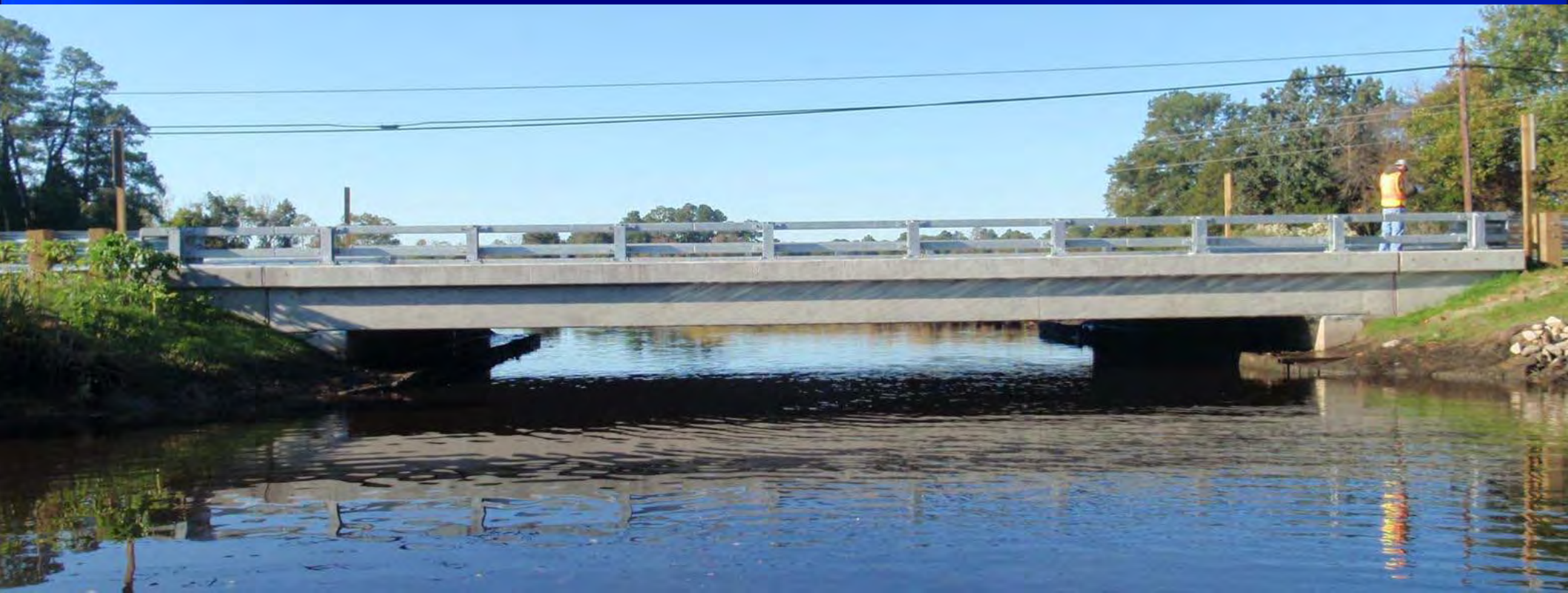


Accelerated Bridge Construction: **The Replacement of MD 362 over Monie Creek**



A traditional MD bridge replacement for spans 55 feet and less

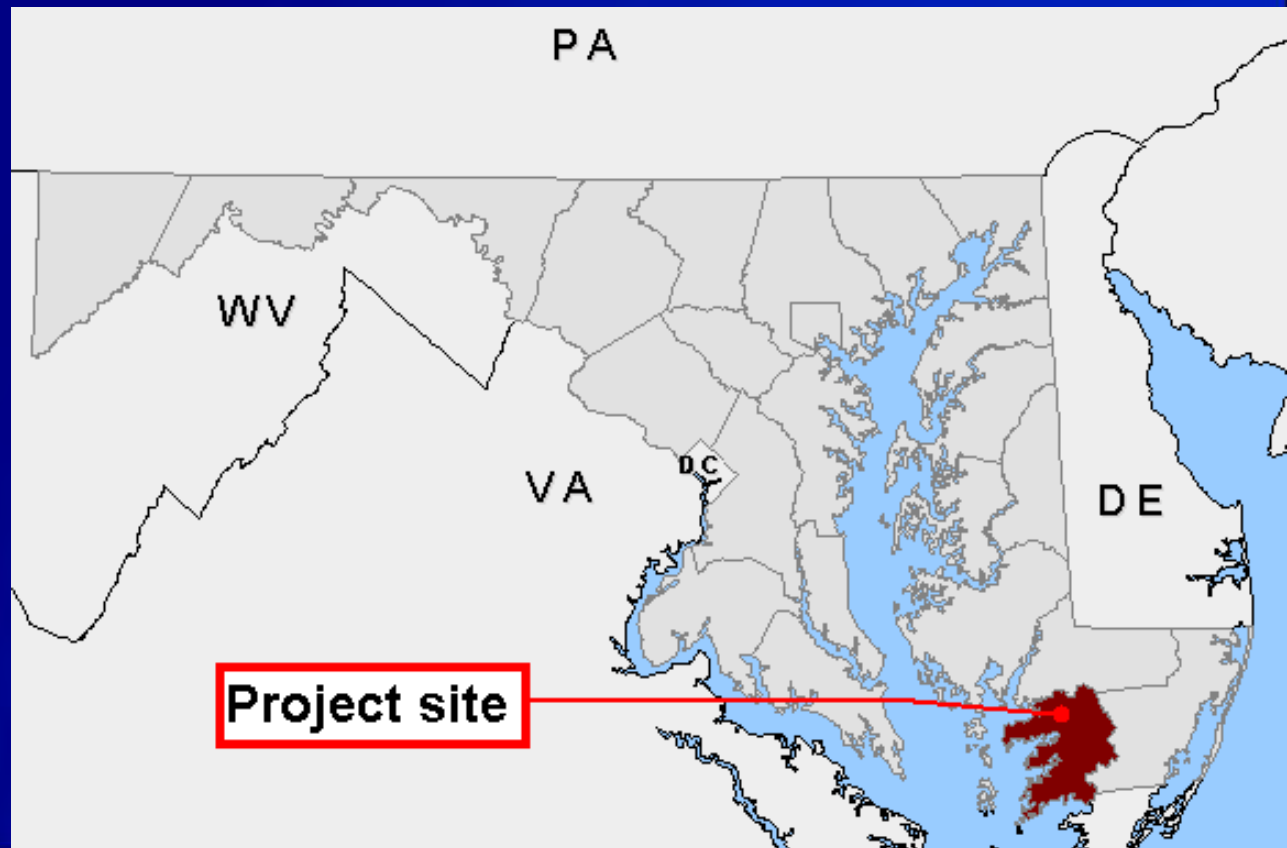
- Solid prestressed concrete slabs post-tensioned transversely together
- Cast-in-place concrete overlay
- No joints
- Semi-integral concrete abutment caps with bond breaker between superstructure and substructure
- Single row of piles – full moment connection between abutment and piles

Maintenance of Traffic & Construction Schedule

- Prefer to complete with a detour in the summer when schools are closed
- Perform in a 10 week duration:
 - 1 week for bridge removal & excavation
 - 2 weeks for pile driving (or spread footings)
 - 2 weeks for casting abutment stems and curing
 - 1 week for scour protection and setting solid prestressed concrete slabs
 - 2 weeks for casting concrete overlay and curing
 - 1 week for curbs and curing
 - 1 week for railing and approach roadway

Accelerated Bridge Construction in MD

- Goal: complete the construction with a 5 week detour
- Try precast abutment caps (reduce cure time)
- Short span length (< 55')
- Low ADT
- Has a detour route
- Found our site:
MD 362 over
Monie Creek



