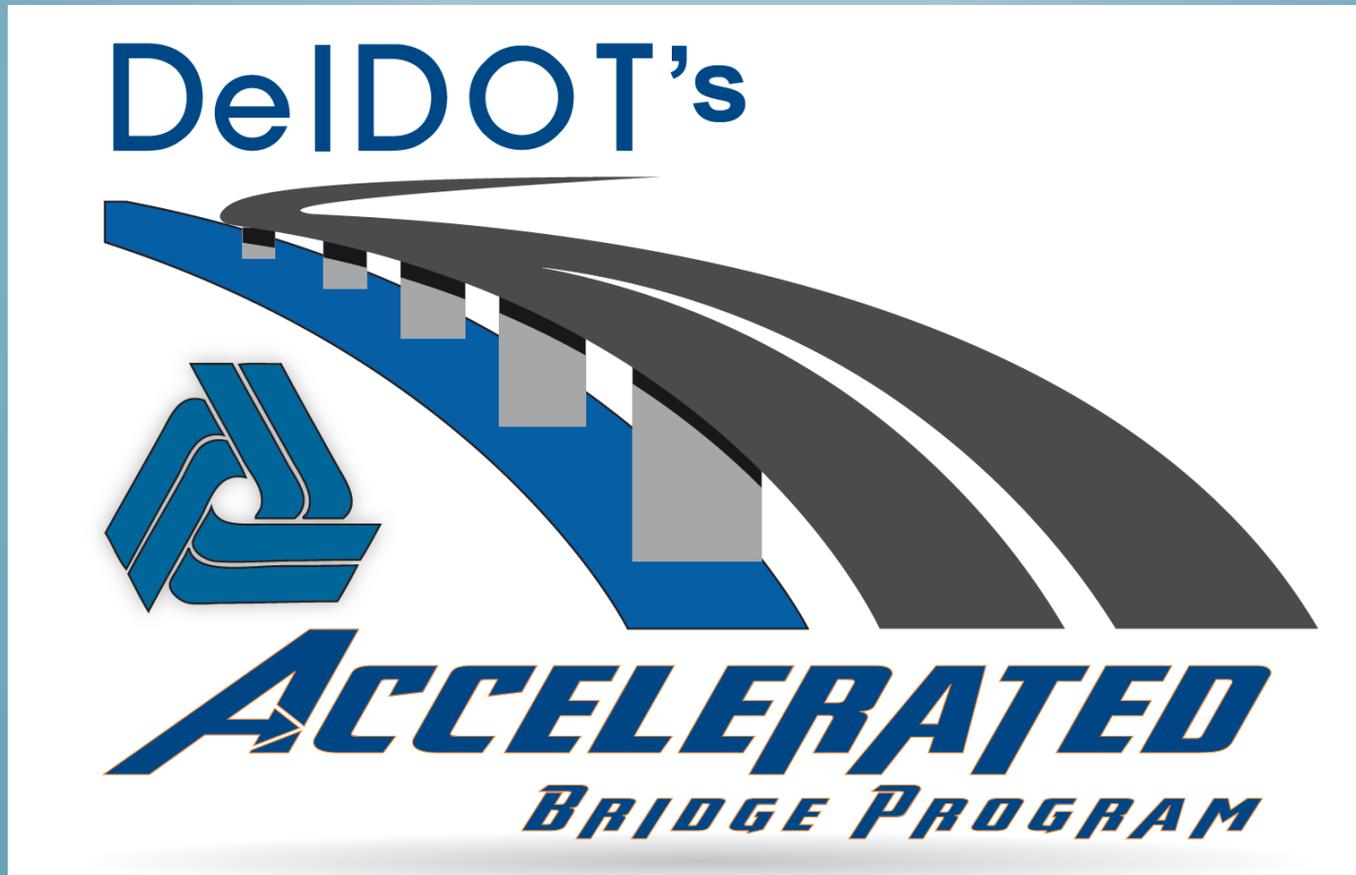


# ABC INITIATIVES AT DELDOT



Presenter: Barry Benton

State Bridge Engineer

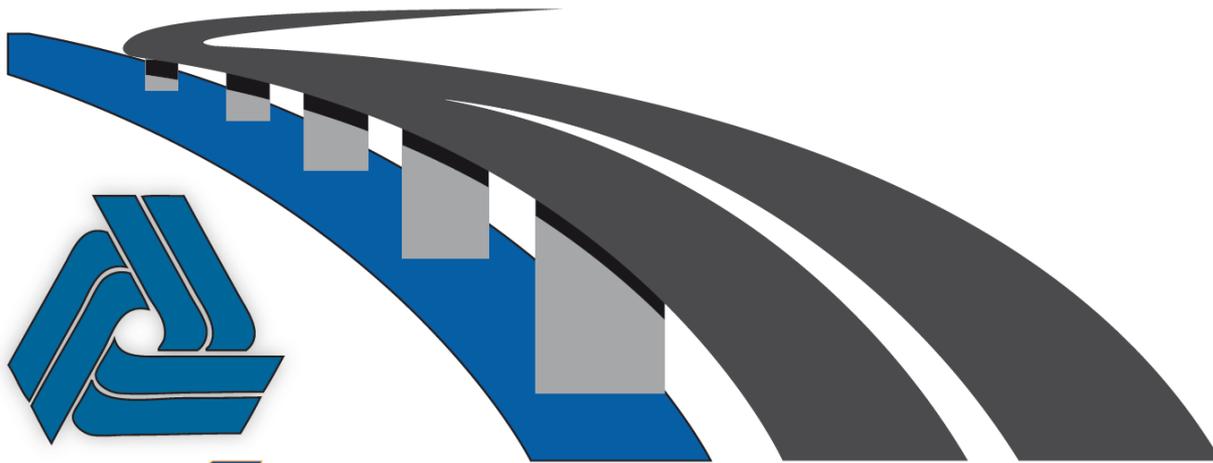
# AGENDA

1. *What is ABC?*
2. *History of ABC at DeIDOT.*
3. *Game Changers to take ABC to the next level.*
4. *ABC Projects currently in design/construction.*
5. *Future of ABC at DeIDOT.*
6. *Thunderous applause.*



# WHAT IS ABC?

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**ACCELERATED**  
*BRIDGE PROGRAM*

