

Copy 1 of 10 Copies
(Original)

VOLUME I Technical Proposal



A Design-Build Project

Replacement of I-81 Bridges
over Rte. 11,
Norfolk Southern Railroad &
Middle Fork Holston River,
Smyth County, Virginia

December 6, 2018

State Project No.: 0081-086-742, P101,
B659; 0081-086-818, B663
Federal Project No.: BR-081-1(336);
NHPP-081-1(351)

Contract ID Number: C00097555DB102

Submitted By:



in conjunction with



Subconsultants:



4.1

LETTER OF SUBMITTAL

December 6, 2018

Mr. Suril R. Shah, P.E.
Alternative Project Delivery Division
Virginia Department of Transportation
1401 East Broad Street, Annex Building, 8th Floor
Richmond, VA 23219

**Re: Letter of Submittal - Design-Build Project - Replacement of I-81 Bridges over Rte. 11, Norfolk Southern (NS) Railroad & Middle Fork Holston (M.F.H.) River, Smyth County, Virginia
Contract ID Number: C00097555DB102**

Dear Mr. Shah,

Orders Construction Company, Inc. (Orders), as the Offeror, is pleased to submit to the Virginia Department of Transportation (VDOT) our Letter of Submittal and accompanying Technical Proposal and Attachments in response to the Request for Proposal (RFP), for the Replacement of I-81 Bridges over Rte. 11, NS Railroad & M.F.H. River Project (Project). Orders has teamed again with our lead designer **Whitman, Requardt & Associates, LLP (WRA)** to deliver this important project for VDOT.

- 4.1.1 Full legal name and address of the Offeror:** Orders Construction Company, Inc.,
501 Sixth Avenue, Saint Albans, WV 25177.
- 4.1.2 Offeror's intent to enter into a contract with VDOT:** Orders Construction Company, Inc., if selected, will enter into a contract with VDOT for the Project in accordance with the terms of this RFP.
- 4.1.3 Offer will remain in full force and effect for one hundred twenty (120) days:** Pursuant to Part 1, Section 8.2, Orders Construction Company declares that the offer represented by the Technical and Price Proposals will remain in full force and effect for one hundred twenty (120) days after the date the Technical Proposal is submitted to VDOT.
- 4.1.4 Point of Contact for the Offeror:** Charlie Stokes, Vice President
Address: 605 Lithia Road, Wytheville, VA 24382
Tel: 276.227.0378 (P), 276.223.0134 (F)
Email: cstokes@ordersconstruction.com
- 4.1.5 Principal Officer for the Offeror:** Nathaniel R. Orders, President
Address: 501 Sixth Avenue, Saint Albans, WV 25177
Tel: 304.722.4237 (P), 304.722.4230 (F)
Email: nate@ordersconstruction.com
- 4.1.6 Interim Milestone Date:** N/A **Final Completion Date:** May 23, 2022
- 4.1.7 Unique Milestone dates:** N/A. Orders is not proposing any Unique Milestone date as part of this proposal.
- 4.1.8 Executed Proposal Payment Agreement:** An Executed Proposal Payment Agreement is included in Appendix, in the form set forth in Attachment 9.3.1 Proposal Payment Agreement.

4.1.9 Certification Regarding Debarment Form: Executed copies of the Certification Regarding Debarment Forms as set forth in Part 1, Section 11.8.6 are provided in Appendix, Attachment 11.8.6 (a) and (b) Certification Regarding Debarment Forms.

4.1.10 DBE Commitment: The Orders Construction Company, Inc. is committed to achieving four percent (4%) DBE participation goal for the entire value of the contract.

The Orders|WRA Design-Build Team has thoroughly evaluated VDOT's RFP requirements, Conceptual Design, and additional information provided with the RFP. We have conducted numerous site visits and collaborated intensively to develop our own Conceptual Design that *provides clear, significant improvements and value to the project and to VDOT* when compared to the RFP Conceptual Design.

We sincerely appreciate the opportunity to make this proposal and are confident that you will find that it substantiates our claim for providing the Department with outstanding initial value and reduced maintenance costs into the future.

Sincerely,



Nathaniel R. Orders
President

4.2

OFFEROR'S QUALIFICATION

4.2 OFFEROR'S QUALIFICATIONS

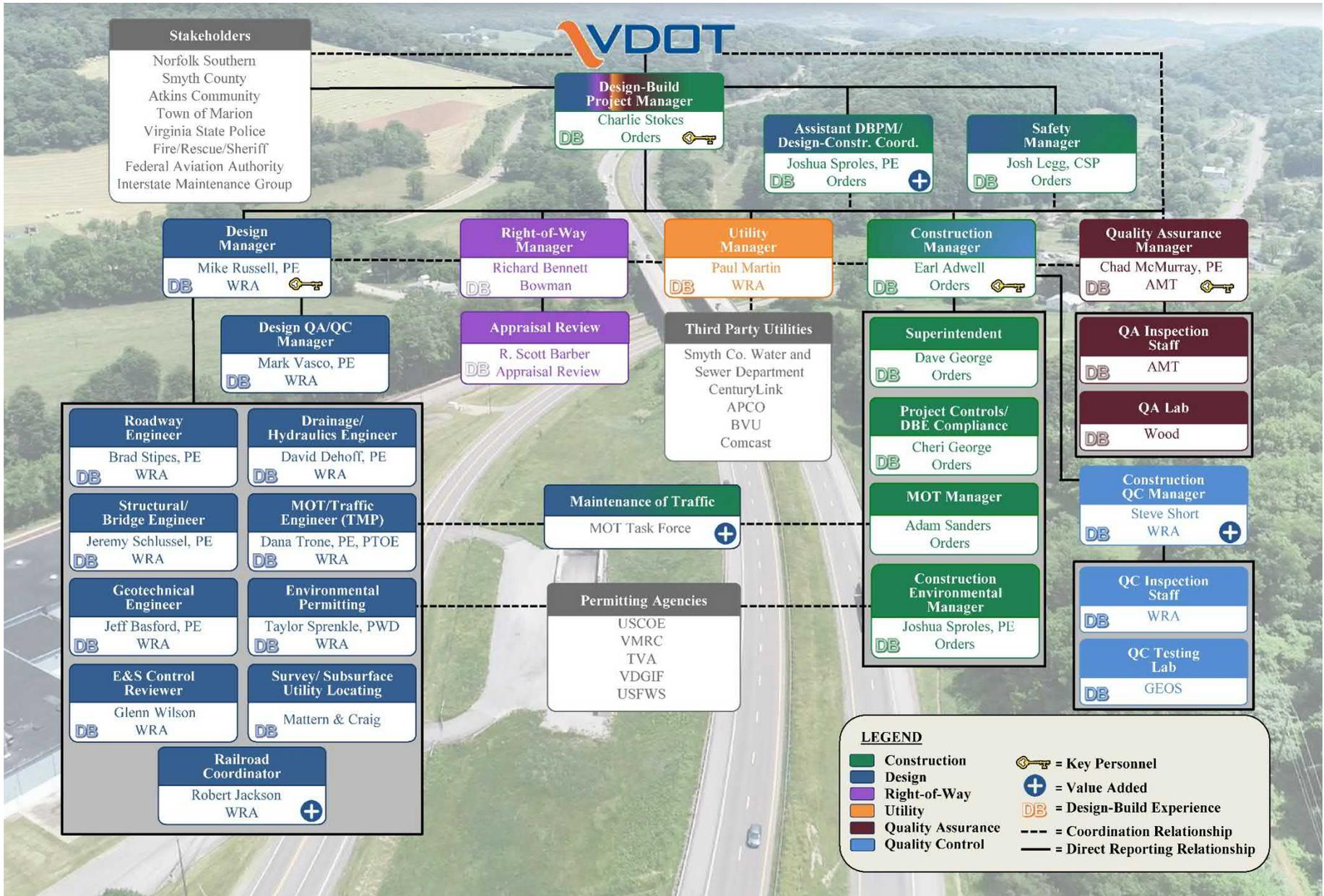
4.2.1 SOQ Statement

The information and statements made in our SOQ remain true and accurate. **No** changes have been made to our organizational structure, Lead Contractor, Lead Designer, Key Personnel or other individuals identified in our SOQ. *Charlie Stokes, DBPM, has continued to lead our Team through the technical proposal process.*

4.2.2 Organizational Chart

The Orders|WRA Design-Build Team's organizational chart is presented on the following page and identifies the chain of command for each team member along with their function and reporting relationships that will be followed throughout the design and construction of the project. This organizational structure is **identical** to what was submitted in the SOQ. As there are no changes to the proposed staffing from that presented in the original Orders|WRA SOQ, a revised organizational narrative is not required per the RFP.

4.2.2 ORGANIZATIONAL CHART



4.3

DESIGN CONCEPT

4.3 DESIGN CONCEPT

The Orders|WRA Design-Build Team Conceptual Design fully embraces the Design-Build approach and believes that this delivery method will continue to grow in the future. With this in mind, we have forged a strong and lasting partnership between Orders and WRA and we are fully committed to partnering with the Department to deliver this and future Design-Build projects successfully.

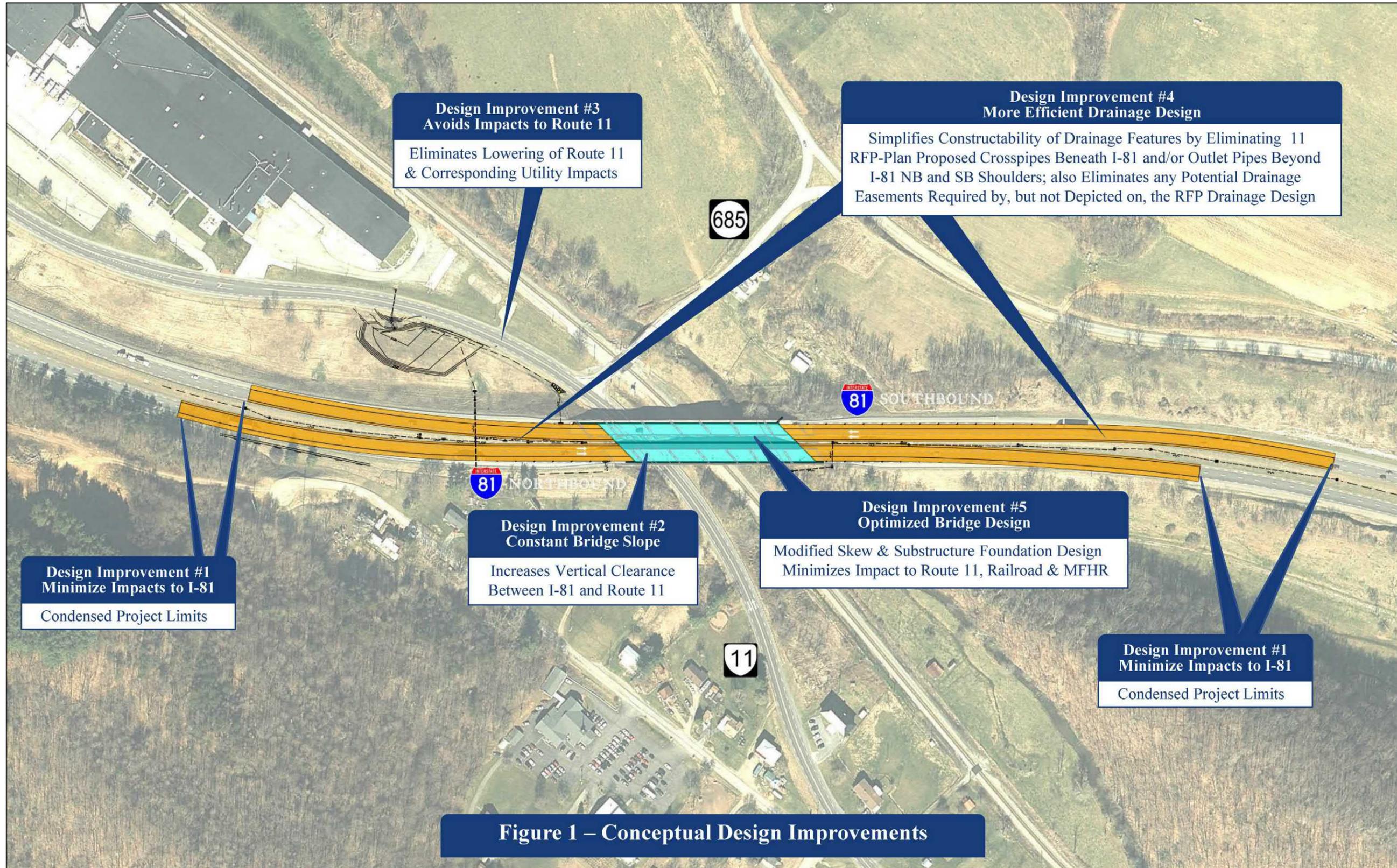
Our design concept for this project begins with the first-hand working knowledge our team members have of the project vicinity, traffic patterns - and perhaps most importantly – the specific constraints for replacing these bridges. Most of our key staff live nearby and we travel the I-81 corridor in this area regularly. As a Design-Build team, we recently completed a project along I-81 in Washington County with several similarities including a very narrow median, a roadway crossing, a stream crossing, complex MOT, and high traffic volumes with high truck percentages. With this working knowledge and highly relevant Design-Build experience along I-81 in Southwest Virginia as an important foundation, Design Manager **Mike Russell, P.E., DBIA** has led the Team through a detailed Conceptual Design process including the following:

- ✓ Thorough review of VDOT’s RFP Package (plans, documents, reports, formal Q&A, etc.)
- ✓ Multiple site visits and team meetings between Orders and WRA to brainstorm/assess alternative ideas
- ✓ Extensive, formal Conceptual Design process to thoroughly investigate ideas
- ✓ A Proprietary Meeting with VDOT (including follow-up clarifications from meeting minutes, etc.)
- ✓ Refinement of the Orders|WRA Design-Build Team Conceptual Design presented in this proposal

Our internal Conceptual Design process, between seasoned design and construction professionals from both Orders and WRA, has already been a highly collaborative one. Our Team’s formal coordination with VDOT through the prescribed process in the RFP has been equally collaborative and productive. Our approach to the final design will continue this same approach – namely, regular design/construction interaction and collaboration throughout the design process. Under the leadership of **Charlie Stokes as DBPM** our Team will be focused on delivering a final design that is completely in sync with Orders’ construction means and methods. Key to this success will be Mike Russell as Design Manager and Josh Sproles as Design-Construction Coordinator. Collectively Charlie, Mike, and Josh will ensure the team remains fully integrated and focused on partnering, quality, and success. The result of these efforts is that ***the Orders|WRA Design-Build Team is providing a project design and approach that meets or exceeds the RFP Technical Requirements while providing increased value by leveraging extensive Design-Build experience to achieve VDOT’s defined Project Priorities:***

- ✓ **Cost** – We have provided a Conceptual Design that ***reduces cost*** and ***increases value*** of improvements
- ✓ **Design Concept** - Our Conceptual Design better targets VDOT’s defined purpose and need of the project (bridge replacement), and either meets or exceeds the RFP requirements
- ✓ **Construction of the Project** – Our construction approach is sound and field-proven
- ✓ **Project Approach** – We have identified and either eliminated or mitigated the major project risks

We have worked diligently as a Team of technical and construction professionals to explore and identify project constraints, potential risks, and stakeholder interests/concerns in developing the Conceptual Design that is presented in Volume II of this proposal. For emphasis, ***the Orders|WRA Design-Build Team’s Conceptual Design meets or exceeds all the RFP Design Technical Requirements established in Part 2 of the RFP document, and subsequent addendums. Our Conceptual Design also delivers several Design Improvements over the RFP Conceptual Design that provide significant Value-Added Benefits to the project.*** These improvements are depicted in Figure 1 and described below on the following pages.



Design Improvement #1 – Minimize Impact to I-81

The Orders|WRA Design-Build Team Conceptual Design simplifies project construction by adjusting the RFP Conceptual alignment with shorter connections to existing I-81 on both sides of the bridges. These curves are superelevated to current VDOT standards to improve driver comfort and expectations as they approach and depart the bridge in both directions. This design improvement also ***eliminates*** the widening of NB I-81 to the outside (as proposed by the RFP Conceptual Design), simplifying construction and maintenance of traffic.

The following are *Value-Added Benefits* of this *Design Improvement*:

- ✓ Targets the Improvements to the Project’s “Purpose and Need”
- ✓ Significantly less mainline work required (i.e. reduced traffic impacts and construction duration)
- ✓ Simplified construction by eliminating I-81 NB widening to the outside
- ✓ Safer and more efficient Maintenance of Traffic
- ✓ Eliminated need for potential temporary or permanent easements and/or retaining walls
- ✓ Reduced project cost

Design Improvement #2 – Constant Bridge Cross Slope

The Orders|WRA Design Build Team Conceptual Design proposes a bridge with a constant 2% cross slope in the same direction for both NBL and SBL. This allows for smoother and safer transitions to the bridge, especially in the NB direction. An additional benefit of this design improvement is increased vertical clearance over Route 11 by ***raising***, instead of ***lowering*** (as the RFP plans depicted), the eastern half of the bridge.

The following are *Value-Added Benefits* of this *Design Improvement*:

- ✓ Increases vertical clearance between I-81 and Route 11
- ✓ Eliminates the need to realign Route 11 for future widening of I-81
- ✓ Enhances rideability and safety in both northbound and southbound directions
- ✓ Reduces project cost

Design Improvement #3 – Avoids Impact to Route 11

The Orders|WRA Design-Build Team Conceptual Design significantly improves the RFP Conceptual Design by eliminating virtually all impacts to Route 11 (including during the future widening of I-81). The refined I-81 profile and bridge cross slope, and the resulting increased vertical clearance achieves the required vertical clearance over both Route 11 and the Railroad, thereby eliminating unnecessary reconstruction of Route 11.

The following are *Value-Added Benefits* of this *Design Improvement*:

- ✓ Eliminates the lowering of Route 11 as depicted in the RFP Conceptual Design
- ✓ Eliminates the need to realign Route 11 for future widening of I-81
- ✓ Eliminates utility impacts along Route 11 (water, sewer, and fiber optic communication lines).
- ✓ Reduces project cost

Design Improvement #4 – More Efficient Drainage Design

The Orders|WRA Design-Build Team Conceptual Design greatly improves and simplifies the constructability of drainage features required by the project. Our Design Improvement is achieved by condensing the project length, combining multiple culverts into a single crossing, and combining multiple outfalls of the median drainage into a single outfall for each side of the bridge. Our design eliminates eleven (11) RFP-Plan proposed crosspipes beneath I-81 and/or outlet pipes beyond the I-81 NB and SB shoulders. Several of these eliminated

crosspipes would most likely have required expensive boring or micro-tunneling to install the pipes under traffic. Finally, this also eliminates several corresponding drainage easements that would likely have been required by the RFP Concept. The specific RFP-Plan proposed pipes that our design has eliminated are SB I-81 Sta. 204+05; 212+10; 216+60; 222+30; NB I-81 Sta. 118+00; 127+05; 130+05; 133+95; 142+10; 147+20; and 150+10.

The following are *Value-Added Benefits* of this *Design Improvement*:

- ✓ Reduces the number of drainage outfalls
- ✓ Eliminates need for permanent drainage easements that would have been required
- ✓ Improves Constructability
- ✓ Eliminates multiple jack and bore pipe/micro-tunneling installations
- ✓ Reduces project cost

Design Improvement #5 – Optimized Bridge Design

As presented at the Proprietary Meeting, the Orders|WRA Design-Build Team proposes a replacement structure with a modified skew and substructure foundation design that minimizes impacts to the Railroad, Route 11, and to the Middle Fork Holston River while facilitating the future widening of I-81. In fact, the location and angle of Pier 1 is completely outside the clear zone for Route 11, eliminating the need for any pier protection or guardrail along this section of Route 11. The elimination of these hazards will provide the travelling public with a safer roadway and will provide VDOT with reduced maintenance costs in the future. Our bridge design also includes a widened footer to facilitate the future widening of I-81. This will allow the future widened abutment to rest on the existing footer providing for logical transition to the widened abutment

The following are *Value-Added Benefits* of this *Design Improvement*:

- ✓ Improves Constructability
- ✓ Reduces existing and proposed safety hazards along Route 11
- ✓ Modified bridge skew eliminates encroachment into the Norfolk Southern 80' clear zone requirement during the future widening of I-81
- ✓ Extended footer facilitates future widening of I-81
- ✓ Eliminates the need to realign Route 11 (horizontally or vertically) to accommodate future widening of I-81
- ✓ Reduces project cost

4.3.1 Conceptual Roadway Plans

The Orders|WRA Conceptual Design provided in Volume II of this submittal meets or exceeds the RFP, VDOT, and AASHTO requirements for the project, including all criteria found in Attachment 2.2 of the RFP Technical Requirements (Part 2), and is contained completely within the existing right-of-way and requires no additional design exceptions or waivers other than the approved ones identified in the RFP. As noted above, the drainage design eliminates the need for any additional drainage easements and contains all stormwater management facilities on the existing right of way. The roadway geometry assumes future widening will be to the outside of the proposed travel lanes and the vertical alignment for I-81 facilitates this widening by eliminating any future impact to Route 11.

Specific design features are as follows:

- (a.) General geometry including horizontal curve data and associated design speeds, the number and widths of lanes and shoulders

The design geometry for each key roadway design element is provided in the below table:

Roadway	Geometric Design Standard	Design Speed (MPH)	Number and Width of Lanes (each direction)	Roadway Shoulder Width	Paved Shoulder Width	Bridge Shoulder Width
Interstate 81	GS-1 (Rolling Terrain)	70	2 – 12'	12' or 16' w/ Guardrail Per GS-1	4' Left 10' Right Per GS-1	6' Left 12' Right
Route 11*	GS-2 (Rolling Terrain)	60	1 – 12'	8' (Approved Design Waiver)	8' per GS-2	N/A

Table 1–Roadway Geometry

**Shown for informational purposes only since our Conceptual Design does not impact Route 11.*

(b.) Horizontal alignments

The horizontal curves and alignments that the Orders|WRA Design-Build Team are proposing in our Conceptual Design all meet or exceed the minimum radii for all required design speeds. The tabulation of our proposed horizontal curve data contrasted with VDOT Geometric Standards and the RFP Plans is shown on Table 2.

The RFP Conceptual Design incorporated significantly longer horizontal curves approaching and departing the proposed bridge to tie to the tangent section outside of the existing horizontal curves. This approach shifted the mainline of NB I-81 to the outside of the existing roadway by as much as **12 feet**. The Orders|WRA Design-Build Team Conceptual Design improves on this design by beginning and ending the project on a point of compound curvature, significantly condensing the overall project length by over 2,200 feet and corresponding impacts to mainline I-81. Our approach is more consistent with VDOT’s policies for bridge replacement projects (i.e. minimizing roadway approach work).

Roadway	Minimum Curve Radius per VDOT Geometric Standard	Minimum Curve Radius on RFP Plans	Minimum Curve Radius on Orders WRA Conceptual Plans
Interstate 81	1,821'	2,850'	2,705'
Route 11*	1204' (per Design Waiver)	3,000'	N/A*

Table 2 – Horizontal Alignment Data

**The Orders|WRA Conceptual Design does not impact Route 11*

(c.) Maximum Grades for all segments and connectors

The profile grades in the Orders|WRA Design-Build Team Conceptual Design meet all RFP requirements. Neither the RFP Conceptual Design or our Team’s Conceptual Design approach the maximum grades allowed by the Standards. Minor deviations from the RFP Plans are depicted in the Orders|WRA Design-Build Team Conceptual Plans provided in Volume II and are as follows:

Roadway	Max. Grade GS-1	Max. RFP Conceptual Plan Grades	Max. Orders WRA Design Grades
Interstate 81	4%	1.53%	1.71%
Route 11 *	4%	3.12%	N/A*

Table 3 – Maximum Vertical Grades

** The Orders|WRA Conceptual Design does not impact Route 11*

(d.) Typical sections of the roadway segments to include retaining walls and bridge structures

The Orders|WRA Design-Build Team’s typical sections are detailed in Volume II of this Technical Proposal and include all features required by the RFP, including proposed minimum pavement section, lane widths, shoulder widths, median widths, ditch widths and any median barrier or retaining wall barrier sections. The minimum pavement sections are identical to that prescribed in Section 2.6.1.

(e.) Conceptual hydraulic and stormwater management design

On the south side of the bridge, a combination of culverts, storm sewer, and roadside ditches will convey runoff from the site towards a proposed stormwater detention facility within VDOT right-of-way. This facility will discharge under Route 11 following existing drainage patterns to an existing private storm sewer which discharges north onto railroad property. On the north side of the bridge of the bridge, stormwater will be conveyed to the Middle Fork of the Holston River via a new outfall adjacent to the northern bridge abutment. Hydraulic facilities will be designed in accordance with the RFP requirements including the VDOT Drainage Manual and Railroad Design guidelines. Our drainage design conveys post-development runoff to the same existing receiving channels located on existing right-of-way. Our design includes the replacement of specified cross pipes required by the RFP within the project limits.

As for Stormwater Management, this project and is subject to Virginia Department of Environmental Quality (DEQ) Part II-B Regulations. Water quality treatment requirements will be calculated according to the Virginia Runoff Reduction Method and offsite nutrient credits will be purchased as necessary to satisfy water quality requirements. No post-project water quality BMPs are proposed.

Water quantity design will satisfy DEQ Part II-B and Virginia Department of Conservation and Recreation’s MS-19 criteria. Where existing outfalls are inadequate for proposed runoff, on-site detention will be utilized to limit post-project discharge to pre-project conditions. No downstream improvements are proposed for existing drainage facilities located on or crossing railroad right-of-way.

The bridge crosses an existing FEMA Zone A floodplain of the (Middle Fork) Holston River. DOT regulations normally allow up to a 1-foot rise in 100-year water surface for Zone A bridge crossings, however planned floodplain increases require negotiation/coordination with local authorities, which might negatively impact the project schedule. For this reason, the crossing will be designed for “no-rise” and will not require coordination. A Hec-Ras modeling will be performed to verify the no-rise condition and determine scour depth for piers and abutments.

The construction phase will require temporary crossover lanes in the median which will require installation and possible relocation/adjustment of temporary drainage systems. A majority of the ultimate condition trunk line will be installed early in the project to allow for drainage of offsite upstream flows through the construction area prior to land disturbance. Temporary pipe systems will utilize this trunk line to the maximum extent possible to minimize redundancy.

(f.) Proposed right-of-way limits

The Orders|WRA Design-Build Team Conceptual Design reflects ***no right-of-way or drainage easement impacts*** to adjacent properties. Our Conceptual Design is completely contained within existing right-of-way and eliminates the need for several drainage easements that would have otherwise been required by the RFP Conceptual Design.

(g.) Proposed utility impacts

The Orders|WRA Design-Build Team’s Conceptual Design is highly efficient and eliminates virtually all of the utility impacts that would have otherwise been created by the RFP Conceptual Plans. All utility relocations will be in accordance with VDOT’s Utility Manual, Manual of Instructions, Utility Relocation Policies and Procedures, and the project’s RFP technical requirements. Our Conceptual Design reflects a focused effort to avoid or minimize utility impacts. Our Team has already begun utility coordination activities by contacting all utility companies and obtaining existing records.

The singular utility conflict anticipated with our Conceptual Design is with the buried communications lines for CenturyLink between Route 11 and I-81 south of the bridges, where the existing lines will conflict with the construction of the proposed stormwater management basin. This construction will lower the existing grade in the area and will likely cause a conflict with the communication line. Test holes along the line will confirm its actual location and ideally this conflict will be mitigated by simply lowering the line in place utilizing existing slack in the cables and additional split duct conduits. Further elaboration on Utility Coordination is included in the Project Approach section of our proposal (Section 4.4.2).

(h.) Provision for future third lane (not to preclude future third lane)

During the development of our Team’s Conceptual Design, we have assumed that any widening to I-81 would occur to the outside of the existing lanes due to the extremely narrow median present in the existing condition. This concept is reflected on the roadway plans included in Volume II. We are confident that our design does not preclude future widening. Our design does not necessarily eliminate the need for additional right-of-way to accommodate a future third lane. Our conceptual plans depict this future widening along with the associated construction limits and additional right-of-way that may be required, while acknowledging that final design of this future widening may include elements to reduce or eliminate this right-of-way need (i.e. retaining walls).

(i.) Other key project features

For emphasis, a key feature of our Conceptual Roadway Design is that our design virtually eliminates any impact to Route 11 while providing the appropriate horizontal and vertical clearances (including the potential future widening of I-81 as noted in the RFP).

