

NASSPA STEEL SHEET PILING SYMPOSIUM

PRESENTS:

STEMMERS RUN STEEL SHEET PILE COFFERDAM AND TRESTLE

BY:

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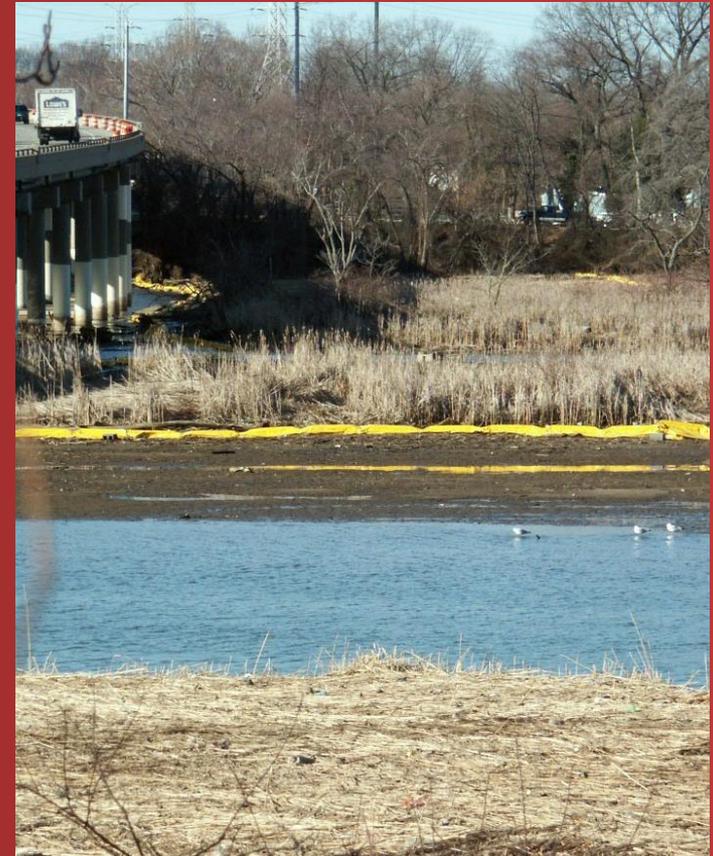
PROJECT BACKGROUND

- Construct 54 inch dia., sanitary sewer force main across Back River in Baltimore County, Maryland
- 1700 linear feet
- Approximately \$7.9 million dollars