# CONVENTIONAL BRIDGE CONSTRUCTION

- *Mostly C.I.P construction*
- *Mostly Sequential Construction*
- *Longer cure times on concrete*
- *General acceptance that bridges took some time to build*
- *Limited use of precast elements (mostly culverts and prestressed beams)*



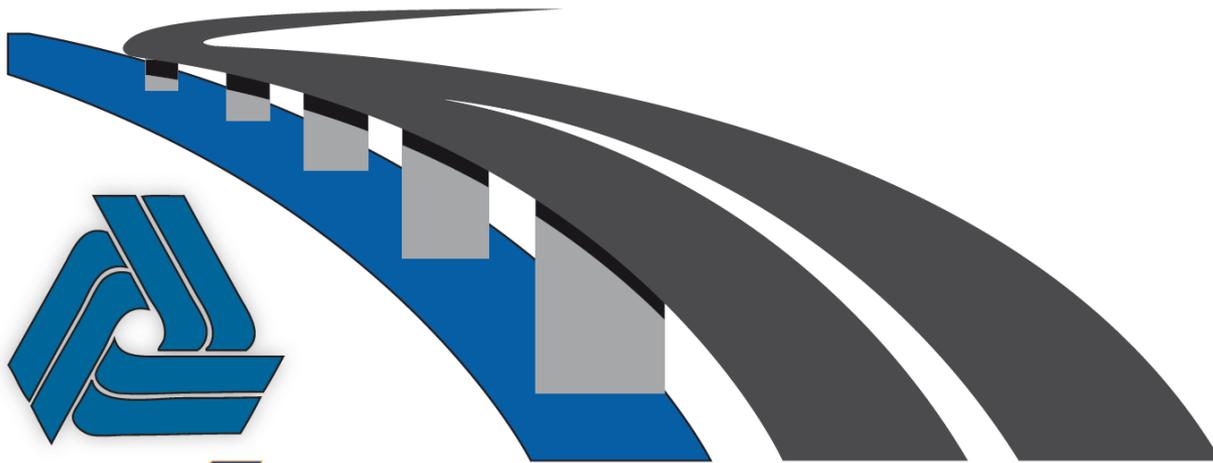
# ACCELERATED BRIDGE CONSTRUCTION

- *Mostly prefabricated elements.*
- *Enough labor to tackle concurrent activities.*
- *Rapid cure times for concrete.*
- *Innovative materials (UHPC)*
- *Limit impacts to traffic.*
- *Get in, get out, stay out mentality.*



# HISTORY OF ABC AT DELDOT

DeIDOT's



**ACCELERATED**  
*BRIDGE PROGRAM*

# CN 95-071-01: BR 1-435 ON N477 OVER CYPRESS BRANCH

- *CIP Concrete Frame – 21’ Span*
- *C.I.P. Concrete Footing on a Deep foundation*
- *400’ of Roadwork*
- *Assigned 100 Calendar Days*



# CN T201407305: BR 3-653 ON RUM BRIDGE ROAD

- *Precast Concrete Frame – 21' Span*
- *Shallow foundation on Precast Concrete Footing*
- *300' of Roadwork*
- *Assigned 40 Calendar Days*



# CN 93-073-01: BR 3-241 ON THARPE ROAD

- *Spread Prestressed Box Beams (50' Span) with C.I.P. Deck*
- *C.I.P. Abutments on Monotube Pile Foundation*
- *300' of Roadwork*
- *Assigned 120 Calendar Days*



# CN 97-073-04: BR 3-305 ON S492 IN LAUREL

- *Spread Prestressed Box Beams (50' Span) with C.I.P. Deck*
- *C.I.P. Abutments on Precast Prestressed Pile Foundation*
- *700' of Roadwork*
- *Assigned 70 Calendar Days*



# CN T200607102: BR 1-234 ON KIRKWOOD HWY

- C.I.P. Deck Replacement Project for WB half of the bridge
- Replace all bearings and paint existing steel
- Rehabilitate abutments and place scour protection
- Phased construction on Kirkwood Highway in 2 phases
- 900' of Approach Roadwork
- Assigned 130 Calendar Days



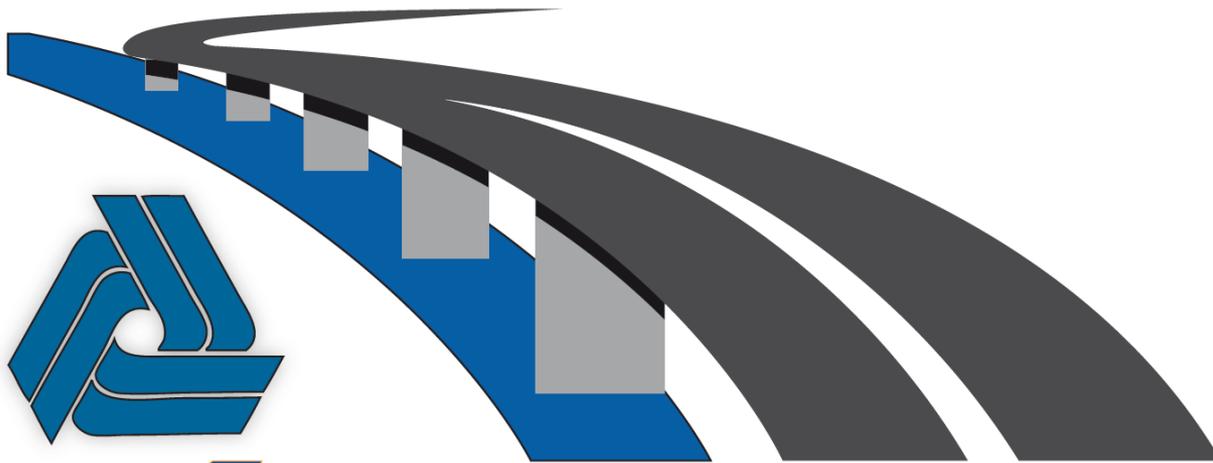
# CN T201407402: BR 1-191 ON MILLTOWN ROAD

- *C.I.P. Deck Replacement Project for entire bridge*
- *Replace all bearings, joints and paint existing steel*
- *Rehabilitate abutments*
- *Construct sidewalk and bridge approaches*
- *All work in one phase*
- *400' of Approach Roadwork*
- *Assigned 80 Calendar Days*



# GAME CHANGERS

DeIDOT's



***ACCELERATED***  
***BRIDGE PROGRAM***

# GAME CHANGERS

- Ability to prefabricate, transport and lift heavy bridges has greatly increased through larger trucks, cranes, SPMTs and bridge slides. Contractors have become innovative as site conditions have dictated rapid bridge construction.