4.3.2 Conceptual Structural Plans

The Orders|WRA Design-Build Team has reviewed the RFP documentation and developed a bridge replacement concept that offers VDOT significant improvements when compared to the RFP Conceptual Design. Our Team’s overall project approach and proposed bridge replacement design will accelerate bridge construction activities and provide a long-term, low-maintenance replacement bridge structure. Our Team confirms that the proposed bridge structures will be designed per AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014, including VDOT Modifications; the RFP requirements for this project; and in accordance with the current Instructional and Informational Memoranda, including the Manual of the Structure and Bridge Division. Renderings of the elevation and transverse sections follow:

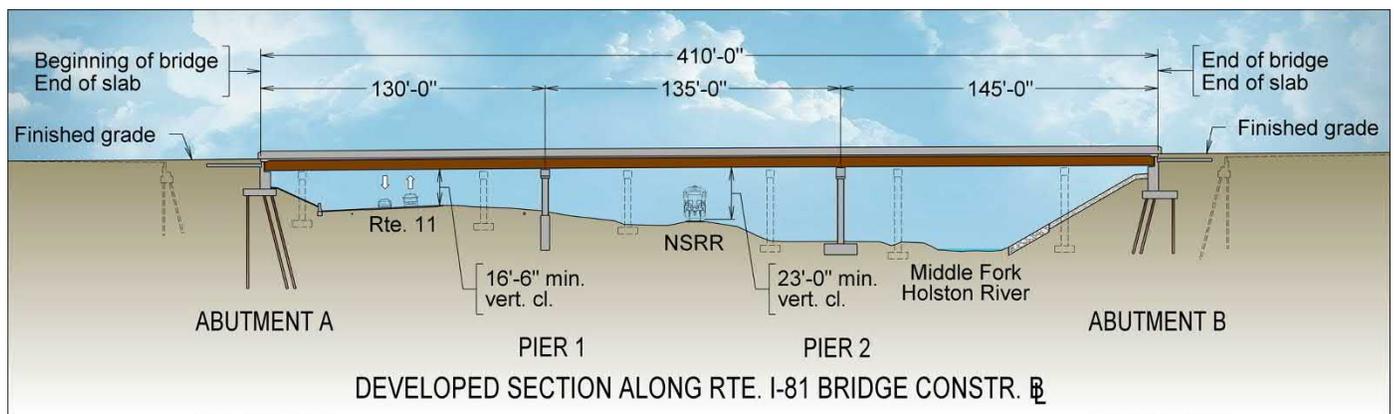


Figure 2 – Developed Bridge Section along I-81

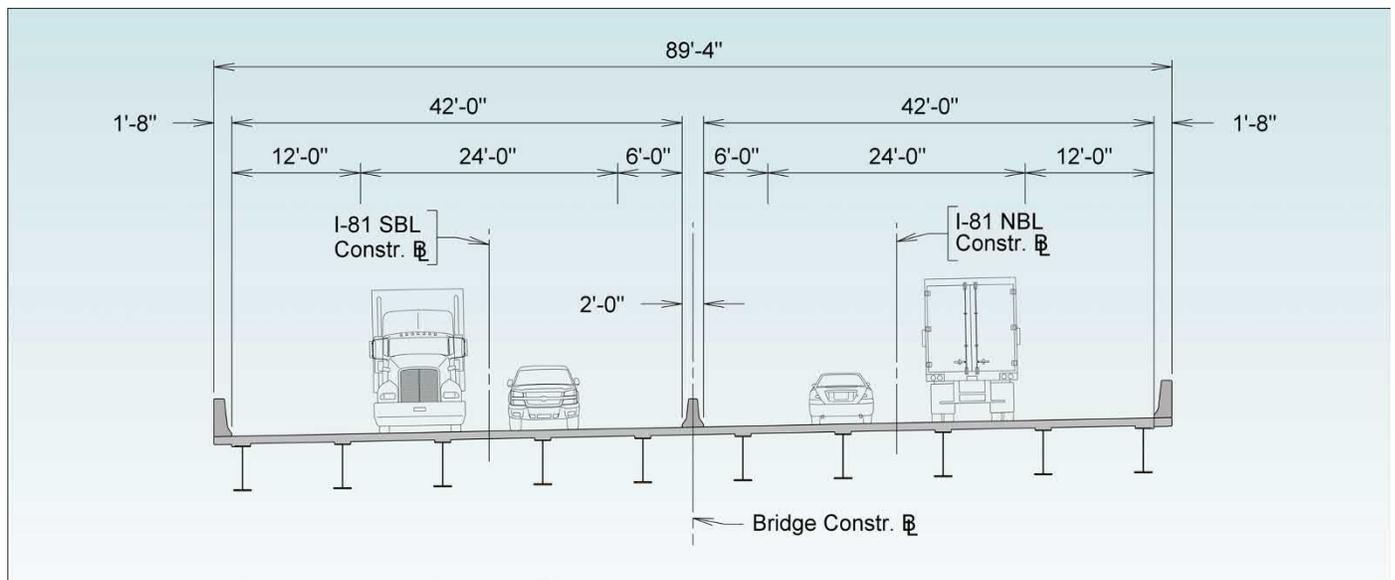


Figure 3 – I-81 Bridge Transverse Section

Proposed Layout

Following a careful review of the RFP plans and documentation, our Team evaluated various concepts that would increase the existing vertical clearance over Route 11 to achieve the 16'-6" minimum, maintain the 23' - 0" vertical clearance over Norfolk Southern Railroad (NS), and achieve the minimum 80-ft clearance zone required for future tracks on NS right-of-way. In addition, the proposed project geometry does not preclude future widening of I-81; this includes establishing the profile such that the **future widening of I-81 will meet the minimum vertical clearances for both Route 11 and NS that are currently required by the Structure and Bridge Division.**

Using the guidelines provided by VDOT's Manual of the Structure and Bridge Division (Part 2, Chapters 6 and 17) and per the RFP Section 2.3.2, the Orders|WRA Design-Build Team reviewed various layouts for the replacement of the existing bridge structures. Our Conceptual Design modifies the overall layout from the RFP documentation and specifically will:

- ✓ Modify the skew angle from 30°-00'-00" degrees to 45°-00'-00" degrees. This change in skew reduces potential future geometric issues for the layout of the skewed bridge structures as the proposed sub-structure units more closely parallel Route 11 and the Norfolk Southern tracks.

The RFP Conceptual Design would have introduced an encroachment into this zone when I-81 is widened in the future (*see Figure 4*). Our change in skew will not violate the 80 ft. NS Railroad clearance zone requirement **for the future widening of I-81**. Also, the modification to the skew eliminates the need for Bridge Pier Protection for Pier 1 along Route 11 and relocation of the existing 8-in water line.

- ✓ Change the sub-structure foundation from steel piles to Drilled Shafts at Pier 1 and Spread Foundation at Pier 2. With the selection of these foundations options, it will allow for the installation of each pier foundation in a single phase (Stage 1), thus reducing the bridge construction time during Stage 2 and 3.
- ✓ Transition the drilled shafts directly into the proposed columns to reduce impacts to the site.

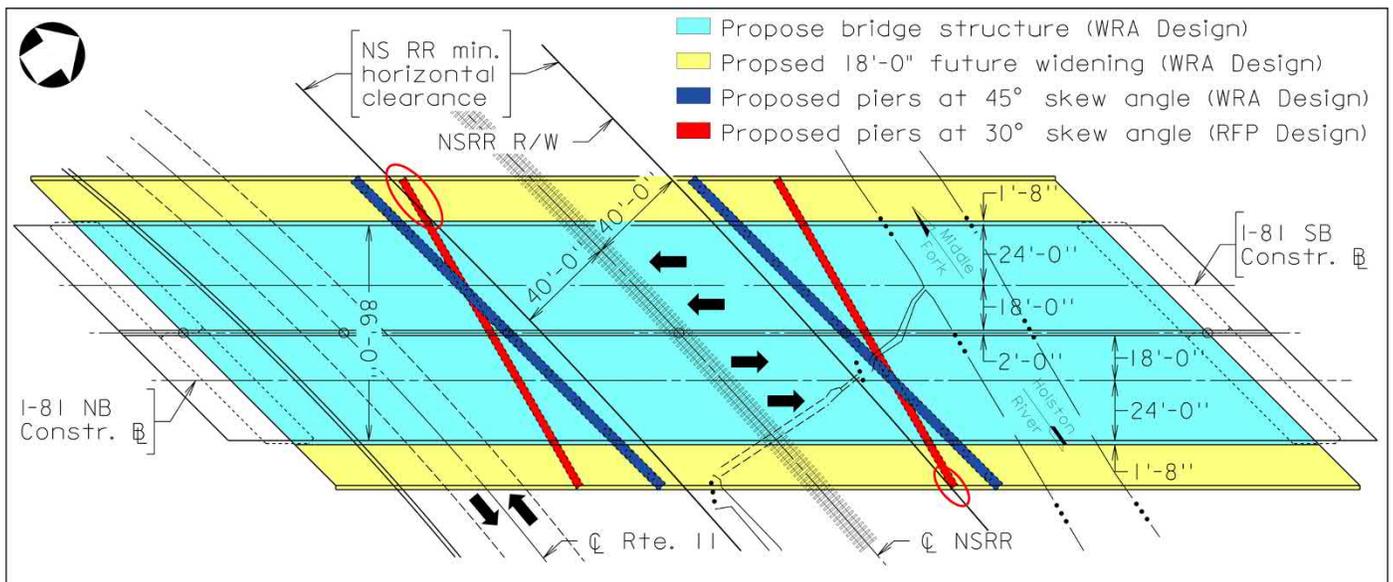


Figure 4 – Comparison of Skew Angles (future areas of conflict circled in red)

Superstructure

Using the modified design approach described previously, the Orders|WRA Design-Build Team evaluated the use of VDOT Bulb-T Girders and Weathering Structural Steel. Due to the proposed modification to a 45° skew of the substructure units, the proposed bridge structure will require the use of a deck slab extension per Chapter 17 of the Manual of the Structure and Bridge Division for replacement structures. Using this knowledge, our Team evaluated cost-effective bridge superstructure options for the replacement of the existing bridge structures at this location for both short-term initial costs and long-term maintenance costs. The following is a summary of our comparison highlights between structural steel and prestressed concrete:



Orders I-81 Deck Pour Commencing

Structural Steel

- **Advantages**

- Reduced dead loads, which reduces foundations/substructure requirements and reduces crane requirements
- Meets the FHWA criteria for weathering steel, eliminating initial and future coating costs
- Reduced pier cap and abutment seat widths
- Shallower web section requirements, requiring less profile adjustments to I-81 to achieve required vertical clearances over Route 11 and Norfolk Southern Railroad
- Facilitates erection in the highly constrained median for Phase 1

- **Disadvantages**

- Stormwater runoff on the weathering steel could stain the substructure units over time unless protected by silicone sealant per VDOT Specifications
- Dead load deflections are larger, which could lead to unanticipated, additional deck cracks
- Constructability checks could require additional temporary support works to satisfy AASHTO requirements
- Requires installation of shear studs in the field, which increases field erection time

Prestressed Concrete

- **Advantages**

- Lower long-term maintenance costs
- Reduced deflections, which should result in less deck cracking
- Reduced field time
- Shear stirrups are pre-cast in beam, resulting in the ability to immediately place deck pans

- **Disadvantages**

- Higher Dead Loads, which require larger substructure foundations and units to accommodate bearings and requires larger cranes
- Due to the proposed skew, would require larger pier caps to accommodate the bearing/geometry requirements of two elements being supported at one pier cap
- Due to girder size requirements, would require larger bearing area at the abutments
- Due to girder size requirements, shipping weight may require additional permits and larger cranes would be required
- Potential camber issues between design and fabrication for long span Bulb-T girders
- Additional superstructure depth requiring the finished grade to be raised even more on I-81
- Due to size and weight, erection of the Phase 1 girders becomes very complex

Following an extensive review of the identified advantages and disadvantages above, and evaluation of overall project cost and benefits, the Orders|WRA Design-Build Team proposes to use a 48-inch deep web ASTM A709 Grade 50W (Weathering Structural Steel Girder) for the proposed bridge structure. This selection was made due to its inherently-reduced dead loads, and for the longer-term benefits described above. The concrete abutments will be protected with a silicone sealant to avoid staining from the weathering steel in accordance with the VDOT Road and Bridge Specification 404.03(1)3. In addition, the superstructure will incorporate the F-shape parapet that meets the TL-5 Criteria.

Substructure

Abutments

The proposed geometry and skew of our modified layout will only permit the deck-slab extension to meet the requirements of VDOT's Manual of the Structure and Bridge Division Part 2, Chapter 17. Using this design concept, our Team evaluated two primary types of abutment substructure alternatives to support the new bridge structure: (1) Traditional pile supported abutments and (2) MSE Wall/pile supported stub abutment with straps. After careful consideration of these two abutment types, the MSE wall with pile supported abutment and straps posed more risks to the project at the Abutment B location (adjacent to the Middle Fork Holston River) by having to support the MSE Strip foundation on the underlying rock due to the poor quality of the subsurface material to account for the potential scour. Due to the risk associated with scour and constructability issues of having to excavate to rock, our Team selected the traditional pile supported abutment for both abutments. Our proposed abutment design will provide for:

- ✓ Stable abutment foundation which takes into account scour design
- ✓ Reduces the construction risks
- ✓ Facilitates future widening of I-81 by extending the proposed footing to enable easier widening detailing
- ✓ Reduces project cost

To support the proposed roadway fill, the Orders|WRA Design-Build Team evaluated a combination of the U-back, in-line, and/or skewed wingwalls. After extensive evaluation of the proposed roadway alignment with our roadway designers, the design of the Abutment A wingwalls will be U-back and the Abutment B wingwalls will be a combination of U-back and skewed wingwalls to account for the slopes at this location.

Piers

To support the proposed superstructure between the two abutments, the Orders|WRA Design-Build Team evaluated hammerhead and multi-column piers to determine a cost-effective pier and provide the most efficient solution for the three stages of construction. Considering the heights are less than 30 ft, and following the guidelines in Chapter 15, the multi-column piers were selected. This accommodates the three stages of construction while having the added benefit of reduced concrete volumes when compared to hammerhead piers.

Foundations

To support the new superstructure/substructure elements, our Team's approach incorporates "lessons learned" from our multiple projects along the I-81 corridor that we have designed in karst terrain. Working with our geotechnical engineering staff, our Conceptual Design proposes the use of H-piles to support both abutments, drilled shafts for Pier 1, and spread foundations for Pier 2. To support the abutments and its associated dead loads and lateral loads, our Conceptual Design specifies three rows of piles driven to refusal to support the design loads. Pier 1 will utilize drilled shafts that support individual columns, thus reducing the impact along this pier line and eliminating costly excavation as opposed to a spread foundation or a pile supported foundation. Pier 2 considers the close proximity of sound rock and will utilize a spread foundation to support individual columns. For both Piers 1 and 2, due to the proposed sequence of construction and width, a joint will be detailed that will be located in line with the I-81 Bridge Construction Baseline. The bridge and geotechnical staff will work closely during the design efforts to evaluate the existing geological conditions to identify potential risks. Our design staff will develop a contingency action plan to address a course of action if we experience pile plunge through a cavity (see section 4.4.3, Page 26 for additional information on our Geotechnical approach).

The strategic combination of the geometric changes to the proposed bridge structures described above enables our Team to propose the multi-span, deck slab extension with weathering structural steel bridge replacement structure, which will minimize the long-term maintenance with these bridge replacements while also facilitating future widening of I-81.

Support of Excavation (SOE)

Due to the close proximity of the existing structures and mainline I-81, excavation support will be required to construct the anticipated phases of work. We will install a system that involves 2 rows of SOE for Phase 1, then reverse the way they support the soil such that these rows can be reused during Phase 2 and 3. The current concept consists of soldier piles and lagging walls installed in the median, (flanking the Phase 1 abutment zone). Temporary soil anchors would extend beneath the NBL and SBL of I-81. Concrete turn back "Wingwalls" will be incorporated into the Phase 1 abutment. These wings will retain the soil supporting I-81 once Phase 1 is put into service. These wingwalls also allow the Phase 2 and 3 abutments to be poured directly against the Phase 1 part of the Abutment. Reversing the SOE from Phase 1 to 2, and 3 involves installing tie rods within the Phase 1 fill as it is placed to tie the opposing lines of SOE together. The front two soldier piles closest to Route 11 will be extracted allowing access to the two concrete wings discussed above. As the excavation for Phase 2 and 3 progress the tiebacks originally installed under I-81 will be excavated and the tie rods installed in the Phase 1 fill will be bolted to whalers moved to the opposing side of the soldier pile line.

4.4

PROJECT APPROACH

4.4 PROJECT APPROACH

4.4.1 Environmental Management

The Orders|WRA Design-Build Team recognizes that securing environmental permits during the design phase and maintaining compliance with environmental permits during the construction phase are both critical to maintaining the project schedule and reducing overall risk to the project. Our Conceptual Design was developed using an integrated approach that linked the designers, environmental staff, and construction experts to ensure that our design will facilitate the permitting process. This integrated approach has allowed us to develop solutions that minimize impacts and to identify required permits and environmental commitments.

Our project schedule accounts for the timeframes required to acquire all permits. Both the DBPM and Design Manager will integrate into the environmental management team with a focus on anticipating and mitigating potential delays. During final design, our environmental staff will continue to collaborate with the designers and the Design-Construction Coordinator (DCC) to identify and minimize impacts. By working with the DCC, all construction means and methods are taken into account when preparing permit applications. The following will be performed to ensure that environmental resource impacts have been documented, minimized, and are cleared by the regulatory agencies for construction and that environmental commitments are met during construction.

Identify and Update Environmental Resources

Upon Notice to Proceed (NTP), environmental resource locations within the project corridor will be refined based on our Conceptual Design. Field work and technical services will be conducted as necessary and may include wetland delineation, stream assessments, water quality studies, and threatened and endangered species reviews that will be utilized for water quality permitting and environmental compliance monitoring. Should this refinement identify unanticipated or unknown resources, the preliminary design will be modified to support avoidance and/or minimization opportunities.

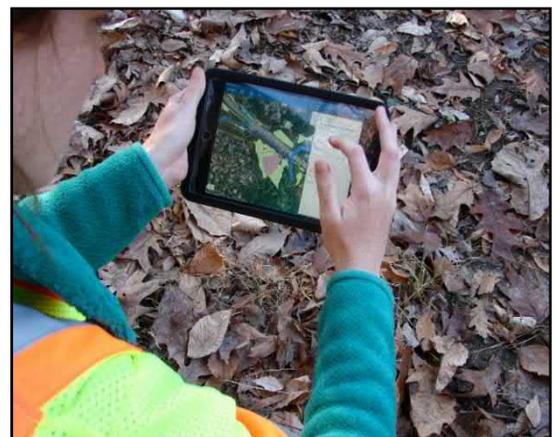
Cultural Resources

As stated in the RFP, all work will be completed within the existing, disturbed, VDOT right-of-way. Since our proposed design is entirely within the current VDOT right-of-way, the previously concluded Section 106 effect determination of No Historic Properties Present or Affected, determined on July 13, 2017, should remain valid. Per Stipulation II.A of the 2016 Federal Programmatic Agreement among FHWA, USACE, TVA, VA SHPO, and VDOT, VDOT also concluded no archaeological studies are required. This should also remain valid, as our proposed design is entirely within the current VDOT right-of-way.

The VDHR’s Virginia Cultural Resource Information System (V-CRIS) was queried on October 18, 2018 to determine if any new resources had been identified since the No Effect determination. No new resources were identified.

Hazardous Materials Management and Studies

As stated in the RFP, VDOT has already conducted studies to identify hazardous materials that could occur within the project



Environmental Data Collection

area. VDOT conducted database searches, consulted with VDEQ, and determined there are no hazmat resources within the current VDOT right-of-way that could be impacted by the proposed project.

The Virginia Department of Environmental Quality’s (VDEQ’s) Virginia Environmental Geographic Information Services (VEGIS) “What’s in my backyard?” application was queried on October 18, 2018 to determine if new resources had been identified. No new resources were identified within the project area. Since no right-of-way is being acquired for this project, no additional hazardous material studies (including Phase 1 Environmental Site Assessments) are required. A Spill Prevention, Control, and Countermeasure Plan will be prepared prior to construction.

Secure the Virginia Dept. of Environmental Quality Virginia Stormwater Management Prog. Permit

Starting at NTP, the Orders|WRA Design-Build Team will design an Erosion and Sediment Control and Stormwater Management Plan to meet the Virginia Stormwater Management Program’s regulatory requirements. Our Team will consult with VDOT to discuss our permitting approach for the MOT, grading and drainage advanced work package and will submit a permit application to VDOT to secure a Virginia Pollutant Discharge Elimination System (VPDES) permit. Based on our previous Design-Build experience, we anticipate receiving the VPDES permit within 45 days of the final permit application submittal.

Coordinate with Agencies for Threatened and Endangered Species

The Orders|WRA Design-Build Team has reviewed the threatened and endangered species studies and coordination conducted by VDOT. VDOT’s database searches identified fifteen listed species, spruce fir moss spider (*Microhexura montivaga*), Carolina northern flying squirrel (*Glaucomys sabrinus*), Tennessee dace (*Chrosomus tennesseensis*), Tennessee heelsplitter (*Lasmigona holstonia*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), shiny pigtoe (*Fusconaia cor*), spotfin chub (*Cyprinella monacha*), little-winged pearlymussel (*Pegias fabula*), fluted kidneyshell (*Ptychobranthus subtentum*), tan riffleshell (*Epioblasma walkeri*), slabside pearlymussel (*Pleuroonia dolabelloides*), northern long-eared bat (*Myotis septentrionalis*), tri-colored bat (*Perimyotis subflavus*), and little brown bat (*Myotis lucifugus*) as potentially occurring in the area. Additionally, T&E waters and a VA Department of Conservation and Recreation Division of Natural Heritage (DCR-DNH) site were identified in database searches.



Northern Long Eared Bat

As identified by VDOT in the RFP, the study area is not in the known ranges of spruce fir moss spider, Carolina northern flying squirrel, and Tennessee dace; therefore, the project is not likely to affect these species. However, VDOT has determined the project may affect, but is not likely to adversely affect the Tennessee heelsplitter, gray bat, Indiana bat, shiny pigtoe, spotfin chub, little-winged pearlymussel, fluted kidneyshell, tan riffleshell, slabside pearlymussel, northern long-eared bat, tri-colored bat, little brown bat, T&E waters, and the DCR-DNH site.

To determine the effect of the project on listed mussel species, VDOT conducted a mussel survey on June 7, 2018. No listed mussels or habitat were identified. Based on the survey results, on June 11, 2018, Virginia Department of Game and Inland Fisheries (VDGIF) determined no additional mussel work is needed and no time of year restriction (TOYR) is needed for mussel species as long as standard best management practices (BMPs) are implemented. On June 19, 2018, the U.S. Fish and Wildlife Service (USFWS) determined the project would not adversely affect fluted kidneyshell, littlewing pearlymussel, shiny pigtoe, slabside

pearly mussel, or tan riffleshell. These survey results are valid for two years; and therefore, the project should not adversely affect listed mussels. Additionally, the project should not adversely affect T&E waters, as these waters were listed due to the potential presence of listed mussel species.

To determine the effect of the project on listed bat species, VDOT conducted a bat inventory on March 12, 2018. No evidence of bats roosting on the bridges were observed. Per the RFP Questions and Answers dated November 15, 2018, if bridge activities do not commence before March 12, 2020, VDOT will update the bat inventory. As stated in the RFP, to protect listed bat species, the Team will adhere to a time of year restriction for tree (>3in dbh) removal from April 15th through September 15th. Additionally, excess tree removal will be avoided, and trees will only be removed within 100 feet of the road surface. All temporary lighting will be directed away from suitable bat habitat during the active bat season. If bats are observed roosting on a structure during construction, the Team will suspend work in the immediate vicinity of the bats until authorized to continue. In order to rely on the USFWS concurrence provided for this project regarding the February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared bat, General Avoidance and Minimization Measure (AMM) 1, Tree Removal AMM1, Tree Removal AMM2, Tree Removal AMM3, Tree Removal AMM4, and Lighting AMM1 will be followed. The Team will also abide by the parameters set out in the VDOT Statewide Little Brown Bat and Tri-Colored Bat Conservation Plan.

Per the RFP, the Team will protect migratory bird species and nests by conforming to Section 107.01 of the Specification Laws to be Observed and the Migratory Bird Treaty Act (MBTA). The Team may take preemptive actions to exclude migratory birds from the site which could include installation of exclusion barriers and/or conducting routine inspections to remove bird nests before eggs are laid beginning before the breeding season and continuing until construction begins. Before exclusion barriers are put in place; the Team will request the VDOT District Environmental Manager inspect the site for signs of migratory birds. Additionally, prior to beginning work on any structure, the Team will search for migratory bird nests. If any signs of migratory birds are observed, the VDOT District Environmental Manager will be contacted and work will not resume until clearance is given. If construction cannot avoid migratory bird nests or nesting activities, the Team will obtain a Region 5 Bird Permit from USFWS.

As stated in the RFP, the Orders|WRA Design-Build Team will adhere to strict E&S measures to protect spotfin chub and the DCR-DNH site. Additionally, per VDOT's correspondence with VDGIF on July 13th and 18th, 2018, the Team will adhere to a time of year restriction for instream work March 15th through May 15th to protect rainbow trout. To further avoid and minimize impacts to listed species, continued coordination with natural resource and regulatory agencies will be required as the project design progresses.

On October 19, 2018, the VDGIF Virginia Fish and Wildlife Information Service (VaFWIS) database, the VDGIF Wildlife Environmental Review Map Service (WERMS), the USFWS IPaC database, the VDCR-DCR-DNH online searchable database, the Center for Conservation Biology (CCB) Mapping Portal, and the USFWS Virginia Field Office's Bald Eagle Map Tool were queried to determine if new threatened or endangered species occurrences had been documented in the project area. One new species, black sandshell (*Ligumia recta*, state threatened), was identified. Once given NTP, the Team will begin coordination with natural resource and regulatory agencies on this new species.

Conduct Avoidance and Minimization

Because of the minimal impacts to wetlands and streams, opportunities for cost-effective avoidance and minimization in the design phase are minimal. The Orders|WRA Design-Build Team will minimize impacts to downstream water quality during the construction phase by adhering to strict erosion and sediment control and stormwater management measures.

Secure Water Quality Permits

The Orders|WRA Design-Build Team will conduct a waters of the United States (WoUS) delineation in accordance with the U.S. Army Corps of Engineers' (USACE's) April 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). The Team will request a Preliminary Jurisdictional Determination from USACE and will determine compensation for any stream proposed for impact by applying the Unified Stream Methodology (USM).

Immediately upon notice to proceed, the Orders|WRA Design-Build Team will hold a Pre-application Meeting with USACE, VDEQ, and VMRC to discuss scope and identify any agency concerns early in the process. The purpose of this meeting is to partner with the regulators and to identify any additional studies, design considerations, or constraints that would cause delays or additional cost.

Because the project has an approved Programmatic Categorical Exclusion (CE) and will impact less than 0.5-acres of wetlands and 1,000 linear feet of streams, it is anticipated the project will qualify for a Nationwide Permit 23 from the USACE. Since the Middle Fork Holston River has a drainage area larger than 5 square miles, a VMRC permit will be required. Pursuant to the Tennessee Valley Authority (TVA) Interpretive Rule, a Section 26a Permit is not required.

Environmental Compliance

The Orders|WRA Design-Build Team understands the importance of maintaining compliance with environmental permits through all phases of construction and has qualified staff currently assisting with environmental compliance for various VDOT construction projects in the Bristol District. Our organizational structure includes a construction environmental manager who will be assigned to the project. The Construction Environmental Manager will report directly to the DBPM and will have the authority to stop work. Once construction begins, the Construction Environmental Manager will collaborate with and support the construction staff to meet environmental commitments and to advise the field construction staff of any issues or construction activities that may impact environmental permits. Our Team will take a proactive approach to environmental compliance to identify potential issues and mitigate those issues before they become violations.

4.4.2 Utilities

Our approach for utility coordination on the Replacement of I-81 Bridges over Rte. 11, Norfolk Southern Railroad & Middle Fork Holston River Project is proactive and in accordance with the VDOT Utility Manual, VDOT Land Use Permit Regulations, and the project RFP documents. We recognize utility conflicts can have a major impact upon the project schedule and budget and are making a concerted effort to identify and address all utility concerns. Utility coordination activities have already begun during the proposal preparation stage of the project. All utility companies with facilities in the project area have been contacted, correct contact people with those companies have been confirmed, and existing facility records from them have been obtained by our Team. These records have been compared to the RFP utility designation survey and our own project site inspection for accuracy and completeness and are included in the Orders|WRA Design-Build Team proposal plans.

The utility companies that have been identified as having facilities in the project area are Appalachian Power Company, ATMOS Energy Corporation, CenturyLink, Comcast Communications, Smyth County Water and Sewer Department, and Sunset Fiber.

By utilizing the project approach to minimize changes along Route 11 by optimizing the profile along I-81 and locating the foundations for the I-81 bridge away from the existing 8” waterline, the Orders|WRA Design-Build Team has mitigated two possible utility conflicts under the new bridge. Therefore, the only anticipated utility conflicts are with the buried communications lines for CenturyLink along the eastern edge of Route 11, where the existing lines will conflict with the excavation for the stormwater management basin. We will closely coordinate a relocation strategy for this line to eliminate any conflict with the stormwater management basin construction. This can be accomplished at the beginning of the project by CenturyLink, taking just a week or so, and not affect the schedule’s critical path.



Fiber Optic Line in Conflict

Advanced utility coordination activities will take place immediately following issuance of Notice to Proceed for the project. This will include hosting the VDOT 45-day Utility Meeting and Preliminary Utility Review Meeting with all of the utility companies with facilities on the project, to explain the impact of the project and sequence of work. Proposal plans will be distributed to the utilities to allow for their review as early as possible. Also, at this time, all of the pertinent utility data will be entered for the project into the VDOT Right- of-Way and Utility Management System (RUMS) system and draft versions of the Design-Build “Master Agreements” will be submitted to the utility companies for review. The utilities will be made aware immediately which facilities of theirs are most likely in conflict, and how those conflicts will play into the project staging.

The locations of all necessary utility test holes will be compiled, and investigations performed. For this particular project, special attention will be given to the need to perform test holes for the Sunset fiber optic line and the Smyth County waterline along Route 11 to verify if the locations for the lines shown in the utility designation survey match their actual locations on site.

As design on the project progresses, the close coordination with the utility owners will continue. We will ensure project designs minimize or avoid utility conflicts. We will utilize an online cloud-based utility coordination tracking system that incorporates both “ball in court” notifications and set due dates for utility coordination tasks. The utility representatives will be able to access the current version of the tracking system always.

When the project plans have reached a level of completeness to show all project impacts to the utilities, we will hold the Utility Field Inspection Meeting (UFI). Plans and preliminary VDOT UT-9 forms will be distributed to the utilities approximately 2 weeks before this meeting. At that meeting, all of the utilities will be able to put forth their relocation strategies, preliminary schedules for performing adjustments and relocations, and their utility easement requirements, if they exist. We currently do not expect utility easements will be necessary for this project. Any questions to the utility relocation cost prorate established in the UT-9 forms can be addressed. Due dates will be set for utility relocation and adjustments plan and estimate submittals, no conflict letter submissions, Design-Build Utility Master Agreement completion, and completed UT-4 form submissions.

Utility relocations and adjustments will be incorporated into the project schedule and not cause delay. The anticipated utility relocations are expected to be completed well in advance of completing the stormwater management pond, so they will not impact the project schedule critical path. If delays are encountered in the utility relocation, additional coordination work will be done with the utilities and assistance offered so that delays are minimized.

Further, we will use the resources of the Orders|WRA Design-Build Team for the benefit of the utility companies where possible. They can be provided with traffic control assistance, clearing, construction entrances, and lay down yards so money spent towards utility adjustments and relocations are not wasted on redundant service providers. This will reduce costs and also help mitigate against any delays.

As project construction approaches, all Design-Build Construction supervisors and crews will be trained to look out for potential unmarked utilities. If they see any evidence of a utility facility in place that is not marked or shown on the plans, they will stop work in the vicinity at once and call for a Miss Utility 3-hour emergency locate. The Design-Build Utility Manager will be notified immediately and will seek to determine if an unmarked utility is present and active. Likewise, if there is a strike of a utility line during construction, all work will stop except for that necessary to maintain public safety. The struck facilities will remain uncovered and the Design-Build Utility Manager will immediately be notified and seek to determine the nature of the utility facility and the utility owner.

As utility adjustments and relocations are completed, the Orders|WRA Design-Build Team will keep the VDOT RUMS system updated with progress of the utilities and close them out as appropriate. The utilities will be directed to submit prompt and correct billing and to submit for all necessary as-built land use permits.

The Orders|WRA Design-Build Utility Coordination team is very experienced working on VDOT Design-Build projects, with three active Design-Build projects underway. We have performed relocation coordination with many utility companies in the past including Dominion Energy, Verizon, Cox, Comcast, Summit IG, Uniti Fiber, Windstream, and Lumos.