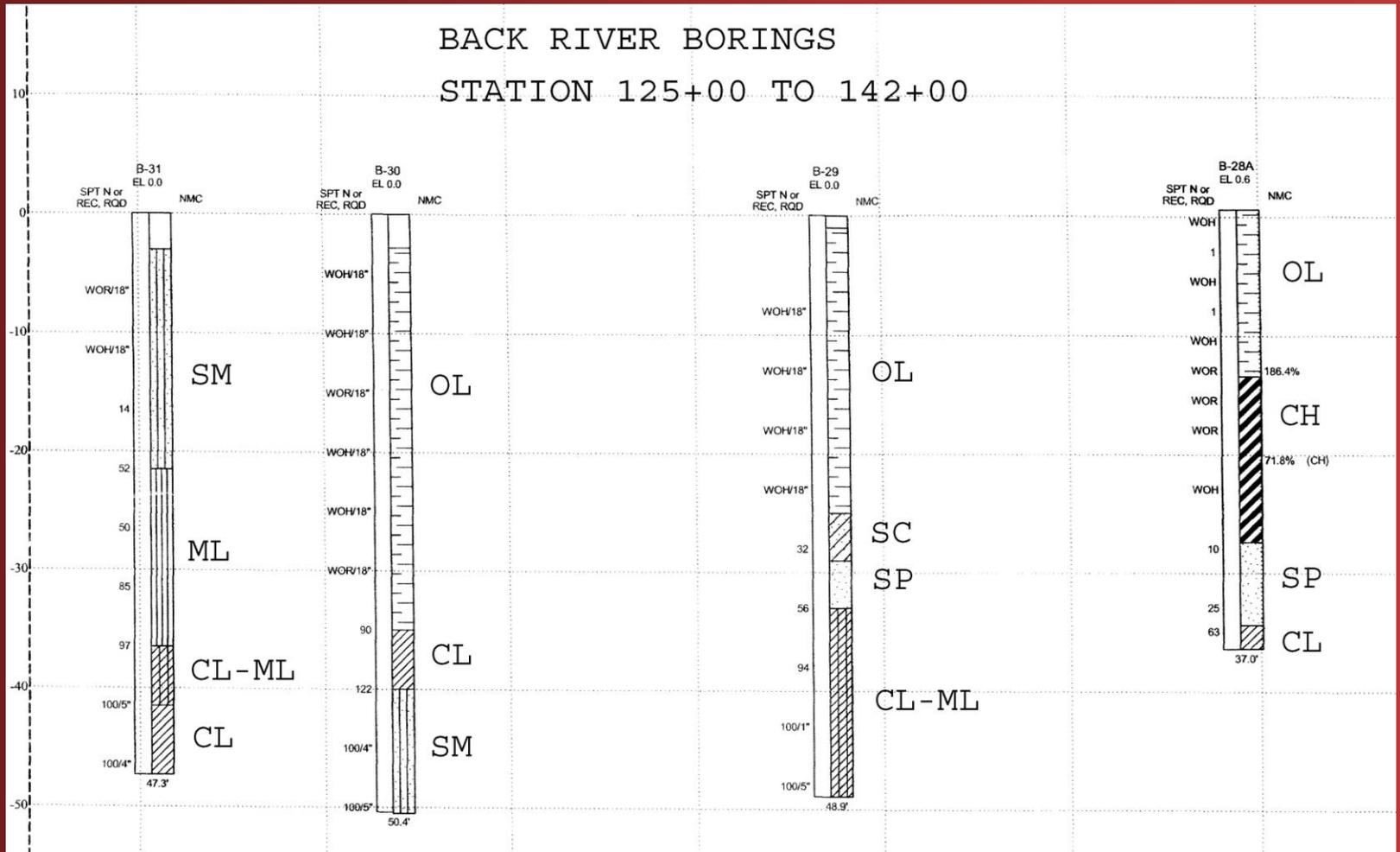


PROJECT CHALLENGES

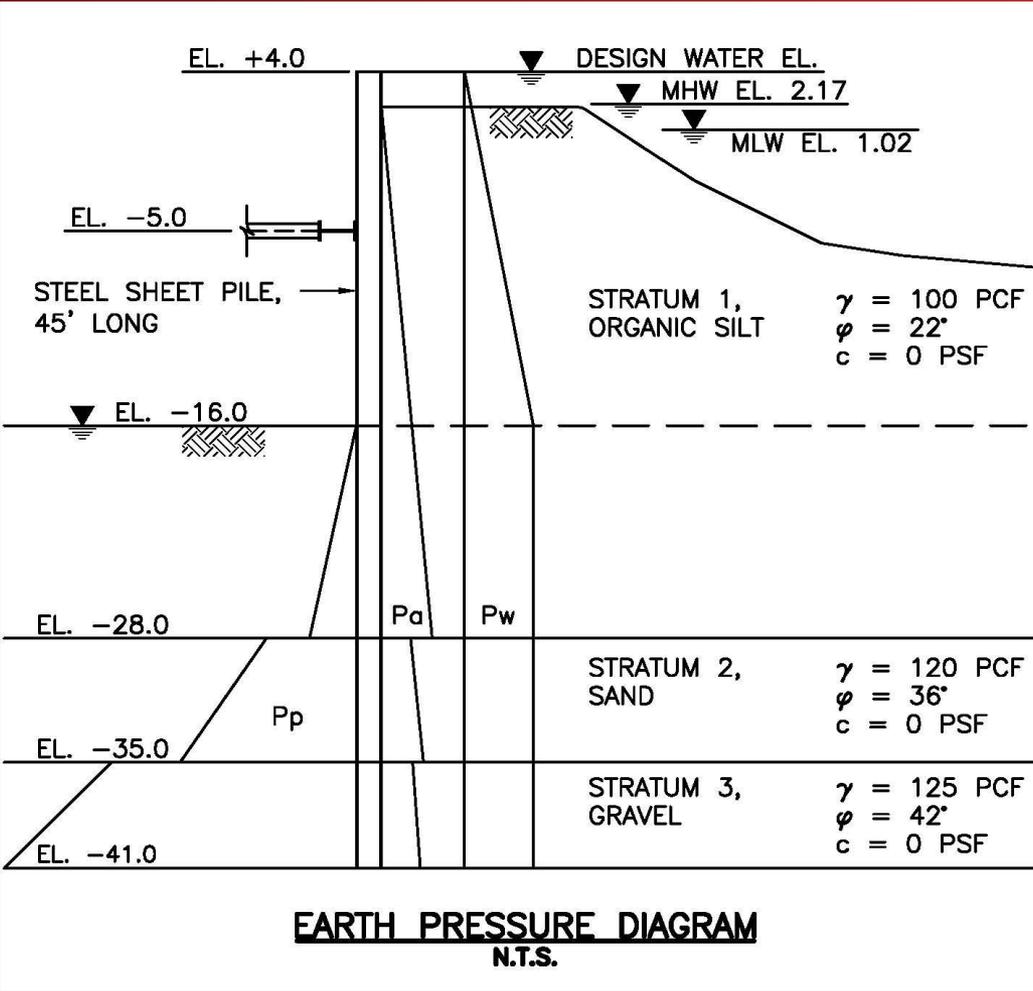
- Construct cofferdam and work platform trestle structures over Back River
- Tidal flow conditions
- Access and tight work area provided by specified 12 feet wide trestle platform
- Deep, very soft (WOH) silts and organic clays
- Hydrostatic head of 20.5 feet
- Maintain and protect wetland environment



