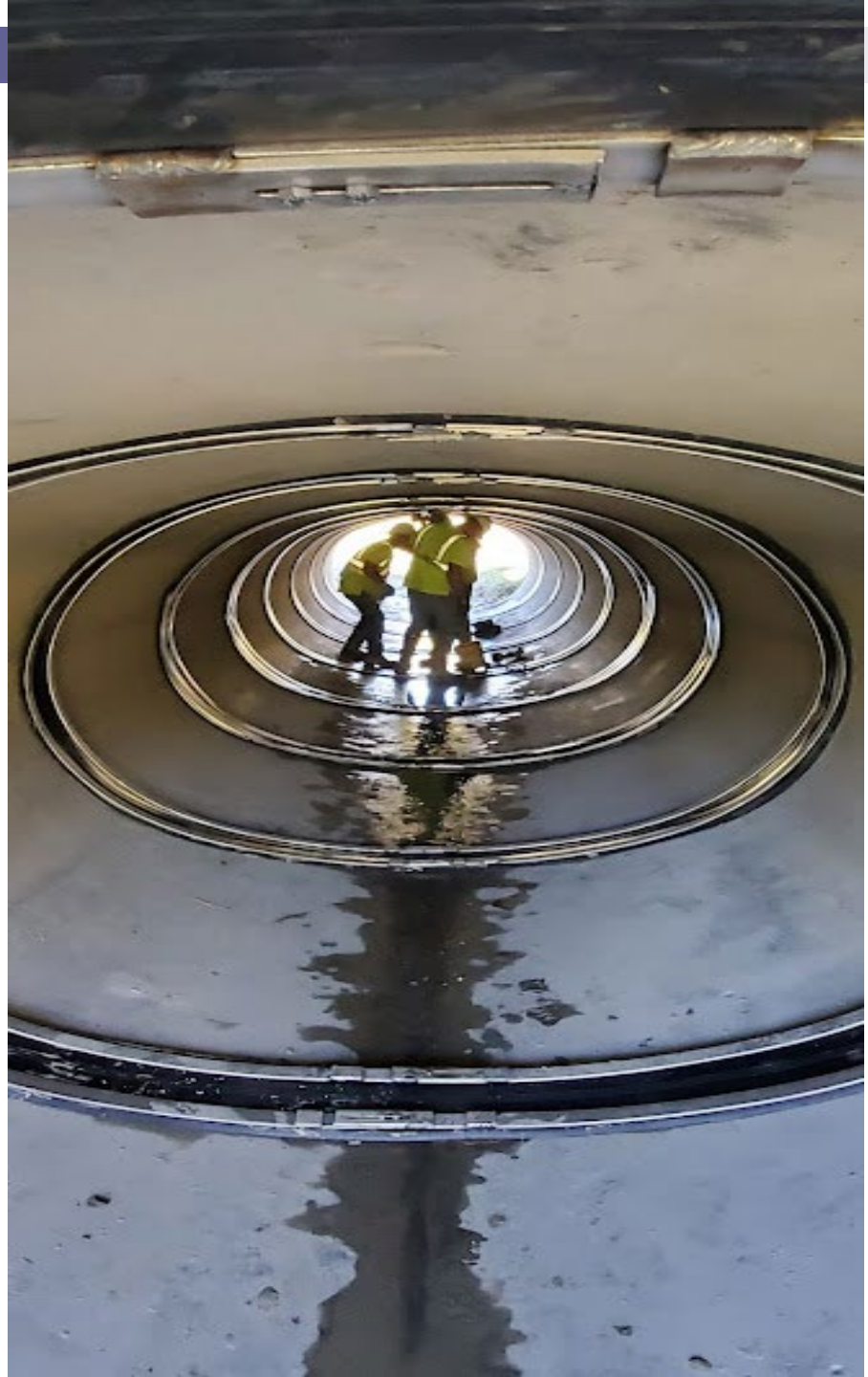
Day 8 –Last grout lift. Grouting procedure complete.

