PHOTOGRAPHIC DOCUMENTATION

OF SMITH COVERED BRIDGE/RUSH COUNTY BRIDGE NO. 94 CARRYING COUNTY ROAD 150 NORTH OVER THE FLATROCK RIVER RUSHVILLE TOWNSHIP, RUSH COUNTY, INDIANA

INDOT DES. NO: 1702753/DHPA NO. 23432

PREPARED ON BEHALF OF:

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For:

INDIANA STATE HISTORIC PRESERVATION OFFICE (SHPO)

Prepared by:



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MANAGEMENT SUMMARY

This report provides architectural documentation of the Smith Covered Bridge, also known as the Rush County Bridge No. 94. The bridge carries County Road 150 North over the Flatrock River in Rushville Township, Rush County, Indiana, approximately 1.5 miles east of State road 3 and north of State Road 44. Its location can be found on the USGS May, Indiana, Topographic Quadrangle, in Township 14 North, Range 10 East, in Section 28.

In coordination with the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation, and the Indiana State Historic Preservation Office, the Indiana Department of Transportation established the "Historic Bridges Programmatic Agreement Regarding Management and Preservation of Indiana's Historic Bridges" (Historic Bridges PA) in July 2006. As part of the historic bridge preservation program, Smith Covered Bridge/Rush County Bridge No. 94, was identified as "Select," a designation for bridges that are "most suitable for preservation and are excellent examples of a given type of historic bridge." The subject bridge is listed on the National Register of Historic Places (NRHP) under Criterion A for its contribution to the transportation history in the state and locality, and under Criterion C for its engineering and architectural significance.

As a "Select" bridge, Smith Covered Bridge/Rush County Bridge No. 94 will be rehabilitated following the Standard Treatment Approach as described in Attachment B of the Historic Bridges PA (Standard Treatment Approach for Historic Bridges). Stipulation 7 of the Standard Treatment Approach states, "(t)he bridge owner will complete any photo documentation in accordance with the specifications provided by the Indiana SHPO."

This report is hereby submitted to the Indiana State Historic Preservation Office (SHPO) to provide a record of the subject bridge per that office's architectural documentation standards to be used for future archival purposes by the public.





1.0 PHOTOGRAPH KEY

Photo 1. IN_RushCounty_SmithCoveredBridge01



Photo 2. IN_RushCounty_SmithCoveredBridge02



Photo 3. IN_RushCounty_SmithCoveredBridge03



Photo 4. IN_RushCounty_SmithCoveredBridge04



Photo 5. IN_RushCounty_SmithCoveredBridge05



Photo 6. IN_RushCounty_SmithCoveredBridge06



Photo 7. IN_RushCounty_SmithCoveredBridge07



Photo 8. IN_RushCounty_SmithCoveredBridge08



Photo 9. IN_RushCounty_SmithCoveredBridge09



Photo 10. IN_RushCounty_SmithCoveredBridge10



Photo 11. IN_RushCounty_SmithCoveredBridge11



Photo 12. IN_RushCounty_SmithCoveredBridge12



Photo 13. IN_RushCounty_SmithCoveredBridge13



Photo 14. IN_RushCounty_SmithCoveredBridge14



Photo 15. IN_RushCounty_SmithCoveredBridge15



Photo 16. IN_RushCounty_SmithCoveredBridge16



Photo 17. IN_RushCounty_SmithCoveredBridge17



Photo 18. IN_RushCounty_SmithCoveredBridge18



Photo 19. IN_RushCounty_SmithCoveredBridge19



Photo 20. IN_RushCounty_SmithCoveredBridge20



Photo 21. IN_RushCounty_SmithCoveredBridge21



Photo 22. IN_RushCounty_SmithCoveredBridge22

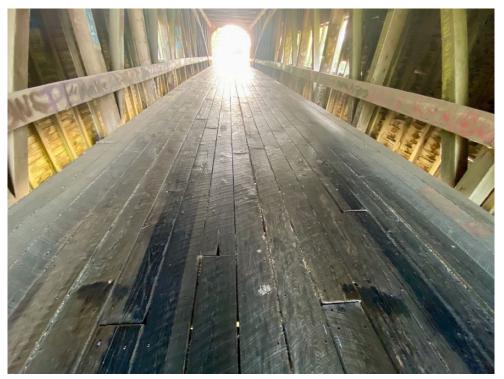


Photo 23. IN_RushCounty_SmithCoveredBridge23



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Photo 25. IN_RushCounty_SmithCoveredBridge25



Photo 26. IN_RushCounty_SmithCoveredBridge26



Photo 27. IN_RushCounty_SmithCoveredBridge27



Photo 28. IN_RushCounty_SmithCoveredBridge28



Photo 29. IN_RushCounty_SmithCoveredBridge29



Photo 30. IN_RushCounty_SmithCoveredBridge30



Photo 31. IN_RushCounty_SmithCoveredBridge31



Photo 32. IN_RushCounty_SmithCoveredBridge32



Photo 33. IN_RushCounty_SmithCoveredBridge33

2.0 DIGITAL PHOTO LOG AND PHOTO KEY MAP

Photo Number	Name	Address	Township, County	Location, Direction, & Description of View	Date
01	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View facing west toward the bridge's east portal from CR 150N.	July 20, 2022
02	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View facing northwest toward the bridge's east portal from CR 150N.	July 20, 2022
03	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of the east portal's decorative elements and builder sign facing up from CR 150N.	July 20, 2022
04	Smith Covered Bridge	CR 150 North over the Flatrock River	the Rushville Twp, Rush Co View of the bridge's cut limestone cap and sandstone at the southeast abutment facing southwest.		July 20, 2022
05	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush CoView of the bridge's cut limestone cap and sandstone at the northeast abutment facing north.		July 20, 2022
06	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, View of the bridge's interior from the east portal entry facing west.		July 20, 2022
07	Smith Covered Bridge	CR 150 North over the Flatrock River	the Rushville Twp, Rush Co View of the bridge's upper lateral bracing and the underside of the metal roof from the east portal entry facing west.		July 20, 2022
08	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the bridge's wooden deck flanked by perpendicular guide rails from the east portal entry facing west.	July 20, 2022

09	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of a floor beam bolted to the bottom chord as visible from the bridge deck facing down towards the bridge's northern interior wall.	July 20, 2022
10	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the window opening beneath the Burr arch on the bridge's south elevation facing southwest.	July 20, 2022
11	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the window opening beneath the Burr arch on the bridge's north elevation facing northwest.	July 20, 2022
12	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the Flatrock River facing south from the bridge's south-facing window.	July 20, 2022
13	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of a junction of the Burr arch bolted to a vertical truss member and adjacent to a diagonal truss member, with the guide rail running parallel to the bridge deck, facing south toward the bridge's southern interior wall.	July 20, 2022
14	Smith Covered Bridge	CR 150 North over the Flatrock River	e Rushville Twp, Rush Co View of the junction between the bridge deck the bridge approach (CR 150N), demarcated by perpendicular timber member at the bridge's western portal, facing west.		July 20, 2022
15	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the Burr arch truss and other truss members and the wall cladding on the bridge's northern interior wall facing northeast from the western portal.	July 20, 2022
16	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the Burr arch truss and other truss members and the wall cladding on the bridge's southern interior wall facing southeast from the western portal.	July 20, 2022

17	Smith Covered	CR 150 North over the	Rushville Twp,	View of the bridge's cut limestone cap and	July 20, 2022
	Bridge	Flatrock River	Rush Co	sandstone on the northwest abutment facing north.	
18	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the bridge's cut limestone cap and sandstone on the southwest abutment facing southeast.	July 20, 2022
19	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of the west portal's decorative elements and builder sign facing up from CR 150N.	July 20, 2022
20	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View facing east toward the bridge's west portal from CR 150N.	July 20, 2022
21	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	wp, View of the wall cladding, roof rafters, and diagonal July 20, truss members facing up from the bridge's west portal.	
22	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co		
23	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the bridge's wooden deck flanked by perpendicular guide rails from the west portal entry facing east.	July 20, 2022
24	Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the cut stone abutment where it meets the east bank of the Flatrock River below the bridge facing south from the bridge's northeast quadrant; the Burr arch truss members' connection with the abutment is also visible.	July 20, 2022

Smith Covered	CR 150 North over the	Rushville Twp,	View of the bridge's north elevation from beneath	July 20, 2022
Bridge	Flatrock River	Rush Co	the bridge facing southwest; rafter tails in the eave are visible.	
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the bottom chords, floor beams, lateral brace members, underdeck stringers, and underside of the bridge deck beneath the bridge facing west from the east bank of the Flatrock River.	July 20, 2022
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of the Burr arch truss members attached to the stone abutment at the southeast quadrant beneath the bridge facing south.	July 20, 2022
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of the stone abutment on the west side of the Flatrock River beneath the bridge facing west.	July 20, 2022
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	wp, View of the bridge's south elevation from beneath July 20 the bridge facing northwest, with rafter tails also visible.	
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	Close-up view of the awning over the bridge's north window opening facing southwest.	July 20, 2022
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	p, View of the bridge's east abutment facing southeast July 20, 2 from the east bank of the Flatrock River.	
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the bridge's north elevation facing southwest from the east bank of the Flatrock River.	July 20, 2022
Smith Covered Bridge	CR 150 North over the Flatrock River	Rushville Twp, Rush Co	View of the entire bridge span over the Flatrock River facing southwest on the north side of the bridge.	July 20, 2022
	BridgeSmith Covered BridgeSmith Covered Bridge	BridgeFlatrock RiverSmith Covered BridgeCR 150 North over the Flatrock River	BridgeFlatrock RiverRush CoSmith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush Co	BridgeFlatrock RiverRush Cothe bridge facing southwest; rafter tails in the eave are visible.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoView of the bottom chords, floor beams, lateral brace members, underdeck stringers, and underside of the bridge deck beneath the bridge facing west from the east bank of the Flatrock River.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoClose-up view of the Burr arch truss members attached to the stone abutment at the southeast quadrant beneath the bridge facing south.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoClose-up view of the stone abutment on the west side of the Flatrock River beneath the bridge facing west.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoClose-up view of the stone abutment on the west side of the Flatrock River beneath the bridge facing west.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoView of the bridge's south elevation from beneath the bridge facing southwest.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoView of the bridge's east abutment facing southeast from the east bank of the Flatrock River.Smith Covered BridgeCR 150 North over the Rush CoRushville Twp, Rush CoView of the bridge's north elevation facing southwest.Smith Covered BridgeCR 150 North over the Flatrock RiverRushville Twp, Rush CoView of the bridge's nort



Photographs from CR 150 N Photographs from ground level or beneath bridge Interior Photographs Figure 1. Photograph locations on an aerial photograph All locations approximate Smith Covered Bridge/Rush County Bridge No. 94 Source: Imagery Date 2012 Aerial Photo Documentation Project 1 inch = 25 feet CR 150N over Flatrock River Ν Rushville Township, Rush County, Indiana Feet Des. No. 1702753/DHPA No. 23432 25 0 Metric Project No. 22-0080 26 Map Date: 07/26/2022

ENTAL

3.0 WRITTEN DESCRIPTION

The subject bridge is located in an area where the land use is primarily rural with active farmland and a handful of low-density single-family houses. The Flatrock River travels north to south through the area, and just north of the bridge the Ben Davis Creek empties into the Flatrock River, which creates some low-lying areas that causes the river to widen there. Dense trees and vegetation flank the river and the banks have a gentle slope to the water. The area topography is mostly flat but the bridge itself is elevated.

Archibald Kennedy and his son Emmett built this single-span Burr Arch truss bridge in 1877. The structure length is 121 feet, with a deck width of approximately 15 feet wide. It has a standing seam metal roof, wood siding, timber decking, and cut limestone wing walls and abutments. The timber truss and arch ring bear directly on the stone abutments. The siding on the sides of the bridge is horizontal clapboard siding instead of vertical siding. The roofline is gabled with paired decorative brackets evenly spaced under the eaves on a very wide cornice. Beneath each gable is painted in green the following:

A.M. Kennedy & Sons. 1877. BUILDERS

Each opening has a round arch portal with pilasters flanking each side and the gabled roofline extends eight feet over each entry. The pilasters stop approximately midway up the portal walls, and above them are scrolled millwork, also painted green. In each gable the wood clapboard is vertical and along the sides the boards are horizontal, and the bridge is painted white. There are long, low window openings about midway through the bridge on both walls with wood awnings. Historical photos reveal the windows are not original to the structure, but were added sometime after 1996. According to the Indiana Historic Bridge Survey administered by the SHPO, the Smith Covered Bridge (HB-0012) was damaged by an attempted arson fire in 1988.

There is one known rehabilitation of the bridge, which occurred in 1996 after a fire damaged several of the members. The wood siding was completely replaced at that time. Existing timber members were retained where possible; in some cases steel plates and epoxy glue were utilized to splice partial existing members to new members and to strengthen existing connections. The 1996 repairs also included replacing some of the original Michigan pine timbers with Douglas Fir. Missing decorative elements such as brackets and millwork were replaced, and the bridge was

painted white. The existing metal roof was also added with the 1996 rehabilitation and was a complete replacement of the original.

The bridge deck, which consists of two layers of timber planks with the lower layer placed transverse to the stringers and the top layer running longitudinal along the length of the bridge, was also replaced at that time with native oak. The new planks were glued and nailed to the stringers and each other for added strength. The timber stringers are simply supported between floor beams and the timber floor beams are located at every panel point of the truss.

The existing bridge railing consists of timber planks nailed to the timber truss.

The existing abutments consist of stacked, rough cut sandstone blocks capped with limestone blocks. The foundation is unknown but assumed to be a spread footing. Both abutments exhibit some exterior face crumbling. The existing spill slopes consist of dirt and no riprap protection is present.

4.0 STATEMENT OF SIGNIFICANCE

The Smith Covered Bridge is significant as one of only five remaining covered bridges in Rush County. It is also the county's oldest extant covered bridge. The Kennedy Family built the bridge using the nationally significant Burr Arch truss type and it is an excellent example of a covered timbered bridge. Bridge builder Theodore Burr devised an innovative adaptation of a traditional arch truss in the early 1800s for timber bridges that utilized segmented arches and multiple kingpost trusses. The Kennedy Family is credited with building approximately sixty covered bridges in southeastern Indiana using the Burr Arch truss system, and they are recognized as one of the state's most prolific timber bridge builders. The bridge retains a high degree of integrity and displays character-defining features of the Burr Arch truss system, as well as possessing finer architectural details on each portal that is a hallmark of a Kennedy-designed covered bridge.

This bridge was included in the "Rush County Covered Bridge Historic District" Multiple Property Documentation Form (MPDF), which is available to view on the Indiana SHPO's State Historic Architectural and Archaeological Research Database (SHAARD). The Rush County Covered Bridge Historic District's National Park Service File Number is 83000099 and its SHAARD National Register File Number is NR-0370. The MPDF includes six covered bridges and the house of Archibald M. Kennedy, the patriarch of one of Indiana's most important covered bridge building companies in the late 1800s, and it was listed on the State Register in April 1980 and on the NRHP in February 1983. The Smith Covered Bridge, as well as the five other bridges in the MPDF, was individually listed on the State Register and on the NRHP at the same time as the MPDF. They share the same National Park Service File Number as the MPDF (83000099), but they have different SHAARD National Register File Numbers (the Smith Covered Bridge's number is NR-0370.05). An aerial map depicting the Smith Covered Bridge's NRHP boundary can be found in Appendix C.

The Smith Covered Bridge was listed in the National Register on 2/2/1983 under Criteria A and C for its association with the history of transportation in the state and county, as well as for its engineering and architectural significance. The bridge retains the majority of its integrity and it is still significant for its direct association with master builders A.M. Kennedy & Sons, as well as for being one of the last remaining examples of an unusual and rare bridge type in the state.

5.0 HISTORIC BRIDGE ALTERNATIVES ANALYSIS: SMITH COVERED BRIDGE

Historic Bridge Alternatives Analysis Bridge No.: Rush County Bridge #94 Des. No.: 1702753 CR 150N over Flatrock River Bridge Rehabilitation Rush County, Indiana NBI Number: 7000084

PROJECT LOCATION:

Rush County Bridge #94 carrying CR 150N over Flatrock River, Located 0.5 miles east of CR 100E (Fort Wayne Road) in Section 28, Township 14 North, Range 10 East, Rushville Township, Rush County, Indiana

This bridge was evaluated by personnel from the Indiana Department of Transportation (INDOT) Bridge Design Unit, and the designer. The attached Draft Historic Bridge Alternatives Analysis has been reviewed by the INDOT Bridge Design Unit and Cultural Resources Office for thoroughness of the replacement option and compliance with INDOT design policies. Concurrence by INDOT with the proposed Scope of Work does not constitute Final Approval of the Historic Bridge Alternatives Analysis. This draft HBAA may now be distributed to the historic consulting parties for review.

Prepared By: United Consulting

Date: February 12, 2021

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Maps Photographs Project sketches Cost Estimate

EXISTING STRUCTURE DATA:

A. Identification/History

Bridge No.: Rush County Bridge #94 Project Location: CR 150N in Rush County, Indiana Bridge Rehabilitation Project over Flatrock River Designation No.: 1702753 Year Built: 1877 Years Rehabilitated: 1996 Most Recent Field Inspection Date: May 22, 2019 Average Daily Traffic (ADT)/Year of ADT: 150 VPD (2015) Percentage of Commercial Vehicles: 3% DHV Low volume road?: (Yes/No) A low-volume road is defined as having a design year ADT of less than or equal to 400. Posted Speed = 30 mphFunctional Classification: Rural Local Road Detour Length: 2 miles Load Rating: 3 ton Sufficiency Rating: 23.6 (2019) National Register of Historic Places Status: On National Register Historic Bridge Prioritization Status: Select Historic Character-Defining Features:

- 1. The Smith Covered Bridge is significant as one of only five remaining covered bridges in Rush County. It is also the county's oldest extant covered bridge.
- 2. The Kennedy Family built the bridge using the nationally significant Burr Arch truss type and it is an excellent example of a covered timbered bridge.
- 3. The bridge retains a high degree of integrity and displays characterdefining features of the Burr Arch truss system, as well as possessing finer architectural details on each portal that is a hallmark of a Kennedydesigned covered bridge.

B. <u>Structure/Dimensions</u>

Surface Type: Timber Out to Out of Copings: 19 feet – 9 inches Out to Out of Bridge Floor: 123 feet – 0 inches Clear Roadway Width: 15 feet – 0 inches Number of Lanes on Structure: 1 Skew: N/A – No Skew Type of Superstructure: Timber thru truss

33

Spans: 1

Type of Substructure/Foundation: Stone abutments

C. <u>Appurtenances</u>

Bridge Railing: Timber Railing Curbs: None Sidewalks: None Utilities: Aerial power and telephone lines south of bridge Railroad: None

D. Approaches

Roadway Width: 16 feet Surface Type: Asphalt Guardrail: 50 feet of guardrail is present in the NW, SW, and SE quadrants. The NE quadrant has 195 feet of guardrail.

EXISTING CONDITIONS:

The National Bridge Inventory (NBI) rating system uses 0 to 9 rating scale. Inspectors give a rating to each of a bridge's primary elements: deck, superstructure, and substructure. A general description of these condition ratings is shown in the table below.

NBI Rating Value	NBI General Condition Description				
9	Excellent Condition – no problems noted.				
8	Very Good Condition – no problems noted.				
7	Good Condition – some minor problems.				
6	Satisfactory Condition – structural elements show some minor deterioration.				
5	Fair Condition – all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.				
4	Poor Condition – advanced section loss, deterioration, spalling or scour.				
3	Serious Condition – loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear crack in concrete may be present.				
2	Critical Condition – advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.				
1	"Imminent" Failure Condition – major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put it back in light service.				
0	Failed Condition – out of service. Beyond corrective action.				

The following summarizes the condition of the existing structure. Photographs are attached showing the existing conditions of the bridge.

A. Bridge Deck and Floor System:

The overall condition of the timber bridge deck and floor system is satisfactory (rating of 6). The bridge deck was replaced in 1996 and consists of two layers of timber planks with the lower layer measuring 9 3/4" x 2 3/8" and placed transverse to the stringers and the top layer measuring 9 1/2 x 2" and running longitudinal along the length of the bridge. The 1996 rehabilitation plans call for the timber deck planks to be native oak and to be glued and nailed to the stringers and each other. The bridge deck was inspected and found to have a few splits at the ends of the boards.

The stringers and floor beams were replaced in 1996 and consist of timber glulam beams. The timber stringers typically measure 6 7/8" x 3", are spaced at 1'-5" and are simply supported between floor beams. The timber stringers between L6 and L7 span a longer distance between floor beams and measure 6 3/4" x 4 7/8" and are simply supported. The timber floor beams measure 13 3/4" x 8 3/8" and are located at every panel point of the truss. The stringers and floor beams were inspected and found to have no significant deterioration and to be in good condition.

The existing bridge railing consists of 2 1/2" x 11 1/2" timber planks nailed to the timber truss. The bridge railing has minor splits and is in satisfactory condition. The bridge railing is not a crash tested railing and thus does not meet INDOT's current performance criteria requirement of a TL-2 Railing per the Indiana Design Manual (IDM) Section 404-4.02.

B. <u>Superstructure</u>

The overall condition of the superstructure is poor (rating of 4). There is one known rehabilitation of the bridge in 143 years. The 1996 rehabilitation was completed after a fire damaged several of the members. Existing members were retained where possible. Steel plates and epoxy glue were utilized to splice old members to new members and to strengthen existing connections. Several lower chord, arch ring, vertical, and diagonal members are severely rotted, particularly near the ends of the bridge where water enters the bridge portal. Arch ring ends have heavy rot at the bearing locations with loss of support. Lower chord members also have heavy rot at the bearing locations.

The interior members and top chord are generally in satisfactory condition with large splits typical throughout. See the attached photographs and Truss Repair and Replacements sketch for additional information.

The timber truss and arch ring bear directly on the stone abutments. Deterioration at these locations consists of heavy rot and loss of bearing.

The existing structure load rating on file showed an HS-20 inventory rating factor of 0.083 which equates to the current posted capacity of 3 tons. The existing conditions and current requirements are shown in the table below.

Element	Existing Condition	Design Requirement
Structural Capacity	3 tons	27 tons (IDM Figure 412-2A)

There are substandard clear roadway width and vertical clearances above the bridge deck to the portal entrance above. The existing conditions and current requirements are shown in the table below.

Element	Existing Condition	Design Requirement
Clear Roadway Width	15 feet	16 feet (IDM Figure 412-2B)
Vertical Clearance	12.5 feet	14.0 feet (IDM Figure 55-3D)

C. <u>Substructure / Foundation</u>

The overall condition of the substructure is fair (rating of 5) and the overall condition of the slope protection is poor (rating of 4). The existing abutments consist of stacked stone blocks. The foundation is unknown but assumed to be a spread footing.

The west abutment has two stones failing under the north lower chord support and above the arch ring support. There are also three stones with the exterior face crumbling in the southwest wingwall. The northwest wingwall has numerous stones severely crumbling near the elevation of the bearing seat. There is no exposure of the footing and the elevation of the footing is unknown relative to the existing ground line.

The east abutment has two stones with the exterior face crumbling near the ground line and the southeast wingwall. The southeast wingwall has two stones with the exterior face crumbling on the west end of the wall. The northeast wingwall also has two stones with the exterior face crumbling on the west end of the wall. There is an existing concrete toe wall at the northeast corner of the abutment that was likely installed due to a previous scour event.

The existing spill slopes consist of dirt and no riprap protection is present.

<u>D, Roof</u>

The overall condition of the roof is fair (rating of 5). The existing standing seam metal roof is generally in good condition; however, it possesses numerous holes that appear to be bullet holes that are allowing water to leak on the bridge. The timber roof rafters and timber sheathing that support the metal roof are generally in satisfactory condition (rating of 6) with minor splits and checks. It is anticipated that additional rot will be uncovered on the face of the members that touch the existing metal roof upon removal of the existing roof.

E. <u>Siding</u>

The overall condition of the siding is poor (rating of 4). The siding was completely replaced in the 1996 rehabilitation. The paint has near complete failure on the south side of the bridge. The siding boards have severely worn, weathered and warped with numerous areas of rot. There are areas where the siding is missing and other areas where it has been repaired. The siding nailing boards are generally in good condition. The siding on the sides of the bridge is horizontal clapboard siding instead of vertical siding. The portal ends have vertical siding and architectural details at the top and wood "columns" at the base. The portal end elements and windows were replaced as needed in the 1996 rehabilitation in kind.

F. <u>Approaches</u>

The overall condition of the approach roadway is satisfactory. The existing pavement consists of asphalt pavement with transverse and longitudinal cracking present. The bridge is elevated relative to the approach road with a slight rise towards the bridge. The lane and shoulder width requirements are shown in the table below and are in accordance with IDM Figure 55-3D.

Element	Existing Condition	Design Requirement
Lane Width	8 feet	9 feet min.; 10 feet desirable (IDM Fig. 55-3D)
Shoulder Width	0 feet	2 feet (IDM Fig. 55-3D)

PURPOSE AND NEED:

The need for the project is based on the overall condition of the existing bridge. The bridge exhibits severe deterioration of the truss at the bearing locations and the ends of the bridge. The siding and roof that are designed to protect the main structural elements from moisture have holes and are severely worn and weathered and the stone abutments have several individual stones that are cracked and/or crumbling. The current Structure Inventory and Appraisal ratings are as follows: Substructure 5 (Fair), Superstructure 4 (Poor), and Deck 6 (Satisfactory). The bridge is posted for a 3 ton load limit.

The purpose of the project is to have a superstructure, substructure, and deck to a rating of 6 (satisfactory), to raise the load posting capacity up to 10 tons, and to extend the life of the bridge by 25 years.

PROJECT ALTERNATIVES:

Two project alternatives were evaluated in relation to the purpose and need for the project. The alternatives are discussed below.

A. <u>Do Nothing/No Build Option:</u>

This alternative ignores the transportation needs of the area by ignoring the deteriorating condition of the bridge. This alternative means that no federal funds will be expended and that no action would occur. This alternative does not improve the overall condition of the crossing over Flatrock River. This alternate does not meet the purpose and need and therefore is not prudent. With no repairs the bridge would have an estimated 5 year useful service life before it would have to be closed to traffic.

B. <u>Rehabilitation for Continued Vehicular Use (two-lane or one-lane option) Meeting Secretary of Interior's Standards for Rehabilitation:</u>

This option includes the rehabilitation of the existing structure for continued vehicular use. Two-way traffic would continue to utilize this one lane bridge. Sketches of the bridge showing the repairs listed below are attached.

Bridge Railings and Transitions

The existing timber bridge railing inside the bridge will be retained. This railing, while it does not meet current design standards, has been in place for over 20 years and exhibits no signs of impact damage. All the required design exceptions and their likelihood of being approved are summarized in a table below.