Existing bridge information

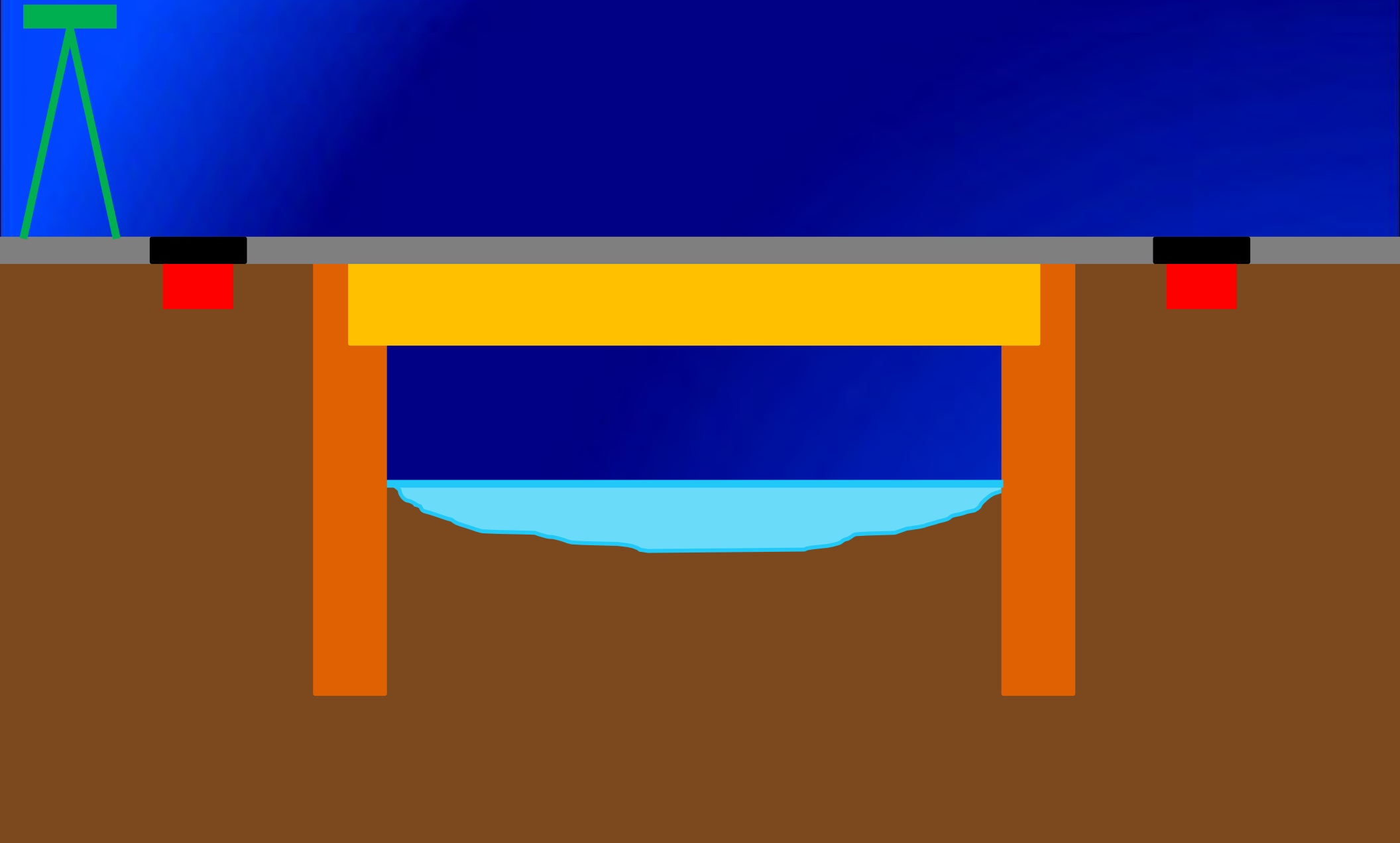
- 41'-0" single span steel girder bridge
- Structurally deficient timber substructure
- ADT = 1700
Design = 2800
- Used county roads for detour
- 48'-0" Clear Roadway



Design considerations

- How do you connect elements together?
 - Piles will be driven first with a 6" tolerance
 - Precast abutment sections need to line up
 - Prestressed slabs weight less than entire abutment cap
 - Need to have multiple section of the abutment cap so one crane can be used
 - If curbs are precast on the slabs, how do we ensure that they will line up with wing walls?
- How do you install scour protection quickly without having to dewater the creek?

