

# NEW NICE BRIDGE



Maryland  
Transportation  
Authority

## NEW NICE/MIDDLETON BRIDGE Replacement Project

Contract Number: NB-0543-0000  
Governor Harry W. Nice/Senator  
Thomas "Mac" Middleton Bridge  
Replacement Design-Build Project

Maryland Concrete Conference  
03-22-2022

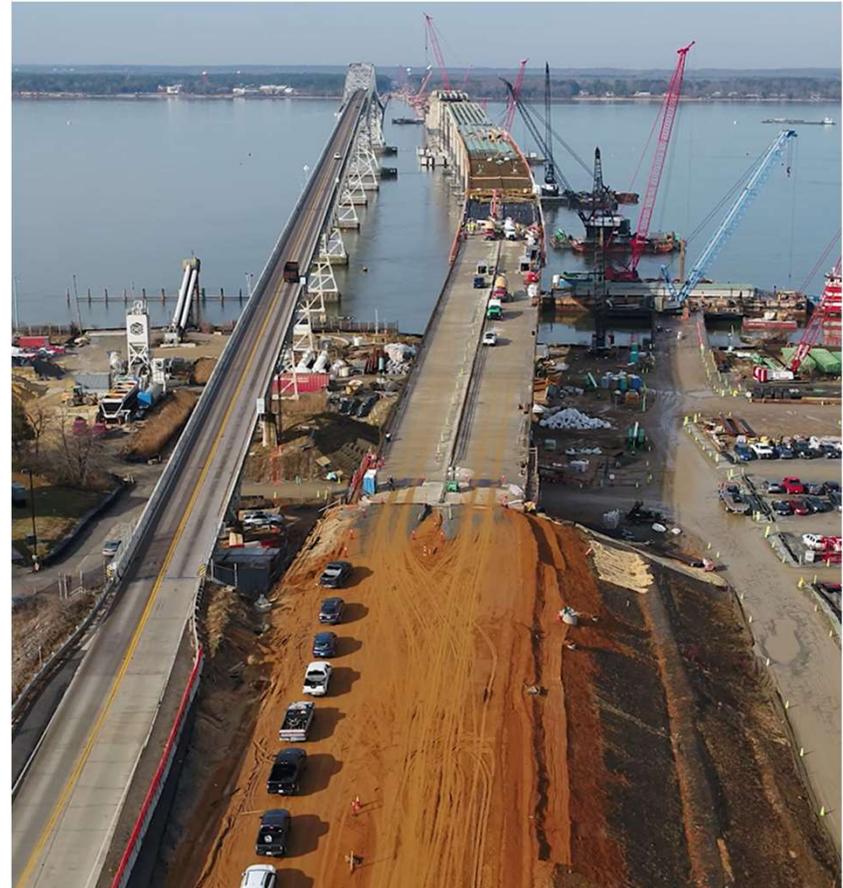
**SKANSKA**

**CORMAN**  
K O K O B I N G

**McLean**

# Project Challenges

- 100-year design life



## 100-year design life

- Corrosion Protection Plan
  - Concrete design elements
    - Chloride corrosion modeled using fid Bulletin 34 Model Code for Service Life Design
    - Max allowable chloride coefficients per NT Build 492
    - Joints minimized (14) with Virginia drainage trough detail
    - Low carbon/ chromium reinforcing steel
    - 8' long fiberglass jackets on low level spans (EL +4' to -4')
    - Use of concrete tubs



## 100-year design life

- Corrosion Protection Plan
  - Concrete construction
    - Rebar type and cover
    - Quality control for concrete
    - Finish/ cracks/ honeycomb



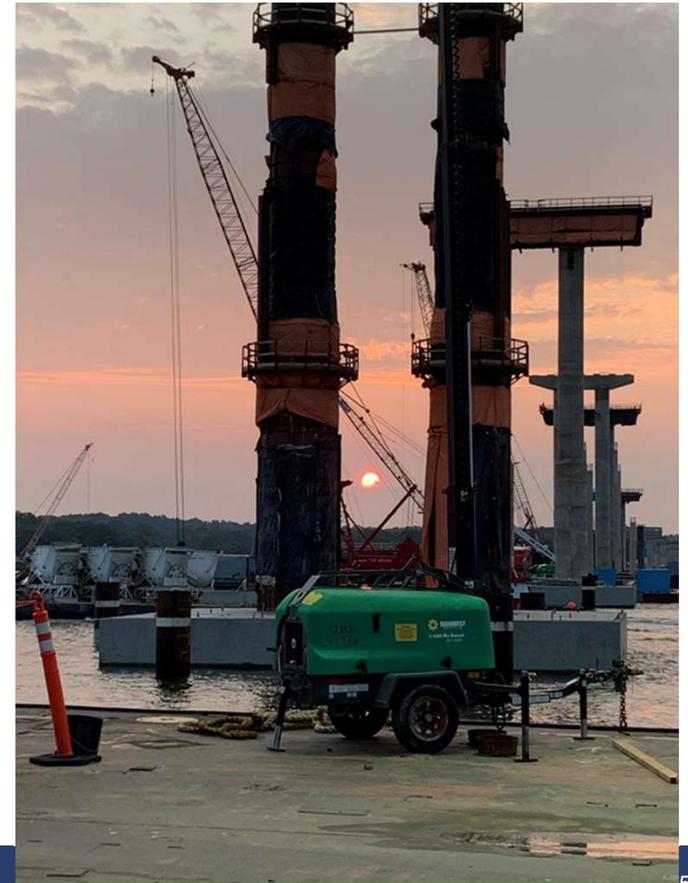
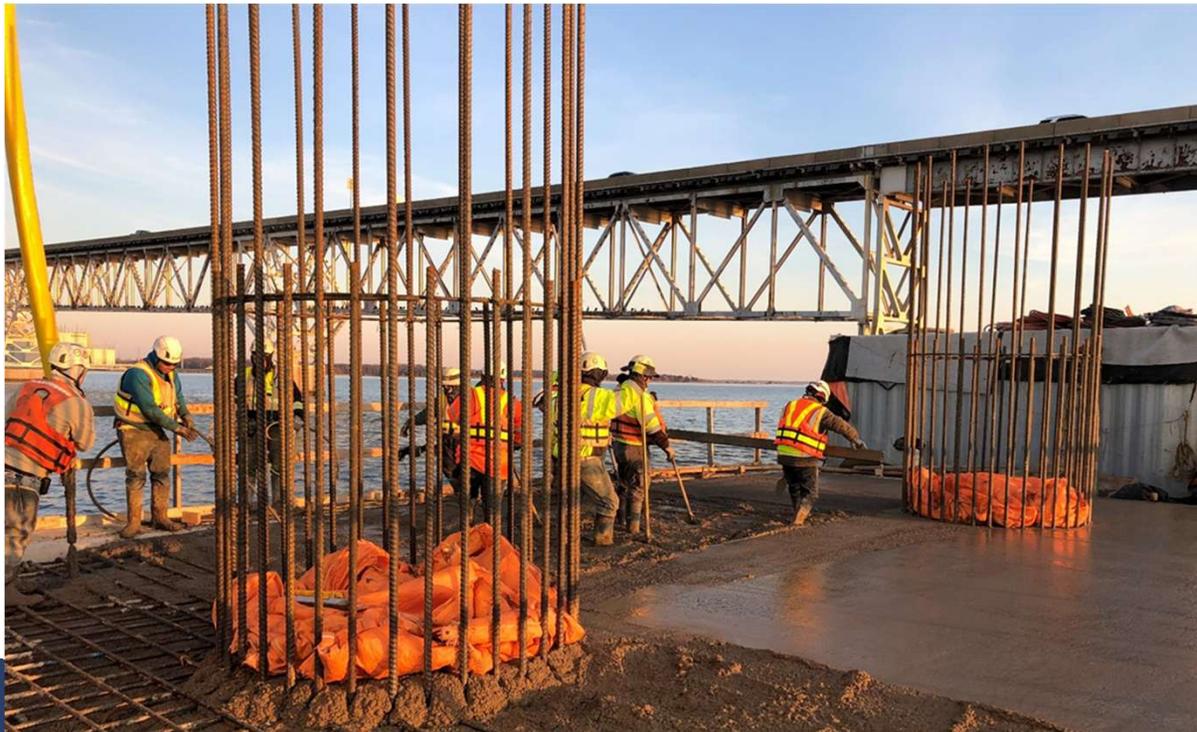
**SIVA CORROSION SERVICES, INC.**  
Materials, Corrosion, and NDT Services