# GAME CHANGERS



# GAME CHANGERS

*The use of UHPC in the United States has solved the problem of how to construct a lasting bridge connection for prefabricated elements.*

- UHPC has extremely high compressive strength.
- Despite its high strength, it has ductility in the post cracked state.
- UHPC bridges cracks internally.
- UHPC has essentially zero permeability.
- UHPC has excellent bonding capabilities.
- UHPC flows very well into small voids.



# RECENT INNOVATIONS



# DELDOT ABC WORKSHOP

- *DeIDOT Bridge and FHWA held an Accelerated Bridge Construction Workshop on September 17<sup>th</sup> at the Farmington Felton Room.*
- *It was attended by 50 staff from DeIDOT, FHWA, NYSDOT, PennDOT, Alabama DOT and Contractors.*
- *Morning was Experience of other states.*
- *The afternoon was DeIDOT's plan for ABC.*



## **Accelerated Bridge Construction FHWA/DeIDOT Workshop**

September 17, 2015

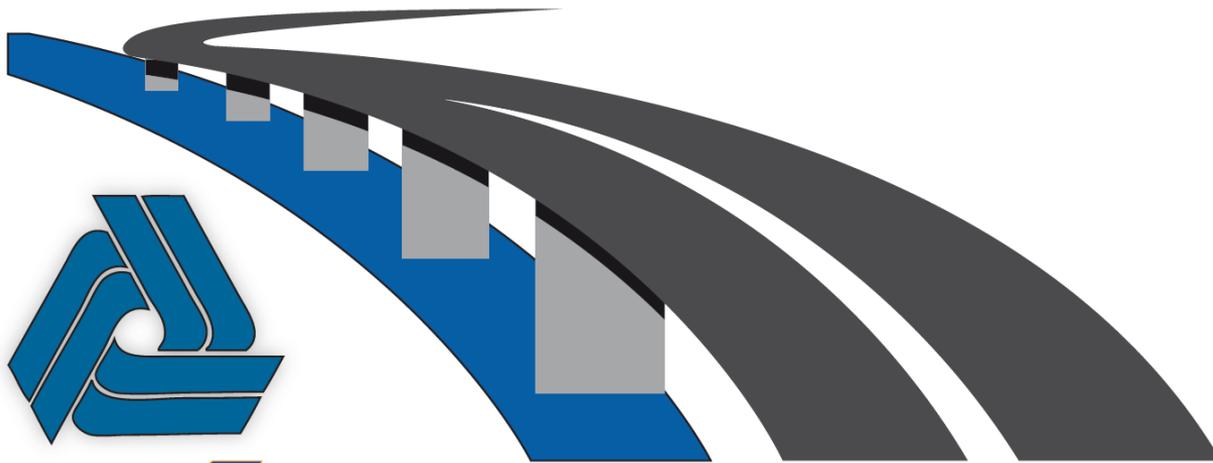
DeIDOT Administration Building, Farmington-Felton Conference Room

Dover, Delaware

**Workshop Agenda**

# PAST & CURRENT PROJECTS

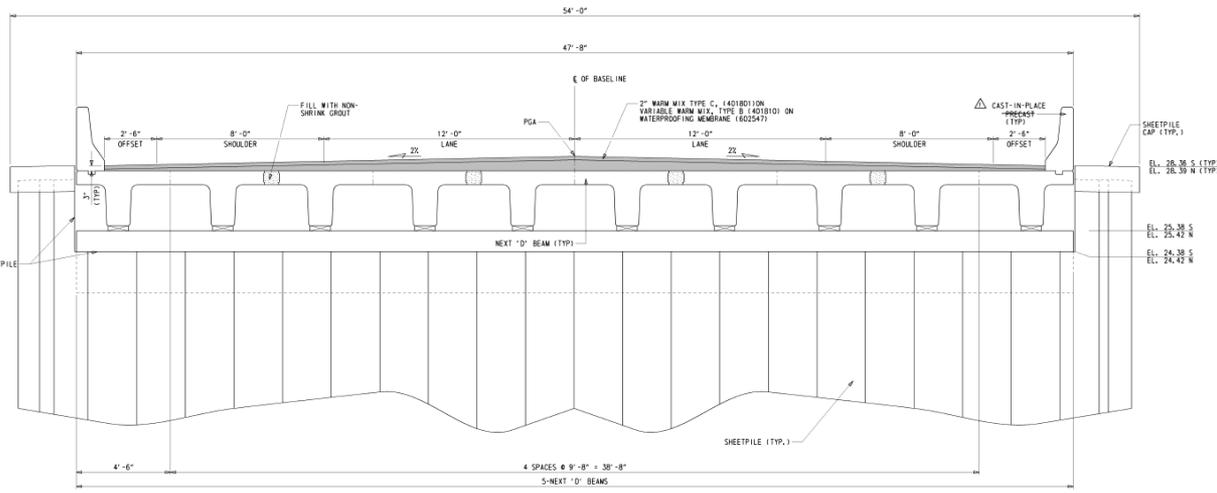
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**ACCELERATED**  
*BRIDGE PROGRAM*

# CN T201107201: BR 2-195A ON WEST RR AVE, WYOMING

- The first use of NEXT beams.
- Precast abutments on shallow foundation behind sheet pile.
- Opted for high strength grout instead of UHPC.
- 61 Calendar Days. Intent was to construct while school was out.



