

I-70 over SR 121 Pre-Bid Meeting

March 4, 2016



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Meeting Objectives

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



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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



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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



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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**



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Current Plan Set

- Dual Design (Bid Option)
 - Superstructure Installation Method

SPMT

(Self-Propelled Modular Transporters)



UDOT 4500 South over I-215

Slide-In



ODOT OR 213 over Washington St.



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Current Plan Set

- **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

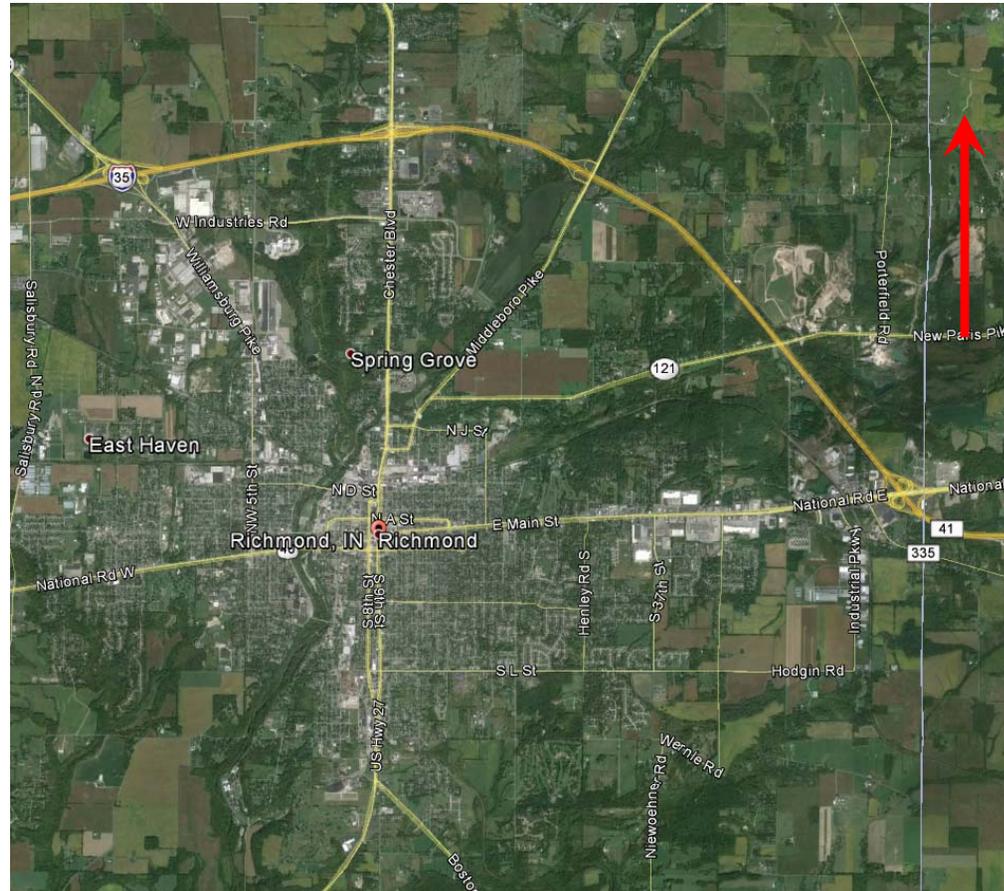


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Project Site

- I-70 over SR 121 just outside of Richmond



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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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- Overhead Utilities on west edge of project



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



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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