Outside of the covered bridge, the existing metal guardrail will be removed for construction access, and new w-beam approach guardrail will be installed upon completion of the bridge rehabilitation. Proper guardrail lengths will be installed in accordance with current IDM design requirements. The approach guardrail will not be connected to the existing bridge railing since the existing stone wingwalls interfere with the guardrail post installation. Instead, the approach guardrail will butt up to the existing stone wingwalls, similar to the existing conditions.

Bridge Deck

The existing timber deck members will be removed as a part of the rehabilitation to allow for the replacement of deteriorated truss and arch members. Upon

completion of truss and arch repairs and replacements, existing timber deck boards in good condition will be reinstalled and new boards will be installed where needed. Longitudinal boards with only deterioration at the ends will be trimmed and reused. It is anticipated that 90% of the existing deck boards will be reused.

Superstructure

Timber truss and arch ring members in satisfactory condition will be retained. Members with minor amounts of rot damage will be repaired by having the existing rot removed and a clean rectangular sawed repair installed with glue and screws. Timber for the repairs will come from structurally sound portions of timbers removed from the structure in other locations.

Members with severe rot damage will be replaced for the full length of the member to the location of the nearest existing connection. New members will be matched to the existing member and installed with the same connection details as the original structure. Fire retardant will be applied to all timbers from the inside of the structure. The material used for the replacement members will be either pine or oak as discussed in the bridge's National Register of Historic Places Inventory Nomination Form which stated "Emmett Kennedy would often travel to Michigan to select the pine timber preferred for the structural members of covered bridges" and "The ends of each arch were made out of oak, which was considered more resistant to decay."

Sketches showing the proposed repair and replacement locations are attached.

Replacement of main timber truss and arch ring members will require the structure to be temporarily supported during construction. It is anticipated that piles will be driven into the ground adjacent to the trusses and a support system consisting of steel beams will be utilized under the lower chord to support the structure while the member replacements are being completed.

The repairs and member replacements listed above will allow the bridge load posting to be raised from 3 tons to 10 tons.

Substructure and Foundation

The east abutment will have the existing stone deterioration repaired by removing the deteriorated facing of the stone and repairing with mortar appropriate to be used with stone blocks. The mortar patches will be attached to the existing stone with dowels and formed on the outside to match the look of the existing stone face.

Stones on the face of the west abutment and on the southwest wingwall will also be repaired with the same method as the east abutment. Failing stones under the northwest bearing and in the northwest wingwall will be replaced with new stones cut to match the look of the existing abutment.

The existing abutments will have revetment riprap installed in front of the abutments to protect the foundations from scour.

<u>Roof</u>

The existing metal roof will be replaced in kind with a new metal roof, white in color, to match the existing roof. Rotted timber rafters and sheathing will be replaced with like sized timber members. It is estimated that 10 transverse roof rafters will be replaced and 25% of the timber sheathing will be replaced.

<u>Siding</u>

Plans from the 1996 rehabilitation specify all new siding to be installed. The current siding is 24 years old and has not been painted since the original installation. While approximately 50% of the siding is anticipated to be in adequate condition for reuse, careful removal of the siding, examining each board's condition, sorting, storing and reinstalling is a labor intensive process and would result in a higher siding cost than complete removal and replacement of the siding. The existing timber siding will be removed as a part of the rehabilitation to allow for the replacement of deteriorated truss and arch members. Upon completion of truss and arch repairs and replacements, new timber siding will be installed.

The existing windows on the north and south sides of the bridge will be reinstalled at the same locations and with the same details as the existing windows, utilizing existing members in good condition. The end portal siding and decorative elements will be retained if in good condition or replaced in kind if they are currently deteriorated. It is estimated that 90% of the window members will be reused.

The cost of this alternative is approximately \$1,360,000. This alternative will provide a 25-year service life. The estimated bridge replacement cost would be \$1,700,000. The rehabilitation cost is 80% of the replacement cost. In accordance with the IDM Section 412-5.04(01), the cost of rehabilitation does not exceed 80% of the replacement cost for this select historic bridge, therefore the cost of the rehabilitation is considered prudent.

This alternative does not meet current design standards for several level 1 and level 2 design criteria. The following table discusses these substandard design items and the potential to obtain design exceptions from INDOT for each.

Substandard Design Element	Design Manual Section	Required Minimum Value	Existing Condition	Value obtained as part of this rehabilitation	Is a Design Exception Likely to be Approved
Bridge clear roadway width	IDM Fig. 412-2B	16 ft	15 ft	15 ft	Yes
Structural capacity	IDM Fig. 412-2A	27 tons	3 tons	10 tons	Yes
Through travel lane cross slope	IDM Fig. 55-3D	1.5%	0.0%	0.0%	Yes
Vertical Clearances	IDM Fig. 55-3D	14.0 ft	12.5 ft	12.5 ft	Yes
Bridge Rail Safety Performance Criteria	IDM 404-4.02	TL-2	Not Crash Tested	Not Crash Tested	Yes

The design exceptions above are obtainable and appropriate for this structure and this project location. Improving any of these items to current design standards would require changes to the existing structure that would significantly alter the existing structure and its historical significance. The structure has been performing adequately at the current site for over 100 years. Traffic volumes on this road are low and residents have not voiced any concerns.

The structural capacity is being raised from 3-tons to 10-tons as a part of this project by replacing severely deteriorated members. This will allow local school busses to cross the structure. A higher structural capacity would only encourage heavier vehicles to attempt to cross the bridge that could cause major damages to the structure. The proposed 10-ton load limit meets the county's goal of allowing school busses to pass while still discouraging heavier vehicles from attempting to cross.

The rehabilitation of this structure as described in this alternative was determined to be feasible and prudent.

MINIMIZATION AND MITIGATION:

In addition to evaluating if there is a feasible and prudent avoidance alternative, minimization and mitigation of unavoidable impacts to the historic resource is required. Minimization means that the impacts are reduced to the maximum extent possible. Mitigation refers to actions that compensate for the impacts to the historic resource.

A. <u>Minimization</u>

The following design modifications that lessen the harm to a rehabilitated historic bridge include these measures:

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- a. Utilizing materials and workmanship that match the original construction when replacing members.
- b. Repairing stone abutments to match existing conditions without replacing entire stones when possible.
- c. Reusing the existing non-standard bridge railing to match current conditions.
- d. Level 1 design exception for structural capacity and vertical clearances.

Rush County will provide rehabilitation plans to the Indiana State Historic Preservation Officer (SHPO) at approximately 30% complete, 60% complete, and when final design plans are complete. The Indiana SHPO will have thirty (30) days to review and provide comments. Rehabilitation plans are attached to this document. They represent 30% plans.

B. <u>Mitigation</u>

Rush County will consult with the Indiana State Historic Preservation Officer (SHPO) to determine if photo documentation of the bridge is needed.

PRELIMINARY PREFERRED ALTERNATIVE:

The Rehabilitation for Continued Vehicular Use (two-lane or one-lane option) Meeting Secretary of Interior's Standards for Rehabilitation alternative was selected as the preliminary preferred alternative for this project. The table below compares the two alternatives examined for this project:

Alternative	Meets Project Purpose and Need	Construction Cost	ROW Amount	Total Cost	Feasible and Prudent
No Build	No	\$0	N/A	\$0	No. This alternative does not meet the purpose of the project to improve the structure's condition and to improve the load carrying capacity of the bridge.
Rehabilitation for Continued Vehicular Use (two- way or one-way option) (Rehab Work No Adverse Effect) Meeting Secretary of Interior's Standards for Rehabilitation	Yes	\$1,360,000	N/A	\$1,360,000	Yes

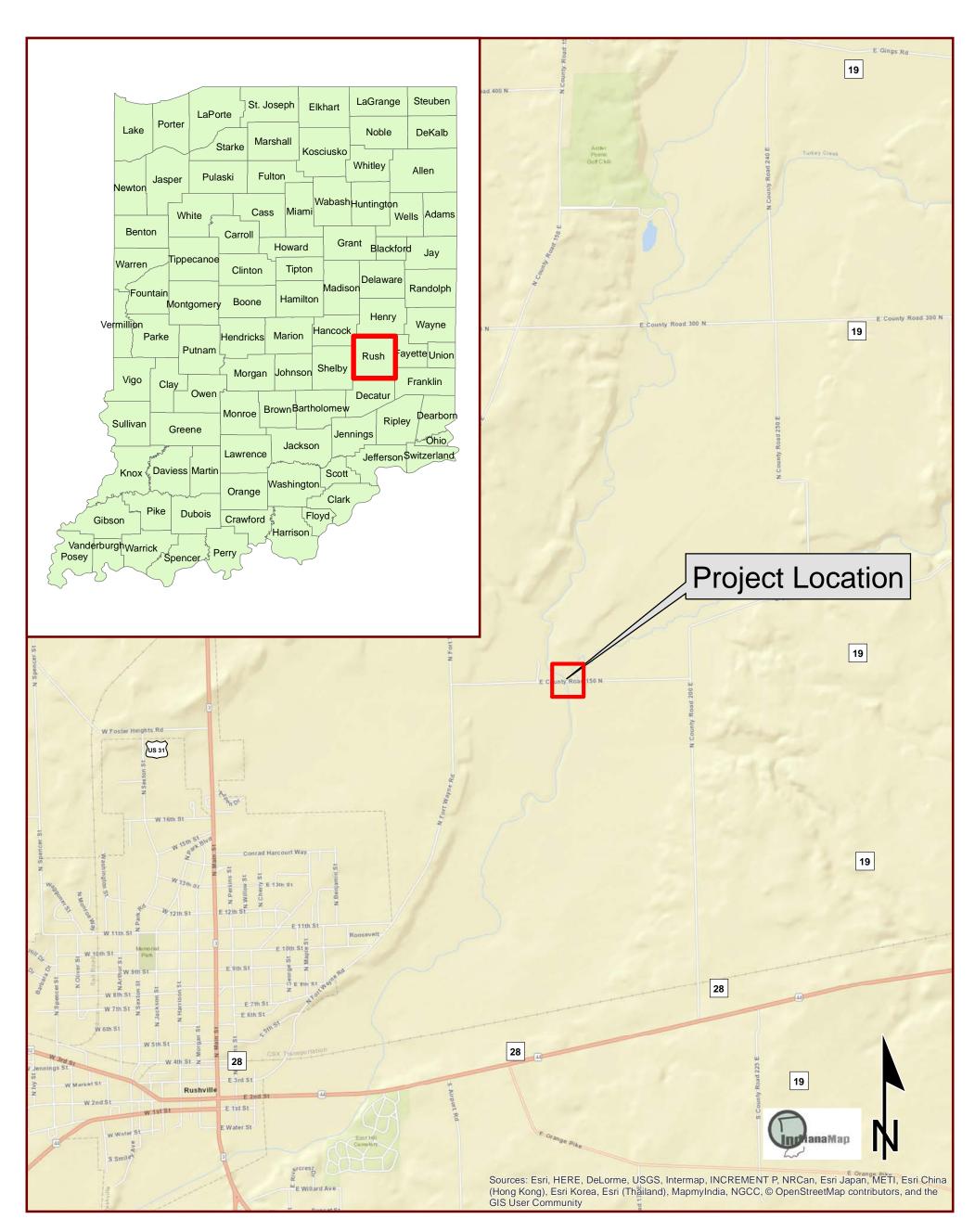
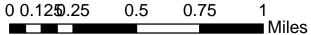


Exhibit 1 - State Location Map Rush County Bridge No. 94 (Smith Covered Bridge) CR 150 N over Flatrock River Bridge Rehabilitation Project Rush County, Indiana





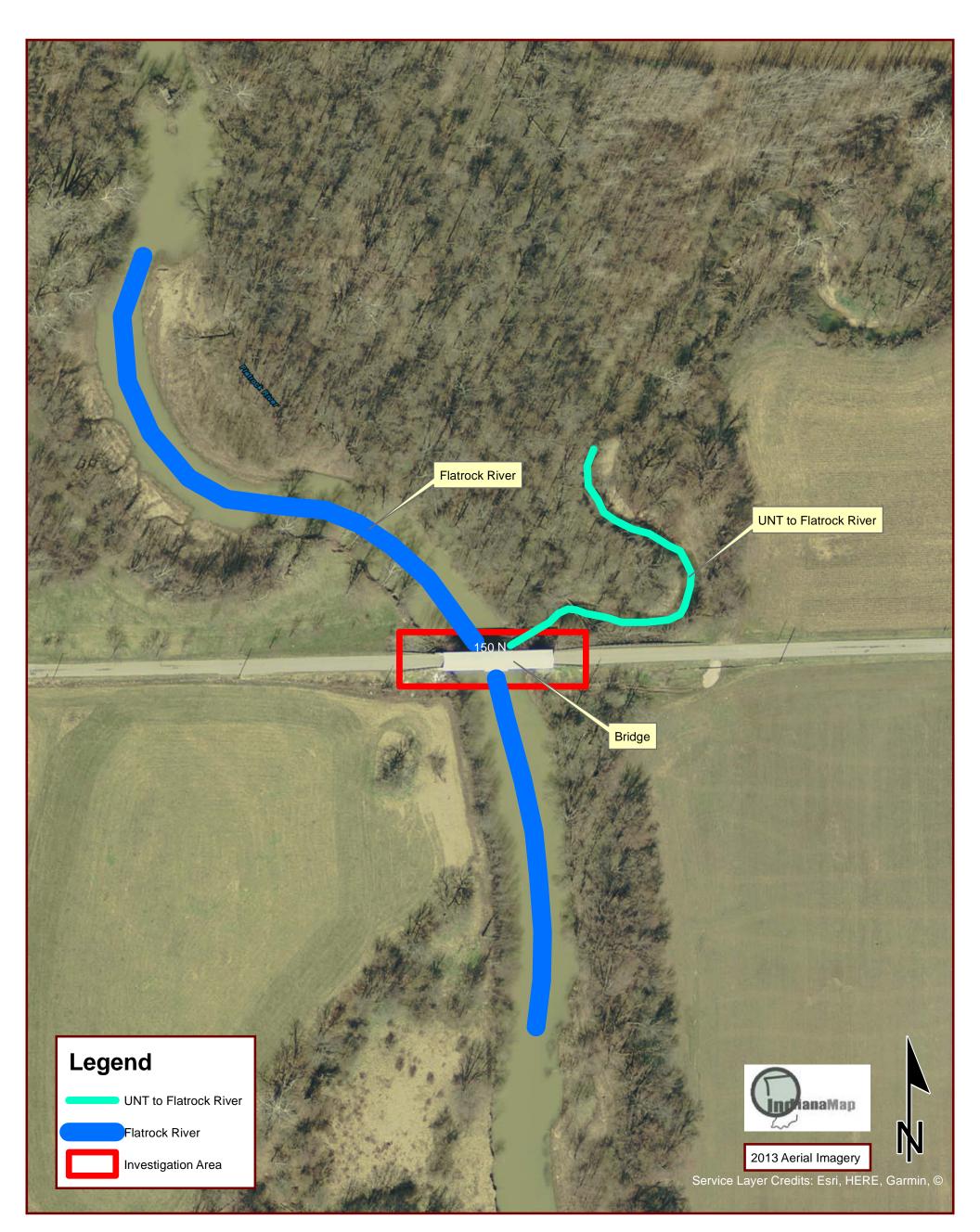
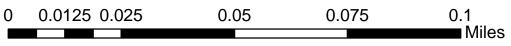


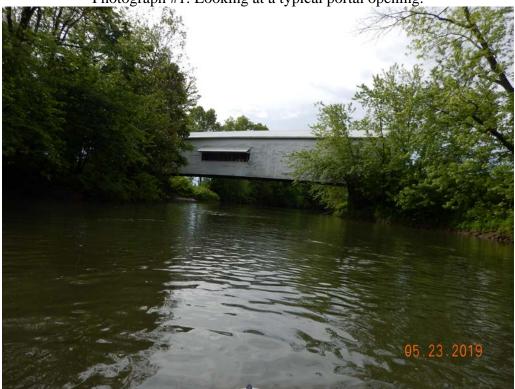
Exhibit 2 - Aerial Photography Map Rush County Bridge No. 94 (Smith Covered Bridge) CR 150 N over Flatrock River Bridge Rehabilitation Project Rush County, Indiana







Photograph #1: Looking at a typical portal opening.



Photograph #2: Looking south toward Rush County Bridge No. 94.

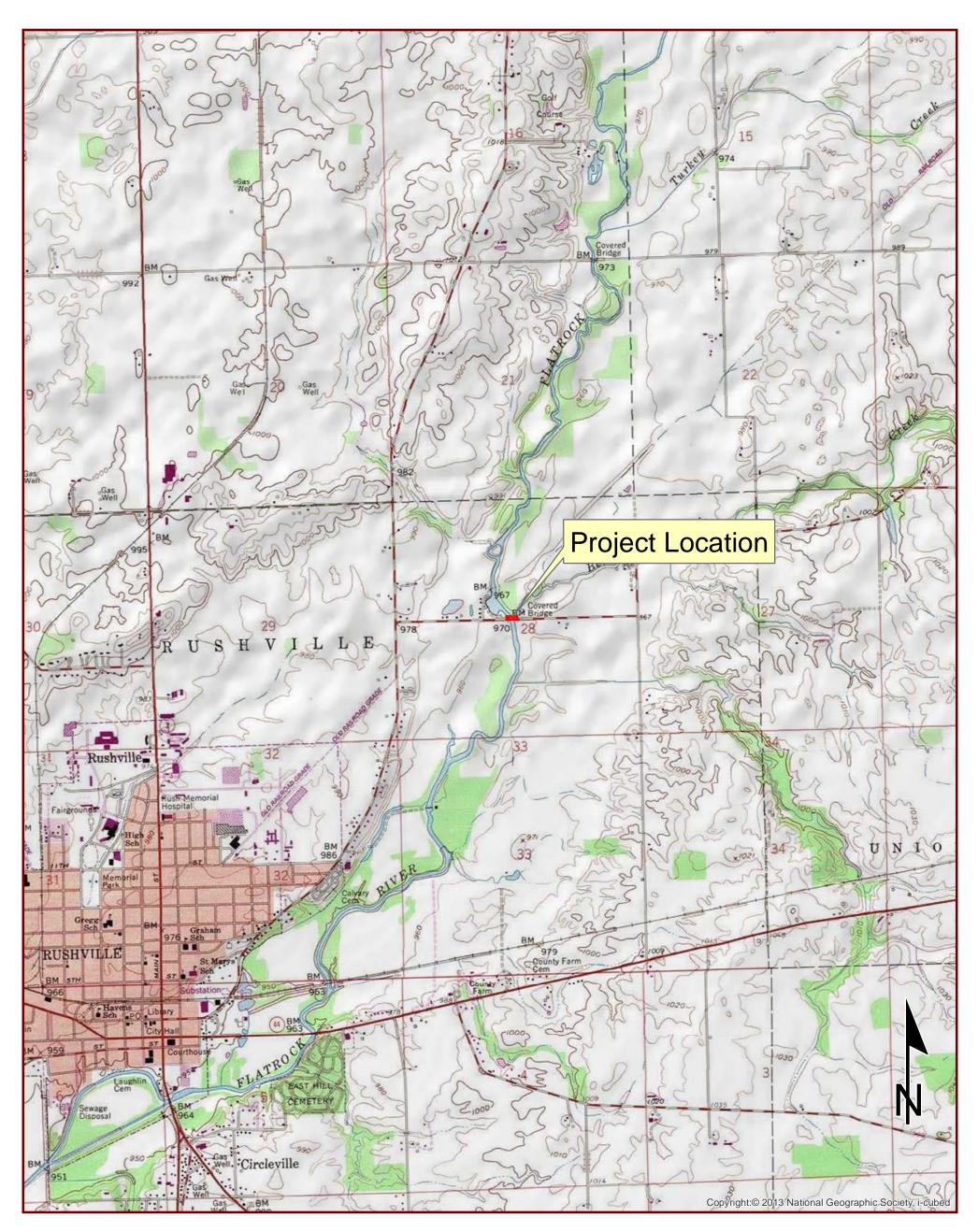
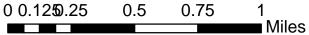


Exhibit 3 - USGS Topographic Map Rush County Bridge No. 94 (Smith Covered Bridge) CR 150 N over Flatrock River Bridge Rehabilitation Project Rush County, Indiana







Photograph #3: Looking at the truss and arch.



Photograph #4: Looking at the roofing system.





Photograph #5: Looking at the floor driving surface



Photograph #6: Looking at the floor support system.



Photograph #7: Looking at the west abutment.



Photograph #8: Looking at the east abutment.



Photograph #9: Looking at existing plate repairs to the vertical and diagonal.



Photograph #10: Looking at existing steel plate repairs to the lower chord.



Photograph #11: Looking at the gap between the vertical and diagonal.



Photograph #12: Looking west along channel of Rimmel Branch from CR 400E.



Photograph #13: Looking at light rot on the lower chord.



Photograph #14: Looking at severe rot on the lower chord.



Photograph #15: Looking at severe rot to the lower chord at the bearing.



Photograph #16: Looking at stone deterioration at NE wingwall



Photograph #17: Looking at cracked stone under northwest truss bearing.



Photograph #18: Looking at deterorated stones in the northwest wingwall.



Photograph #19: Looking at approach guardrail to be replaced.

		<u></u>	INDEX		<u></u>		7
RUCTURE		TYPE	SPAN AND S	KEW	OVER	STATION	
RUSH 94		BER TRUSS	ONE SPA 119'-2"		LATROCK RIVER	28+29.47 "A"	
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INDIANA DEPARTMENT OF TRANSPORTATION



RIDGE REHABILITATION PLANS

FOR SPANS OVER 20 FEET ROUTE: CR 150 N OVER FLATROCK RIVER PROJECT NO. 1702753 P.E.

PROJECT NO. 1702753 CONST.

Rehabilitation of Rush County Bridge No. 94 carrying CR 150 N over Flatrock River, Located in Section 28, Township 14 North, Range 10 East, Rushville Township, in Rush County, Indiana.

R.10.E. CR 300 N Gas Wetl CR 200 N CR 200 M CR 150 N Bridge RUSHVILLE

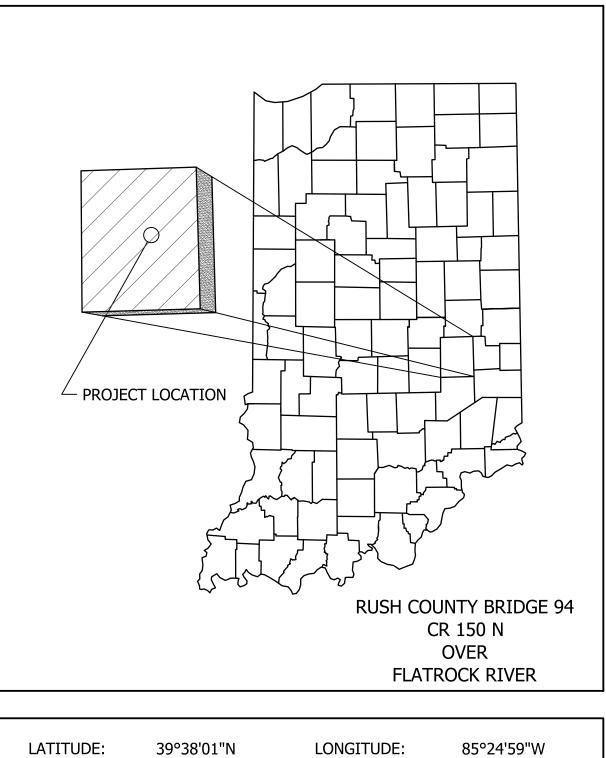
LOCATION MAP

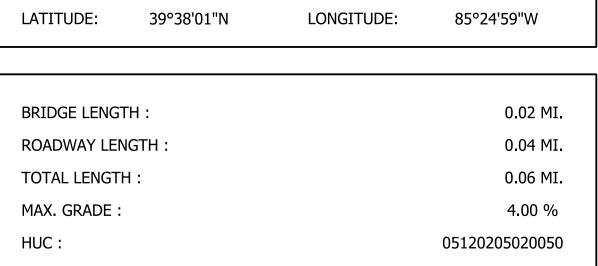


8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250 Phone 317-895-2585 www.ucindy.com

ANS				BRIDGE FILE
REPARED BY:	UNITED CONSULTING	(317) 895-2585		RUSH 94
		PHONE NUMBER		DESIGNATION
				1702753
ERTIFIED BY:			SURVEY BOOK	SHEETS
PROVED		DATE	-	1 of 7
R LETTING:			CONTRACT	PROJECT
-	INDIANA DEPARTMENT OF TRANSPORTATION	DATE	B-41303	1702753

TRAFFIC DATA	CR 150 N
A.A.D.T. (2021)	150 V.P.D.
A.A.D.T. (2041)	190 V.P.D.
D.H.V. (2041)	20 V.P.H.
DIRECTIONAL DISTRIBUTION	50%
TRUCKS	3% D.H.V.
DESIGN DATA	
DESIGN SPEED	30 M.P.H.
PROJECT DESIGN CRITERIA	3R (NON-FREEWAY)
FUNCTIONAL CLASSIFICATION	LOCAL ROAD
RURAL/URBAN	RURAL
TERRAIN	LEVEL
ACCESS CONTROL	NONE



