



WINTER WORKSHOP 2020: LESSONS LEARNED FROM PAST INNOVATIVE PROJECTS

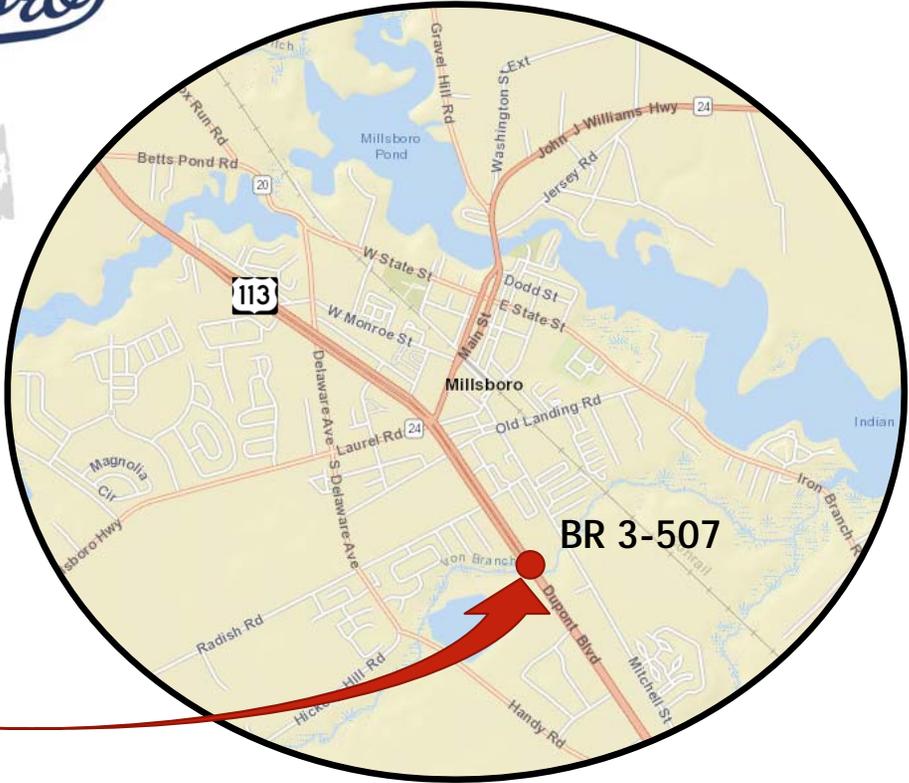
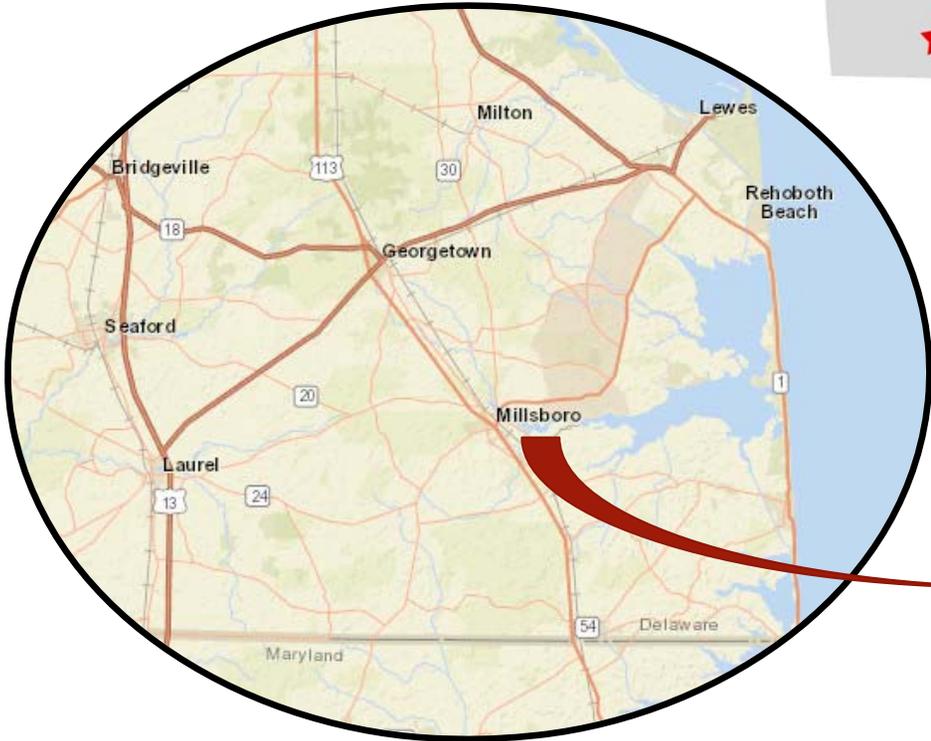
Featuring BR 3-507 on US113 over Iron Branch

