ACCELERATED BRIDGE CONSTRUCTION
FHWA / DeIDOT WORKSHOP

September 17, 2015
Delaware Department of Transportation
Project Overview

SR 141, Commons Boulevard Intersection Improvements

- Follows completion of SR 141, Ramps G & F
- 3rd lane widening on SR 141/Pavement reconstruction
- Geometric improvements at ramps
- Capacity improvements at SR 141/Commons Blvd. Intersection
- Remove Airport Road signal and crossover
Project Overview

SR 141, Commons Boulevard Intersection Improvements

I-95 and SR 141 Interchange

• Replace Bridges 676 and 677 (SR 141 over I-95 SB)
Project Overview

Why Consider ABC?

- Traffic Volumes: SR 141 = 78,000 AADT, I-95 > 100,000 AADT
- Bridges 675 and 678 will be constructed under a prior contract beginning in Fall 2015 with a 2 year construction schedule.
- Evaluated temporary detours, however, adequate detours not available for the traffic volumes.
- The Decision was made to accelerate the bridge construction to match the anticipated roadway construction duration
Bridge Overview

Replacement of Bridges 676 and 677

- Goal is to Replace Both Bridges in a Single Construction Season
- Construction will be a Combination of both Conventional and Accelerated Bridge Construction Techniques
- Presentation will Focus on Bridge 676
• Aerial View of Bridge 676

• Existing Bridge Carries 3 Lanes of Traffic and Substandard Width Shoulders

• Bridge is to be Widened to 4 Lanes with Full Width Shoulders
• Elevation View of Bridge 676

• Existing Bridge Consists of 4 Single Spans with a Total Length of 232 Feet

• Bridge will be Lengthened and will Consist of 3 Equal Spans and 245 Foot Overall Length
Proposed Configuration – Bridge 676

ELEVATION

SCALE: 1” = 30’-0”
Bridge 676

The Challenges

• Bridges to Remain on the same Alignment while Maintaining the Roadway Existing Profiles
• Maintain 2 Lanes of Traffic During Construction
• Lengthen and Widen Both Bridges
• Located in an Area with Poor Underlying Soils Requiring Deep Foundations
• Accelerate Construction to Under 1 Year.
Bridge 676

Proposed Accelerated Construction Techniques

• Utilize Precast Concrete Pier Caps (36 ft. lengths, 56 Ton Wt.)
• Still Evaluating the use of Precast Pier Columns
• Utilize Modular Steel Girder / Precast Concrete Slab Units with 6” Closure Pours (8’-2” out to out width, 80 ft. lengths, 46 Ton Wt.)
• Still Investigating Precasting the Concrete Barriers on Exterior Modular Units
Bridge 676

Proposed Conventional Construction

- Driven Pile Foundations for Piers and Abutments
- Cast-in-Place Concrete Footings
- Cast-In-Place Concrete Abutments
- Cast-In-Place Approach Slabs
- Polyester Polymer Concrete (PPC) Deck Overlay
Bridge 676 Details
Bridge 676 Details

INTERIOR MODULE SECTION
Bridge 676 Details

Proposed Typical Section
Bridge 676 Details

Proposed Typical Section – Phase 1
Bridge 676 Details

Proposed Typical Section – Phase 2
LONGITUDINAL CLOSURE POUR DETAIL
Bridge 676
Details

Typical Precast Pier Cap
Fabricating Modular Units
Bridge 676
Details
Setting Modular Units
Bridge 676 Details
Longitudinal Closure Pours
Bridge 676 Construction Sequence
Bridge 676 Construction Sequence

Phase 1: Demolition
Bridge 676 Construction Sequence

Phase 1: Substructure Construction
Bridge 676 Construction Sequence

Phase 1: Set Modular Girder Units
Bridge 676 Construction Sequence

Phase 1: Longitudinal Closure Pours and Concrete Barrier Completed
Bridge 676 Construction Sequence

Phase 2: Demolition
Bridge 676
Construction Sequence

Phase 2: Substructure Construction
Bridge 676 Construction Sequence

Phase 2: Set Modular Girder Units
Bridge 676
Construction Sequence

Phase 2: Completed Structure
Proposed Schedule

• Currently Working on the Preliminary Design
• Project Advertisement - Fall 2017
• Construction Start - March 2018
• Both Bridges to be Completed in 8 Months. (4 Months Each MOT Phase)
• Bridges 676 and 677 Constructed Concurrently
Conclusion

ABC Advantages for This Project

• Bridges 676 and 677 will be Constructed in Less than half the Time of Similar Bridges 675 and 678 Using Conventional Methods
• Construction Time Savings of More Than 1 Year over Earlier Contract
• Reduced Impacts to Motorists on Heavily SR 141 and I-95 SB
• Increased Safety for Construction Forces
• Improved Quality of Construction by Utilizing Precast Elements
Questions ?