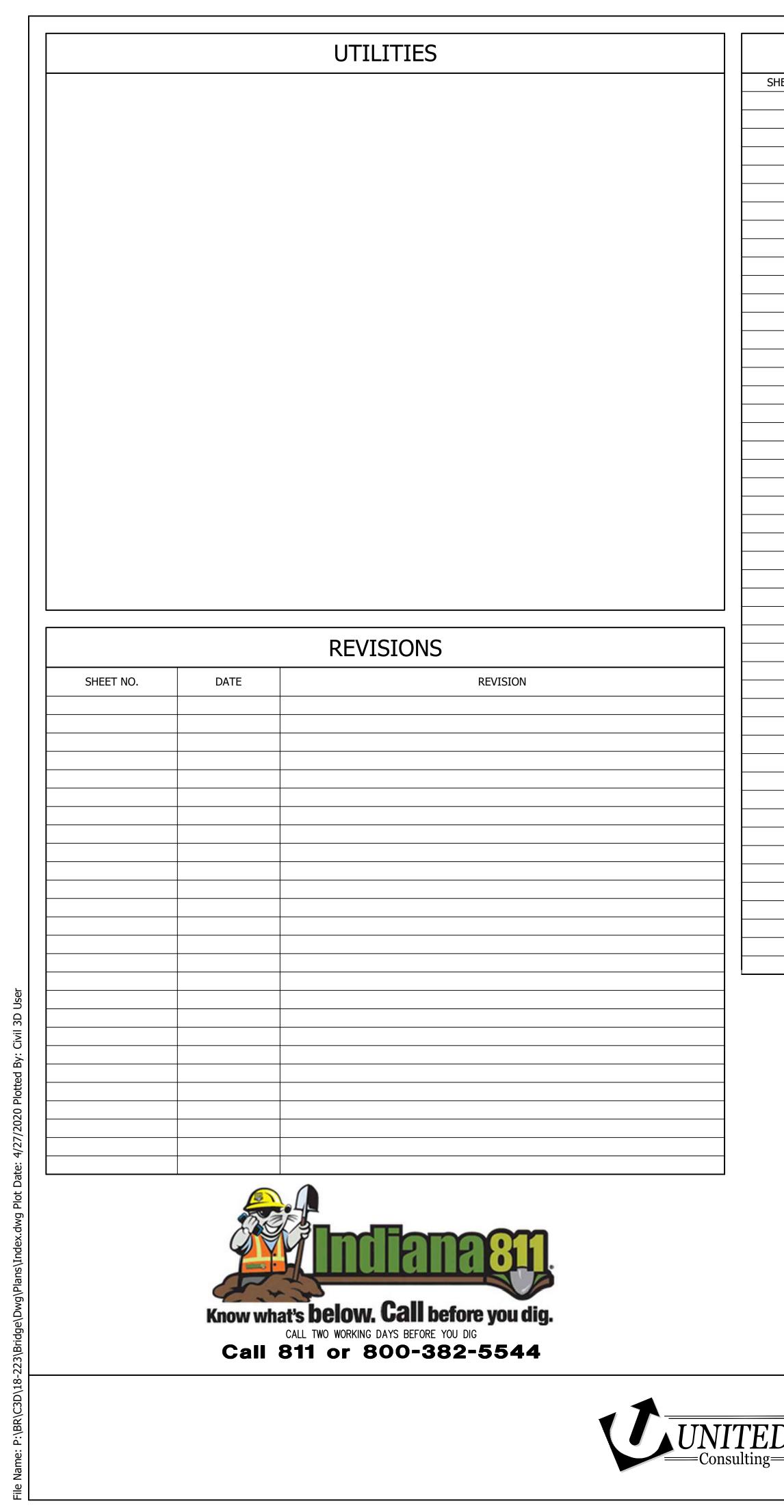


[INDIANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS DATED 2020 TO BE USED WITH THESE PLANS]

PROJECT LOCATION

Rush County Bridge No. 94

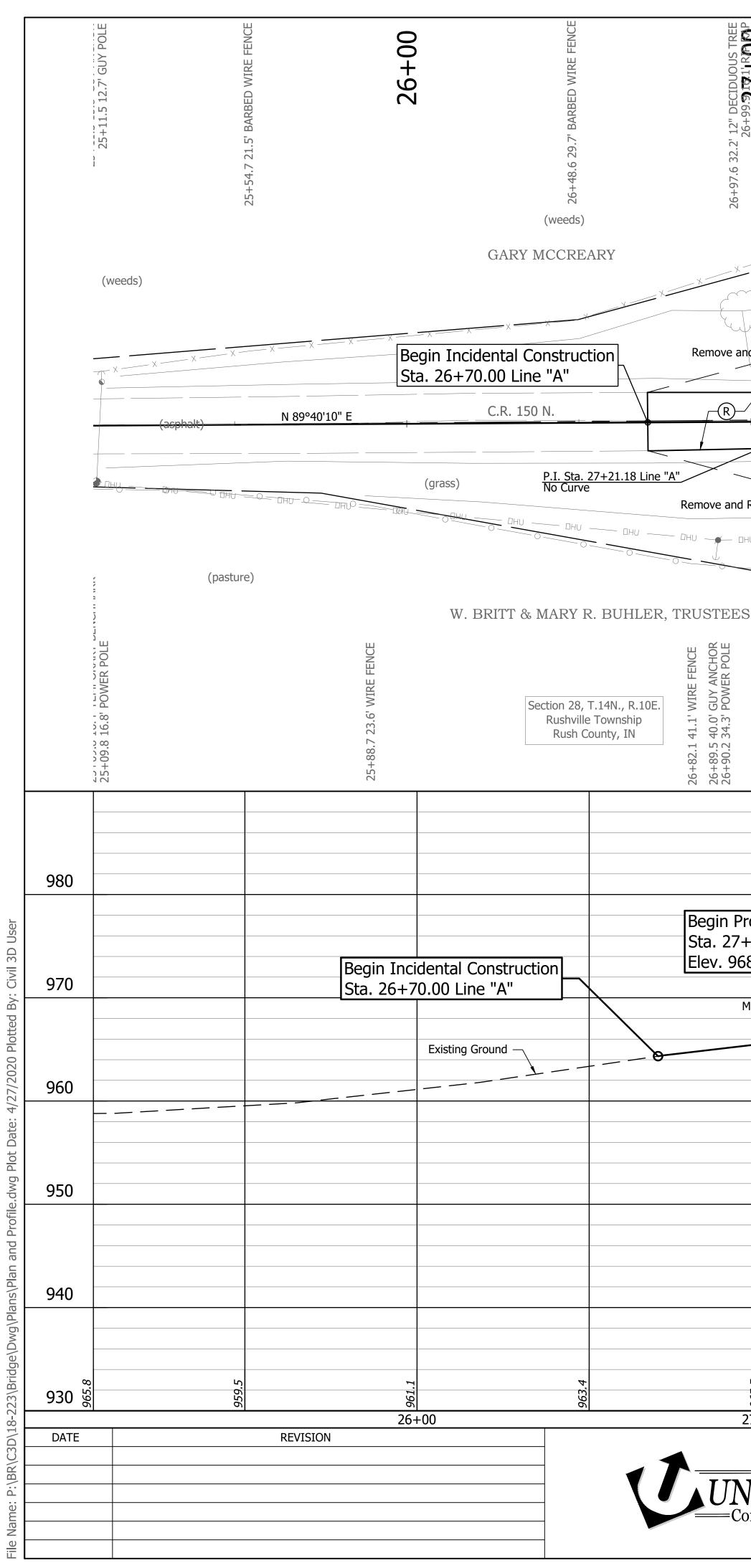
Scale: 1" = 2000'



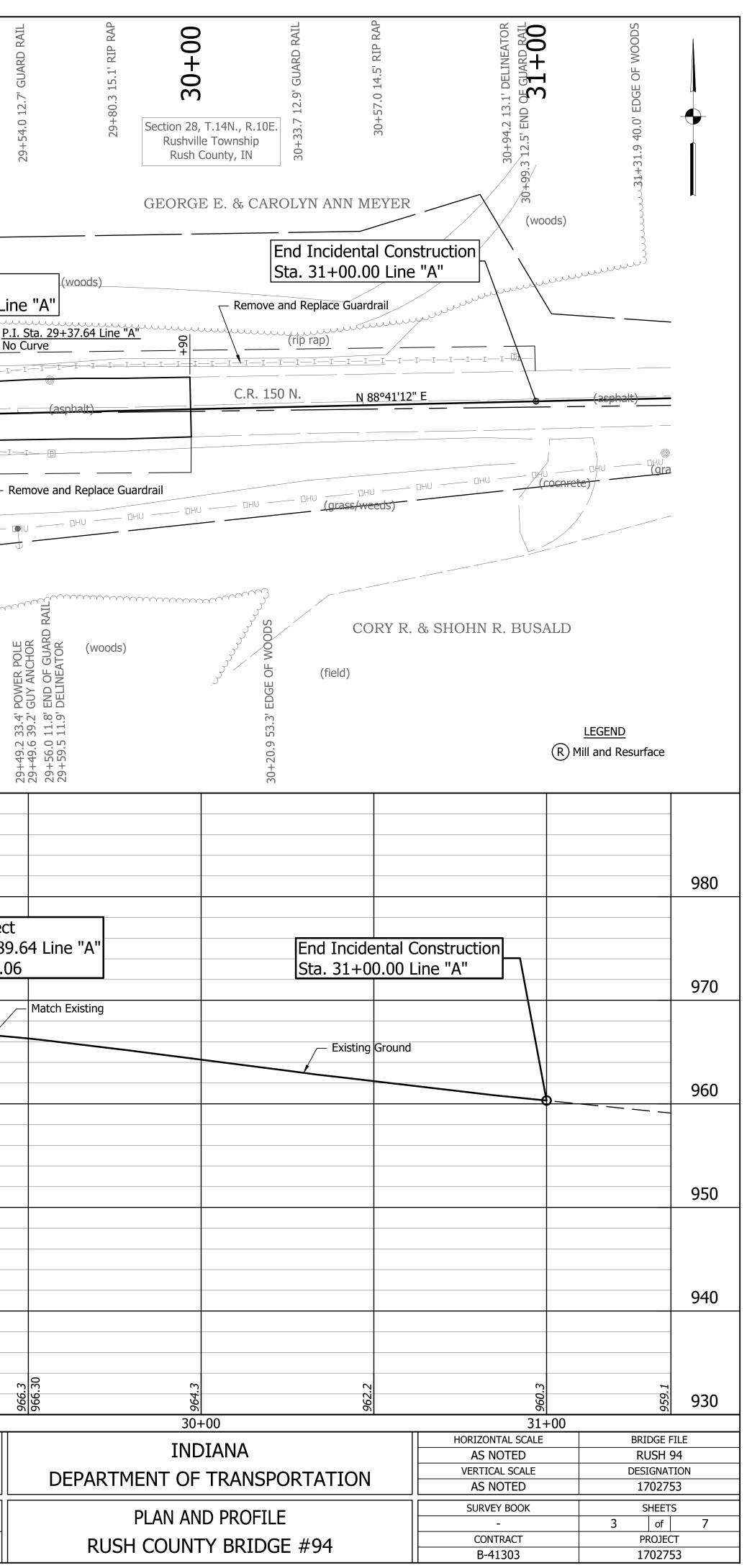
	GENERAL NOTES		INDEX
SHEET NO.	DESCRIPTION	SHEET NO.	
		1	TITLE
		2 3	INDEX PLAN AND PROFILE
		4-5	GENERAL PLAN
		6	REPLACEMENT AND REPAIRS MISCELLANEOUS DETAILS
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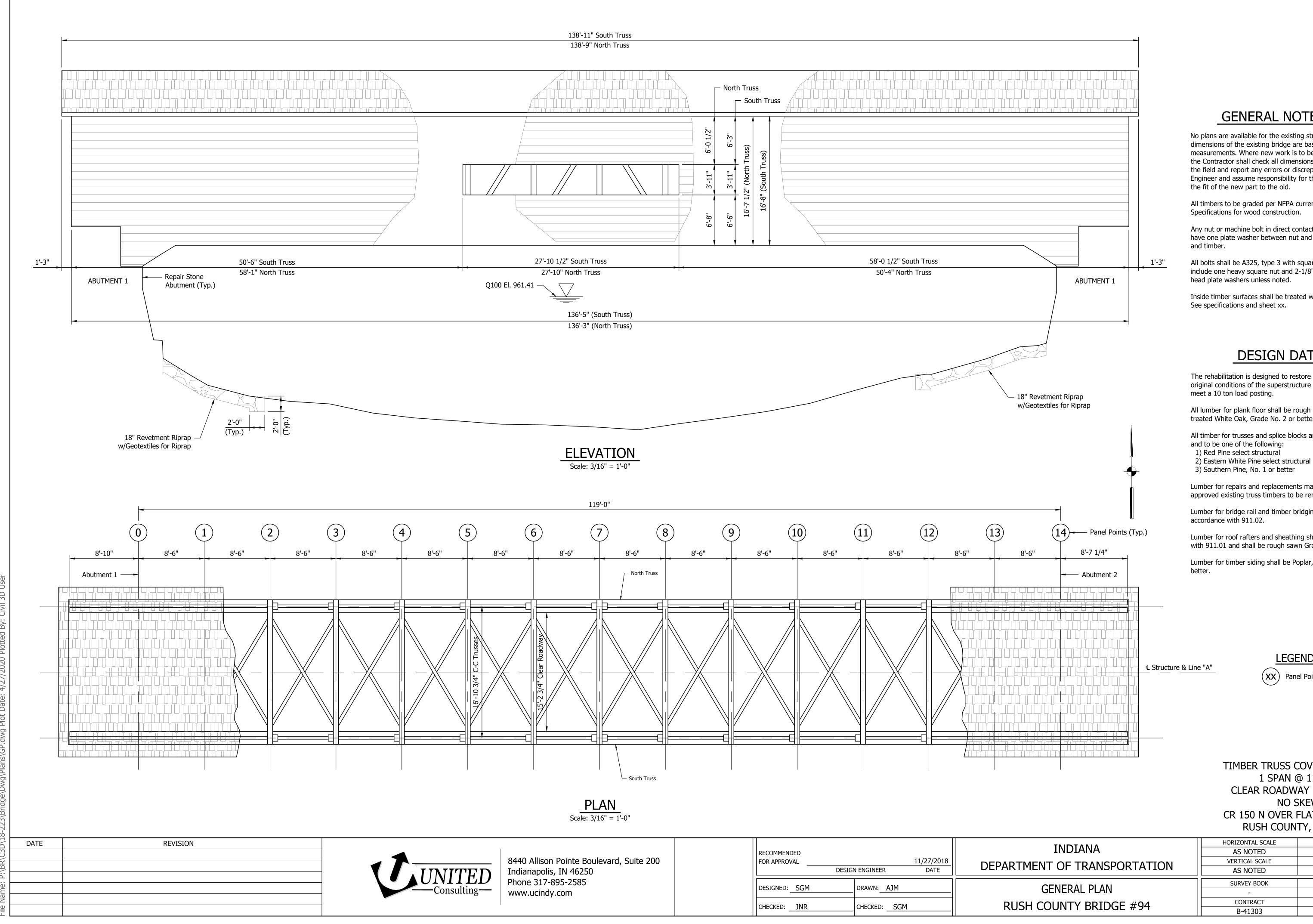
	D Phone 317-895-2585	RECOMMENDED FOR APPROVAL	IN ENGINEER	DATE
		DESIGNED: SGM	DRAWN: AJM	
		CHECKED: JNR	CHECKED: SGM	

	HORIZONTAL SCALE BRIDGE FILE			
INDIANA	AS NOTED	R	USH 94	
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION		
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753		
	SURVEY BOOK	SHEETS		
INDEX	-	2	of	7
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT		
RUSH COUNTEDRIDGE # 34	B-41303	1702753		



27+01.3 12 2 CELINIC O R 27+03.2 13.4' END OF GUARD RAIL 27+13.8 49.8' BARBED WIRE FENCE 27+19.4 34.7' 12" DECIDUOUS TREE 27+28.8 11.1' GUARD RAIL	27+55.1 8.8' END OF GUARD RAIL 27+56.1 8.6' STONE WALL 27+60.1 9.2' BENCHMARK - STEM ONLY	27+69.3 7.4' BRIDGE DECK CORNER 28+69.3 7.4' BRIDGE DECK CORNER		28+34.4 7.4' BRIDGE DECK		28+89.7 7.5' BRIDGE DECK CORNER 28+91.1 7.8' STONE WALL 29+07 8 8 3 610NF	29+04.0 8.4' END OF GUARD RAIL 29+04.4 9.3' RIP RAP 29+05.4 16.4' EDGE OF WOODS	29+21.9 28.1' EDGE OF WOODS App <u>. P.</u> L.	
Replace Guardrail	A"			(Wood deck) FLATROCK RAVER	Construction Limits			nd Project a. 28+89.0 (rip rap)	
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40 Allison Pointe Boulevard,	Suite	20
dianapolis, IN 46250		
one 317-895-2585		
ww.ucindy.com		

RECOMMENDED FOR APPROVAL	DESIGN ENGINEE	11/27/2018 R DATE
DESIGNED: SGM	DRAWN:	AJM
CHECKED: JNR	CHECKED	: SGM

GENERAL NOTES

No plans are available for the existing structure. All dimensions of the existing bridge are based on field measurements. Where new work is to be fitted to old work, the Contractor shall check all dimensions and conditions in the field and report any errors or discrepancies to the Engineer and assume responsibility for the corrections and the fit of the new part to the old.

All timbers to be graded per NFPA current National Design Specifications for wood construction.

Any nut or machine bolt in direct contact with timber shall have one plate washer between nut and timber or bolt head

All bolts shall be A325, type 3 with square heads and shall include one heavy square nut and 2-1/8"x3"x3" A588 square head plate washers unless noted.

Inside timber surfaces shall be treated with a fire retardant. See specifications and sheet xx.

DESIGN DATA

The rehabilitation is designed to restore the approximate original conditions of the superstructure and is designed to meet a 10 ton load posting.

All lumber for plank floor shall be rough sawn pressure treated White Oak, Grade No. 2 or better.

All timber for trusses and splice blocks are to be rough sawn and to be one of the following:

1) Red Pine select structural

3) Southern Pine, No. 1 or better

Lumber for repairs and replacements may be cut from approved existing truss timbers to be removed.

Lumber for bridge rail and timber bridging shall be in accordance with 911.02.

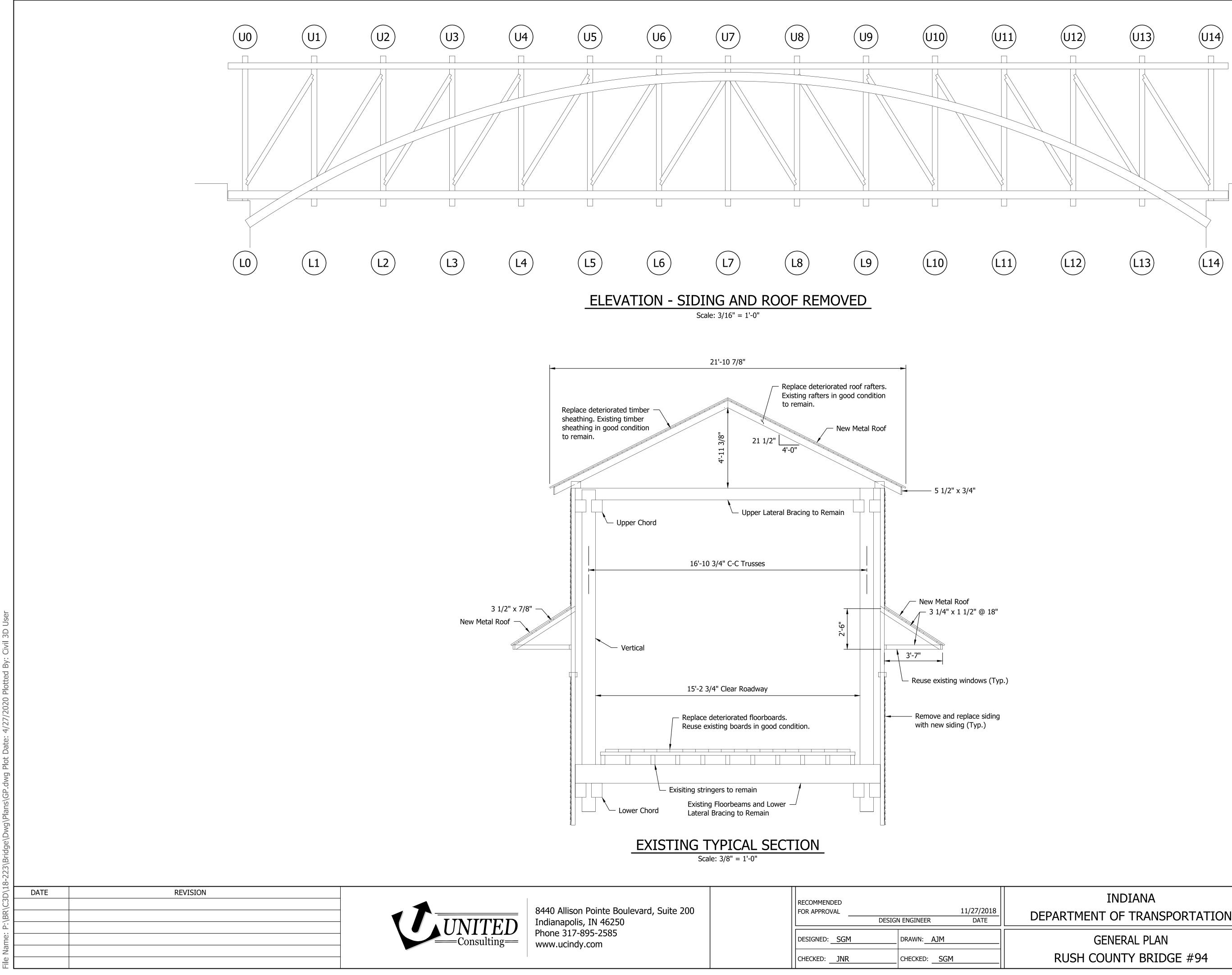
Lumber for roof rafters and sheathing shall be in accordance with 911.01 and shall be rough sawn Grade No. 2 or better.

Lumber for timber siding shall be Poplar, Grade No. 2 or



TIMBER TRUSS COVERED BRIDGE 1 SPAN @ 119'-0" CLEAR ROADWAY = 15'-23/4''NO SKEW CR 150 N OVER FLATROCK RIVER RUSH COUNTY, INDIANA

HORIZONTAL SCALE BRIDGE FILE AS NOTED RUSH 94 DESIGNATION VERTICAL SCALE AS NOTED 1702753 SHEETS SURVEY BOOK 4 of 7 -CONTRACT PROJECT 1702753 B-41303



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	HORIZONTAL SCALE	BRIDGE FILE
INDIANA	AS NOTED	RUSH 94
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753
	SURVEY BOOK	SHEETS
GENERAL PLAN	-	5 of 7
	CONTRACT	PROJECT
RUSH COUNTY BRIDGE #94	B-41303	1702753

TIMBER TRUSS COVERED BRIDGE 1 SPAN @ 119'-0" CLEAR ROADWAY = 15'-23/4"NO SKEW

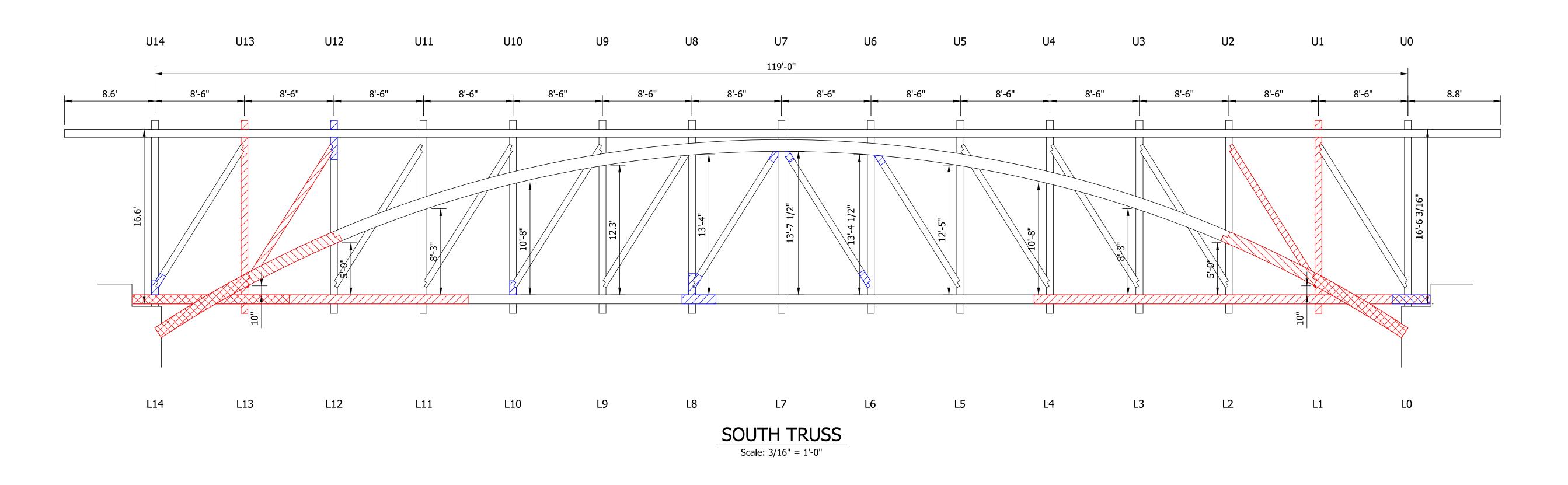
CR 150 N OVER FLATROCK RIVER

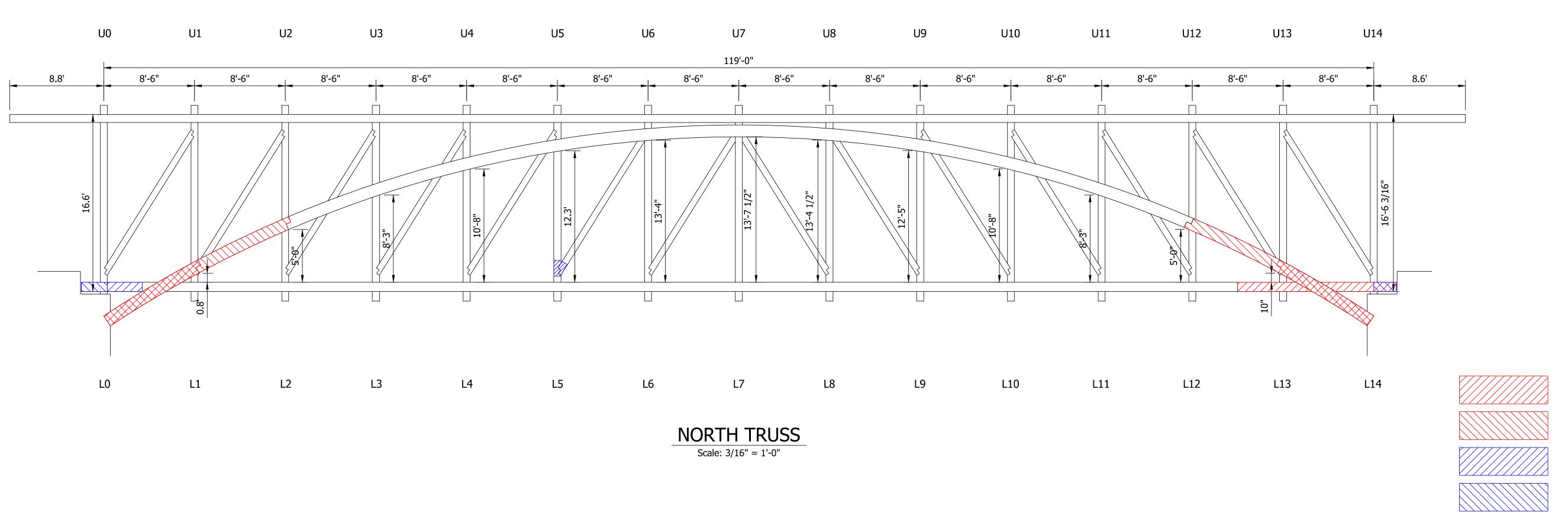
RUSH COUNTY, INDIANA

NOTE:

<u>LEGEND</u> **XX** Panel Points

Treat timber bridge with Fire Protection in accordance with details shown on sheet x and specifications.