SOIL CONDITIONS

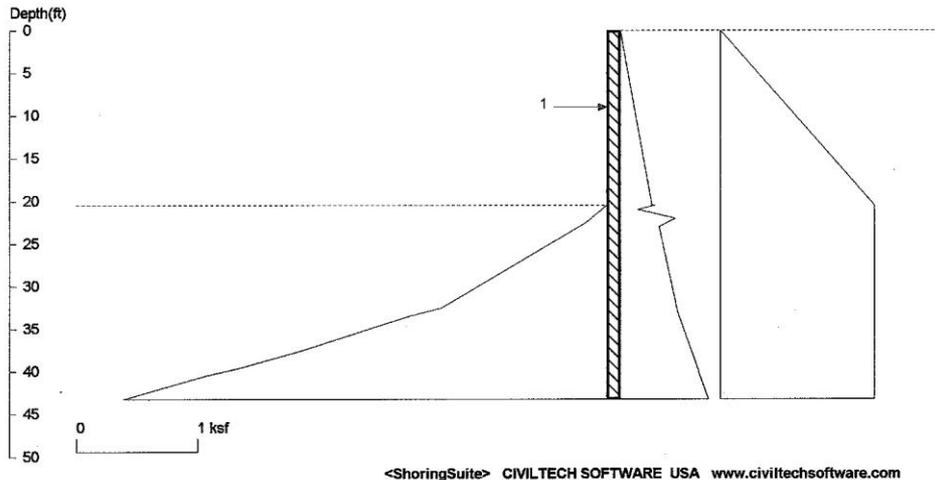


EARTH PRESSURE DIAGRAM



COFFERDAM DESIGN

STEMMER RUN FORCE MAIN BALTIMORE, MD.



Licensed to 4324324234 3424343 Date: 10/8/2008
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 UNITS: Dimension - ft; Force and Shear - kip; Pressure and Stress - ksf; Moment - kip-ft; Pres. Slope - kip/ft³; Deflection - in.

Wall Height=20.5 Pile Diameter=1.0 Pile Spacing=1.0 Wall Type: 1. Sheet Pile

PILE LENGTH: Min. Embedment=22.73 Min. Pile Length=43.23
 MOMENT IN PILE: Max. Moment=117.10 per Pile Spacing=1.0 at Depth=22.83

PILE SELECTION:
 Request Min. Section Modulus = 42.6 in³/ft, F_y = 50 ksi = 345 MPa, F_b/F_y = .66
 -> Pile meet Min. Section Requirements:
 4N AZ25 FSPZ25 PZ38 BZ26
 H175 AZ26 PZ35 AZ28 H215
 BZ32 FSPZ32 PZ40 5RU3

BRACE FORCE: Strut, Tieback, Plate Anchor, and Deadman

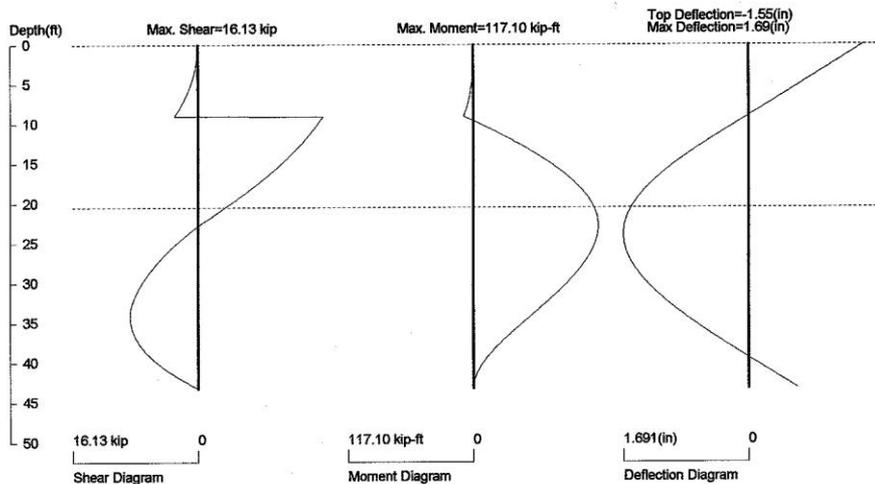
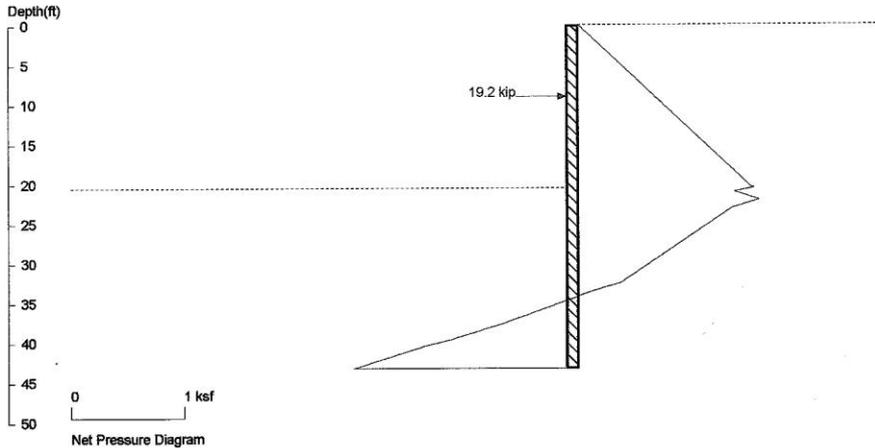
No. & Type	Depth	Angle	Space	Total F.	Horiz. F.	Vert. F.	N/A	N/A
1. Strut	9.0	0.0	1.0	19.2	19.2	0.0	0.0	0.0

