



Pennsylvania Turnpike Commission Roadway and Bridge Reconstruction between Milepost 324.65 and 326.18





ROADWAY AND BRIDGE RECONSTRUCTION BETWEEN MILEPOST 324.65 AND 326.18

- Project Overview

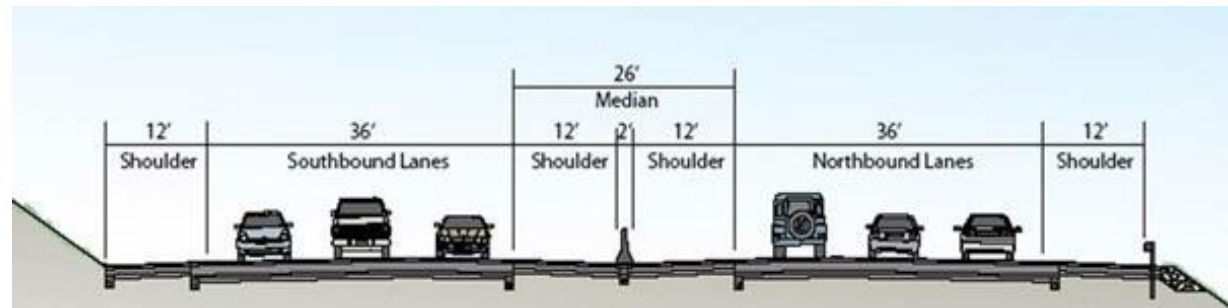
- Prime Contractor: Trumbull Corporation
- Notice to Proceed: August 13, 2021
- Completion Date: May 16, 2025
- Contract Amount: \$117,784,976.08

- Unique Aspects / Challenges

- Culvert Extensions
 - Geotechnical Treatments
 - 3-Span Bridge over Rt 422 & North Gulph Rd
 - Utility Relocations
 - Waste Volume
 - Undercutting / Cement Stabilization
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MP 324.65 – 326.18 Project Overview

- Valley Forge Interchange to Valley Forge Road / EB Valley Forge Service Plaza
- Chester and Montgomery Counties
- Full depth widening from 2 lanes in each direction to 3
- 2 Arch Culvert Extensions
- 3 Mainline Bridge Replacements
- 4 Retaining Walls
- 9 Sound Barrier Walls
- 6 Sign Structures
- 3 Sign Structure Removals
- Valley Forge Service Plaza ramp reconstruction and new highway lighting
- One mile of mill & overlay east of the Valley Forge Interchange
- Mill & overlay of local roads