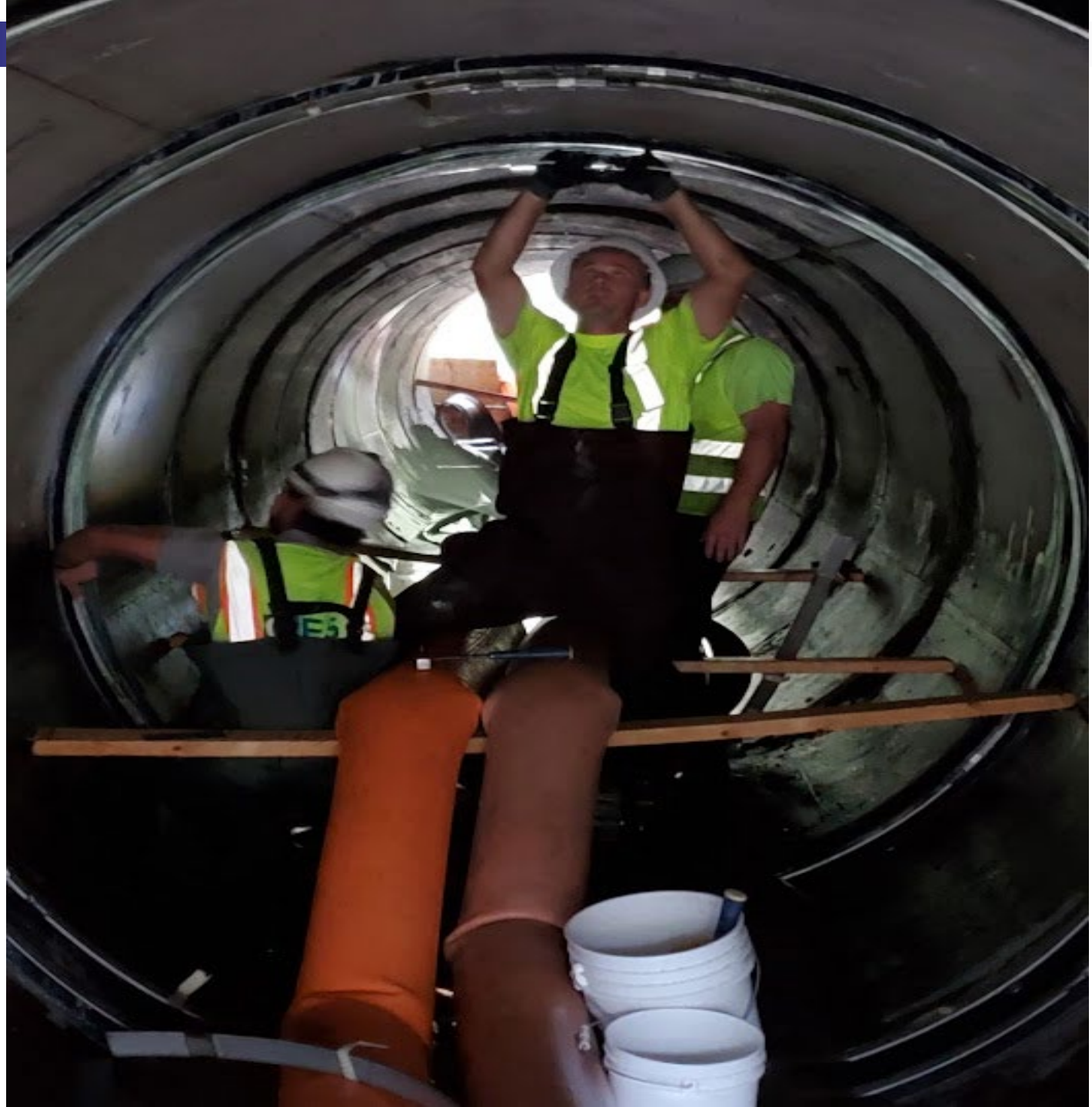
Grout through vent

Outlet

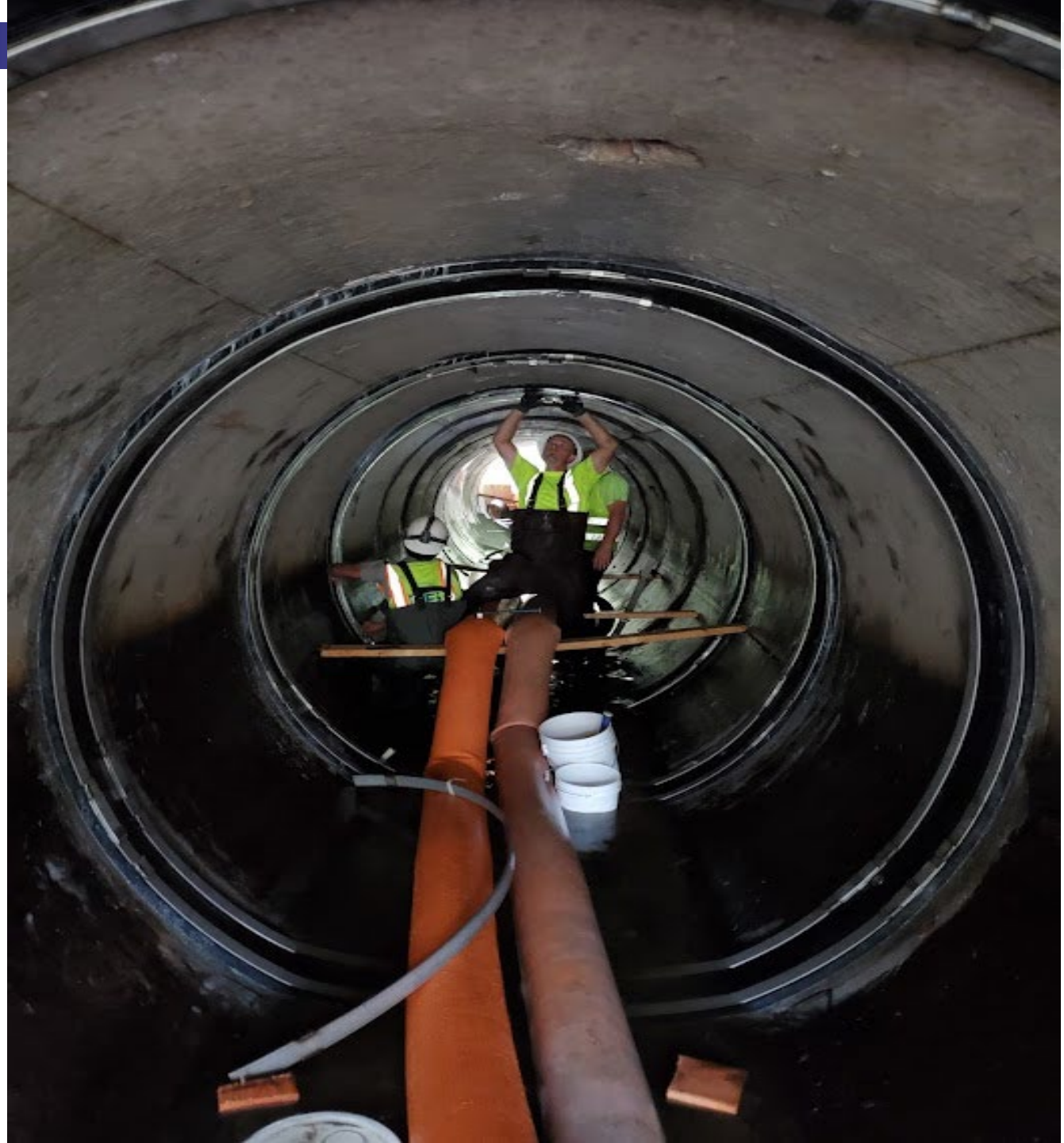
Lane closure to replace failed roadway slabs. If relines are installed prior to sever deterioration
and road failure, all work can be completed with little or no road closure.