BRIDGE SECTION



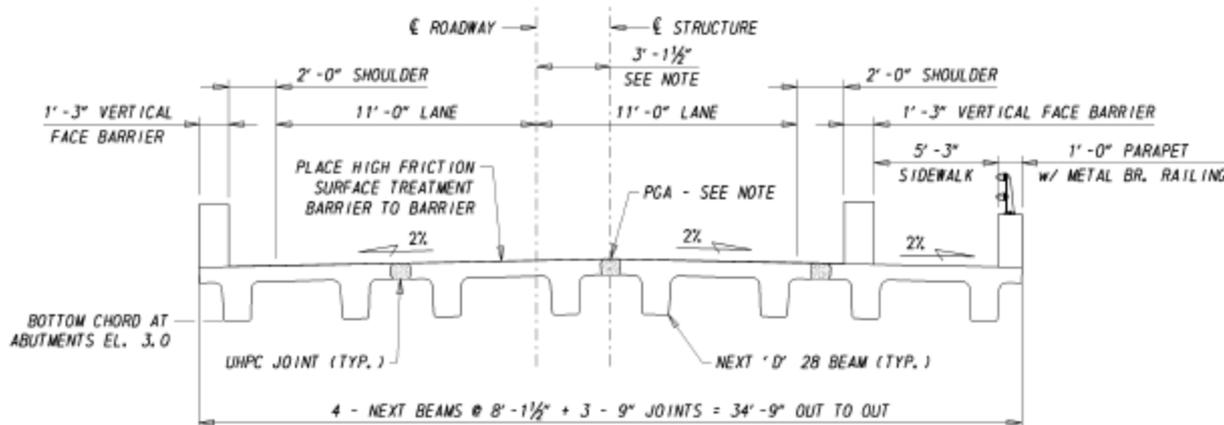
**CN T201207602: BR 3-558 ON S417 DAISEY ROAD**



*First use of UHPC*

# CN T201607303: PRIME HOOK ROAD IMPROVEMENTS

- The second of NEXT beams.
- CIP abutments on deep foundation behind sheet pile.
- UHPC connections with thin epoxy riding surface.
- Focus is maintenance free bridge and reducing superstructure depth.
- NEXT Beam is a good fit for the project.

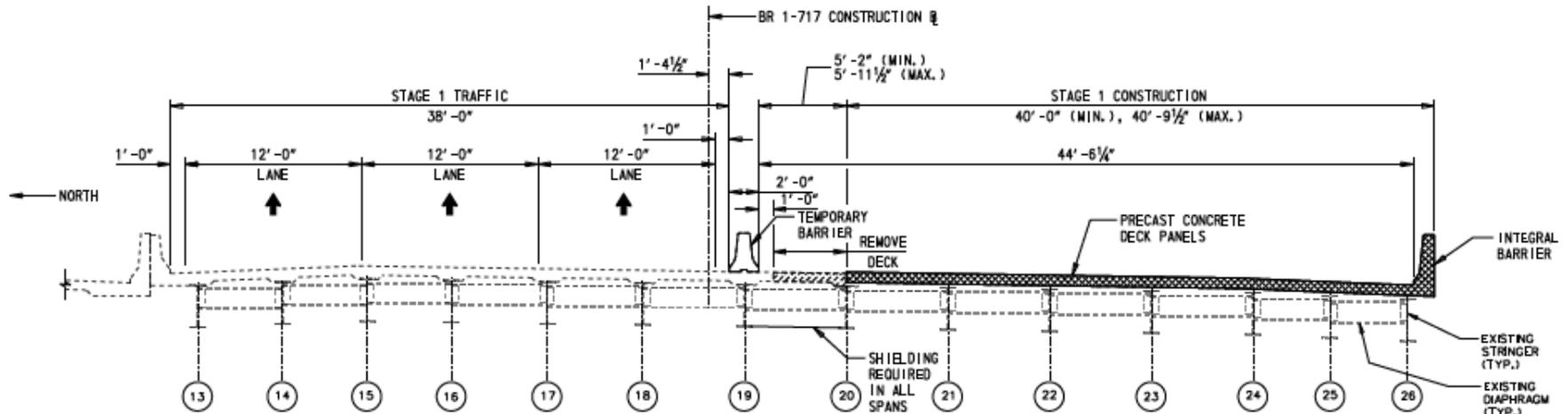


# CN T201507407: BR 1-717 ON I-95 OVER SR 7

- Deck Replacement Project using precast panels for NB Lanes
- Replace all bearings, joints and paint existing steel
- Rehabilitate abutments
- Work in 2 phases
- Approach Roadwork
- Assigned 35 Calendar Days

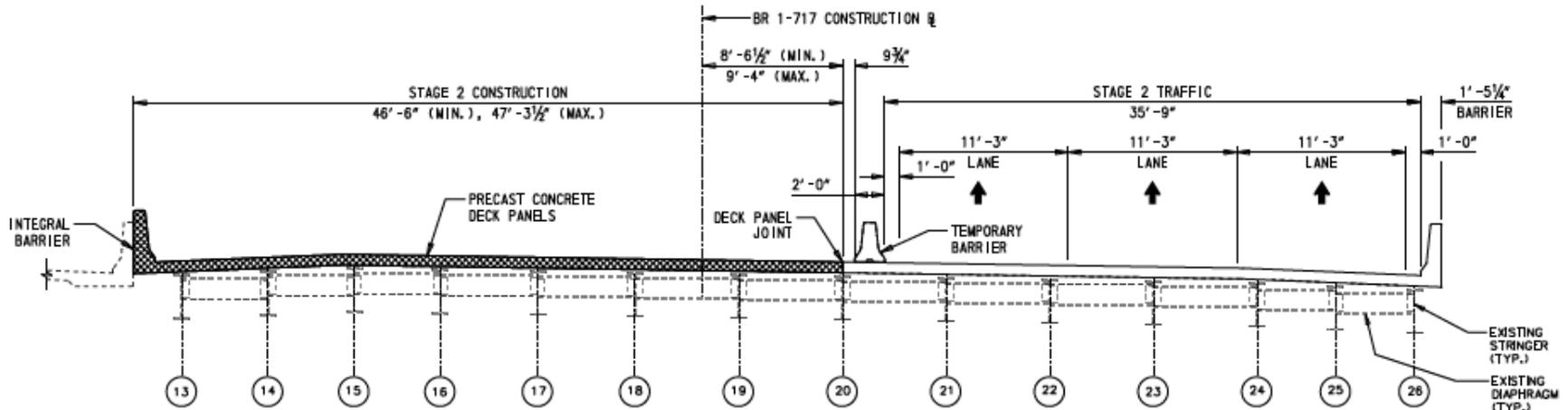


# CN T201507407: BR 1-717 ON I-95 OVER SR 7



## STAGE 1 CONSTRUCTION

SCALE: 3/8" = 1'-0"