DelDOT Bridge Design

Presented by:
Jonathan Karam &
Eric Yoder

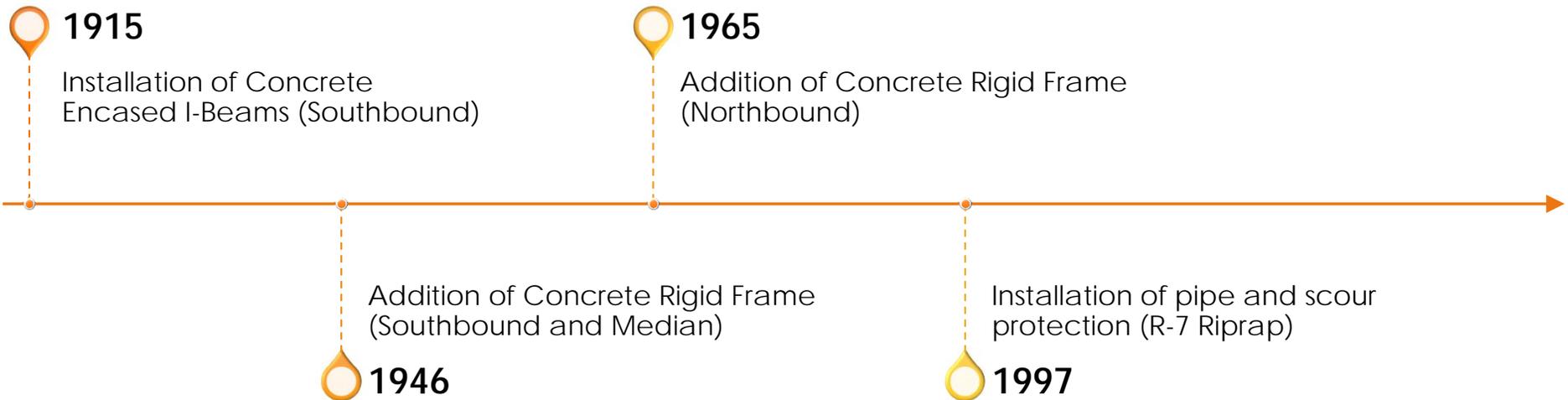
LOCATION

Millsboro

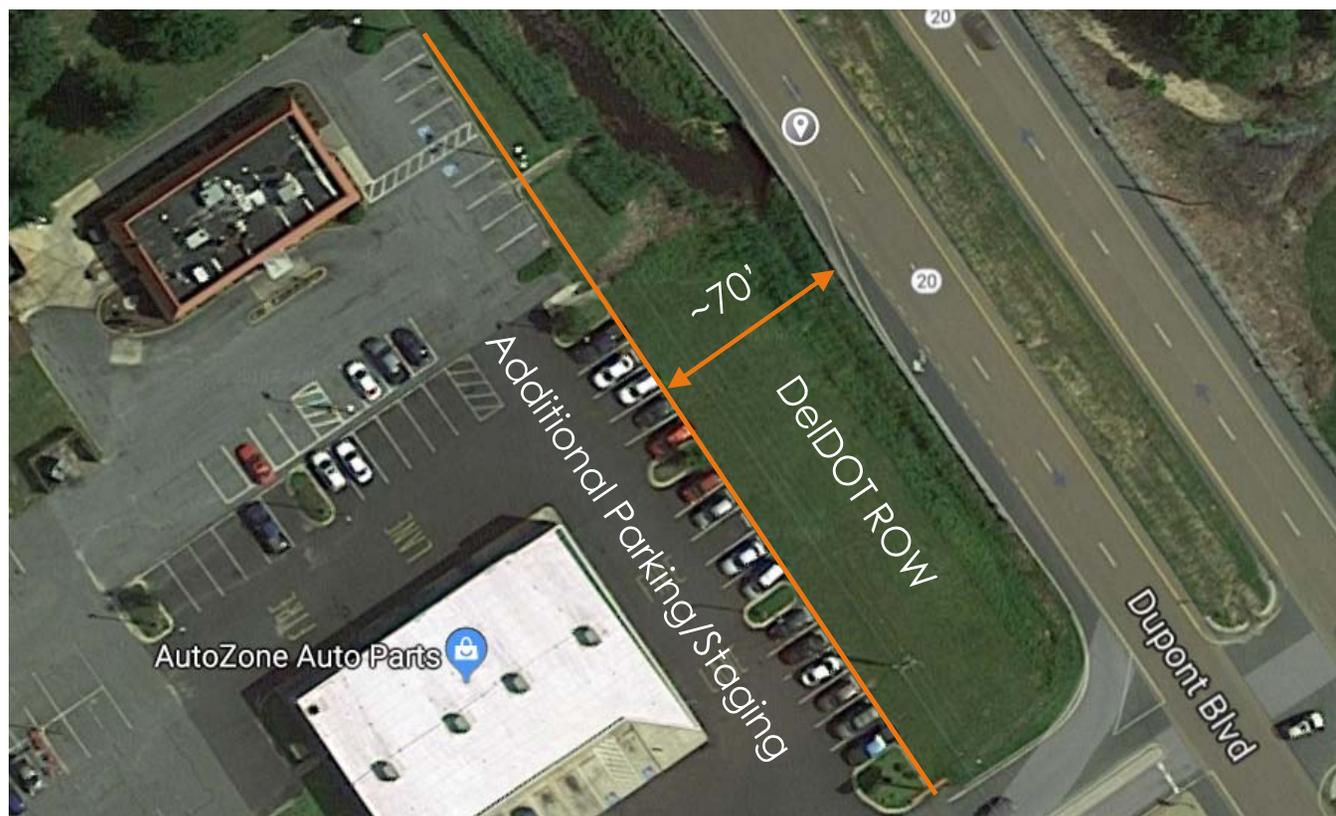




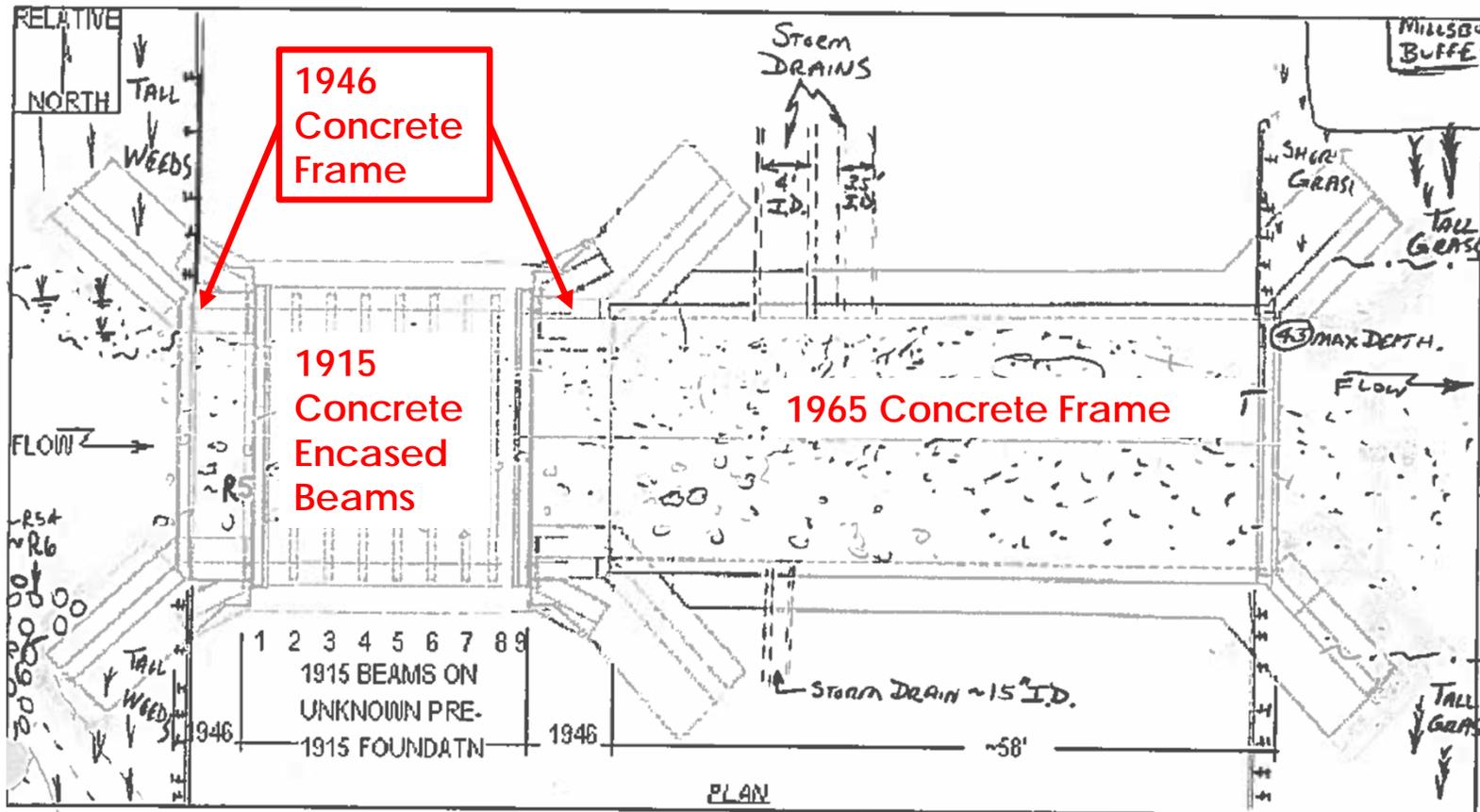
TIMELINE



SITE AERIAL



EXISTING STRUCTURE "FRANKENSTEIN"



- The existing structure consists of concrete encased steel beams on concrete abutments that were widened with a concrete frame (twice)





CONDITION OF 1915 CONCRETE ENCASED BEAMS





CONDITION OF 1945 REINFORCED CONCRETE FRAME



CONDITION OF 1965 FRAME





FULL REPLACEMENT ISSUES/CONCERNS

Possibility of failure if removed in segments

- Large traffic shift due to removal of entire 1915 portion (over 4500 ft)

Drainage Issues (2 large drainage pipes in center of structure)

- Issues setting up stream diversion and keeping work area dry

High A.A.D.T.