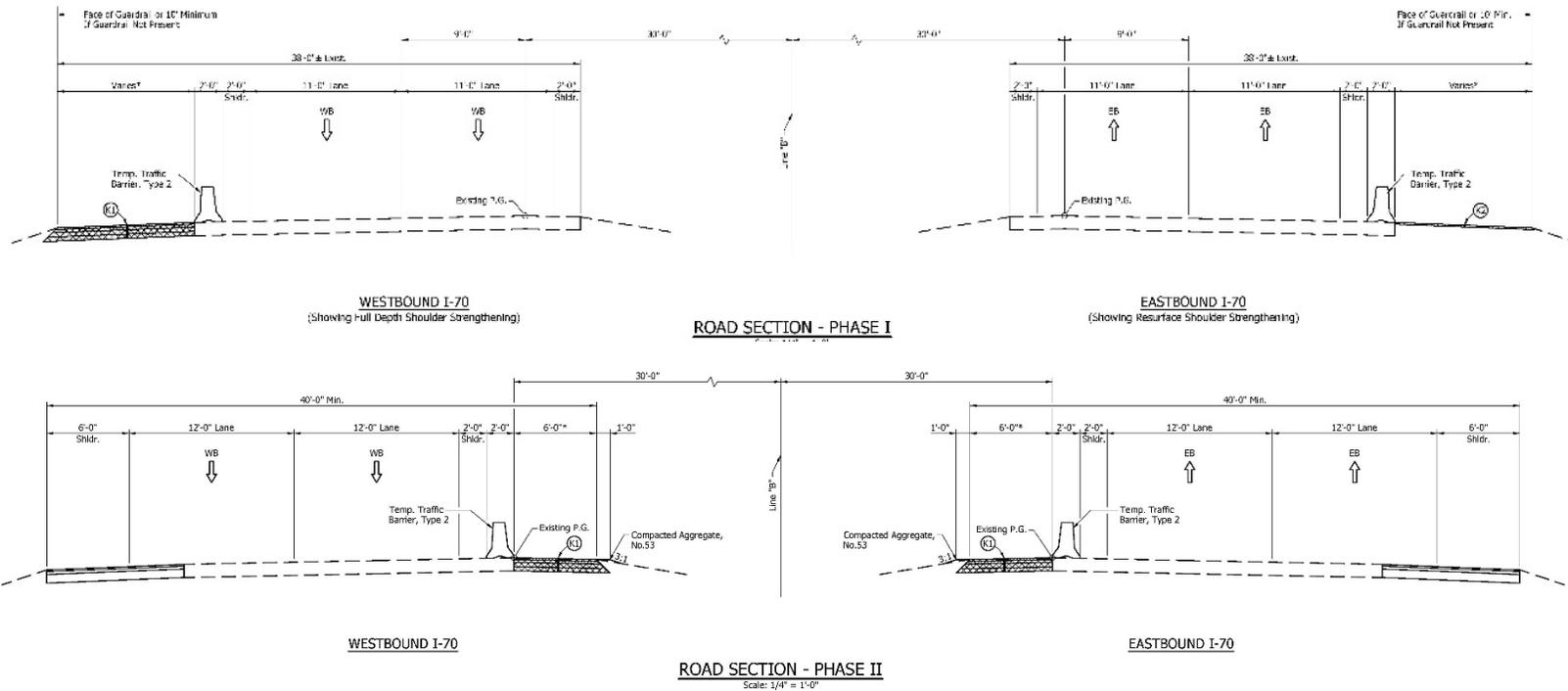


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Maintenance of Traffic

Phase I & Phase II – 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**

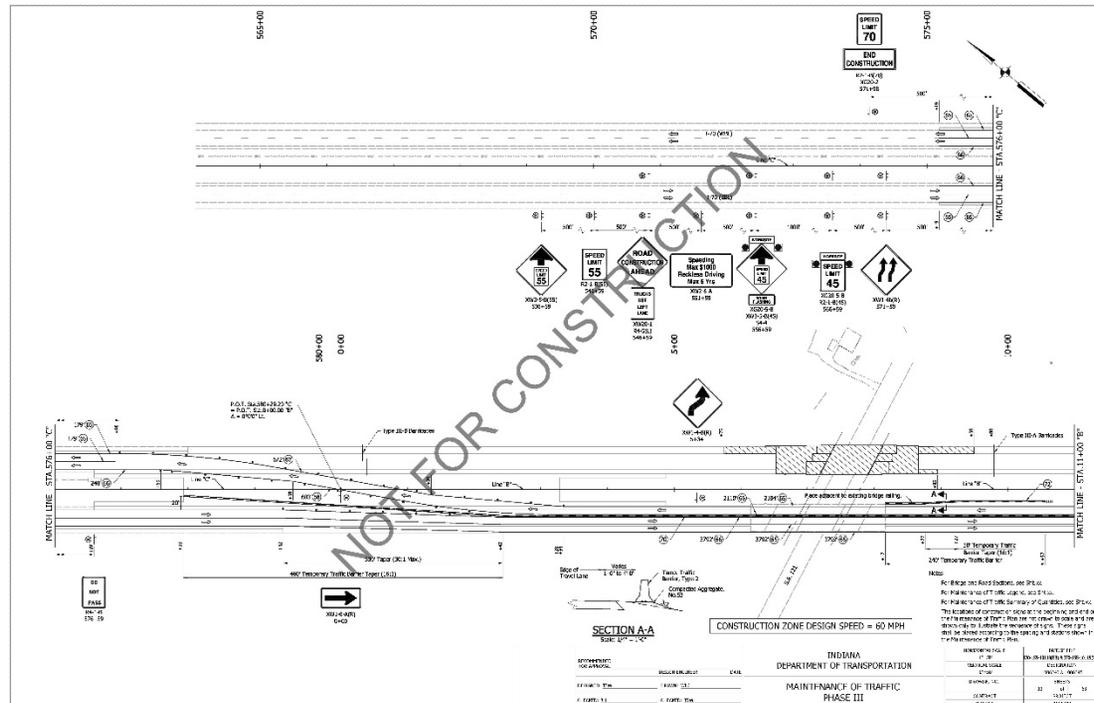


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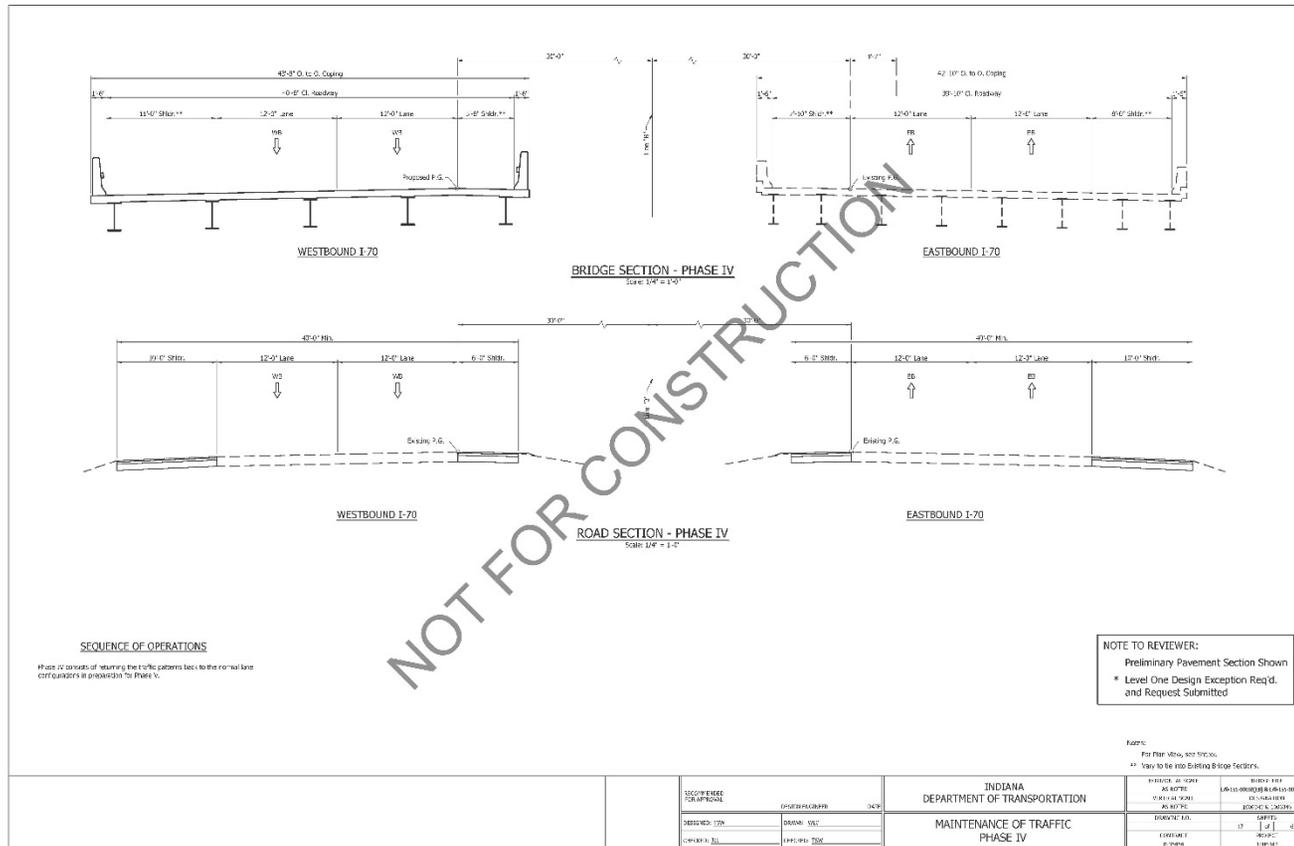
Maintenance of Traffic