UNITS: Width, Diameter, Spacing, Length, Depth, and Height - ft; Force - kip; Bond Strength and Pressure - ksf

- Shoring Suite Plus, Version 7.3
- Single tier, braced system with triangular earth pressure distribution

DESIGN RESULTS

STEMMER RUN FORCE MAIN BALTIMORE, MD.



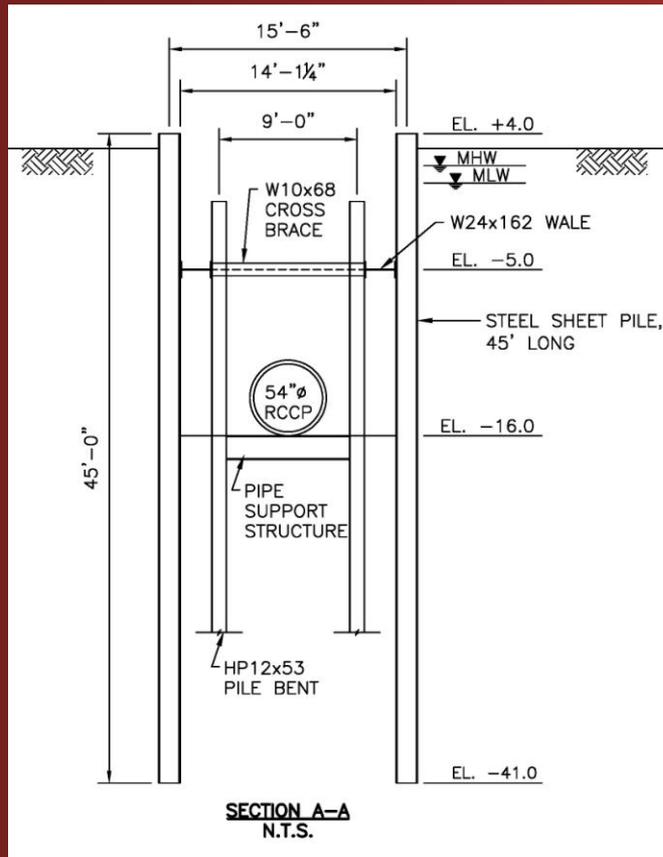
PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 1.0 foot or meter