- 40,000 cars/day projected

MOT/Lane shifts/Temporary paving Issues

- Very long taper lengths which results in a lot of temporary paving
- Huge public impact to residents and businesses nearby



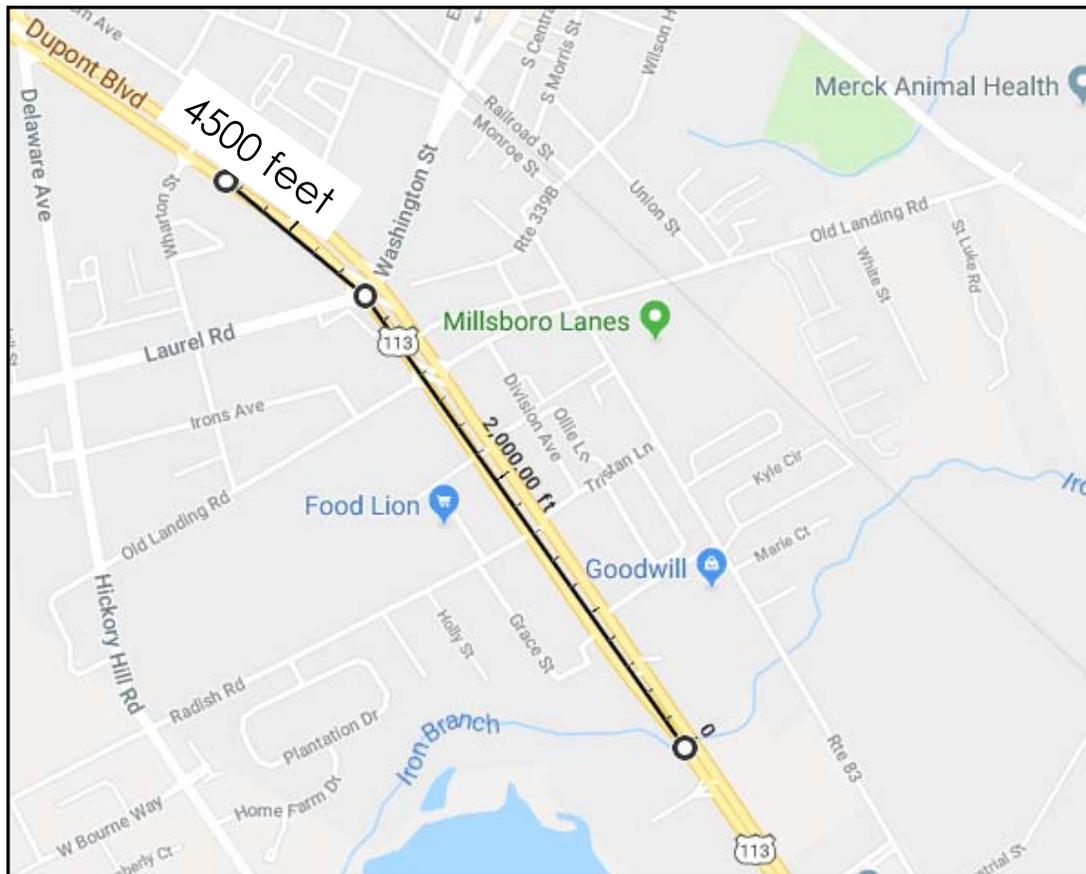
DESIGN ALTERNATIVES

Single lane
closures

Contraflow

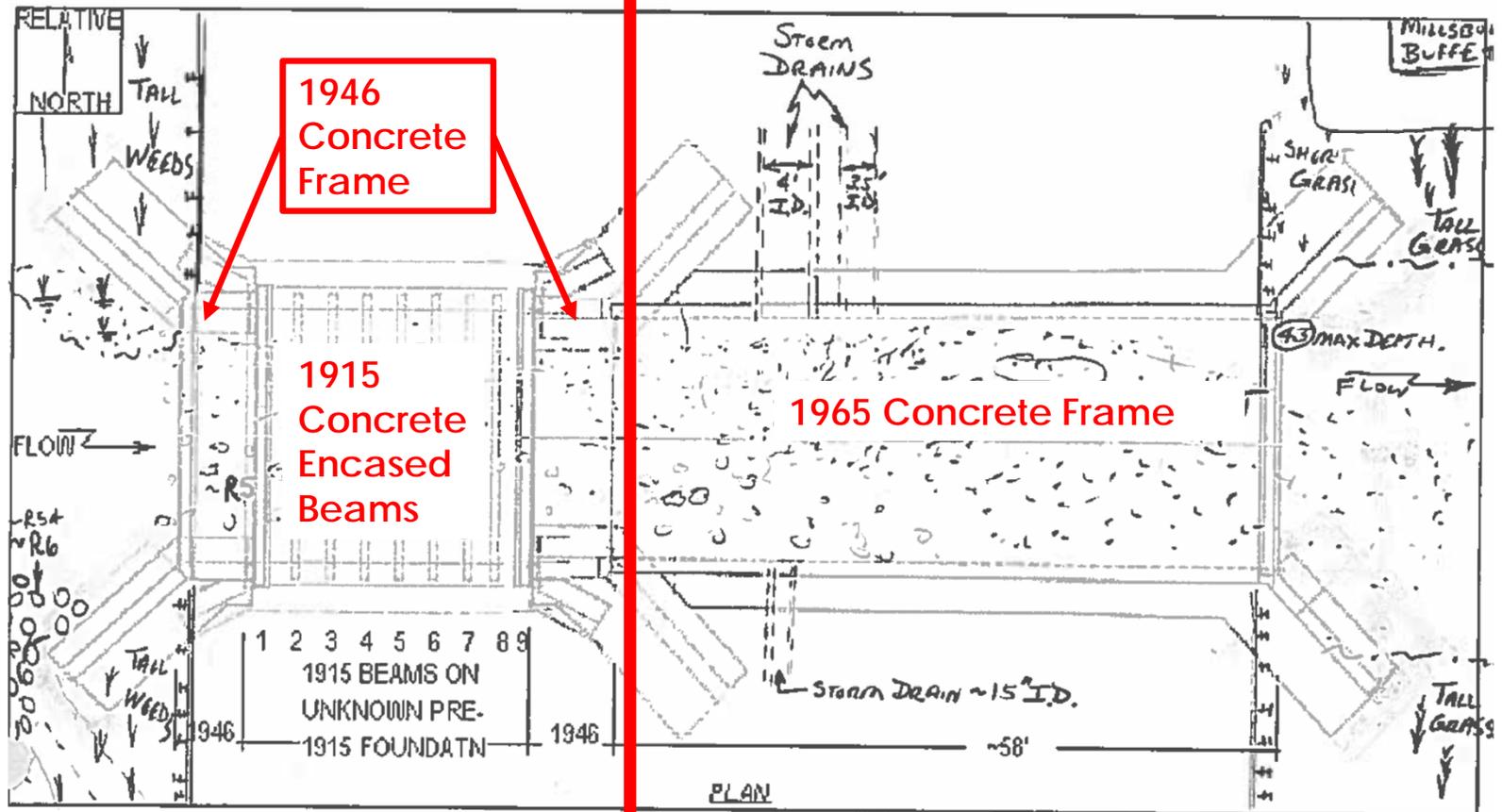
Full Closure

CONTRAFLOW TRAFFIC SHIFT IMPACTS



- At a reduced speed of **45mph**
- 4500 feet taper length
- 12+ residential driveways impacted
- Very high impact to businesses

PROJECT SCOPE



Limits of Removal/Replacement

ACCELERATED BRIDGE CONSTRUCTION VS. TRADITIONAL CONSTRUCTION

Traditional

- ❖ Construction time of 6 months+
- ❖ Requires lane closures and shifts to construct temporary paving
- ❖ Expensive to maintain traffic
- ❖ Northbound lanes will be impacted via lane closures and shifts
- ❖ Prolonged impact to local businesses and homeowners
- ❖ Workers exposed to traffic
- ❖ Typically cast-in-place foundation and barrier