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RECOMMENDED FOR APPROVAL	N ENGINEER	DATE
DESIGNED: SGM	DRAWN: AJM	
CHECKED: JNR	CHECKED: SGM	

Replace inside or only member

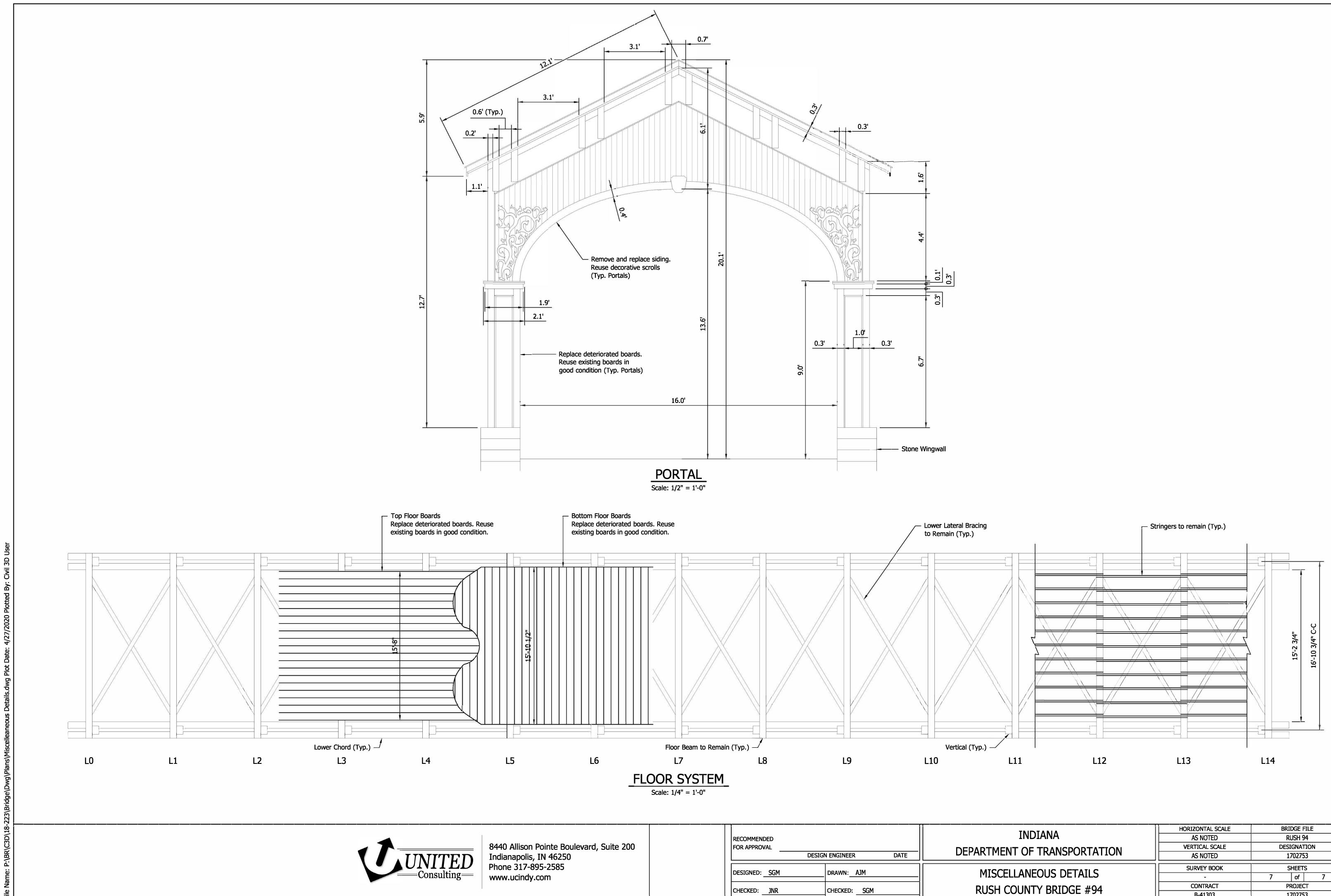
Replace outside member

Repair inside or only member

Repair outside member

INDIANA DEPARTMENT OF TRANSPORTATION REPLACEMENT AND REPAIRS RUSH COUNTY BRIDGE #94

HORIZONTAL	SCALE	BRII	DGE F	=ILE
AS NOTE)	RI	JSH 9	94
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-		6	of	7
CONTRAC	Т	PF	ROJEC	СТ
B-41303		17	70275	53



	HORIZONTAL SCALE	BRI	DGE FILE	
INDIANA	AS NOTED	R	USH 94	
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DES	IGNATION	
DEFARIMENT OF TRAINSPORTATION	AS NOTED	1	1702753	
	SURVEY BOOK	S	HEETS	
MISCELLANEOUS DETAILS	2 2	7	of 7	
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT		
	B-41303	1	702753	

County: RUS District: Gre	SH enfield		Route:	CR 150N
Pay Item	Description	Quantity Unit	Bid Price	Extension Alt
105-06845	construction engineering	1.000 L.S.	35,000.00	35,000.00
109-08359	liquidated damages	1.000 \$	1.00	1.00
109-08360	contract liens	1.000 \$	1.00	1.00
110-01001	mobilization and demobilization	1.000 L.S.	55,000.00	55,000.00
201-52370	clearing right of way	1.000 L.S.	35,000.00	35,000.00
202-51328	present structure, remove portions	1.000 L.S.	65,000.00	65,000.00
203-02000	excavation, common	5.000 C.Y.	26.00	130.00
205-12108	storm water management budget	10,000.000 \$	1.00	10,000.00
205-12109	swqcp preparation and implementation, level 1	1.000 L.S.	15,000.00	15,000.00
306-08043	milling, transition	444.000 SYS	6.00	2,664.00
401-07329	qc/qa-hma, 4, 70, surface, 9.5 mm	37.000 TON	131.00	4,847.00
601-02241	guardrail, remove	500.000 L.F.	4.50	2,250.00
601-03871	railing, wood, end treatment	4.000 EACH	2,400.00	9,600.00
601-90027	guardrail, wood beam	500.000 L.F.	90.00	45,000.00
616-06405	riprap, revetment	84.000 TON	45.00	3,780.00
621-01004	mobilization and demobilization for seeding	1.000 EACH	450.00	450.00
621-06560	mulched seeding u	1,111.000 SYS	1.60	1,777.60
628-09401	field office, a	10.000 MONTH	1,500.00	15,000.00
710-09158	patching concrete structures	680.000 S.F.	125.00	85,000.00
711-51820	temporary support	1.000 L.S.	100,000.00	100,000.00
712-03819	timber roof {used for steel roof}	3,567.000 S.F.	25.00	89,175.00
712-03820	timber siding	3,684.000 S.F.	13.50	49,734.00
712-04272	lumber and timber, untreated	4.000 MBF	12,500.00	50,000.00
712-04686	fire protection	1.000 L.S.	50,000.00	50,000.00
712-04704	paint bridge	1.000 L.S.	50,000.00	50,000.00
712-05097	metal parts	700.000 LBS	30.00	21,000.00
712-05098	timber {timber, wedge and epoxy splice block}	15.000 EACH	1,300.00	19,500.00
712-05098{1}	timber {timber, truss repair}	20.000 EACH	1,750.00	35,000.00
712-06386	plank floors, single ply	2,000.000 S.F.	16.50	33,000.00
712-94725	structural timber	4,700.000 B.F.	30.00	141,000.00
712-95676	lumber and timber, treated	1.500 MBF	7,100.00	10,650.00
801-03290	construction sign, c	2.000 EACH	195.00	390.00
801-04308	road closure sign assembly	8.000 EACH	225.00	1,800.00
801-06625	detour route marker assembly	26.000 EACH	97.00	2,522.00
801-06640	construction sign, a	8.000 EACH	138.00	1,104.00

PRICING REPORT

Project: Covered Bridge over Flatrock River Location: County: RUSH District: Greenfield Date: 06/26/2018 Time: 08:49:12

State: IN

Project ID: **RUSH 94** Bid Date: //

801-06775

801-07118

801-07119

802-04314

maintaining traffic

sign {sign refurbish}

barricade, iii-a

barricade, iii-b

63 E:

1.000 L.S.

96.000 L.F.

96.000 L.F.

2.000 EACH

30,000.00

11.50

11.50

4,000.00

30,000.00

1,104.00

1,104.00

8,000.00

		SG	M 4/27/2020
PRICING REPORT			e: 06/26/2018 ime: 08:49:12
Project: Covered Bridge over Flatrock River Location: County: RUSH District: Greenfield		Project ID: RUSH 94 Bid Date: // S Route: CR 150N	State: <i>IN</i>
Pay Item Description	Quantity Unit	Bid Price Extension Alt	
TOTALS		1,080,583.60	
Contingency @ 15% = \$1,242,671.14 Inflation to 2022 @ 3% = \$1,357,900.31 USE: \$1,360,000			

JWO 6/22/2018

6.0 ENGINEERING DRAWINGS: STAGE THREE BRIDGE REHABILITATION PLANS AND LIST OF UNIQUE SPECIAL PROVISIONS FOR THE SMITH COVERED BRIDGE REHABILITATION PROJECT

PROJECT:Rush County Bridge #94; DES 1702753



DESIGN CONCEPT

- The goal of this project is to rehabilitate the historic covered bridge to extend its useful life. Improvements to the approach road have been kept to a minimum to minimize the project costs. The project limits have been set from the beginning to the end of the bridge deck with only incidental construction work completed on the approaches. Incidental work includes removing and replacing existing guardrail to provide contractor access and milling and resurfacing the approach road to provide a clean finished product after the contractor has used it for material storage and equipment access. A small amount of full depth pavement has been provided where an existing stone wingwall is being rebuilt.
- The project utilized two level 1 design exceptions required for Structural Capacity and Vertical Clearance. These were determined necessary for the historic rehabilitation of the covered bridge as well as to minimize the likelihood of heavy vehicles crossing the historic bridge in the future. Rush County desires the structure to be posted at 10 tons upon completion of the project.
- Several level 2 design exceptions have been utilized on the project based on Practical Design concepts and sound engineering judgement.
- A hands on thorough inspection of all the bridge elements to determine the existing condition resulted in detailed plans for the replacement and rehabilitation of the deteriorated members.

DESIGN CONCEPT – PROJECT HIGHLIGHTS

PROJECT GOAL	DESIGN ELEMENTS IMPLEMENTED
Meet the schedule	Project letting is scheduled for September 2022. There are no utility relocations and no r/w acquisition is required. The project will meet the letting date with the two items that usually delay a project at this stage already finalized.

DESIGN ELEMENT

- Level 1 design exceptions have been approved and level 2 design exceptions have been documented to provide a Practical Design solution to a bridge that was built over 100 years ago.
- The road is a very low volume road with a historic bridge that was and will remain posted for a load limit. The road is only one mile long and does not extend beyond the nearest crossroads. The only accident in the past 4 years was a tall vehicle that hit the portal entry of the covered bridge. The bridge is currently posted for a substandard vertical clearance that will remain. No geometric improvements to the site are warranted for this historic bridge rehabilitation project.

PLAN QUALITY

The bridge plans and unique special provisions (USP) provide details of all the proposed rehabilitation items on this structure. Due to the unique nature of the work on this structure, many USP were needed for the project to adequately define the work, materials, and payment.

DOCUMENTATION OF WORK

- All required documentation submitted is clear, concise, and presented in an organized fashion.
- A correspondence file has been provided showing some of the design decisions made on the project.
- Notes have been added to the project plans to explain some of the project decisions.

RESPONSIVENESS

- All comments from the previous submittal have been addressed and accepted.
- Our project manager, Scott Minnich is available for discussion of the submittal at 317-895-2585 if you have questions.

							1
	· -		INDE			CTATION	
RUCTURE	ТІМВІ	YPE ER TRUSS ED BRIDGE	C	N AND SKEW DNE SPAN: 119'-0" NO SKEW	OVER FLATROCK RIVER	STATION 28+29.47 "A"	-
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INDIANA DEPARTMENT OF TRANSPORTATION

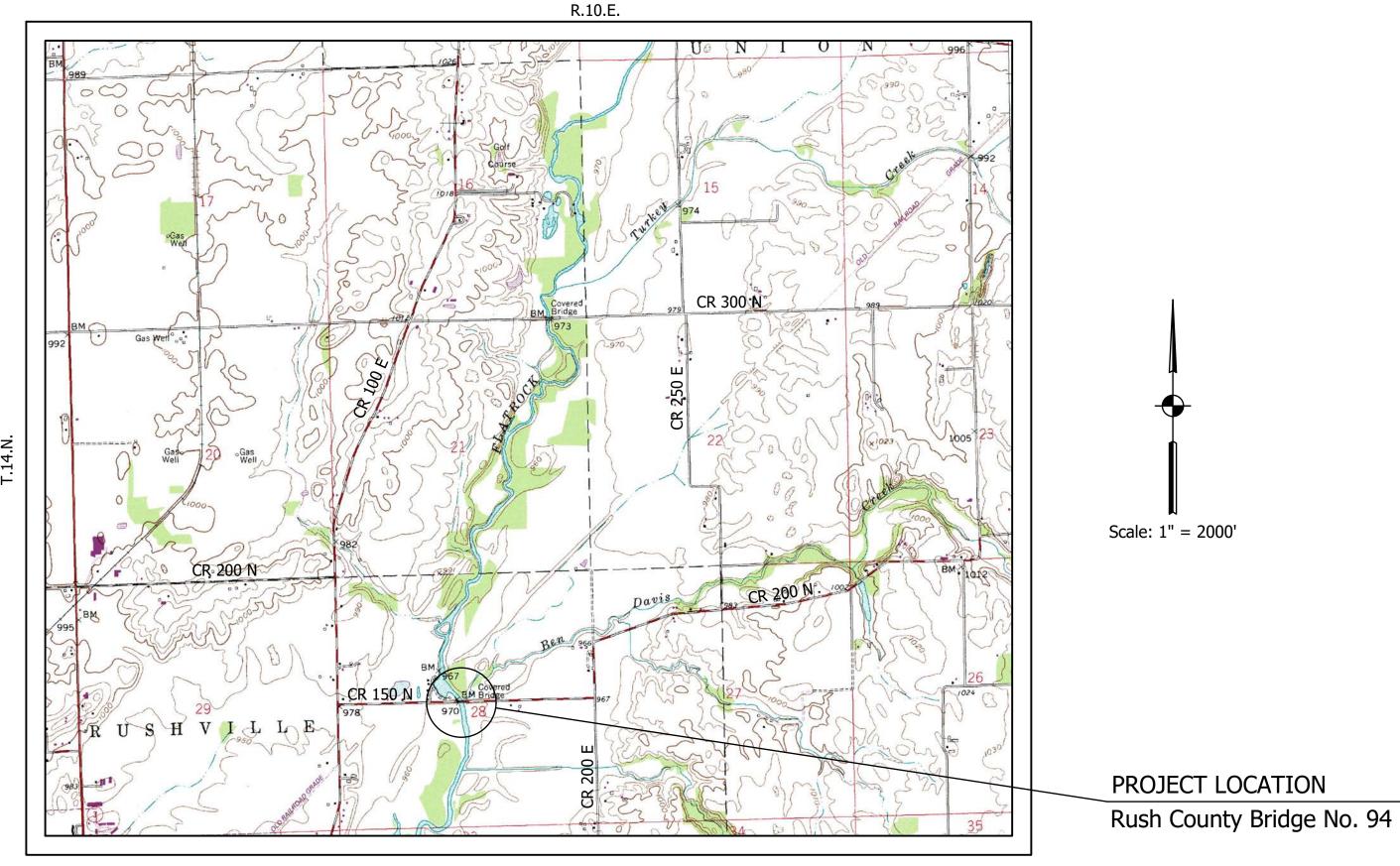


BRIDGE REHABILITATION PLANS

FOR SPANS OVER 20 FEET ROUTE: CR 150 N OVER FLATROCK RIVER

PROJECT NO. 1702753 P.E. 1702753 CONST.

Rehabilitation of Rush County Bridge No. 94 carrying CR 150 N over Flatrock River located 0.52 miles west of CR 200E. Located in Section 28, Township 14 North, Range 10 East, Rushville Township, in Rush County, Indiana.



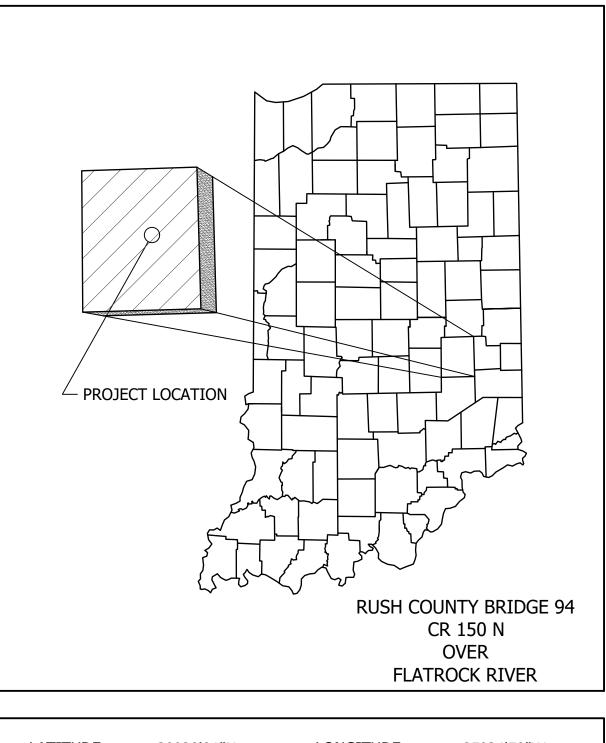
LOCATION MAP



8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250 Phone 317-895-2585 www.ucindy.com

PLANS PREPARED BY:	UNITED CONSULTI
CERTIFIED BY:	
PPROVED	

TRAFFIC DATA	CR 150 N
A.A.D.T. (2022)	150 V.P.D.
A.A.D.T. (2042)	190 V.P.D.
D.H.V. (2042)	20 V.P.H.
DIRECTIONAL DISTRIBUTION	50%
TRUCKS	3% D.H.V.
DESIGN DATA	
DESIGN SPEED	30 M.P.H.
PROJECT DESIGN CRITERIA	3R (NON-FREEWAY)
FUNCTIONAL CLASSIFICATION	LOCAL ROAD
RURAL/URBAN	RURAL
TERRAIN	LEVEL
ACCESS CONTROL	NONE



LATITUDE:	39°38'01"N	LONGITUDE:	85°24'59"W
BRIDGE LENGT	Ή:		0.02 MI.
ROADWAY LEN	IGTH :		0.00 MI.
TOTAL LENGTH	1:		0.02 MI.
MAX. GRADE :			+0.04 %
HUC :			05120205020030

[INDIANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS DATED 2022 TO BE USED WITH THESE PLANS]

BRIDGE FILE RUSH 94 (317) 895-2585 ING DESIGNATION PHONE NUMBER 1702753 SHEETS SURVEY BOOK DATE of -20 1 PROJECT CONTRACT 1702753 INDIANA DEPARTMENT OF TRANSPORTATION DATE B-41303

Scale: 1" = 2000'



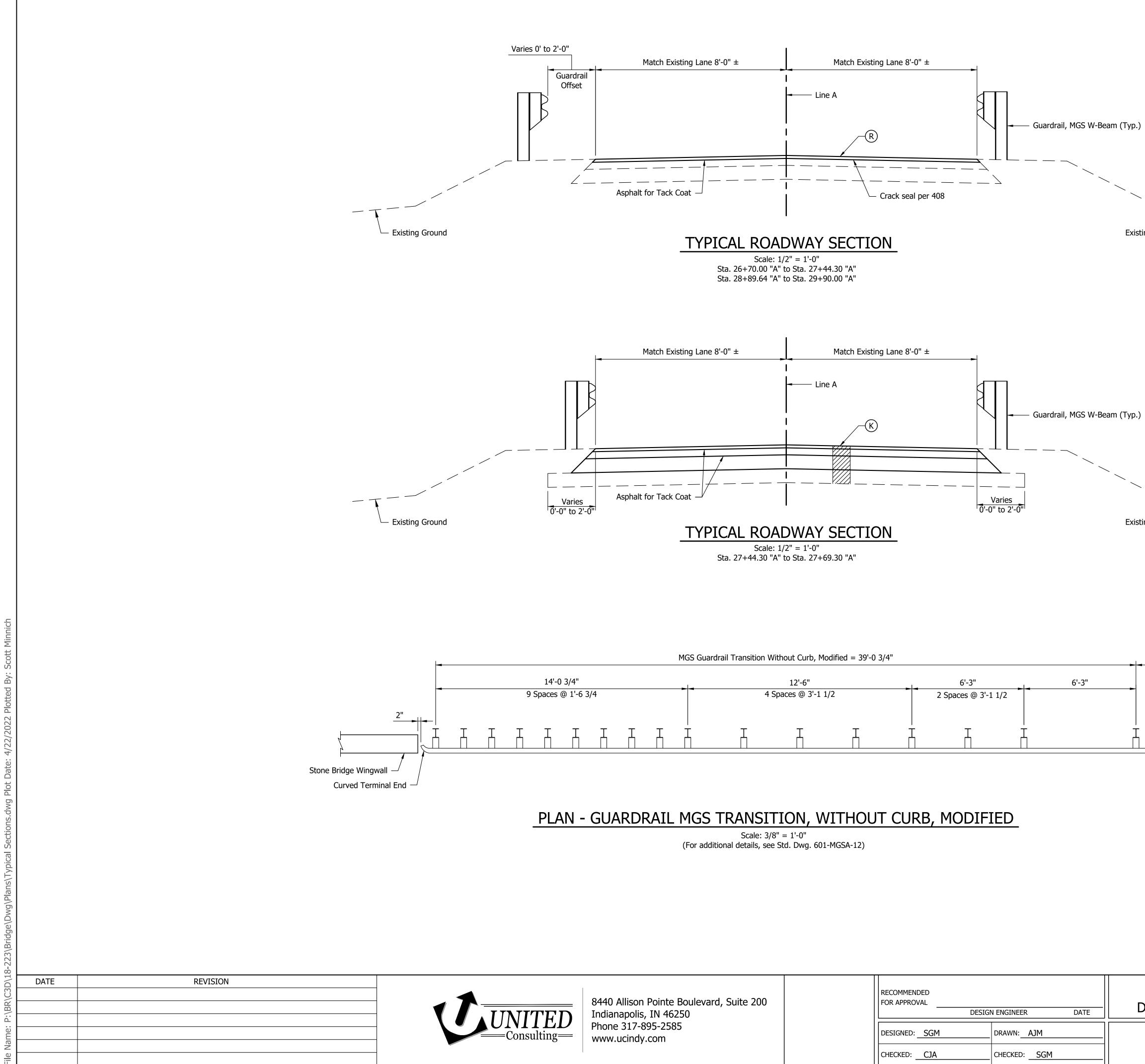


SHEET NO.	DESCRIPTION	SH

TED Iting=	8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250 Phone 317-895-2585 www.ucindy.com		RECOMMENDED FOR APPROVAL	GN ENGINEER	DATE
			DESIGNED: <u>SGM</u> CHECKED: <u>JNR</u>	DRAWN: AJM CHECKED: SGM	

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	HORIZONTAL SCALE	BRIDGE FILE	
INDIANA	AS NOTED	RUSH 94	
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION	
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753	
	SURVEY BOOK	SHEETS	
INDEX	-	2 of 20	
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT	
RUSH COUNTEDRIDGE #94	B-41303	1702753	



MGS Guardrail Transition Without Curb, Modified = 39'-0 3/4"								_	MGS Standard Post Spacing							
	14'-0	3/4"						12'-6"		I	6'-3"	1	6'-3"			
9	Spaces (⊉ 1'-6 3,	/4				4	Spaces @ 3'-1	1/2		2 Spaces @ 3'-	-1 1/2				
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Note to reviewer:

Existing road has no striping. No new striping to be included in this project.

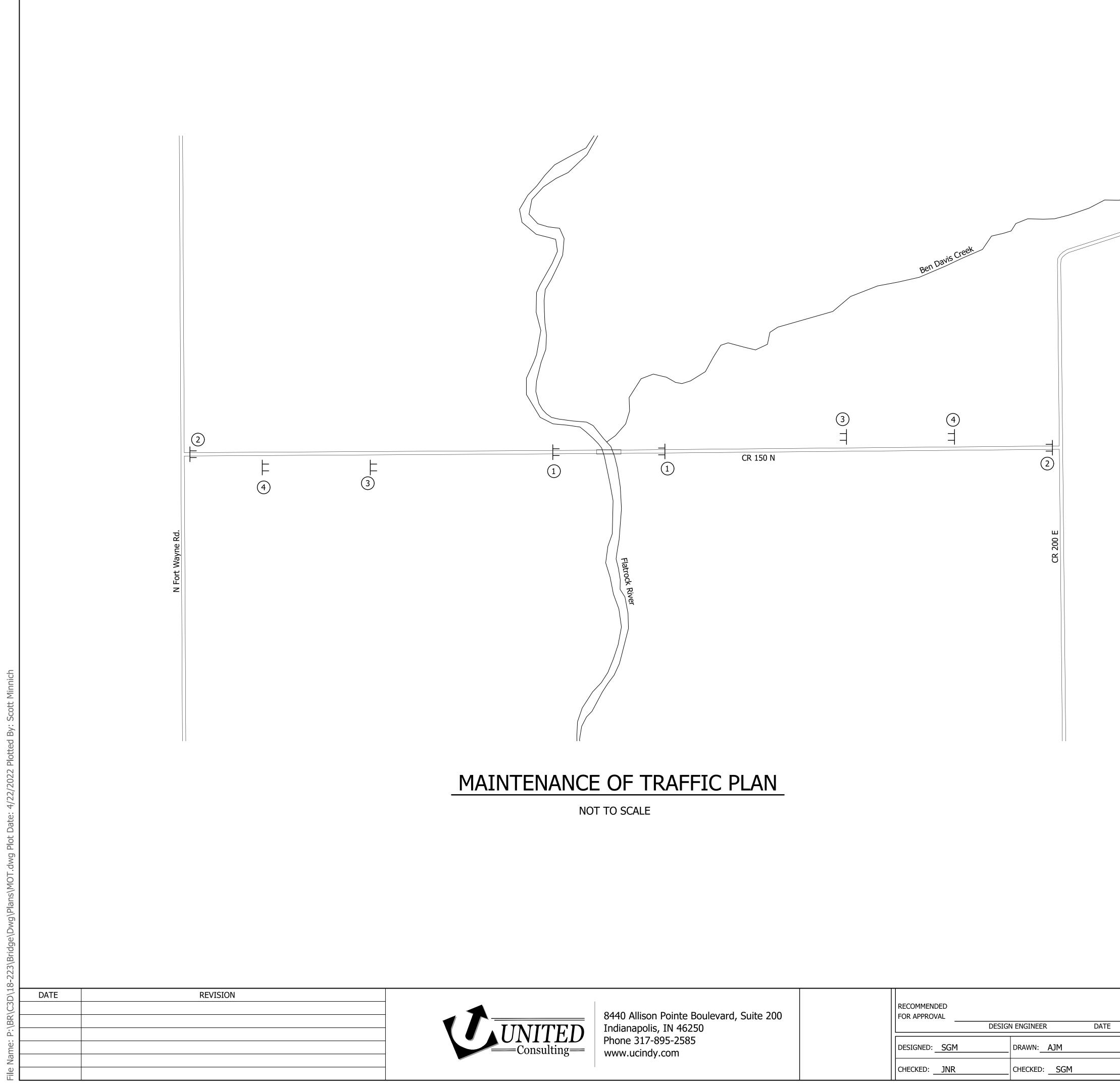
Existing Ground $-\!\!\!/$

<u>LEGEND</u>

- R Mill and Resurface 165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on Existing Pavement
- K HMA Full Depth
- 165 lbs/sys QC/QA-HMA, 3, 64, Surface, 9.5 mm on 275 lbs/sys QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on 660 lbs/sys QC/QA-HMA, 3, 64, Base, 25.0 mm on Subgrade Treatment Type II on Geotextile for Pavement Type 1B

Existing Ground $-\!\!\!/$

	HORIZONTAL SCALE	BRIDGE FILE
INDIANA	AS NOTED	RUSH 94
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION
DEPARTMENT OF TRAINSPORTATION	AS NOTED	1702753
	SURVEY BOOK	SHEETS
TYPICAL SECTIONS	-	3 of 20
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT
RUSH COUNTEDRIDGE # 94	B-41303	1702753



NITED	8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250	RECOMMENDED FOR APPROVAL	SIGN ENGINEER DATE	INDIANA DEPARTMENT OF TRANSPORTATION	HORIZONTAL SCALE AS NOTED VERTICAL SCALE AS NOTED	BRIDGE FILE RUSH 94 DESIGNATION 1702753
	Phone 317-895-2585 www.ucindy.com	DESIGNED: SGM	DRAWN: AJM	MAINTENANCE OF TRAFFIC	SURVEY BOOK -	SHEETS 4 of 20
		CHECKED: JNR	CHECKED: SGM	RUSH COUNTY BRIDGE #94	CONTRACT B-41303	PROJECT 1702753

Note to reviewer:

Rush County noted at the field check meeting that a marked detour is not required.