User Input Pile, AZ25 E (ksi)=29000.0, I (in⁴)/foot=382.6

- REQUIRED SSP SECTION MODULUS = 42.6 in³/ft
- SSP LENGTH = 45 ft MIN.
- WALE LOAD = 19.2 KLF
- MAX. D = 1.69 in

COFFERDAM DETAIL



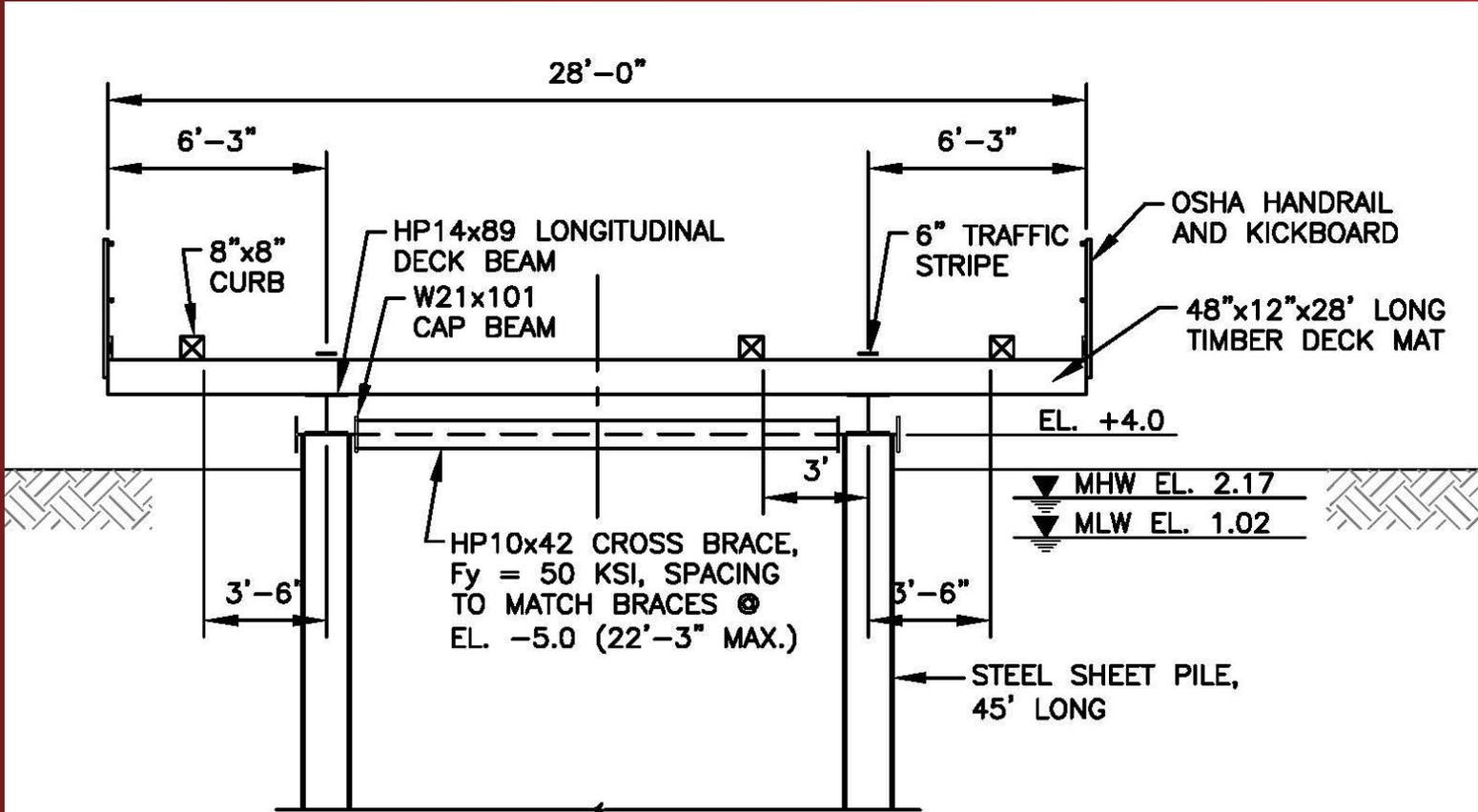
■ Timber deck not shown

■ Timber deck & pipe shown

TRESTLE DESIGN

- Timber deck mats supported by the SSP and cap beams
- AASHTO HS20-44
- 200T Crane and equipment live loads
- Vehicles restricted from cantilevered timber deck
- 300 PSF misc. construction load on cantilevered deck

TIMBER DECK SYSTEM



DECKING SYSTEM DETAIL
N.T.S.