Joint Seals

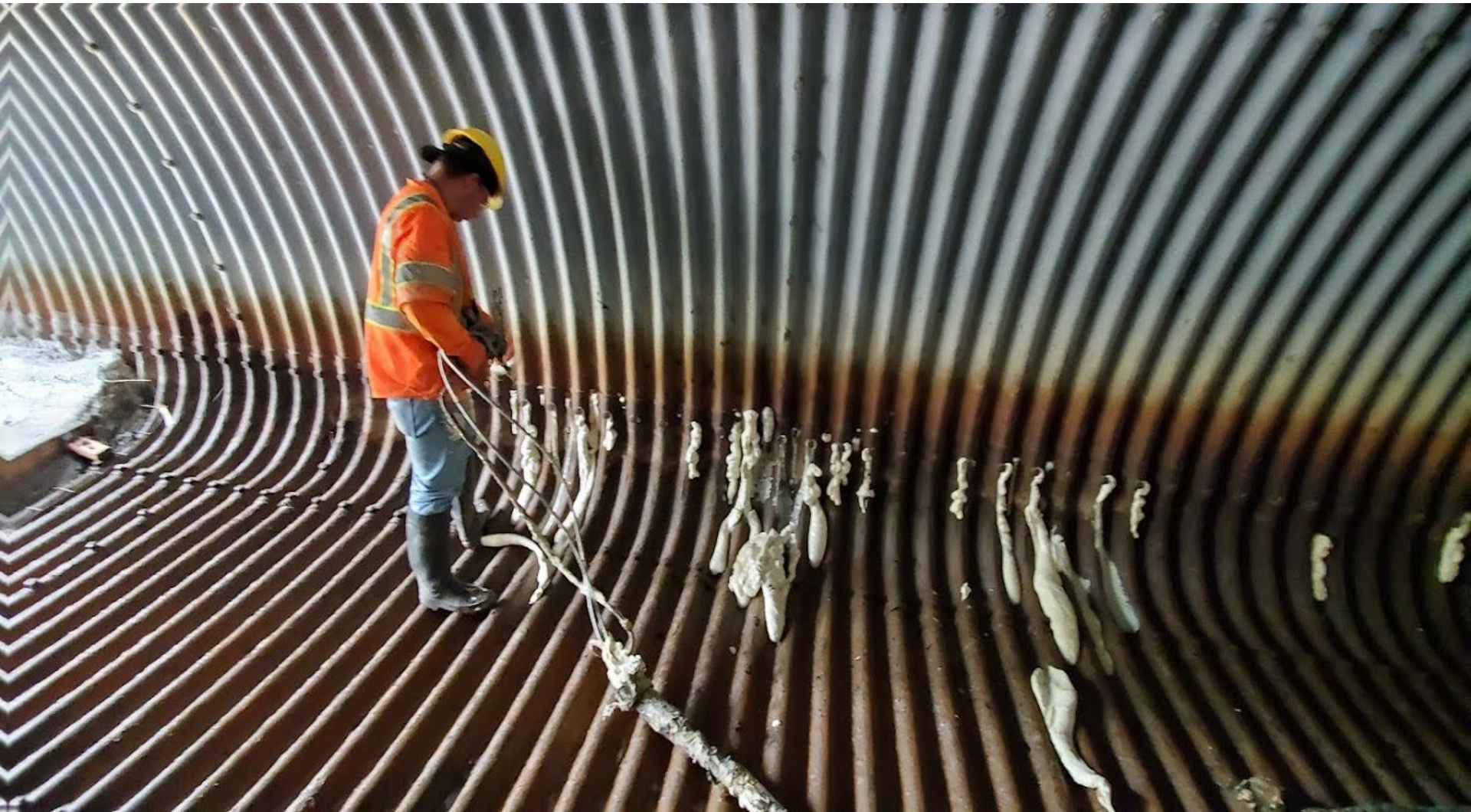





36"
36"



Flat Bottom Arch Invert Repairs Barry County Road Commission




CES
2"


CIPP

Cured-in-Place-Pipe

- 30-year plus history of the product
  - Most extensively used trenchless product
- 4” thru 108” diameter
- Gravity/Pressure applications
  - Mainlines and laterals
  - Manholes
- Predominately used within sewers
  - Industrial applications
- Independently verified

CIPP can be utilized for various pipeline concerns:

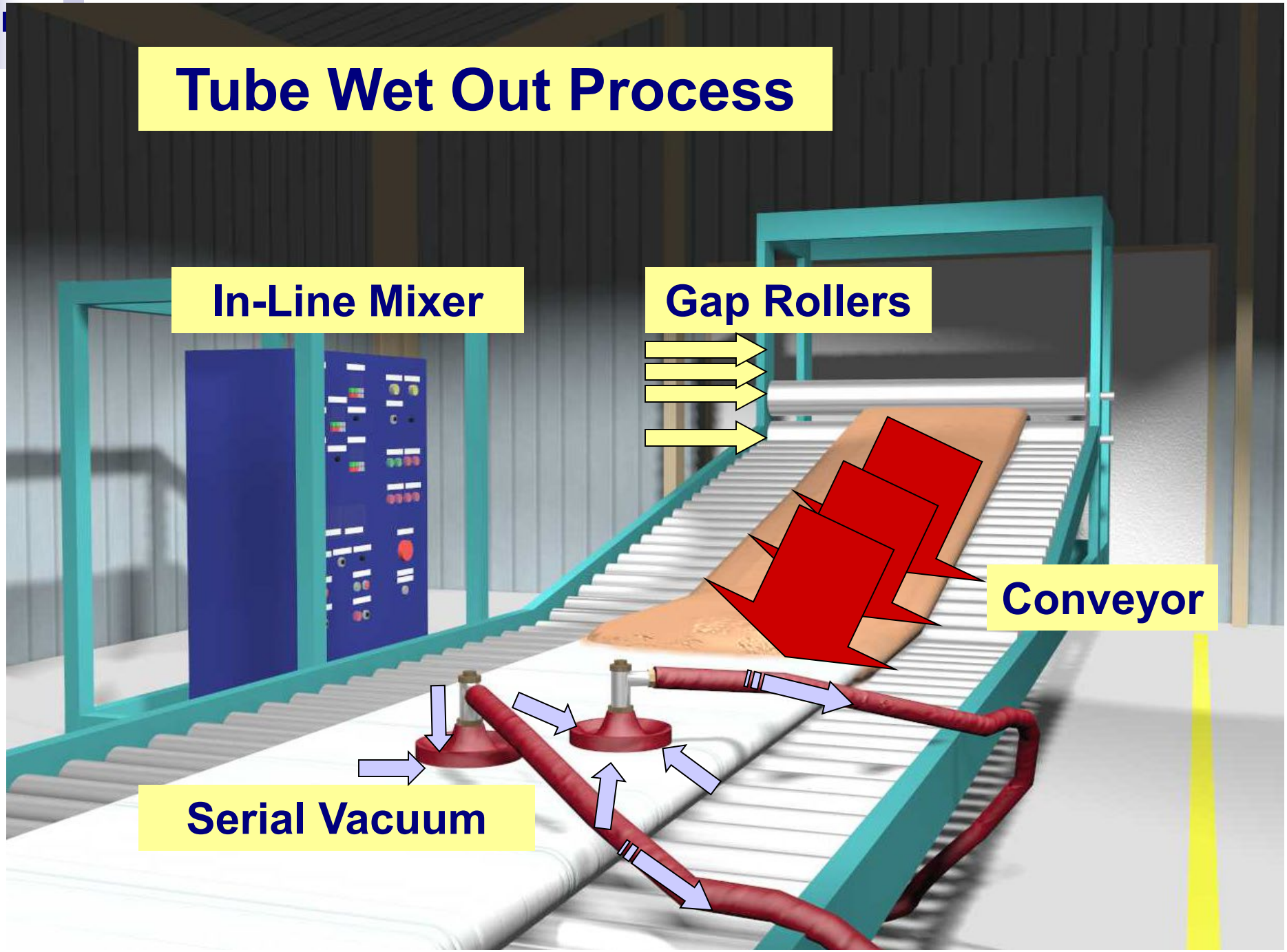
- Structural
- Environmental
- Strength Enhancement (New construction)
- Infiltration
- Pressure / Gravity Applications
- Lateral Connections
- Point Repairs