## 100-year design life

- Thermal Control Plan
- Prevent cracking
- Monitor weather
- Concrete curing/ temperatures

**EXACT**



**SKANSKA**

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KOKOSING

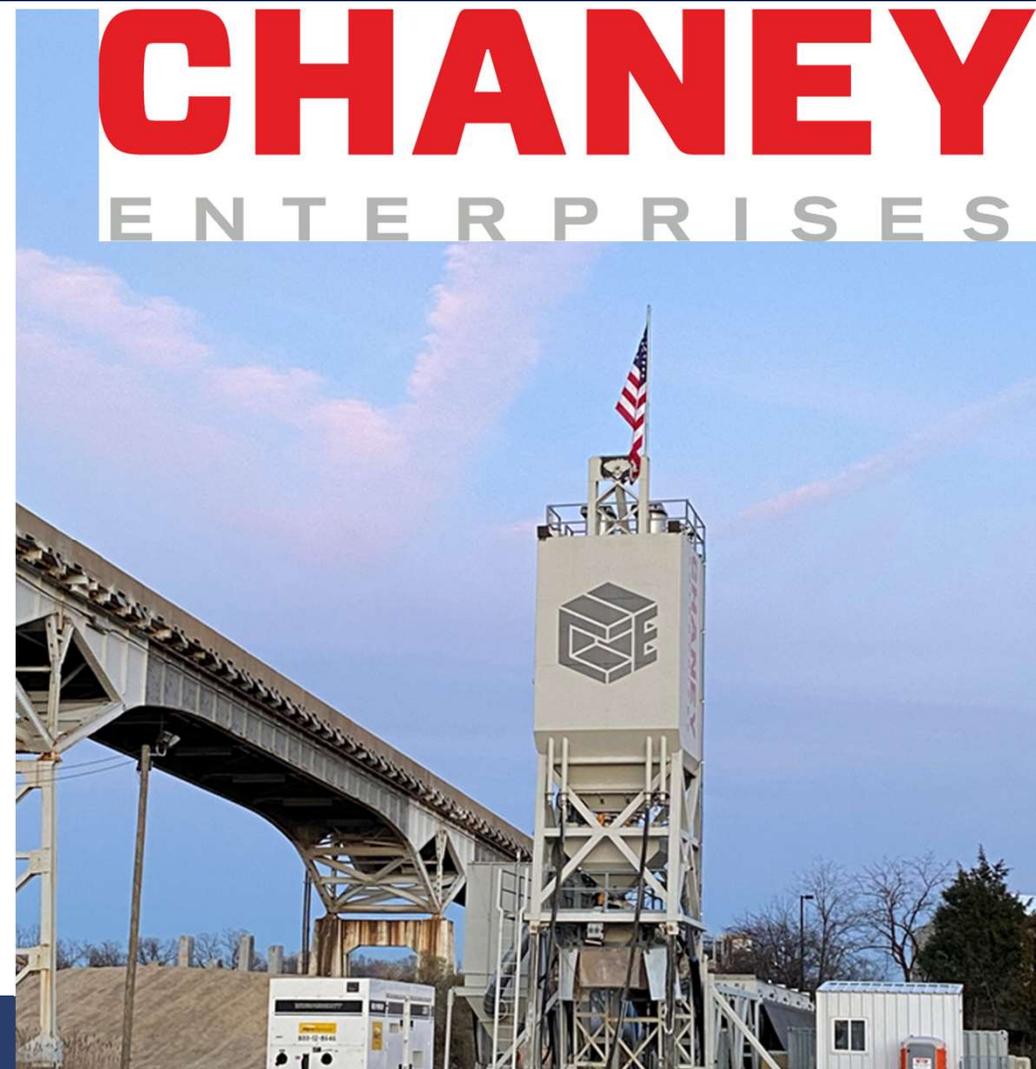
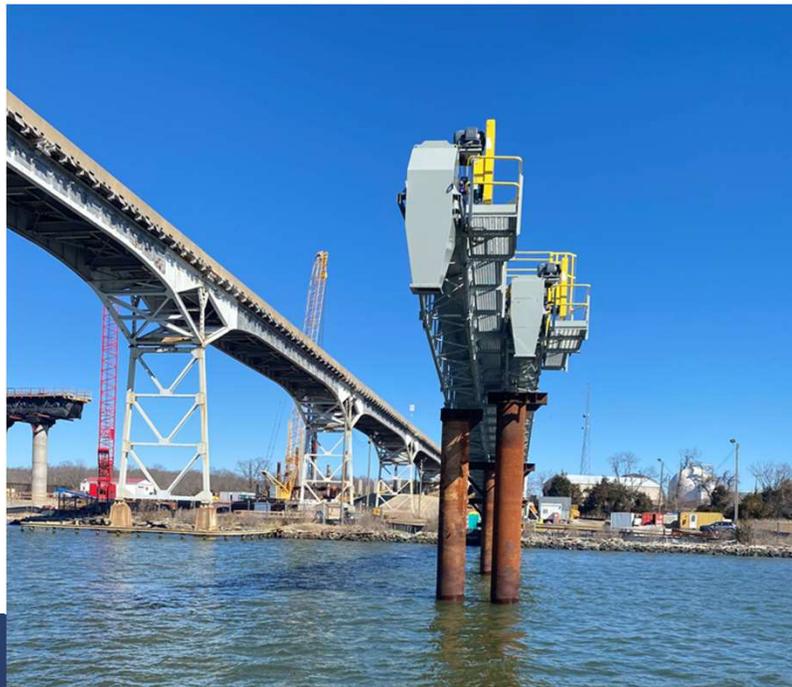
**McLean**