TIMBER DECK DETAILS

- SSP cap beams & deck beam mat support



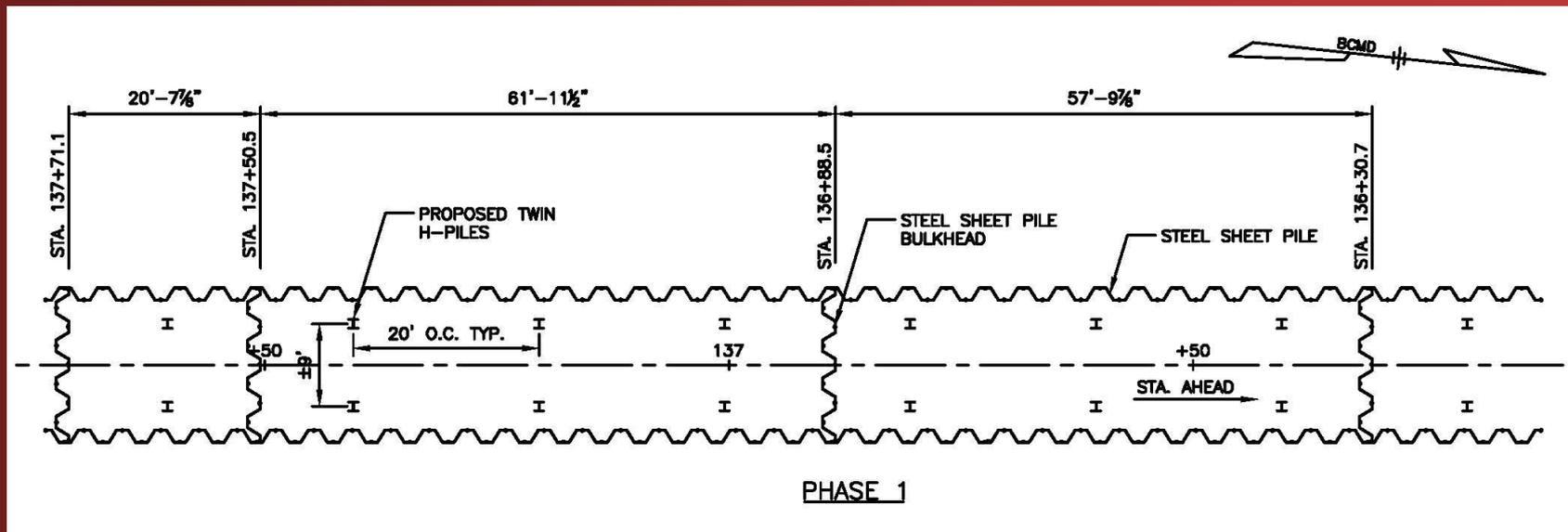
- Crane load over SSP & cap/deck beams

WORK TRESTLE



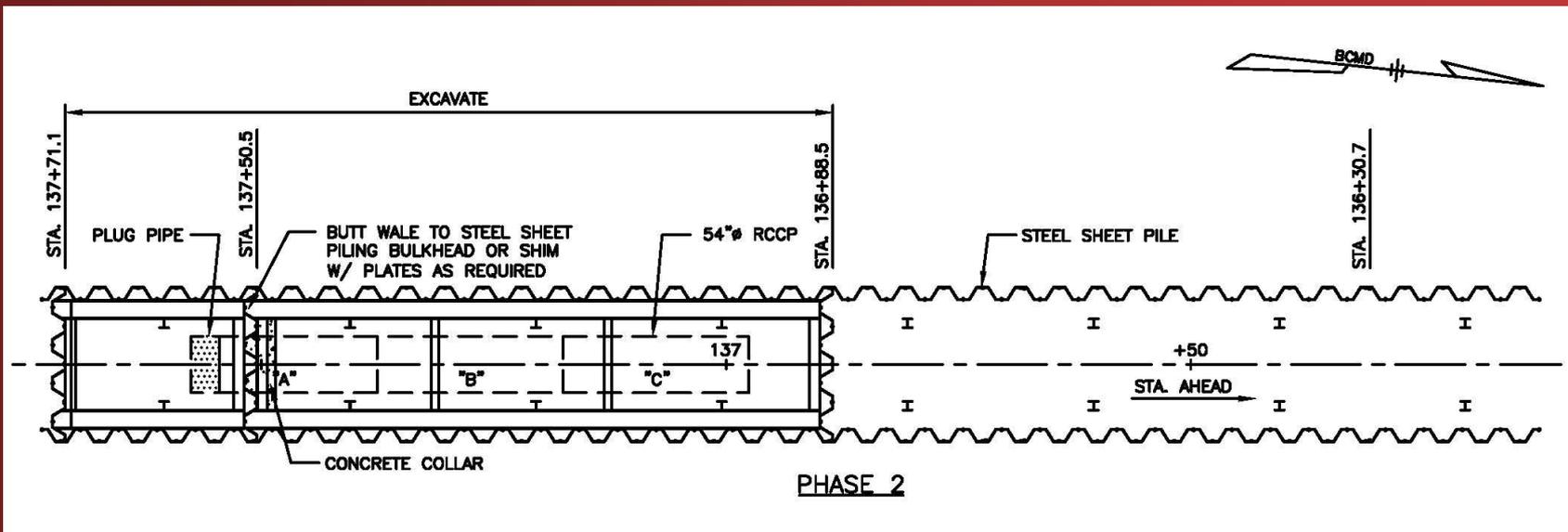
- Trestle completed from North to starter cofferdam

CONSTRUCTION PHASING



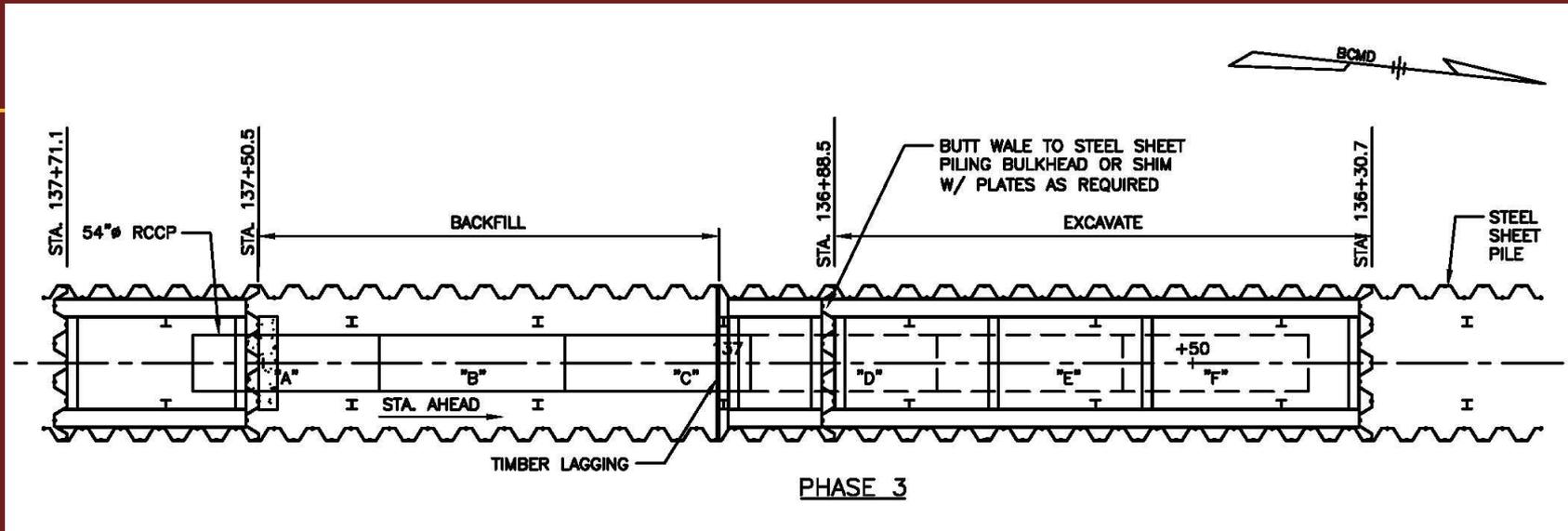
- Install SSP from North shore
- Construct timber deck
- Install bulkheads and pile bents (Optional)