Drive piles prior to closing the road





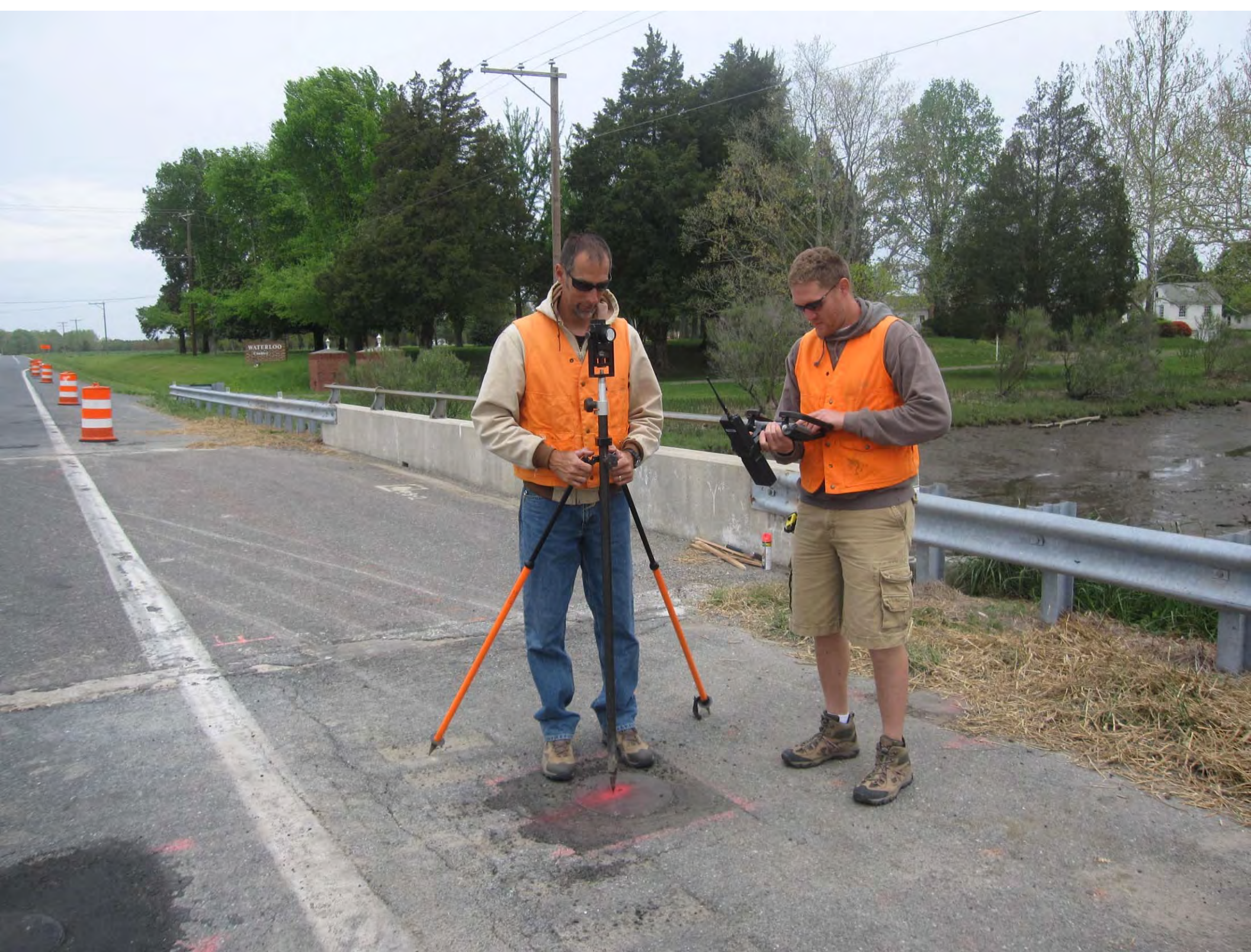










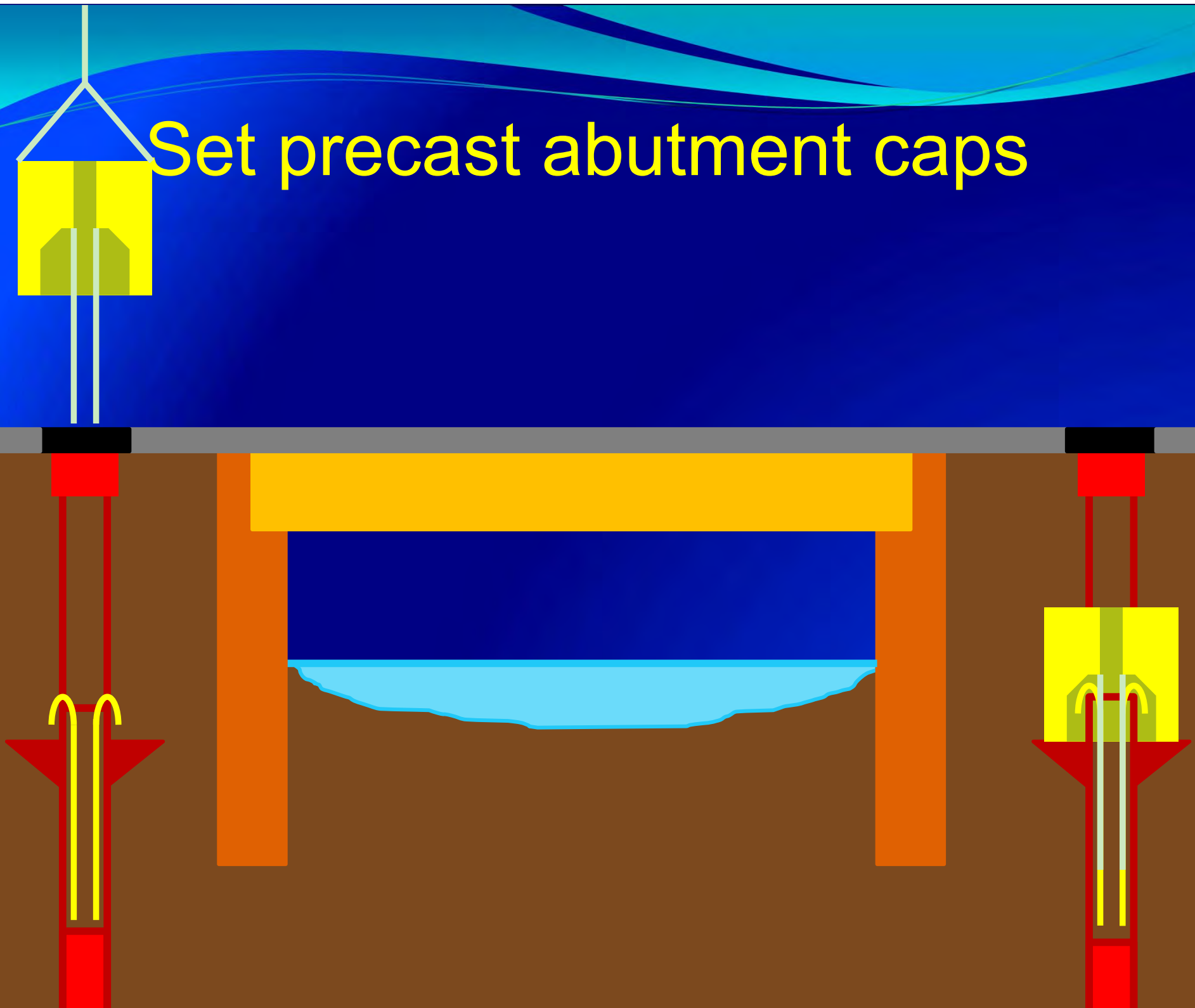