ESTIMATE OF QUANTITIES MAINTENANCE OF TRAFFIC	
ROAD CLOSURE SIGN ASSEMBLY	4 Ea.
CONSTRUCTION SIGN, A	4 Ea.
BARRICADE, III-A	48 Lft.
BARRICADE, III-B	48 Lft.

<u>LEGEND</u>

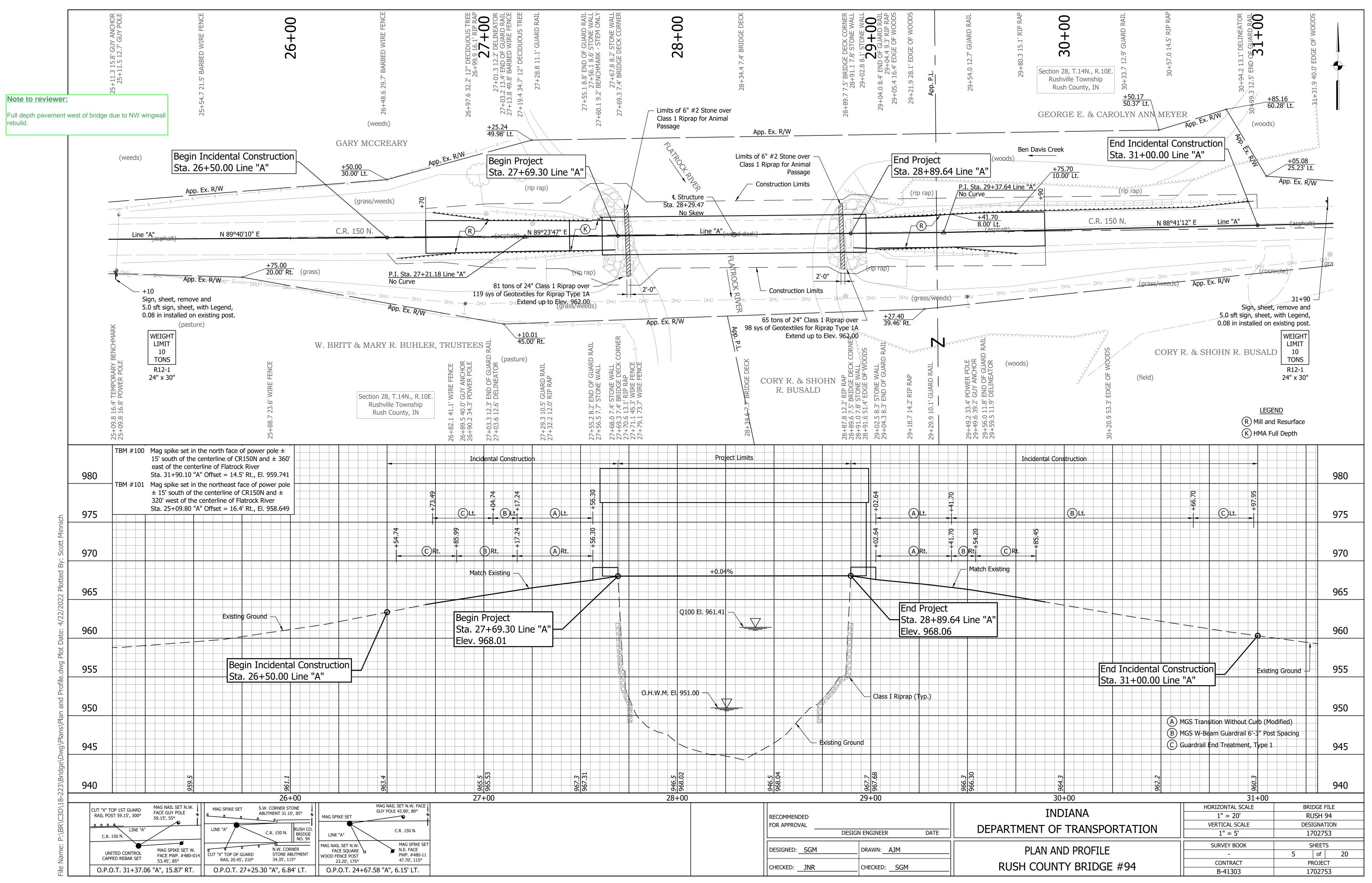
1 Type III-A Barricade and Road Closure Sign Assembly (with R11-2)

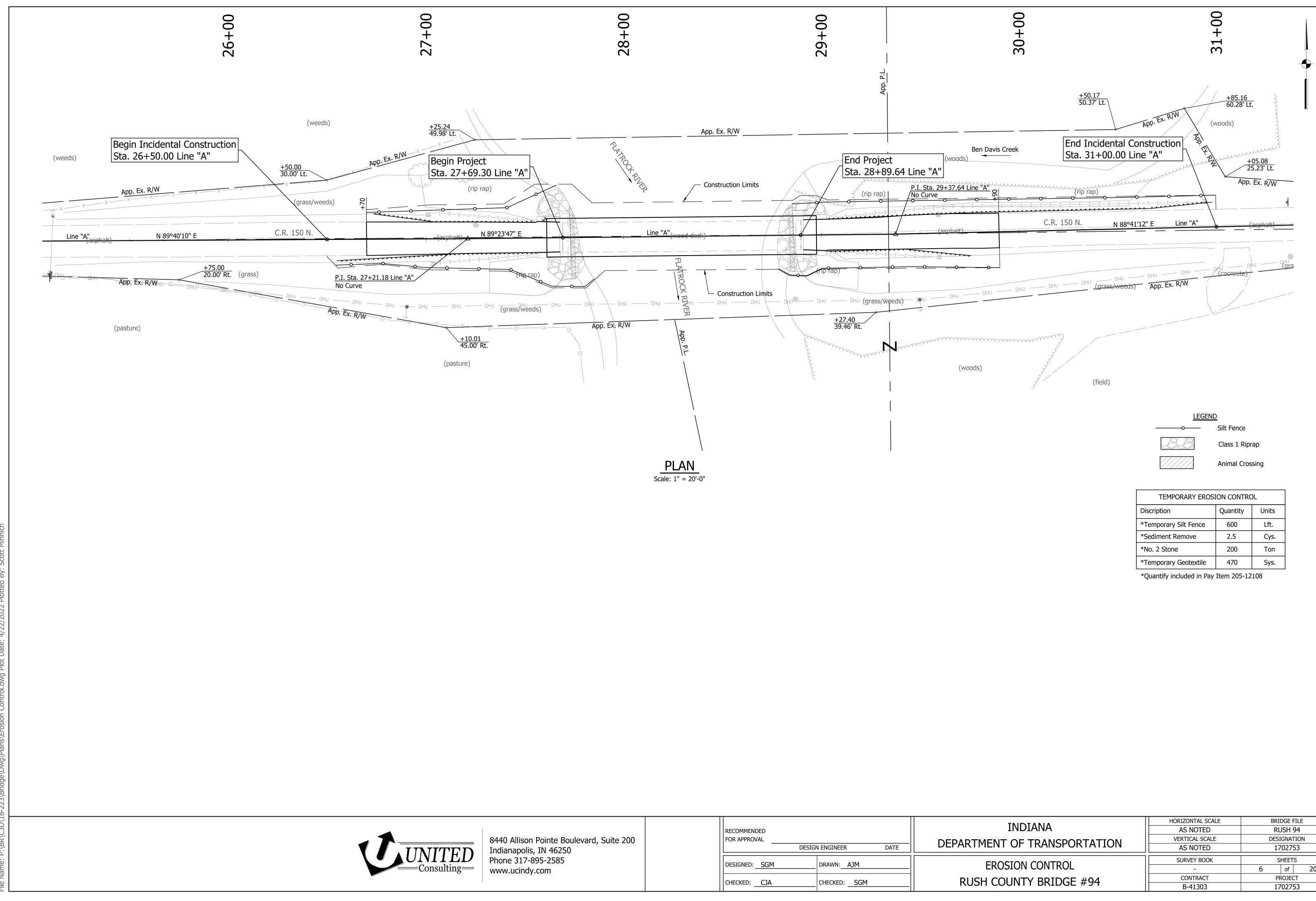
2 Type III-B Barricade and Road Closure Sign Assembly (with R11-3 & XG20-5)

3 XW20-3 (Road Closed 500 ft.)

(4) XW20-3 (Road Closed 1000 ft.)

NOTES:
Road closure sign notice, XG20-5, to be placed 2
weeks prior to closure of CR 150 N or as directed
by the Engineer.

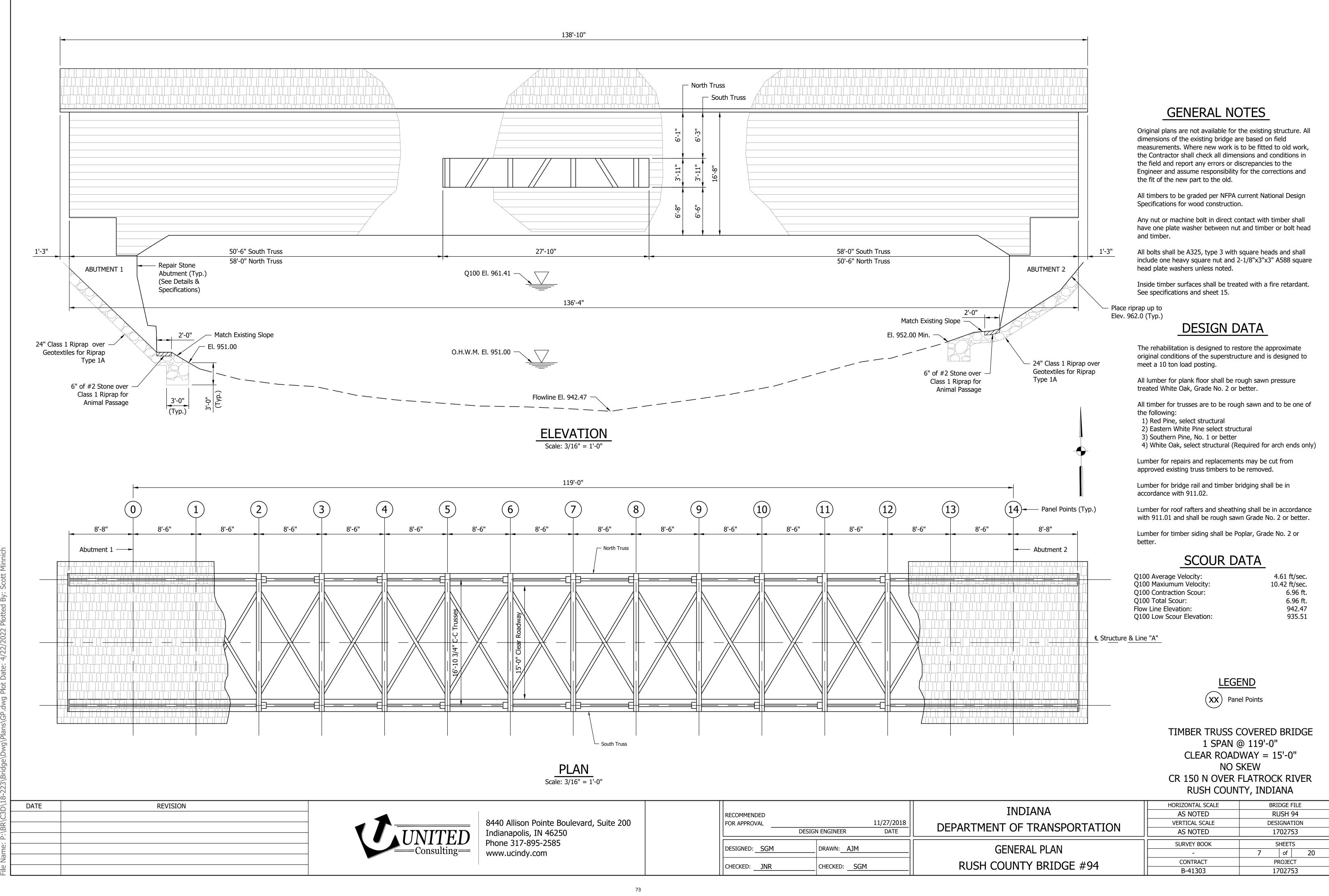




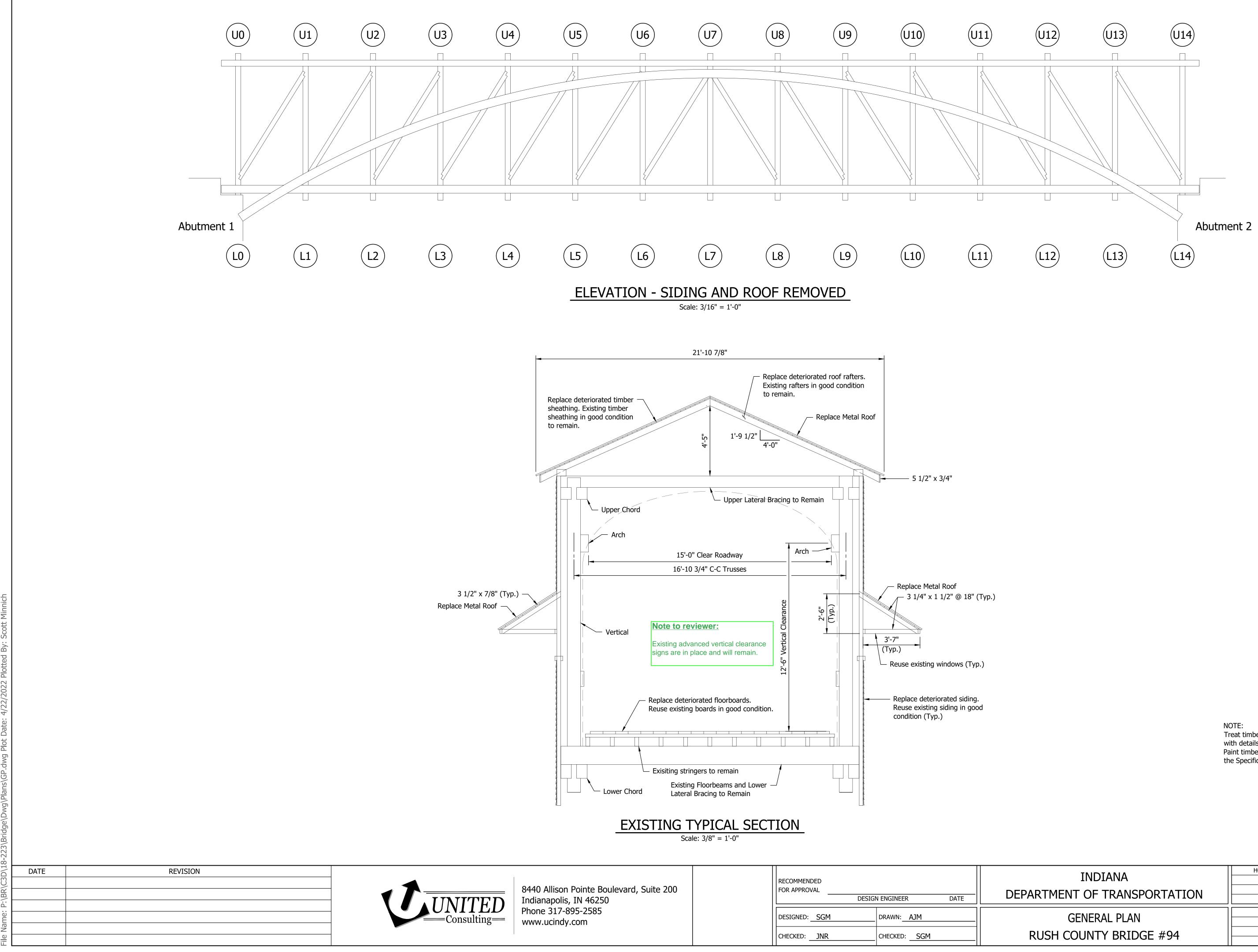
NITED Consulting—	8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250 Phone 317-895-2585 www.ucindy.com		RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE
			DESIGNED: SGM CHECKED: CJA	DRAWN: AJM CHECKED: SGM	

TEMPORARY EROSION CONTROL						
Discription	Quantity	Units				
*Temporary Silt Fence	600	Lft.				
*Sediment Remove	2.5	Cys.				
*No. 2 Stone	200	Ton				
*Temporary Geotextile	470	Sys.				

INDIANA	HORIZONTAL SCALE	BRIDGE FILE		
	AS NOTED	RUSH 94		
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION		
	AS NOTED	1702753		
EROSION CONTROL	SURVEY BOOK	SHEETS		
	-	6	of	20
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT		
	B-41303	1702753		







<u>LEGEND</u> (XX) Panel Points

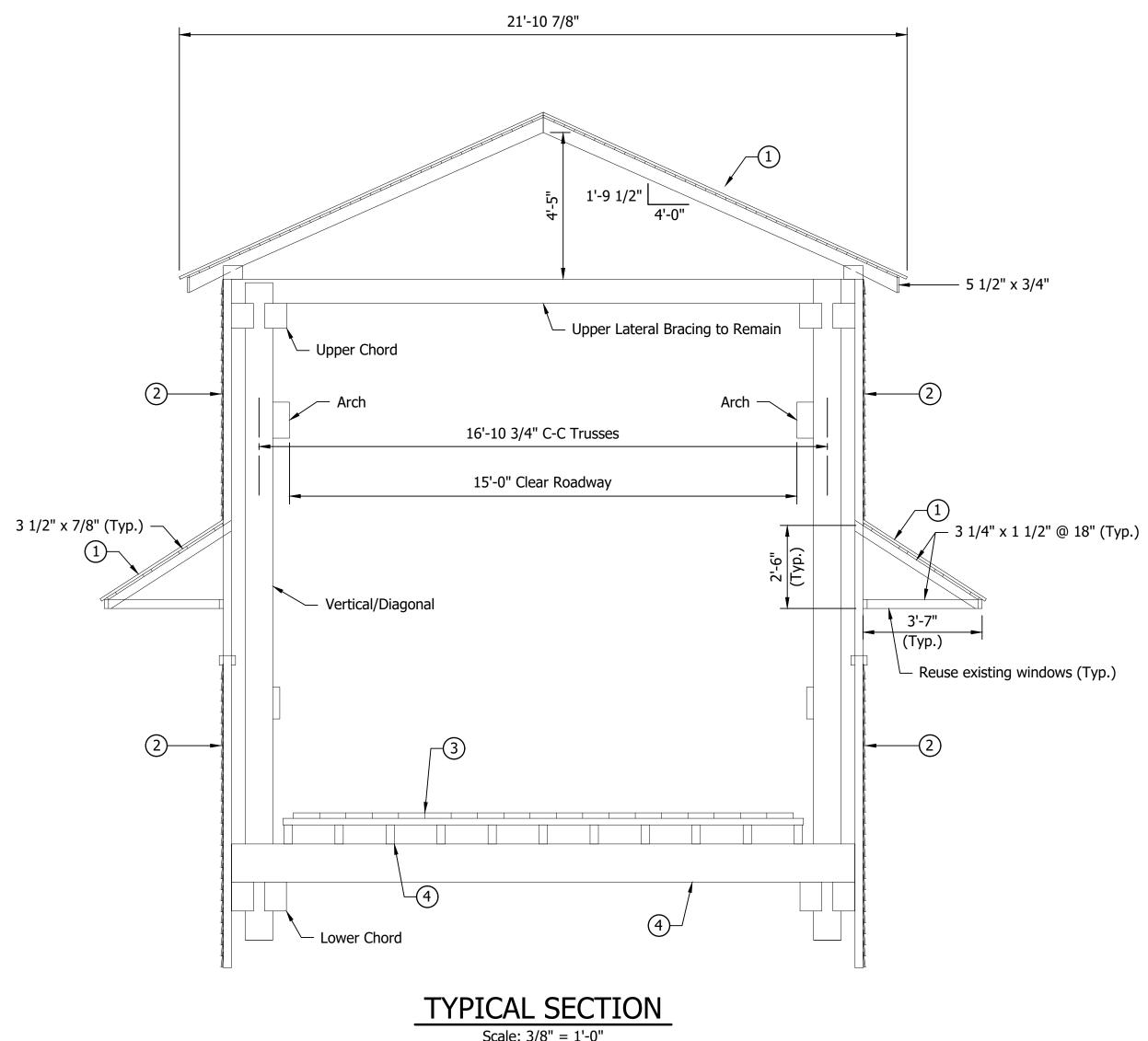
Treat timber bridge with Fire Protection in accordance with details shown on sheet 15 and specifications. Paint timber siding white in color and in accordance with the Specifications.

> TIMBER TRUSS COVERED BRIDGE 1 SPAN @ 119'-0" CLEAR ROADWAY = 15'-0''NO SKEW CR 150 N OVER FLATROCK RIVER

RUSH COUNTY, INDIANA

	HORIZONTAL SCALE	BRI	DGE FILE
INDIANA	AS NOTED	RUSH 94	
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION	
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753	
	SURVEY BOOK	SHEETS	
GENERAL PLAN	-	8	of 20
RUSH COUNTY BRIDGE #94	CONTRACT	PF	ROJECT
RUSH COUNTEDRIDGE #94	B-41303	1702753	

			Lower Chord	
			TYPICAL SEC Scale: 3/8" = 1'-	
i	REVISION		8440 Allison Pointe Boulevard, Suite 200	RECOMMENDED FOR APPROVAL
		Consulting	Indianapolis, IN 46250 Phone 317-895-2585 www.ucindy.com	DESIGNED: SGM DRAWN: AJM CHECKED: CJA CHECKED: SGM
			75	



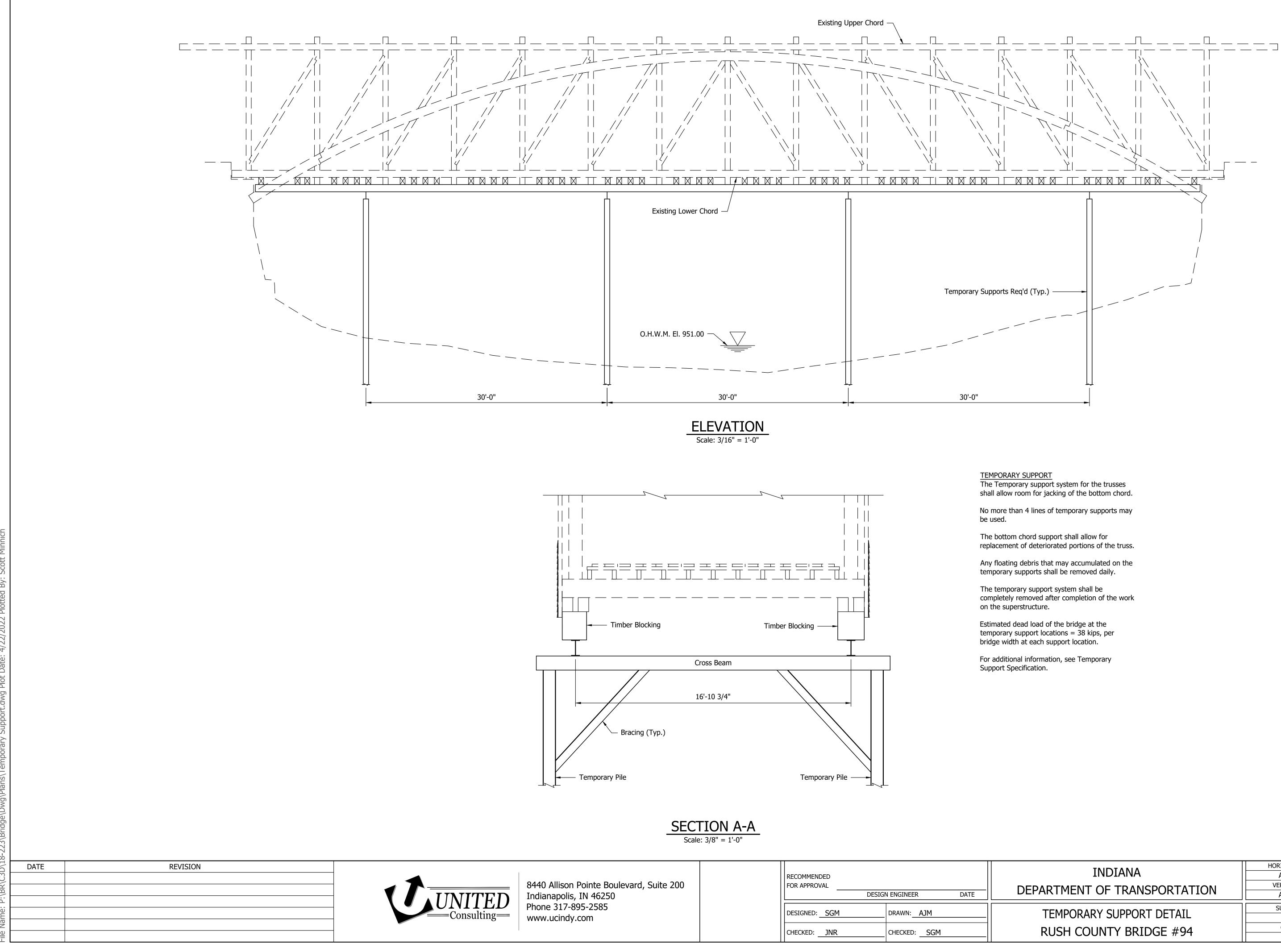
REMOVAL DETAILS:

- Remove existing metal roof and dispose. Remove nailers, rafters, edge boards, and rafter support blocks and save undamaged portions for reuse.
- 2 Remove all siding. Save undamaged portions for reuse. Remove nailers and save for reuse.
- 3 Remove all plank floor timbers and save undamaged portions for reuse.
- (4) Floor beams and stringers may need to be moved to permit replacement or repair of truss and arch members.