# Logistics

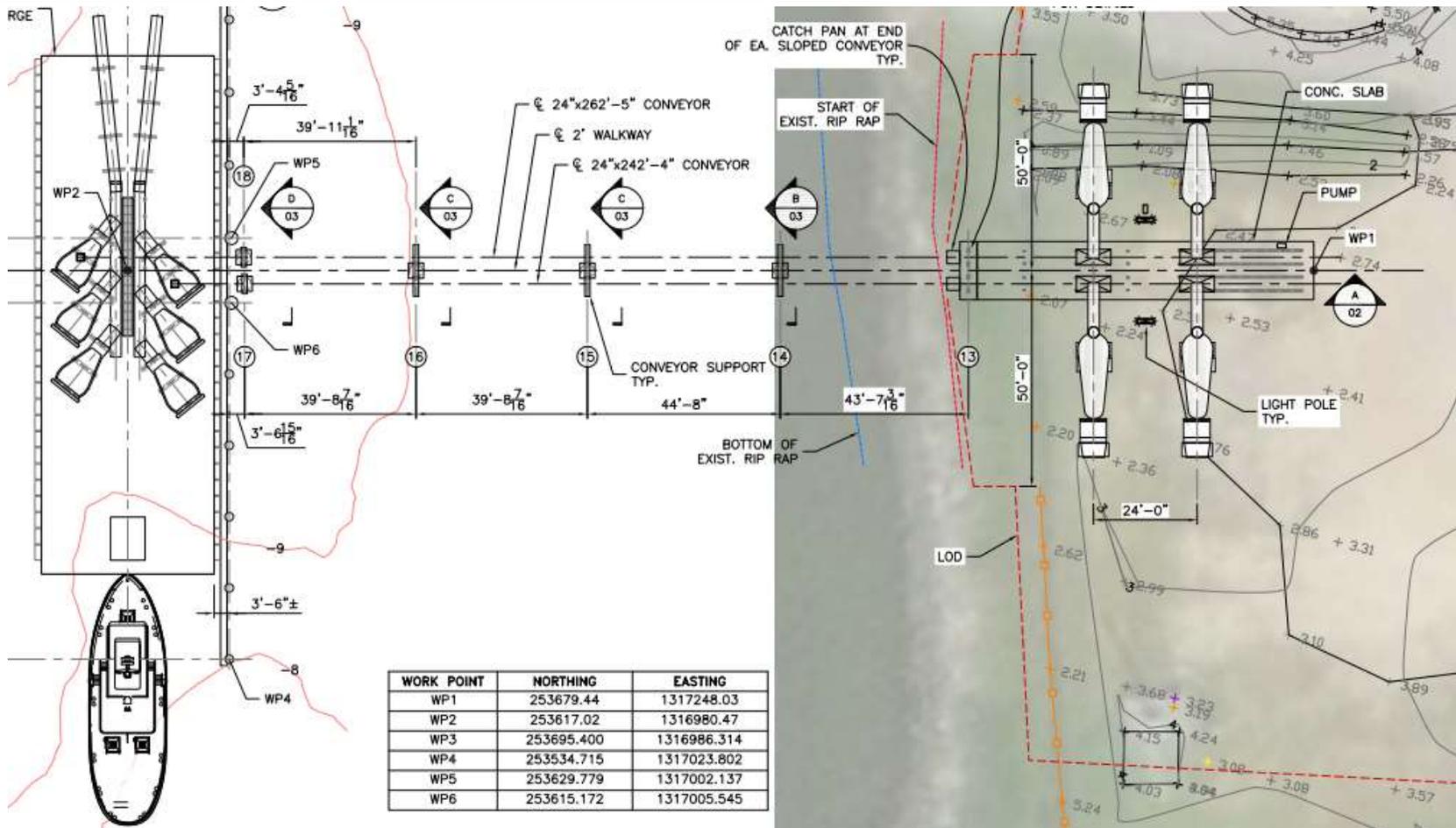


## Logistics

- On-site Batch plant
- Conveyor/ agitators/ remixers
- Quality control



**CHANNEY**  
ENTERPRISES





**SKANSKA**

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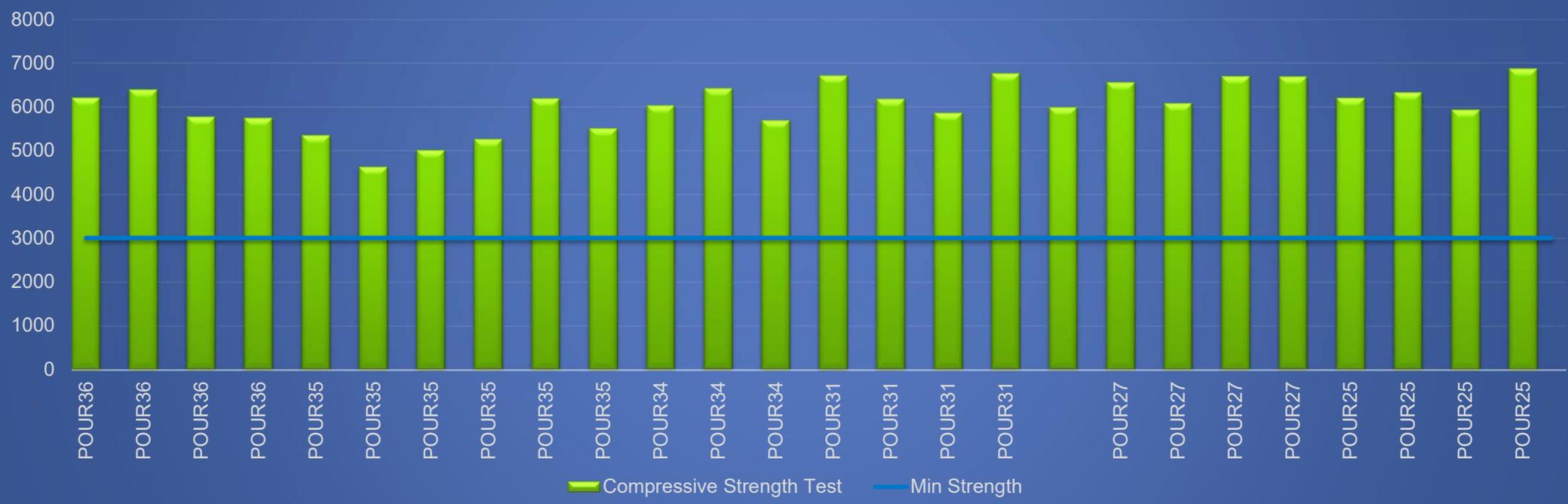
**binni**  
concrete