04.24.2009

Set precast abutment caps

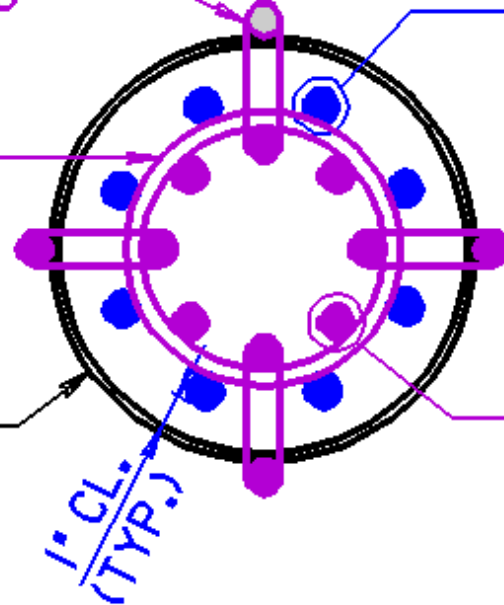


Plan view of pile

4-#8 HOOK BARS, PLACED
IN PILE PRIOR TO SETTING
PRECAST CAP

#3 TIES @ 1'-0" C/C

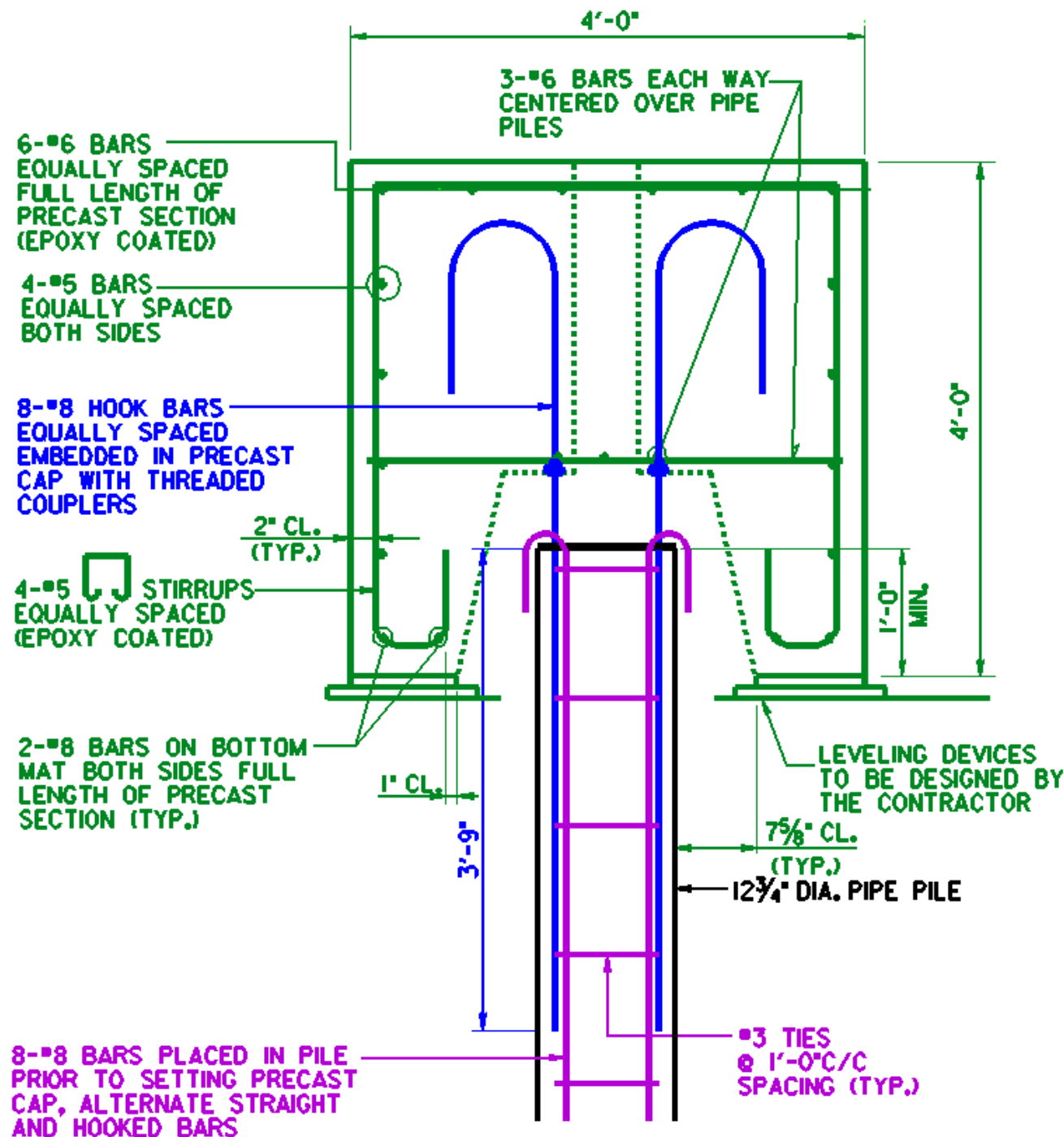
12 $\frac{3}{4}$ " DIA. PIPE PILE
 $\frac{1}{2}$ " MIN. THICKNESS