4.4.3 Geotechnical

The Orders|WRA Design-Build Team has reviewed the information included in the Geotechnical Data Report (GDR) provided with the RFP, and researched geological and geotechnical references, maps, and publications. The Orders|WRA Design-Build Team will use this information or supplement it to identify and manage geotechnical risks by selecting appropriate foundation solutions relative to the level of detail we know about the subsurface. Tempering the foundation design with the level of subsurface detail available presents the most risk of geotechnical engineering for the project. It is critical to understand the subsurface stratigraphy to base all decisions regarding structure support, grading and drainage upon.

Subsurface Conditions

Based on the information available in the RFP we perceive the general soil and bedrock stratigraphy, from bedrock to surface, is as follows:

- Bedrock in this formation is predominately karst consisting of dolomite, shale, limestone, and siltstone, and was encountered beneath the ground surface at depths ranging from one foot to 34.5 feet. Breccia was encountered in boring BR-06 10 feet beneath ground surface. Rock in the western three-fourths of the proposed south abutment area is highly weathered and highly fractured with several mud seams in the cores. Rock recovery and quality increase dramatically moving north from the proposed south abutment area.

- The soil directly above bedrock in several locations is very dense, highly weathered rock, sometimes referred to as intermediate geo-material (IGM). This material was encountered at depths between four and 28.5 feet beneath the ground surface.
- The residual soils underlying the site consist of a range of material that includes lean and fat clays, silty clay, clayey and silty sand, and clayey gravel.
- Above the residual soils is existing fill material consisting of fat and lean clays with varying amount of sand, sandy elastic silt, poorly graded gravel with sand, and various amounts of gravel and boulders. The thickness of the fill ranges from one foot to 37 feet. The deeper fill areas are in the area of the existing bridge abutments.
- Surface materials at the site consist of one to five inches of topsoil, and 4.5 to 13 inches of asphalt followed by six to 24 inches of crushed stone base in the roadways.

Ground water was encountered during the drilling operations at seven of the bridge boring locations at depths ranging from two to 23 feet beneath the ground surface. Ground water within the site is expected to be affected by the level of the Middle Fork Holston River.

Subsurface Investigation

Although we have a good understanding of the generalized subsurface conditions, additional detail and confidence are necessary to refine the design of the project. A supplemental subsurface investigation will be performed to better define the subsurface stratification along the project. Our program will be tailored with the understanding of how karst geologic features can be masked and may not show themselves unless specifically investigated for.

During the design phase the Orders|WRA Design-Build Team will conduct an additional subsurface investigation consisting of Standard Penetration Test (SPT) borings with rock corings and electro-resistivity surveys to further assess subsurface conditions at the abutment pier locations and roadway alignment.

Rock borings will be performed at the bridge foundations. The number and length of rock to be cored will vary depending on level of detail needed to support the proposed foundation type. For example, Borings along Pier 1 will extend on the order of 20-30 feet into rock to substantiate a drilled shaft foundation while rock coring performed at Pier 2 may only extend 10 feet into rock to better define the upper rock surface to support

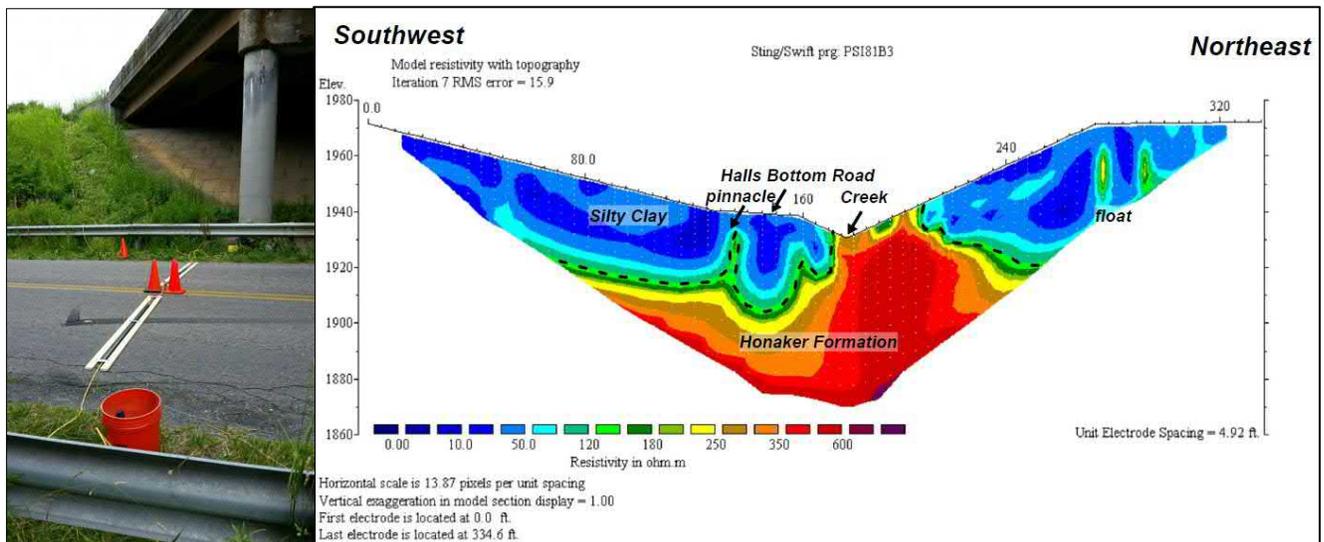


Figure 5 - Electric Resistivity Plot for I-81 Over Sinking Creek and Halls Bottom Road

a shallow foundation. An electro resistivity (ER) imaging survey will be conducted along the proposed Abutment A alignment to locate potential caverns and voids, and to assess the rock profile in these locations.

Additional borings will also be taken along both the NBL and SBL to meet the requirements of Chapter III of the VDOT MOI. These borings will be located between borings previously drilled for the project and listed in the GDR. The depth of these borings will be 10 feet or auger refusal, whichever occurs first.

Laboratory testing will be performed on selected soil samples and rock cores to aid in the project's geotechnical designs. Testing will include natural moisture content, Atterberg limits, gradation, rock unconfined compression tests, and California Bearing Ratio (CBR). Undisturbed samples obtained with thin-walled Shelby tubes will be obtained for consolidation testing, and soil shear strength tests for slope stability analyses.

Bridge Foundation

Abutments

The Orders|WRA Design-Build Team is proposing cantilever-style abutments with deck slab extensions. The abutments will be supported by steel H-piles with tip protection driven to rock at refusal blow count criteria. Three rows of piles will be used for tall wall abutments. One dynamic load test will be performed at each abutment to monitor stresses at end of drive and define refusal driving conditions.

Abutment A

Existing soil borings and pile driving lengths from the existing bridge provide good confidence that not only does the top of rock elevation vary significantly, but the thickness and strengths of rock shelves below the surface are highly variable as well. GDR borings at Abutment A (south abutment) indicate that top of rock slopes from east to west and drops in elevation between the east NBL shoulder area to the northbound and southbound lanes (NBL and SBL), with rock quality decreasing to the west. Given the inconsistent nature of the strata at Abutment A we are considering a foundation option consisting of three rows of driven H-piles. These driven elements provide their own confirmation of the grounds ability to support the system. Because we will not have fully delineated every soil seam, rock shelf thickness or void space, the system being considered can be designed such that a catastrophic collapse would not occur if a single pile were to lose capacity. The system would also include spacing the piles such that no two piles would fall on the roof of a single void. The Electro-Resistivity study we are proposing will have sufficient resolution to identify a void which spans the spacing of 2 piles.

Abutment B

GDR borings taken for Abutment B (north abutment) and existing bridge pile lengths indicate top of rock in this area is relatively level and sound. We have sufficient subsurface information at Abutment B to justify steel H-piles can be driven to capacity without danger of breaking through a rock crust.

Pier 1

Our current understanding of the subsurface at Pier 1 spotlights the potential to encounter soil seams below the top of rock. In order to limit the foundation foot print in this area we will provide a deep foundation alternative. Due to the limited subsurface information available, we are currently proposing Pier 1 to be supported by 4-foot diameter shafts drilled into rock, assuming the drilled shafts will be

designed using only skin friction to prevent them from possibly breaking through any rock ledges. Although a foundation system can be designed with the available information we will perform exploratory rock coring at each drilled shaft location to a depth of 20 feet below estimated shaft bottom to determine the type and quality of the material beneath the shaft once we are awarded the project. When this information is obtained a refined shaft design including tip resistance will be provided in the final design.

Pier 2

The existing soil borings and geophysical survey in the area of Pier 2 show top of rock to be relatively shallow with potential for some soil seamed below this shelf. There is more working room at the Pier 2 location, so we are considering Pier 2 to be supported by spread footings with low bearing pressure on rock. To confidently set a bearing pressure and bottom of footing elevation more refinement of the subsurface is necessary. We will delineate the subsurface using several soil borings with rock coring spread around the foundation. Rock core analysis will enable us to confidently determine if steps in the foundation will be most economical. We currently anticipate approximately a five-foot step at the western section of the pier footprint to be excavated to rock and replaced with subfoundation concrete to provide a level foundation surface. Additional information is required to confirm this design. Even if highly fractured rock is present it can support the anticipated footing loads on a spread foundation.



I-81 Maury River Pier Construction

Pavement

New pavement and temporary pavement are required with the realignment of I-81 towards the existing median as the NBL and SBL approach the bridge. Although the RFP prescribes minimum pavement sections to be used it qualifies additional subgrade testing be performed to substantiate this design.

Several borings in the GDR indicate unsuitable and/or marginally accepted soils and rock are expected to be encountered in the roadway work. Suitability of these materials will be based on plasticity, excess moisture content, swell potential, presence of rock, or soils containing debris, organic, or other deleterious materials. Since CBR values were not included in the GDR, we will obtain bulk samples for CBR testing. Assuming the supplementary exploration verifies the job site can support the design CBR of 5, localized material at the proposed subgrade not meeting the minimum CBR value of 5 stated in Part 2 of the RFP will be removed and replaced with suitable material. Additional soil borings along the proposed new pavement areas will be used to identify shallow rock to reduce risks in the construction schedule associated with unforeseen time to remove rock.

Construction Phase

WRA's in house geotechnical engineering staff can rapidly provide direction and adapt the design based on the subsurface data being collected as the construction process commences. Examples of these design adaptations include alterations to pile driving criteria based on pile driving records and pile testing records which define the top of rock surface and its integrity. Further refinements of the design are often necessary when cuttings from drilled shafts are logged along with penetration rates. The final selection of socket lengths is determined once the stratigraphy is observed at the actual shaft location. Such refinement in design carries

all the way up to the pavement subgrade where the actual subgrade preparation measures are adjusted based on proof rolls and moisture density measurements.

The Orders|WRA Design-Build Team will temper the foundation solutions selected for the project based on the level of detail we obtain about the subsurface both during the design phase and specified to be obtained through the construction process. Basing the foundation solutions on the level of detail we have on the subsurface reduces risk and enables us to assure a sound product will be constructed.

4.4.4 Railroad Coordination

Scheduling and working around any railroad introduces several types of risk to any project:

- Physical Risk
- Risk of Design Conflicts
- Scheduling Risks

First, similar to I-81, the railroad is a transportation corridor involving moving vehicles that present a physical risk to the work and workers. Second, similar to VDOT, the railroads have their own criteria and standards that govern the safe operation and sound construction and maintenance practices necessary to protect their interests. The risk here is some of Norfolk Southern’s criteria and standards have the potential to conflict with those of VDOT and may restrict solutions that are available to solve problems and make improvements. Third, there is a risk to the scheduling and progress of the work when railroad approvals must be obtained for the means and methods of the work and for obtaining railroad personnel, such as watchmen and inspectors, for safety and approval purposes to protect the work. The experience of the Orders|WRA Design-Build Team on similar projects has educated us with these risks and enabled us to mitigate them as a matter of its normal project routine.



First, the following methods will be employed to minimize physical risk:

- **Training** - All on-site personnel who will work on, around, or over the railroad will receive the NS-approved Contractor Roadway Worker Safety Training. The Orders|WRA Design-Build Team believes workers who are informed of the risks of the work, and how to mitigate them, are inherently safer. We have in-house personnel who are trained as trainers, so no time will be lost scheduling outside parties to train our construction personnel. In-house trainers also can expedite the training of any new personnel added during the life of the project.



WRA’s Railroad Coordinator – Bob Jackson Performs NS Safety Training

- **Safe Access** - Use of the Flowing Spring Road public grade crossing for access across the railroad. There are two reasons for doing this even though the draft construction agreement with NS states NS may permit the installation and use of a temporary contractor's crossing:
 - The public crossing's active warning devices (flashing light signals and gates) make it inherently safer than a temporary construction crossing. It should be noted these warning devices were added after a fatality occurred at this crossing in 1996, so there is risk to crossing the track in this area even without the distractions of active construction work.
 - Though NS has stated it may permit a temporary crossing for the project, the crossing must still be designed and then submitted to NS's engineer for approval. This process has the potential to introduce scheduling risk to the project.
- **Highly Visible Zone Separation** - Where work will need to take place within 25 feet of the railroad's track, the installation of orange construction fence will be considered to reduce the risk to not only construction workers accidentally stepping into the foul of the track, but also to reduce the risk of a railroad worker stepping into an excavation or other work.
- **Daily Job Briefings** - Also, when work will take place anywhere on the NS right-of-way, daily job briefings with the NS Roadway Worker In Charge (RWIC) are absolutely essential to reducing physical risk. The Orders|WRA Design-Build Team understands the importance of these meetings which serve to help coordinate the work between the railroad and the contractor as well as being a safety tool. We also understand no work will take place on those days when a job briefing is required until the job briefing has taken place, since the resulting significant safety violation would cause significant physical risk to the work and would likely cause a major scheduling impact as well since it would result in the shutdown of the project on its property by NS.
- **Equipment and Storage Monitoring** - Physical risk also includes non-activities such as storage of materials and equipment on NS's Right-of-Way which may, in some cases, pose safety risks to NS and contractor personnel or operations. The Orders|WRA Design-Build Team understands that, to avoid these risks, storage of materials and equipment on NS's right-of-way is not allowed without prior written approval from NS, and in no case will NS tolerate any activity or condition that will interfere with the operations of the railroad. We also understand that clean-up of the NS right-of-way after the work or storage activities are complete, and restoration of the right-of-way to a pre-activity condition, or better, is also essential to risk reduction since it restores the area to a generally safe condition thereby reducing the chances of injuries for both NS and contractor personnel.

Second, to reduce the risk of design conflicts, the Orders|WRA Design-Build Team is familiar with, and follows, the design criteria set forth in the NS Public Projects Manual and the AREMA Manual for Railway Engineering. Our team includes a Railroad Coordinator to ensure these requirements are met. For the I-81 bridge at Atkins, the existing bridge already meets the railroad's design criteria (except for the existing drainage onto the NS right-of-way from the roadway) so most of the design conflict risk will be associated with temporary construction work, primarily during demolition activities. These include:

- **Demolition of existing piers and deck** - Mitigation will be by application of geotextile to cover the track and ballast shoulders in accordance with Public Projects Manual Typical Drawing No. 23; deck removal means and methods, especially installation of a demolition shield that extends no more than 6 inches into the existing clearance envelope; and working as much as possible on the side of the existing piers opposite the track.
- **Excavation for proposed pier substructures** - Mitigation will be by following the support of excavation criteria set forth in the NS and AREMA Manuals, erection of temporary fences or

barricades as necessary, and maintaining horizontal clearances from the track in accordance with the NS Public Projects Manual.

- **Removal of the NS C&S pole line** - This pole line is out of service, and NS has already agreed to remove it with its own forces. Coordination with NS regarding scheduling the removal will be key to avoiding conflicts between the NS work and the Orders|WRA Design-Build Team work.

Third, to reduce the risk of scheduling conflicts, our designated Railroad Coordinator will process all correspondence and other communications between the Orders|WRA Team and NS. This single coordination interface between both parties is a proven method of insuring expeditious and accurate routing and handling of all submittals, requests and questions. Our Railroad Coordinator is experienced in this type of assignment and is familiar not only with VDOT's standards and organization, but with the NS public projects process, NS standards, and AREMA recommended practices.

The Orders|WRA Design Build Team has learned on previous projects that Norfolk Southern has established a process for handling activities that will impact its right-of-way, and it is critical to work within this process to keep the reviews and approvals on schedule. VDOT has already begun working through that process by drafting its VDOT/NS Railroad Construction Agreement which shall govern all construction activities that may impact the railroad right-of-way during this project. At this point, VDOT has already completed the public project process steps outlined in the NS Public Projects Manual, article 4.1.3. Also, because of VDOT's preliminary work, Scott Overbey, the NS Engineer – Public Improvements for this region, is familiar with the project and can help shepherd submittal reviews and responses to requests for information through the NS process should an unexpected snag occur in this process. Mr. Overbey is familiar with the Orders|WRA Design-Build Team through long association on numerous projects going back to the 1990's, and we have established a good working relationship with him during that time which should continue through, and be a benefit to, this project.

With the Railroad Coordinator and public project process in place, the Orders|WRA Design-Build Team will develop and submit to NS the type, size and location plans for the proposed structure that will span the NS right-of-way in accordance with the instructions in the NS Public Projects Manual, article 4.1.4, adjusted for a design/build project. Following the approval of the TS&L plans we will develop and submit the demolition and erection plans. All submittals for review by NS will be given a QC and QA review by the Railroad Coordinator and Design QA reviewer and will be submitted to the NS Engineer per the protocols that will be established at the project kick-off meeting. As construction proceeds, the Railroad Coordinator will maintain contact with the NS Engineer, providing him/her with copies of the two-week look ahead report and scheduling requests for watchmen, NS inspectors and the track outages that will be required during steel erection.

Finally, scheduling watchmen has become a significant issue with all railroads in recent years. The volume of ongoing public projects and reduced manpower has stressed the resources which railroads have available for watchmen purposes. The Orders|WRA Design-Build Team will try to negotiate with NS to advertise the watchman's position to reduce the uncertainty of the availability of the watchman. If we are unsuccessful in this effort, we will use our work schedule to have the Railroad Coordinator make watchman requests as far in advance as possible to have our requests be 'first in line' for available watchmen.

4.5

CONSTRUCTION OF PROJECT

4.5 CONSTRUCTION OF THE PROJECT

Construction of the project will be led by I-81 seasoned professionals and craftsmen that truly care about the impact their daily work activities have on the traveling public. Our Team is convinced that pre-planning for success is the backbone of successful projects. Proper public notification, signing, message boards, pavement markings, and other temporary traffic control devices are paramount and will be utilized in the construction of the project. As with any project that requires multiple phasing and traffic shifts, replacement of existing structures, roadway construction, and improving drainage on and along a busy interstate highway, many issues face the Team. We have addressed each of these with proper traffic control, planning, a site-specific safety plan, and a pre-engineered shoring system that allows ease of construction for this 4-phase bridge construction project. All of this will ensure that the roadway and railroad travel ways remain safe and secure.

Work with, on, over, and/or near active railroads always requires proper planning, communication and timely execution as previously discussed in Section 4.4.4. Having recently completed the Rte. 11 bridge replacement up track about a mile from this project, as well as many other railroad overpasses, we have the experience and knowledge to ensure that Norfolk Southern's property and train schedule will remain intact. The experience of the design team as well as the construction team working with and on railways will be an asset to all entities involved.

Simply put, the Orders|WRA Design-Build Team is focused on the following items to safely and successfully achieve this 4-phase bridge construction project:

- Place the need of safety of the traveling public at the forefront of all efforts.
- Ensure safety of construction and inspection staffs
- Minimize and/or eliminate risks to the environment
- Meet the needs of Norfolk Southern Railroad
- Foster a working relationship with all stakeholders
- Require no addition of Right-of-Way
- Commit to a high-quality project when turned over to VDOT, on-time.

The Orders|WRA Design-Build Team has studied and reviewed thoroughly the RFP requirements for construction and proposes a project Construction Approach that meets or exceeds these expectations. The Orders|WRA Design-Build Team proposes a Sequence of Work that greatly simplifies the Maintenance of Traffic Plan envisioned in the RFP plans. By simplifying the Maintenance of Traffic Phases, the construction can progress in a more efficient and safer manner.

4.5.1 Sequence of Construction

Approach to Construction Phasing

When planning the Sequence of Construction, the Orders|WRA Design-Build Team strived to minimize delays to the traveling public and provide a clear path to successfully completing the project by the Final Completion Date as set forth in the Letter of Submittal. Experience has taught us that no matter how great a plan is, things can happen to create delay. The Orders|WRA Design-Build Team will minimize the chance for delays by thoroughly investigating areas that have the potential to cause delays and coordinate closely with all stakeholders to minimize impacts that have local concerns.

Construction Sequence

The Orders|WRA Design-Build Team’s design allows for much of the improvements to be constructed out of traffic. The sequencing for this project is listed below:

Phase 1

- Install E&S measures as required for the proposed construction activities
- Install initial traffic control devices and signs
- Place temporary concrete barrier as necessary along I-81 using nighttime lane closures
- Construct SWM basin (to be used as temporary sediment basin)
- Install shielding over river and the railroad
- Start bridge work
- **Bridge Construction Sequence**
 - Install support of excavation at each new abutment and at pier 2
 - Perform structural excavation at pier 2 and at abutments “A” and “B”
 - Drive bearing pile for abutment “A”
 - Drive bearing pile for abutment “B”
 - Install drilled shafts for pier 1
 - Form, reinforce, and pour substructure for piers 1 and 2
 - Form, reinforce, and pour substructure for abutments “A” and “B”
 - Backfill substructures
 - Erect structural steel
 - Install deck forms
 - Place deck reinforcing steel
 - Install screed rail, runoffs, and deck screed
 - Pour bridge deck concrete
 - Form, reinforce, and pour approach slabs
 - Groove Deck
 - VDOT bridge inspection
 - Set temporary barrier across bridge



Bridge Construction of I-81 Bridges over Halls Bottom Road and Sinking Creek, July 2017

- Remove any unsuitable material that is present on the I-81 NB cross over alignment and haul to an approved disposal site
- Place approved fill material (borrow material will be hauled at night during off hours to minimize impacts to traffic)
- Install the temporary drainage items that are specific to the I-81 NB crossover
- Place aggregate base for I-81 NB crossover
- Complete crossover roadway approaches
- Pave and stripe I-81 NB crossovers
- Shift I-81 NB traffic to the cross over alignment, per the Traffic Management Plan, using the middle section of the new I-81 bridge
- Demolish existing I-81 NB bridge
 - This work will have minimal traffic impacts to Route 11

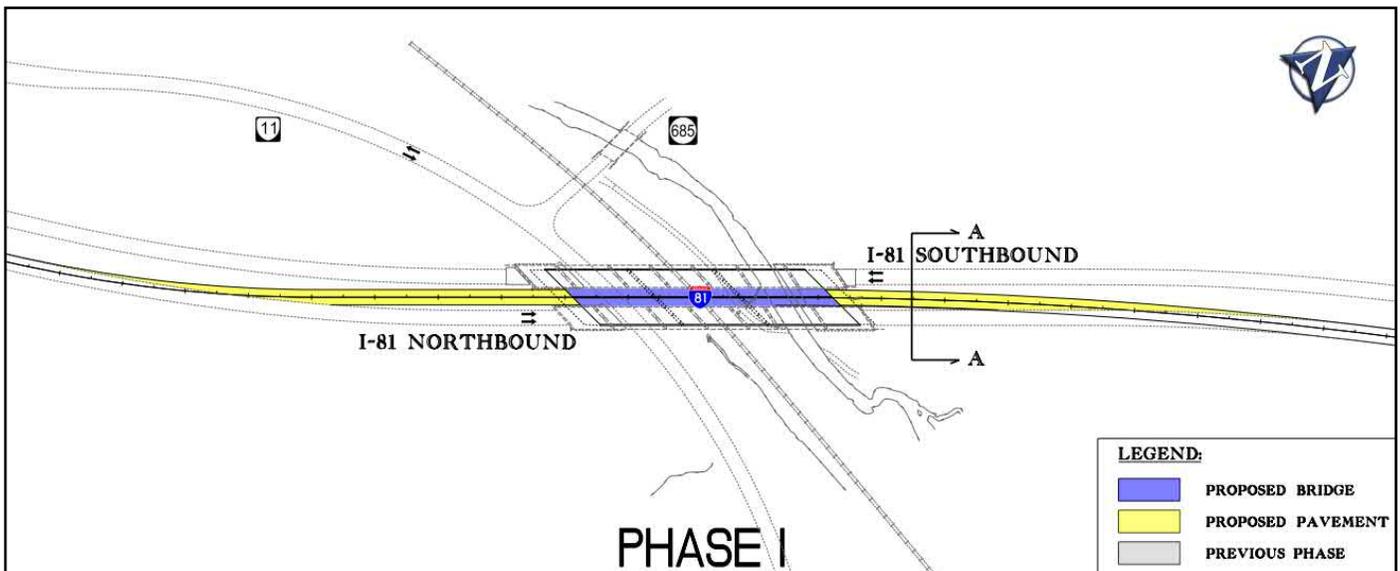


Figure 6 – Phase I MOT

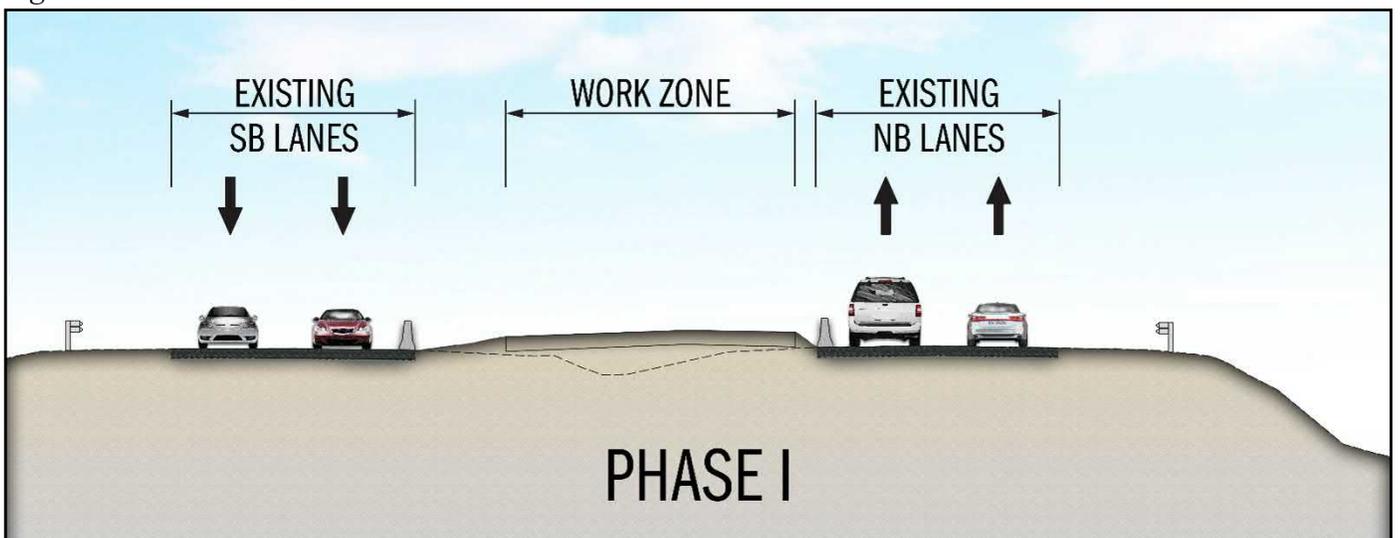


Figure 7 – Phase I Section AA Work Zone

The next phase will construct the NB portion of the new I-81 Bridge. The sequencing for this phase is as follows:

Phase 2

Stage I

- Start NB section of bridge – following the same sequence as the previous bridge section
- Construct bridge parapet
- VDOT bridge inspection
- Install permanent drainage items to complete I-81 NB drainage system
- Construct I-81 NB roadway approaches to the new bridge
- Overlay and stripe I-81 NB roadway
- Shift I-81 NB traffic to the outside temporary alignment, per the Traffic Management Plan, using the new I-81 NB bridge section

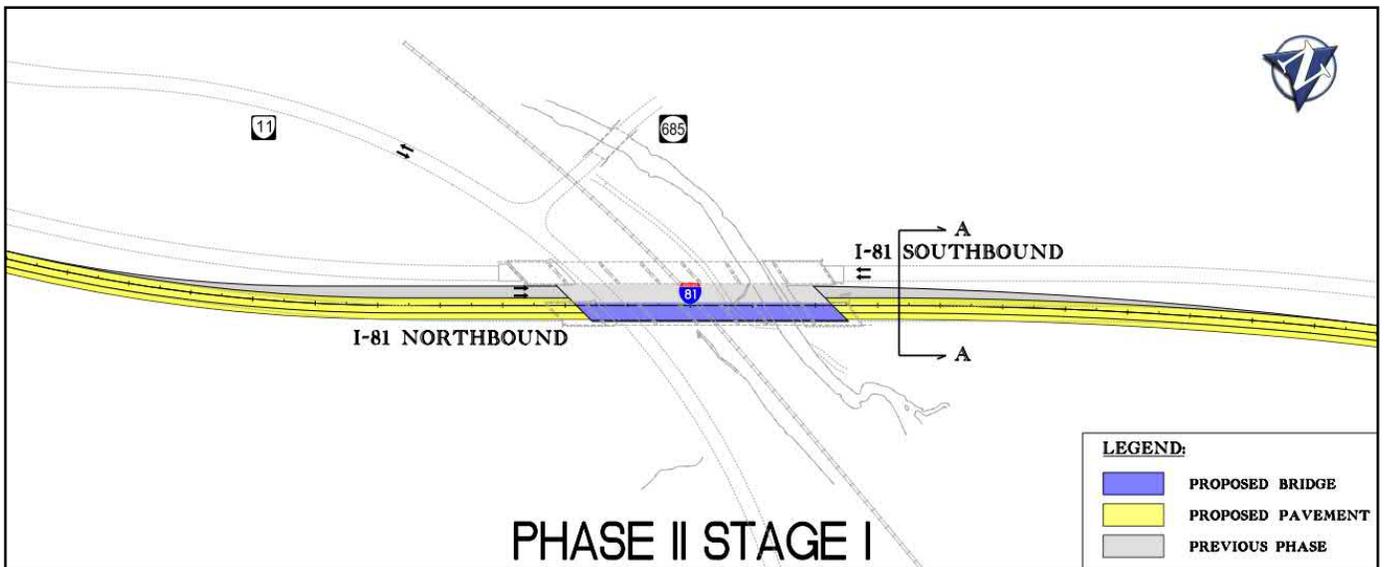


Figure 8 – Phase II Stage I MOT

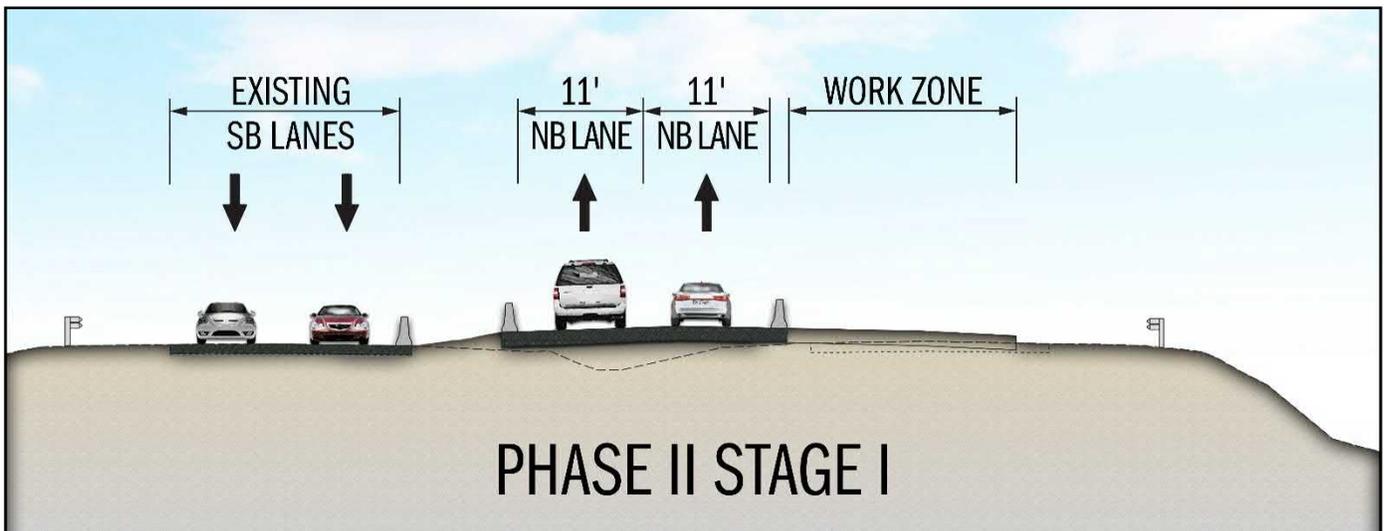


Figure 9 – Phase II Stage I Section AA Work Zone

Stage II

- Remove I-81 NB crossovers
- Install the I-81 SB crossovers
- Shift I-81 SB traffic to the new SB crossover alignment, per the Traffic Management Plan, using the middle section of the new I-81 bridge
- Demolish existing I-81 SB bridge
 - This work will have minimal traffic impacts to Route 11