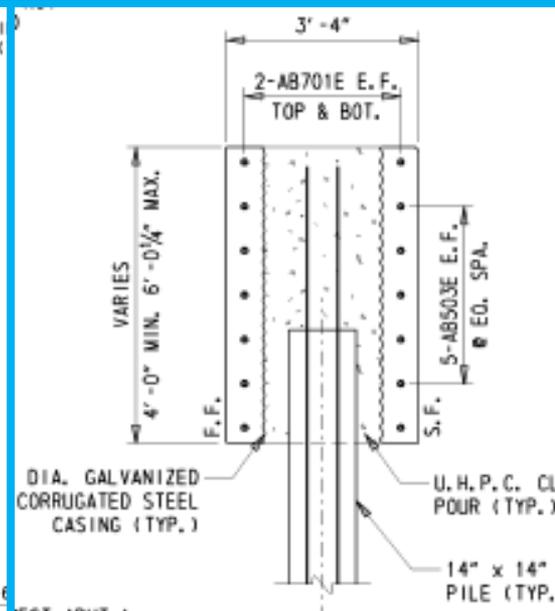
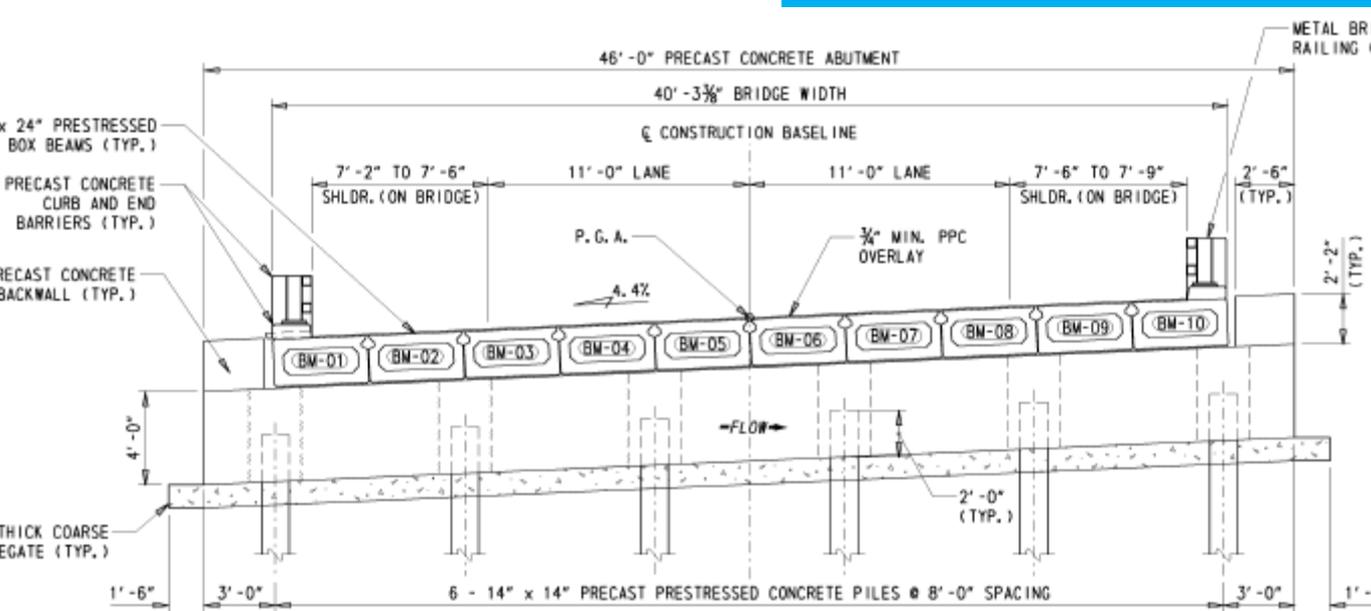
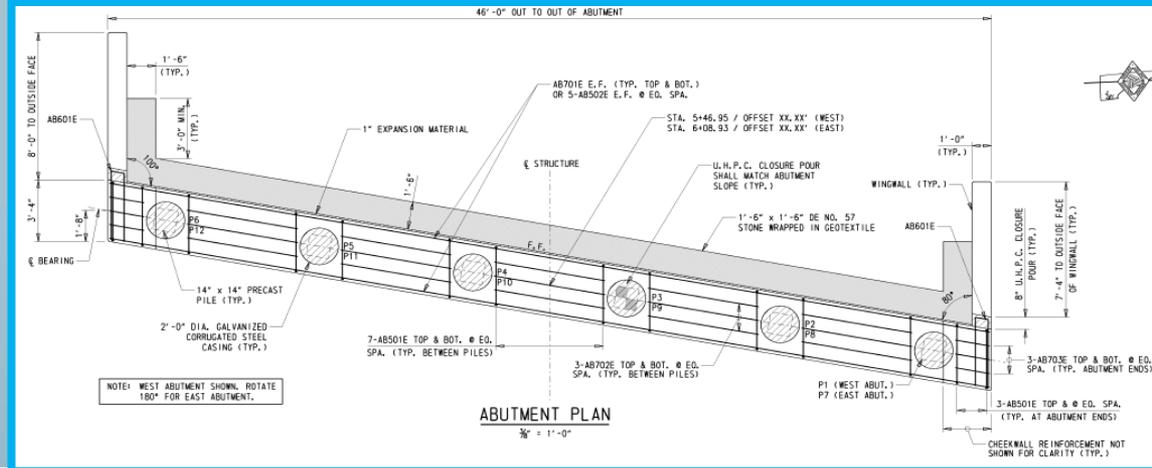


## STAGE 2 CONSTRUCTION

SCALE: 3/8" = 1'-0"