8-#8 BARS EQUALLY SPACED
THREADED INTO 8-#8 HOOK BARS
EMBEDDED IN PRECAST CAP

8-#8 STRAIGHT BARS, PLACED
IN PILE PRIOR TO SETTING
PRECAST CAP

ABUTMENT PILE REINFORCEMENT SECTION



ABUTMENT SECTION

Typical Abutment Section

EFFECTIVE 7-7-09

**ROAD
CLOSED**

REOPENS 8-10-09

EFFECTIVE 7-7-09

**ROAD
CLOSED**

REOPENS 8-10-09

NOTICE

BRIDGE CLOSED

ON MARYLAND 362 WEST

ALL TRUCKS MUST

FOLLOW DETOUR

































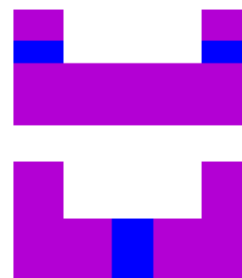
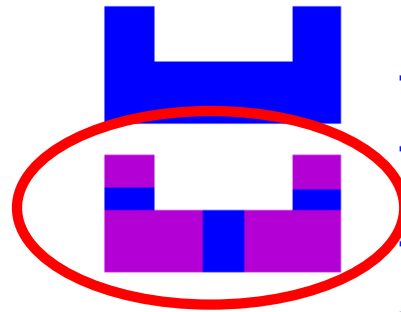
Plan view of options for abutment