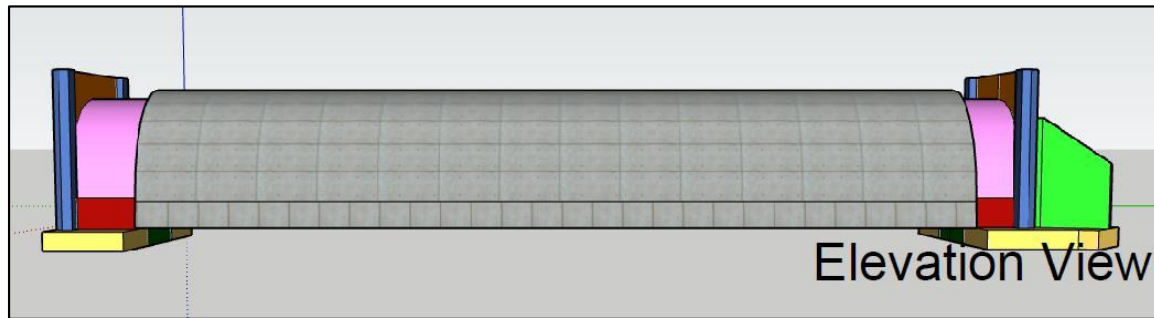
Stage 1A Looking East



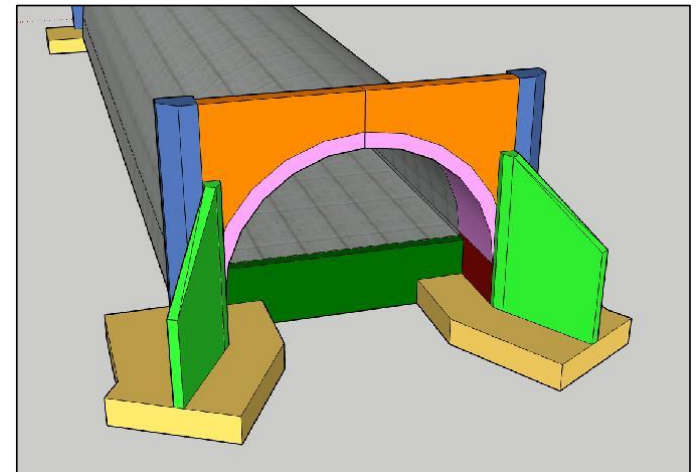
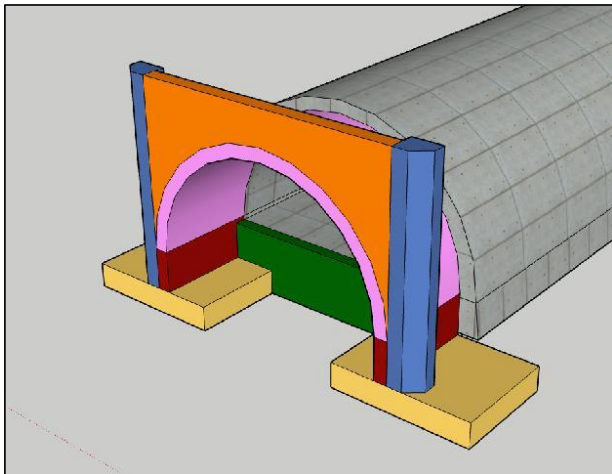
Stage 1A Looking West

Culvert Extension EB-741 (West Branch Trout Creek)