Estimated Percentage of Existing				
Materials Adequate fo	r Reuse			
Stringers	100%			
Floor Beams	100%			
Plank Floors, Two Ply	90%			
Rafters	85%			
Sheathing	75%			
Siding	40%			

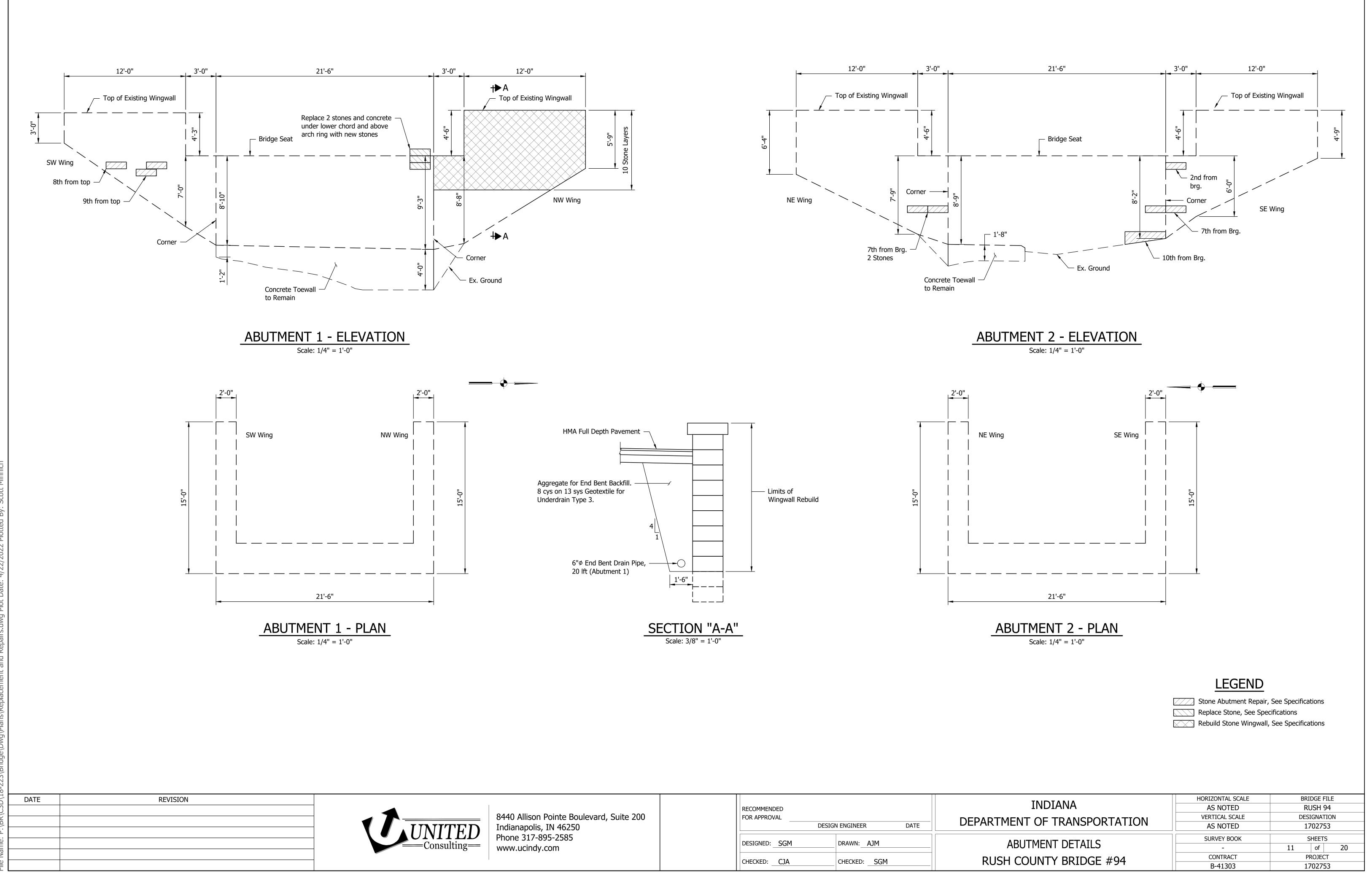
	HORIZONTAL SCALE	BRIDGE FILE		Ξ
INDIANA	AS NOTED	R	RUSH 94	
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION		N
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753		
	SURVEY BOOK	SHEETS		
REMOVAL DETAILS	-	9	of	20
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT		
	B-41303	1702753		

NOTE: For General Notes, see sheet 7. See Specifications for "Present Structure, Remove Portions" for additional information.



FOR APPROVAL	
DE	SIGN ENGINEER DATE
DESIGNED: SGM	DRAWN: AJM
CHECKED: JNR	CHECKED: SGM

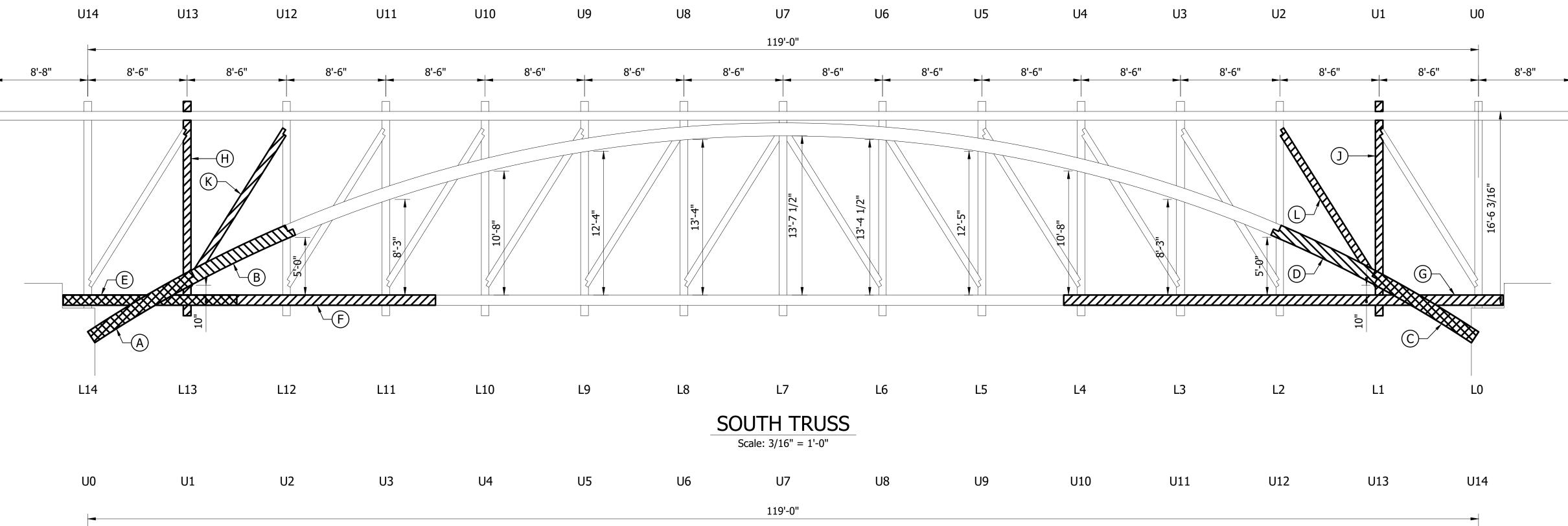
	HORIZONTAL SCALE	BRIDGE FILE
INDIANA	AS NOTED	RUSH 94
DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION
DEPARTMENT OF TRANSPORTATION	AS NOTED	1702753
	SURVEY BOOK	SHEETS
TEMPORARY SUPPORT DETAIL	-	10 of 20
RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT
RUSH COUNTEDRIDGE # 94	B-41303	1702753

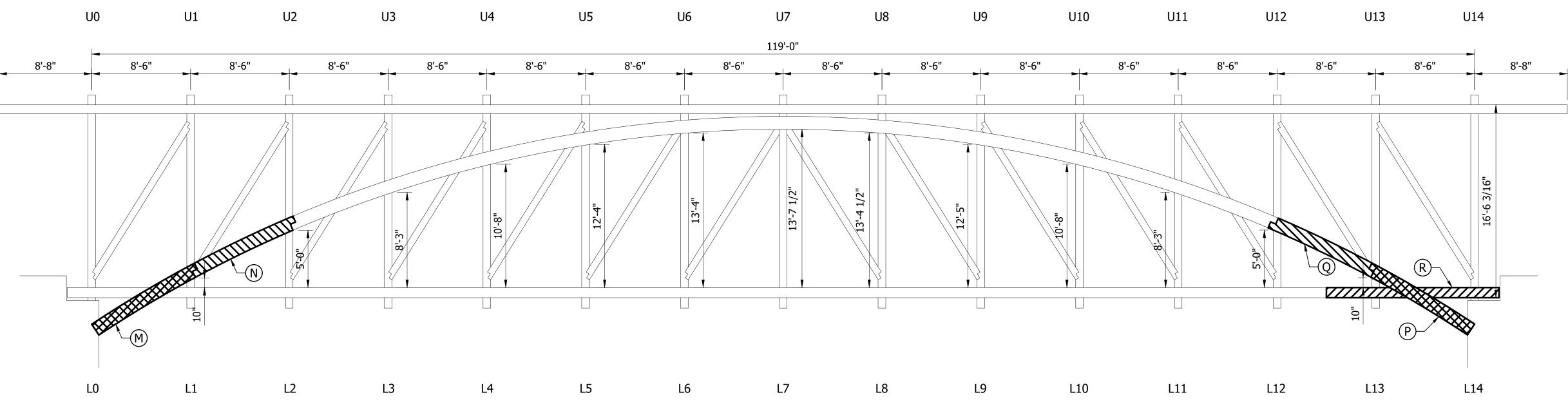


TTED	8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250	RECOMMENE FOR APPROV	/AL	DESIGN ENGINEER	DATE
ITED	Phone 317-895-2585 www.ucindy.com	DESIGNED:	SGM	DRAWN: AJM	
		CHECKED:	CJA	CHECKED: SGM	1

	AS NOTED	RUSH 94			
	VERTICAL SCALE	DESIGNATION			
	AS NOTED	1702753			
]	SURVEY BOOK	SHEETS			
	-	11 of 20			
	CONTRACT	PROJECT			
	B-41303	1702753			







TRUSS & ARCH REPAIRS/REPLACEMENTS

- 1. Support the structure.



NORTH TRUSS Scale: 3/16" = 1'-0"

2. Replace or repair members as shown on the drawings.

3. Check condition of all bolts and replace damaged bolts, tighten all loose bolts.

STRAIGHTEN AND BRACE TRUSSES

Check longitudinal and vertical alignment of trusses and adjust where necessary. Tighten cross bracing connection and bolts on upper and lower chords.

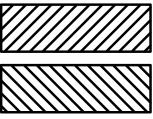
2. Remove the temporary support blocks from the trusses. The support system may be left in place during final phases of the work if needed for worker access. Remove the contractor's temporary support system after completion of all work on the superstructure.

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	T	RUSS/ARCH TII	MBER REPLACEMENT TAE	BLE		
Location	Truss/Arch Member	Location	Description of Work	Size	Approximate Length	Finish
А	South Arch	Inside	Replace Member	14" x 6"	10'-0"	Rough Sawn
В	South Arch	Outside	Replace Member	14" x 6"	20'-0"	Rough Sawn
С	South Arch	Inside	Replace Member	14" x 6"	10'-0"	Rough Sawn
D	South Arch	Outside	Replace Member	14" x 6"	20'-0"	Rough Sawn
E	South Lower Chord	Outside	Replace Member	11" x 8"	16'-0"	Rough Sawn
F	South Lower Chord	Inside	Replace Member	11" x 8"	40'-0"	Rough Sawn
G	South Lower Chord	Inside	Replace Member	11" x 8"	40'-0"	Rough Sawn
Н	South Vertical	-	Replace Member	10" x 8"	18'-0"	Rough Sawn
J	South Vertical	-	Replace Member	10" x 8"	18'-0"	Rough Sawn
К	South Diagonal	-	Replace Member	8" x 7"	18'-0"	Rough Sawn
L	South Diagonal	-	Replace Member	8" x 7"	18'-0"	Rough Sawn
М	North Arch	Inside	Replace Member	14" x 6"	10'-0"	Rough Sawn
Ν	North Arch	Outside	Replace Member	14" x 6"	20'-0"	Rough Sawn
Р	North Arch	Inside	Replace Member	14" x 6"	10'-0"	Rough Sawn
Q	North Arch	Outside	Replace Member	14" x 6"	20'-0"	Rough Sawn
R	North Lower Chord	Inside	Replace Member	11" x 8"	16'-0"	Rough Sawn

RECOMMENDED FOR APPROVAL		
DESIG	N ENGINEER	DATE
DESIGNED: SGM	DRAWN: AJM	
CHECKED: CJA	CHECKED: SGM	

LEGEND



Replace inside or only member

Replace outside member

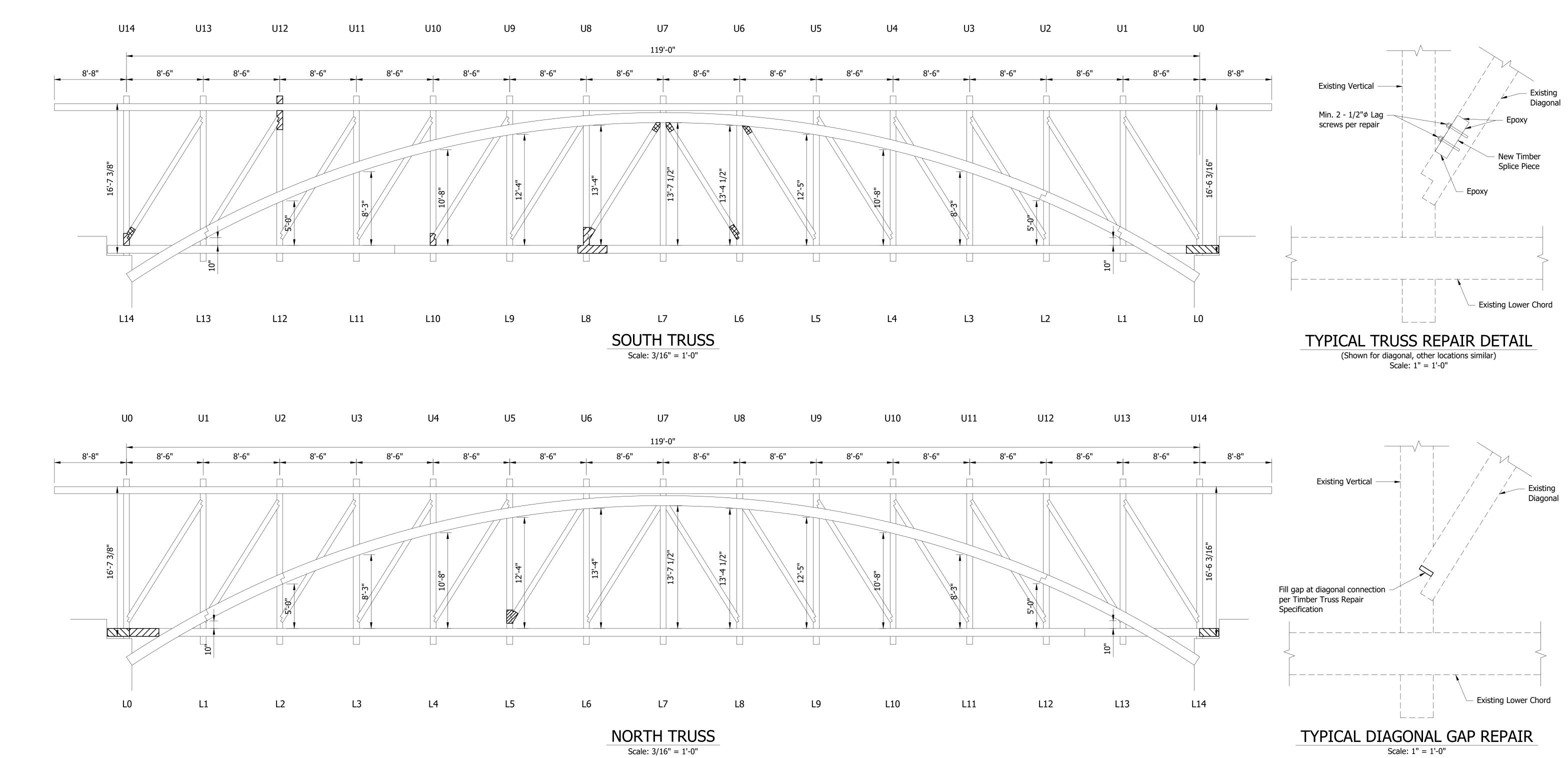
Notes:

Replace members to existing splice locations with existing splice and connection details.

For additional information on Timber Structures, see specifications. For additional information on Structure, Truss Repair, see specifications.

INDIANA DEPARTMENT OF TRANSPORTATION TIMBER REPLACEMENTS RUSH COUNTY BRIDGE #94

nal information on Structure, Truss Repair, see specifications.						
HORIZONTAL SCALE	BR	IDGE FI	LE			
AS NOTED	RUSH 94					
VERTICAL SCALE	DESIGNATION					
AS NOTED	1702753					
SURVEY BOOK	SHEETS					
-	12	of	20			
CONTRACT PROJECT						
B-41303	B-41303 1702753					

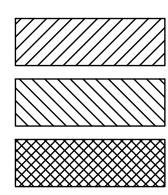




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DESIG	N ENGINEER DATE
DESIGNED: SGM	DRAWN: AJM
CHECKED: JNR	CHECKED: SGM

LEGEND



Repair inside or only member

Repair outside member

Repair diagonal gap at vertical

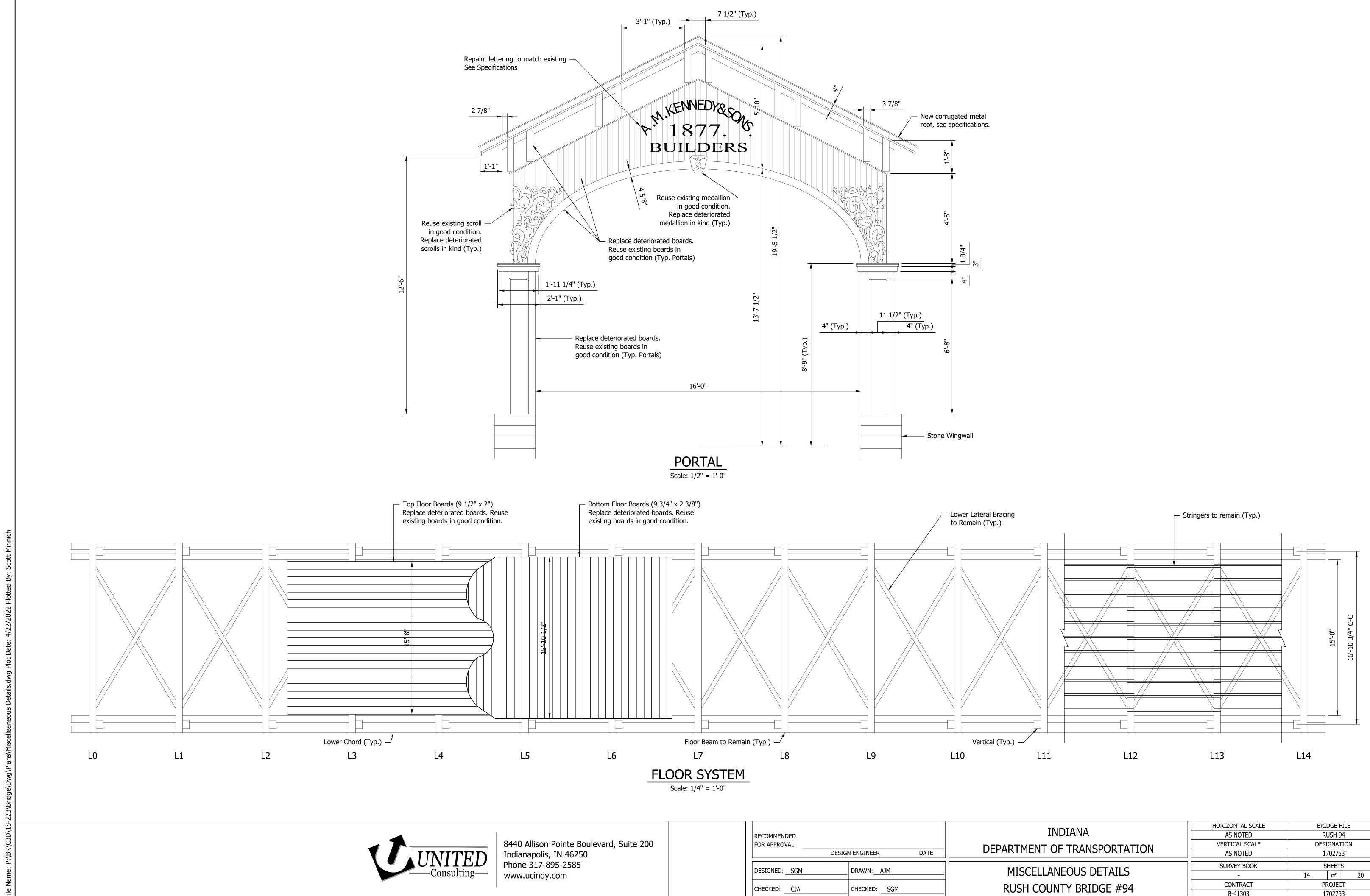
Notes:

See Timber Truss Repair Specification for additional information.

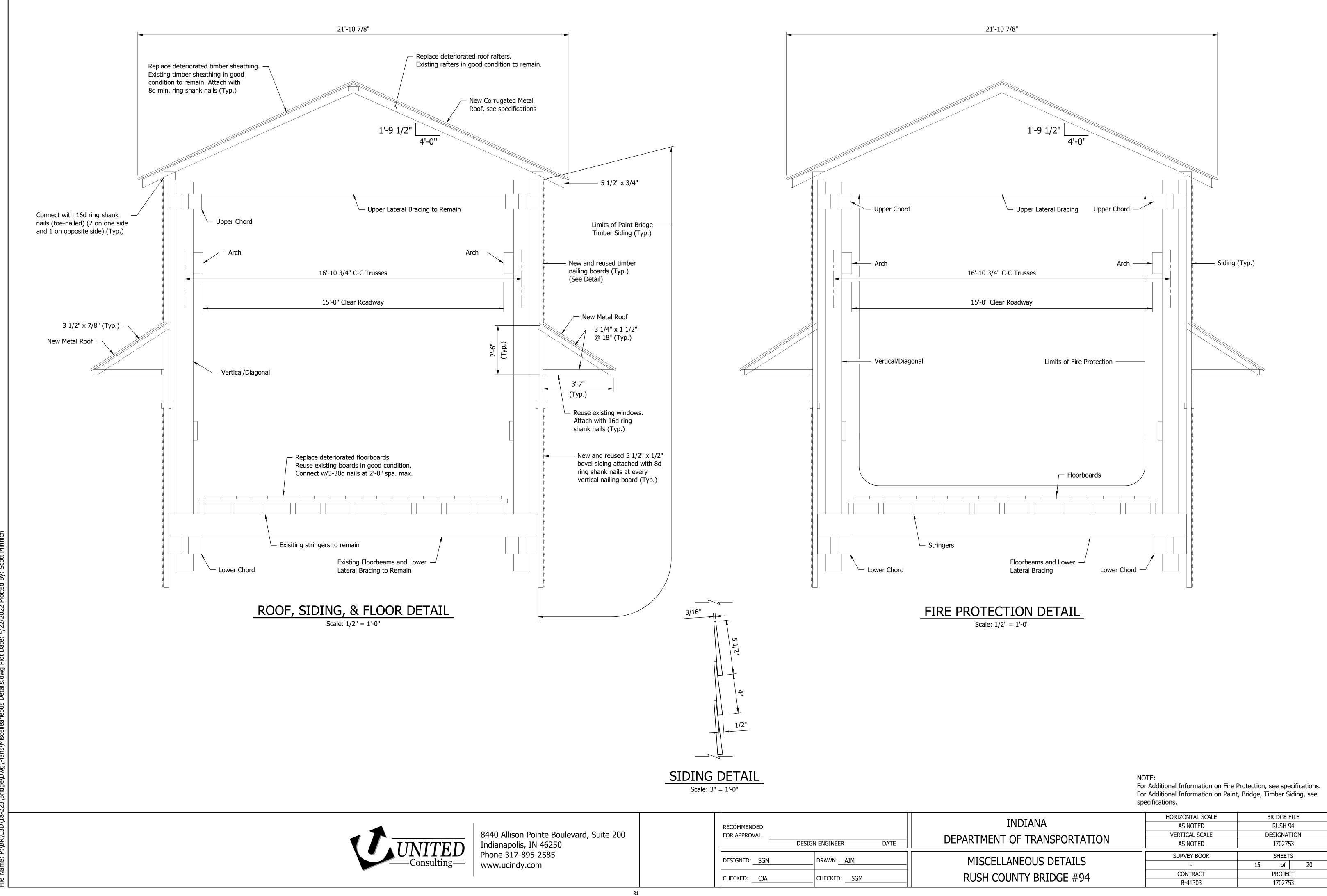
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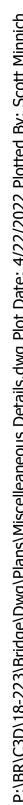
TIMBER REPAIRS RUSH COUNTY BRIDGE #94

HORIZONTAL SCALE	BRIDGE FILE								
AS NOTED	RUSH 94								
VERTICAL SCALE	DES	IGNA	FION						
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SURVEY BOOK	SHEETS								
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CONTRACT	P	ROJE	Т						
B-41303	1	70275	53						



HORIZONTAL SCALE BRIDGE FILE	
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DEPARTMENT OF TRANSPORTATION	
DEPARTMENT OF TRANSPORTATION AS NOTED 1702753	
SURVEY BOOK SHEETS	
MISCELLANEOUS DETAILS	20
RUSH COUNTY BRIDGE #94	
B-41303 1702753	





	SUMMARY OF BRIDGE QUANTITIES																							
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ROOF															3,785		0.991							
TRUSS																			17		2,072			
FLOOR																				1,890				
SIDING																4,328	0.435							
SUBSTRUCTURE																							1,000	
UNDISTRIBUTED																	0.574	200	4		415			
TOTALS															3,785	4,328	2.000	200	21	1,890	2,487		1,000	