Mix Design	Description	Delivered Volume	Theoretical Volume	Accepted Volume	# Tests Actual	# Tests Required * Delivered Volume	Notes
NB-MX-3K1-F25-BRG	3500 PSI	1080	780	1020	25	22	
S3W-N35-4-15	Mix #3 Foundations	366	346	356	17	8	
NB-MX-3KM-F45-19	3500 psi MASS HNBA3M01	1062	959	1022	21	21	
S6W-N50-4-40	S6W-N50-4-40	150	146	150	8	3	
NB-MX-3K1-F25-19	3500 psi	1574	1437	1546.5	43	31	
NB-MX-6K1-F25-BRG	4500 PSI. HNBA6001	692	650	652	33	14	
NB-MX-3KM-F45-BRG	3500 PSI. HNB 3M01	12695	11731	12062	232	211	
NB-MX-6K1-F25-19	HNB6001 4500 psi	298	183	146	10	6	
NB-MX-6K2-F25-BRG	6001 deck mix with fibers 4500 psi	3750	4152	3568	100	75	
S4W-N25-4-5	MIX #4	101	84	86	5	3	
NB-MX-SCC-T20-BRG	8000 Mix	287	289	287	14	6	SCM NCR 158 SCM NCR 139
NB-MX-3KM2-F45-BRG	3500 PSI. HNBA3M02	15077	13064	14719	355	302	SCM NCR 143
		37134	33823	35616	863	702	



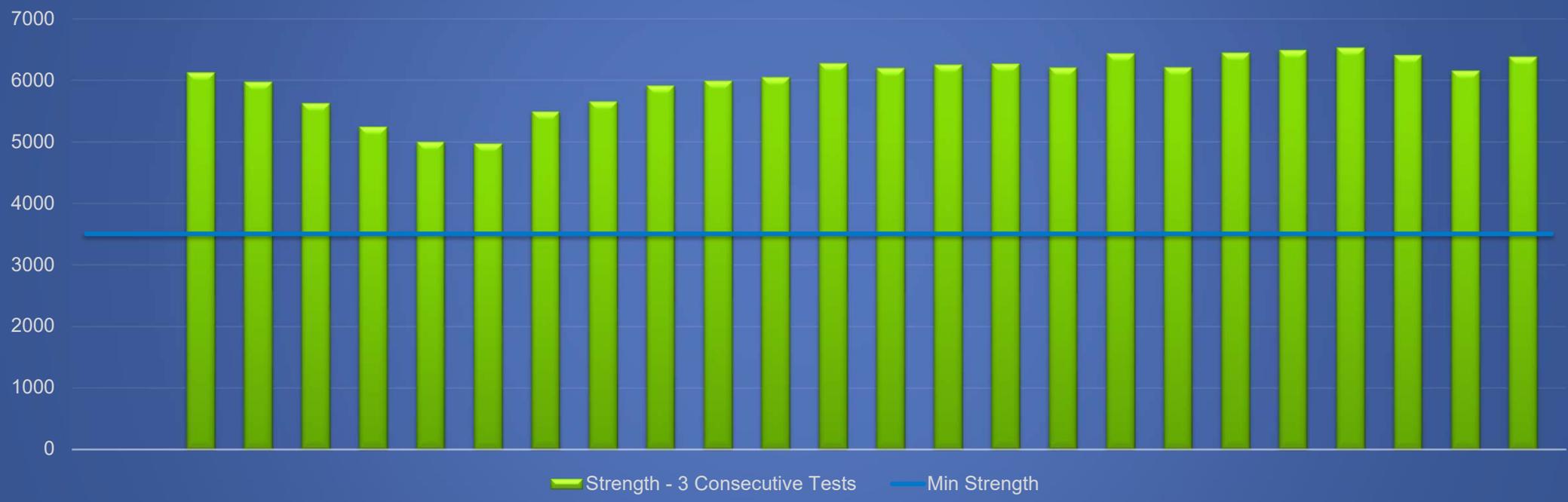
Mix Design: NB-MX-3K1-F25-BRG

### 28 Day Strengths - Compressive Strength Test: NB-MX-3K1-F25-BRG



Comments: None.

### 3 Consecutive Strength Test Average: NB-MX-3K1-F25-BRG



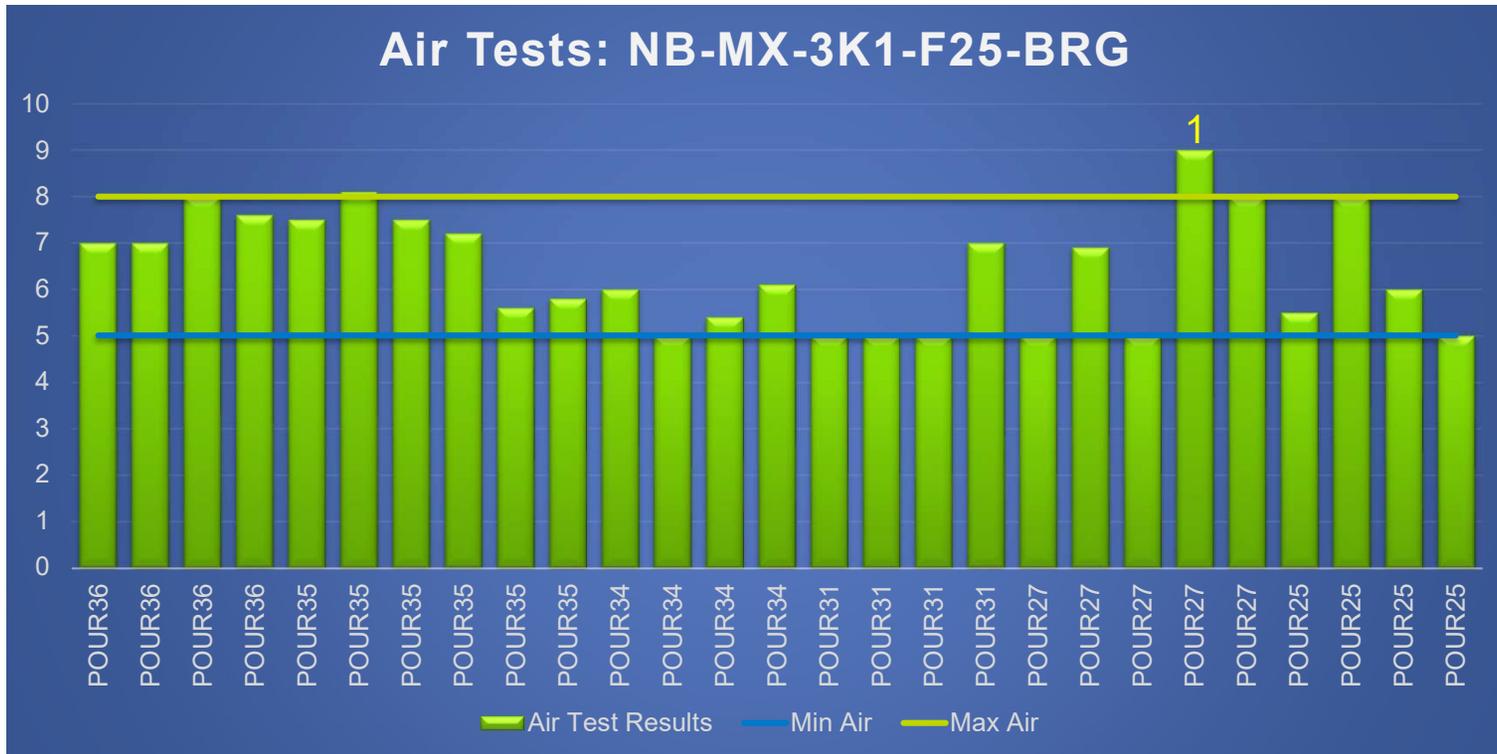
Comments: None.