CAST-IN-PLACE
THE ENTIRE CAP

PRECAST CAP IN FOUR SECTIONS
WITH THREE CLOSURE POURS
AS SHOWN

PRECAST CAP IN THREE
SECTIONS WITH TWO
CLOSURE POURS AS SHOWN

PRECAST ABUTMENT AND WING WALL
CAPS IN TWO SECTIONS WITH ONE
CLOSURE POUR AS SHOWN



PRECAST CAP IN TWO SECTIONS
WITH ONE CLOSURE POUR,
CAST-IN-PLACE WING
WALLS, AS SHOWN

PRECAST CAP IN ONE SECTION
WITH NO CLOSURE POUR,
CAST-IN-PLACE WING
WALLS, AS SHOWN

PRECAST ABUTMENT AND
WING WALL CAPS IN ONE
SECTION WITH NO CLOSURE
POURS, AS SHOWN



LEGEND

PRECAST



CAST-IN-PLACE

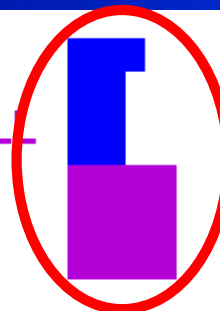


Section view options for wing walls

CAST-IN-PLACE
ENTIRE WING WALL



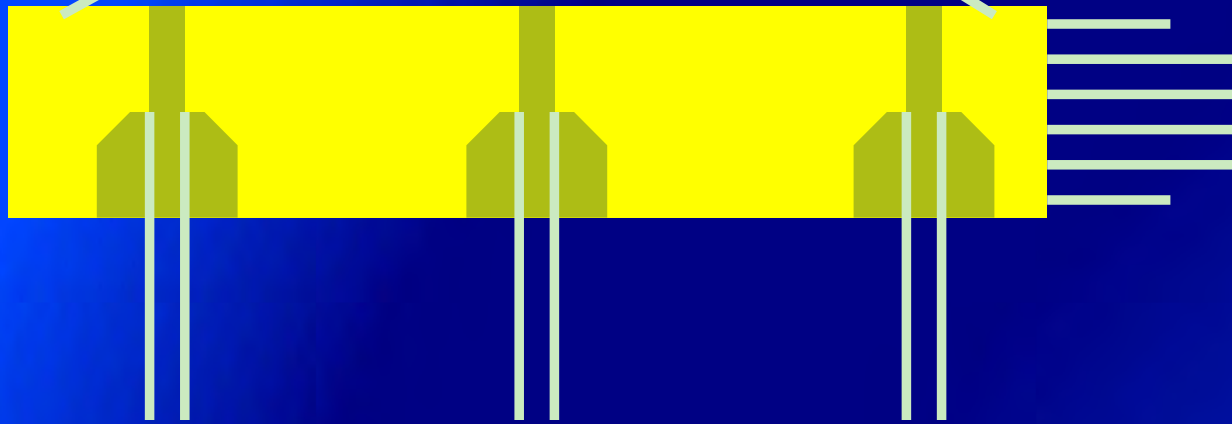
PRECAST WING WALL
CAP AND CAST-IN-
PLACE WING WALL
STEM