Downstream Side:
All Cast-In-Place

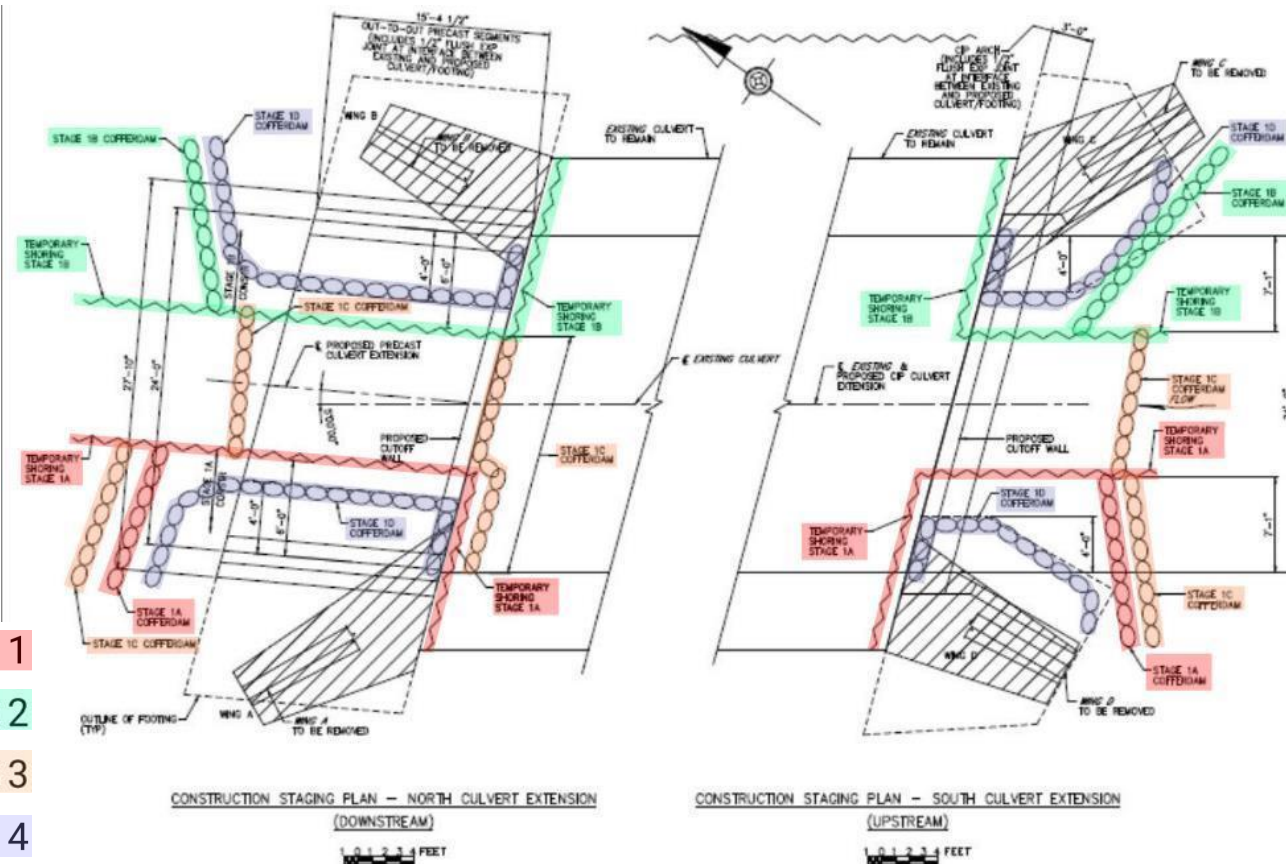


Upstream Side:
Precast Wingwalls
Cast-In-Place
Footers and
Headwall



Culvert Extension Sequencing

- Step 1
- Step 2
- Step 3
- Step 4



- Complicated Staging
- Bypass Pumping
- Flood Prone Area

Trout Creek Flood Prone Area



Trout Creek Flood Prone Area



**Culvert Extension Deadline:
June 30, 2022**

Actual Completion Dates:

**EB-741 (West Branch):
June 15, 2022**

**EB-743 (East Branch):
June 23, 2022**



Geotechnical Treatments

Type	Bid Amount
Sinkhole Drilling and Grouting	\$6,944,484
Sinkhole Repair PDA	\$573,200
Deep Dynamic Compaction	\$1,154,204
Undercuts w/ Various Backfill	\$1,807,516
Mandatory Pile Predrilling	\$851,314
Pile Extraction/Redriving/Obstruction Drilling	\$620,572
Total	\$11,951,290

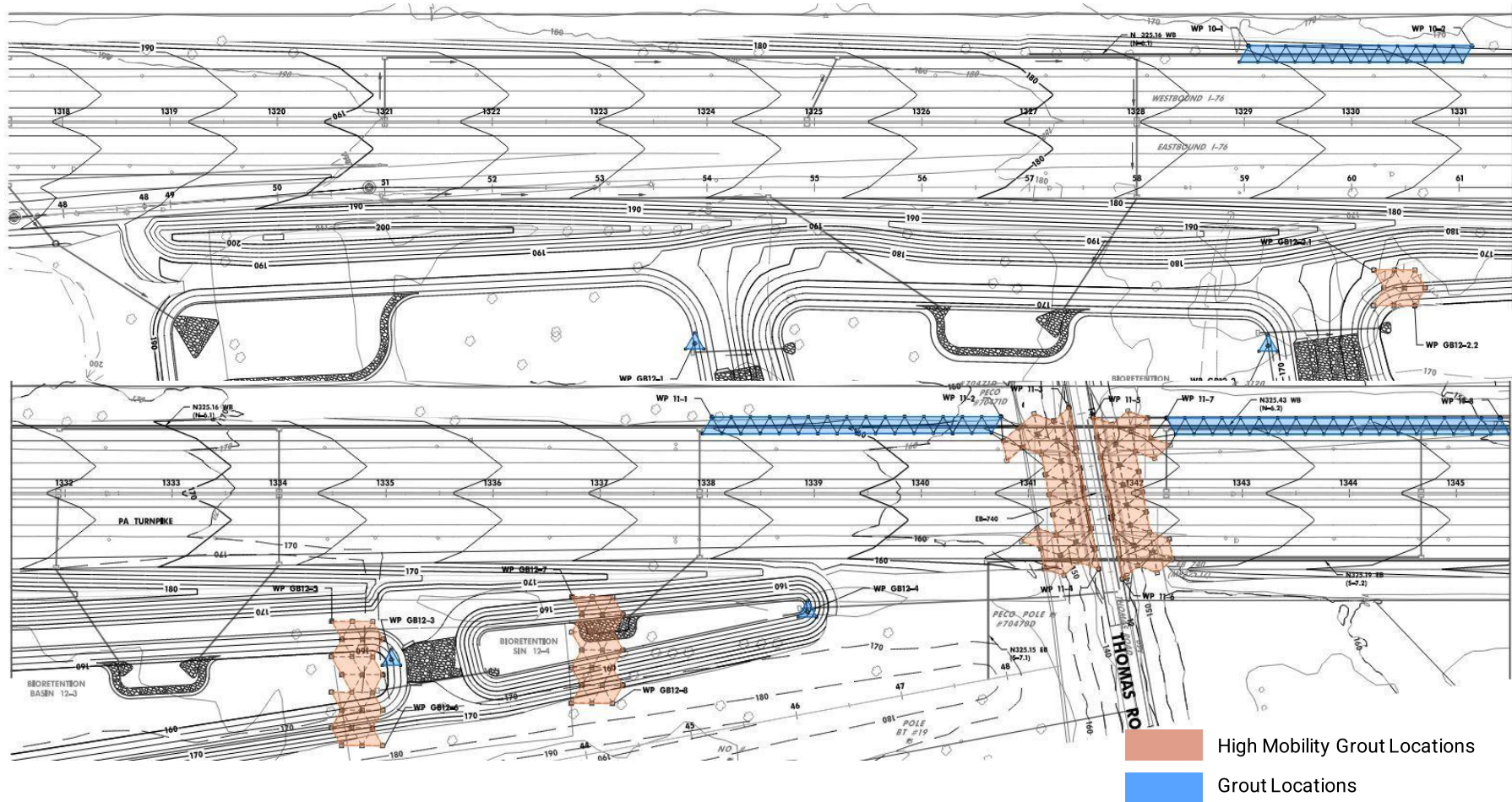
Geotechnical work is approximately 10% of the Total Contract Amount