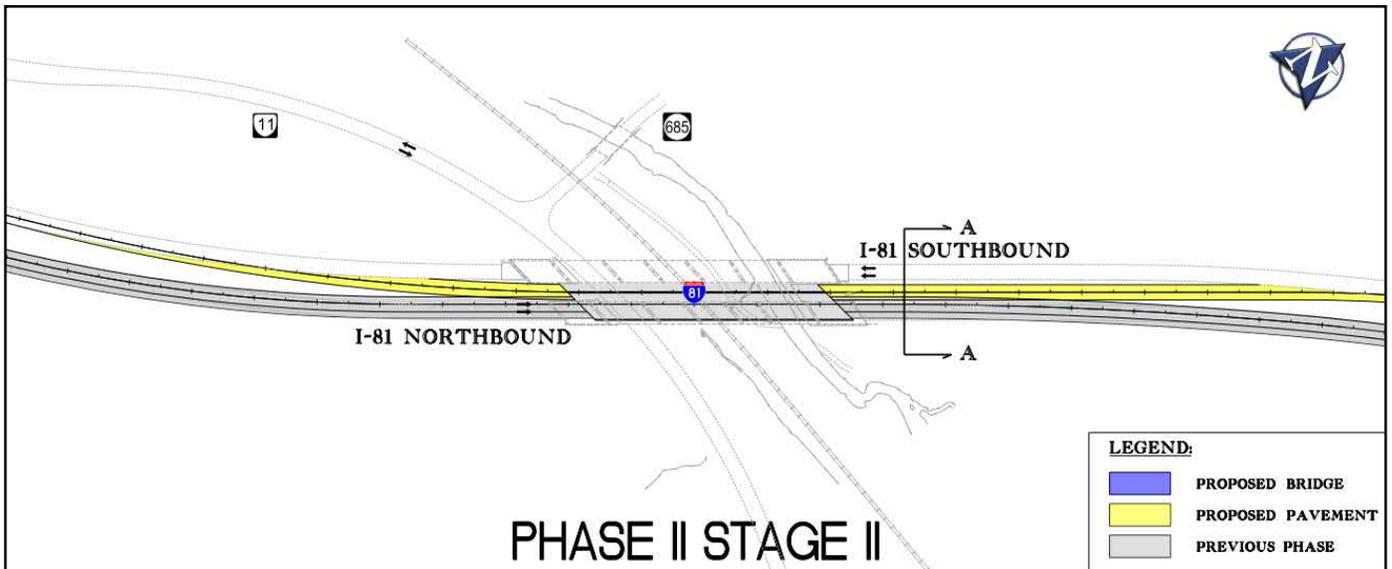


Figure 10 – Phase II Stage 2 MOT

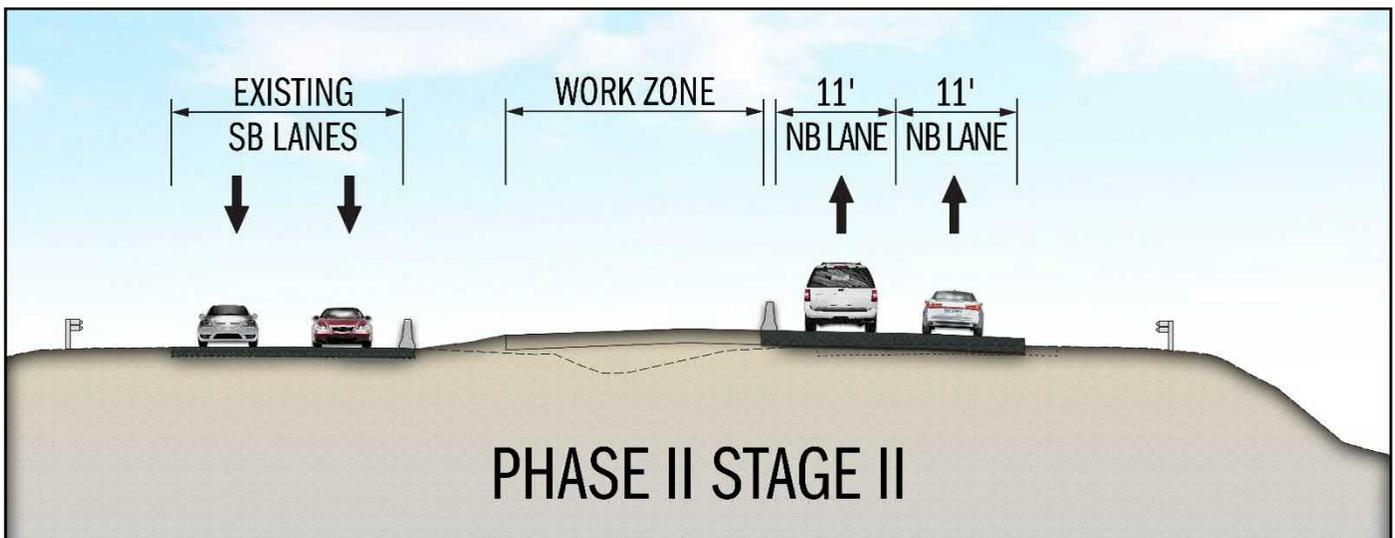


Figure 11 – Phase II Stage 2 Section AA Work Zone

The next phase allows for the construction of the new SB portion of the I-81 bridge. The sequencing for this phase is as follows:

Phase 3

- Start the remaining bridge work – following the same sequence as the previous bridge work
- Install permanent drainage items to complete I-81 SB drainage system
- Construct I-81 SB roadway approaches to the new bridge
- Overlay and stripe I-81 SB roadway
- Switch NB and SB I-81 traffic to its permanent alignment, per the Traffic Management Plan

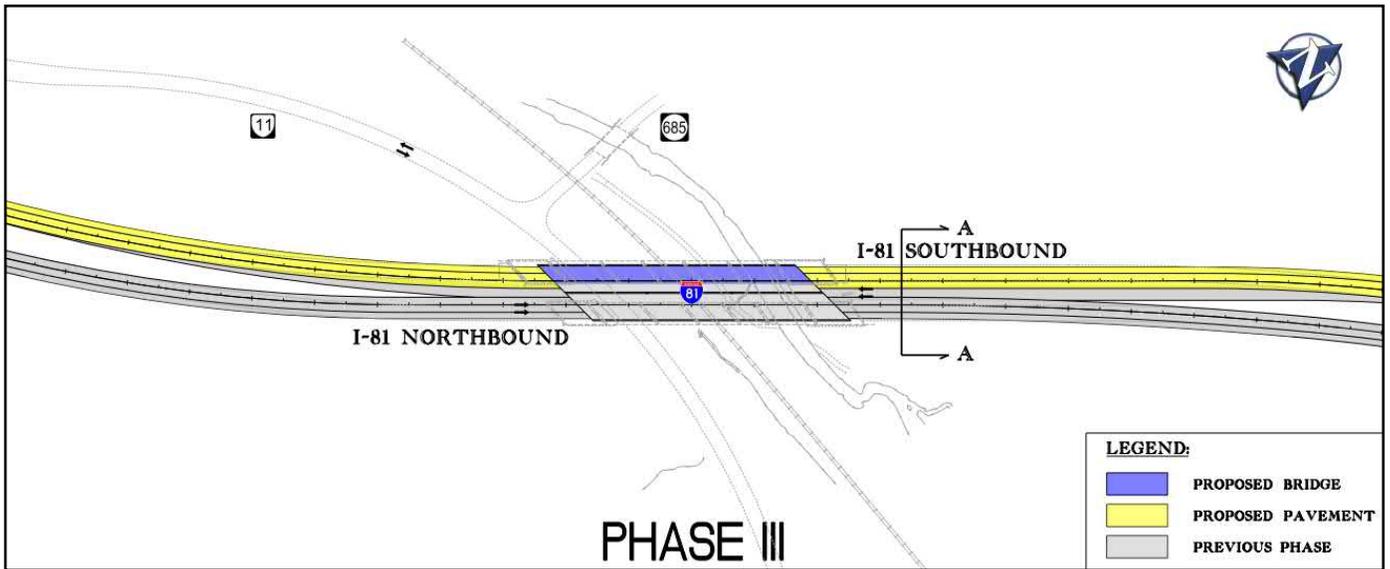


Figure 12 – Phase IV MOT

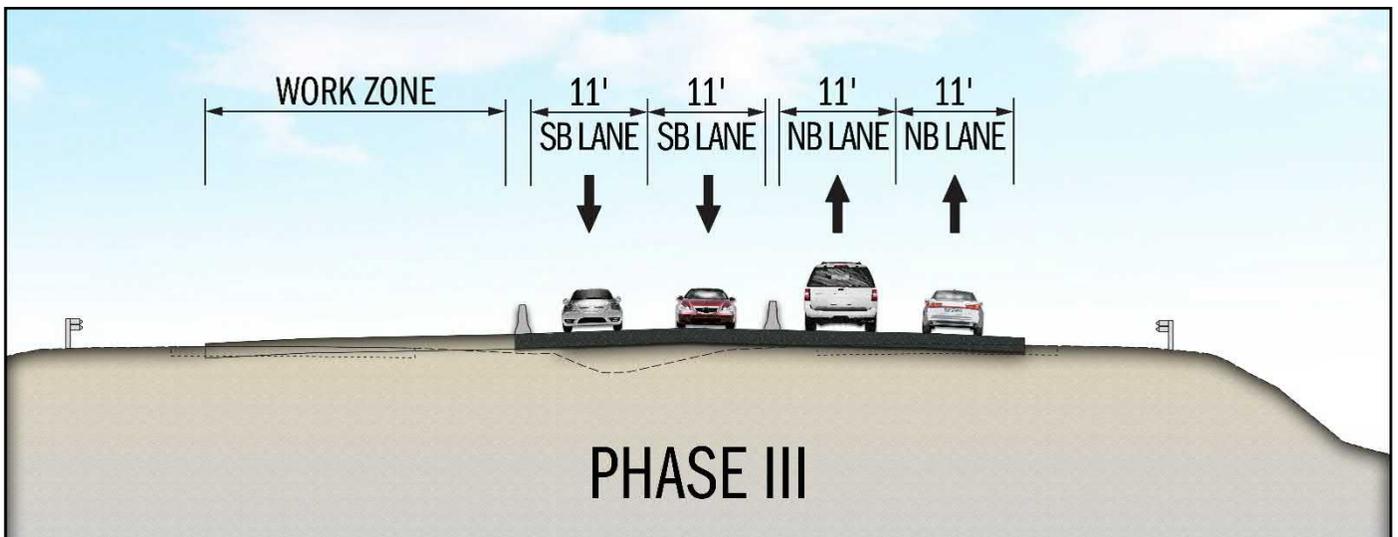


Figure 13 – Phase III Section AA Work Zone

The final phase allows for the median and shoulder work to be completed along with final paving and pavement markings. The sequencing for this phase is as follows:

Phase 4

- Complete median work
- Place final asphalt and markings
- Complete project stabilization and remove all E&S measures
- Complete project

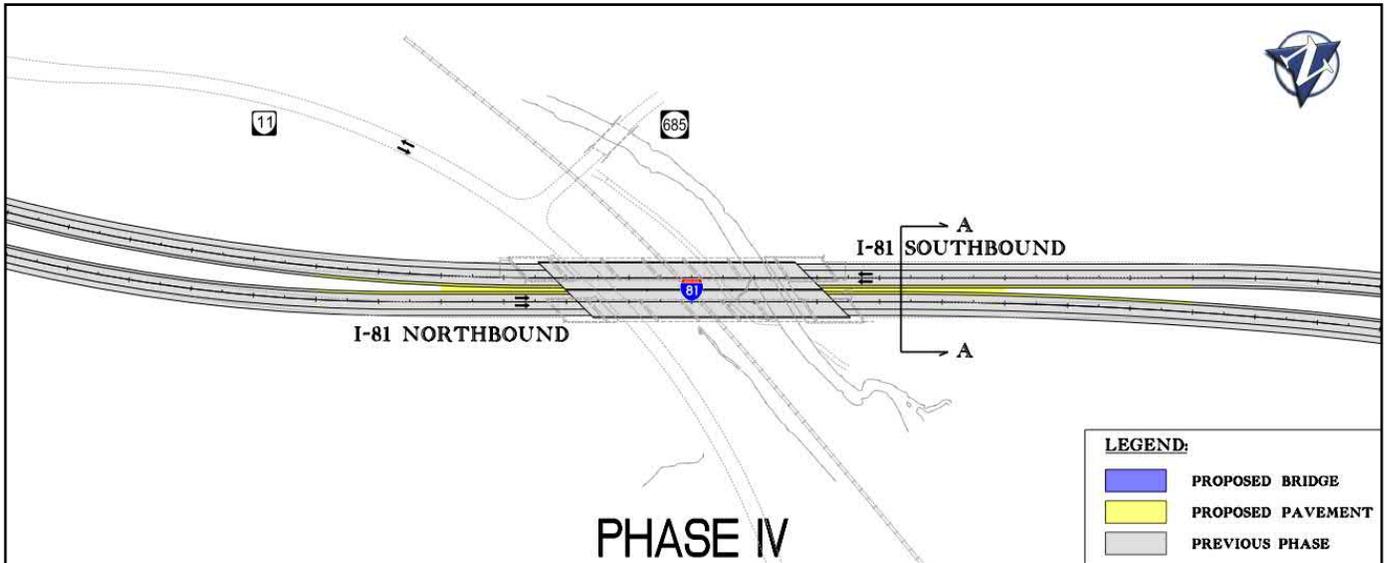


Figure 14 – Phase IV MOT

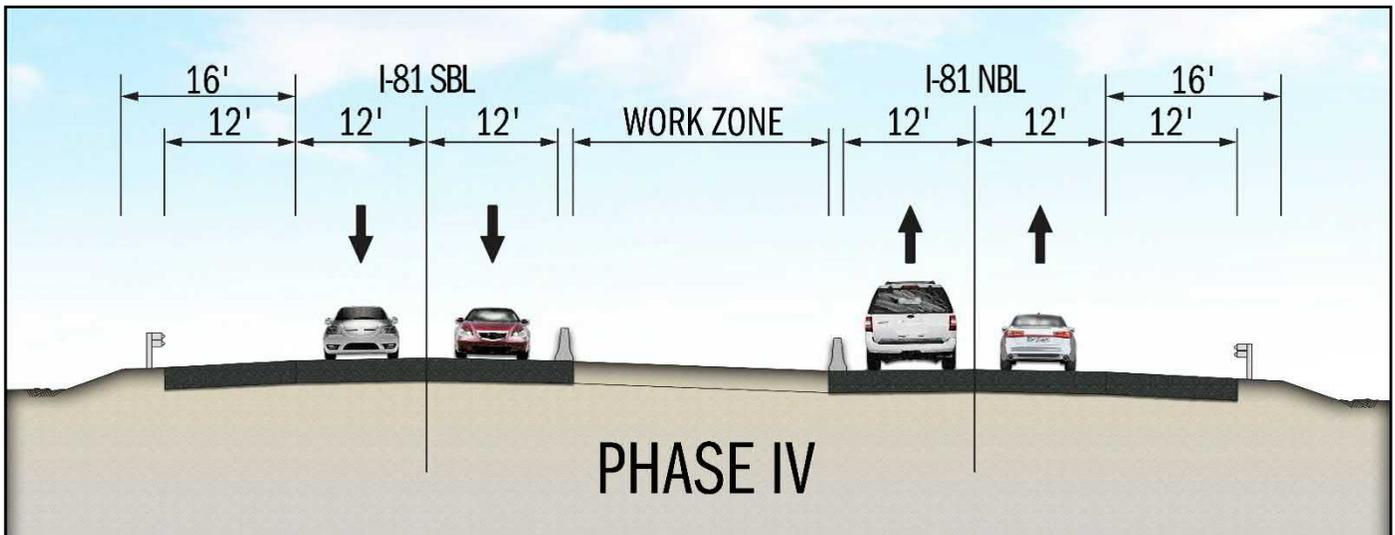


Figure 15 – Phase IV Section AA Work Zone

Safety

Safety of the traveling public, stakeholders, construction workers, and job site visitors is paramount for the success of the project and permeates every decision made regarding the approach to construction. For every phase and stage of construction, the Orders|WRA Design-Build Team will use Portable Changeable Message Signs (PCMS) to warn motorists that there is construction ahead and the driver should be prepared for these

traffic pattern changes. Group II channelizing devices and temporary barrier, impact attenuators, and temporary pavement marking will be used to assist in guiding vehicles safely through the work zone. Our Team will make it a priority to accomplish activities with potential major traffic impact during non-peak hours.

The Team will rely heavily on the presence of the Virginia State Police as they are the most effective deterrent to unsafe driver behavior. Every activity will be in accordance with the Virginia Work Area Protection Manual. The approach to vehicular safety and how vehicles operate through the work zone is a critical issue. The Orders|WRA Design-Build Team understands the importance of work zone safety and will be diligent in maintaining a safe and predictable work zone throughout construction. All safety measures will be monitored continuously by the Safety Manager and Traffic Control Manager under the direct supervision of the Construction Manager.

Vehicular accidents can occur when the driver's expectations are not met. The Orders|WRA Design-Build Team's Conceptual Design attempts to meet driver's expectations while traveling through the work zone. Each traffic shift and/or change in the normal traffic patterns increases the chances for accidents during a project. The Orders|WRA Design-Build Team is planning to construct this project with four major traffic shifts.

Construction access is key to successful on-time, safe and quality work. Access to work areas, like that of abutment B, is a primary issue that can impact success, timeliness and safety. When entry into work areas from travel lanes is needed, access will be executed with proper warning devices, oversized construction entrances and spotters.

To mitigate the risk to everyday worker safety, our Team will employ industry-standard safety measures during each phase of construction. These measures will include (but not limited to):

- Daily safety meetings
- Crane inspections
- Rigging inspections
- Equipment alarms
- Mirrors on vehicles
- Pre-lift meetings
- Use of spotters
- Railroad specific safety items
- Rescue boat and throw rings near the river
- Job site radio communication

Operations

The Orders|WRA Design-Build Team is intimately familiar with the issues associated with travel time reliability along the I-81 Corridor. The ability of the traveling public to navigate the work zone in a logical and safe manner is a top priority for our Team. Orders is currently constructing the adjacent I-81 Bridge Replacement Project over Mulberry Lane and recognizes managing the concurrent and overlapping work zones is critical. To further mitigate potential delays to the traveling public, our Team will prioritize the monitoring and maintenance of the following items to enhance the reliability of the system:

- Work Zone Temporary Traffic Control measures

- Existing bridge deck condition
- Construction entrances
- Railroad traffic
- Incident management
- Weather monitoring
- Travel time monitoring

Staging Areas

The staging areas must be convenient to optimize production. Off peak hour deliveries and trucking will be incorporated into the schedule. Crane positions will be planned as not to interfere with railroad traffic or public travel. Access points and staging locations will be located at the safest locations possible to facilitate the work.

Storage Areas

Our Team is planning on securing a storage area from an adjoining property owner on the west side of the river to work in conjunction with a previously secured area on the eastern side of the project and the existing storage locations for the Mulberry Bridge Replacement project. These existing and proposed storage areas are located outside of the work zone.

4.5.2 Transportation Management Plan

Maintaining Traffic Through All Phases of Construction

The main purpose of this project is to replace two aging bridges on Interstate 81 to ensure safety and reliability of the corridor. The Orders|WRA Design-Build Team is fully aware of the ultimate goal for this project. It is also of utmost importance that the path taken to get these bridges replaced is a safe and efficient path for all individuals involved: construction workers, traveling public, bicyclist, inspectors, surveyors etc.

To pave the way for this safe and efficient path, the project has been designed to allow for most of the construction to take place out of traffic. The following will be included in the Transportation Management Plan (TMP):

- A Temporary Traffic Control (TTC) Plan, designed to accommodate each phase of construction.
- Public Communication Plan, that will be used to address each phase of the project.
- Incident Management Plan (IMP), which will be tailored to fit each phase of the project.



Work Zone on I-81 over Halls Bottom and Sinking Creek, September 2017

The detailed TTC Plan will address the needed traffic control elements and the locations of them for each construction activity to safely move vehicles through the work zones. These elements will include the following items: concrete barrier, temporary roadway striping, temporary advanced work zone signage, group II channelizing devices, advanced warning using Portable Changeable Message Signs (PCMS), and the location of construction entrances.

The Incident Management Plan (IMP) is a critical plan that requires coordination with VDOT, emergency response organizations, and other concerned stakeholders. This plan prepares for and documents steps that will be taken if an incident occurs within the corridor. The IMP will address the following:

- 24 hours, 7 days a week emergency contact list
- Coordination with first responders and VDOT TOC
- Pre-planned messages for PCMS in the case of an incident
- Agency responsibilities checklist

Proposed Lane Closures

Temporary lane closures will be utilized to construct the following:

- Nighttime I-81 Lane Closures for I-81 NB and I-81 SB crossover tie-ins
- Nighttime I-81 Lane Closures for setting temporary barrier

Time of Day Restrictions

Our Team is aware of and will adhere to the Time of Day Restrictions established in the RFP.

Flagging Operations

The following operations will require flagging on Route 11:

- Removal of existing I-81 bridge overhangs that are over Route 11 travel ways
- Girder removal and girder erection
- Final Paving

Minimum Lane Widths

The minimum lane widths for I-81 and Route 11 will be 11-feet.



Girder Placement On I-81 over Halls Bottom Road, July 2017

Work Zone Speed Reductions

The Orders|WRA Design-Build Team will perform a Work Zone Traffic Impact Analysis to determine the impact of a reduced work zone speed. Based on recent projects we feel a reduced speed of 55mph to a maximum of 60mph is appropriate and warranted. Regardless, any reduction in the work zone speed will be requested in accordance with TE-350.1.

Project Stakeholders

The summary that follows describes the stakeholders that are in or near the project and outlines our planned communication and mitigation strategies to limit disruptions to vehicular, pedestrian, and bicycle traffic through the work area and adjacent public roadways.

Prior to construction starting a “Pardon our Dust” meeting will be scheduled to target these stakeholders specifically but will also be open to the public. Primary communication with the project stakeholders during construction will include real time traffic information using Portable Changes Message Signs (PCMS) and the Virginia 511 Traveler’s Information System. Descriptions of major traffic changes or construction operations that may have an impact on traffic outside the normal work zone operations will be provided to the VDOT Project Manager and Communications managers as well as the Traffic Operations Center so that any press releases or construction updates can be communicated to the local press and public.

Stakeholder/Impact	Communication/Mitigation Strategies
Traveling Public: <i>Potential time delay for temporary construction operations affecting Route 11 users.</i>	<ul style="list-style-type: none"> Provide advance warning via PCMS Facilitate regular public meetings with stakeholders Public outreach campaign starting with a “Pardon our Dust Meeting”. Minimize lane closures and traffic shifts Maximize temporary lane widths
Utilities (Smyth Co., CenturyLink, BVU, APCO, Comcast) <i>Need for early notification to ensure coordination of relocations.</i>	<ul style="list-style-type: none"> Invite utility companies to attend the progress meetings that the Orders WRA Design-Build Team will be attending. This will enable proper coordination with conflicts and their resolutions. Evaluate the TMP to ensure the relocation efforts are being accomplished safely.
Local Community Residents <i>Construction in close proximity</i>	<ul style="list-style-type: none"> Facilitate regular public meetings with stakeholders Public outreach campaign starting with a “Pardon our Dust Meeting”.
Schools (Smyth County): <i>Potential delays to school buses and other school drop-off/pick-up traffic.</i>	<ul style="list-style-type: none"> Facilitate regular public meetings with stakeholders Public outreach campaign starting with a “Pardon our Dust Meeting”. Engage the Schools Transportation Personnel to coordinate with bus schedules Strategically schedule construction activities Analyze peak AM and PM traffic volumes to minimize disruptions.
Railroad (Norfolk Southern) <i>Construction in close proximity</i> <i>Need for early notification to ensure coordination</i>	<ul style="list-style-type: none"> Invite Norfolk Southern to attend the progress meetings that the Orders WRA Design-Build Team will be facilitating monthly. This will enable proper coordination.
Police, Fire & Rescue: <i>Potential for delay in response time</i>	<ul style="list-style-type: none"> Public outreach campaign, starting with a “Pardon our Dust Meeting”. Facilitate regular meetings with these stakeholders

Table 4 - Stakeholder Impact and Mitigation Strategy

4.6

PROPOSAL SCHEDULE

4.6 PROPOSAL SCHEDULE

4.6.1 Proposal Schedule

The 11x17 copy of the proposal schedule is included in Volume II of the Technical Proposal.

4.6.2 Proposal Schedule Narrative

General

The Orders Construction DB Team has developed the following proposal schedule narrative detailing our overall plan to perform the contracted work in accordance with the Contract Documents for the I-81 Bridge Replacement over Route 11, NS Railroad, and MFH River.

Calendars

The Proposal schedule contains 4 calendars:

- Standard 5 day work week with holidays. This calendar is used for all design and administrative activities as well as VDOT reviews;
- 7 day calendar – This calendar is used for cure times and various other activities that can run on a 7 day calendar;
- Standard Construction Calendar – This calendar is for all non-paving construction activities that can be impacted by weather. This calendar includes holidays and an allowance for up to 4 weather impacted days each month;
- Paving Calendar – This calendar is used for all paving activities and includes weather and holidays. No paving work is planned between December 15 and March 1 of any year.

Sequence of Activities

Design and Overall Plan to Accomplish Work:

The Proposal schedule consists of Design activities and the general sequence of construction activities. Immediately following Notice to Proceed, we will begin field surveys and investigations necessary for the design of the project. A complete design level survey will be completed and utility designations and locations will be completed along with geotechnical investigations and analyses. The Geotechnical Report will be finalized including required reviews by VDOT. Preliminary Roadway Design including associated Maintenance of Traffic/TMP, Drainage/SWM/E&S, will be completed, reviewed for quality, and then reviewed by VDOT and FHWA. Concurrent with much of this design work, the structures design will be under way progressing through the Stage I and Stage II designs. These designs shall then be finalized and be in the QA/QC review in preparation for submittal to VDOT and FHWA. Other design related activities that will also be completed include securing required construction (permitting and railroad coordination) permits. The Roadway and Bridge Plans will then be completed and submitted to VDOT and FHWA for further review before then being finalized. Upon finalization and Notice to Commence from VDOT work will begin and will be carried out following the submitted schedule, plans and other pertinent documents to ensure the project is completed safely, on time and on budget in accordance with all Standard, Specifications and other documents. At the appropriate stages and as early as possible, NS Railroad will be engaged for any necessary reviews/approvals that are required.

Administrative

The project team will begin to submit all the initial contractually required submittals and documentation including the Letter of Submittal and the Attachments to the Letter of Submittal, the Price Proposal, QA/QC plan, Health and Safety plan, utility status report, geotechnical exploration plans, and insurance documentation and schedules.

Overall Sequence to Accomplish the Work

Because of the long lead time involved in procuring and fabricating structural steel, that process is the driver of both the design and construction sequence up to setting of the first structural steel. As a result, the majority of the critical path lies along bridge design and construction activities.

Project Start up and Design Phase

- Notice to Proceed
- Begin Survey and Geotechnical investigations
- Begin communication with NS RR for right of entry, flaggers, etc.
- Stage 1 Bridge Design and Stage 2 Bridge Superstructure Design
- Phase 1 Roadway Design
- Bridge Stage 2 Design Substructure
- Final Roadway Design

Beginning of Construction

- Installation of project construction signs
- Mobilization including establishment of staging and storage area(s)
- Documentation of existing conditions
- Contact Miss Utility
- Installation of E&S Controls, MOT, and Sediment Basin

Stage 1 – NB Bridge Construction

- Traffic to utilize existing lanes
- Install additional MOT as needed
- Construct median side of new NBL bridge
- Grade and pave approaches
- Shift Traffic from existing NBL to new bridge and temporary diversion

Phase I Roadway Construction

- Demolish existing NBL bridge
- Construct new NBL bridge
- Grade and pave approaches
- Guardrail, seeding, signage for permanent NBL
- Shift NBL traffic to new NB and bridge

Phase 2 Roadway

- Demolish temporary pavement from NBL tie-ins
- Grade new SBL tie-ins
- Grade Ramp tie-ins
- Signs, guardrail, seeding for new SBL

- Shift SBL from existing lanes to new lanes

Stage 2 Bridge

- Demolish old SBL bridge
- Construct New SBL Bridge

Phase 3 Roadway

- Grade and Pave approaches
- Guardrail, seeding, signage for permanent SBL
- Shift traffic from SB diversions to permanent SBL

Phase 4 Roadway

- Reshape median
- Place final asphalt
- Place final pavement markings

Closeout

- Final Clean-up
- VDOT Final Inspection
- Punchlist
- Demobilization

Explanation for Critical Path:

This Critical Path shows the sequencing for construction to be carried on the I-81 over MFH, NS Rail Road and Route 11 Bridge Replacement Project. The following activities are networked together to determine the shortest possible timeframe to complete this project and the critical path items include the following activities (listed in alphanumeric order).