PRECAST ENTIRE
WING WALL



Filling precast abutment caps





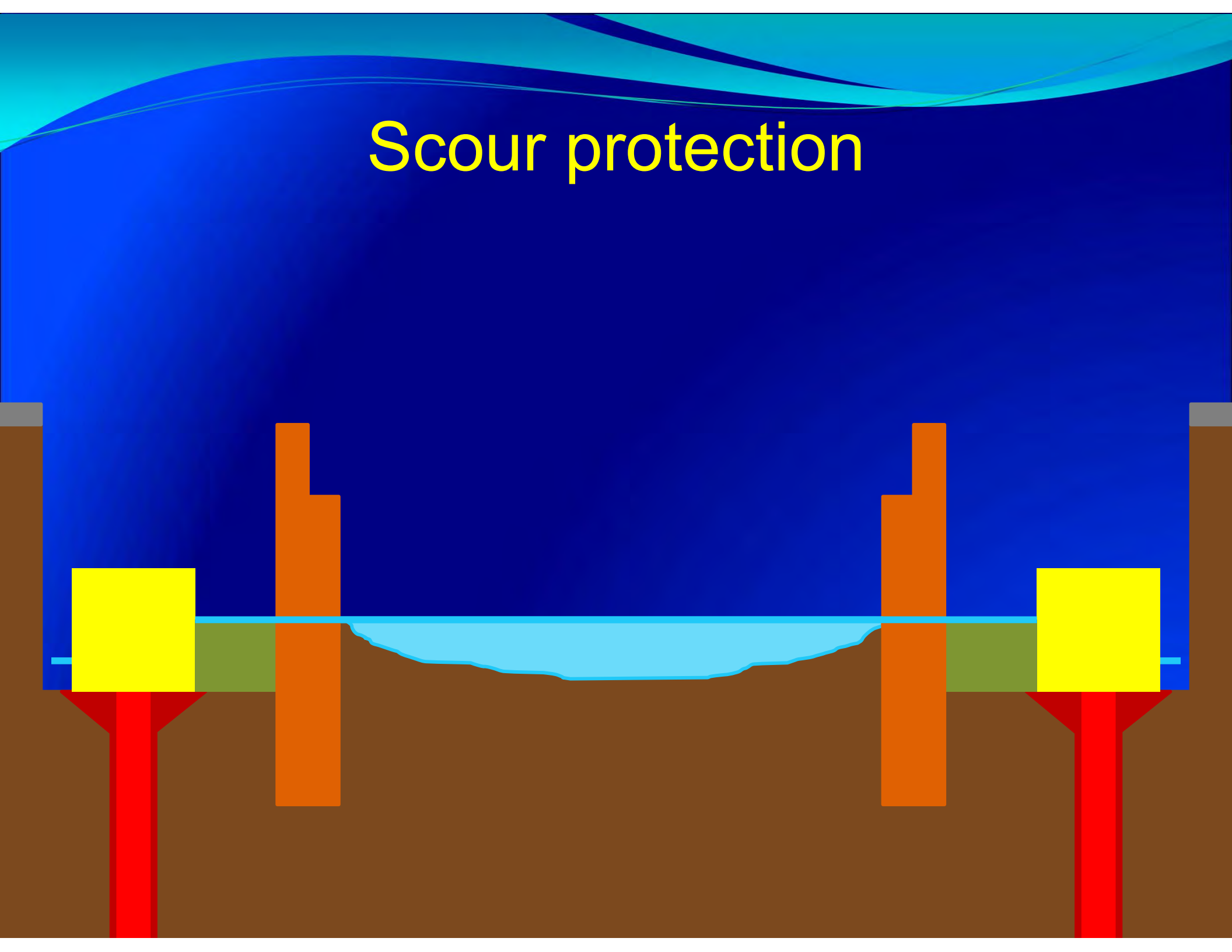




AIB
3944
6-10-09



Scour protection







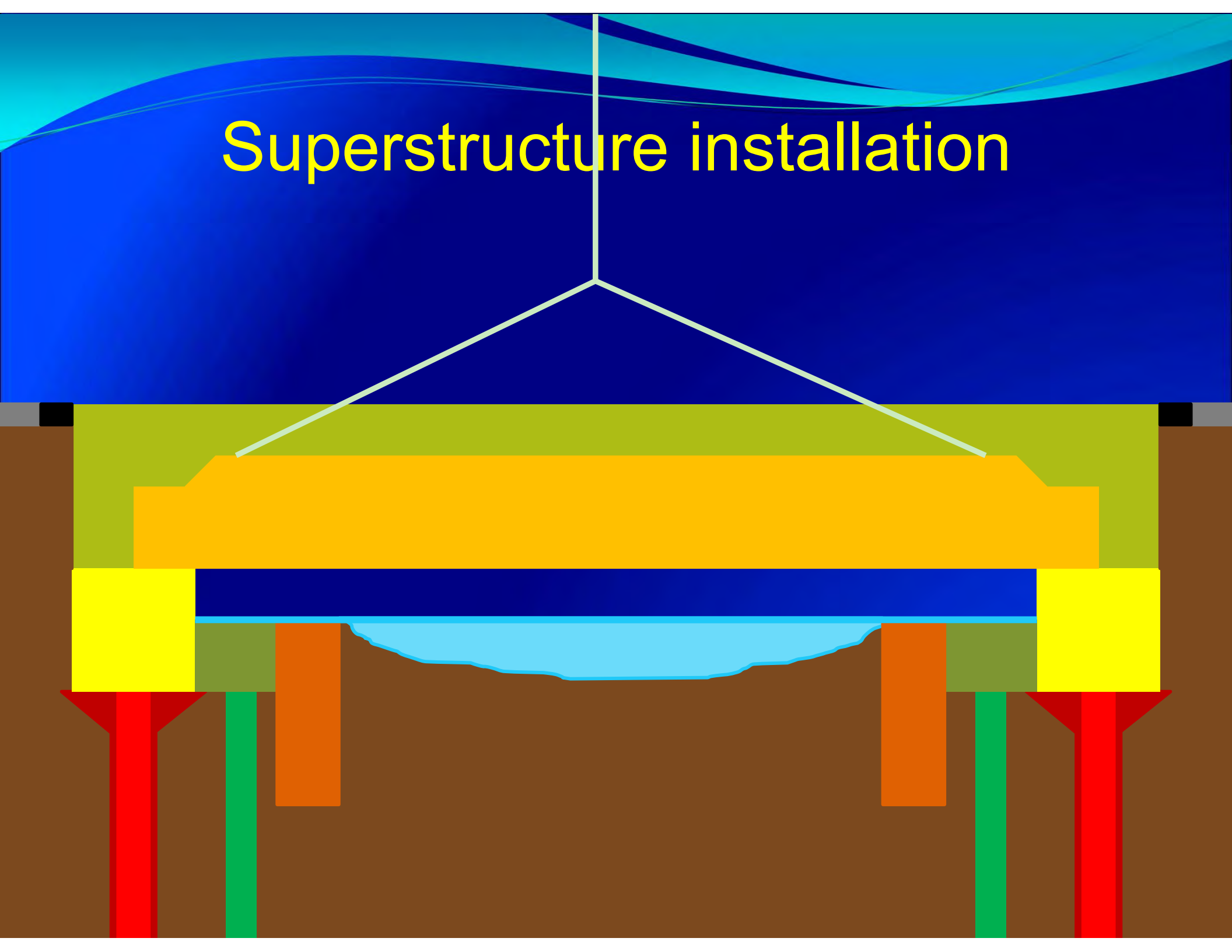








Superstructure installation

























Conclusions

- Goal = 5 weeks = 35 days.
- Incentive \$6,000 per day (\$30,000 max)
- Disincentive \$6,000 per day after 35 days.
- Bridge was closed on July 7, 2009.
- New bridge was opened on Aug. 14, 2009.
(It was ready to be opened on August 12)
- Total time bridge was closed: 37 days.
- Overall successful project!

Questions? jnavarra@sha.state.md.us