### Slump Tests: NB-MX-3K1-F25-BRG



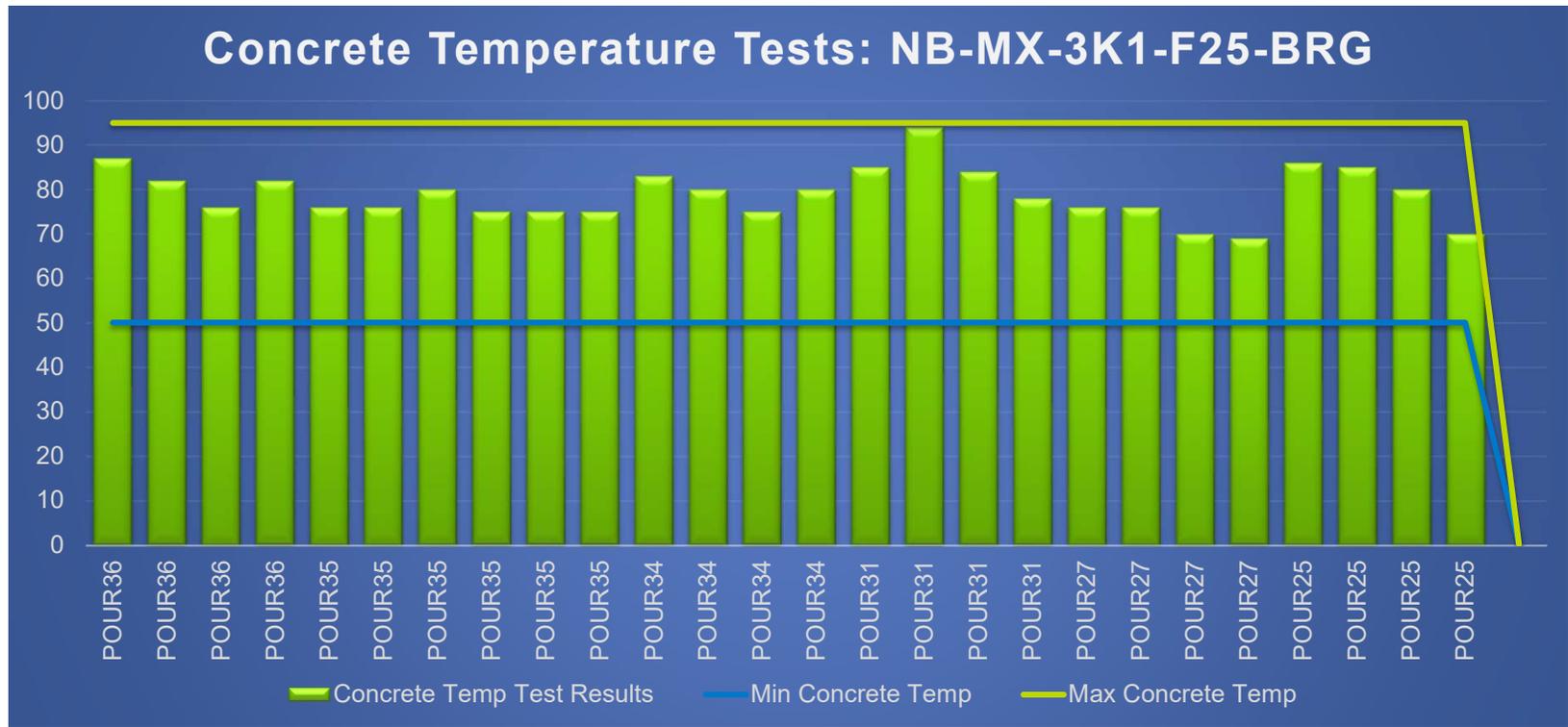
Comments:

1. Pour 36 explanation of out of tolerance slump: 8.5" slump for ticket 2198123 was re-tested and accepted at 8" slump.
2. Pour 34 explanation of out of tolerance slump: 8.75" slump for ticket 2195915 was re-tested after adding 15oz air and accepted at 7" slump
3. Pour 31 explanation of out of tolerance slump: 3.5" slump for ticket 2193069 was accepted and used per area manager approval.
4. Pour 31 explanation of out of tolerance slump: 4" slump for ticket 2192941 was accepted and used per area manager approval.
5. Pour 25 explanation of out of tolerance slump: 3" slump for ticket 2186726 was tested at plant for slump 9" for agitator 10 B3, 15-gal water was added in remixer.



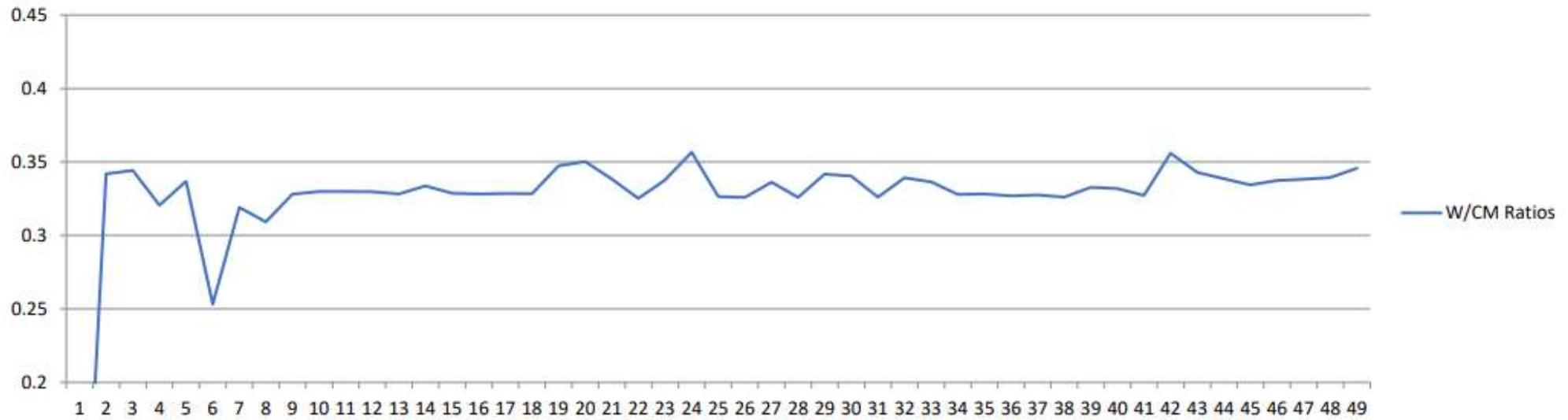
Comments:

1. Pour 27 explanation of out of tolerance air: 9% air for ticket 2186124 was re-tested and accepted at 8% air.



Comments: None.