CIPP Can Respond quickly!

- Local Installers
- Local Wet out Operations
- In stock materials for standard sizes
- Water / Air Installations
- Most Tube Manufacturing is performed off site in Factory.

Tube Manufacturing

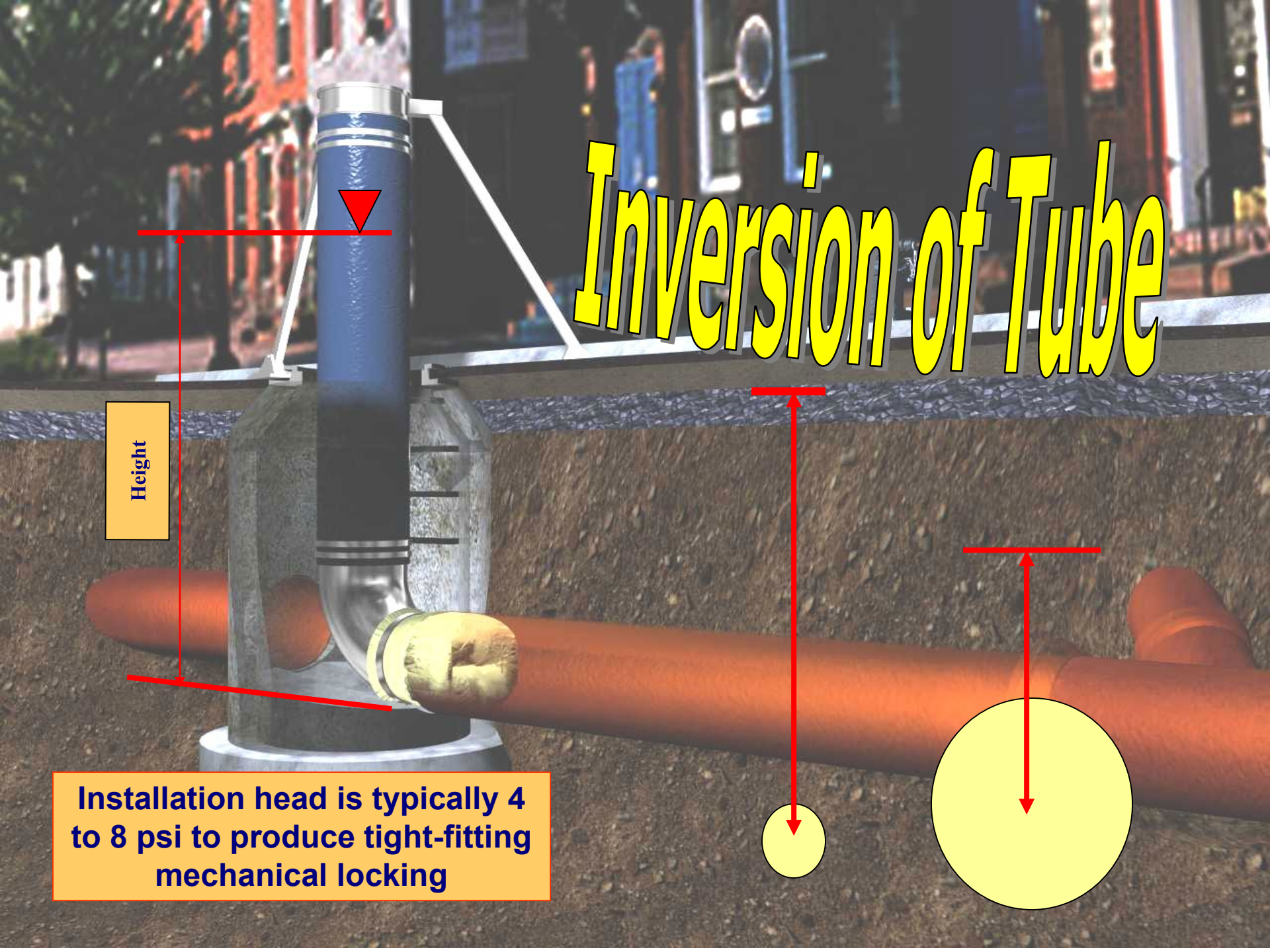
(ISO Certified)


