I-70 over SR 121
Pre-Bid Meeting

March 4, 2016
Meeting Objectives

- Solicit feedback from General Contractors and Specialty Contractors
- Share Preliminary Construction Details (60% Plans)
- Solidify Design Concept for Final Plan Development
Project Objectives

- **Safe Project**
  - During Construction
  - In Service

- **Successful Project**
  - Completed on time, according to plan and within budget
  - Learn from a “conventional” (non-Milton Madison) ABC project for future implementation
  - Positive experience for Owner, User and Contractor
Project Objectives

- Accelerated Construction Schedule
  - Minimize User Cost
  - Minimize MOT Cost
  - Other states are focusing on this type of work as the primary interstate replacement method
Current Plan Set

- Finalized Details
  - Limits of Construction along I-70
  - Limits of Construction along SR 121
  - Interstate Lane Closure Exception - 13 days per MOT Phase
  - Maintenance of Traffic (mostly)
  - Superstructure Geometry
  - Superstructure Type
Current Plan Set

- Dual Design (Bid Option)
  - Superstructure Installation Method

SPMT
(Self-Propelled Modular Transporters)

UDOT 4500 South over I-215

ODOT OR 213 over Washington St.

Slide-In
Details Under Development

- Foundation Type
- Substructure Configuration
- Bridge will be in service during construction of substructure
Contract Structure

- Design Bid Build
- \( A + B \)
  - \( A = \) Construction Cost
  - \( B = \) User Cost for I-70 daytime closures (per hour)
  - \( B = \) User Cost for SR 121 when 1 lane is not provided (per day)
  - Monetary amounts still under development
Project Site

- I-70 over SR 121 just outside of Richmond
Project Site

- High bedrock 3’ - 9’ below surface
- Bridge staging area (BSA) in SE corner
- Overhead Utilities on west edge of project
Project Site

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Existing Structure

- Simple Span Steel Beam with RC Girder Approach
  - Spans
- Built in 1959
- 27.15 Deg. Skew
- End Bent on Piles
- Pier on Spread Footing
Existing Structure

- Built Horizontally in Wrong Location
- 41’-3” instead of 45’-8”
Constructability Discussion

- Maintenance of Traffic/Duration
- Construction Staging
- Substructure
  - Foundation
  - Wingwalls
  - Closure Pours
Maintenance of Traffic

- Finalized (mostly)
- Pavement Design under development
- Lane Closure Exception for 13 days per closure
- Begins Friday after 9 p.m.
- Ends Second Friday at 6 a.m.
- For example
  - Close 9:00 p.m. Friday 10/6/17
  - Open 5:59 a.m. Friday 10/20/17
Maintenance of Traffic

- Phase I & Phase II - Shoulder Strengthening

[Diagrams showing road sections for Phase I and Phase II with details on shoulder strengthening.]
Maintenance of Traffic

- Adjacent Bridges Cause Complications
Maintenance of Traffic

- **Shoulder Strengthening** - 3000 ft. (3600 ft. barrier)
- **Temporary Traffic Barrier** (currently shown)?
  - Two lanes of traffic open
  - Can work during day
  - Length of barrier required
- **Barrel Drop with Lane Closure**?
  - Must be in conformance with Lane Closure Policy
- **Not a “Critical Path” item**
Maintenance of Traffic

- Phase III - Not Allowed in June, July or August
- Maximum Duration of 13 Days
Project Site

- Phase IV - Reset to Normal
Maintenance of Traffic

- Phase V - Not Allowed in June, July or August
- Maximum Duration of 13 Days
Maintenance of Traffic

- Coordination
  - Anticipate Back-ups
  - Fluid Maintenance of Traffic Alerts
  - Coordination with Ohio
  - Public Outreach
- BSA in southeast corner - 0.6 acres
BSA

- On an approximate 5.5% slope south
- Rock 3’-4’ below the surface
- All temporary supports must be removed completely after project completion
- Area must be restored to original condition
Construction Staging - SPMT

- Contract Document Requirements - Submittal
  - Provisions based on templates from FHWA and other States
  - Heavy Lift System Details
  - Contingency Plan
  - Temporary Supports (BSA)
  - Monitoring System and Tolerances
  - Schedule
Construction Staging - SPMT

- Installation - After existing structure removed, install Precast Bent Cap
  - Grouted Couplers
  - Corrugated Metal Pipe (CMP) Pocket (Preferable)
Construction Staging - SPMT

- CMP Pocket
Construction Staging - SPMT

- WB Installation - Fairly “Conventional” for SPMT
Construction Staging - SPMT

- Backfill behind Wings and Cap (flowable fill)
- Precast Approach Slabs
  - Full approach slab with concrete transitions 209 k
  - Currently shown as three pieces with Transitions (75 k, 45 k, 45 k)
  - Each concrete transition 8 k
  - Closure pours between sections and between abutment and approach slab
- Roadwork and Appurtenances
Construction Staging - SPMT