Accelerated

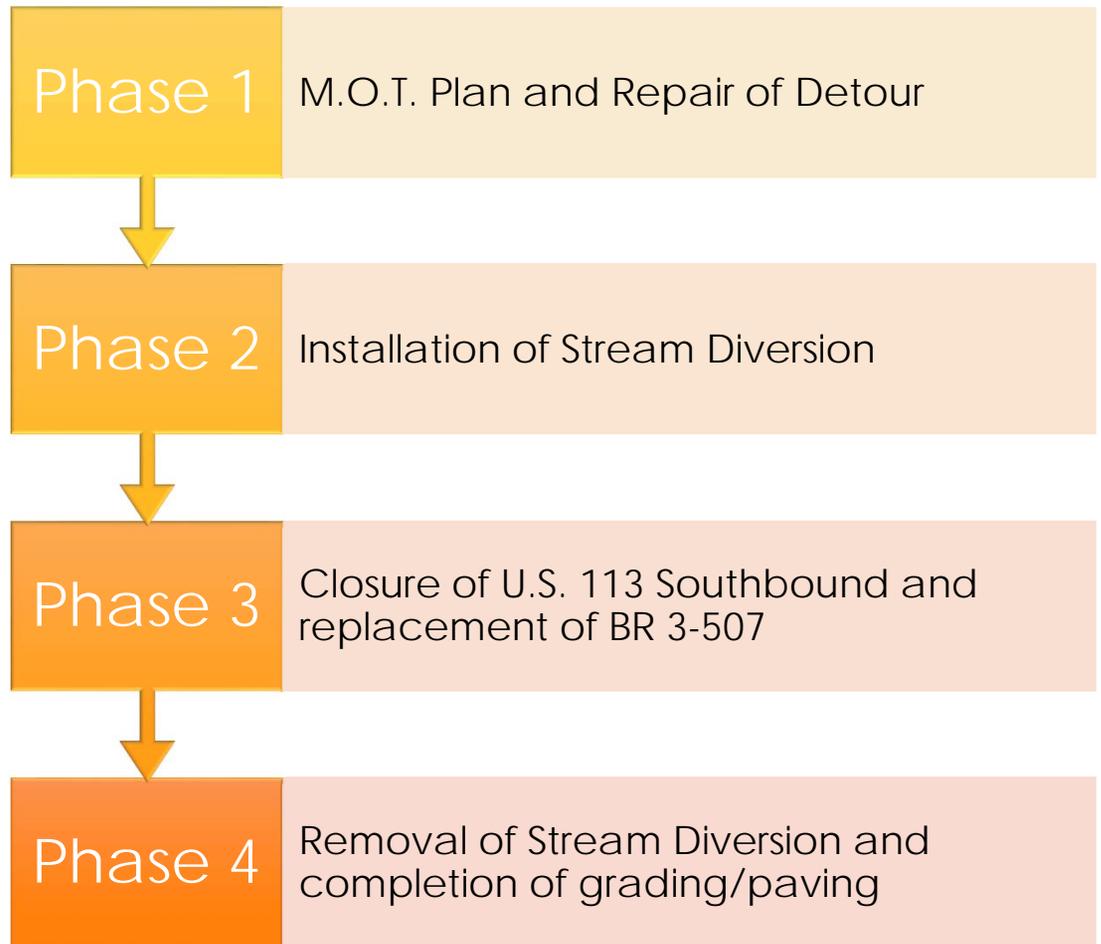
- ❖ 14 day closure of southbound lanes
- ❖ Will not require any temporary paving
- ❖ Full Detour
- ❖ No disruptions to northbound traffic
- ❖ Access to businesses and residences will be maintained
- ❖ Enclosed workspace promotes safer construction
- ❖ Pre-cast barrier/elements

CONSTRUCTION FEASIBILITY

- AECOM performs constructability assessment
- Initially planned for 7 days, extended to 9 days

Mar-02-18		BR 3-507 Phase 2 Layback							AECOM	
Activity ID	Activity Name	Original Duration	Start	Finish	Predecessors	Successors	Total Float	Calendar	2019	
									Apr	May
BR 3-507 Phase 2		210h	Apr-08-19	Apr-16-19			0h	7 Day-12 Hour/2 shifts per day	Apr-16-19, BR 3-507 Phase 2	
Phase 2 (Closure SB US 113)		210h	Apr-08-19	Apr-16-19			0h	7 Day-12 Hour/2 shifts per day	Apr-16-19, Phase 2 (Closure SB US 113)	
A1000	Implement M&P for Phase 2	6h	Apr-08-19	Apr-08-19		A1010	0h	7 Day-12 Hour/2 shifts per day	Implement M&P for Phase 2	
A1010	Excavate/Remove Existing Roadway Pavement to Subgrade	12h	Apr-08-19	Apr-08-19	A1000	A1020	0h	7 Day-12 Hour/2 shifts per day	Excavate/Remove Existing Roadway Pavement to Subgrade	
A1020	Install SOE North/South Sides (only @ East end)	12h	Apr-08-19	Apr-09-19	A1010	A1030	0h	7 Day-12 Hour/2 shifts per day	Install SOE North/South Sides (only @ East end)	
A1030	Layback, Install Stone/Dewatering	24h	Apr-09-19	Apr-10-19	A1020	A1040, A1050	0h	7 Day-12 Hour/2 shifts per day	Layback, Install Stone/Dewatering	
A1040	Sawcut/Demo Existing Box Culvert/Footings	12h	Apr-10-19	Apr-10-19	A1030	A1060	0h	7 Day-12 Hour/2 shifts per day	Sawcut/Demo Existing Box Culvert/Footings	
A1050	Layback Culvert Bottom (Downstream)	6h	Apr-10-19	Apr-10-19	A1030	A1060	6h	7 Day-12 Hour/2 shifts per day	Layback Culvert Bottom (Downstream)	
A1060	Locate Reinf./Drill Dowels into Existing Culvert	6h	Apr-10-19	Apr-10-19	A1040, A1050	A1070	0h	7 Day-12 Hour/2 shifts per day	Locate Reinf./Drill Dowels into Existing Culvert	
A1070	Excavate for PC Footings/Partially Remove Rip-Rap	6h	Apr-10-19	Apr-11-19	A1060	A1080	0h	7 Day-12 Hour/2 shifts per day	Excavate for PC Footings/Partially Remove Rip-Rap	
A1080	Install Agg. Base/Install PC Footings/Form Ftg. Closure/Backfill	12h	Apr-11-19	Apr-11-19	A1070	A1090	0h	7 Day-12 Hour/2 shifts per day	Install Agg. Base/Install PC Footings/Form Ftg. Closure/Backfill	
A1090	Install DE#3 on Geotextile	6h	Apr-11-19	Apr-11-19	A1080	A1100, A1110	0h	7 Day-12 Hour/2 shifts per day	Install DE#3 on Geotextile	
A1100	Install Rigid Frame/Wingwalls/Grout at Base	24h	Apr-11-19	Apr-12-19	A1090	A1120	0h	7 Day-12 Hour/2 shifts per day	Install Rigid Frame/Wingwalls/Grout at Base	
A1110	Form for Closure Pour	12h	Apr-11-19	Apr-12-19	A1090	A1120	12h	7 Day-12 Hour/2 shifts per day	Form for Closure Pour	
A1120	Pour Closure Pour w/ UHPC	6h	Apr-12-19	Apr-13-19	A1100, A1110	A1130	0h	7 Day-12 Hour/2 shifts per day	Pour Closure Pour w/ UHPC	
A1130	Cure Closure Pour	12h	Apr-13-19	Apr-13-19	A1120	A1140	0h	7 Day-12 Hour/2 shifts per day	Cure Closure Pour	
A1140	Strip Closure Pour	6h	Apr-13-19	Apr-13-19	A1130	A1150	0h	7 Day-12 Hour/2 shifts per day	Strip Closure Pour	
A1150	Backfill to Subgrade	6h	Apr-13-19	Apr-14-19	A1140	A1160	0h	7 Day-12 Hour/2 shifts per day	Backfill to Subgrade	
A1160	Remove SOE North/South Sides	12h	Apr-14-19	Apr-14-19	A1150	A1170	0h	7 Day-12 Hour/2 shifts per day	Remove SOE North/South Sides	
A1170	Prepare Subbase to Grade/Install DI-1/P2/Prep for Pave	12h	Apr-14-19	Apr-15-19	A1160	A1180	0h	7 Day-12 Hour/2 shifts per day	Prepare Subbase to Grade/Install DI-1/P2/Prep for Pave	
A1180	Pave to Limits	36h	Apr-15-19	Apr-16-19	A1170	A1190	0h	7 Day-12 Hour/2 shifts per day	Pave to Limits	
A1190	Install GR/PM/Signage/Remove P2 M&P/Open Road	6h	Apr-16-19	Apr-16-19	A1180		0h	7 Day-12 Hour/2 shifts per day	Install GR/PM/Signage/Remove P2 M&P/Open Road	

PROPOSED PLAN



PUBLIC OUTREACH

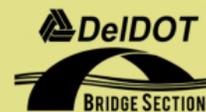
- Multiple Town Hall Meetings
 - Legislators
 - Senators
 - City Council
 - Chief of Police
- Public Workshop
- Interviews with various newspapers/TV stations
- Brochures
 - Hand-delivered over **1000** brochures to business and residences along US113

NOTICE OF UPCOMING US113 SOUTHBOUND TEMPORARY CLOSURE



This brochure provides information about Bridge 3-507, located on US113 Southbound in Millsboro, which will need to be replaced due to age and generally poor condition.