Tube Wet Out Process
In-Line Mixer
Gap Rollers
Conveyor
Serial Vacuum

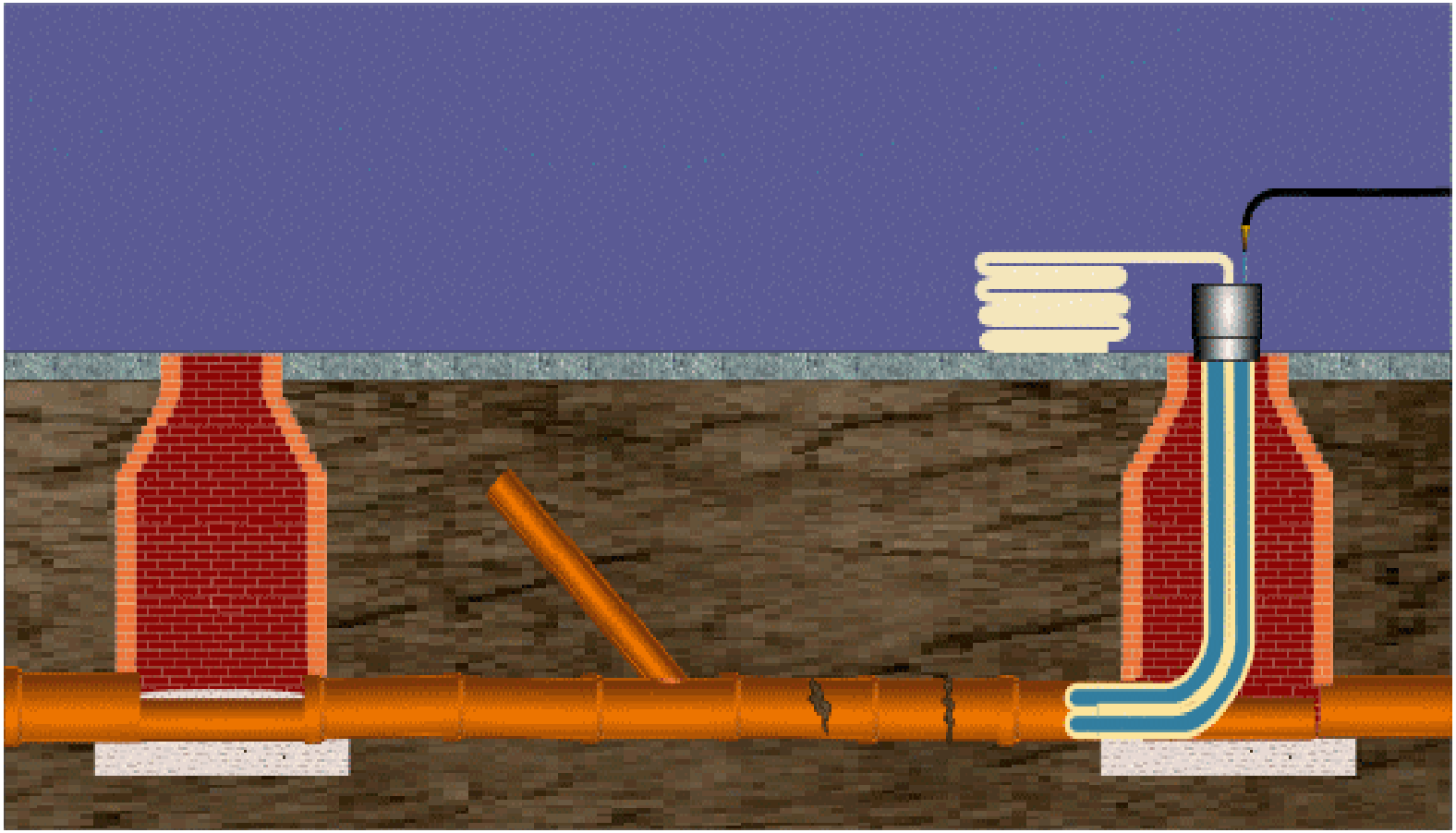
CCTV

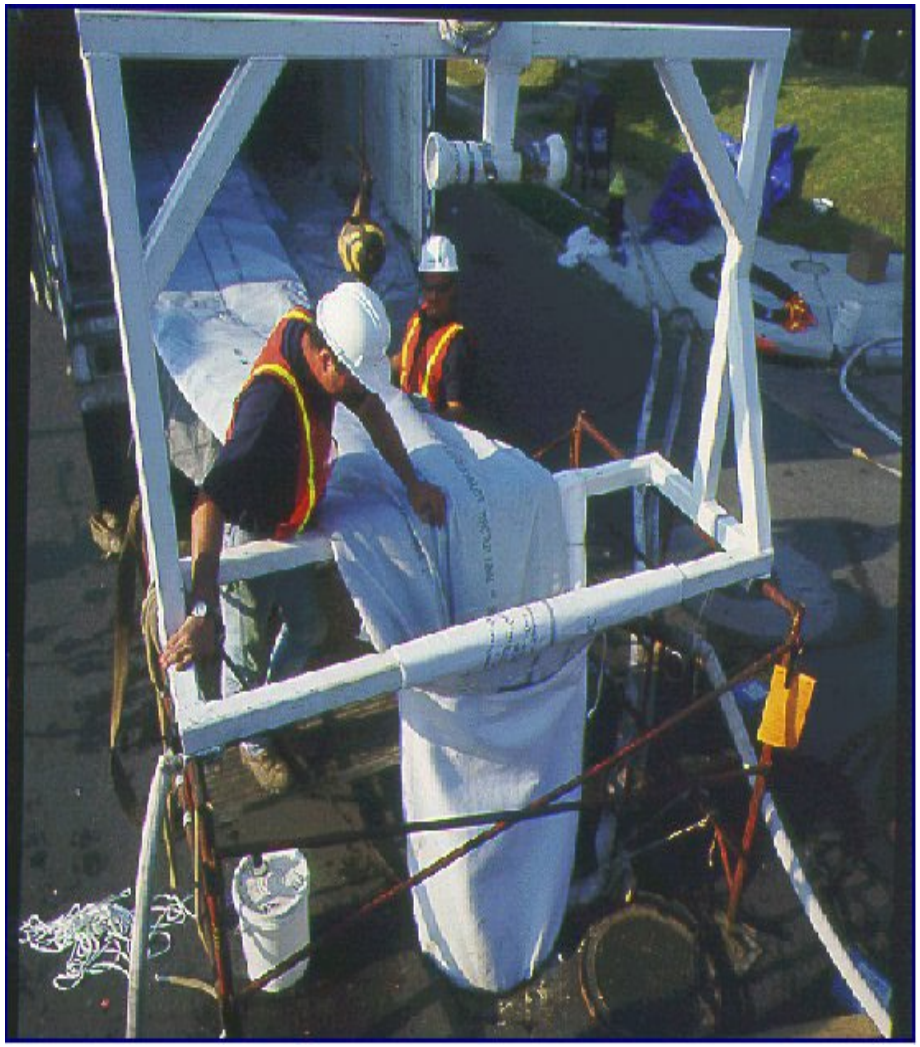
Inversion Process

- Water / Air
- Water is most reliable
- Air can offer increased efficiencies


Inversion of Tube
Height
Installation head is typically 4 to 8 psi to produce tight-fitting mechanical locking

Tube Inversion





Once in-place, the process water is heated to cure the thermosetting resins and create a “Cured-in-Place-Pipe”

Curing Process


CES


SOUTH
75
St Ignace


MOTOR
VEHICLES
ONLY
PROHIBITED


CES

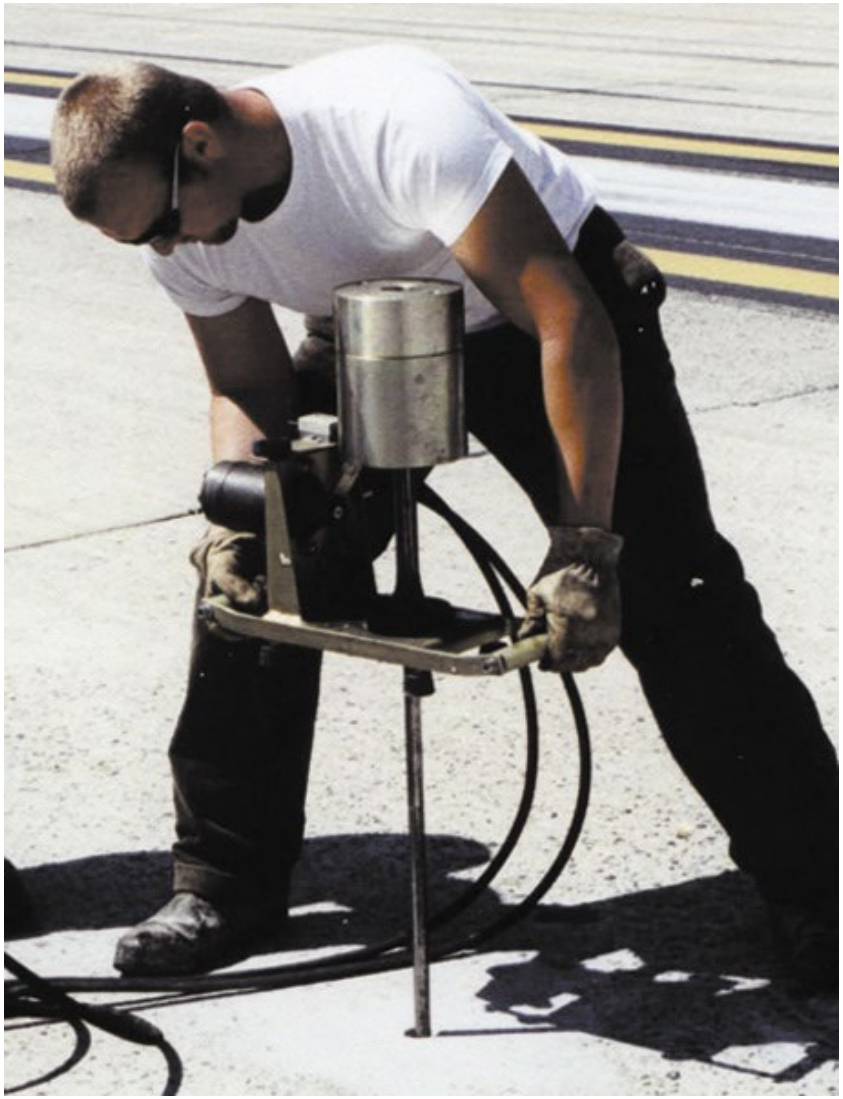
URETEK USA

the soil stabilization and pavement lifting company that revolutionized the industry

NEXT GENERATION – UDI

Requirements for a Successful Project

- Having appropriate Polymer for Highway work.
