“Crossing the Lower Chesapeake Bay”
The Chesapeake Bay Bridge-Tunnel Facility

March 8, 2018

Chris Williams, P.E.
Jacobs Engineering Group
Location
Ferry Crossing
The Original Crossing
The Original Crossing
The Original Crossing
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HALF CROSS SECTION NEAR INTERMEDIATE DIAPHRAGM

HALF CROSS SECTION NEAR END DIAPHRAGM
The Original Crossing
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CROSS SECTION THRU ISLAND - SCHEME I
TOE OF SLOPE PROTECTION
The Original Crossing
The Original Crossing
The Original Crossing
The Original Crossing
The Original Crossing
The Original Crossing
The Parallel Crossing

- Mid 1980’s need for expansion considered
- Safety, maintenance & seasonal traffic
The Parallel Crossing

• New construction on West (Bay) side
• 36-ft roadway
• Two 12-ft lanes, 10-ft and 2-ft shoulders
• 250-ft Typical separation between old and new trestles, 64 ft at south end leaving Virginia Beach
• Typical 100-ft trestle spans, 12 miles
• Two high-level bridges – NCB & FIB
• 800-ft separation at North Channel to minimize scour effects relative to each other
• Expanded toll plazas
The Parallel Crossing
The Parallel Crossing
The Parallel Crossing

- 18-ft or 23-ft Segments
- Fabricate spiral cage
- Place cage in cylindrical form with P/T ducts
The Parallel Crossing

- Place concrete from conveyor as spinning
The Parallel Crossing

• Centrifugal spin at 200 RPM for 20 minutes
  – Centrifugal force = higher density and improves durability and decreases permeability
The Parallel Crossing – Piles

- Steam cure for 3 hours nominal
- Strip forms
- Yard storage until P/T
- Place segments in P/T bed
- Epoxy joints between segments, P/T segments and grout ducts
- Release at 4 ksi (grout) – Less than 24 hrs.
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PIERS NCBI1 THRU NCBI4

54" DIA. CONCRETE CYLINDER PILE, TYP.

PIER NCBI5

4'-0" LAYER OF SCOUR PROTECTION, TO FOLLOW EXISTING BAY BOTTOM CONTOURS

2:1 SLOPE, TYP.

BAY BOTTOM ELEV. VARIES (-55.0± TO -25.0±)

PIER FOOTING ELEV. 0.00
The Parallel Crossing
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The Parallel Thimble Shoal Tunnel – Why?

- Route 13 Corridor is a Corridor of Statewide Significance
- Lack of viable alternative route
- Lane closures for oversized escort loads
- Lane closures for ordinary maintenance work
- Age of existing tunnels
- Improvement in levels of service and safety
The Parallel Thimble Shoal Tunnel

- Existing Crossover
- #2 Island
- Existing Thimble Shoal Channel Tunnel (NB Traffic)
- Approximate Edge of Existing Island
- #1 Island

Proposed Thimble Shoal Channel Tunnel (SB Traffic)

Optional Fishing Pier

Optional Restaurant
PTST – Immersed Tube Tunnel Option
The Parallel Crossing

SECTION THRU TUNNELS NEAR PORTAL ISLANDS
SCALE: 1" = 40'

SECTION THRU TUNNELS AT MID-CHANNEL
SCALE: 1" = 40'

PARALLEL
CHESAPEAKE BAY
BRIDGE AND TUNNEL
The Parallel Crossing
The Parallel Thimble Shoal Tunnel
The Parallel Thimble Shoal Tunnel

Section A-A @ Sta.295+00
The Parallel Thimble Shoal Tunnel

Top of existing ITT + 10 ft

Reduced Strength Concrete Fill

Seabed at proposed alignment

EL. – 36 ft (+/-)

<15 ft*

EL. – 48 ft (+/-)

EL. – 68 ft (+/-)

* Where concrete cover is <15', confirm combination of soil and concrete is sufficient to prevent floatation given height of internal backfill.

5 ft internal backfill

45.5 ft
Cost / Construction Information

• Original Crossing - $200M, 42 months
• Parallel Crossing - $197M, 48 months
• Parallel Thimble Shoal Tunnel - $756M, TBD
Significant Impacts and Repairs
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Thank You!

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