The Delaware Department of Transportation has determined that only a portion of this bridge will need to be impacted, so only the southbound lanes of US113 at this location will be temporarily closed so that this work can be completed with minimal impact.



Public Feedback Requested:

This bridge project has been determined to be necessary due to several factors listed in this informational brochure.

DeIDOT understands that closures of this type can and do present an inconvenience to motorists and local residents. We strive to lessen any inconvenience to the public while still maintaining a safe and reliable transportation infrastructure for all users. While we appreciate your patience during any project, we also value your input.

For additional project information, please visit our website via either link below:

Scan QR Code for
more information



Or, access this information online here:

https://www.deldot.gov/information/projects/bridges/us113_BR3-507/

We welcome any questions, comments or concerns that you may have regarding the temporary road closure or this project.

Thank You!



PRE-CONSTRUCTION PREPARATIONS



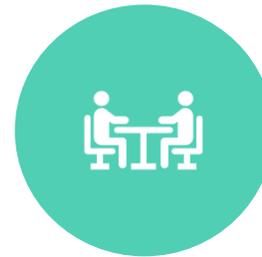
INCENTIVES &
DISINCENTIVES
(\$12,000/DAY)



WEATHER



PRE-BID
MEETING



PRE-CONSTRUCTION
MEETING



ON-SITE DESIGN
SUPPORT



CONTRACT AWARDED

- Mumford and Miller won the contract as the lowest bidder
- Estimated cost of construction = \$1,260,000
- Low bid = \$1,195,815.30
- Lone bidder
- Includes Incentives/disincentives based on RUC (\$12,000/day)



CONSTRUCTION BEGINS

 **Road Closed**
Dupont Blvd

Dupont Blvd

Started 11/3/19 at 10:12 AM
Ending 11/17/19 at 11:59 PM

The Delaware Department of Transportation says the bridge needs significant repairs. The agency also said route 113 between Radish Road and Commerce Drive will be closed until at least Nov. 17.

Portion of Rt 113 over Iron Branch Bridge to close this fall

By KELLI STEELE • JUL 29, 2019

 Share
 Tweet
 Email



DeIDOT alerts motorists to Route 113 bridge work in Millsboro

Both southbound lanes will be closed for two weeks starting Nov. 3



DeIDOT announces closures to Route 113 for bridge replacement beginning next month

October 24, 2019 by Sarah Ash



US 113 Southbound Lane Closed for Bridge Construction

Posted: Nov 05, 2019 5:29 PM EST
Updated: Nov 05, 2019 5:29 PM EST



Businesses brace for losses ahead of US 113 southbound closure

October 8, 2019 by Brooke Butler

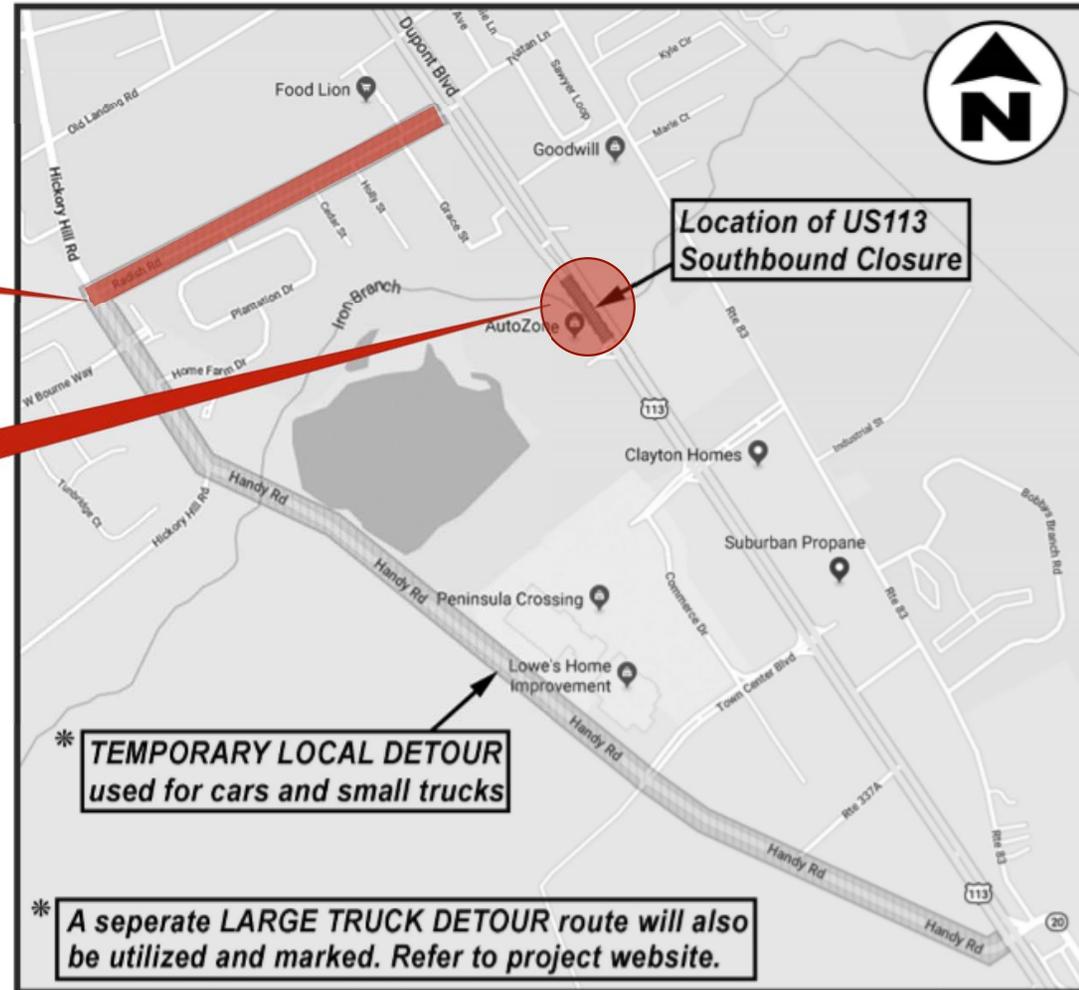


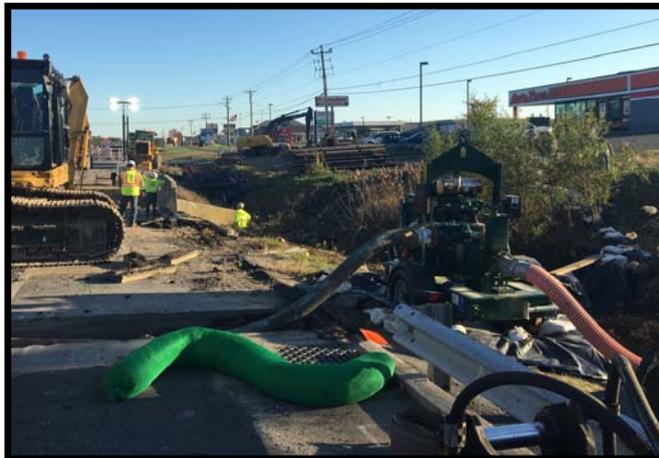
PHASE 1

- Paving of detour
- M.O.T.