- EB Installation - More Complicated
- EB Installation - More Complicated
Construction Staging - SPMT

- EB Installation - More Complicated
- Bridge Rail may be left off during move, but other precautions must be made
- Other than the actual installation, remainder of the activities same as WB
- Each installation needs to be completed in less than the allowable closure time
Contract Document Requirements - Submittal

- Provisions based on templates from FHWA and other States
- Contingency Plan
- Monitoring System and Tolerances
- Schedule
Existing Bridges Built too Close Together

- Causes 1 lane in each direction to be closed in Phase III (A+B)
1’-7 ½” Clearance between Existing and Proposed
Construction Staging - Slide

- End Diaphragm set up to allow for 3 Slide Methods
  - Temporary Slide Shoe with Track
  - Slide on Teflon Bearings
  - Slide on Rollers
Construction Staging - Slide

- End Diaphragm set up to allow for 3 Slide Methods

Temporary Slide Shoe

Slide on Teflon Bearings

Slide on Rollers
Installation

- Once Existing Bridge is removed, slide new WB superstructure into place
- It is important to have a system that is capable of pushing and pulling in case complications arise during installation
- Install Temporary Shoring as required
- Backfill behind diaphragm
- Install Temporary Shoring and Wings
Construction Staging - Slide

- Install Temporary Shoring and Wings
  - Currently shown as MSE Wall
  - Precast Concrete?
Construction Staging - Slide

- Precast Approach Slabs
- Roadwork and Appurtenances
- Repeat for EB Bridge
- Each installation needs to be completed in less than the allowable closure time
Foundation

- Planned to be built while existing bridge is in service
- To minimize foundation size, looking at ways of limiting horizontal force on abutments
  - MSE with straps attached to abutment
  - Expanded Polystyrene Blocks (Geofoam)
  - Cellular Concrete Fill
  - Constructability concerns (access)?
Foundation

- Currently two options shown
- **Spread Footings**
  - Main concern is depth of excavation under bridge and backslope into existing end bent
  - Temporary shoring feasible under bridge
Foundation

- Excavation
Foundation

- **Micropiles**
  - Logical Choice
  - Current Provision is as a “Design Build” Item
  - Provide two configurations with loads and Contractor designs final configuration

![Diagram showing two configurations with load capacities.](image)

- **Configuration 1**:
  - Max Pile Load = 400 k
  - Min Pile Load = -50 k

- **Configuration 2**:
  - Max Pile Load = 200 k
  - Min Pile Load = 0 k
Foundation

- **Micropiles - Testing**
  - Two Verification Tests
  - Proof Test on 5% of piles
  - Testing applies actual loads to installed piles to test grout strength and capacity

- **Micropile Casing**
  - Buy America Clause needs to be satisfied
  - Mill Certification is required
Third Option - Drilled Shaft with Straddle Bent

- Conventionally Reinforced Straddle Bent
- Still need to determine if viable option due to concrete shrinkage between shafts
- May require Straddle Bent to be built first and then connected to drilled shafts
Foundation

- Third Option - Drilled Shaft with Straddle Bent
Foundation

- For Spread Footing and Drilled Shaft Option, abutment would go full width (SPMT and Slide)
- For Micropile option with SPMT, median may use MSE walls with pile sleeves for future widening
Wingwalls and Closures

- Main concern is time within the closure period
- All options are proposing MSE Walls for the outer wings
- Precast concrete or MSE for Median wall closure?
- Precast concrete or MSE for Wing Closure?
Wingwalls and Closures

- MSE or Precast Concrete
- Wing angle cause access concern?
Specialty Item Payment

- Goal is to get usable information for future projects
- SPMT - Payment separated
  - Engineering
  - Temporary Substructure and BSA
  - Installation and other items
  - 50% payment after first move. Remainder after second
Specialty Item Payment

- Goal is to get usable information for future projects
- Slide - Payment separated
  - Engineering
  - Installation and other items
  - 50% payment after first move. Remainder after second
Specialty Item Payment

- Goal is to get usable information for future projects
- Micropile
  - Testing
  - Installation
- All payment made after work completed
Contractor Information

- Prequalification is required for this Project
- http://www.in.gov/indot/2740.htm
Closing Comments

- Current Design Plan Status approximately 60% Complete
- Plan Development Scheduled for Completion October 17, 2016
- Anticipated Letting Date February 8, 2017
- WE APPRECIATE ANY FEEDBACK TO HELP MAKE THIS A BETTER PROJECT!!
QUESTIONS/ COMMENTS?

Topics

- Barrel Drop versus TTB during Phase I & II
- Slide Option - 1’-7 ½” clearance between bridges
- Precast Concrete Closures or MSE
- Excavation/ backfill for new abutment (shoring)
Future Questions/ Comments

Additional Questions/ Comments can be sent to the INDOT Project Manager until 5:00 p.m. 3/18/2016. Comments and Responses will be compiled and put on the website for the project.

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http://www.in.gov/dot/div/contracts/abc/i70/i70.htm