Compaction Grouting

- Preventative Sinkhole Treatment
 - Pressure injection of cement grout into existing soil and rock zones to fill voids under proposed structures and roadway to plug the throat of sinkholes
 - Limited Mobility (1" slump) and High Mobility (7" slump) Grout locations specified in Contract
 - Bid Amount: \$7.5m
 - 80,100 LF of Drilling Tabulated
 - 13,285 CY of Grout Tabulated
-

Compaction Grouting Areas



Deep Dynamic Compaction (DDC)

What is DDC?

A ground improvement technique that densifies soils by using a drop weight.

For this project, DDC was used to improve the subsurface profile directly under 4 proposed basins.

The ground was subjected to repeated surface tamping with a 15-ton weight from approximately 60ft high.



DDC Challenges / Concerns

- Finding a Contractor
- Proximity to Traveling Public
- Noise/Vibration
- Potential Sinkholes
- Excessive Pore Pressure
- Pinnacled Rock
- Varied End of Drop Criteria



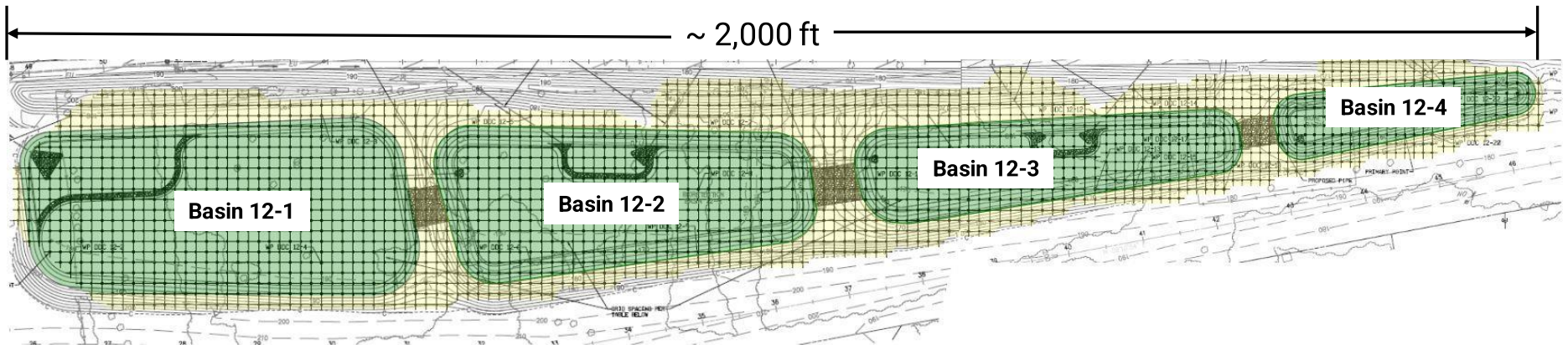
DDC Overview

PLANNED:

- 2,062 total drop points
- 20,434 total drops planned
- Approx. 10-week duration
- Bid Amount: \$1,079,203.80

ACTUAL:

- 1,747 total drop points
- 8,573 total drops performed due to variable criteria
- Approx. 4-week duration
- Actual Amount: \$865,665.67