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				ΤΝΙΌΤΑΝΙΑ	HORIZONTAL SCALE	BRIDGE FILE
		RECOMMENDED		INDIANA	AS NOTED	RUSH 94
	8440 Allison Pointe Boulevard, Suite 200	FOR APPROVAL		DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE	DESIGNATION
	Indianapolis, IN 46250	DESIG	N ENGINEER DATE	DEPARTMENT OF TRAINSPORTATION	AS NOTED	1702753
I'ED	Phone 317-895-2585				SURVEY BOOK	SHEETS
lting=		DESIGNED: SGM	DRAWN: AJM	BRIDGE SUMMARY	-	16 of 20
9	www.ucindy.com			RUSH COUNTY BRIDGE #94	CONTRACT	PROJECT
		CHECKED: <u>CJA</u>	CHECKED: <u>SGM</u>	KUSH CUUNIT DRIDGE #94	B-41303	1702753

	WIDTH	LENGTH	RADII	DISTANCE BEYOND R/W LINE		HC		ILT & CONCRETI ROACHES	E
LOCATION	IM		RA			BEYOND R/W LINE			WITHIN R/
				DISTA	COMP. AGGR. BASE	HMA FOR APPROACHES	CONCRETE 6 Inch	COMP. AGGR. BASE	HMA FOR APPRO
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MAINLINE									
TOTALS									

	GUARDRAIL SUMMARY TABLE																	
LOCA	ATION			Ŵ	-BEAM GUAR	DRAIL LENGTH	Η	1	-	CURVED W-BEAM GUARDRAIL SYSTEM								
FROM STATION	TO STATION	LEFT RIGHT	MGS W-BEAM @ 6'-3" SPA.	MGS W-BEAM, SHOP CURVED @ 6'-3" SPA.	Double Faced @ 6'-3" Spa.	Long Post @ Spa.	GUARDRAIL REMOVE	NESTED GUARDRAIL	THRIE BEAM TRANSITION	HAND DIG GUARDRAIL POST HOLES	GUARDRAIL END TREATMENT "TYPE I"	guardrail Mgs Transition With Curb	GUARDRAIL MGS TRANSITION WITHOUT CURB, MODIFIED	TERM SYS ⁻		CONNECTOR SYSTEM		REMARKS
			lft.	lft.	lft.	lft.	lft.	lft.	EACH	EACH	EACH	EACH	EACH	TYPE	EACH	TYPE EACH		
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26+23.49	27+56.30	X	31.25								1		1					
29+02.64	30+97.95	X	125.0								1		1				FLARED	
29+02.64	29+85.45	x	12.5								1		1					
	TOTALS		181.25								4		4					

PERM	ANENT S	SEEDING
LOCATION	MULCHED SEEDING, R	MOBILIZATION & DEMOBILIZATION FOR SEEDING
	SVS.	Each

LOCATION	MULCHED SEEDING, R	MOBILIZATION & DEMOBILIZATION FOR SEEDING
	sys.	Each
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SW QUAD	222	
NE QUAD	445	
SE QUAD	222	
TOTALS	1,111	1



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		EXCAN		QC/QA PCCP 12"	SUBGRADE TREATMENT,	ΓA		ASPHALT	MATERIAL FOI	R ROADS		SUBGRADE TREATMENT, TYPE II	E FOR	JOINT ADHESIVE, SURFACE	ADHECTVE
			/ATION	12"	I M	Щ	QC/QC-HMA,	QC/QA-HMA,			A A	РЕ Д К	EN 11	LDH KFA	
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FOR APPROACHES	6 Inch	CUT	FILL				9.5 MM	19.0 mm					бт	-	
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							30	7	15			45	45	200	

	8440 Allison Pointe Boulevard, Suite 200 Indianapolis, IN 46250	RECOMMENDED FOR APPROVAL	DESIGN ENGINEER DATE	_
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		CHECKED: CJA	CHECKED: SGM	- _

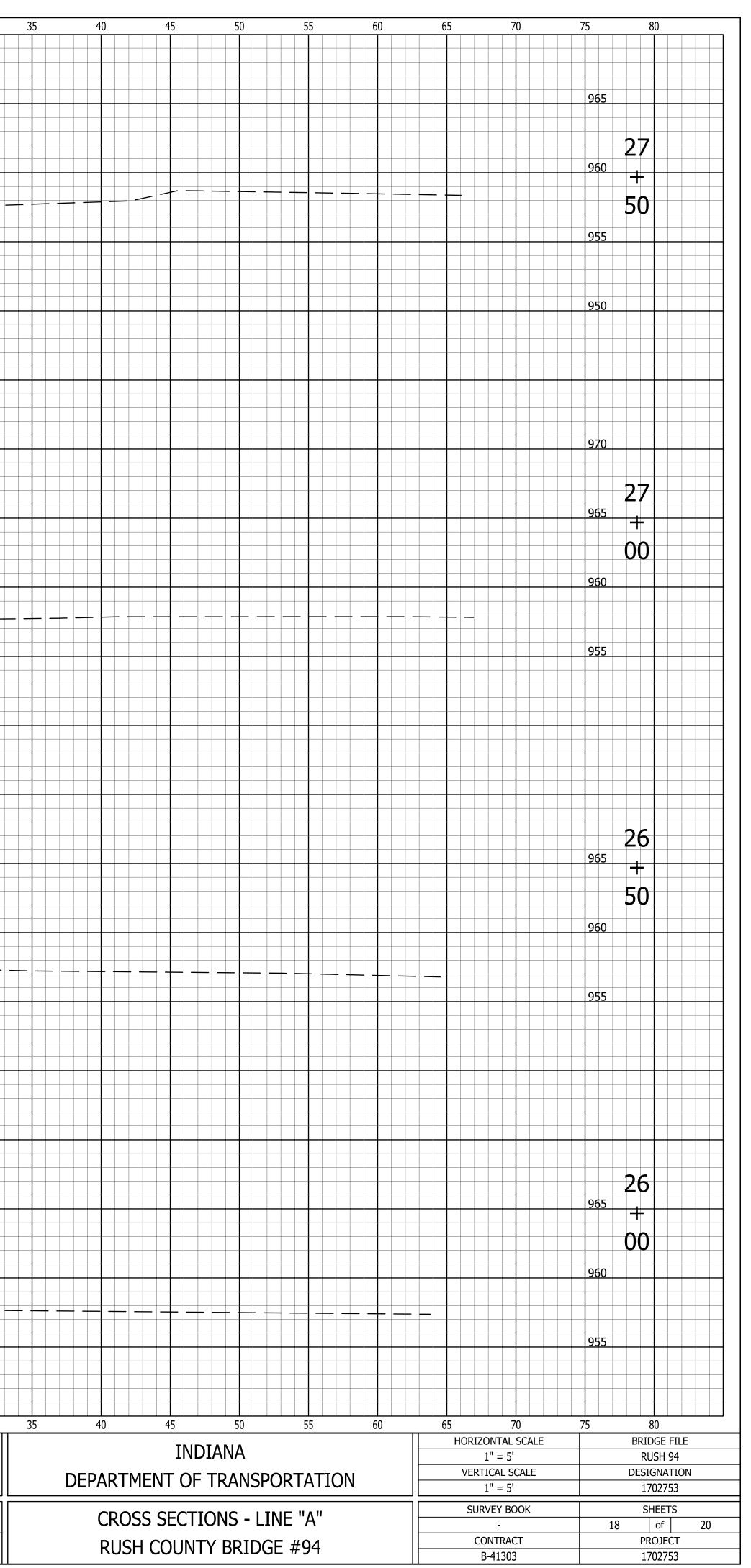
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25	200	311	0.5	0.5		400			

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DEPARTMENT OF TRANSPORTATION	VERTICAL SCALE							
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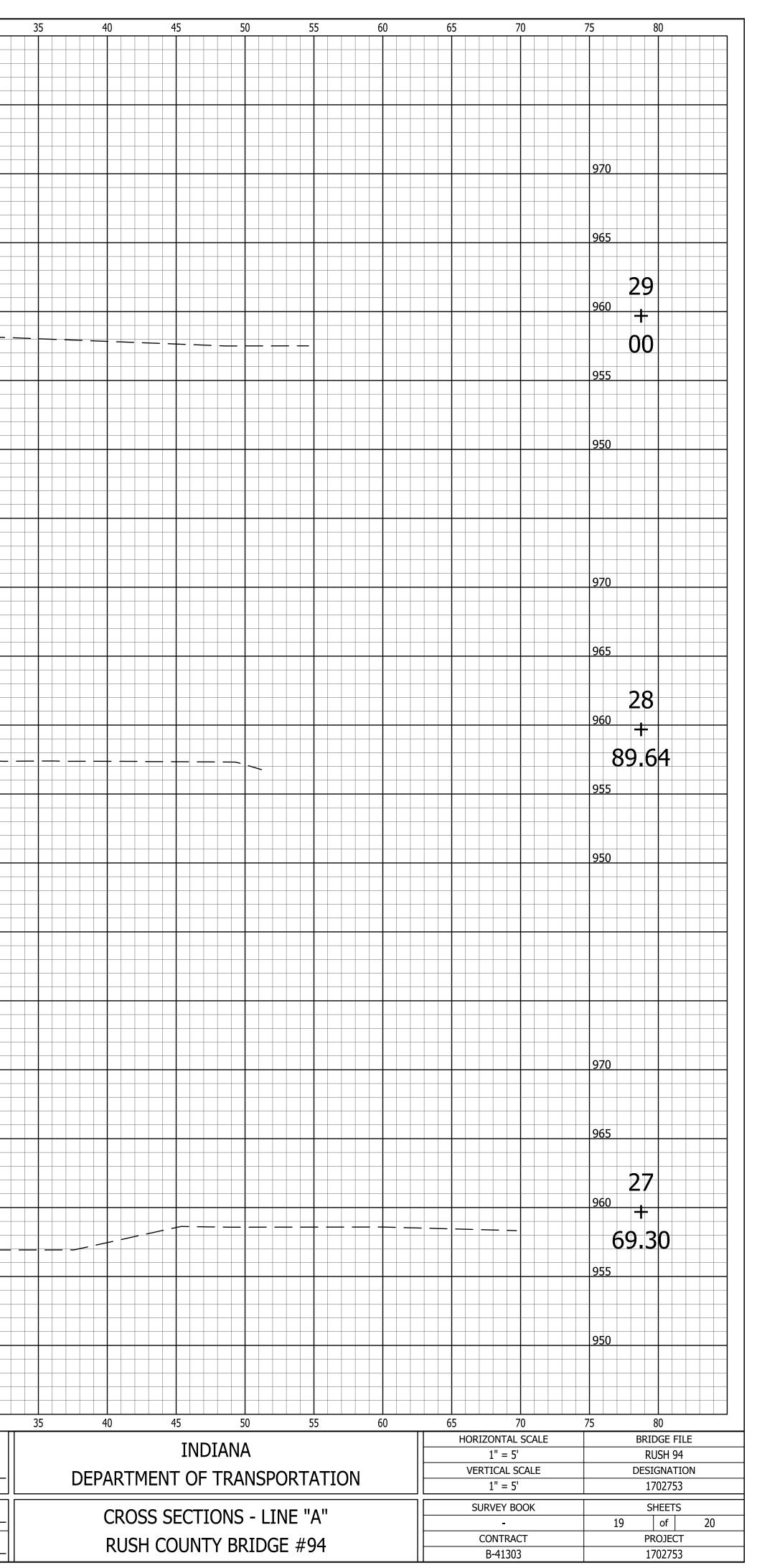
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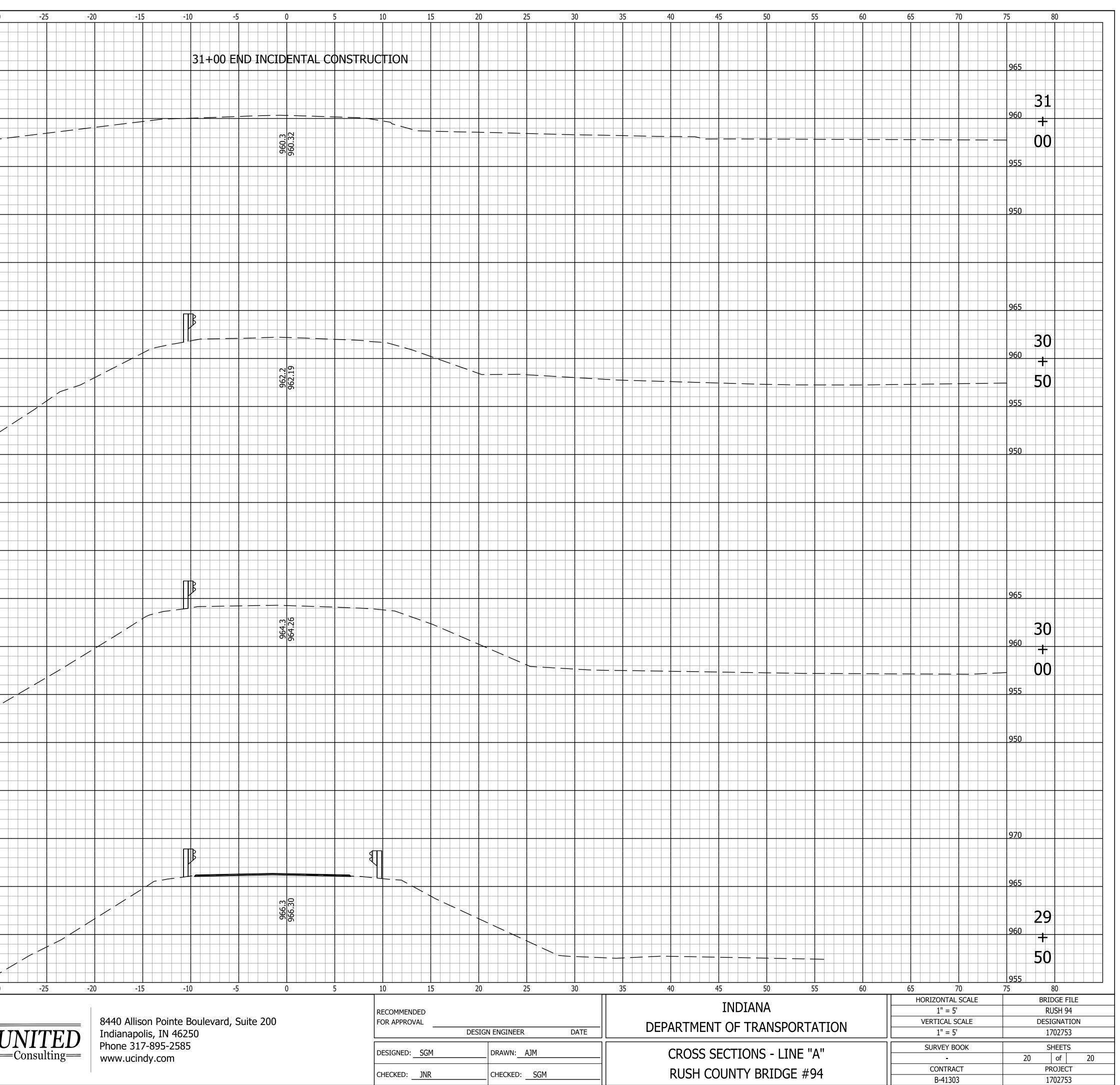
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BAT AVOIDANCE AND MITIGATION MEASURES

Specific avoidance and minimization measures, AMMs, related to the Indiana bat (Myotis sodalis) and Northern long-eared bat, NLEB (Myotis septentrionalis) required for this contract shall be as follows:

General AMM 1 - All operators, employees, and contractors working in areas of known or presumed bat habitat shall be aware of all Transportation Agency environmental commitments, including all applicable AMMs.

Tree Removal AMM 1 - To the extent practicable, all phases and aspects of the project, such as temporary work areas, shall be modified to avoid tree removal in excess of what is required to implement the project safely.

Tree Removal AMM 2 - Time of year restrictions for tree removal shall be applied when bats are not likely to be present or tree removal shall be limited to 10 or fewer trees per project at any time of year within 100 ft of existing road or rail surfaces and outside of documented roosting and foraging habitat or travel corridors. A visual emergence survey shall be conducted with no bats observed. Tree removal may not occur during the active season for bats, from April 1 through September 30.

Tree Removal AMM 3 - Tree removal shall be limited to that shown on the plans. Bright orange flagging or fencing shall be installed prior to any tree clearing to ensure contractors stay within the clearing limits.

Tree Removal AMM 4 - Documented Indiana bat or NLEB roosts that are still suitable for roosting, or trees within 0.25 mile of roosts, or documented foraging habitat, shall not be cut down at any time of the year.

The Contractor shall not handle dead or injured bats, regardless of species, and any other federally listed species that are found at the project site in order to preserve biological material in the best possible condition and to protect personnel from exposure to diseases, such as rabies. Project personnel shall ensure that any evidence about determining the cause of death or injury is not unnecessarily disturbed. Reporting the discovery of dead or injured listed species shall be required in all cases to enable the Service to determine whether the level of incidental take exempted by the biological opinion, BO, is exceeded, and to ensure that the terms and conditions are appropriate and effective. Parties finding a dead, injured, or sick specimen of any bat, regardless of species, or other endangered or threatened species, shall promptly notify the USFWS Bloomington Field Office at (812) 334-4261.

The active season for the bats is April 1 through September 30.

"Suitable habitat" refers to the summer or winter habitat that is appropriate for use by the Indiana bat or NLEB, and may be known or unknown in terms of documented use.

"Trees" in accordance with this special provision is a pure stand of trees less than 3 in. dbh, which are not mixed with larger trees or a mixed stand of trees less than 1,000 ft from a forested or wooded area.

Tree removal shall be in accordance with 201.02 and as shown on the plans. If tree removal beyond that shown on the plans is required, the Contractor shall obtain approval from the Engineer and the appropriate district Environmental

Services Department before proceeding. Trees shall not be removed from wetlands or floodplain areas.

Suitable roosting sites shall remain after the structure work is complete.

At the pre-construction conference, in accordance with 108.04, the Contractor shall provide documentation that the Contractor's employees and subcontractors that will be present on the project site are aware of the environmental commitments and AMMs.

All costs associated with the bat AMMs shall be included in the cost of other items.

SAFETY, HEALTH, AND SANITATION

Flatrock River is listed as impaired for E. coli and mercury in fish tissue. Workers who are working in or near water with E. coli shall take care to wear appropriate PPE, observe proper hygiene procedures, including regular hand washing, and limit personal exposure. Exposure to mercury in fish tissue is considered low, assuming workers are not eating biota surrounding or associated with the water body.

Mr. Rick Denney of Greensburg Municipal Water shall be notified of oil or chemical spills that occur during construction. He can be reached via e-mail at watersupt@cityofgreensburg.com or phone at (812) 663-2641.

UNDISTRIBUTED QUANTITIES

The schedule of pay items contains the following undistributed quantities in addition to known plan quantities:

712-04272 Lumber and Timber, Untreated 0.574	MFBM
712-05097 Metal Parts 20) LBS
712-05098 Timber, Truss Repair 4	EACH
712-94725 Structural Timber Truss 499	BDFT

The exact location of the undistributed quantity, if required, will be determined by the Engineer during the time of construction.

PRESENT STRUCTURE, REMOVE PORTIONS

The Standard Specifications are revised as follows:

SECTION 202, AFTER LINE 189, INSERT AS FOLLOWS:

The Contractor shall carefully remove the existing timber rafters, sheathing, rafter supports, siding, siding nailing boards, floor, bridge railing, and floor beams if necessary to complete the work. The Contractor may need to punch the existing nails through in order to remove the existing members without causing significant damage. Members not rotted, split, checked, warped, or otherwise damaged shall be saved for reuse at the direction of the Engineer. Members that have only deteriorated ends shall have deteriorated ends cut off and saved for reuse if possible. Materials shall be stockpiled on site and checked for acceptability by the Engineer.

While the roof and siding are removed, the Contractor shall cover the trusses and floor during rain events to prevent the bridge members from absorbing moisture. Sufficient care should be taken to protect the structural members from the weather while the roof and siding are removed.

Other existing bridge members shall be removed as shown on the plans.

SECTION 202, AFTER LINE 798, INSERT AS FOLLOWS:

The cost of sorting, storing, and reinstallation of existing rafters, sheathing, rafter supports, siding nailing boards, bridge rail, and floor beams, including required nails, shall be included in the cost of present structure, remove portions.

The cost of removing, sorting, and storing of timber materials to be reused, removing other designated members to be replaced, covering of the trusses and floor, and removal of any other existing part of the bridge shall be included in the cost of present structure, remove portions.

REPOINTING MASONRY IN STRUCTURES, MODIFIED

Description

This work shall consist of repointing of the masonry on the bridge abutments in accordance with 105.03.

This work shall consist of repointing dressed stone masonry structures with mortar in accordance with these specifications and as shown on the plans. Hard, sound mortar joints, as determined by the Engineer, may remain in place. Otherwise repoint joints as described herein. The texture, color, and tooling of the repointing are to resemble the original mortar joints. Repointing shall include the design and dry-blending of the mortar mix, the preparation of the masonry joints, and the mixing, placement, tooling, and curing of mortar.

Materials

Materials shall be in accordance with the following:

(a) Portland cement:

Portland cement shall meet section 901.01(b), grey or white as required to best match original mortar color. Alkali shall be less than or equal to 0.60 percent. Fly ash, slag and pozzolans are not permitted as substitutes for Portland cement.

- (b) Mortar: Mortar shall be ASTM C270 Type N resembling the original mortar in appearance.
- (c) Hydrated Lime: ASTM C207 Type S or SA, incorporated as a finely divided powder in uniform particle size, free of lumps, flakes, or other inconsistencies.
- (d) Aggregate:

Uniformly graded rounded to sub-angular natural sand, washed, screened, and dried. Aggregate is to be selected to match the color and texture of the original mortar aggregate as closely as possible while remaining in compliance with grading requirements of AASHTO M 45 or ASTM C 144. Aggregate is to comply with Section 904.02 for organic impurities and soundness.

- (e) Other admixtures: No admixtures shall be used without the express written consent of the Engineer and the mortar manufacturer. Calcium chloride is not permitted in any mortar.
- (f) Water: Section 913.01.

Construction requirements

(a) GENERAL

(1) Standards

The Contractor shall perform all repointing in accordance with recommendations in the National Park Service Cultural Resources Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings". This Brief may be found at the National Park Services website at https://www.nps.gov/tps/how-to-preserve/briefs.htm.

(2) Qualifications of Personnel

Repointing shall be performed by first class crafts persons qualified in repointing historic masonry. Proof of adequate training and/or five years of experience shall be furnished upon request by the Engineer. One skilled journeyman mason shall be present at all times during preparation and repointing and shall personally direct the work.

(b) PROPORTIONING

Mortar shall be as specified above. Suitable prepackaged mortars may be available, or a custom mix may have to be prepared. The mixture shall have at least 2 parts lime to 1 part Portland cement. The Contractor shall submit an initial mix design and cured mortar sample or samples for approval by the Engineer. Approval of preliminary mix design will be based on compliance with the requirements of this section and visual comparison of samples to original mortar which have been broken to expose un-weathered material. The mix design shall include a list of all ingredients and their proportions in the mix, the source of all materials, and the gradation of the aggregates. Final mix design approval will be given based on the mock-up section on the abutments.

(c) MOCK-UP SECTION

Before starting work, The Contractor shall prepare and repoint a sample area of not less than 4 feet high by 4 feet long using the preliminary mortar mix design and the proposed procedures, and finish for approval by the Engineer. The Contractor shall remove unsatisfactory work at no extra cost. Satisfactory work will be used as the standard for, and be incorporated as part of, the remainder of the work.

(d) JOINT PREPARATION

The Contractor shall clean masonry joints of all loose or deteriorated mortar, dirt, dust, roots, moss, and other foreign material to a minimum depth of 3/4 inch or 2.5 times the joint width, whichever is greater, and a maximum of 8 inches. The Contractor shall leave sound mortar in place except where removal is needed to obtain the minimum depth.

The existing unsound mortar shall be removed with masonry chisels or pneumatic carving tools. Contractor shall not chip or spall surrounding masonry edges or otherwise widen the existing masonry joints. The Contractor shall finish the preparation by thoroughly brushing, blowing, or rinsing the joints free of dust and fine material.

(e) MORTAR DRY-BLENDING, DELIVERY, AND STORAGE

- (1) Premixed mortar: Cement, lime, and aggregates of the approved mix design are to be blended and packaged under controlled conditions, requiring only the addition of water on site. Dry mortar ingredients are to be batched within plus or minus 1% accuracy. The Contractor shall not change the source of any mortar components without the approval of the Engineer.
- (2) Delivery: The Contractor shall deliver dry-blended mortar mix to the project site in clearly labeled plastic-lined bags or other suitable containers each bearing the name and address

of the manufacturer, Production Codes or Batch Numbers, and color or formula numbers.

- (3) Storage and Handling: The Contractor shall store containers off the ground in a clean, dry state protected against weather, traffic and foreign materials.
- (f) ENVIRONMENTAL REQUIREMENTS
 - (1) Cold Weather Requirements:
 - (A) In cold weather the mixing water may be heated to maintain mortar Temperature above 40 degrees F until placed. If necessary, the Contractor shall store materials in a heated area to allow mortar temperatures to remain above 40°F throughout the placement and finishing cycle.
 - (B) The Contractor shall work when temperatures of at least 40°F exist and are expected to remain above 40°F for 48 hours after completion of the work. The Contractor shall cover work with a weather-resistant membrane if air temperatures fall below 40°F. Antifreeze liquids, chloride salts or other such substances shall not be used.
 - (2) Hot Weather Requirements: The Contractor shall not place mortar when temperatures exceed 95°F. Under hot, dry, and windy conditions, the Contractor shall use extra care to follow proper pre-dampening, protection and moist curing procedures as required to keep mortar moist for 72 hours following final tooling.
- (g) MIXING AND USING MORTAR
 - (1) The Contractor shall add only clean, potable water at the project site. The Contractor shall not add cement, lime, bonding agents, coloring admixtures, set accelerators, plasticizers, air entraining admixtures or other materials on site unless specifically authorized in writing.
 - (2) Pre-hydrating the mortar will be allowed but is not required. Pre-hydration consists of mixing dry materials with only enough water to make a damp, stiff mix that will hold its form when pressed in a ball and allowing this mix to rest for a period not to exceed 1 hour.
 - (3) The Contractor shall slowly add water to dry or pre-hydrated mix as needed to reach the desired working consistency and mix between 5 and 10 minutes in a mechanical mortar mixer or paddle mixer.
 - (4) The Contractor shall use mortar within 1-1/2 hours of mixing, after which unused mortar is to be discarded. This period shall be reduced to 1 hour in hot weather. Retempering is allowed in accordance with ASTM C270, Subparagraph 6.4, if it is demonstrated that retempering does not negatively affect color consistency. Retempering is to be used to replace water

lost to evaporation only. The Contractor shall not retemper mortars that have begun to set.