PHASES 2, 3, & 4

- Stream Diversion (#2)
- Replacement of BR 3-507 (#3)
- Remove Stream Diversion and M.O.T. (#4)





PHASE 2: STREAM DIVERSION



PHASE 3: CLOSURE OF US113 - DAY 1



- Demolition begins!
- Initial excavation of pavement

- Sawcut, demolition, and excavation

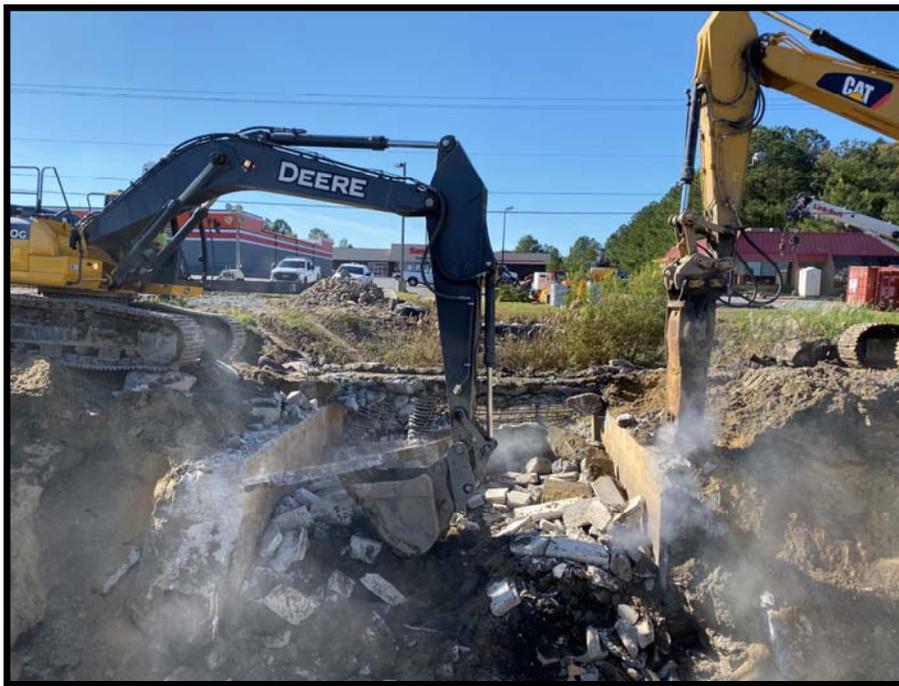




Bon Appétit



DAY 2

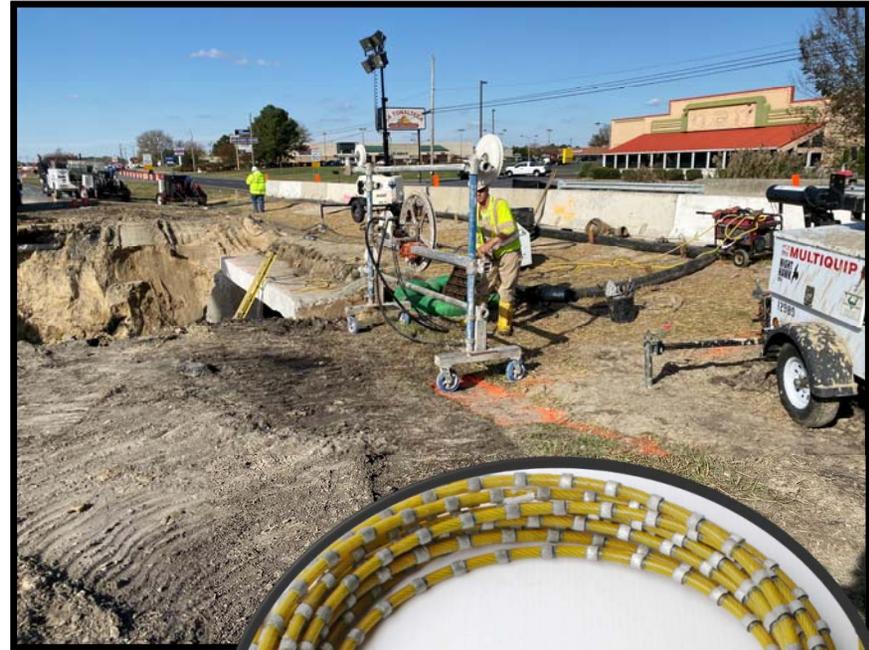


- Top of frame removed
- Breaking up and excavating abutments



- Frame to remain and sump pit

- Wire Sawing Operation







DAY 3

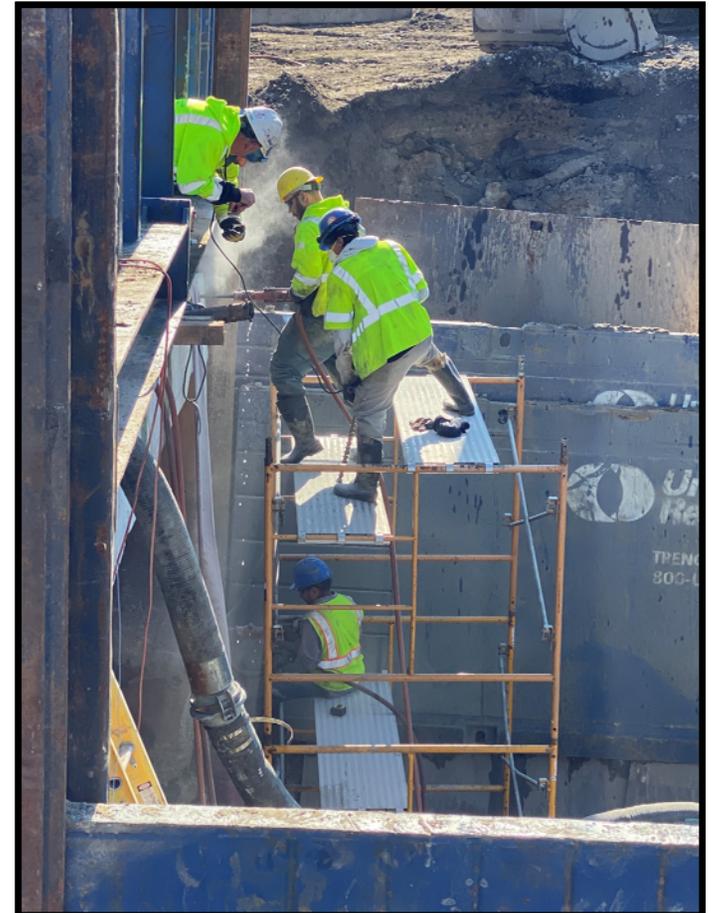


- Excavation to final grade
- Challenges with groundwater

DAY 4



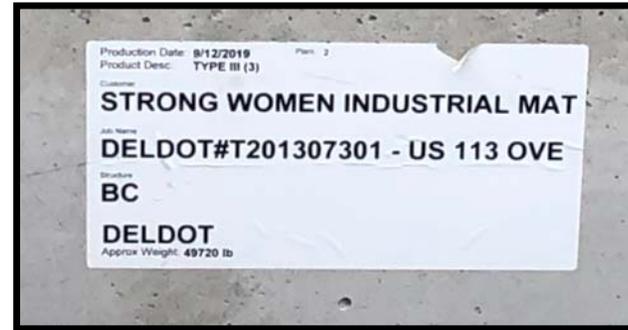
- Final elevation reached
- Dowel into existing frame