DDC Prep



Crater Field

EB-744 3-Span Bridge over Rt 422 and N. Gulph Rd



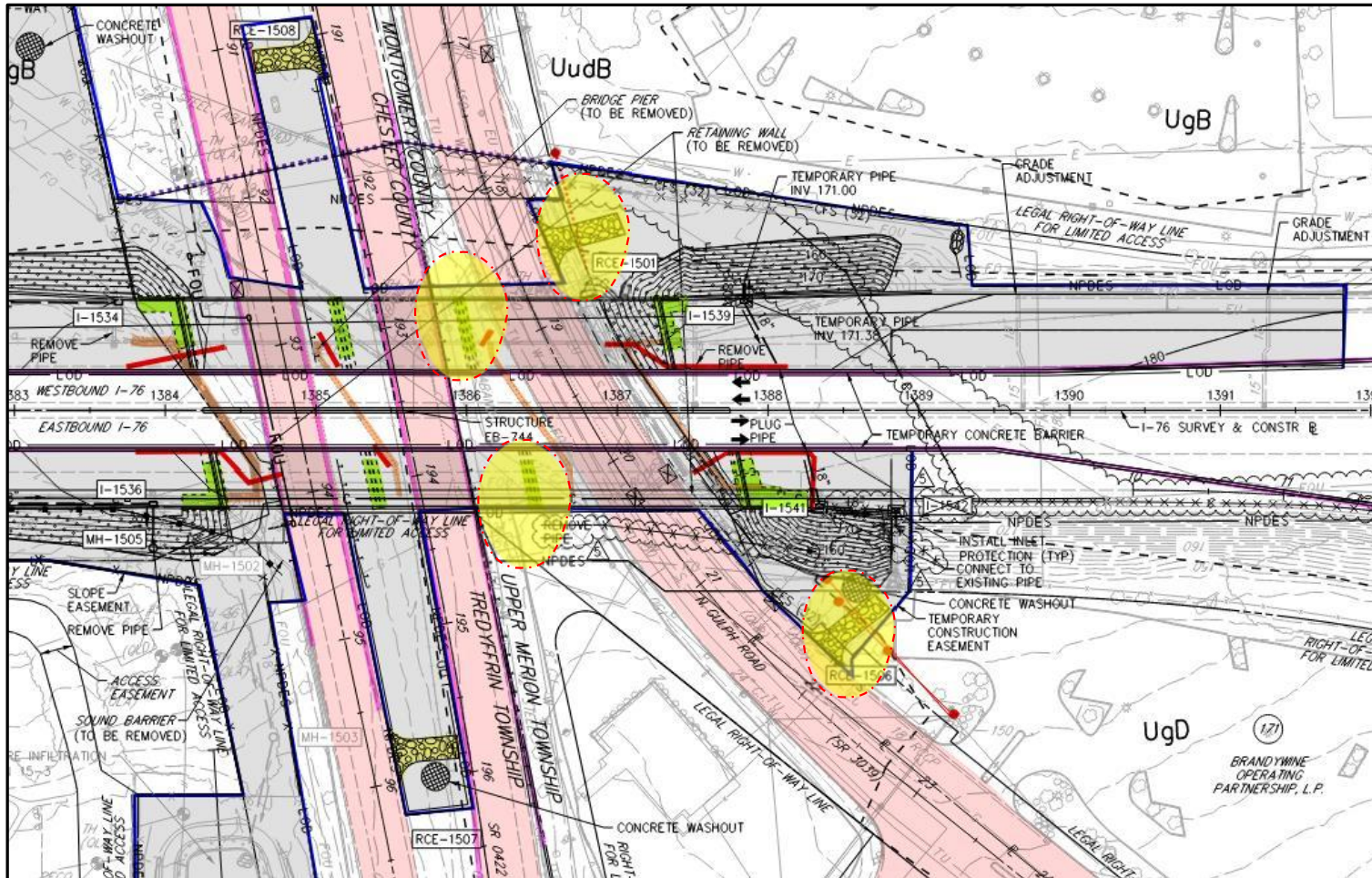
Overview:

- 44,142 LF of HP 12x74 H-Pile
- 11,760 LF of Mandatory Predrilling
- 404 Total Piles

Challenges:

- Access Issues
 - Limited Work Area
 - PTC Fiber Optic Line Relocation
 - Active 42" Water Main 5ft off edge of Pier 2 footer
 - Noise / Vibration Concerns
 - Difficult Pile Driving Conditions in Karst Dolomite
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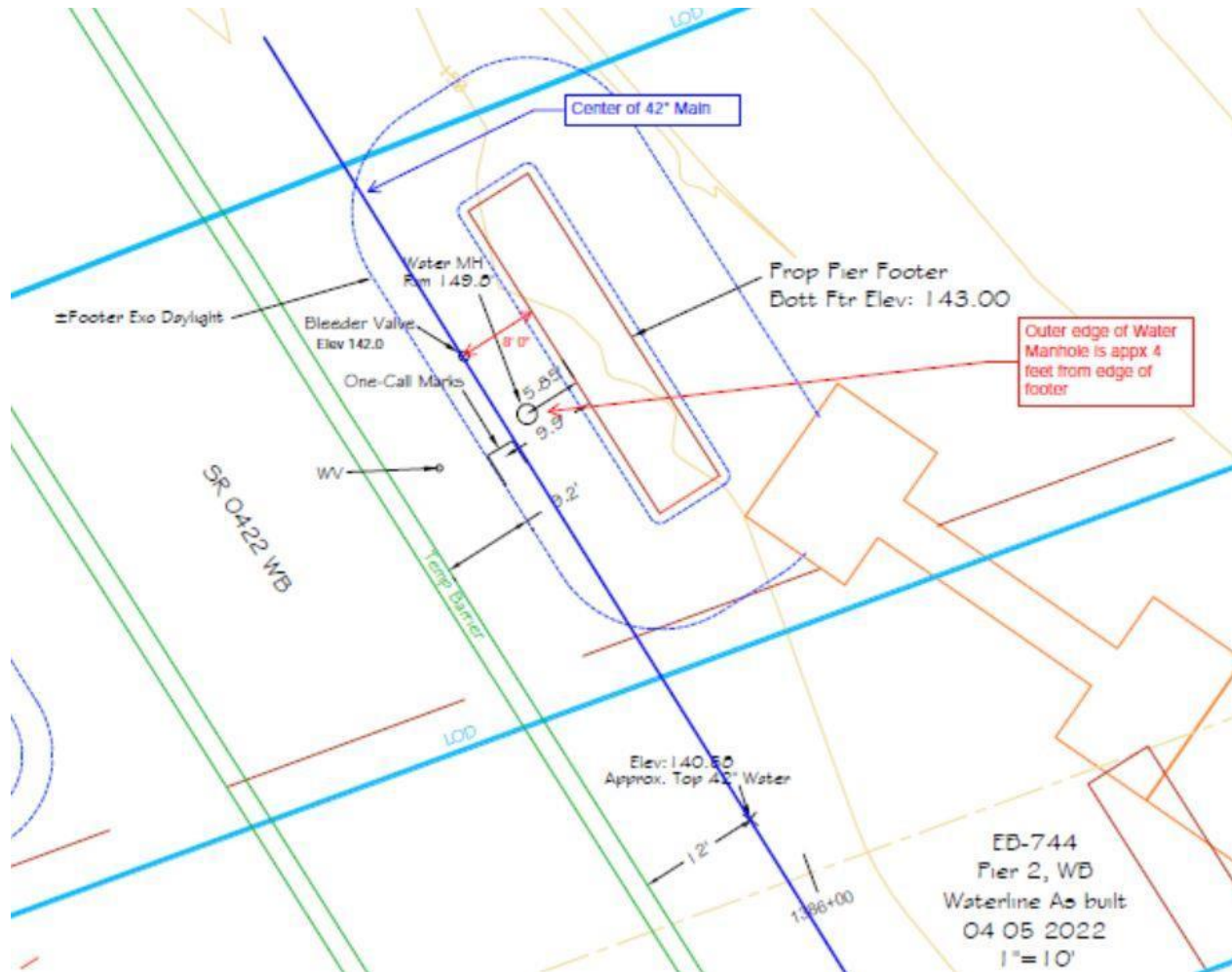
Limited Work Area and Access at EB-744