- (h) PLACEMENT
 - (1) Pre-wetting. The Contractor shall continually pre-dampen masonry surfaces to receive repointing mortar for a minimum of 60 minutes prior to mortar placement. Masonry surfaces should be saturated but free of excess or standing water at time of mortar placement.
 - (2) Filling joints. The Contractor shall start by filling deeper sections, compacting each layer, packing it into the rear and corners of the joint. Where joints are deeper than 1 inch, the Contractor shall place mortar in multiple layers or "lifts". Such lifts shall not be thicker than 1 inch nor half the depth of the joint. The Contractor shall allow each layer to reach "thumbprint" hardness before applying the next layer.
 - (3) Tooling. When final layer is thumb print hard, the Contractor shall tool to match original profile. To avoid changing the appearance of the abutments it may be necessary for the Contractor to slightly recess the mortar from the masonry surface. The Contractor shall not flush fill joints in worn masonry if this results in a visually wider joint than the original. The Contractor shall remove excess mortar and smears using a stiff natural bristle or nylon brush and clean water before it has set.
 - (4) Curing. The Contractor shall wet cure newly tooled joints by lightly misting with clean water periodically for at least 72 hours following installation. The Contractor shall mist as needed, depending on temperature, humidity, wind and suction of the masonry, but at least every three hours the first day and at least three times a day thereafter.
 - (5) All existing weepholes shall be maintained.
- (i) Final Cleaning. The Contractor shall allow mortar to fully cure for a minimum of 28 days before final cleaning. Longer cure times are required in cooler weather. Only light scrubbing with a stiff natural bristle or nylon brush or low pressure (100 psi) washing should be used to avoid damaging newly repointed joints.

Method of Measurement

The accepted quantities of masonry repointing will be paid for at the contract price per square foot of masonry repointed.

Basis of Payment

Repointing of masonry in structure, modified, will be paid for at the contract unit price of repointed masonry complete in place.

Payment will be made under:

Pay Item

Pay Unit Symbol

Repointing Masonry in Structures, Modified..... SFT

The cost of the materials, cleaning, preparation, removal and replacement of mortar, removal and disposal of old mortar, labor, supervision, and all incidentals shall be included in the cost of the pay item.

TEMPORARY SUPPORT

Description

This work shall consist of jacking, temporarily supporting and bracing of the bridge during the removal and replacement of truss members as shown on the plans.

Materials

Materials may be steel or timber.

Construction Materials

The Contractor shall design the temporary support of the bridge for the work shown on the plans. The Contractor may use details similar to those shown on the plans or propose an alternate temporary support method. Temporary support shall be capable of supporting the weight of the structure, construction equipment, workers, materials, wind load, and any other loads which may be present during the rehabilitation of this structure. Shop drawings shall be submitted for approval and shall include construction details, sequence of operations and design calculations and shall bear the seal of a professional engineer licensed in the State of Indiana. Shop drawings shall also be in accordance with 105.02.

Temporary support shall not be placed in the channel other than as shown on the plans and shall not damage any of the existing bridge members to remain. Damage to existing bridge members during temporary support and removal and replacement of members shall be repaired to the satisfaction of the Engineer.

Temporary support shall be removed to at least two feet below the existing ground and any excavations shall be filled with b borrow.

Method of Measurement

Temporary support will not be measured for payment.

Basis of Payment

This work will be paid for at the contract lump sum price for temporary support.

Payment will be made under:

Pay Item

Pay Unit Symbol

Temporary Support LS

The cost of design, labor, equipment, materials, repair of damaged members, installation and removal of temporary support, jacking temporary bracing, and all incidentals necessary to complete the work shall be included in the cost of the pay item.

If the Contractor elects to install an alternate temporary support system or utilizes multiple temporary support methods, such work shall be included in the cost of the pay item.

EPOXY WOOD ADHESIVE

Timber truss repair locations shall be coated with an epoxy paste, gel, or non-sag bonding adhesive on all connecting sides of the repair. Surfaces to be bonded shall be cleaned in accordance with the manufacturer's recommendations and shall be, at a minimum, cleaned with a vacuum or high pressure air blast. Bonded surfaces shall be clamped together while the epoxy cures for the time required as specified by the manufacturer. Surfaces that are not being bonded together shall be taped off to prevent epoxy material from adhering to these surfaces.

This work will not be measured separately for payment and shall be included in the cost of the pay items.

The epoxy wood adhesive shall be a structural epoxy bonding adhesive and shall be one of the following:

- 1. Concresive Paste LPL, Concresive 1420 and SCB Concresive 1380 Liquid by BASF Corporation.
- 2. Scotch-Weld 2216 B/A Tan NS, Scotch-Weld 2216 B/A Translucent, Scotch-Weld 1838 B/A Tan and Scotch-Weld 1838-L B/A Translucent by 3M
- 3. Rhino 405 Structural Epoxy Gel and Rhino 1411/4111 by Rhino Linings Corporation Epoxy

FIRE PROTECTION

Description

This work shall consist of applying a clear fire protection to exposed wood surfaces on the interior of the covered bridge, as shown on the plans in accordance with 105.03.

Materials

Fire protection shall be one of the following systems or as approved. Product shall be a liquid applied, dry clear and shall be designed for exterior wood applications. Product shall be one of the following:

1. Flame Control Coatings, Inc., P.O. Box 786 Niagara Falls, NY 14302 (716) 282-1399

Products may be purchased at most Sherwin-Williams paint stores. Product shall be a three coat system of: 1. Flame Control No. 6 Clear Wood Sealer

- 2. Flame Control No. 129 Class "B" Fire Retardant Varnish Base Coat
- 3. Flame Control No. 130 Class "B" Fire Retardant Varnish Overcoat Low Gloss
- 2. Nochar, Inc. 8650 Commerce Park Place, Suite K Indianapolis, IN 46268 (317) 613-3046

Nochar Fire Preventer "NFP"

3. Flame Stop Inc. 924 Blue Mound Rd. Ft. Worth, TX 76131 (817) 306-1222

Flame Stop II

Construction Requirements

The Contractor shall submit, for approval, product sheets along with manufacturer's instructions for application prior to ordering materials. Surface preparation, mixing, and application shall be in accordance with manufactures instructions. High pressure water shall not be used for surface preparation. High pressure air will be allowed for cleaning of members. If the method of cleaning is damaging the existing timbers, the work shall cease immediately and shall not resume until the Engineer is assured the tools or methods used will not cause further damage.

Method of Measurement

Fire protection will not be measured for payment.

Basis of Payment

The accepted quantities of fire protection will be paid for at the contract lump sum price for the work, complete in place.

Payment will be made under:

Pay Item PayUnit SymbolFire Protection.....LS

The cost of surface preparation, labor, equipment, materials and incidentals necessary to complete the work shall be included in the cost of the pay item.

PAINT BRIDGE, TIMBER SIDING

Description

This work shall consist of applying one coat of primer and two coats of finish paint to the exterior face and top and bottom lip of the timber siding, roof soffit, portal entrances, portal scrolls, and portal lettering on the covered bridge.

Materials

Paint system shall be one of the following systems.

- 1. PPG Paints
 Primer PPG Gripper Interior/Exterior Primer + Sealer
 Final PPG Permanizer Exterior Acrylic Latex
 May be purchased at:
 PPG Point Store
 7025 Madison Ave.
 Indianapolis, IN 46227
 (317) 787-9393
- 2. Sherwin-Williams
 Primer Exterior Latex Wood Primer
 Final Duration Exterior Acrylic Latex
 May be purchased at:
 Sherwin-Williams
 1557 N. State St.
 Greenfield, IN 46140
 Phone: (317)462-5238
- 3. California Points
 Primer Trouble Shooter 100% Acrylic Latex Wood Primer
 Final Ultra 2010 Exterior Paint
 May be purchased at:
 Dunlap Building Materials
 13 S. Smith St.
 Batesville, IN 47006
 (812) 934-2710

One supplier shall be used for supplying both primer and final coats of paint. Finish coat paint color shall match the existing bridge siding and portal scroll and lettering colors. The sheen shall be flat or velvet flat. Color samples shall be provided to the Engineer for approval prior to ordering paint. The Engineer will coordinate the approval of the color with the Rush County Highway Superintendent, Mr. Jerry Sitton, at (765) 932-2926.

Construction Requirements

Surface preparation, mixing, and application shall be in accordance with the manufacturer's instructions and as listed here. All loose paint from reused siding shall be removed prior to priming. Surfaces to be painted shall be free of moisture, dirt and dust. Thinning of paint will not be permitted. All exterior surfaces of siding and portals, as well as the tops and bottoms of the siding boards that are exposed shall be painted. All surfaces to be painted, including all previously painted boards, shall receive one coat of primer. All surfaces shall then receive two coats of finish paint. The Contractor shall protect surfaces that are not to receive paint, including but not limited to bridge truss and stone substructure, from receiving paint. Paint on surfaces not designated to be painted, shall be removed by the Contractor to the satisfaction of the Engineer.

Primer coat and one coat of finish paint may be applied to the siding and portal scrolls prior to installation. The final coat of paint shall be applied after the final installation of siding.

Existing portal lettering shall be repainted to match the existing lettering. Contractor shall document the existing letting by stencil or other approved method prior to removing existing siding. Final portal lettering shall be neat, consistent, and match the existing lettering to the satisfaction of the Engineer.

Pollution control shall be in accordance with 619.07.

Method of Measurement

Paint Bridge, Timber Siding will not be measured for payment.

Basis of payment

The accepted quantities of Paint Bridge, Timber Siding will be paid for at the contract lump sum price for the work, complete in place.

Payment will be made under:

Pay Item

Pay Unit Symbol

Paint Bridge, Timber Siding LS

The cost of surface preparation, stencil, access, containment, labor, equipment, materials, protection of areas not to receive paint, cleanup, and incidentals necessary to complete the work shall be included in the cost of the pay item.

ROOF CORRUGATED METAL

Description

This item shall include all labor, equipment, and materials necessary to install the new metal roof as shown on the plans, as directed by the Engineer, or per the metal roof panel manufacturer's instructions.

Materials

Materials and applicable construction requirements shall be in accordance with the following:

Metal roof panels shall be factory formed, lappable and conform to ASTM A366 with a factory painted finish. Paint color shall be white or as approved by Engineer. Panels shall be made from 26 gauge, Grade 40 structural steel. The panels shall be "PBR" type with a coverage width of 36 inches and a profile with a 12 inch rib pitch and 1 ¼ inch rib height.

Construction Requirements

Metal roof panels shall be roll-formed on a stationary industrial type rolling mill to gradually shape the sheet metal. Portable roll-formers, rented or owned by the installer, are not acceptable. Fabricate flashings from the same material as the roof system.

Prior to installation, Contractor shall submit manufacturer's specifications, standard profile sheet, and product data brochure. Shop drawings showing the roof plan and with layout of panels, screws, and substrate shall be submitted to the Engineer for approval prior to fabrication. Drawings shall contain material type and metal thickness. Submit manufacturer's certification that materials meet specification requirements. Contractor shall submit a 6" long x full width panel sample, showing the proposed metal gauge, panel profile and finish color for approval.

Panel manufacturer shall have a minimum of ten (10) years of experience in manufacturing metal roofing in a permanent stationary indoor facility. Panel installer shall have a minimum of 5 years of experience in installation of metal roofing of similar size and scope.

Materials shall be protected and properly packaged to protect against transportation damage in transit to project site. Upon delivery, exercise care in unloading, stacking, moving, storing, and erecting to prevent twisting, bending, scratching, or denting. Materials shall be stored in a safe, dry environment under a waterproof covering to prevent water damage. Allow for adequate ventilation to prevent condensation.

Install eaves edge and gable edge aluminum drip edge tight with fascia boards. Secure flange with nails spaced at manufacturer recommendations. Proceed with installing the metal roof panels. Install panels in full length sections, plumb, level and straight with the ribs parallel, conforming to the design as indicated. Orient panel ribs perpendicular to the roof purlins. Fasten panels and flashing with plated steel or stainless steel screws. The screws shall be combined with EPDM or neoprene gaskets. Screws for panels shall be of the type and size and of sufficient length to penetrate the supporting member by 1". All fasteners shall be applied in accordance with the fastening schedule as per the manufacturer's specifications. Screws for flashings and side laps shall be $\#14 \times 7/8"$ sheet metal stich screws. All accessories, flashing, and side laps shall be fastened 12" on center or per manufacturer's specifications whichever is least. Closures shall be premolded polyethylene to match the profile of the

metal roof panel and shall be furnished in maximum 10 ft. lengths. Exposed flashing shall be lapped 6".

Method of Measurement

This work will be measured by the square foot (SFT) of exposed roof area to be covered.

Basis of Payment

This work will be paid for at the contract unit price per square foot.

Payment will be made under:

Pay Item

Pay Unit Symbol ROOF CORRUGATED METAL SFT

The cost of the roof panels, nails, screws, washers, other fasteners, samples, and other incidental items required to complete this work shall be included in the cost of this work.

STONE ABUTMENT REPAIR

Description

This work shall consist of repairing or replacing damaged stones in the existing stone abutments in accordance with 105.03. This work shall consist of the removal and repair or replacement of limestone rock sections within the stone abutments which are deteriorated and noted to be replaced as shown on the plans or as noted herein.

Materials

Materials shall be in accordance with the following:

(a) Portland cement:

Portland cement shall be in accordance with 901.01(b), grey or white as required to best match the original mortar color. Alkali shall be less than or equal to 0.60 percent. Fly ash, slag and pozzolans are not permitted as substitutes for Portland cement.

(b) Hydrated Lime:

ASTM C207 Type S or SA, incorporated as a finely divided powder in uniform particle size, free of lumps, flakes, or other inconsistencies.

(c) Aggregate:

Aggregate shall be uniformly graded rounded to sub-angular natural sand, washed, screened, and dried. Aggregate is to be selected to match the color and texture of the original mortar aggregate as closely as possible while remaining in compliance with grading requirements of AASHTO M 45 or ASTM C 144. Aggregate is to comply with Section 904.02 for organic impurities and soundness.

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(d) Other admixtures:
No admixtures shall be used without approval from the Engineer and
the mortar manufacturer. Calcium chloride is not permitted in all
mortar.
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- (e) Water: Shall be in accordance with 913.01.
- (f) Structural Stone: Contractor shall utilize limestone for the replacement of all stone removed. The new limestone shall be similar in shape, texture and color as the limestone removed.
- (g) Anchor pins: #4 rebar shall be in accordance with 703.
- (h) Grout material for field drilled anchor holes shall be in accordance with 702.03.

Construction requirements

General Requirements: The Contractor shall furnish all materials, equipment, labor, and supervision required. The objective of the repairs is to repair or replace deteriorating limestone in order to maintain the structural integrity of the portal structure.

(a) Limestone Repair

- (1) Stones marked in the plans for repair shall have the deteriorated facing of the stone removed to sound limestone. Repairs should not be deeper than 9 inches. If deterioration exceeds 9 inches, the entire stone shall be replaced.
- (2) Clean out area where facing of stone was removed. Drill and anchor a minimum of 4 pins to connect a new limestone facing dutchman stone. Facing dutchman stone shall fit tightly against face of existing stone it is connecting to. The outside facing of stone shall match the existing adjacent stones. Mortar joints shall be maintained and upon anchors curing, be re-mortered with mortar and construction methods in accordance with the REPOINTING MASONRY IN STRUCTURES, MODIFIED unique special provision.
- (3) The Contractor may choose to replace the entire stone in accordance with Individual Limestone Replacement requirements listed below.
- (b) Individual Limestone Replacement
 - (1) Carefully sawcut out existing fractured limestone areas which are to be removed. Contractor shall take extreme care when performing sawcuts in order to ensure additional parts of the structure are not damaged during construction.
 - (2) Clean area out where old stone was removed. New stone shall also be clean from debris before placing and mortaring in place. The exterior of the new stone shall be carved to match adjacent stones. Natural stratification should be parallel to the bedding plane.
 - (3) Insert new stone into removed and excavated area. Mortar new stone in place using mortar and construction methods in accordance with the REPOINTING MASONRY IN STRUCTURES, MODIFIED unique special provision.
- (c) Northwest Wingwall Rebuild
 - (1) Remove existing wingwall stones and matchmark stones for reinstallation in the same locations. Deteriorated stones shall be replaced with new stones at the direction of the Engineer. New stones shall be carved to match the adjacent stones size.
 - (2) Old and new stones shall be clean from debris before placing and mortaring in place. The exterior of new stones shall be carved to match adjacent stones.
 - (3) Mortar stones in place using mortar and construction methods in accordance with the REPOINTING MASONRY IN STRUCTURES, MODIFIED unique special provision.

Method of Measurement

Stone Abutment Repair will not be measured for payment.

Basis of Payment

Stone Abutment repair completed and in place will be paid for at the contract lump sum price for the work, complete in place.

Payment will be made under:

Pay Item

Pay Unit Symbol

Stone Abutment Repair LS

The cost of the materials, hardware, removal, matchmarking, field fabrication, labor, installation, cleanup, supervision, and all incidentals necessary to repair or replace the stones on the abutments shall be included in the cost of the pay item.

The cost of replacing a stone rather than repairing a stone shall be included in the cost of the pay item.

The Standard Specifications are revised as follows:

SECTION 712, BEGIN LINE 22, DELETE AND INSERT AS FOLLOWS:

Machine bolts, drift bolts, and dowels shall be medium steel. Machine bolts shall have square heads and nuts, unless otherwise specified. Nails shall be full-barbed, heavy, brightzinc coated or stainless steel, flat-head, ear nails. Lumber and timber shall be treated or untreated. Rods, plates, bars, and shapes shall be structural steel. Castings shall be steel or iron. Washers may be cast O. G. or malleable castings or they may be cut from medium steel plates. Spikes shall be cut, wire, or boat spikes. Spikes, bolts, dowels, washers, and lag screws shall be black or galvanized. New bolts and nuts shall be A325, type 3 with square heads. All washers shall be A588 steel and shall be square.

SECTION 712, AFTER LINE 43, INSERT AS FOLLOWS:

The Contractor shall obtain the services of a person or persons experienced in timber frame construction of historic structures. This shall include timber selection, orientation, measurement, layout, fabrication, and installation. This person shall be known as the Timber Framer.

The Timber Framer shall be in charge of and responsible for the selection of timber to be used for repair of the trusses. The Timber Framer shall be present at the job site at all times during the performance of timber framing work. The Timber Framer need not be present during other activities.

The Timber Framer shall have a minimum of five years of experience in timber frame construction of historic structures.

The Engineer will approve or reject the Contractor's Timber Framer within 10 calendar days following the submission of the report of names and verifiable resume information. Work on the bridge structure shall not commence until the Contractor receives written approval of its Timber Framer from the Engineer. In the event the Contractor elects to substitute an alternate, verifiable resume information shall be submitted to the Engineer prior to that individual's performance of timber framing related work. The Engineer will approve or reject the Contractor's proposed substitute within 10 calendar days. Failure to utilize the Timber Framer whose experience resumes were submitted may be cause for suspension of that portion of the work. Delays caused by the Contractor's failure to meet this requirement shall be the Contractor's sole responsibility and shall not be cause for extension of time.

SECTION 712, AFTER LINE 49, INSERT AS FOLLOWS:

Nails shall be used for connection of secondary structural timber members, i.e., bracing, roof system, and floor system, to each other and for their connection to the main structural timber members of the truss. The length of nail used shall be sufficient to provide a minimum of 1-1/2 in. penetration into structural timber members.

Nails shall be stainless steel or zinc coated steel. Pre-drilling of lumber and structural timber member may be required to avoid splitting of wood. 8d minimum length, ring shank nails

shall be used to attach siding and trim boards to the nailing boards. 16d minimum length, ring shank nails shall be used to connect the roof framing. 30d minimum length, ring shank nails shall be used to attach new floor plank boards. A minimum of two nails shall be used to connect boards to cross boards unless otherwise noted.

SECTION 712, AFTER LINE 96, INSERT AS FOLLOWS:

The Contractor shall install all existing timber members approved for reuse first and use new timber where sufficient existing timber is not available.

Timber shall be pre-drilled to avoid splitting of members.

Temporary bracing of the truss during construction shall be the responsibility of the Contractor.

Lower chord member and arch ring replacements shall terminate at an existing splice, utilize the existing member connection details, and produce a snug tight connection that is true and in line upon completion of the work. New splice locations shall be epoxy glued in accordance with the Epoxy Wood Adhesive specification. Upon completion of the timber work and prior to removal of the temporary support, the Contractor shall check all bolts to verify that they are all snug tight. Loose connections shall be tightened to snug, without damaging the connecting timber members. The Contractor shall use penetrating oil on all existing bolts when loosening or tightening. Broken or damaged bolts, nuts and washers shall be replaced with like size members. The truss shall be square prior to final tightening of metal members.

The Contractor shall temporarily support the truss while replacing members. The Contractor shall jack the existing structure to be level and square and to remove any built up stresses in the members being replaced. Member replacements shall be sized based on the jacked condition.

Lower chord replacements at splice blocks shall be epoxy glued in accordance with the Epoxy Wood Adhesive Specification.

The Contractor shall reinstall existing vertical nailing boards to the outside of the wood trusses at the locations shown on the plans. The nailers shall be shimmed and trimmed as necessary to produce a plumb and straight surface for attachment of the siding. Nailer boards shall be provided and installed at the portal ends of the bridge to match the existing conditions or as needed for installation of the portal siding to match existing siding conditions. The Contractor shall install all existing timber siding and timber nailers approved for reuse on the sides of the bridge near the ends of the bridge and install new members for the remainder of the structure. Siding boards shall be installed plumb and shall match the existing overlap. Portal Scrolls shall be reused if possible or replaced in kind if deteriorated. Prior to painting, existing nail holes and vertical joints between siding pieces shall be filled with house caulk suitable for outdoor windows and siding and guaranteed for at least 20 years. All timber siding shall terminate at the same location on the top and the bottom to provide a smooth line across the structure except at the arch ends where the siding shall extend 1" beyond the bottom of the arch. Laps for adjacent siding boards shall be staggered a minimum of 30 inches and lap locations shall be randomized across the bridge.

SECTION 712, BEGIN LINE 156, DELETE AND INSERT AS FOLLOWS:

The surfaces shall be painted with 1 coat of waterborne finish paintin accordance with the painting specification. The paint shall be applied by brush or roller only and at the rate recommended by the manufacturer. All finishes shall be uniform in texture and color. If a painted surface is unsatisfactory, the paint shall be removed and the surface shall be cleaned and repainted or corrected as may be directed.

SECTION 712, BEGIN LINE 180, INSERT AS FOLLOWS:

If new top course floorboards are required, the Contractor shall install the new top course plank floorboards in the wheel lines of the vehicles. Top plank floorboards shall be a minimum of 9 in. in width, shall match the existing timber cross section size, and shall have random staggered splice location. Bottom course plank floorboards shall run full width of the floor.

SECTION 712, BEGIN LINE 190, INSERT AS FOLLOWS:

Structural Timber, Truss will be measured for payment by the actual board feet, BDFT, of timber used for the restoration of the timber truss, obtained using actual sizes and actual lengths of timber members replaced.

Timber siding will be measured for payment by the actual square foot of timber siding installed, whether reusing existing siding or using new siding. Measurements will be based on the final trimmed dimensions.

SECTION 712, BEGIN LINE 197, DELETE AND INSERT AS FOLLOWS:

The accepted quantity of Structural Timber, Truss will be paid for at the contract unit price per board feet measure, BDFT.

The accepted quantity of Timber Siding will be paid for at the contract unit price per square foot.

Payment will be made under:

Pay Item

Pay Unit Symbol

Lumber and Timber, Treated	MFBM
Lumber and Timber, Untreated	MFBM
Metal Parts	LBS
Plank Floors, Ply	SFT
Structural Timber, Truss	BDFT
Timber Siding	<i>SFT</i>

The cost of preservative treatment, hardware, *pre-drilling, checking, and tightening of metal connections, painting, and necessary incidentals shall be included in the cost of the pay items.*

The cost of installing existing or new timber siding, timber scrolls at portal ends, and all other exterior face timber at portals shall be included in the cost of Timber Siding.

The cost of installing existing or new plank floor shall be included in the cost of Plank Floor, Single Ply.

The cost of installing new arch or truss members and all work associated with epoxy gluing new and old lower chord members back together at splice locations shall be included in the cost of Structural Timber, Truss.

The cost of all labor, equipment, materials, including nails, batten boards, timber nailers, caulk, windows, window framing, and all incidentals necessary to complete the work shall be included in the cost of Timber Siding.

TIMBER, TRUSS REPAIR

Description

This work shall consist of repairing timber truss members by removing a piece of the existing member where needed and splicing in a replacement timber piece as shown on the plans, in accordance with 712, and as directed by the Engineer.

Materials

Timber for truss repairs shall be cut from existing truss members that have been removed and replaced with new members and shall be in good condition and not be rotted or split. Epoxy shall be per the Epoxy Wood Adhesive specification. Bolts shall be ASTM A325, type 3.

Construction Requirements

The Contractor shall temporarily support the truss where the member is to be repaired.

For timber rot, the Contractor shall remove the damaged area of wood by sawing to remove a rectangular piece of the member. The Engineer will verify that the remaining timber is sound by poking with an awl. If the remaining timber is unsound, additional removal shall be required. The Contractor shall not install the new timber piece until the removal limits have been approved by the Engineer.

The Contractor shall cut a replacement piece from salvaged truss members that have been replaced. The replacement piece shall be sound and not be rotted or split. If adequate salvaged timber is not available, the Contractor shall utilize new timber meeting the requirements of Structural Timber, Truss.

The Contractor shall cut the replacement piece to fit tight with the existing timber and to match the existing timber surfaces and grain direction. The Contractor shall apply paste, gel or non-sag epoxy to all surfaces of the existing timber member being repaired and to the replacement member surfaces to be bonded in accordance with the Epoxy Wood Adhesive specification. For timber rot locations, the Contractor shall install a minimum of two lag bolts to further connect the patch to the original member. If the short plan dimension of the truss repair piece is greater than or equal to eight inches, four lag bolts shall be installed. Lag bolts shall be predrilled and installed in accordance with the National Design Specifications for Wood Construction, current edition. One washer per bolt shall be utilized. The Contractor shall install additional temporary clamping as necessary to hold the pieces together until the epoxy has set.

Method of Measurement

Timber, Truss Repair will be measured for payment by the actual number of truss repair locations completed, per each and will include both rot repairs and diagonal gap repairs.

Basis of Payment

Timber, Truss Repair will be paid for at the contract unit price per each.

Payment will be made under:

Pay Item Pay Unit Symbol Timber, Truss Repair EACH

The cost of all labor, equipment, materials, and all incidentals necessary to complete the work shall be included in the cost of the pay item.

The cost of temporarily supporting the truss shall be included in the cost of Temporary Support.