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



Project Site

- Phase IV – Reset to Normal

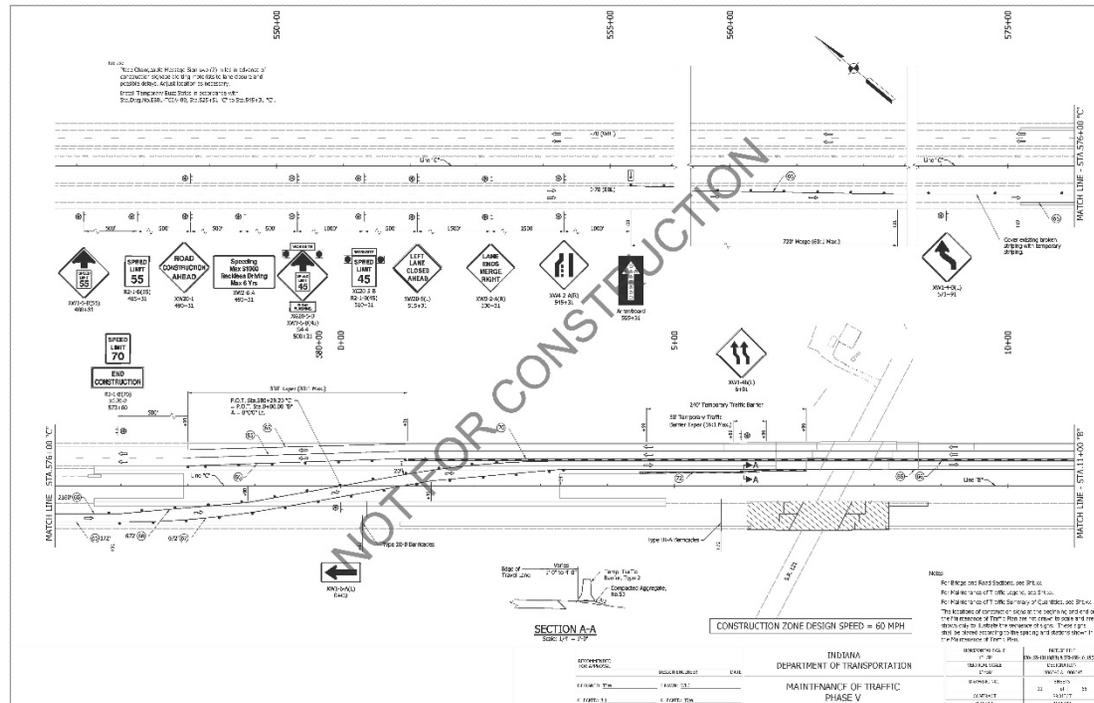


NOT FOR CONSTRUCTION



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**

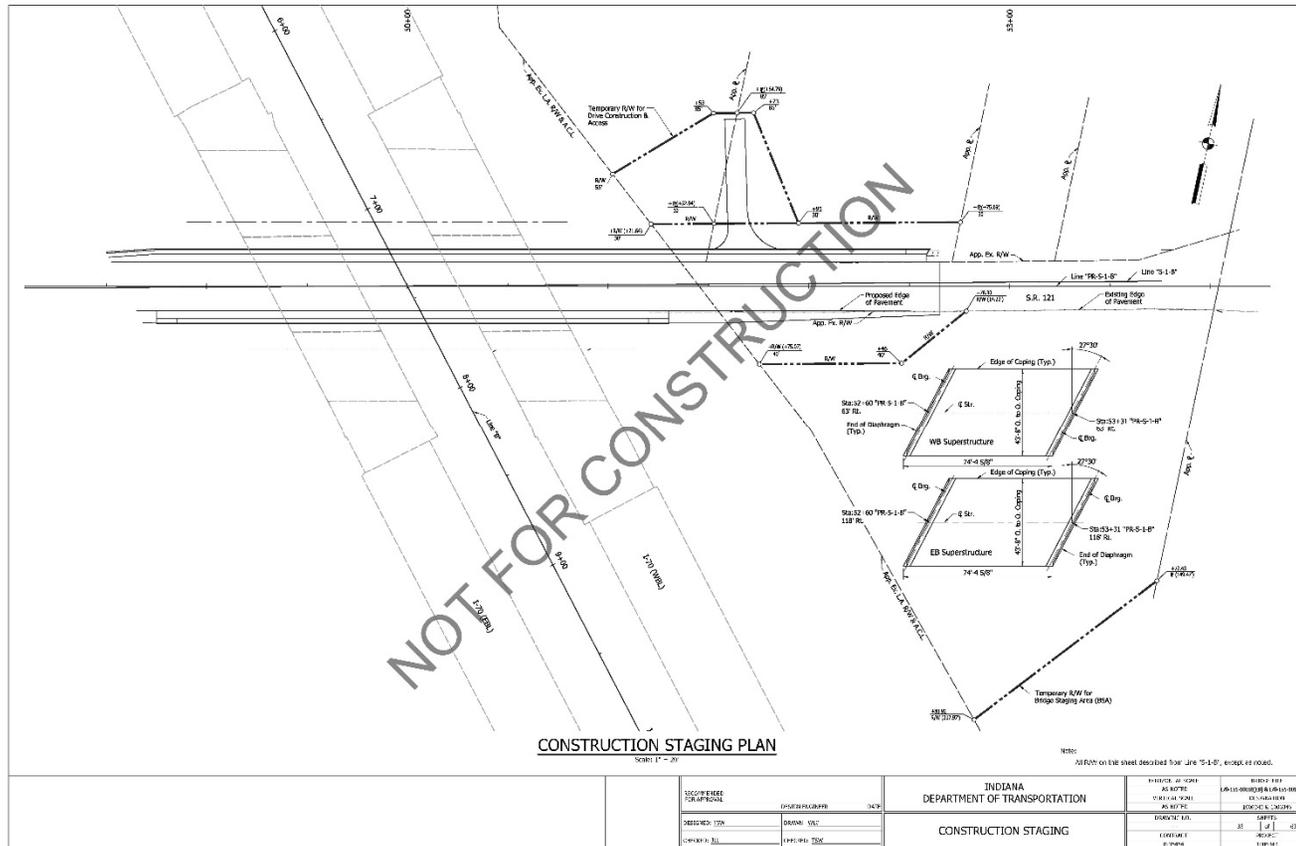


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Construction Staging - SPMT

- BSA in southeast corner - 0.6 acres



Construction Staging - SPMT

- **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



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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

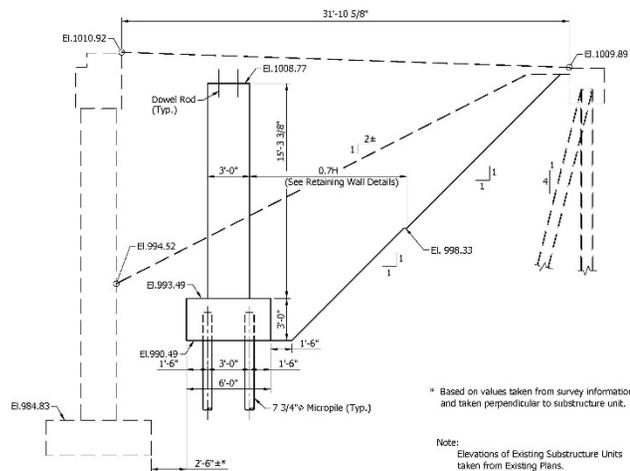


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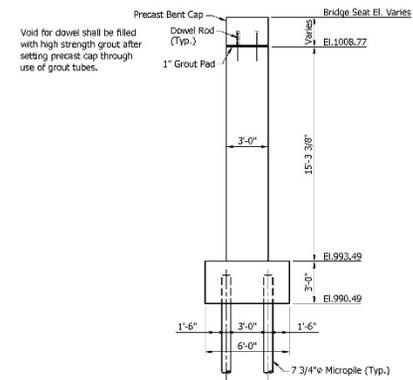


Construction Staging - SPMT

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



SECTION A-A
PRIOR TO EXISTING BRIDGE REMOVAL
Scale: 1/4" = 1'-0"