### W/CM Ratio Results





**NEW NICE  
MIDDLETON  
BRIDGE**

**PRECAST CONCRETE BY:**





## A GROWING HISTORY

**1946** John “Jack” Ogorchock in 1946 as a trucking company in Brookeville, PA. His company expands into supplying concrete materials and ready-mix concrete, opening a plant in DuBois- DuBrook Concrete is born.

**1970's-80's** DuBrook Concrete expands in Pennsylvania; opens new locations in both Texas and Northern Virginia.

**1985** Concrete Precast Systems (a DuBrook division) produces its first precast job- 250,000; of barrier

**1991** Concrete Precast Systems produces 1,000,000 sf of sound wall in Chesapeake, VA

**1993** Absorptive sound wall, Whisper Wall™, is created/patented.

**2007** Coastal Precast Systems secures first large project, \$25M Washington Bypass for NCDOT (1,000 girders and 1,200 30” pile).

**2014** CPS expands operational footprint to Wilmington, NC

**2019** CPS expands to its second barge-accessible plant in Cape Charles, VA



## Cape Charles Plant

- **90 Acres**
- **2 Docks for Loading Barges:**
  - One 220' x 60' Pier
  - One 650'+ Dock-able Bulkhead
  - Two American Cranes, Two 150-ton MiJacks
- **120 CY per Hour Concrete Batch Plant**



## Chesapeake Plant

- **50 Acres**
- **160,000 SF Indoor Manufacturing Facility**
- **4 Docks for Loading Barges:**
  - Two 160' & Two 270' long piers.
  - Can accommodate up to 75' x 300' barge with 14-ft draft.
  - 400-ton maximum capacity Pier Crane
- **Railroad Delivery Capabilities**
- **150 CY per Hour Concrete Batch Plant**



## Wilmington Plant

- **40 Acres**
- **200+ CY per Hour Concrete Batch Plant**
- **Convenient access to interstate highways**
- **Seven Prestressing Beds**



## Cape Charles Plant



# NICE MIDDLETON BRIDGE



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- \$463 million design-build project awarded to Skanska-Corman-McLean JV
- Replacement bridge for the current Nice/Middleton Bridge.
- Approximately 1.7-mile connects Virginia to Maryland via Rte 301.
- Doubles vehicle capacity, adding two lanes each way.
- Barrier installation and shoulder installation improves safety.
- Raises boat clearance to 135-ft. allowing for tall ships.
- Project completion: Spring 2023.
- 100-year service life.

**SKANSKA**

**CORMAN**  
K O K O S I N G

**McLean**  
CONTRACTING COMPANY

# PRECAST/PRESTRESS HIGHLIGHTS

- 36" Square Piles (770)
- 66" Cylinder Piles (90)
- 79" PCBT Beams (189)
- 95" PCBT Beams (232)
- Footing Tubs (29)
- Fender Rings (8)
- Drain Troughs (13)



**45**  
**PRECAST**

# PIER FOOTING BATHTUBS

- Accelerated construction exponentially
- Weights ranged from 150 to 192 Tons
- Concrete Strength: 7,500 psi