- Gather Soils Reports, Construction Drawings, and Visit Site to compile information to create a repair plan.
- Have Experienced Technicians with Robust DCP unit to test subgrade soils to minus 30 feet, so they can adjust injection plan when on site if necessary.



Depth ft - in	Number of blows
0' - 4"	asphalt
0' - 8"	pavement
1' - 0"	pavement
1' - 4"	pavement
1' - 8"	**21**
2' - 0"	**18**
2' - 4"	**15**
2' - 8"	5
3' - 0"	3
3' - 4"	4
3' - 8"	3
4' - 0"	2
4' - 4"	1
4' - 8"	2
5' - 0"	1
5' - 4"	0
5' - 8"	2
6' - 0"	1
6' - 4"	3
6' - 8"	4

Depth ft - in	Number of blows
7' - 0"	2
7' - 4"	2
7' - 8"	**wor**
8' - 0"	**wor**
8' - 4"	**wor**
8' - 8"	**wor**
9' - 0"	**wor**
9' - 4"	**wor**
9' - 8"	7
10' - 0"	3
10' - 4"	3
10' - 8"	3
11' - 0"	5
11' - 4"	4
11' - 8"	2
12' - 0"	2
12' - 4"	1
12' - 8"	2
13' - 0"	2
13' - 4"	2