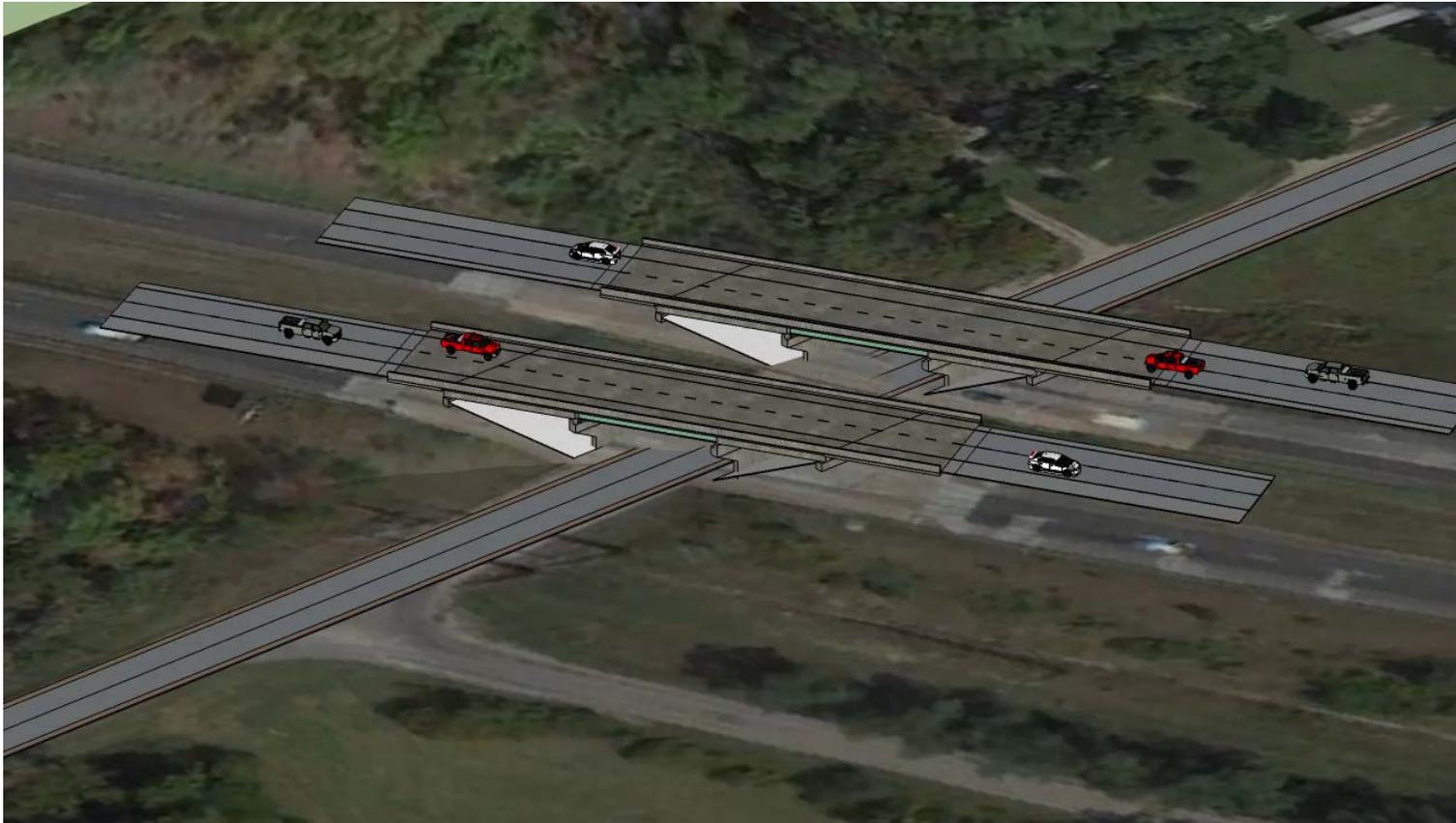


SECTION A-A
AFTER EXISTING BRIDGE REMOVAL
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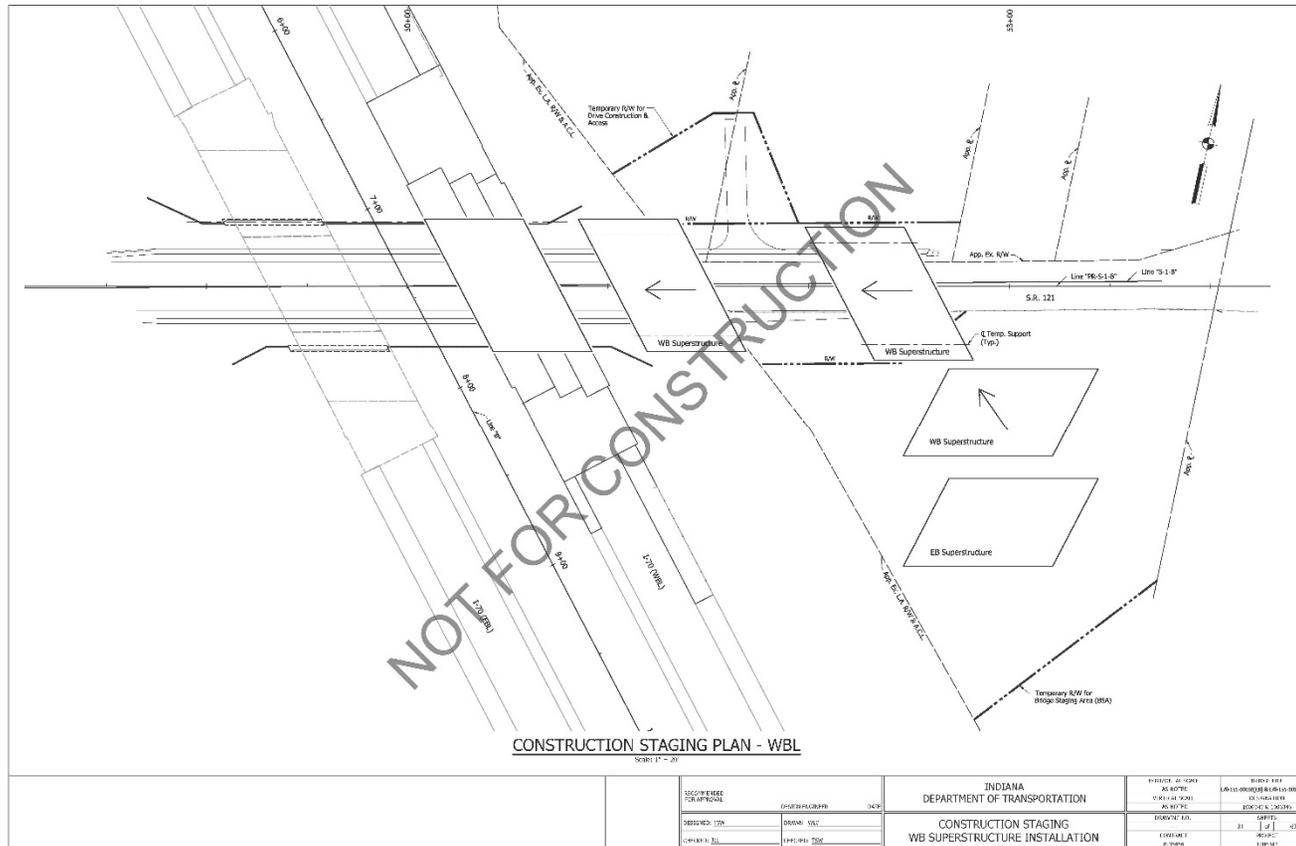
Construction Staging - SPMT