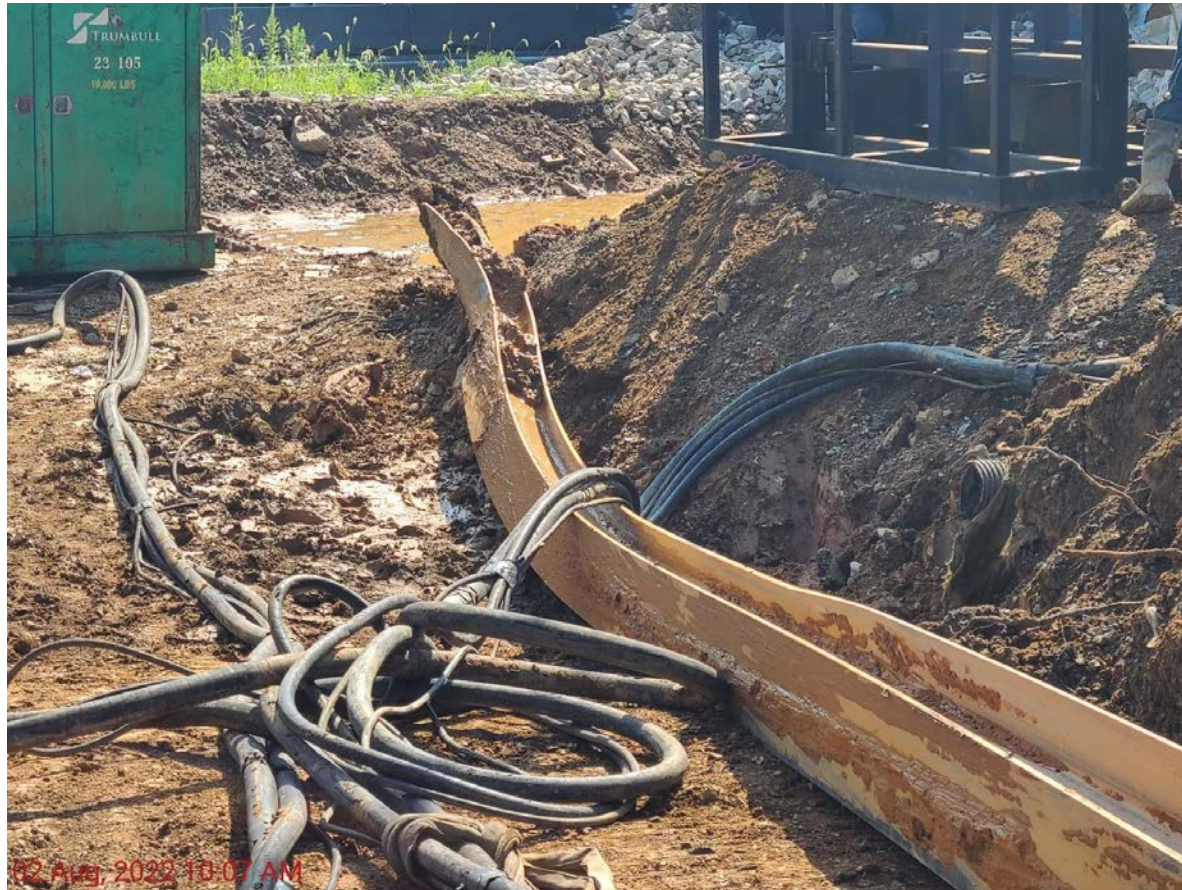
PTC Fiber Optic Line Relocation at EB-744