Depth ft - in	Number of blows
13' - 8"	3
14' - 0"	3
14' - 4"	6
14' - 8"	**8**
15' - 0"	8
15' - 4"	6
15' - 8"	7
16' - 0"	7
16' - 4"	7
16' - 8"	8
17' - 0"	9
17' - 4"	10
17' - 8"	10
18' - 0"	10
18' - 4"	10
18' - 8"	10
19' - 0"	10
19' - 4"	10
19' - 8"	7
20' - 0"	11

URETEK USA

the soil stabilization and pavement lifting company that revolutionized the industry

POLYURETHANE MATERIAL

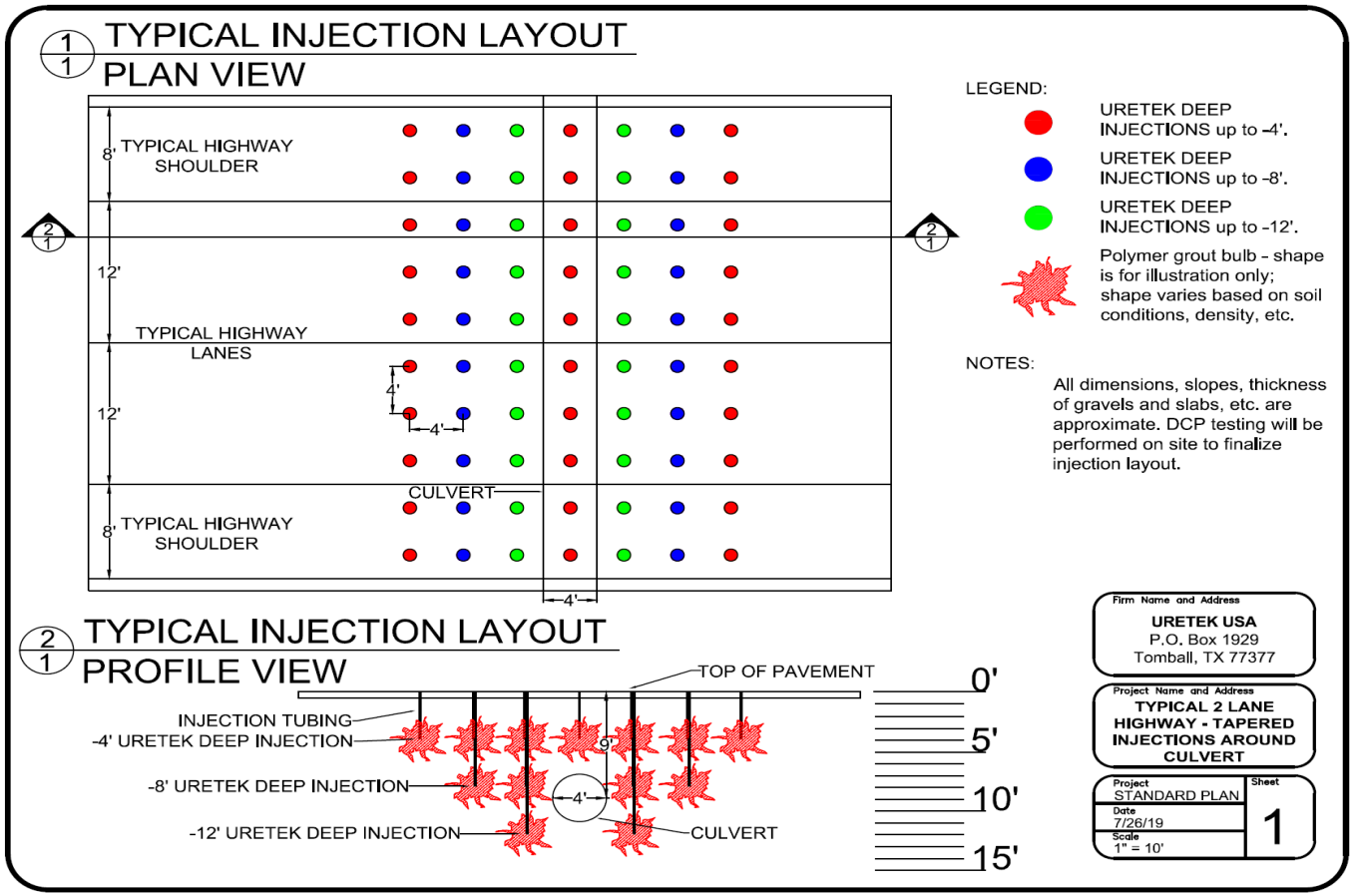
- Low viscosity
- 2-component: Resin & Hardener (1:1 by volume)
- Formulated to resist water intrusion into the reaction
- Exothermic chemical reaction generates CO2 gas
- CO2 gas causes expansion of the polymer and creates pressure on the surrounding environment

URETEK USA

the soil stabilization and pavement lifting company that revolutionized the industry

POLYURETHANE MATERIAL

- Rapid Cure –
  - ✓ Reaction complete in < 1 minute
  - ✓ Can support traffic after 20 minutes
  - ✓ Full strength in 24 hours
- Rigid Structural Polyurethane created as the material cures
- Installed density range – 4 to 10 lbs / CF
- Strength varies with density


1/1 TYPICAL INJECTION LAYOUT
PLAN VIEW
8' TYPICAL HIGHWAY SHOULDER
12'
TYPICAL HIGHWAY LANES
12'
8' TYPICAL HIGHWAY SHOULDER
4'
4'
CULVERT
4'
2/1
2/1
LEGEND:
URETEK DEEP INJECTIONS up to -4'.
URETEK DEEP INJECTIONS up to -8'.
URETEK DEEP INJECTIONS up to -12'.
Polymer grout bulb - shape is for illustration only; shape varies based on soil conditions, density, etc.
NOTES:
All dimensions, slopes, thickness of gravels and slabs, etc. are approximate. DCP testing will be performed on site to finalize injection layout.
2/1 TYPICAL INJECTION LAYOUT
PROFILE VIEW
TOP OF PAVEMENT
INJECTION TUBING
-4' URETEK DEEP INJECTION
-8' URETEK DEEP INJECTION
-12' URETEK DEEP INJECTION
9'
4'
CULVERT
0'
5'
10'
15'
Firm Name and Address
URETEK USA
P.O. Box 1929
Tomball, TX 77377
Project Name and Address
TYPICAL 2 LANE HIGHWAY - TAPERED INJECTIONS AROUND CULVERT
Project
STANDARD PLAN
Sheet
1
Date
7/26/19
Scale
1" = 10'