- 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

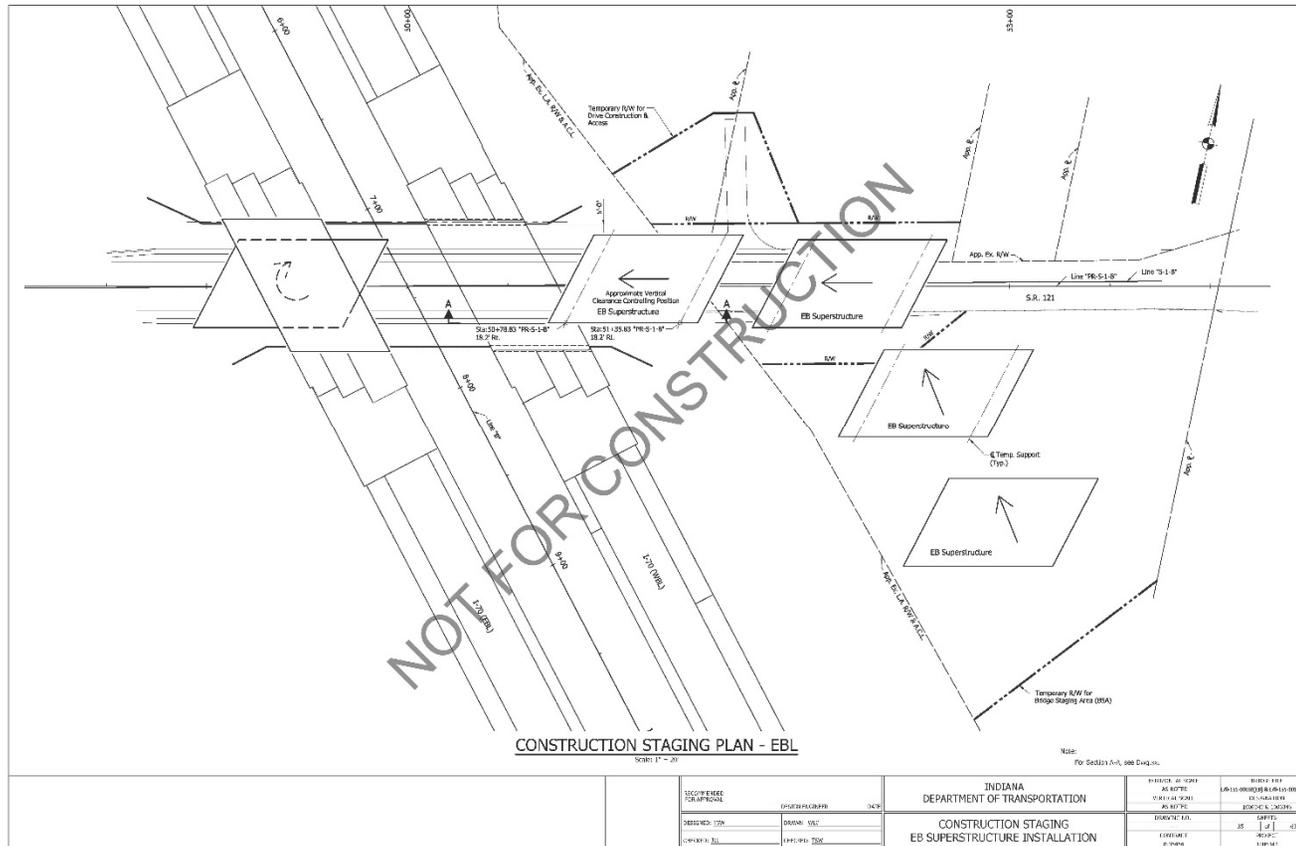


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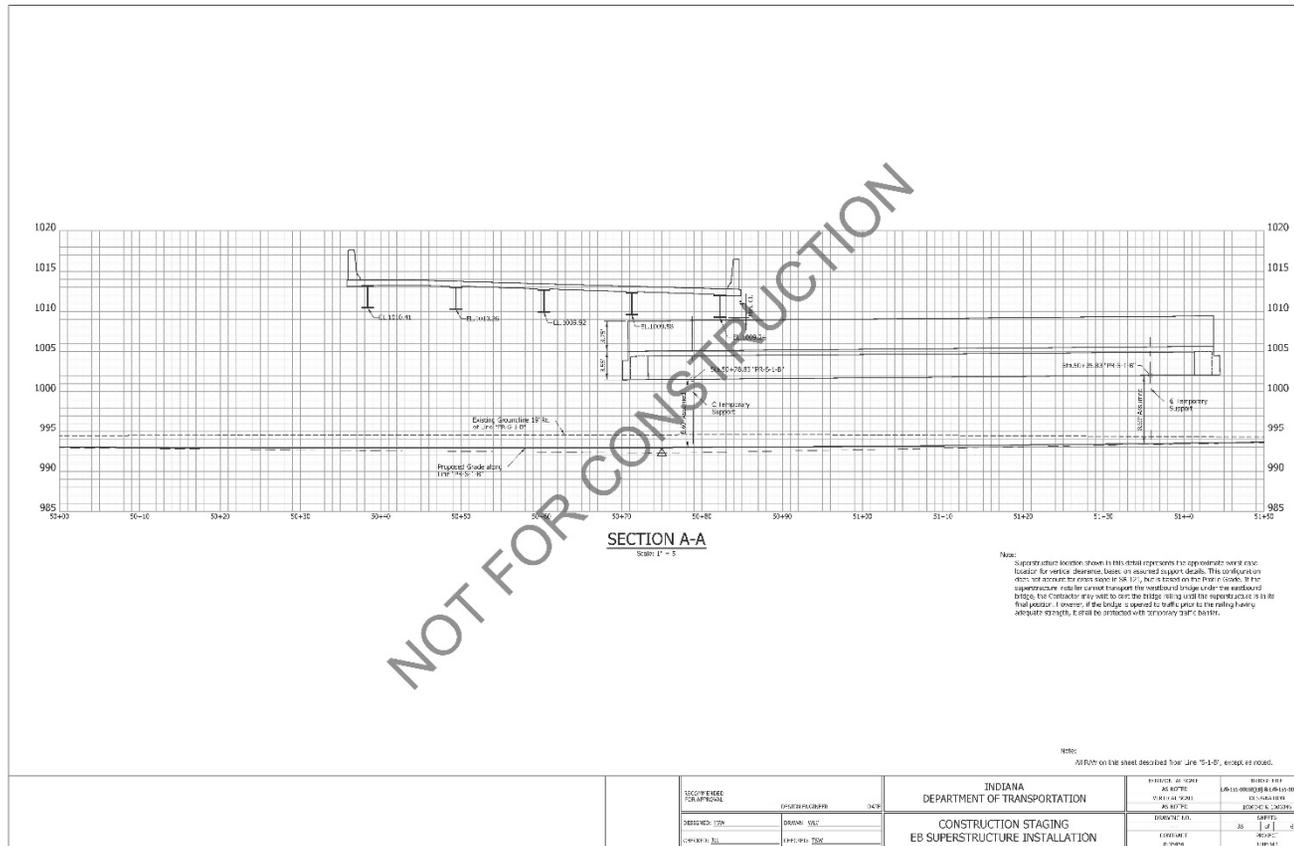
Construction Staging - SPMT

- EB Installation – More Complicated



Construction Staging - SPMT

- 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**



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Construction Staging - Slide

- **Contract Document Requirements - Submittal**
 - Provisions based on templates from FHWA and other States
 - Contingency Plan
 - Monitoring System and Tolerances
 - Schedule