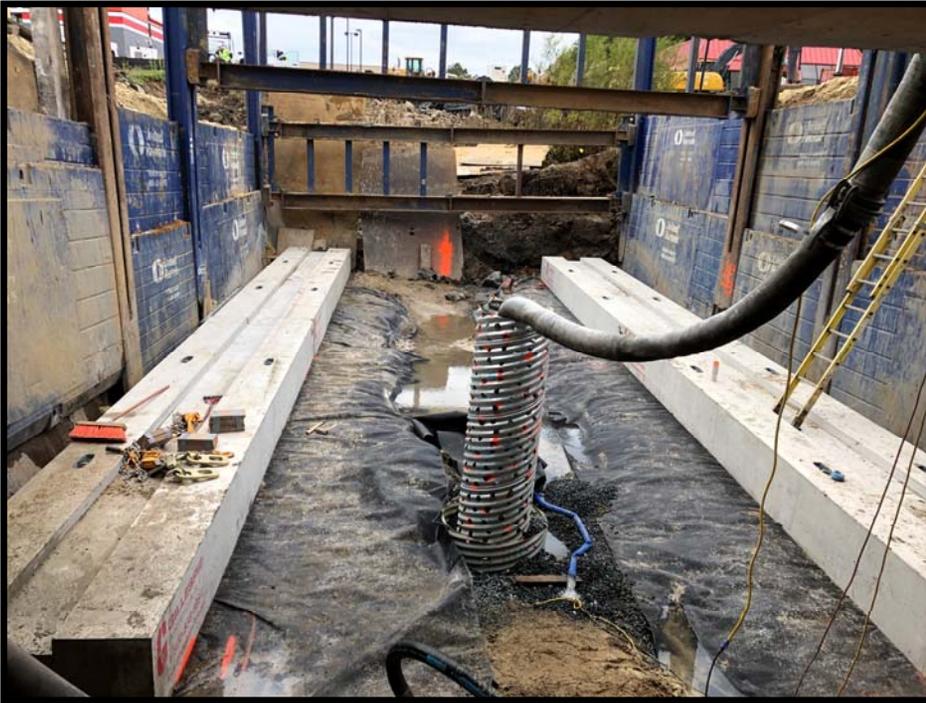


DAY 5

- Extra large crane for 25 ton pieces
- Shopping plaza used for staging
- Placement of footers
- Frame assembly