The critical path runs through the following activities:

ORD1020	Final Completion
ORD1290	Shop Drawings Structural Steel
ORD1310	Fabricate Structural Steel
ORD1340	Deliver Structural Steel
ORD1670	Erect Structural Steel Stage 1 Bridge
ORD1680	Install Deck Forms Stage 1 Bridge
ORD1690	Place Reinf Steel Stage 1 Bridge
ORD1700	Pour and Cure Decks Stage 1 Bridge
ORD1710	Install Traffic Control Items on Stage 1 Bridge
ORD1720	Switch Traffic on the NB Diversion
ORD1730	Demolish Existing NB Bridge
ORD1820	Support of Excavation
ORD1830	Structural Excavation Abutment A
ORD1840	Structural Excavation Abutment B
ORD1850	Structural Excavation Pier 2
ORD1860	Drilled Shafts Pier 1
ORD1910	F/R/P Substructure Pier 1
ORD1920	F/R/P Substructure Abutment B

ORD1930	Backfill Substructure
ORD1940	Erect Structural Steel Stage 2 Bridge
ORD1950	Install Deck Forms Stage 2 Bridge
ORD1960	Place Reinf Steel Stage 2 Bridge
ORD1970	Pour and Cure Decks Stage 2 Bridge
ORD1980	Install Traffic Control Items on Stage 2 Bridge
ORD1990	Switch NB Traffic on New Construction
ORD2000	Re-shape median for SB Diversion
ORD2010	Switch SB Traffic onto SB Diversion
ORD2020	Demolish Existing SB Bridge
ORD2100	Support of Excavation Stage 3 Bridge
ORD2110	Structural Excavation Pier 2 Bridge
ORD2120	Structural Excavation Abutment A Bridge
ORD2130	Structural Excavation Abutment B Bridge
ORD2160	Drive Bearing Pile Abutment B Stage 3
ORD2200	F/R/P Substructure Abutment B
ORD2210	Backfill Substructure
ORD2220	Erect Structural Steel Stage 3 Bridge
ORD2230	Install Deck Forms Stage 3 Bridge
ORD2240	Place Reinf Steel Stage 3 Bridge
ORD2250	Pour and Cure Decks Stage 3 Bridge
ORD2260	Construct Parapets Stage 3 Bridge
ORD2270	Install Traffic Controls for SB Traffic Switch
ORD2280	Switch SB Traffic to new Construction
ORD2290	Reshape Median for Ultimate
ORD2320	Clean-up
ORD2350	Demobilize
VDOT1020	NTP
VDOT1370	VDOT and NS Review WP-2
VDOT1420	VDOT and NS Review WP-4
VDOT1430	VDOT and NS Review/Approve WP-4
VDOT1715	VDOT Bridge Inspection
VDOT1985	VDOT Bridge Inspection
VDOT2360	VDOT Bridge Inspection
WRA1030	WP-4 Bridge Stage 2 Superstr Approved for Construction
WRA1350	Bridge Stage 1
WRA1360	Design QA/QC WP-2
WRA1450	Bridge Stage 2 Superstructure Design
WRA1460	Design QA/QC WP-4
WRA1470	Revise Resubmit WP-4
WRA1480	WP-4 RFC Package

Proposed Means and Methods

Means and Methods for constructing this project will follow all federal, state, and local guidelines. It will incorporate restrictions put on the project by VDOT. All work will adhere to pertinent Standard, Specification or Reference Documents and will be submitted to VDOT for review.

The project will be staffed with an MOT/E&S crew, Grading crew, Drainage crew, and 2 bridge crews. Project equipment will include 3 cranes, 4 excavators, 2 dozers, 2 rollers, diesel pile hammer, vibratory pile hammer, motor grader, and a full complement of other various support equipment. This level of staffing and equipment will allow the Orders DB Team to construct the project in the most efficient manner possible and ensure that the project stays on track for completion by the contract date.

Key Assumptions

The following assumptions have been made in assessing the durations necessary to complete the work:

- Winter weather will be normal
- Va. State police will be available when scheduled
- Railroad flagger will be available as scheduled
- Local source materials can be located—acquired
- Structure foundation materials will be as represented in Geotech info that was provided
- Roadway materials will be as represented in Geotech info that was provided
- Condition of the existing structures will be as expected from visual survey
- Condition of existing drainage structures will be as expected from information provided
- All concept information is accurate
- All submittals required to be reviewed by VDOT and NS will be done on time.

APPENDICES AND ATTACHMENTS

- **Attachment 4.0.1.1**
 - Technical Proposal Checklist and Contents
- **Attachment 3.6 (Form C-78-RFP)**
 - Acknowledgement of RFP, Revisions, and/or Addenda
- **Attachment 9.3.1**
 - Proposal Payment Agreement
- **Attachment 11.8.6(a) and 11.8.6(b)**
 - Certification Regarding Debarment Forms
 - *Orders Construction Company, Inc.*
 - *Whitman, Requardt & Associates, LLP*
 - *A. Morton Thomas & Associates, Inc.*
 - *Bowman Consulting Group, Ltd.*
 - *Appraisal Review Specialists, LLC*
 - *GEOServices, LLC*
 - *Mattern & Craig, Inc.*
 - *Wood Environmental & Infrastructure, Inc.*

Attachment 4.0.1.1

Technical Proposal Checklist and Contents

ATTACHMENT 4.0.1.1
REPLACEMENT OF I-81 BRIDGES OVER RTE. 11, NS RAILROAD & M.F.H RIVER
TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Offerors shall furnish a copy of this Technical Proposal Checklist, with the page references added, with the Technical Proposal.

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Technical Proposal Checklist and Contents	Attachment 4.0.1.1	Section 4.0.1.1	no	Vol. I - Appendix
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.6 (Form C-78-RFP)	Sections 3.6, 4.0.1.1	no	Vol. I - Appendix
Letter of Submittal	NA	Sections 4.1		Vol. I - Pgs. 1-2
Letter of Submittal on Offeror's letterhead	NA	Section 4.1.1	yes	Vol. I - Pgs. 1-2
Identify the full legal name and address of Offeror	NA	Section 4.1.1	yes	Vol. I - Pg. 1
Authorized representative's original signature	NA	Section 4.1.1	yes	Vol. I - Pg. 2
Declaration of intent	NA	Section 4.1.2	yes	Vol. I - Pg. 1
120 day declaration	NA	Section 4.1.3	yes	Vol. I - Pg. 1
Point of Contact information	NA	Section 4.1.4	yes	Vol. I - Pg. 1
Principal Officer information	NA	Section 4.1.5	yes	Vol. I - Pg. 1
Interim Milestone and Final Completion Date(s)	NA	Section 4.1.6	yes	Vol. I - Pg. 1
Unique Milestone Date(s)	NA	Section 4.1.7	yes	Vol. I - Pg. 1
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.8	no	Vol. I - Pg. 1, Appendix
Certification Regarding Debarment Forms	Attachment 11.8.6(a) Attachment 11.8.6(b)	Section 4.1.9	no	Vol. I - Pg. 2, Appendix
Written statement of percent DBE participation	NA	Section 4.1.10	yes	Vol. I - Pg. 2

ATTACHMENT 4.0.1.1

REPLACEMENT OF I-81 BRIDGES OVER RTE. 11, NS RAILROAD & M.F.H RIVER

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Offeror's Qualifications	NA	Section 4.2		Vol. I - Pgs. 3-4
Confirmation that the information provided in the SOQ submittal remains true and accurate or indicates that any requested changes were previously approved by VDOT	NA	Section 4.2.1	yes	Vol. I - Pg. 3
Organizational chart with any updates since the SOQ submittal clearly identified	NA	Section 4.2.2	yes	Vol. I - Pg. 4
Revised narrative when organizational chart includes updates since the SOQ submittal	NA	Section 4.2.2	yes	Vol. I - Pg. 3
Design Concept	NA	Section 4.3		Vol. I - Pgs. 5-16
Conceptual Roadway Plans and description	NA	Section 4.3.1.1	yes	Vol. I - Pgs. 8-11, Vol. II - Pgs. 40-47
Conceptual Structural Plans and description	NA	Section 4.3.1.2	yes	Vol. I - Pgs. 12-16, Vol. II - Pgs. 48-53
Project Approach	NA	Section 4.4		Vol. I - Pgs. 17-28
Environmental Management	NA	Section 4.4.1	yes	Vol. I - Pgs. 17-20
Utilities	NA	Section 4.4.2	yes	Vol. I - Pgs. 20-22
Geotechnical	NA	Section 4.4.3	yes	Vol. I - Pgs. 22-26
Railroad Coordination	NA	Section 4.4.4	yes	Vol. I - Pgs. 26-28
Construction of Project	NA	Section 4.5		Vol. I - Pgs. 29-39
Sequence of Construction	NA	Section 4.5.1	yes	Vol. I - Pgs. 30-37

ATTACHMENT 4.0.1.1

REPLACEMENT OF I-81 BRIDGES OVER RTE. 11, NS RAILROAD & M.F.H RIVER

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Transportation Management Plan	NA	Section 4.5.2	yes	Vol. I - Pgs. 37-39
Proposal Schedule	NA	Section 4.6		Vol. I&II -S1-S11
Proposal Schedule	NA	Section 4.6	no	Vol. II - S6-S11
Proposal Schedule Narrative	NA	Section 4.6	no	Vol. I - S1-S5
Proposal Schedule in electronic format (CD-ROM)	NA	Section 4.6	no	CD-ROM

Attachment 3.6 (Form C-78-RFP)

Acknowledgement of RFP, Revisions, and/or Addenda

ATTACHMENT 3.6**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION**

RFP NO. C00097555DB102
 PROJECT NO.: 0081-086-742, P101, B659; 0081-086-818, B663

ACKNOWLEDGEMENT OF RFP, REVISION AND/OR ADDENDA

Acknowledgement shall be made of receipt of the Request for Proposals (RFP) and/or any and all revisions and/or addenda pertaining to the above designated project which are issued by the Department prior to the Letter of Submittal submission date shown herein. Failure to include this acknowledgement in the Letter of Submittal may result in the rejection of your proposal.

By signing this Attachment 3.6, the Offeror acknowledges receipt of the RFP and/or following revisions and/or addenda to the RFP for the above designated project which were issued under cover letter(s) of the date(s) shown hereon:

1. Cover letter of RFP – August 28, 2018
(Date)
2. Cover letter of RFP Addendum #1 – October 12, 2018
(Date)
3. Cover letter of RFP Addendum #2 – November 9, 2018
(Date)
4. Cover letter of RFP Addendum #3 – November 15, 2018
(Date)
4. Cover letter of RFP Addendum #4 – November 30, 2018
(Date)



SIGNATURE

12-5-18

DATE

NATHANIEL R. ORDERS

PRINTED NAME

PRESIDENT

TITLE

Attachment 9.3.1

Proposal Payment Agreement

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this "Agreement") is made and entered into as of this 5TH day of DECEMBER, 2018, by and between the Virginia Department of Transportation ("VDOT"), and DRIVERS CONSTRUCTION CO., INC. ("Offeror").

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications ("SOQs") pursuant to VDOT's **June 1, 2018** Request for Qualifications ("RFQ") and was invited to submit proposals in response to a Request for Proposals ("RFP") for the **Replacement of I-81 Bridges over Rte. 11, NS Railroad & M.F.H River, Project No. 0081-086-742, P101, B659; 0081-086-818, B663** ("Project"), under a design-build contract with VDOT ("Design-Build Contract"); and

WHEREAS, as part of the procurement process for the Project, Offeror has already provided and/or furnished to VDOT, and may continue to provide and/or furnish to VDOT, certain intellectual property, materials, information and ideas, including, but not limited to, such matters that are: (a) conveyed verbally and in writing during proprietary meetings or interviews; and (b) contained in, related to or associated with Offeror's proposal, including, but not limited to, written correspondence, designs, drawings, plans, exhibits, photographs, reports, printed material, tapes, electronic disks, or other graphic and visual aids (collectively "Offeror's Intellectual Property"); and

WHEREAS, VDOT is willing to provide a payment to Offeror, subject to the express conditions stated in this Agreement, to obtain certain rights in Offeror's Intellectual Property, provided that Offeror submits a proposal that VDOT determines to be responsive to the RFP ("Offeror's Proposal"), and either (a) Offeror is not awarded the Design-Build Contract; or (b) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror; and

WHEREAS, Offeror wishes to receive the payment offered by VDOT, in exchange for granting VDOT the rights set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement and other good and valuable consideration, the receipt and adequacy of which are acknowledged by the parties, the parties agree as follows:

1. **VDOT's Rights in Offeror's Intellectual Property.** Offeror hereby conveys to VDOT all rights, title and interest, free and clear of all liens, claims and encumbrances, in Offeror's Intellectual Property, which includes, without restriction or limitation, the right of VDOT, and anyone contracting with VDOT, to incorporate any ideas or information from Offeror's Intellectual Property into: (a) the Design-Build Contract and the Project; (b) any other contract awarded in reference to the Project; or (c) any subsequent procurement by VDOT. In receiving all rights, title and interest in Offeror's Intellectual Property, VDOT is deemed to own all intellectual property rights, copyrights, patents, trade secrets, trademarks, and service marks in Offeror's Intellectual Property, and Offeror agrees that it shall, at the request of VDOT, execute all papers and perform all other acts that may be necessary to ensure that VDOT's rights, title and interest in Offeror's Intellectual Property are protected. The rights conferred herein to VDOT include, without limitation, VDOT's ability to use Offeror's Intellectual Property without the obligation to notify or seek permission from Offeror.

2. **Exclusions from Offeror's Intellectual Property.** Notwithstanding Section 1 above, it is understood and agreed that Offeror's Intellectual Property is not intended to include, and Offeror does not convey any rights to, the Escrow Proposal Documents submitted by Offeror in accordance with the RFP.

3. **Proposal Payment.** VDOT agrees to pay Offeror the lump sum amount of **Thirty Thousand and 00/100 Dollars (\$30,000.00)** ("Proposal Payment"), which payment constitutes payment in full to Offeror for the conveyance of Offeror's Intellectual Property to VDOT in accordance with this Agreement. Payment of the Proposal Payment is conditioned upon: (a) Offeror's Proposal being, in the sole discretion of VDOT, responsive to the RFP; (b) Offeror complying with all other terms and conditions of this Agreement; and (c) either (i) Offeror is not awarded the Design-Build Contract, or (ii) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror.

4. **Payment Due Date.** Subject to the conditions set forth in this Agreement, VDOT will make payment of the Proposal Payment to the Offeror within forty-five (45) days after the later of: (a) notice from VDOT that it has awarded the Design-Build Contract to another Offeror; or (b) notice from VDOT that the procurement for the Project has been cancelled and that there will be no Contract Award.

5. **Effective Date of this Agreement.** The rights and obligations of VDOT and Offeror under this Agreement, including VDOT's ownership rights in Offeror's Intellectual Property, vests upon the date that Offeror's Proposal is submitted to VDOT. Notwithstanding the above, if Offeror's Proposal is determined by VDOT, in its sole discretion, to be nonresponsive to the RFP, then Offeror is deemed to have waived its right to obtain the Proposal Payment, and VDOT shall have no obligations under this Agreement.

6. **Indemnity.** Subject to the limitation contained below, Offeror shall, at its own expense, indemnify, protect and hold harmless VDOT and its agents, directors, officers, employees, representatives and contractors from all claims, costs, expenses, liabilities, demands, or suits at law or equity (“Claims”) of, by or in favor of or awarded to any third party arising in whole or in part from: (a) the negligence or wilful misconduct of Offeror or any of its agents, officers, employees, representatives or subcontractors; or (b) breach of any of Offeror’s obligations under this Agreement, including its representation and warranty under Section 8 hereof. This indemnity shall not apply with respect to any Claims caused by or resulting from the sole negligence or wilful misconduct of VDOT, or its agents, directors, officers, employees, representatives or contractors.

7. **Assignment.** Offeror shall not assign this Agreement, without VDOT's prior written consent, which consent may be given or withheld in VDOT’s sole discretion. Any assignment of this Agreement without such consent shall be null and void.

8. **Authority to Enter into this Agreement.** By executing this Agreement, Offeror specifically represents and warrants that it has the authority to convey to VDOT all rights, title, and interest in Offeror’s Intellectual Property, including, but not limited to, those any rights that might have been vested in team members, subcontractors, consultants or anyone else who may have contributed to the development of Offeror’s Intellectual Property, free and clear of all liens, claims and encumbrances.

9. **Miscellaneous.**

a. Offeror and VDOT agree that Offeror, its team members, and their respective employees are not agents of VDOT as a result of this Agreement.

b. Any capitalized term used herein but not otherwise defined shall have the meanings set forth in the RFP.

c. This Agreement, together with the RFP, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto.

d. It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the Commonwealth of Virginia, validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

e. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia.

IN WITNESS WHEREOF, this Agreement has been executed and delivered as of the day and year first above written.

VIRGINIA DEPARTMENT OF TRANSPORTATION

By: _____

Name: _____

Title: _____

[Insert Offeror's Name]

By: 

Name: NATHANIEL R. ORDERS

Title: PRESIDENT

Attachment 11.8.6(a) and 11.8.6(b)

Certification Regarding Debarment Forms

- *Orders Construction Company, Inc.*
- *Whitman, Requardt & Associates, LLP*
- *A. Morton Thomas & Associates, Inc.*
- *Bowman Consulting Group, Ltd.*
- *Appraisal Review Specialists, LLC*
- *GEOservices, LLC*
- *Mattern & Craig, Inc.*
- *Wood Environmental & Infrastructure, Inc.*

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; and have not been convicted of any violations of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1) b) of this certification; and

d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

 12-5-18 PRESIDENT
Signature Date Title

ORDERS CONSTRUCTION COMPANY, INC.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	December 6, 2018	Vice President
Signature	Date	Title

Whitman, Requardt & Associates, LLP

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

<u>Ch. M. May</u>	<u>11/20/18</u>	<u>ASSOCIATE</u>
Signature	Date	Title

A. MORTON THOMAS & ASSOCIATES, INC.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

 _____ 11/15/18 _____ Principal/Branch Manager
Signature Date Title

Bowman Consulting Group, Ltd. _____
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

<u>R. Curt Pyle</u>	<u>11-15-2018</u>	<u>Managing Partner</u>
Signature	Date	Title

Appraisal Review Specialists, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

Nathan Turner 11-21-18 Office Manager
Signature Date Title

GEOServices, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

Michael A. Agre **11/20/18**
Signature Date

P.E., V.P., Principal
Title

Mattern & Craig, Inc.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.


Signature Date 11/15/2018 Title BRANCH MANAGER

WOOD ENVIRONMENT & INFRASTRUCTURE, INC.
Name of Firm



in conjunction with



Subconsultants:



December 6, 2018



Copy 1 of 10 Copies
(Original)

VOLUME II: Roadway and Bridge Design Concept Plans and Proposal Schedule

A Design-Build Project

Replacement of I-81 Bridges over Rte. 11, Norfolk Southern Railroad & Middle Fork Holston River, Smyth County, Virginia

State Project No.: 0081-086-742, P101, B659; 0081-086-818, B663
Federal Project No.: BR-081-1(336); NHPP-081-1(351)
Contract ID Number: C00097555DB102

Submitted By:



In Conjunction With:



Subconsultants:



THIS PROJECT WAS DEVELOPED UTILIZING THE DEPARTMENT'S ENGINEERING DESIGN PACKAGE (GEOPAK). GEOPAK COMPUTER IDENTIFICATION NO. 97555



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

REPLACEMENT OF I-81 BRIDGES OVER RTE. 11, NORFOLK SOUTHERN RAILROAD & MIDDLE FORK HOLSTON RIVER
SMYTH COUNTY
FROM: 2.14 MILES NORTH OF EXIT 50
TO: 2.61 MILES NORTH OF EXIT 50

FUNCTIONAL CLASSIFICATION AND TRAFFIC DATA		
	MAINLINE	ROUTE 11
FROM:	2.14 MILES NORTH OF EXIT 50	-
TO:	2.61 MILES NORTH OF EXIT 50	-
FUNCTIONAL CLASSIFICATION	RURAL PRINCIPAL ARTERIAL (INTERSTATE)-DIVIDED-ROLLING	RURAL MINOR ARTERIAL-ROLLING
MIN. DESIGN SPEED	75 MPH	60 MPH
ADT (2016)	30,768 NB / 30,768 SB	(2015) 2,500
ADT (2045)	45,000 NB / 45,000 SB	6,650
DHV (2045)	4,500 NB / 4,500 SB	665
D (%) (design hour)	50%	50%
T (%) (design hour)	20%	2%
V (MPH)	*	*
TC STD.	TC-5.11R	TC-5.11R
GEOMETRIC STD.	GS-1	GS-2

* SEE PLAN SHEETS FOR HORIZONTAL CURVE DESIGN SPEEDS.

CONVENTIONAL SIGNS

STATE LINE	---
COUNTY LINE	----
CITY, TOWN OR VILLAGE	-----
RIGHT OF WAY LINE	-----
FENCE LINE	-----
UNFENCED PROPERTY LINE	-----
FENCED PROPERTY LINE	-----
WATER LINE	-----
SANITARY SEWER LINE	-----
GAS LINE	-----
ELECTRIC UNDERGROUND CABLE	-----
TRAVELED WAY	-----
GUARD RAIL	-----
RETAINING WALL	-----
RAILROADS	-----
BASE OR SURVEY LINE	-----

LEVEE OR EMBANKMENT	-----
BRIDGES	-----
CULVERTS	-----
DROP INLET	-----
POWER POLES	-----
TELEPHONE OR TELEGRAPH POLES	-----
TELEPHONE OR TELEGRAPH LINES	-----
HEDGE	-----
TREES	-----
HEAVY WOODS	-----
GROUND ELEVATION	-----
GRADE ELEVATION	-----

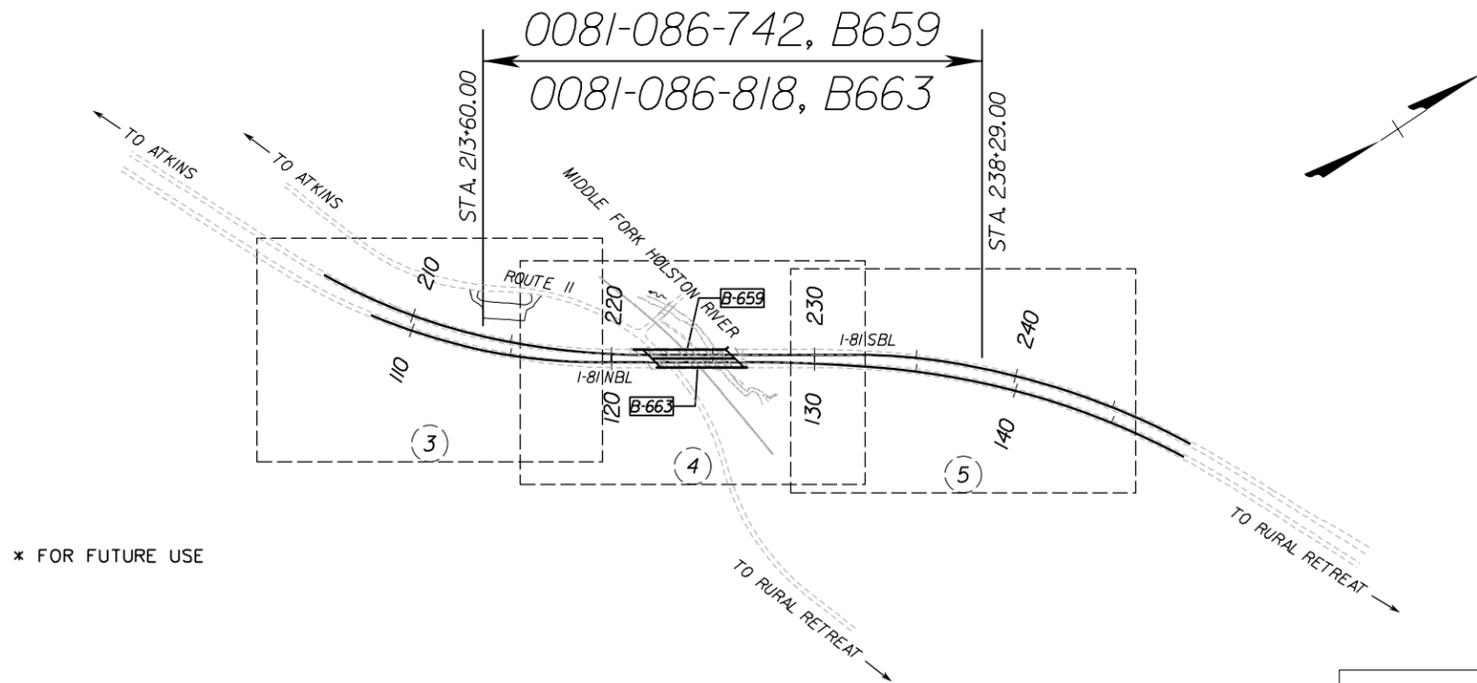
THE COMPLETE ELECTRONIC PDF VERSION OF THE PLAN ASSEMBLY AS AWARDED, HAS BEEN SEALED AND SIGNED USING DIGITAL SIGNATURES AND THE OFFICIAL PLAN ASSEMBLY IN ELECTRONIC FORMAT IS STORED IN THE VDOT CENTRAL OFFICE PLAN LIBRARY, INCLUDING ALL SUBSEQUENT REVISIONS, WILL BE THE OFFICIAL CONSTRUCTION PLANS. FOR INFORMATION RELATIVE TO ELECTRONIC FILES AND LAYERED PLANS, SEE THE GENERAL NOTES.

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT.

THIS PROJECT IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT'S 2016 ROAD AND BRIDGE SPECIFICATIONS, 2016 ROAD AND BRIDGE STANDARDS, 2009 MUTCD, 2011 VIRGINIA SUPPLEMENT TO THE MUTCD, 2011 VIRGINIA WORK AREA PROTECTION MANUAL AND AS AMENDED BY CONTRACT PROVISIONS AND THE COMPLETE ELECTRONIC PDF VERSION OF THE PLAN ASSEMBLY.

ALL CURVES ARE TO BE SUPERELEVATED, TRANSITIONED AND WIDENED IN ACCORDANCE WITH STANDARD TC-5.11R, EXCEPT WHERE OTHERWISE NOTED.

THE ORIGINAL APPROVED TITLE SHEET(S), INCLUDING ORIGINAL SIGNATURES, ARE FILED IN THE VDOT CENTRAL OFFICE PLAN LIBRARY. ANY MISUSE OF ELECTRONIC FILES, INCLUDING SCANNED SIGNATURES, IS ILLEGAL AND ENFORCED TO THE FULL EXTENT OF THE LAW.



* FOR FUTURE USE

POPULATION 31,470 (2015 CENSUS)

STATE PROJECT NO.	SECTION	FEDERAL AID PROJECT NO.	TYPE CODE	UPC NO.	LENGTH INCLUDING BRIDGE(S)		LENGTH EXCLUDING BRIDGE(S)		TYPE PROJECT	DESCRIPTION
					FEET	MILES	FEET	MILES		
0081-086-742	P101	BR-081-11336)		97555	2,469	0.47			PRELIM. ENG.	
	B659									BRIDGE
0081-086-818	B663			111265					BRIDGE	NORTHBOUND BRIDGE

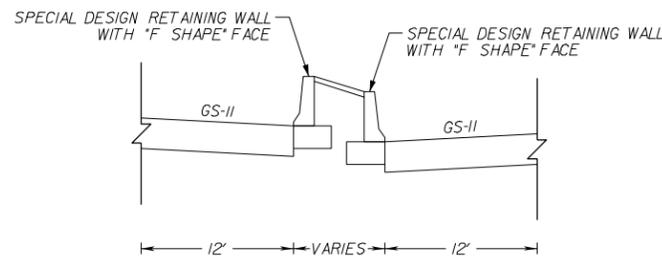
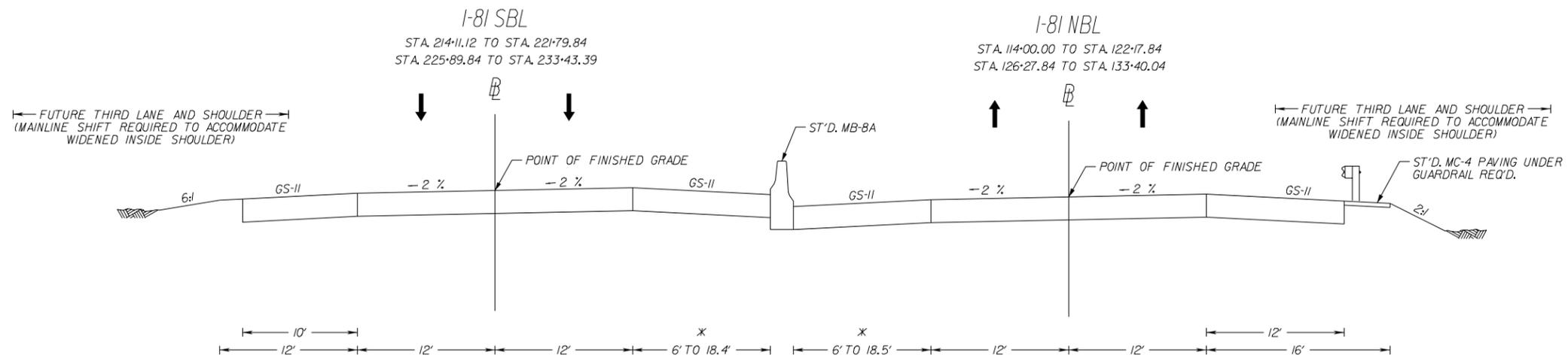
NOTE: PROJECT LENGTHS BASED ON I-81 SB CONSTRUCTION BASELINE.