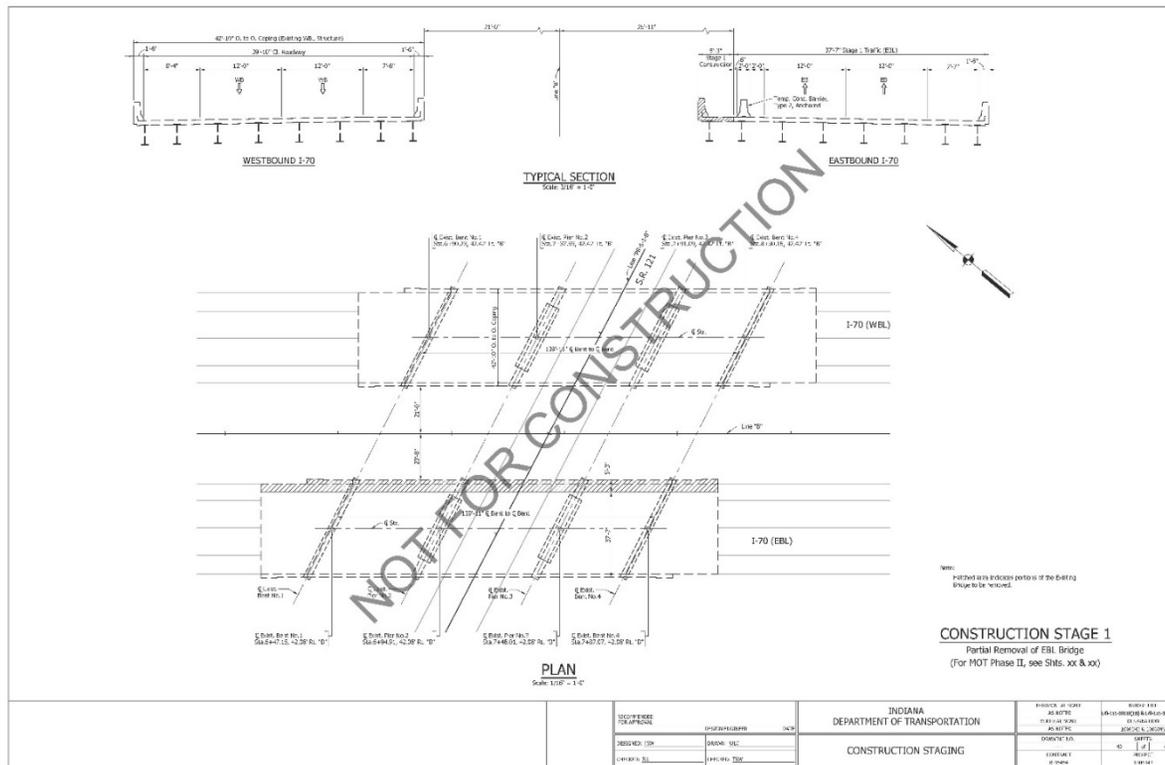


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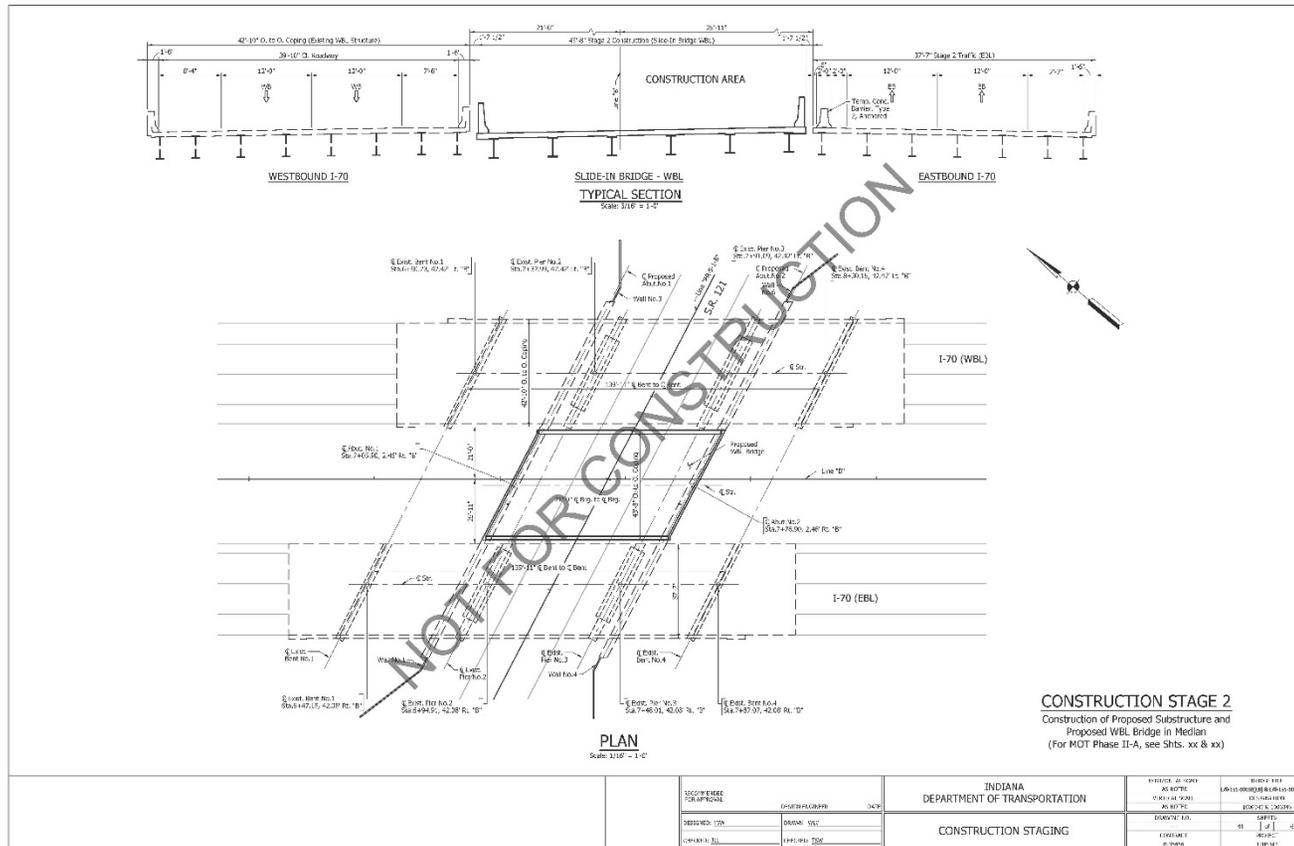
Construction Staging - Slide

- Existing Bridges Built too Close Together
 - Causes 1 lane in each direction to be closed in Phase III (A+B)



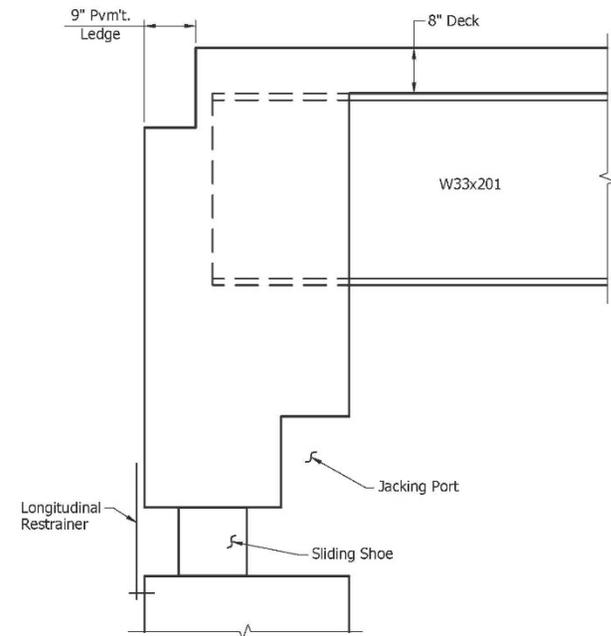
Construction Staging - Slide

- 1'-7 1/2" 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

Construction Staging - Slide

■ 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

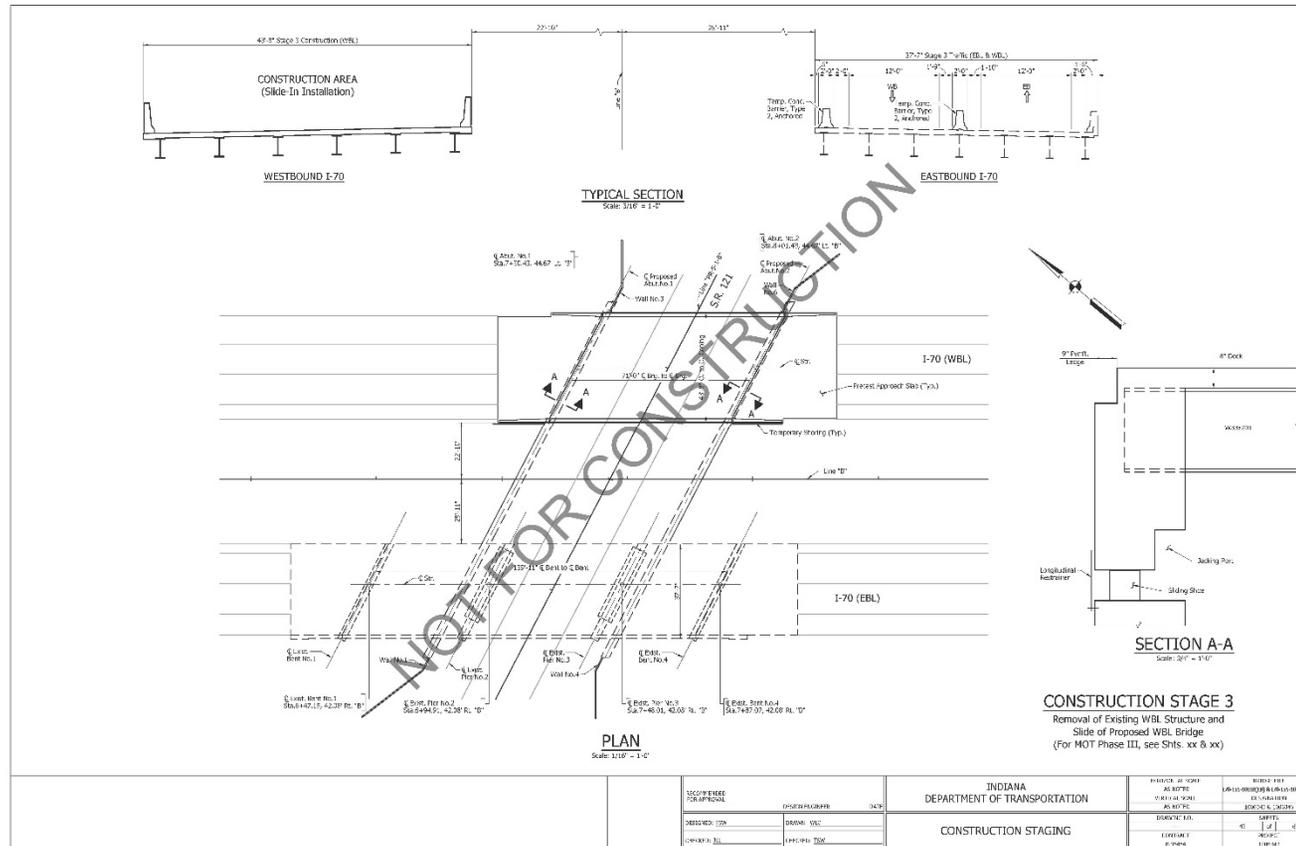


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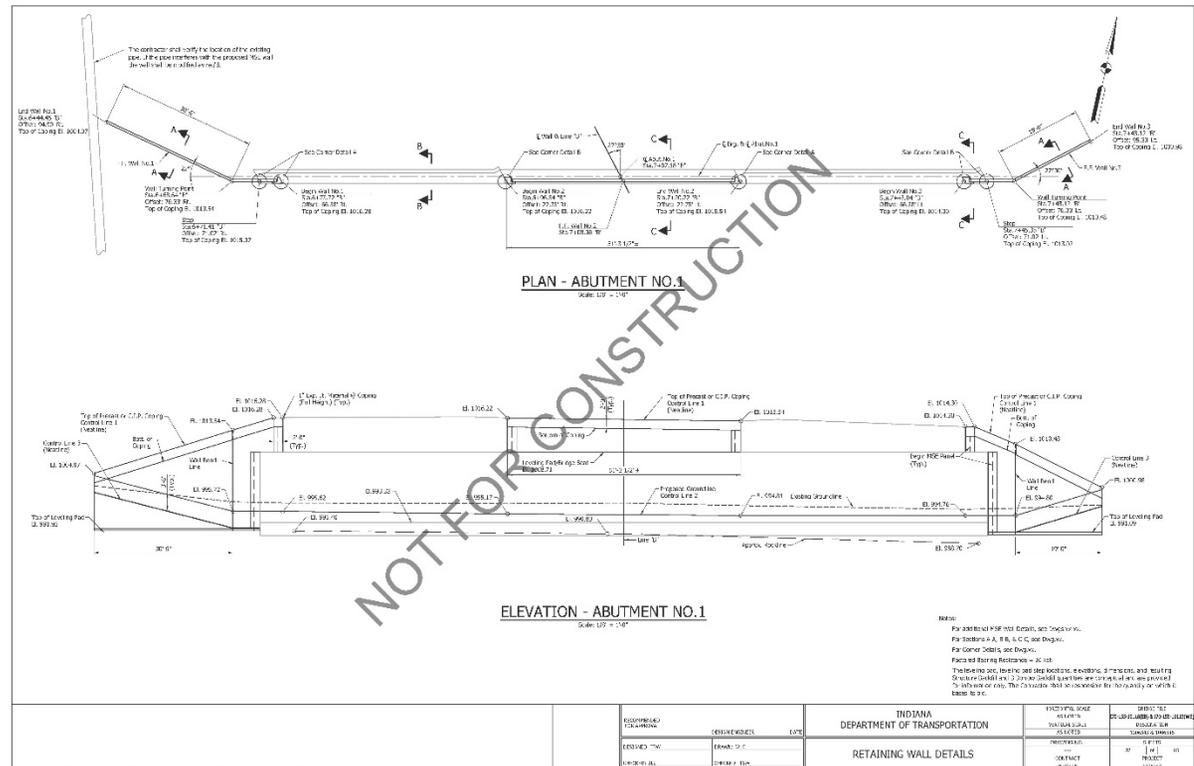
Construction Staging - Slide

- 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**



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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)?



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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**