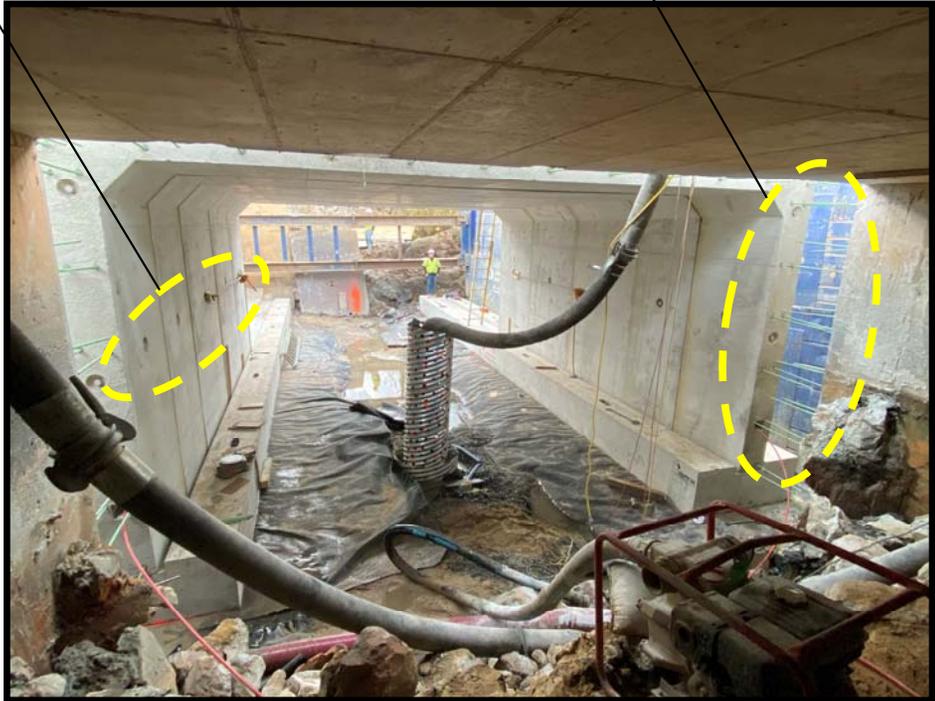




Come-along used to tighten frame



Closure pour

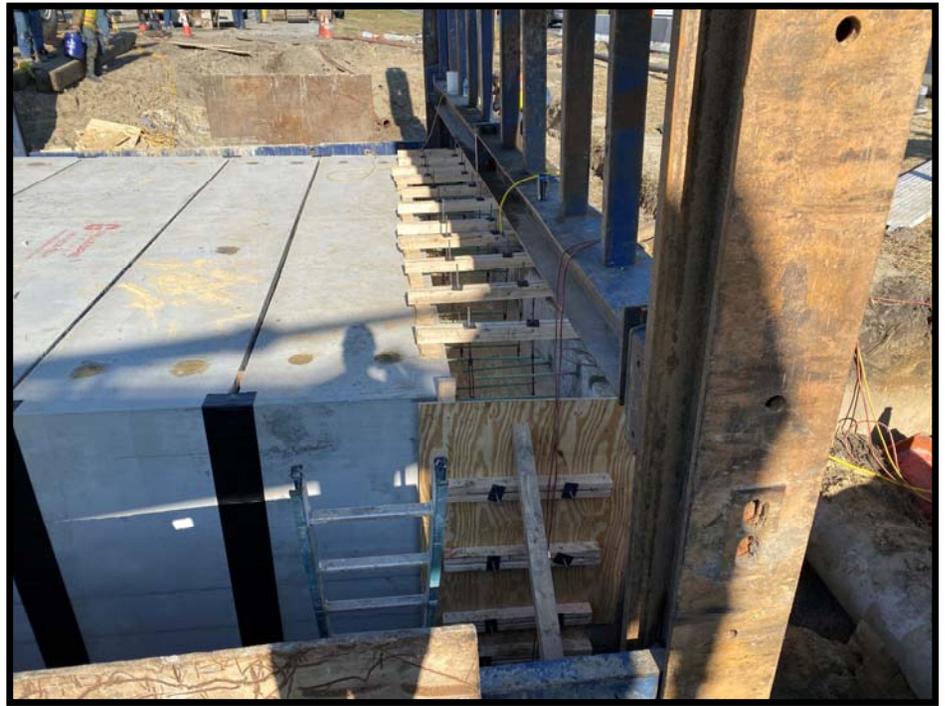




DAY 6



- Post tensioning of frame segments
- Set precast barrier/moment slab

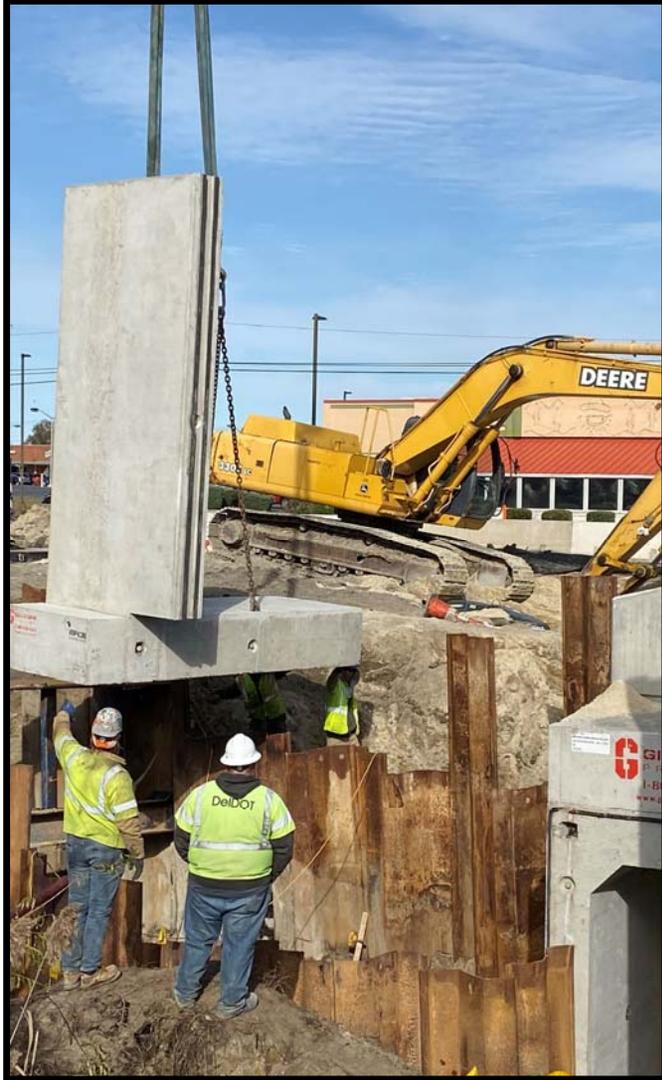
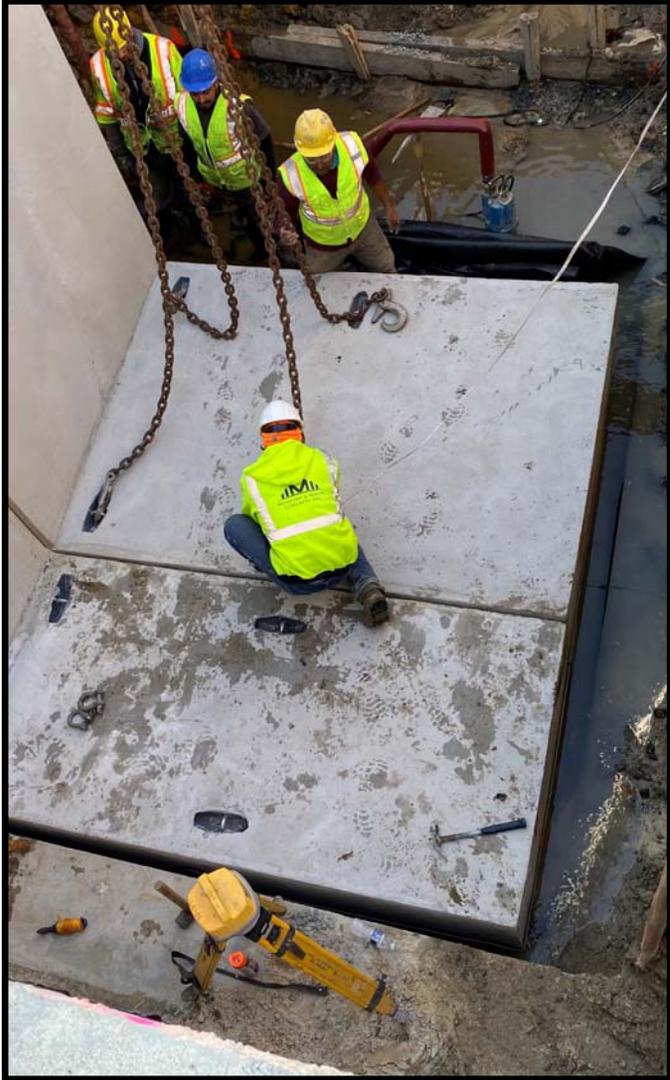


- Closure pour utilizing high early strength concrete

DAY 7

- Drive sheet piles for excavation support
- Set wingwalls
- Groundwater still an issue
- Finish backfilling main structure





- Placement of SW wingwall



- Backfill/compaction



DAY 8



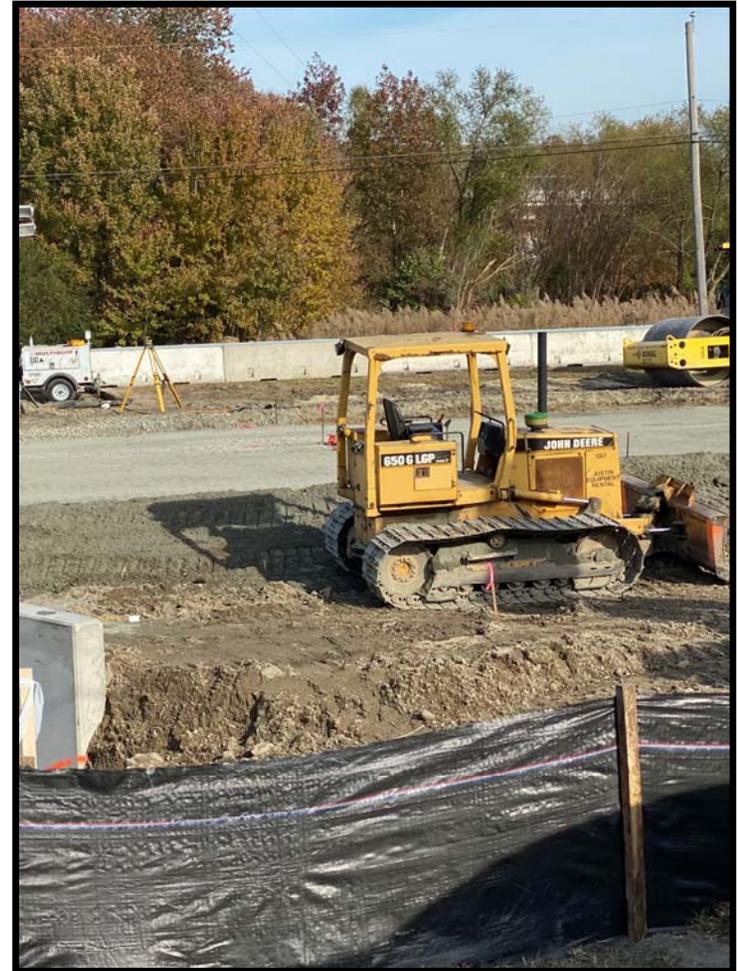
- Backfill wingwalls



- Finalize road grading



- Inspecting inside the frame



- Grading side slopes and swales

DAY 9



- Paved and striped through the night

OPEN TO TRAFFIC!!!



FINAL INSPECTION



KUDOS FROM THE PUBLIC

Millsboro Fire Company's Post



Like Comment Share

Jerry Bedwell and 129 others

94 shares

All Comments

Great work 🙌🙌🙌🙌🙌 I can't believe how fast this was done!

Top Fan
This was truly a record for quickest road work (in my opinion lol).
13h Like Reply

Thanks for the good news!!
16h Like Reply

That was quick! Thank you!!
17h Like Reply

Thanks for the update and huge thanks to them for being so quick!!!!
😊
16h Like Reply

Patience? That took, what, a little over a month? That was fast! Good thing it wasn't the company contracted to do Laurals bridge. Fantastic job, and major props to the company!
1d Like Reply 11

9 days. I'm actually impressed, deldot knocked it out.
23h Like Reply 2

Yea, not even close to a month. Road closed starting 11/04 and it was expected to be closed for two weeks so this is great news.
22h Like Reply 1

actually it closed 11/03. Sunday morning. Worked 24 hours a day. I live in the closed zone. It went off without a hitch!!

LESSONS LEARNED

- ✓ Add item in contract for Pre-construction Planning Meeting
- ✓ Plan on additional space for staging/equipment
- ✓ Material availability/procurement during 24/7 operations
- ✓ Availability of Subcontractors during 24/7 operations
- ✓ Additional room may be needed for alternate stream diversion
- ✓ Public prefers 24/7 construction when needed
- ✓ **Accelerated Bridge Construction is the future**





**THANK
YOU!!!**

Group 3 Construction

Traffic Section

Millsboro PD

Town of Millsboro

Mumford & Miller

KCI inspection

Craig, Jason, Nick, Mike G

Jerry (Brochures)



QUESTIONS?