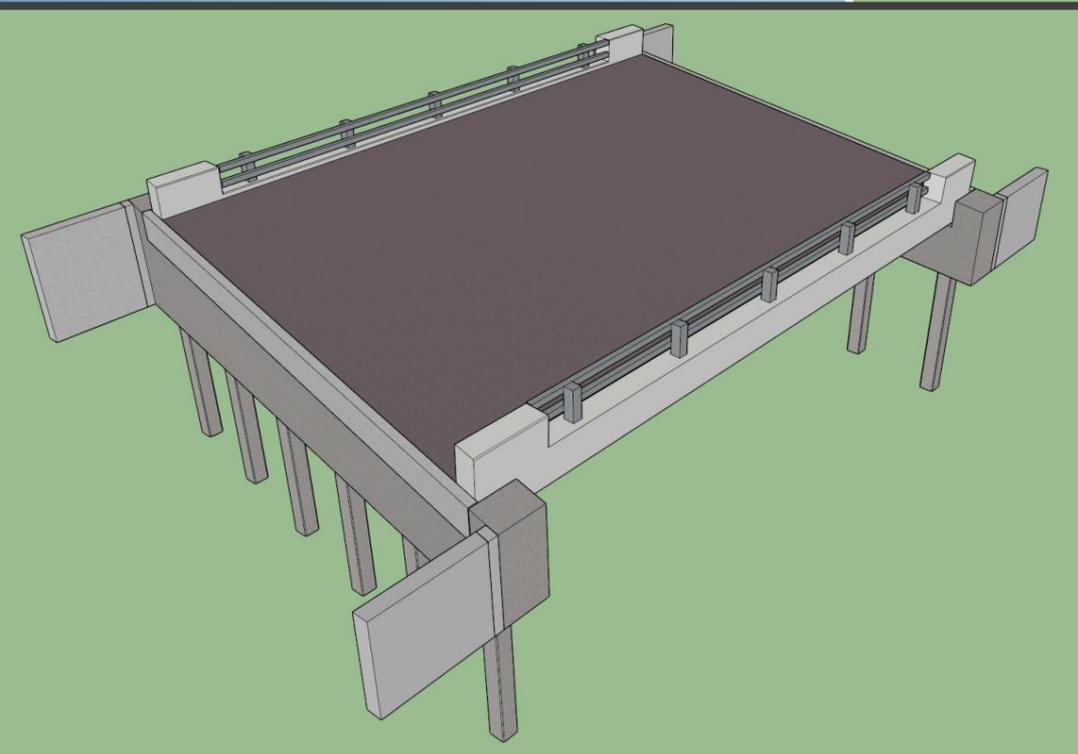
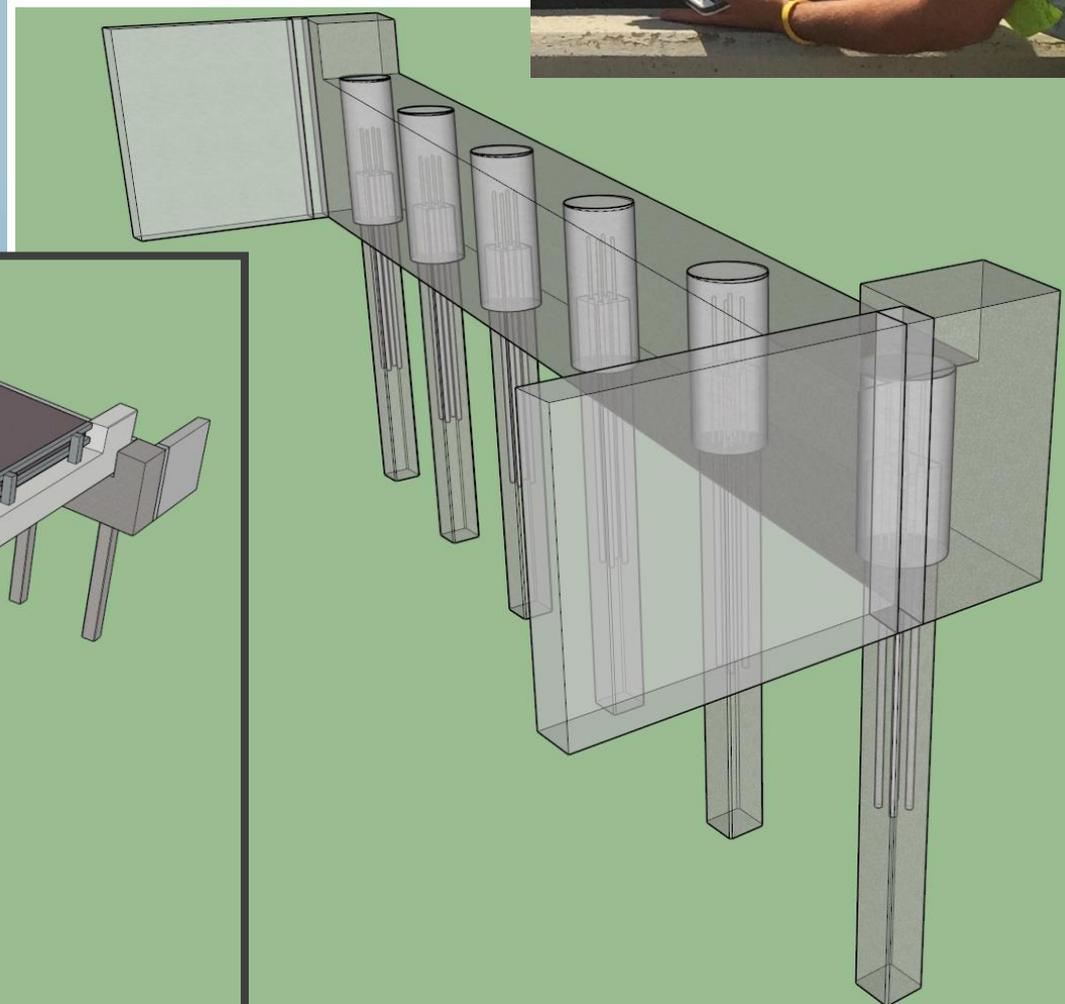
# CN T201407104: BRIDGE 1-438

- Adjacent Prestressed Box Beams (50' Span) with PPC Riding Surface
- Precast Abutments on Precast Prestressed Pile Foundation
- 550' of Roadwork
- Assigned ? Calendar Days



# CN T201407104: BRIDGE 1-438

- Model completed using Google Sketchup
- (Lunch and Learn on 2/19 – Starring NICK DEAN!!)