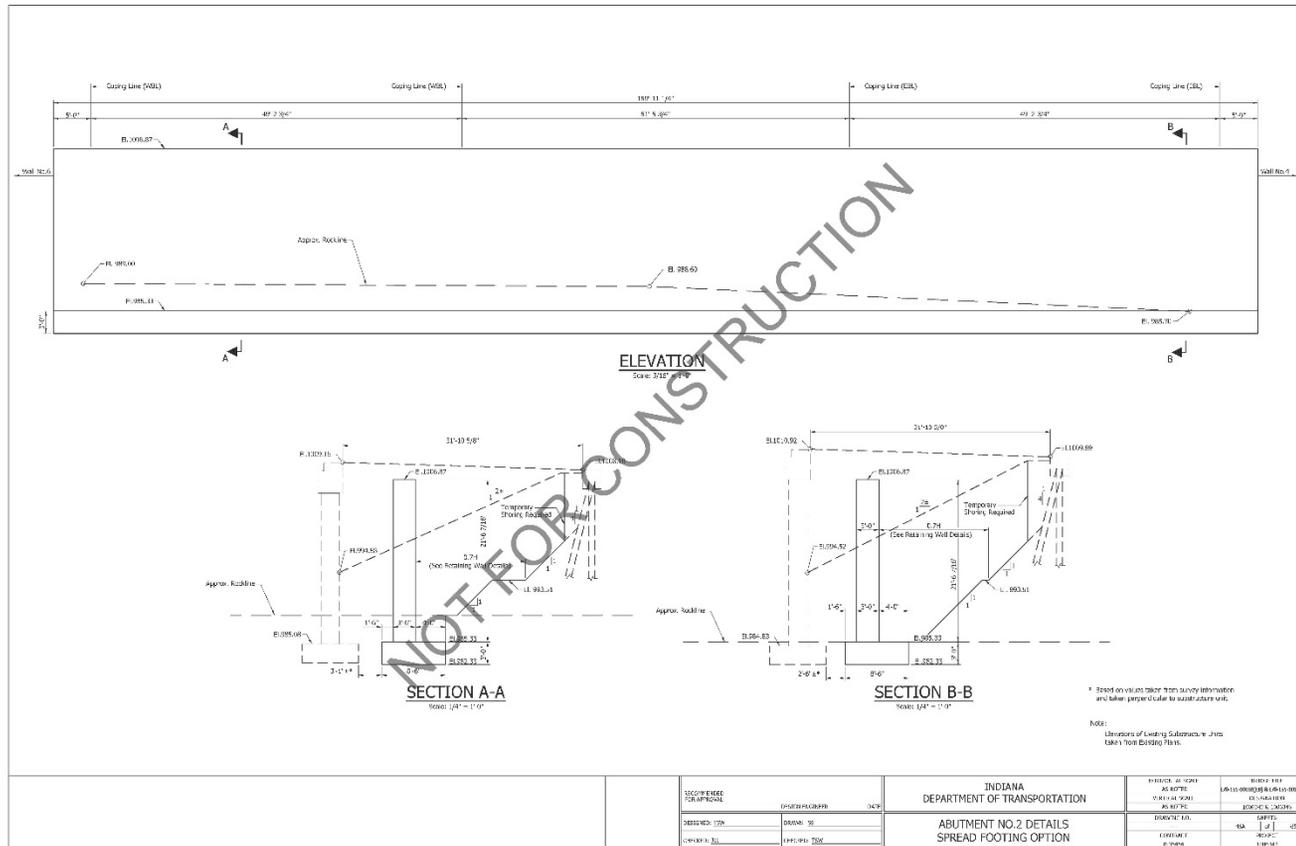


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Foundation

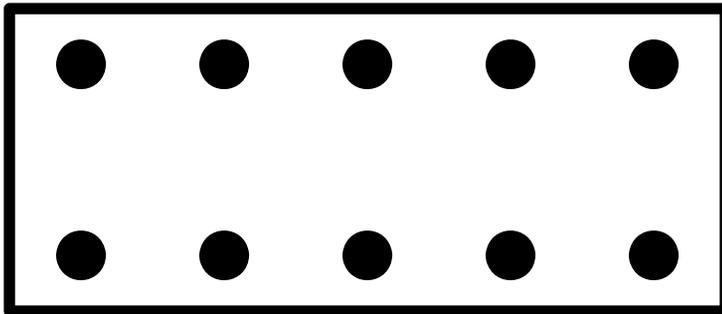
- Excavation



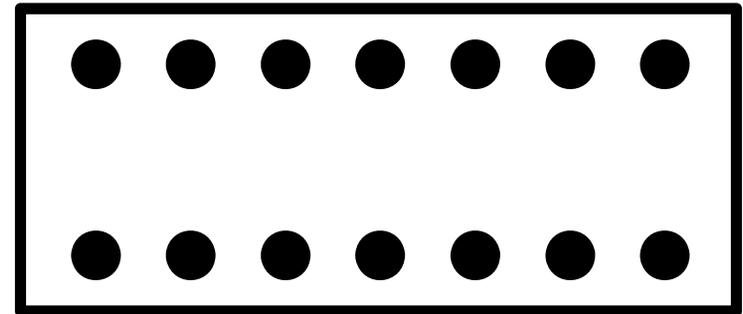
Foundation

■ Micropiles

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



Max Pile Load = 400 k
Min Pile Load = -50 k



Max Pile Load = 200 k
Min Pile Load = 0 k



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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



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Foundation

- **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**



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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



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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?

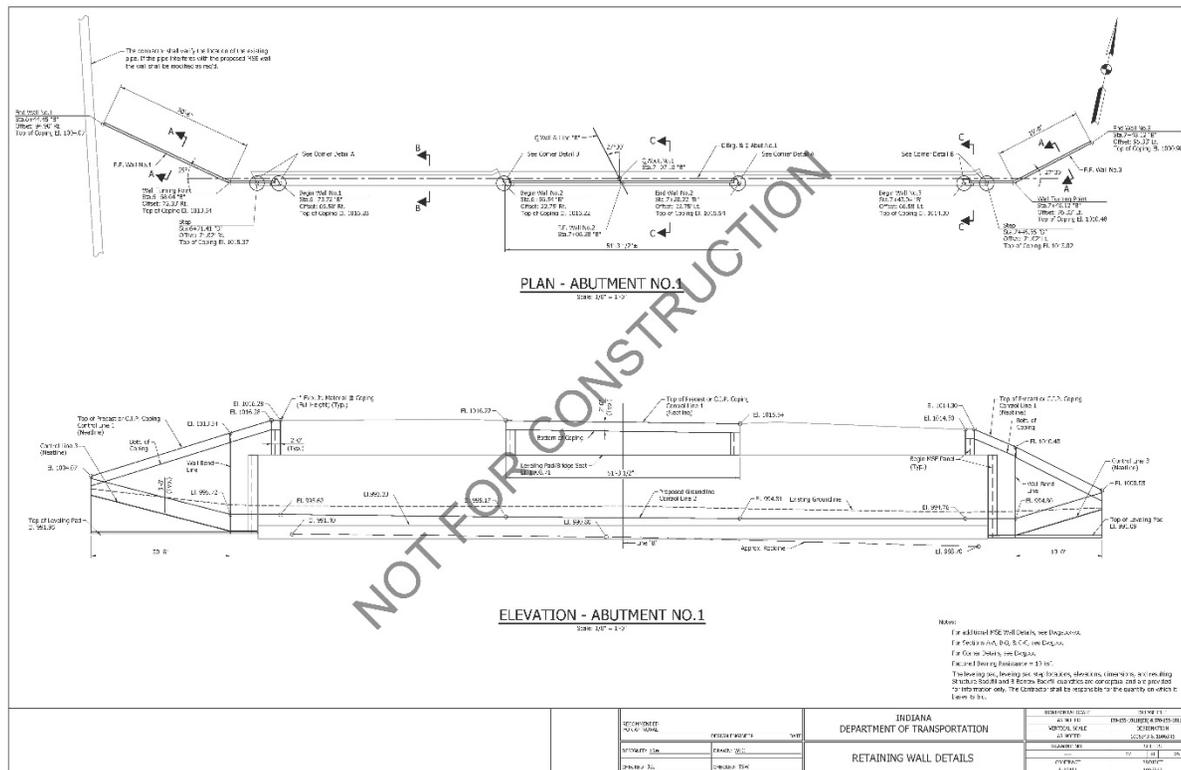


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Wingwalls and Closures

- 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



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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



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Specialty Item Payment

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



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Contractor Information

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



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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!!**



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Closing Comments

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)



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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

jwooldridge@indot.in.gov

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



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