CONSTRUCTION PHASING



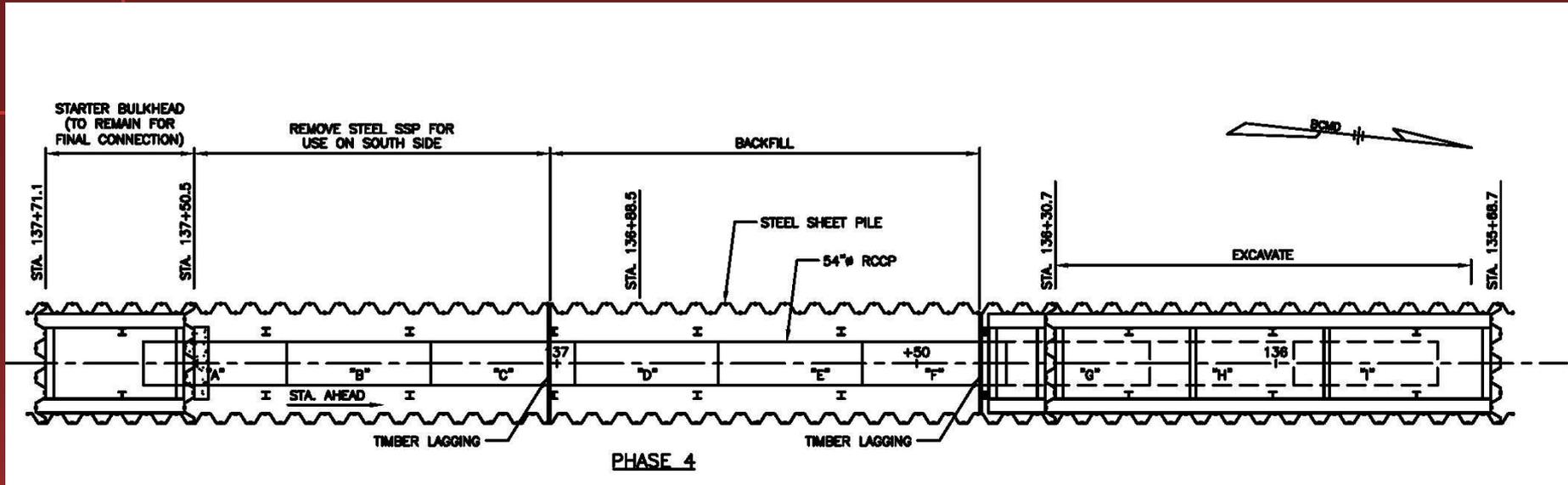
- Excavate cofferdam
- Install wales and braces
- Install pipe sections
- Construct concrete collar and pipe plug

CONSTRUCTION PHASING



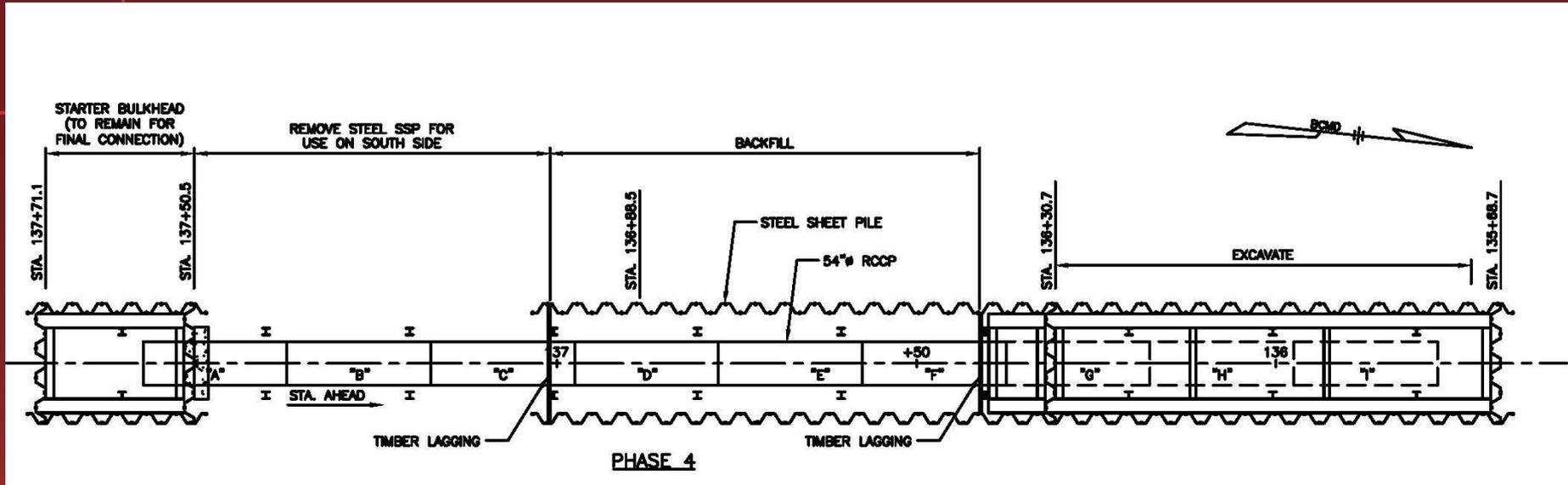
- Install SSP bulkhead (If not previously installed)
- Install lagging to pipe support piles
- Excavate and install wales and braces in next segment cofferdam
- Backfill previous cofferdam segment
- Install next three pipe sections