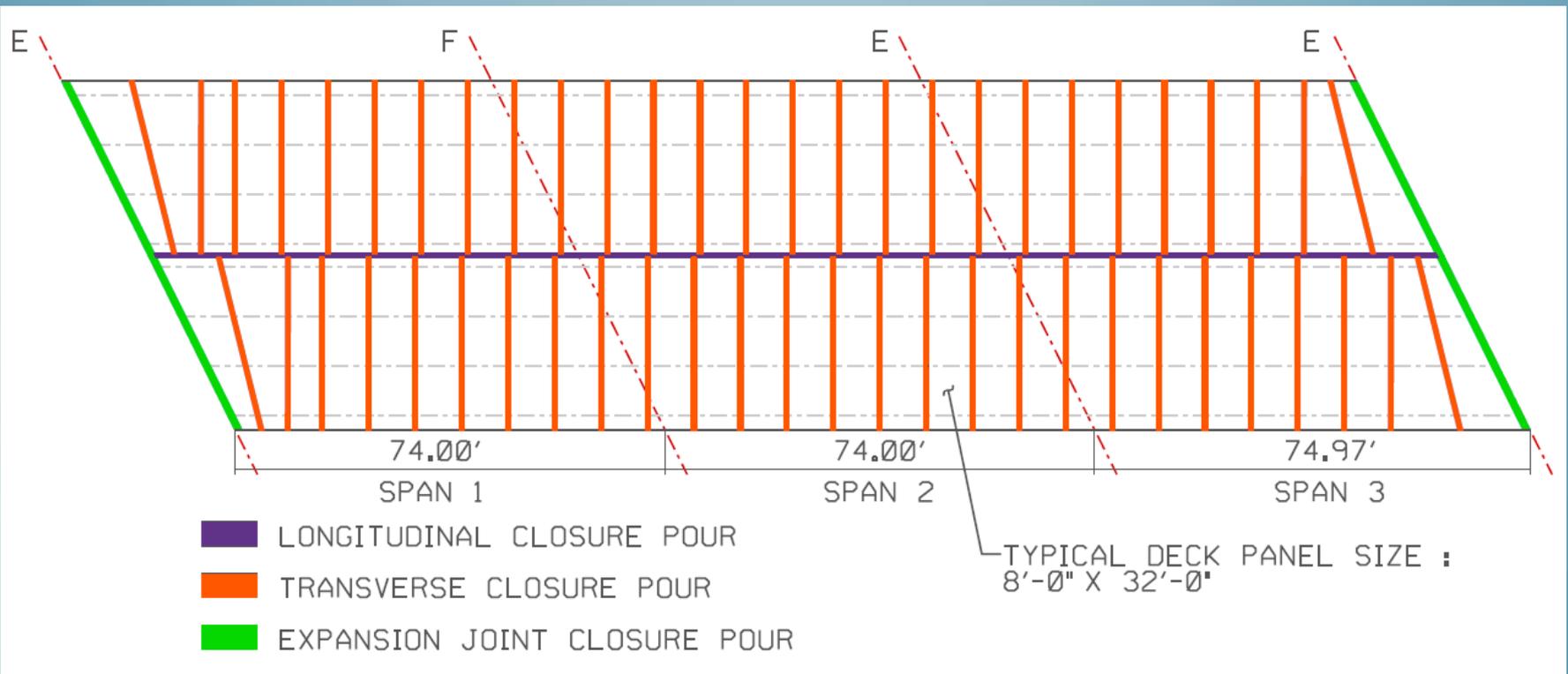
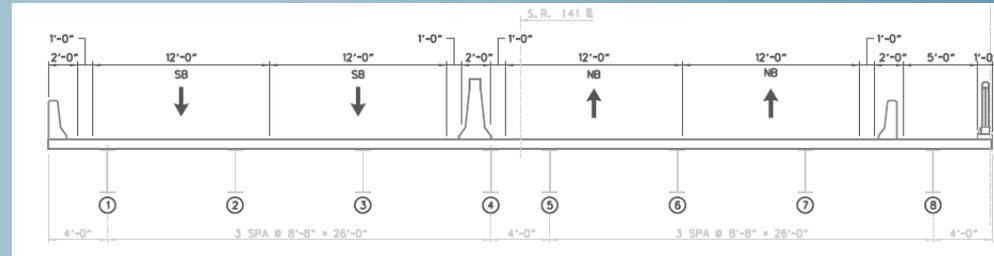
# CN T201407105: BRIDGE 1-680 ON SR141 OVER US13

- *Low clearance over US 13 so it gets hit... a lot!*
- *Have had numerous deck punch throughs.*
- *7 Span Steel Girder Bridge (600' Long)*
- *28,000 ADT*



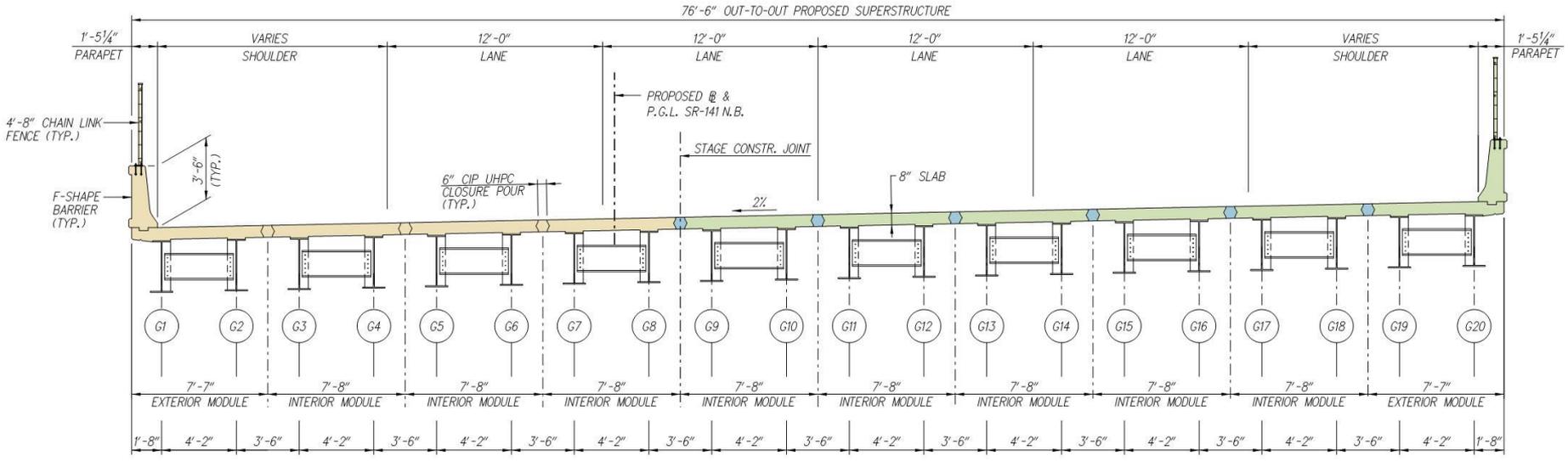
# CN T201407105: BRIDGE 1-680 ON SR141 OVER US13

- Increase undeclearance to 14'6"
- Maximize bridge width to accommodate 5' sidewalk
- Plan is for a full closure of the road and complete in 3 weeks.