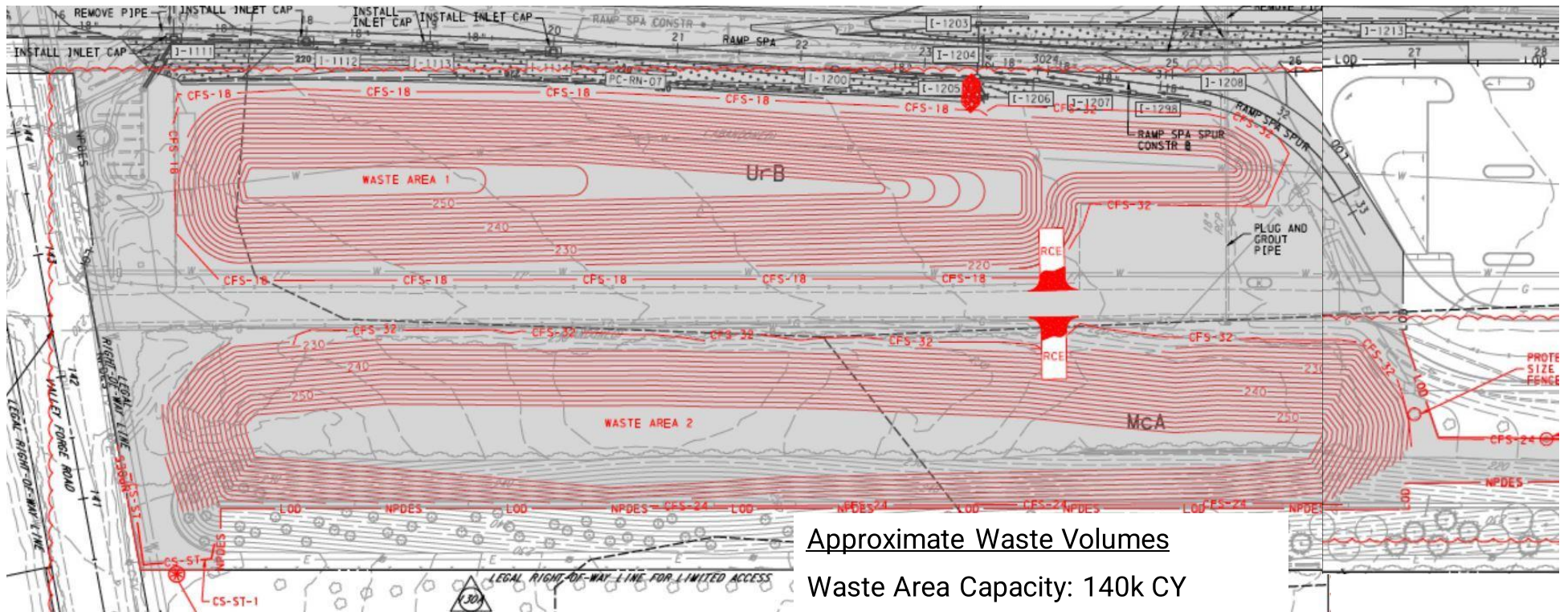
Active 42" Water Main at EB-744



Difficult Pile Driving Conditions at EB-744



Waste Volume



Approximate Waste Volumes

Waste Area Capacity: 140k CY

Contractor Waste Takeoff: 210k CY

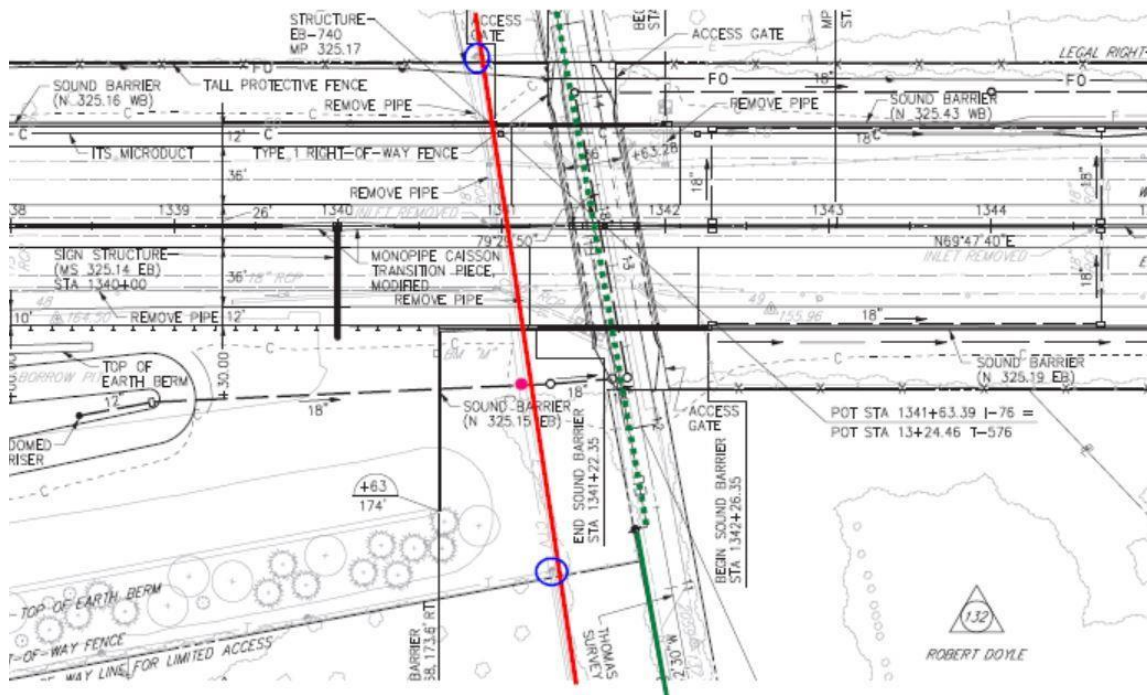
Potential Excess Material: 70k CY

Undercutting / Cement Stabilization

- Tabulated Undercut: 28,000 CY (40% of subgrade)
- Contractor Cement Stabilization Proposal under consideration to eliminate waste for tabulated undercuts



Utility Relocations



- Unknown PECO Pole Identified on November 5, 2021
- Utility Relocation Completed on August 14, 2022

PECO Utility Pole Conflict Resolved



PECO Pole in Conflict with Excavation

Aqua PA Waterline Relocation



Jacking pit for installation of two 48-inch sleeves under US 422





Questions?