CONSTRUCTION PHASING



- Install next SSP bulkhead (if not already installed)
- Install lagging to pipe support piles
- Excavate and install wales and braces in next segment cofferdam
- Backfill previous cofferdam segment
- Install next three pipe sections

CONSTRUCTION PHASING



- Remove timber deck, SSP, wales, and braces in completed cofferdams for use on South side

SSP INSTALLATION

- Driving from North toward starter cofferdam location



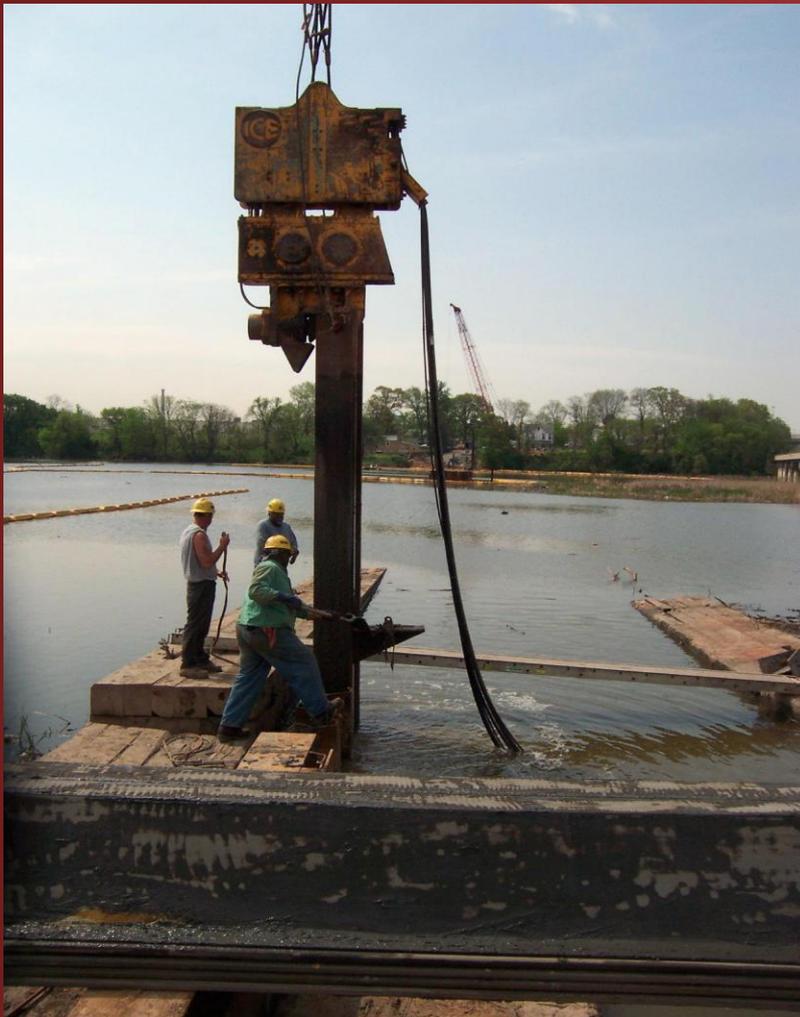
NORTH SIDE PIPE INSTALLATION



A VIEW FROM THE NORTH



SSP EXTRACTION



- SSP is pulled at the North shore for reuse starting at the South shore

STARTER COFFERDAM & SSP REMOVAL AT NORTH SHORE



SSP INSTALLATION FROM SOUTH TOWARD STARTER COFFERDAM



BUSY BOARDWALK!

- Tight working conditions on the trestle
- Multiple construction operations working concurrently



PROJECT BENEFITS

- Eliminated separate work trestle
- Increased work platform width, 12' to 28'
- Sequencing shortened construction time allowing opposite shorelines to be worked simultaneously
- Cost savings from reclaimed materials
- Minimized environmental impact and wetland disturbance
- Improved construction operations

THANK YOU

Peirce Engineering, Inc.

Civil ~ Construction Engineering