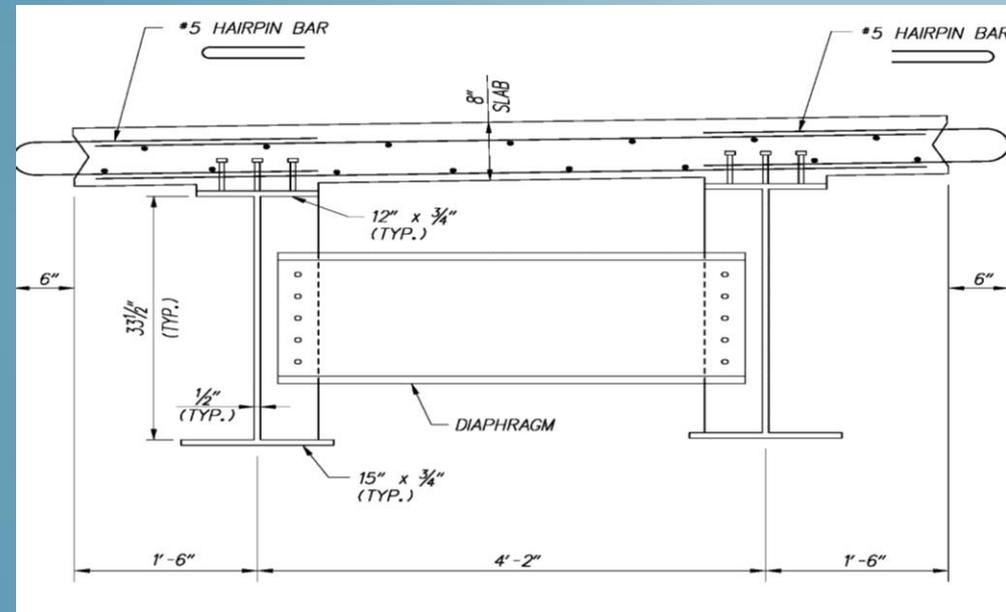
# SR 141, COMMONS BLVD INTERSECTION IMPROVEMENTS BRIDGES 1-676 & 1-677 ON SR141 OVER I-95

- SR 141 = 78,000 AADT, I-95 > 100,000 AADT
- No adequate detours
- Bridge 1-675 & 1-678 will be constructed under CN T201109001 w/ a 2 year schedule w/ conventional construction (bridges are critical path)
- Decision was made to use ABC for Bridges 1-676 & 1-677 to get them off of the critical path and complete both bridges in 1 construction season.

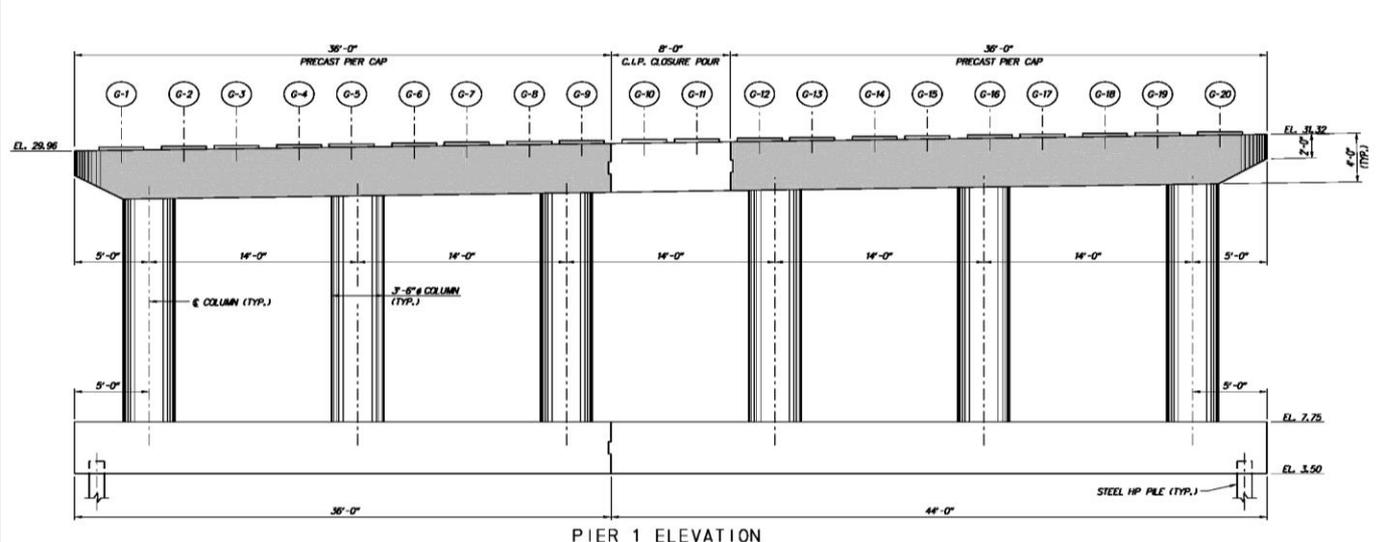


PROPOSED TYPICAL SECTION

# SR 141, COMMONS BLVD INTERSECTION IMPROVEMENTS BRIDGES 1-676 & 1-677 ON SR141 OVER I-95



# SR 141, COMMONS BLVD INTERSECTION IMPROVEMENTS BRIDGES 1-676 & 1-677 ON SR141 OVER I-95



# BRIDGE 1-714 ON CHAPMAN RD OVER 1-95

## Conceptual Bridge Replacement Options



Three-span steel plate girder



Two single-span P/S PA bulb tee

# BRIDGE 3-150 ON SR 1 OVER LEWES – REHOBOTH CANAL

- *The bridge requires a lot of work, including total deck replacement and correction of the vertical alignment, re-alignment of the drop in span, new bearings and joints and major substructure repairs.*
- *High volume of traffic in a resort area will mean tight time restrictions.*
- *Limited work space.*
- *Good candidate for ABC and CM/GC Bridge Project.*



# SUMMARY

- *We've already seen a change in DeIDOT's approach to bridge construction over the last two plus decades.*
- *Technology and innovation allow us to now construct bridges faster than we ever have before.*
- *The travelling public is not accepting of large travel delays and demands that we do business differently.*
- *Secretary Cohan has a platform of innovation, efficiency and transparency. ABC lines up with all of her initiatives and has her support.*
- *This is a very exciting time to be a bridge designer or constructor.*



# DeIDOT's



***ACCELERATED***  
***BRIDGE PROGRAM***

**THANK YOU!**