TECHNICAL PROPOSAL CONCEPT PLANS
I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD & MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
(PROJECT: 0081-086-742)

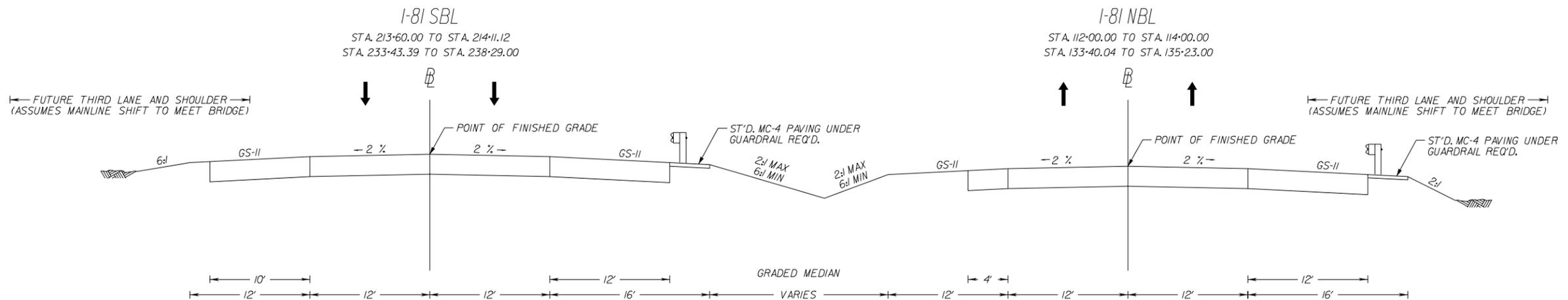
SHEET 1

TYPICAL SECTIONS



* I-81 NBL:	STA. 118+53.80 TO STA. 121+42.58	TRANSITION 12' TO 6'
	STA. 121+42.58 TO STA. 122+17.84	6'
	STA. 126+27.84 TO STA. 127+02.92	6'
	STA. 127+02.92 TO STA. 133+40.04	TRANSITION 6' TO 18.5'
I-81 SBL:	STA. 218+56.00 TO STA. 221+63.12	TRANSITION 12' TO 6'
	STA. 221+63.12 TO STA. 221+79.81	6'
	STA. 225+89.84 TO STA. 227+26.95	6'
	STA. 227+26.95 TO STA. 233+43.39	TRANSITION 6' TO 18.4'

- NOTES:
1. SEE PLAN SHEETS FOR AREAS OF FULL-DEPTH VS. MILL / OVERLAY.
 2. SEE STRUCTURAL PLANS FOR BRIDGE TYPICAL SECTION.
 3. SEE PLANS FOR EXACT GUARDRAIL LOCATIONS. SEE SB TYPICAL ON OUTSIDE FOR SHOULDER REQUIREMENTS WITHOUT GUARDRAIL.
 4. SEE PLANS FOR SUPERELEVATION INFORMATION.



MINIMUM PAVEMENT SECTIONS PER RFP

NEW PAVEMENT AND PAVEMENT WIDENING FOR I-81 (INCLUDING SHOULDERS)

SURFACE - ASPHALT CONCRETE SURFACE COURSE, SM-12.5E @ 220 LBS/SY
 INTERMEDIATE - ASPHALT CONCRETE INTERMEDIATE COURSE, IM-19.0E @ 230 LBS/SY
 BASE - 10 INCHES ASPHALT CONCRETE BASE COURSE, BM-25.0D
 SUBBASE - 12 INCHES AGGREGATE BASE MATERIAL, TYPE 1, 2I-B (DAYLIGHT THROUGH THE SHOULDER AS NEEDED)
 LEVELING COURSE: 2 INCHES TYPE 1, 2I-B
 OPEN GRADED AGGREGATE MATERIAL: 12 INCHES - AGGREGATE MATERIAL #1

NEW PAVEMENT AND PAVEMENT WIDENING FOR RTE. 11 (INCLUDING SHOULDERS)

SURFACE - ASPHALT CONCRETE SURFACE COURSE, SM-12.5A @ 220 LBS/SY
 INTERMEDIATE - ASPHALT CONCRETE INTERMEDIATE COURSE, IM-19.0A @ 230 LBS/SY
 BASE - 8 INCHES ASPHALT CONCRETE BASE COURSE, BM-25.0A
 SUBBASE - 6 INCHES AGGREGATE BASE MATERIAL, TYPE 1, 2I-B

MILL AND OVERLAY FOR I-81, RTE. 11 AND FLOWING SPRING (MAX. BUILD-UP 8 INCHES)

MILL - 2 INCHES
 SURFACE - ASPHALT CONCRETE SURFACE COURSE TYPE SM-12.5 E @ 220 LBS/SY
 INTERMEDIATE - ASPHALT INTERMEDIATE COURSE TYPE IM-19.0E @ 115 LBS/SY PER INCH OF THICKNESS (VARIABLE BUT NO MORE THAN 8 INCHES OF INTERMEDIATE PERMITTED)

TECHNICAL PROPOSAL CONCEPT PLANS
 I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
 MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 2





ROADWAY	MAX. DESIGN GRADE
INTERSTATE 81	1.71%

- ① Curve 81SB_1
PI • 209+79.84
DELTA • 17° 31' 18" (LT)
D • 1' 55' 00"
T • 460.68'
L • 914.17'
R • 2,989.34'
PC • 205+19.16
PCC • 214+33.33
- ② Curve 81SB_2
PI • 217+99.50
DELTA • 11° 41' 46" (LT)
D • 1' 36' 10"
T • 366.17'
L • 729.79'
R • 3,575.00'
PCC • 214+33.33
PT • 221+63.12
E • 6.1%
Lr • 192.63'
V • 75 MPH
- ③ Curve 81NB_1
PI • 110+63.06
DELTA • 9° 43' 02" (LT)
D • 1' 45' 00"
T • 278.30'
L • 555.27'
R • 3,274.04'
PC • 107+84.76
PCC • 113+40.03
- ④ Curve 81NB_2
PI • 116+39.70
DELTA • 12° 38' 36" (LT)
D • 2' 07' 05"
T • 299.67'
L • 596.91'
R • 2,705.00'
PCC • 113+40.03
PT • 119+36.94
E • 7.6%
Lr • 240.00'
V • 75 MPH

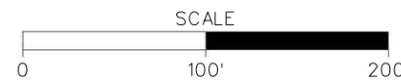
LEGEND:

- EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE
- EXISTING PIPE
- PROPOSED DITCH
- C — DENOTES CONSTRUCTION LIMITS IN CUT
- F — DENOTES CONSTRUCTION LIMITS IN FILL

- PROPOSED BRIDGE
- MILL AND OVERLAY
- PROPOSED PAVEMENT
- PROPOSED CONCRETE

- SFM — SANITARY LINE
- G — GAS LINE
- W — WATER LINE
- E — UNDERGROUND POWER CABLE
- T/FO — TELEPHONE FIBER OPTIC
- FODuct — FIBER OPTIC DUCT
- T/Tg — UNDERGROUND TELEPHONE CABLE

- ① ST'D. GR-MGS1 REQ'D.
- ② ST'D. GR-MGS2 REQ'D.
- ③ ST'D. GR-MGS3 REQ'D.
- ④ ST'D. GR-MGS4 REQ'D.
- ⑤ SPECIAL DESIGN RETAINING WALL WITH "P" SHAPE FACE
- ⑥ ST'D. MB-7F REQ'D.
- ⑦ ST'D. MB-8A REQ'D.
- ⑧ 42" PIER PROTECTION SYSTEM
- ⑨ ST'D. GR-FOA-2, TYPE 1 REQ'D.
- ⑩ ST'D. GR-FOA-2, TYPE 2 REQ'D.
- ⑪ ST'D. GR-FOA-4, TYPE 2 REQ'D.
- ⑫ ST'D. GR-9 (MEDIAN VERSION) REQ'D.
- ⑬ PAVED SHOULDER



TECHNICAL PROPOSAL CONCEPT PLANS
1-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 3





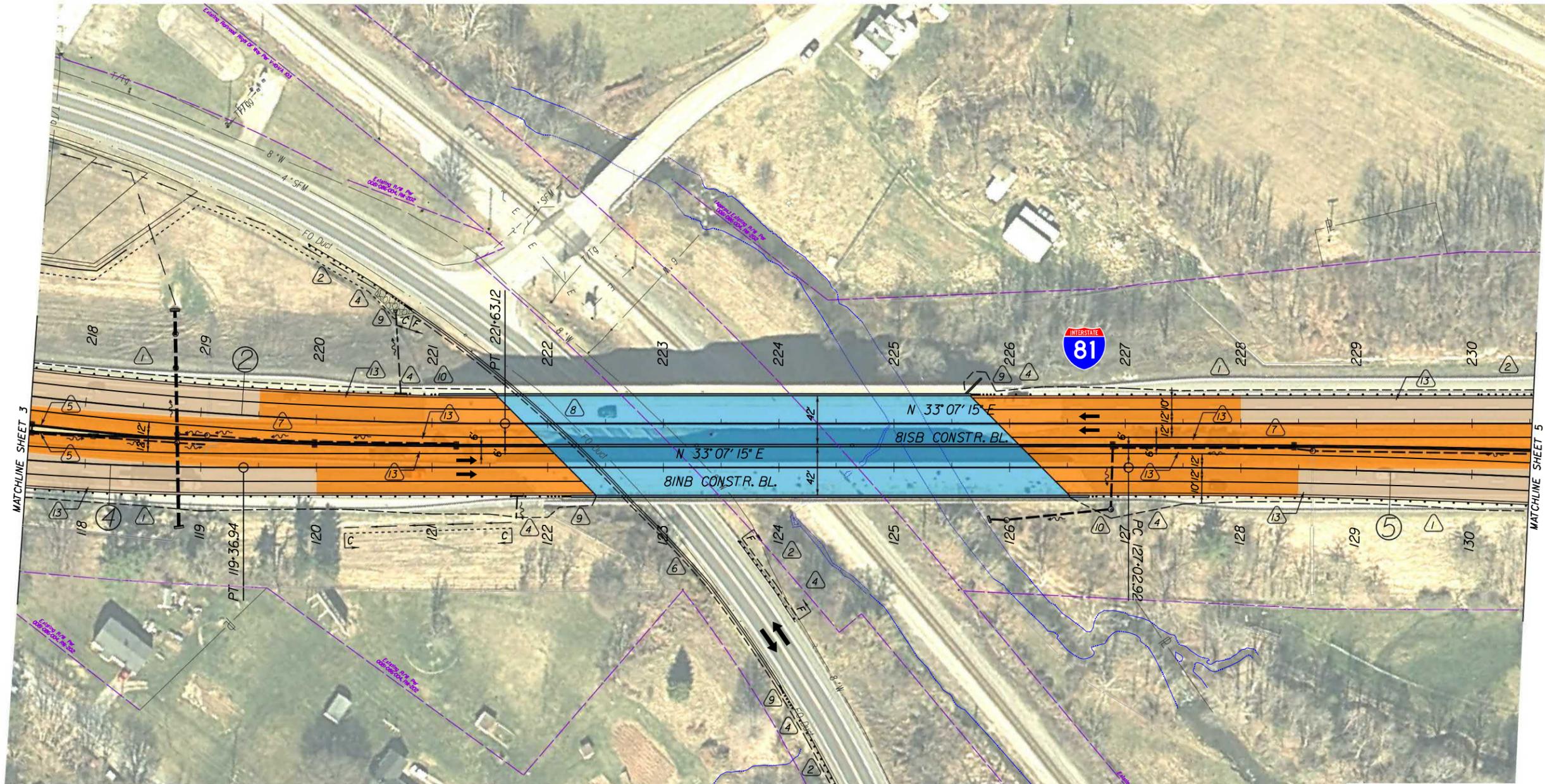
LEGEND:

EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE	FUTURE BRIDGE WIDENING	SANITARY LINE
PROPOSED RIGHT OF WAY	FUTURE LANE/SHOULDER	GAS LINE
EXISTING PIPE	PROPOSED BRIDGE	WATER LINE
DENOTES CONSTRUCTION LIMITS IN CUT	PROPOSED ROADWAY	UNDERGROUND POWER CABLE
DENOTES CONSTRUCTION LIMITS IN FILL		TELEPHONE FIBER OPTIC
		FIBER OPTIC DUCT
		UNDERGROUND TELEPHONE CABLE

TECHNICAL PROPOSAL CONCEPT PLANS
I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 3A

SCALE
 0 100' 200'



MATCHLINE SHEET 3

MATCHLINE SHEET 5

ROADWAY	MAX. DESIGN GRADE
INTERSTATE 81	1.71%

- ② Curve BISB_2
PI - 217-99.50
DELTA - 11° 41' 46" (LT)
D - 1' 36' 10"
T - 366.17'
L - 729.79'
R - 3,575.00'
PCC - 214-33.33
PT - 221+63.12
E - 6.1%
Lr - 192.63'
V - 75 MPH
- ④ Curve BINB_2
PI - 116-39.70
DELTA - 12° 38' 36" (LT)
D - 2' 07' 05"
T - 299.67'
L - 596.91'
R - 2,705.00'
PCC - 113-40.03
PT - 119-36.94
E - 7.6%
Lr - 240.00'
V - 75 MPH

- ⑤ Curve BINB_5
PI - 130-30.52
DELTA - 5° 04' 10" (RT)
D - 0' 46' 27"
T - 327.59'
L - 654.75'
R - 7,400.00'
PC - 127-02.92
PCC - 133-57.68
E - 3.2%
Lr - 101.05'
V - 75 MPH

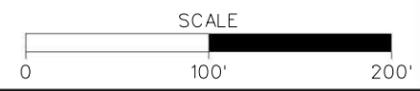
LEGEND:

- EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE
- EXISTING PIPE
- PROPOSED DITCH
- [C] DENOTES CONSTRUCTION LIMITS IN CUT
- [F] DENOTES CONSTRUCTION LIMITS IN FILL

- [Blue Box] PROPOSED BRIDGE
- [Orange Box] MILL AND OVERLAY
- [Dark Orange Box] PROPOSED PAVEMENT
- [Yellow Box] PROPOSED CONCRETE

- SFM — SANITARY LINE
- G — GAS LINE
- W — WATER LINE
- E — UNDERGROUND POWER CABLE
- T/FO — TELEPHONE FIBER OPTIC
- FO Duct — FIBER OPTIC DUCT
- T/Tg — UNDERGROUND TELEPHONE CABLE

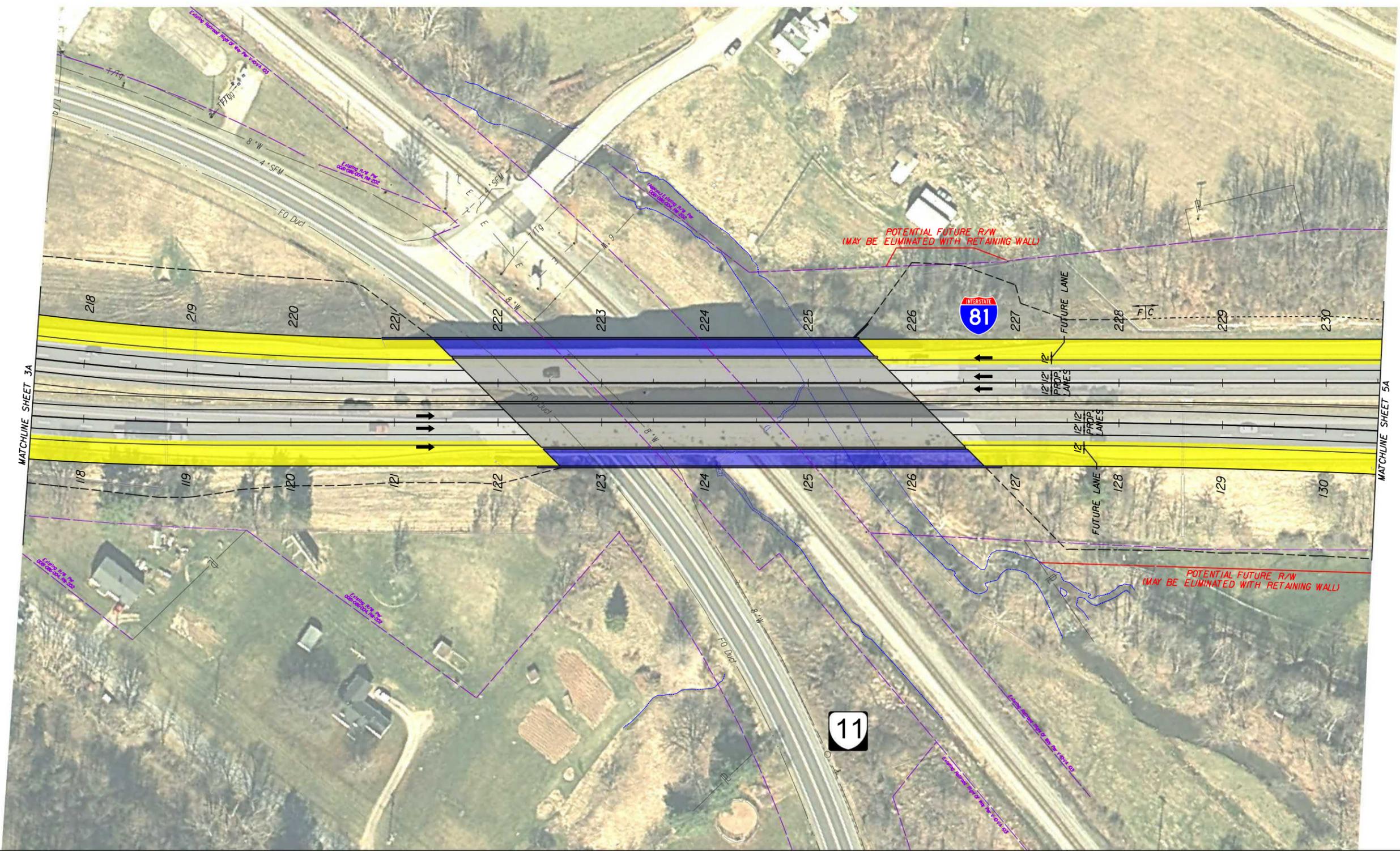
- ① ST'D. GR-MGS1 REQ'D.
- ② ST'D. GR-MGS2 REQ'D.
- ③ ST'D. GR-MGS3 REQ'D.
- ④ ST'D. GR-MGS4 REQ'D.
- ⑤ SPECIAL DESIGN RETAINING WALL WITH "F" SHAPE FACE
- ⑥ ST'D. MB-7F REQ'D.
- ⑦ ST'D. MB-8A REQ'D.
- ⑧ 42" PIER PROTECTION SYSTEM
- ⑨ ST'D. GR-FOA-2, TYPE 1 REQ'D.
- ⑩ ST'D. GR-FOA-2, TYPE 2 REQ'D.
- ⑪ ST'D. GR-FOA-4, TYPE 2 REQ'D.
- ⑫ ST'D. GR-9 (MEDIAN VERSION) REQ'D.
- ⑬ PAVED SHOULDER



TECHNICAL PROPOSAL CONCEPT PLANS
I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 4



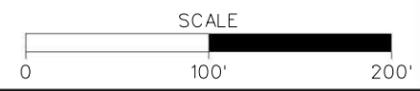


LEGEND:

- EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE
- PROPOSED RIGHT OF WAY
- EXISTING PIPE
- DENOTES CONSTRUCTION LIMITS IN CUT
- DENOTES CONSTRUCTION LIMITS IN FILL

- FUTURE BRIDGE WIDENING
- FUTURE LANE/SHOULDER
- PROPOSED BRIDGE
- PROPOSED ROADWAY

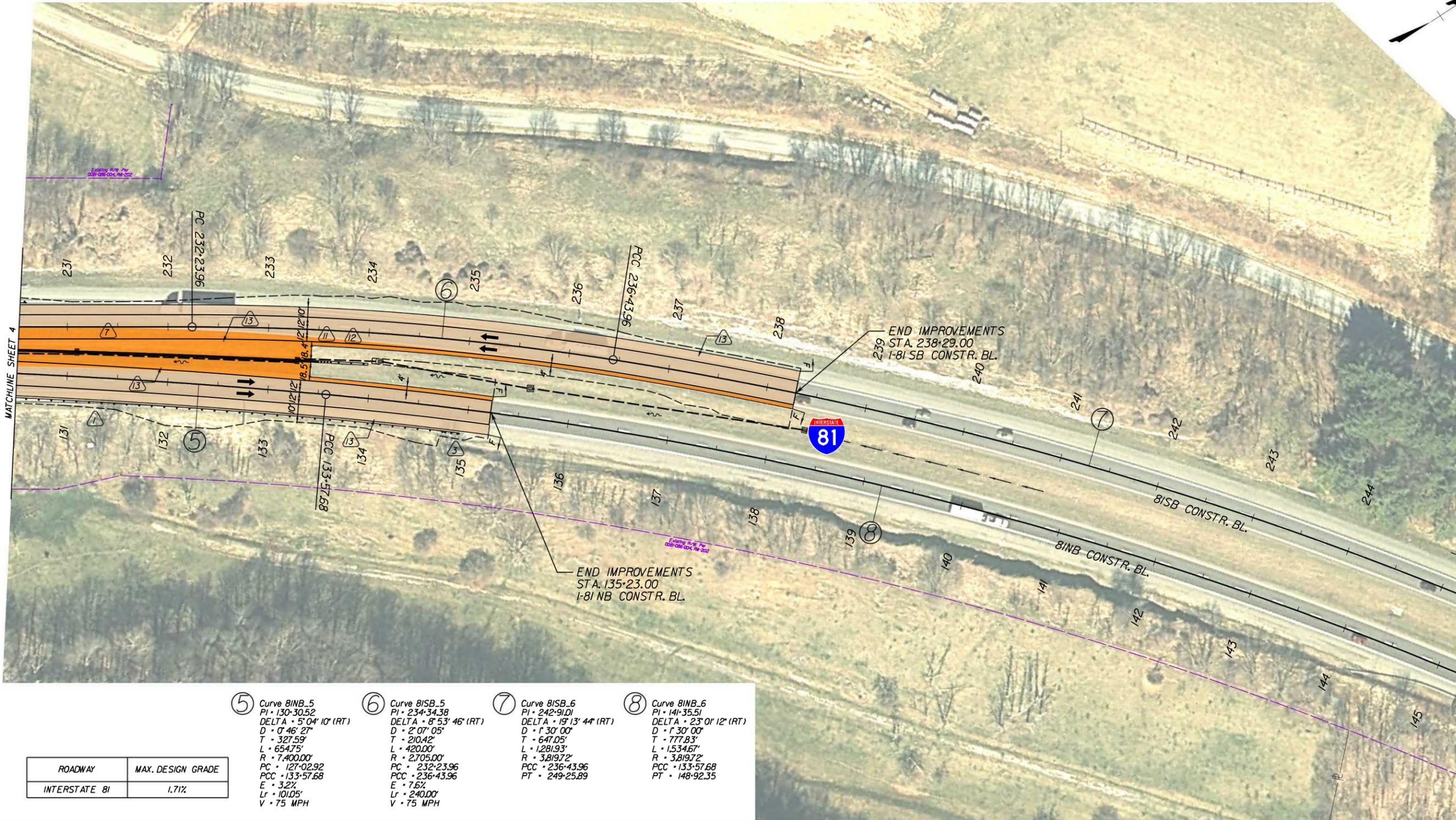
- SFM — SANITARY LINE
- G — GAS LINE
- W — WATER LINE
- E — UNDERGROUND POWER CABLE
- T/FO — TELEPHONE FIBER OPTIC
- FO Duct — FIBER OPTIC DUCT
- T/Tg — UNDERGROUND TELEPHONE CABLE



TECHNICAL PROPOSAL CONCEPT PLANS
 I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
 MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 4A





ROADWAY	MAX. DESIGN GRADE
INTERSTATE 81	1.71%

- ⑤ Curve BINB_5
 PI • 130+30.52
 DELTA • 5° 04' 10" (RT)
 D • 0' 46' 27"
 T • 327.59'
 L • 654.75'
 R • 7,400.00'
 PC • 127+02.92
 PCC • 133+57.68
 E • 3.2%
 Lr • 101.05'
 V • 75 MPH
- ⑥ Curve B1SB_5
 PI • 234+34.38
 DELTA • 8° 53' 46" (RT)
 D • 2' 07' 05"
 T • 210.42'
 L • 420.00'
 R • 2,705.00'
 PC • 232+23.96
 PCC • 236+43.96
 E • 7.6%
 Lr • 240.00'
 V • 75 MPH
- ⑦ Curve B1SB_6
 PI • 242+91.01
 DELTA • 19° 13' 44" (RT)
 D • 1' 30' 00"
 T • 647.05'
 L • 1,281.93'
 R • 3,819.72'
 PC • 236+43.96
 PT • 249+25.89
- ⑧ Curve BINB_6
 PI • 141+35.51
 DELTA • 23° 01' 12" (RT)
 D • 1' 30' 00"
 T • 777.83'
 L • 1,534.67'
 R • 3,819.72'
 PC • 133+57.68
 PT • 148+92.35

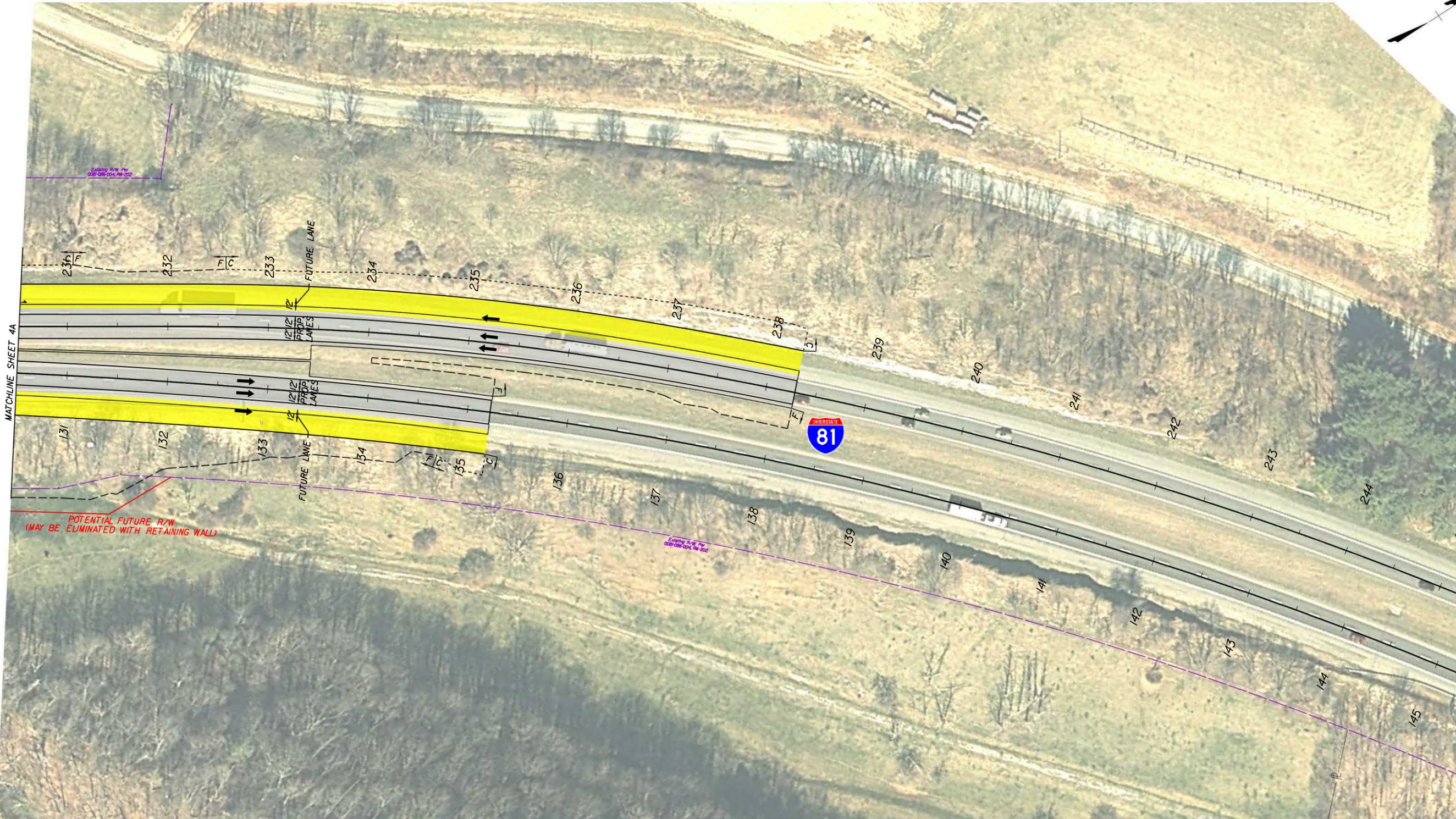
LEGEND:

- EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE
- EXISTING PIPE
- PROPOSED DITCH
- DENOTES CONSTRUCTION LIMITS IN CUT
- DENOTES CONSTRUCTION LIMITS IN FILL
- PROPOSED BRIDGE
- MILL AND OVERLAY
- PROPOSED PAVEMENT
- PROPOSED CONCRETE
- SFM — SANITARY LINE
- G — GAS LINE
- W — WATER LINE
- E — UNDERGROUND POWER CABLE
- T/FO — TELEPHONE FIBER OPTIC
- FO Duct — FIBER OPTIC DUCT
- T/Tg — UNDERGROUND TELEPHONE CABLE
- ① ST'D. GR-MGS1 REQ'D.
- ② ST'D. GR-MGS2 REQ'D.
- ③ ST'D. GR-MGS3 REQ'D.
- ④ ST'D. GR-MGS4 REQ'D.
- ⑤ SPECIAL DESIGN RETAINING WALL WITH "P" SHAPE FACE
- ⑥ ST'D. MB-7F REQ'D.
- ⑦ ST'D. MB-8A REQ'D.
- ⑧ 42" PIER PROTECTION SYSTEM
- ⑨ ST'D. GR-FOA-2, TYPE 1 REQ'D.
- ⑩ ST'D. GR-FOA-2, TYPE 2 REQ'D.
- ⑪ ST'D. GR-FOA-4, TYPE 2 REQ'D.
- ⑫ ST'D. GR-9 (MEDIAN VERSION) REQ'D.
- ⑬ PAVED SHOULDER

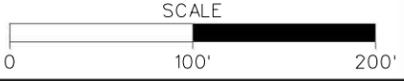


TECHNICAL PROPOSAL CONCEPT PLANS
I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 5



LEGEND:		— SFM — SANITARY LINE
— — — — — EXISTING RIGHT OF WAY & EXISTING LIMITED ACCESS LINE	■ FUTURE BRIDGE WIDENING	— G — GAS LINE
— — — — — PROPOSED RIGHT OF WAY	■ FUTURE LANE/SHOULDER	— W — WATER LINE
— — — — — EXISTING PIPE	■ PROPOSED BRIDGE	— E — UNDERGROUND POWER CABLE
⌈ — — — — — DENOTES CONSTRUCTION LIMITS IN CUT	■ PROPOSED ROADWAY	— T/FO — TELEPHONE FIBER OPTIC
⌋ — — — — — DENOTES CONSTRUCTION LIMITS IN FILL		— FO Duct — FIBER OPTIC DUCT
		— T/Tg — UNDERGROUND TELEPHONE CABLE



TECHNICAL PROPOSAL CONCEPT PLANS
 I-81 OVER ROUTE 11, NORFOLK SOUTHERN RAILROAD &
 MIDDLE FORK HOLSTON RIVER BRIDGE REPLACEMENT
 (PROJECT: 0081-086-742)

SHEET 5A

STATE	FEDERAL AID		STATE	SHEET
VA.	ROUTE	PROJECT	ROUTE	PROJECT
			81	0081-086-742, B659 & 0081-086-818, B663
Federal Structure No. 00000000017478		FHWA Construction and Scour Code:		
Federal Stewardship and Oversight Code: NFO		UPC No. 97555, 111265		

DESIGN EXCEPTION(S):
 Use of standard BMB-3A on bridge. Approved by State Structure and Bridge Engineer on July 26, 2018.