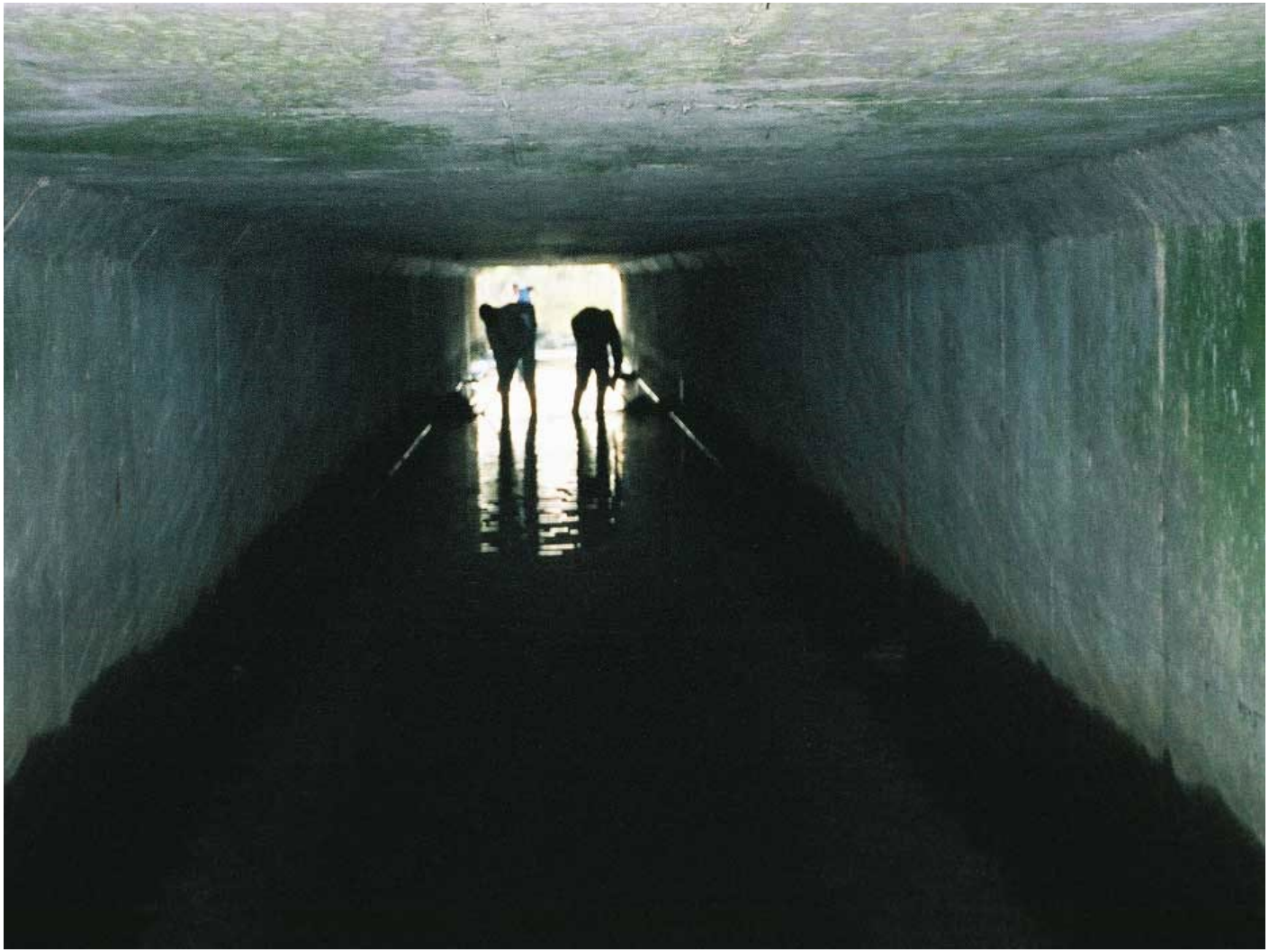
Injection inside steel reinforced, plexi-glass box so material flow could be observed

Stabilized soil mass was free-standing after box removed

Vertical load applied using an excavator

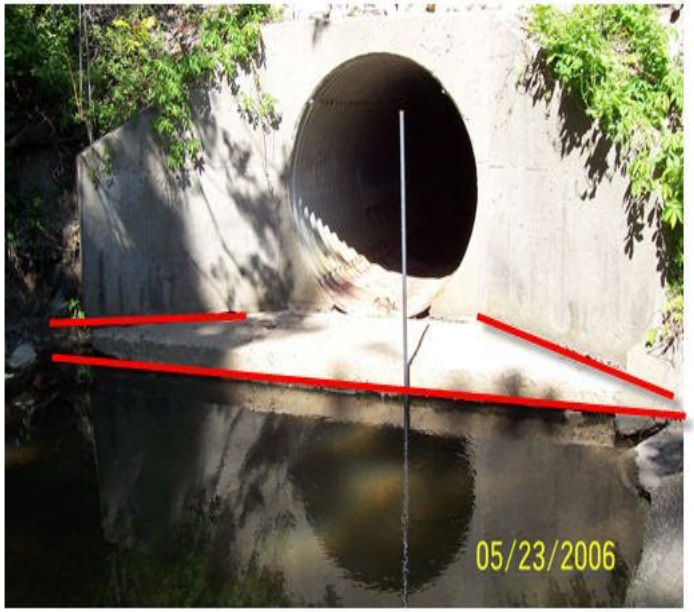
Soil mass would not crush,
but excavator was lifted 11 inches


6/2/2003



Bridgman - Culvert

4. Culvert apron 7' X 22' – two injection to 5' depth



Calculation: Deep Injection - apron

100# per injection X $10.00 X 2 = $2000.00

Summary:

Bridgman – Culvert Base