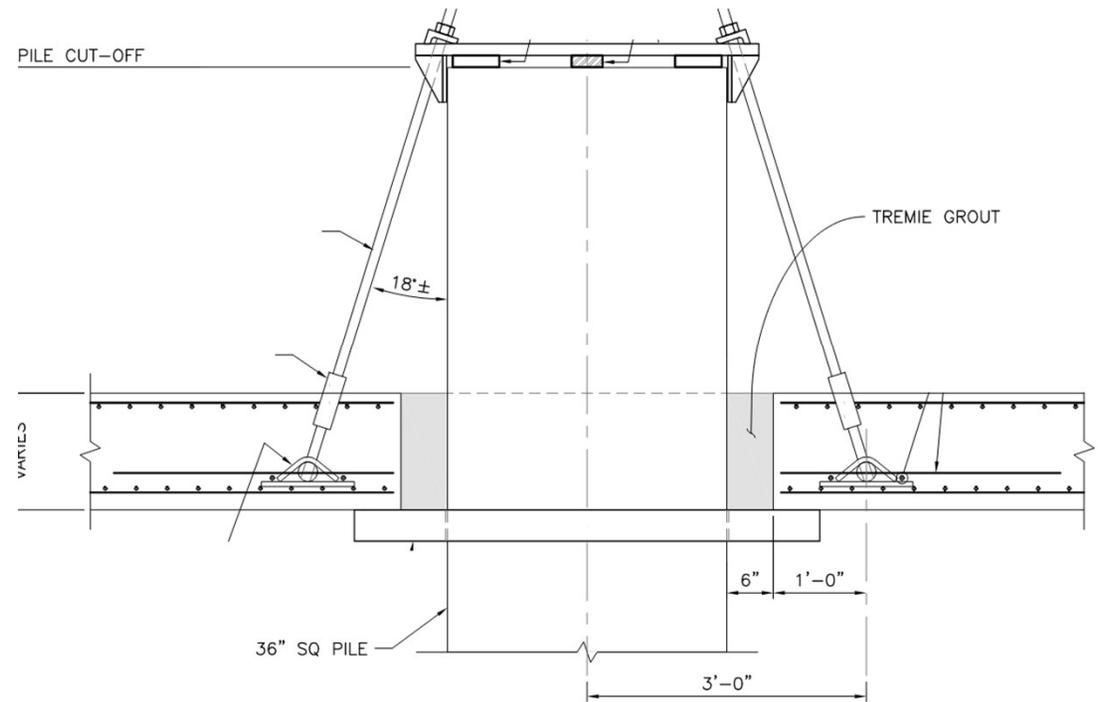




**PIER FOOTING  
BATHTUBS**

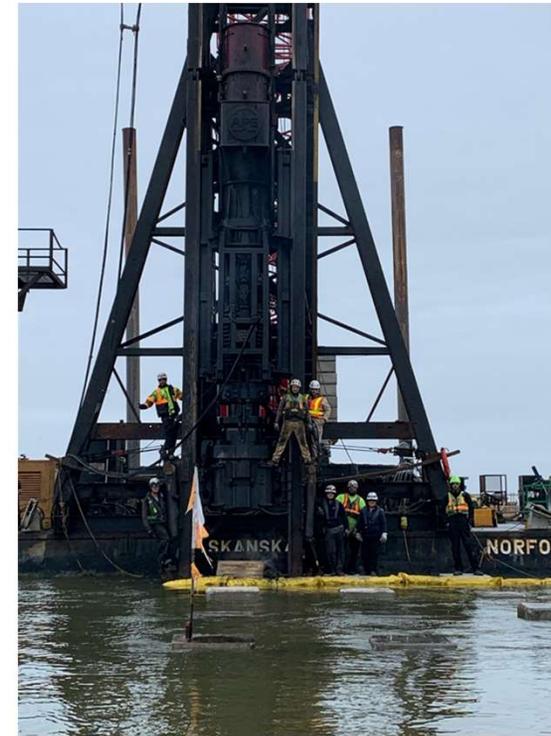
# PIER FOOTING BATHTUBS

- Buoyancy and Deadload Considerations for design



# 36" PRESTRESSED SQUARE PILE

- Piles utilized several VDOT specifications



# 36" PRESTRESSED SQUARE PILE

- Length: Up to 206ft
- Weight: Up to 139 Tons
- Conventional Uncoated Prestress Strand
- Galvanized Spiral Reinforcement



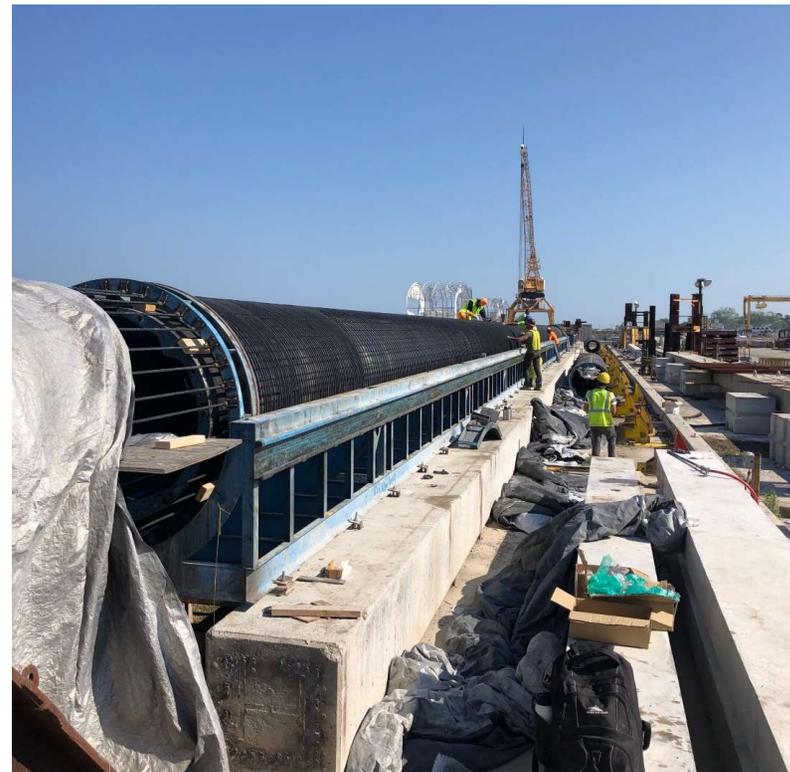


## 66" PRESTRESSED CYLINDER PILE

- Length: Up to 198ft
- Weight: Up to 130 Tons

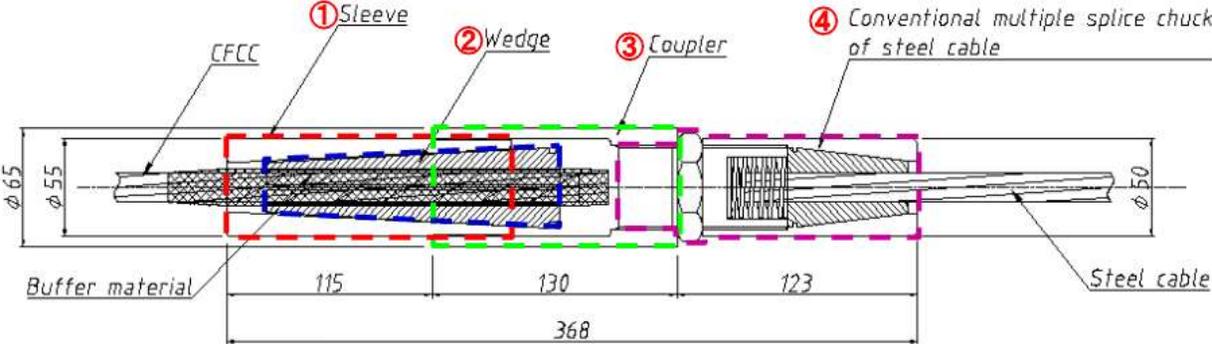
## 66" PRESTRESSED CYLINDER PILE

- Carbon Fiber Reinforced Polymer (CFRP)
  - 7-strand 0.6" Prestress Strands
  - Spiral: 9.7MM mono-wire (Large Tow)
  - Alternate to Stainless Steel



# 66" PRESTRESSED CYLINDER PILE

Components required to tension CFCC:



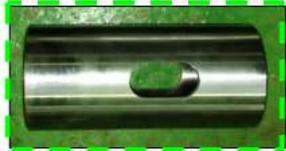
① Sleeve for CFCC



② Wedges for CFCC



③ Coupler for CFCC



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# 66" PRESTRESSED CYLINDER PILE

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- Conventional Casting Methods
- "Static" Cast with Collapsible Mandrel





# PCEF Bulb Tee Beams

- **95" Tall Bulb Tee Beams**
- Length: 172'-11" to 174-8"
- Weight: 111 - 113 Tons
- Epoxy-coated rebar
- 0.6" Prestressing Strands: 64
  - Draped Strands: 24
- 10,000 psi concrete
  
- **79" Tall Bulb Tee Beams**
- Length: 122'-2" to 149'-5"
- Weight: 70 - 86 Tons
- Epoxy-coated rebar
- 0.6" Prestressing Strands: 47 & 61
  - Draped Strands: 15 & 21
- 10,000 psi concrete



# PCEF Bulb Tee Beams

- Indoor Manufacturing

# PCEF Bulb Tee Beams

- Finished Beam Required Minimal Finish Work



# PIER PROTECTION FENDERS

- For Piers 43 and 44
- Each segment weighed approximately 160 Tons.
  - 73 cubic yards of concrete (8,000 psi)
  - EPS Foam Voids

TECTION FOR MAIN SPAN





## PIER PROTECTION FENDERS



## DRAINAGE TROUGHS

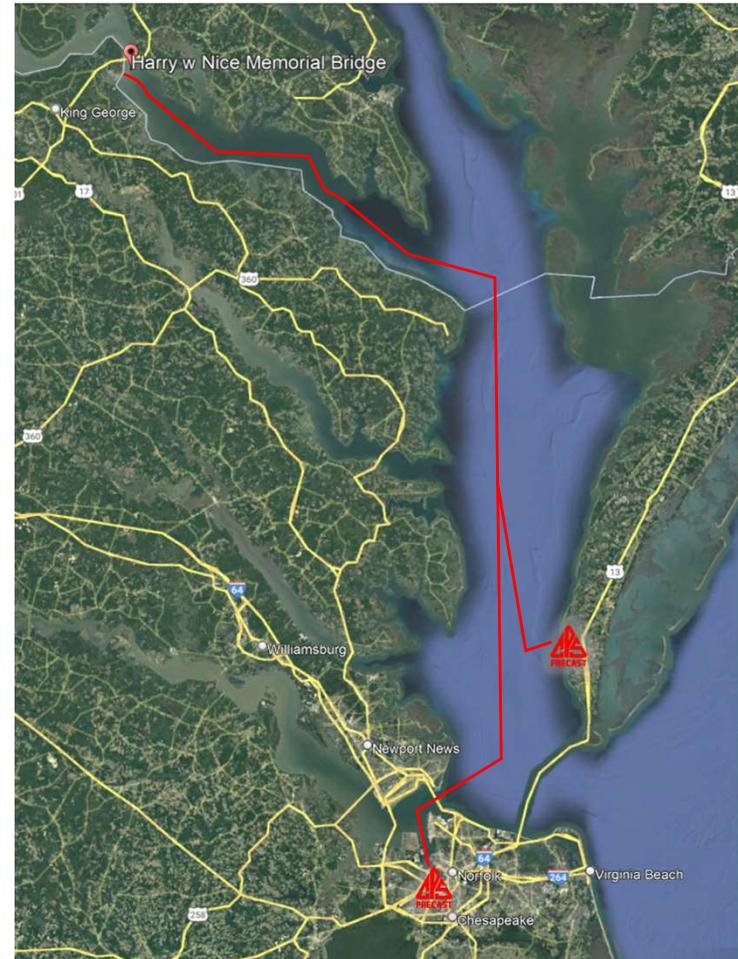
- “Virginia Pier”
- To Collect Rain Water from Expansion Joints.



# DRAINAGE TROUGHS

# DELIVERY BY BARGE

- Total Barge Loads: 120+



# DELIVERY BY BARGE

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- To the Jobsite:
  - **From Cape Charles, 105 miles**
  - From Chesapeake, 145 miles





# DELIVERY BY BARGE

- Barge Delivery is Less Obtrusive to Public
- **Get In, Get Out, Stay Out!!!**

# COASTAL PRECAST SYSTEMS

[WWW.CSPRECAST.COM](http://WWW.CSPRECAST.COM)

WILMINGTON • CHESAPEAKE • CAPE CHARLES

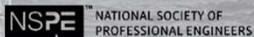
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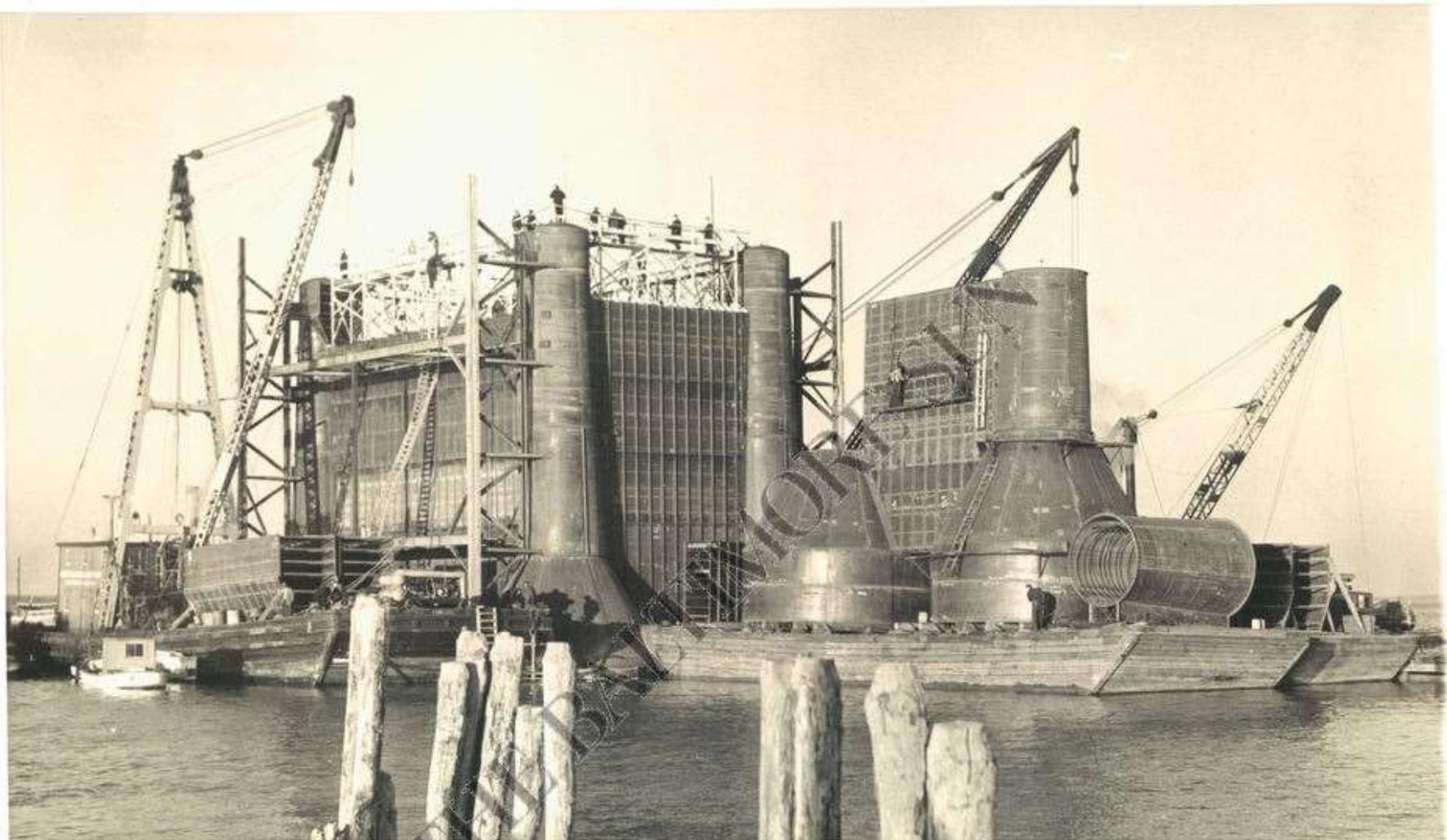
**Skanska/Corman/McLean JV**



**SKANSKA** **CORMAN**  
KOKOSING

**McLean**

Existing bridge demolition



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*McLean*

# NEW NICE MIDDLETON BRIDGE



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