GENERAL NOTES:
 The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: 86'-0" face-to-face of curbs.
 Span layout: 130' - 135' - 145' Steel girder spans.
 Capacity: HL-93 loading.
 Drainage area: 24 sq. mi.
 Specifications:
 Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.
 Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.
 Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the contract documents.

This project is to be constructed in accordance with the Virginia Department of Transportation Work Area Protection Manual, August 2011 and latest revisions.

Design loading includes 20 psf allowance for construction tolerances and construction methods.

All structural steel, except in bearings and sole plates, shall be ASTM A709 Grade 50W and shall be unpainted except as required by Section 407 of the Specifications. Structural steel in bearings and sole plates shall be ASTM A709 Grade 36 and shall be painted.

Concrete in superstructure, parapets, terminal walls and median barriers shall be Low Shrinkage Class A4 Modified in accordance with Section 217.12(a); in substructure, Class A3.

All reinforcing steel shall be deformed and shall conform to ASTM A615, Grade 60 except for steels noted as Corrosion Resistant Reinforcing (CRR) which shall conform to Section 223 of the Specifications. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

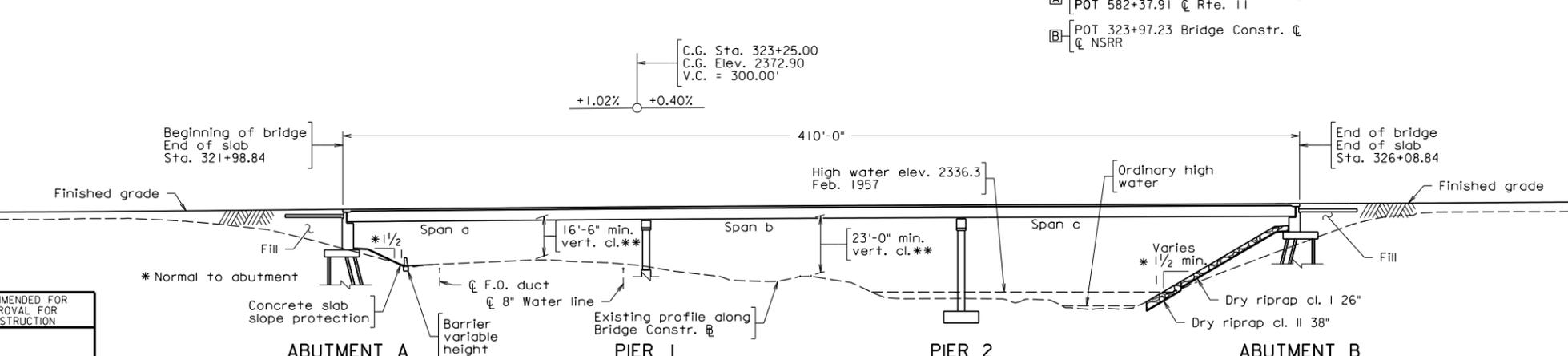
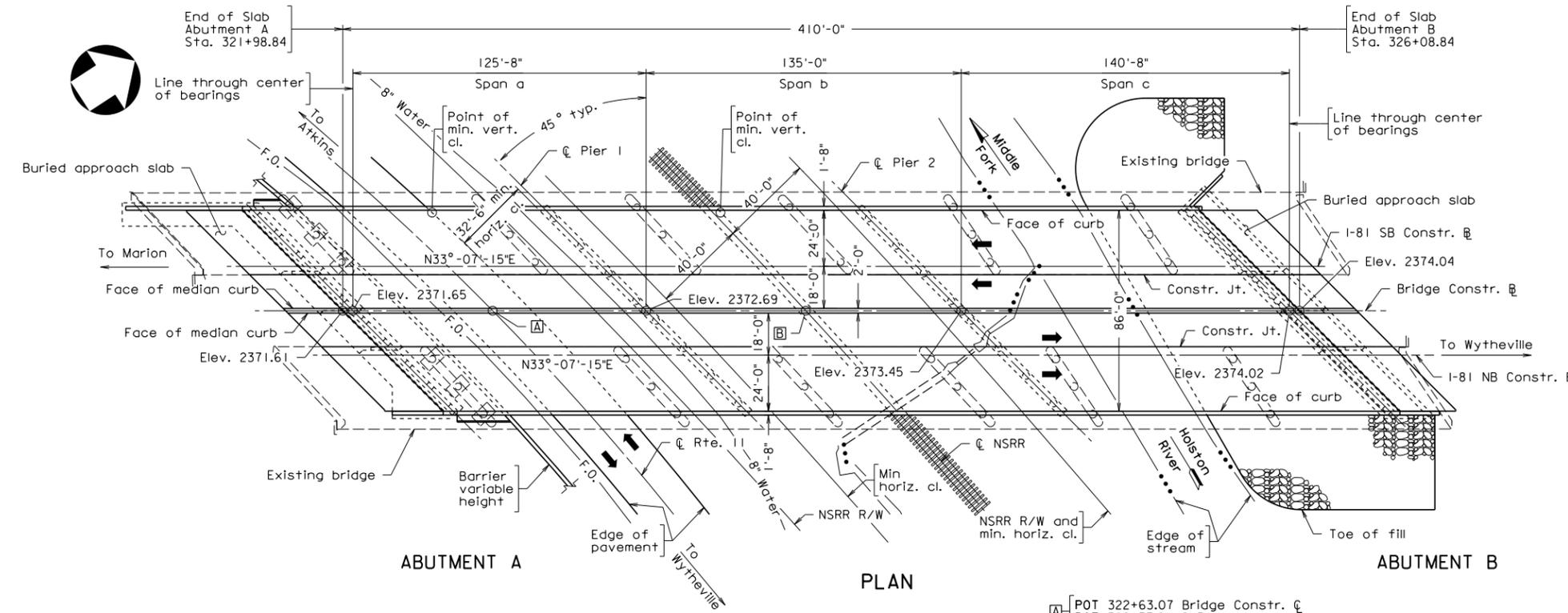
Bridge No. of existing bridges are 2034 (NBL) and 2035 (SBL). Plan Nos. are 157-04, 157-04A, and 157-04B.

The existing structure is designated a Type B structure in accordance with Sec. 411.

VDOT
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
PROPOSED BRIDGE REPLACEMENT ON
I-81 NBL AND SBL OVER
RTE. 11, NORFOLK SOUTHERN RAILROAD
AND MIDDLE FORK HOLSTON RIVER
SMYTH COUNTY - 1.84 MI. S. OF RTE. 683
PROJ. 0081-086-742, B659
& 0081-086-818, B663

Recommended for Approval: _____ Date _____
 Orders Construction _____ Date _____
 Approved: _____ Date _____
 Chief Engineer _____ Date _____

302-97
 Date: December 6, 2018 © 2018, Commonwealth of Virginia Sheet 1 of 6



Bridge to be constructed on Bridge Constr. B.
 For coordination with Roadway Plans:
 Beginning of bridge\End of slab is at Sta. 221+79.84 on I-81 SB Constr. B.
 End of bridge\End of slab is at Sta. 225+89.84 on I-81 SB Constr. B.
 Beginning of bridge\End of slab is at Sta. 122+17.84 on I-81 NB Constr. B.
 End of bridge\End of slab is at Sta. 126+27.84 on I-81 NB Constr. B.

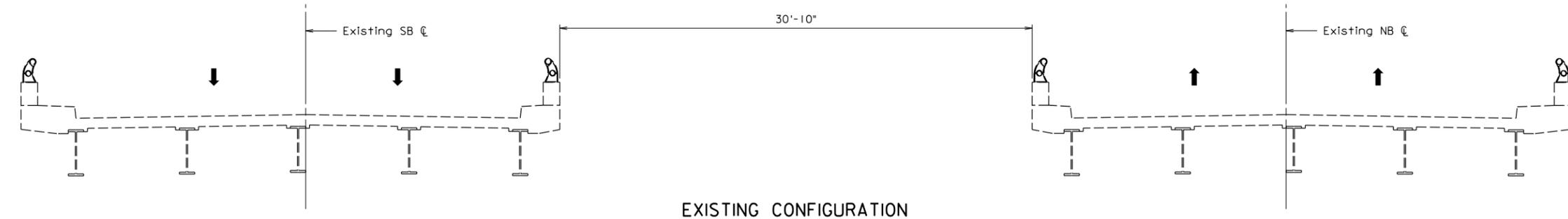
RECOMMENDED FOR APPROVAL FOR CONSTRUCTION
VDOT PROJECT MANAGER
DISTRICT CONSTRUCTION ENGINEER
WHITMAN REQUARDT & ASSOCIATES RICHMOND, VA STRUCTURAL ENGINEER
PLANS BY:
COORDINATED:
SUPERVISED:
DESIGNED:
DRAWN:
CHECKED:

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION

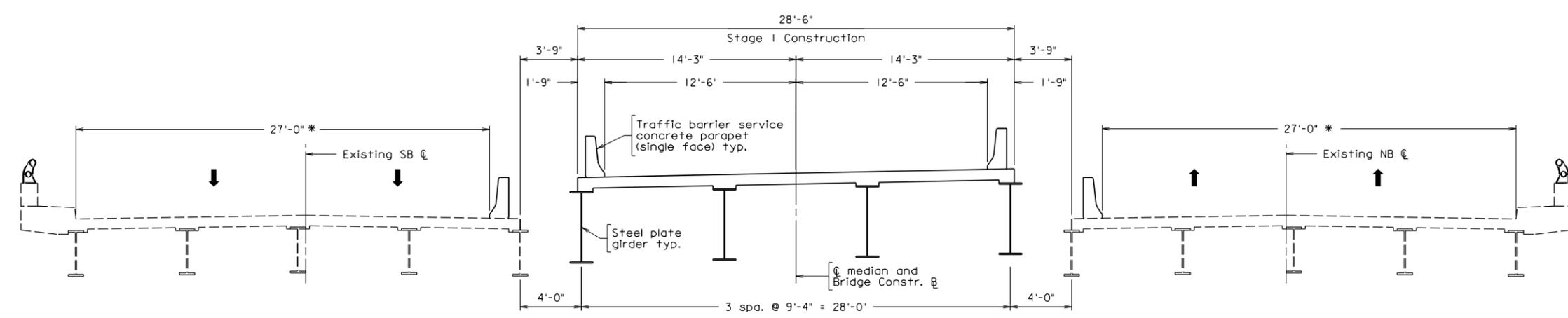
Scale: 1" = 30'-0"

No.	Description	Date
REVISIONS		
For Table of Revisions, see Sheet 2.		

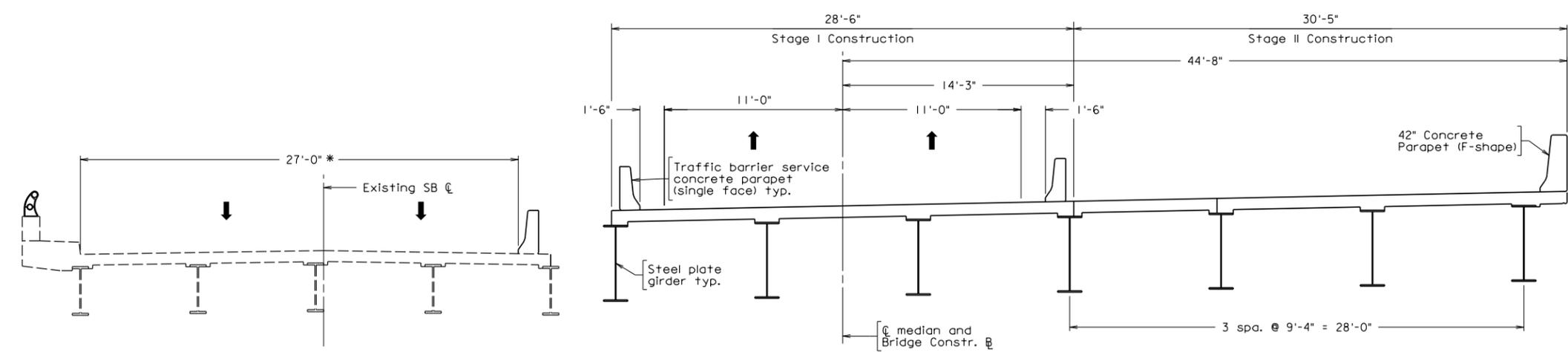
STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT		ROUTE	PROJECT
VA.			81	0081-086-742, B659 & 0081-086-818, B663
				2



EXISTING CONFIGURATION



STAGE I DEMOLITION AND CONSTRUCTION



STAGE II DEMOLITION AND CONSTRUCTION

Note:
* Minimum 11'-0" lanes and 1'-0" shoulders to be maintained.

WHITMAN REQUARDT & ASSOCIATES
RICHMOND, VA
STRUCTURAL ENGINEER

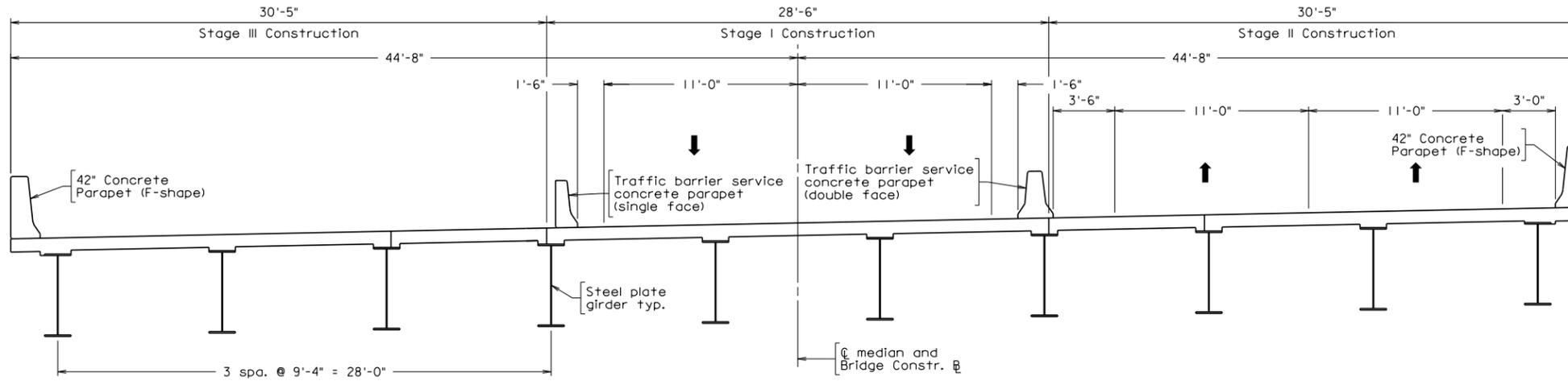
Scale: 1/4" = 1'-0" unless otherwise noted.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION

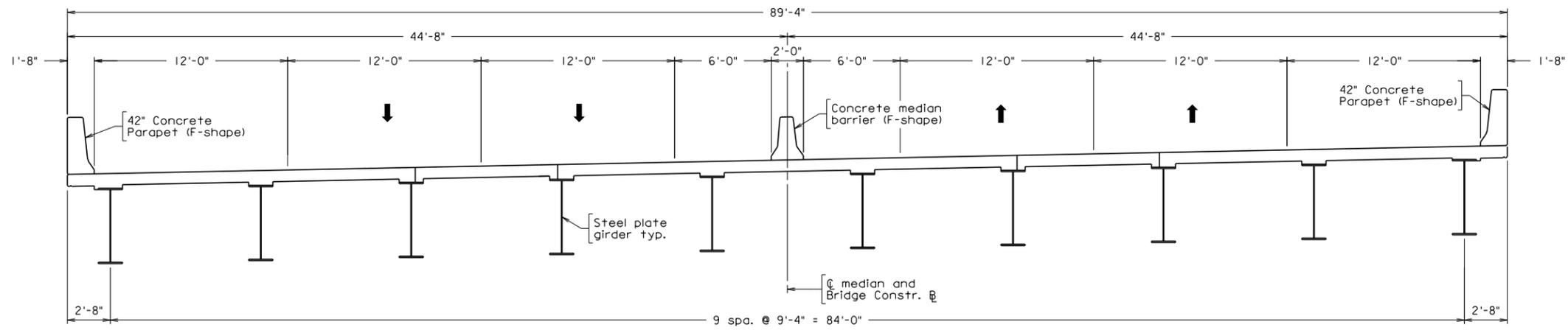
© 2018, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
SEQUENCE OF CONSTRUCTION (1 OF 2)			
No.	Description	Date	Revisions
Designed: WRA.....	Date	Plan No.	Sheet No.
Drawn: WRA.....	Dec. 2018	302-97	2 of 6
Checked: WRA.....			

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT		ROUTE	PROJECT
VA.			81	0081-086-742, B659 & 0081-086-818, B663
				3



STAGE III DEMOLITION AND CONSTRUCTION



FINAL CONFIGURATION

WHITMAN REQUARDT & ASSOCIATES
RICHMOND, VA
STRUCTURAL ENGINEER

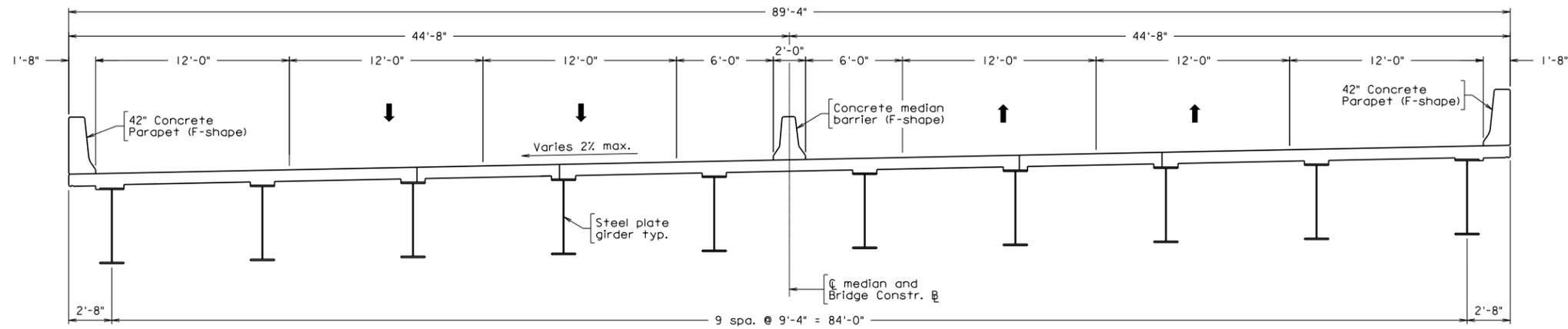
Scale: 1/4" = 1'-0" unless otherwise noted.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED
FOR CONSTRUCTION

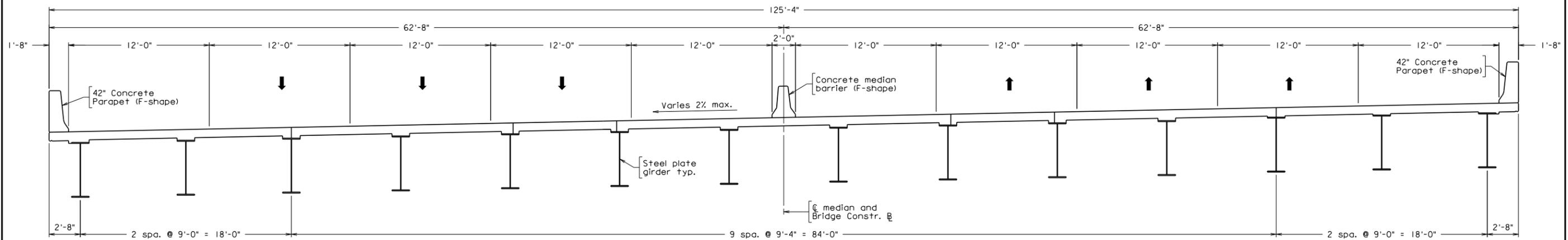
© 2018, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
SEQUENCE OF CONSTRUCTION (2 OF 2)			
No.	Description	Date	Revisions
Designed: WRA.....	Date	Plan No.	Sheet No.
Drawn: WRA.....	Dec. 2018	302-97	3 of 6
Checked: WRA.....			

STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT		ROUTE	PROJECT
VA.			81	0081-086-742, B659 & 0081-086-818, B663
				4



FINAL CONSTRUCTION



PROPOSED FUTURE CONSTRUCTION

WHITMAN REQUARDT & ASSOCIATES
RICHMOND, VA
STRUCTURAL ENGINEER

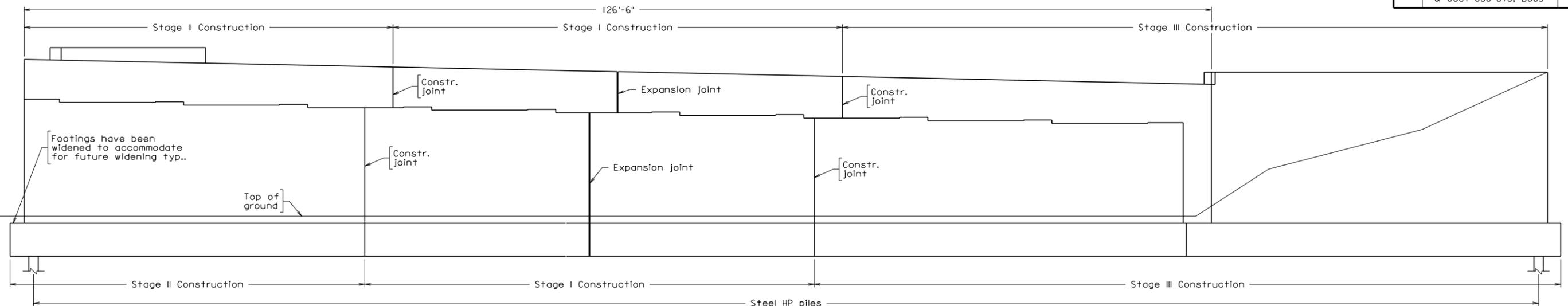
Not to Scale

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED
FOR CONSTRUCTION

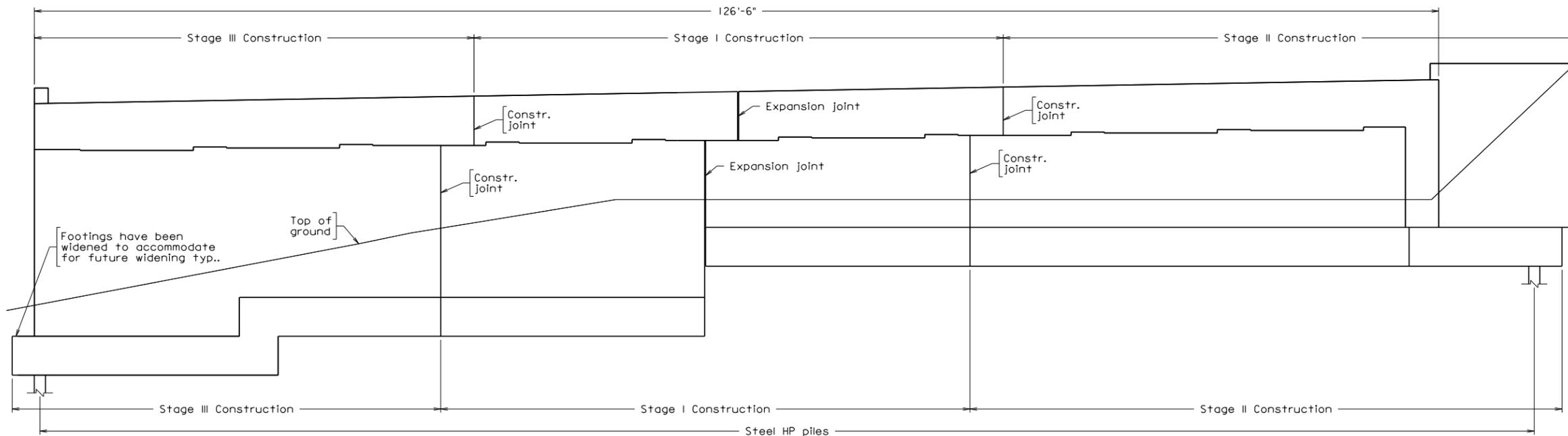
© 2018, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
FUTURE WIDENING			
No.	Description	Date	Revisions
Designed: WRA	Date	Plan No.	Sheet No.
Drawn: WRA	Dec. 2018	302-97	4 of 6
Checked: WRA			

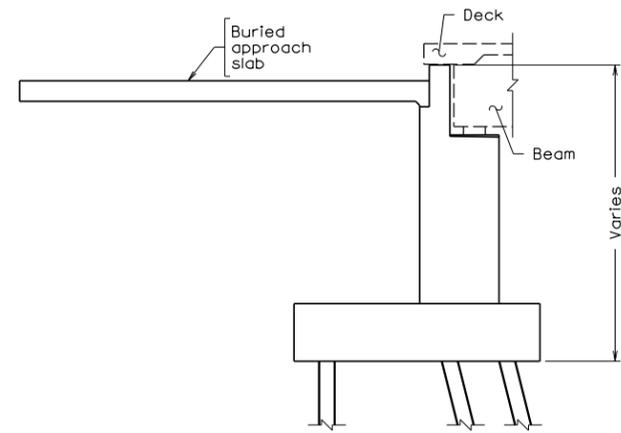
STATE	FEDERAL AID		STATE	SHEET
ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.		81	0081-086-742, B659 & 0081-086-818, B663	5



ABUTMENT A



ABUTMENT B



TYPICAL SECTION
Not to scale

Scale: 3/16" = 1'-0" unless otherwise noted.

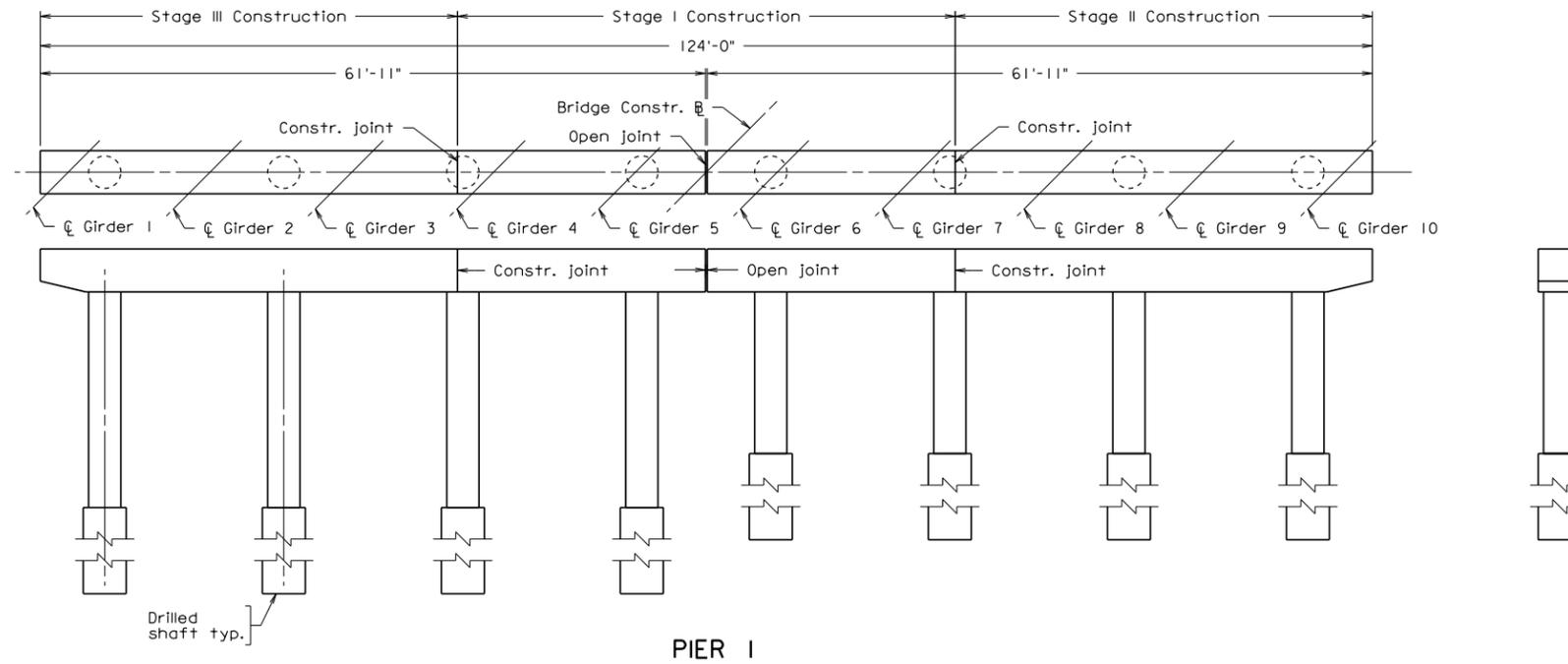
WHITMAN REQUARDT & ASSOCIATES
RICHMOND, VA
STRUCTURAL ENGINEER

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED
FOR CONSTRUCTION

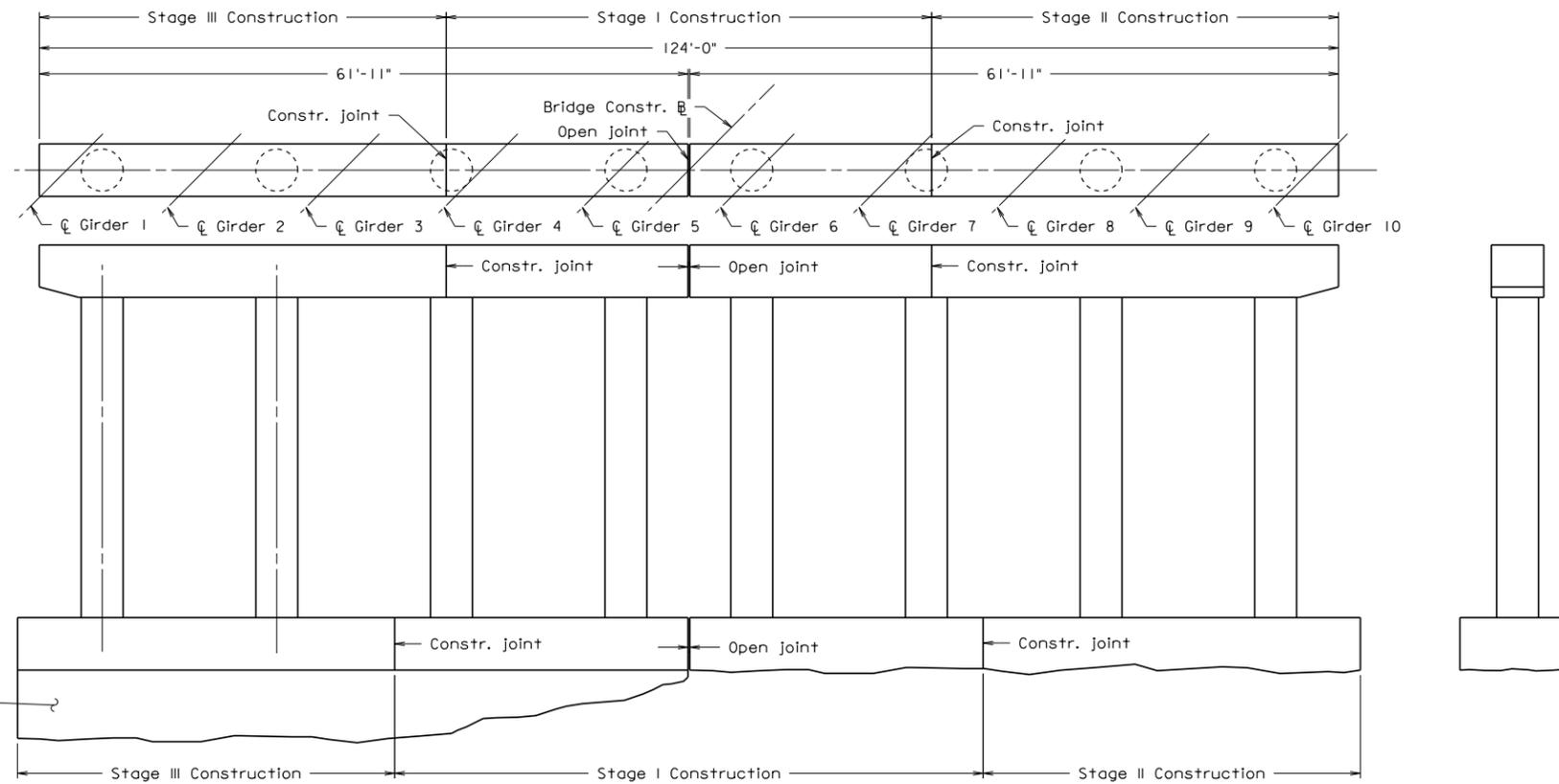
© 2018, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
ABUTMENTS			
No.	Description	Date	Revisions
Designed: WRA.....	Date	Plan No.	Sheet No.
Drawn: WRA.....	Dec. 2018	302-97	5 of 6
Checked: WRA.....			

STATE	FEDERAL AID		STATE	SHEET
VA.	ROUTE	PROJECT	ROUTE	NO.
			81	6
			0081-086-742, B659 & 0081-086-818, B663	



PIER 1



PIER 2

WHITMAN REQUARDT & ASSOCIATES
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: 1/8" = 1'-0" unless otherwise noted.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION

© 2018, Commonwealth of Virginia

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION			
STRUCTURE AND BRIDGE DIVISION			
PIERS			
No.	Description	Date	Revisions
Designed: WRA.....	Date	Plan No.	Sheet No.
Drawn: WRA.....	Dec. 2018	302-97	6 of 6
Checked: WRA.....			

Activity ID	Critical	Activity Name	Original Duration	Start	Finish	Total Float	Activity %	2019												2020												2021												2022															
								F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M												
I-81 over RTE 11 Proposal Schedule (UPC 97555)								852	28-Jan-19	23-May-22	0																																																
VDOT1000	<input type="checkbox"/>	Notice of Intent to Award	0	28-Jan-19*		0	0%	Notice of Intent to Award, 28-Jan-19*																																																			
VDOT1010	<input type="checkbox"/>	CTB Approval	0	20-Feb-19*		0	0%	◆ CTB Approval, 20-Feb-19*																																																			
VDOT1020	<input checked="" type="checkbox"/>	NTP	0	25-Mar-19*		0	0%	◆ NTP, 25-Mar-19*																																																			
ORD1000	<input type="checkbox"/>	Start of Construction	0	30-May-19		64	0%	◆ Start of Construction, 30-May-19																																																			
ORD1020	<input checked="" type="checkbox"/>	Final Completion	0		23-May-22*	0	0%																																																				
Project Milestones								852	28-Jan-19	23-May-22	0																																																
Administrative								115	25-Mar-19	04-Sep-19	316																																																
ORD1030	<input type="checkbox"/>	Perform Scope Validation and Submit Notice	120	25-Mar-19	22-Jul-19	34	0%	04-Sep-19, Administrative Perform Scope Validation and Submit Notice ◆ Submit Preliminary Baseline Schedule, 25-Mar-19																																																			
ORD1060	<input type="checkbox"/>	Submit Preliminary Baseline Schedule	0	25-Mar-19		71	0%																																																				
VDOT1040	<input type="checkbox"/>	VDOT Review/Approve Preliminary Baseline Schedule	21	25-Mar-19	14-Apr-19	131	0%																																																				
ORD1120	<input type="checkbox"/>	Prepare QA/QC Plan	15	25-Mar-19	08-Apr-19	22	0%																																																				
ORD1130	<input type="checkbox"/>	Internal Review QA/QC Plan	2	09-Apr-19	10-Apr-19	16	0%																																																				
ORD1140	<input type="checkbox"/>	DB Team Present QA/QC Plan	1	11-Apr-19	11-Apr-19	16	0%																																																				
VDOT1070	<input type="checkbox"/>	VDOT Review QA/QC Plan	21	11-Apr-19	02-May-19	23	0%																																																				
ORD1160	<input type="checkbox"/>	Revise/Resubmit QA/QC Plan	2	02-May-19	04-May-19	23	0%																																																				
VDOT1080	<input type="checkbox"/>	VDOT Review/Approve QA/QC Plan resubmittal	21	04-May-19	25-May-19	23	0%																																																				
ORD1180	<input type="checkbox"/>	DB Kickoff Meeting	1	28-May-19	28-May-19	15	0%																																																				
ORD1040	<input type="checkbox"/>	Prepare and Submit Final Scope Issue Document	5	16-Jul-19	22-Jul-19	24	0%																																																				
VDOT1030	<input type="checkbox"/>	VDOT Review and Resolve Scope Issues	21	22-Jul-19	12-Aug-19	478	0%																																																				
ORD1080	<input type="checkbox"/>	Submit Full Baseline Schedule	0		22-Jul-19	24	0%																																																				
VDOT1050	<input type="checkbox"/>	VDOT Review/Approve Baseline Schedule	21	22-Jul-19	12-Aug-19	34	0%																																																				
ORD1100	<input type="checkbox"/>	Revise/Resubmit Baseline Schedule	2	13-Aug-19	14-Aug-19	23	0%																																																				
VDOT1060	<input type="checkbox"/>	VDOT Review Approve Baseline Schedule resubmittal	21	14-Aug-19	04-Sep-19	34	0%																																																				
Design Phases								489	25-Mar-19	24-Feb-21	323																																																
Milestones								489	25-Mar-19	24-Feb-21	323																																																
WRA1050	<input type="checkbox"/>	Obtain Project Permits	0		25-Mar-19	111	0%	◆ Obtain Project Permits, ◆ WP-2 Bridge Stage 1 Approved for Construction, ◆ WP-1 MOT/ECS/Grade and Drain Approved for construction, ◆ WP-4 Bridge Stage 2 Superstr Approved for Construction, ◆ WP-5 Final Roadway Approved for Construction, ◆ WP-3 Bridge Stage 2 Substr Approved for Construction,																																																			
WRA1010	<input type="checkbox"/>	WP-2 Bridge Stage 1 Approved for Construction	0		21-May-19	29	0%																																																				
WRA1000	<input type="checkbox"/>	WP-1 MOT/ECS/Grade and Drain Approved for construc	0		17-Jul-19	45	0%																																																				
WRA1030	<input checked="" type="checkbox"/>	WP-4 Bridge Stage 2 Superstr Approved for Construction	0		13-Aug-19	0	0%																																																				
WRA1040	<input type="checkbox"/>	WP-5 Final Roadway Approved for Construction	0		12-Feb-20	80	0%																																																				
WRA1020	<input type="checkbox"/>	WP-3 Bridge Stage 2 Substr Approved for Construction	0		06-Mar-20	188	0%																																																				
Survey								43	25-Mar-19	22-May-19	80																																																
WRA1070	<input type="checkbox"/>	Send Survey Notification	1	25-Mar-19	25-Mar-19	80	0%	22-May-19, Survey Send Survey Notification																																																			
WRA1080	<input type="checkbox"/>	Field Survey	42	26-Mar-19	22-May-19	80	0%	Field Survey																																																			
Geotechnical								25	26-Mar-19	29-Apr-19	152																																																
WRA1120	<input type="checkbox"/>	Final	4	26-Mar-19	29-Mar-19	98	0%	29-Apr-19, Geotechnical Final																																																			
WRA1090	<input type="checkbox"/>	Geophysical investigation	7	02-Apr-19	10-Apr-19	97	0%																																																				
WRA1100	<input type="checkbox"/>	Prepare Geophysical Report	6	11-Apr-19	18-Apr-19	97	0%																																																				
WRA1110	<input type="checkbox"/>	Prepare Core Boring Plan	7	19-Apr-19	29-Apr-19	97	0%																																																				
WRA1130	<input type="checkbox"/>	Submit Geophysical Report	1	19-Apr-19	19-Apr-19	158	0%																																																				
Structures								84	23-May-19	20-Sep-19	190																																																
WRA1140	<input type="checkbox"/>	Perform Soil Borings and Lab Work	30	23-May-19	05-Jul-19	80	0%	20-Sep-19, Structures Perform Soil Borings and Lab Work																																																			
WRA1150	<input type="checkbox"/>	Prepare Geotechnical Report	15	08-Jul-19	26-Jul-19	189	0%	Prepare Geotechnical Report																																																			

Activity ID	Critical	Activity Name	Original Duration	Start	Finish	Total Float	Activity %	2019												2020												2021												2022											
								F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M								
VDOT1370	<input checked="" type="checkbox"/>	VDOT/FHWA and NS Review WP-2	21	05-Apr-19	26-Apr-19	2	0%																																																
WRA1380	<input type="checkbox"/>	Revise Resubmit WP-2	1	29-Apr-19	29-Apr-19	19	0%																																																
VDOT1390	<input type="checkbox"/>	VDOT/FHWA and NS Review/Approve WP-2	21	29-Apr-19	20-May-19	28	0%																																																
WRA1400	<input type="checkbox"/>	WP-2 RFC Package	1	21-May-19	21-May-19	19	0%																																																
WP-3 Bridge Stage 2 Substructure			116	23-Sep-19	06-Mar-20	188																																																	
WRA1410	<input type="checkbox"/>	Bridge Stage 2 Design	75	23-Sep-19	09-Jan-20	190	0%																																																
WRA1420	<input type="checkbox"/>	Design QA/QC WP-3	5	10-Jan-20	16-Jan-20	190	0%																																																
VDOT1400	<input type="checkbox"/>	VDOT/FHWA and NS Review WP-3	21	16-Jan-20	06-Feb-20	271	0%																																																
WRA1430	<input type="checkbox"/>	Revise Resubmit WP-3	5	07-Feb-20	13-Feb-20	190	0%																																																
VDOT1410	<input type="checkbox"/>	VDOT/FHWA and NS Review/Approve WP-3	21	13-Feb-20	05-Mar-20	271	0%																																																
WRA1440	<input type="checkbox"/>	WP-3 RFC Package	1	06-Mar-20	06-Mar-20	188	0%																																																
WP-4 Bridge Stage 2 Superstructure			90	08-Apr-19	13-Aug-19	0																																																	
WRA1450	<input checked="" type="checkbox"/>	Bridge Stage 2 Superstructure Design	50	08-Apr-19	17-Jun-19	0	0%																																																
WRA1460	<input checked="" type="checkbox"/>	Design QA/QC WP-4	5	18-Jun-19	24-Jun-19	0	0%																																																
VDOT1420	<input checked="" type="checkbox"/>	VDOT/FHWA and NS Review WP-4	21	24-Jun-19	15-Jul-19	0	0%																																																
WRA1470	<input checked="" type="checkbox"/>	Revise Resubmit WP-4	5	16-Jul-19	22-Jul-19	0	0%																																																
VDOT1430	<input checked="" type="checkbox"/>	VDOT/FHWA and NS Review/Approve WP-4	21	22-Jul-19	12-Aug-19	0	0%																																																
WRA1480	<input checked="" type="checkbox"/>	WP-4 RFC Package	1	13-Aug-19	13-Aug-19	0	0%																																																
WP-5 Final Roadway			89	07-Oct-19	12-Feb-20	80																																																	
WRA1490	<input type="checkbox"/>	Final Roadway Design	50	07-Oct-19	17-Dec-19	79	0%																																																
WRA1500	<input type="checkbox"/>	Design QA/QC WP-5	5	18-Dec-19	24-Dec-19	79	0%																																																
VDOT1440	<input type="checkbox"/>	VDOT/FHWA Review WP-5	21	24-Dec-19	14-Jan-20	113	0%																																																
WRA1510	<input type="checkbox"/>	Revise Resubmit WP-5	5	15-Jan-20	21-Jan-20	81	0%																																																
VDOT1450	<input type="checkbox"/>	VDOT/FHWA Review/Approve WP-5	21	21-Jan-20	11-Feb-20	113	0%																																																
WRA1520	<input type="checkbox"/>	WP-5 RFC Package	1	12-Feb-20	12-Feb-20	80	0%																																																
Construction Phase			852	28-Jan-19	23-May-22	0																																																	
QA/QC			837	28-Jan-19	02-May-22	15																																																	
QAQC1000	<input type="checkbox"/>	Prep Meeting MOT	0	28-Jan-19		111	0%																																																
QAQC1010	<input type="checkbox"/>	Prep Meeting E&S	0	28-Jan-19		111	0%																																																
QAQC1020	<input type="checkbox"/>	Prep Meeting Clear and Grub	0	28-Jan-19		111	0%																																																
QAQC1030	<input type="checkbox"/>	Prep Meeting Drainage	0	28-Jan-19		111	0%																																																
QAQC1040	<input type="checkbox"/>	Prep Meeting Earthwork	0	28-Jan-19		111	0%																																																
QAQC1050	<input type="checkbox"/>	Prep Meeting AGG Base	0	28-Jan-19		111	0%																																																
QAQC1060	<input type="checkbox"/>	Prep Meeting Asphalt Paving	0	28-Jan-19		111	0%																																																
QAQC1070	<input type="checkbox"/>	Prep Meeting Pavement Markings	0	28-Jan-19		111	0%																																																
QAQC1080	<input type="checkbox"/>	Prep Meeting Guardrail	0	28-Jan-19		111	0%																																																
QAQC1090	<input type="checkbox"/>	Prep Meeting Seeding	0	28-Jan-19		111	0%																																																
QAQC1100	<input type="checkbox"/>	Prep Meeting Structure and Support of Excavation	0	28-Jan-19		111	0%																																																
QAQC1110	<input type="checkbox"/>	Prep Meeting Piles	0	28-Jan-19		141	0%																																																
QAQC1120	<input type="checkbox"/>	Pre Meeting Drilled Shafts	0	28-Jan-19		159	0%																																																
QAQC1130	<input type="checkbox"/>	Prep Meeting Reinf. Steel	0	28-Jan-19		174	0%																																																
QAQC1140	<input type="checkbox"/>	Prep Meeting Substructure Concrete	0	28-Jan-19		174	0%																																																
QAQC1150	<input type="checkbox"/>	Prep Meeting Deck Construction	0	28-Jan-19		214	0%																																																
QAQC1160	<input type="checkbox"/>	Prep Meeting Parapets	0	28-Jan-19		547	0%																																																
ORD1190	<input type="checkbox"/>	Construction Kick-off Meeting	1	29-May-19	29-May-19	15	0%																																																

█ Actual Level of Effort
 █ Remaining Work
 █ Critical Remaining Work
 ◆ Milestone
 ─ summary

Activity ID	Critical	Activity Name	Original Duration	Start	Finish	Total Float	Activity %	2019												2020												2021												2022											
								F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M								
ORD1200	<input type="checkbox"/>	Monthly Project Meetings	750	30-May-19	02-May-22	15	0%	[Gantt bar for Monthly Project Meetings]																																															
Submittals and Procurement			174	25-Mar-19	28-Nov-19	15		[Summary bar for Submittals and Procurement]																																															
ORD1210	<input type="checkbox"/>	Purchase Orders	120	25-Mar-19	11-Sep-19	44	0%	[Gantt bar for Purchase Orders]																																															
ORD1220	<input type="checkbox"/>	Contracts	40	25-Mar-19	17-May-19	91	0%	[Gantt bar for Contracts]																																															
ORD1230	<input type="checkbox"/>	Working Drawing Temporary Shoring	10	25-Mar-19	05-Apr-19	134	0%	[Gantt bar for Working Drawing Temporary Shoring]																																															
ORD1240	<input type="checkbox"/>	Working Drawing Substructure Formwork	5	08-Apr-19	12-Apr-19	134	0%	[Gantt bar for Working Drawing Substructure Formwork]																																															
ORD1250	<input type="checkbox"/>	Working Drawing Steel Erection	10	15-Apr-19	26-Apr-19	134	0%	[Gantt bar for Working Drawing Steel Erection]																																															
ORD1260	<input type="checkbox"/>	Working Drawing Demolition	10	29-Apr-19	10-May-19	134	0%	[Gantt bar for Working Drawing Demolition]																																															
ORD1270	<input type="checkbox"/>	Working Drawing Deck Forms	10	13-May-19	24-May-19	134	0%	[Gantt bar for Working Drawing Deck Forms]																																															
ORD1330	<input type="checkbox"/>	Fabricate Reinf. Steel	20	22-May-19	19-Jun-19	57	0%	[Gantt bar for Fabricate Reinf. Steel]																																															
ORD1280	<input type="checkbox"/>	Working Drawing Deck Concrete	10	28-May-19	10-Jun-19	134	0%	[Gantt bar for Working Drawing Deck Concrete]																																															
ORD1350	<input type="checkbox"/>	Deliver Reinf.	5	05-Jul-19	11-Jul-19	57	0%	[Gantt bar for Deliver Reinf.]																																															
ORD1290	<input checked="" type="checkbox"/>	Shop Drawings Structural Steel	35	13-Aug-19	17-Sep-19	0	0%	[Gantt bar for Shop Drawings Structural Steel]																																															
ORD1300	<input type="checkbox"/>	Shop Drawings SIP Forms	20	14-Aug-19	11-Sep-19	44	0%	[Gantt bar for Shop Drawings SIP Forms]																																															
ORD1320	<input type="checkbox"/>	Fabricate SIP Forms	20	12-Sep-19	09-Oct-19	44	0%	[Gantt bar for Fabricate SIP Forms]																																															
ORD1310	<input checked="" type="checkbox"/>	Fabricate Structural Steel	70	17-Sep-19	26-Nov-19	0	0%	[Gantt bar for Fabricate Structural Steel]																																															
ORD1360	<input type="checkbox"/>	Deliver SIP Forms	5	10-Oct-19	16-Oct-19	44	0%	[Gantt bar for Deliver SIP Forms]																																															
ORD1340	<input checked="" type="checkbox"/>	Deliver Structural Steel	2	27-Nov-19	28-Nov-19	0	0%	[Gantt bar for Deliver Structural Steel]																																															
Construction			852	28-Jan-19	23-May-22	0		[Summary bar for Construction]																																															
ORD1370	<input type="checkbox"/>	Mobilization	60	28-Jan-19	19-Apr-19	111	0%	[Gantt bar for Mobilization]																																															
ORD1380	<input type="checkbox"/>	Set up Field Offices	10	04-Feb-19	15-Feb-19	115	0%	[Gantt bar for Set up Field Offices]																																															
ORD1410	<input type="checkbox"/>	Inspection Plan for Contractor Maintenance	2	18-Feb-19	19-Feb-19	456	0%	[Gantt bar for Inspection Plan for Contractor Maintenance]																																															
ORD1430	<input type="checkbox"/>	Maintenance - Perform Contractor Maintenance Items	120	20-Feb-19	08-Aug-19	456	0%	[Gantt bar for Maintenance - Perform Contractor Maintenance Items]																																															
ORD1440	<input type="checkbox"/>	Install Sheilding over River	10	20-Feb-19	05-Mar-19	115	0%	[Gantt bar for Install Sheilding over River]																																															
ORD1450	<input type="checkbox"/>	Install Work Bridge over River	10	22-Feb-19	07-Mar-19	115	0%	[Gantt bar for Install Work Bridge over River]																																															
ORD1390	<input type="checkbox"/>	Set up Disposal Areas	5	25-Mar-19	29-Mar-19	137	0%	[Gantt bar for Set up Disposal Areas]																																															
ORD1400	<input type="checkbox"/>	Set up Borrow Sites	15	01-Apr-19	19-Apr-19	137	0%	[Gantt bar for Set up Borrow Sites]																																															
ORD1420	<input type="checkbox"/>	Install E&S Controls	20	06-Aug-19	04-Sep-19	16	0%	[Gantt bar for Install E&S Controls]																																															
Phase 1 Roadway Construction			189	17-Jul-19	14-Apr-20	1		[Summary bar for Phase 1 Roadway Construction]																																															
ORD1460	<input type="checkbox"/>	Install Initial MOT Items	10	17-Jul-19	31-Jul-19	45	0%	[Gantt bar for Install Initial MOT Items]																																															
ORD1470	<input type="checkbox"/>	Construct Sediment Basin	19	25-Sep-19	22-Oct-19	1	0%	[Gantt bar for Construct Sediment Basin]																																															
ORD1480	<input type="checkbox"/>	Clear and Grub Phase 1	7	22-Oct-19	31-Oct-19	1	0%	[Gantt bar for Clear and Grub Phase 1]																																															
ORD1490	<input type="checkbox"/>	Rough Grade Phase 1	45	31-Oct-19	08-Jan-20	1	0%	[Gantt bar for Rough Grade Phase 1]																																															
ORD1500	<input type="checkbox"/>	Install Drainage for Phase 1 Roadway	45	08-Jan-20	11-Mar-20	1	0%	[Gantt bar for Install Drainage for Phase 1 Roadway]																																															
ORD1510	<input type="checkbox"/>	Aggr Base Phase 1	10	11-Mar-20	25-Mar-20	1	0%	[Gantt bar for Aggr Base Phase 1]																																															
ORD1520	<input type="checkbox"/>	Asphalt Pave Phase 1	5	25-Mar-20	01-Apr-20	1	0%	[Gantt bar for Asphalt Pave Phase 1]																																															
ORD1530	<input type="checkbox"/>	Pavement Marking Phase 1	5	01-Apr-20	08-Apr-20	1	0%	[Gantt bar for Pavement Marking Phase 1]																																															
ORD1540	<input type="checkbox"/>	Prepare MOT for Phase 2	4	08-Apr-20	14-Apr-20	1	0%	[Gantt bar for Prepare MOT for Phase 2]																																															
Construction Stage 1 Bridge			264	21-May-19	04-Jun-20	0		[Summary bar for Construction Stage 1 Bridge]																																															
ORD1550	<input type="checkbox"/>	Support of Excavation	22	21-May-19	21-Jun-19	29	0%	[Gantt bar for Support of Excavation]																																															
ORD1560	<input type="checkbox"/>	Structural Excavation Abutment A	8	21-Jun-19	03-Jul-19	29	0%	[Gantt bar for Structural Excavation Abutment A]																																															
ORD1570	<input type="checkbox"/>	Structural Excavation Abutment B	8	03-Jul-19	16-Jul-19	32	0%	[Gantt bar for Structural Excavation Abutment B]																																															
ORD1600	<input type="checkbox"/>	Drive Bearing Pile Abutment A	33	03-Jul-19	20-Aug-19	29	0%	[Gantt bar for Drive Bearing Pile Abutment A]																																															
ORD1580	<input type="checkbox"/>	Structural Excavation Pier 2	6	16-Jul-19	24-Jul-19	33	0%	[Gantt bar for Structural Excavation Pier 2]																																															
ORD1610	<input type="checkbox"/>	Drive Bearing Pile Abutment B	22	16-Jul-19	15-Aug-19	32	0%	[Gantt bar for Drive Bearing Pile Abutment B]																																															

█ Actual Level of Effort
 █ Remaining Work
 █ Critical Remaining Work
 ◆ Milestone
 ▾ summary

Activity ID	Critical	Activity Name	Original Duration	Start	Finish	Total Float	Activity %	2019												2020												2021												2022													
								F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M	J	Jul	A	S	O	N	D	J	F	M	A	M										
ORD2000	☑	Re-shape median for SB Diversion	16	31-Mar-21	22-Apr-21	0	0%																																																	■	Re-shape median for SB Diversion
ORD2010	☑	Switch SB Traffic onto SB Diversion	1	22-Apr-21	23-Apr-21	0	0%																																																	■	Switch SB Traffic onto SB Diversion
ORD2020	☑	Demolish Existing SB Bridge	22	23-Apr-21	25-May-21	0	0%																																																	■	Demolish Existing SB Bridge
Phase 3 Roadway Construction			52	23-Apr-21	06-Jul-21	183																																																		▼	06-Jul-21, Phase 3 Roadway Const
ORD2030	☐	Clear and Grub Phase 3 Roadway	3	23-Apr-21	28-Apr-21	123	0%																																																	■	Clear and Grub Phase 3 Roadway
ORD2040	☐	Rough Grade Phase 3 Roadway	21	28-Apr-21	27-May-21	123	0%																																																	■	Rough Grade Phase 3 Roadway
ORD2050	☐	Install Drainage Phase 3 Roadway	21	05-May-21	04-Jun-21	123	0%																																																	■	Install Drainage Phase 3 Roadway
ORD2060	☐	Place Aggr. Base Phase 3 Roadway	6	04-Jun-21	14-Jun-21	123	0%																																																	■	Place Aggr. Base Phase 3 Roadway
ORD2070	☐	Asphalt Pave Phase 3 Roadway	5	14-Jun-21	21-Jun-21	127	0%																																																	■	Asphalt Pave Phase 3 Roadway
ORD2080	☐	Install Pavement Marking Phase 3 Roadway	5	21-Jun-21	28-Jun-21	178	0%																																																	■	Install Pavement Marking Phase 3 R
ORD2090	☐	Install Guardrail Phase 3 Roadway	5	28-Jun-21	06-Jul-21	178	0%																																																	■	Install Guardrail Phase 3 Roadway
Construction Stage 3 Bridge			207	25-May-21	21-Mar-22	0																																																		▼	21-M
ORD2100	☑	Support of Excavation Stage 3 Bridge	42	25-May-21	26-Jul-21	0	0%																																																	■	Support of Excavation Stage 3 Br
ORD2110	☑	Structural Excavation Pier 2 Bridge	12	26-Jul-21	11-Aug-21	0	0%																																																	■	Structural Excavation Pier 2 Bri
ORD2140	☐	Drilled Shafts Pier 1 Stage 3	15	26-Jul-21	16-Aug-21	34	0%																																																	■	Drilled Shafts Pier 1 Stage 3
ORD2120	☑	Structural Excavation Abutment A Bridge	12	11-Aug-21	27-Aug-21	0	0%																																																	■	Structural Excavation Abutme
ORD2170	☐	F/R/P Substructure Pier 2	40	11-Aug-21	07-Oct-21	37	0%																																																	■	F/R/P Substructure Pier
ORD2190	☐	F/R/P Substructure Pier 1	40	16-Aug-21	12-Oct-21	34	0%																																																	■	F/R/P Substructure Pier
ORD2130	☑	Structural Excavation Abutment B Bridge	14	27-Aug-21	17-Sep-21	0	0%																																																	■	Structural Excavation Abut
ORD2150	☐	Drive Bearing Pile Abutment A Stage 3	26	27-Aug-21	05-Oct-21	9	0%																																																	■	Drive Bearing Pile Abutme
ORD2160	☑	Drive Bearing Pile Abutment B Stage 3	21	17-Sep-21	18-Oct-21	0	0%																																																	■	Drive Bearing Pile Abut
ORD2180	☐	F/R/P Substructure Abutment A	30	05-Oct-21	16-Nov-21	9	0%																																																	■	F/R/P Substructure
ORD2200	☑	F/R/P Substructure Abutment B	30	18-Oct-21	01-Dec-21	0	0%																																																	■	F/R/P Substructur
ORD2210	☑	Backfill Substructure	10	01-Dec-21	15-Dec-21	0	0%																																																	■	Backfill Substruc
ORD2220	☑	Erect Structural Steel Stage 3 Bridge	7	15-Dec-21	27-Dec-21	0	0%																																																	■	Erect Structura
ORD2230	☑	Install Deck Forms Stage 3 Bridge	25	27-Dec-21	01-Feb-22	0	0%																																																	■	Install Deck
ORD2240	☑	Place Reinf Steel Stage 3 Bridge	6	01-Feb-22	09-Feb-22	0	0%																																																	■	Place Reinf
ORD2250	☑	Pour and Cure Decks Stage 3 Bridge	12	09-Feb-22	25-Feb-22	0	0%																																																	■	Pour and
ORD2260	☑	Construct Parapets Stage 3 Bridge	10	25-Feb-22	11-Mar-22	0	0%																																																	■	Constr
ORD2270	☑	Install Traffic Controls for SB Traffic Switch	3	11-Mar-22	16-Mar-22	0	0%																																																	■	Install
VDOT2360	☑	VDOT Bridge Inspection	2	16-Mar-22	18-Mar-22	0	0%																																																	■	VDOT
ORD2280	☑	Switch SB Traffic to new Construction	1	18-Mar-22	21-Mar-22	0	0%																																																	■	Switch
Phase 4 Roadway Construction			30	21-Mar-22	02-May-22	1																																																		▼	
ORD2290	☑	Reshape Median for Ultimate	14	21-Mar-22	08-Apr-22	0	0%																																																	■	Res
ORD2300	☐	Place Final Asphalt	8	08-Apr-22	20-Apr-22	1	0%																																																	■	Pl
ORD2310	☐	Place Final Pavement Markings	8	20-Apr-22	02-May-22	1	0%																																																	■	
Final Completion			31	08-Apr-22	23-May-22	0																																																		▼	
ORD2320	☑	Clean-up	20	08-Apr-22	06-May-22	0	0%																																																	■	
ORD2330	☐	Punch list Inspection	3	02-May-22	05-May-22	1	0%																																																	■	
ORD2340	☐	Punch List Work	10	05-May-22	19-May-22	1	0%																																																	■	
ORD2350	☑	Demobilize	11	06-May-22	23-May-22	0	0%																																																	■	

■ Actual Level of Effort ■ Remaining Work ◆ Milestone
■ Actual Work ■ Critical Remaining Work ▼ summary



VOLUME II: Roadway and Bridge Design Concept Plans and Proposal Schedule

A Design-Build Project

Replacement of I-81 Bridges over Rte. 11,
Norfolk Southern Railroad & Middle Fork Holston River,
Smyth County, Virginia

State Project No.: 0081-086-742, P101, B659; 0081-086-818, B663

Federal Project No.: BR-081-1(336); NHPP-081-1(351)

Contract ID Number: C00097555DB102

Submitted By:



In Conjunction With:



Subconsultants:

