WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Joe Manchin III
Governor

September 2, 2009

MEMORANDUM

TO: DD

FROM: DDC

SUBJECT: State Project S217-23/9-8.40
Federal Project BR-0239(003)D
Ann Moore Run Bridges Replacement Study
Harrison County

The Design Study Unit of the Initial Design Section (DDC) has completed the Draft Study Report for the Ann More Run Brides Replacement, dated August 2009 and has made a recommendation as to the preferred alternative for its replacement. A copy of the 2009 Draft Study Report and our evaluation documents are attached for your reference.

A Field Review for the Ann Moore Run Bridges is scheduled to be held on September 29, 2009. Those wishing to attend shall meet at the site at 10:00 a.m. to review and discuss the alternatives within the Draft Study. Please provide written comments to Harry Bradley, either at this meeting or via email at Harry.A.Bradley@wv.gov.

We look forward to your participation and input with regard to this project. If you have any questions, please contact Harry Bradley (304-558-9726) or Feras Tolaymat (304-558-9713), leader of the Design Study Unit.

CJB:HB:fl

Attachments

cc: DDC(HAB, FT), DDM(ME), DDR(Road, Util.), DDI(Br., Geo.), DDT(Perm., Util.), DDE, CP(GTI, GA), DT-Design, DT-Operations, DR-Est., D4-E/M, D4-R/W, D4-Bridge, CH(CR)

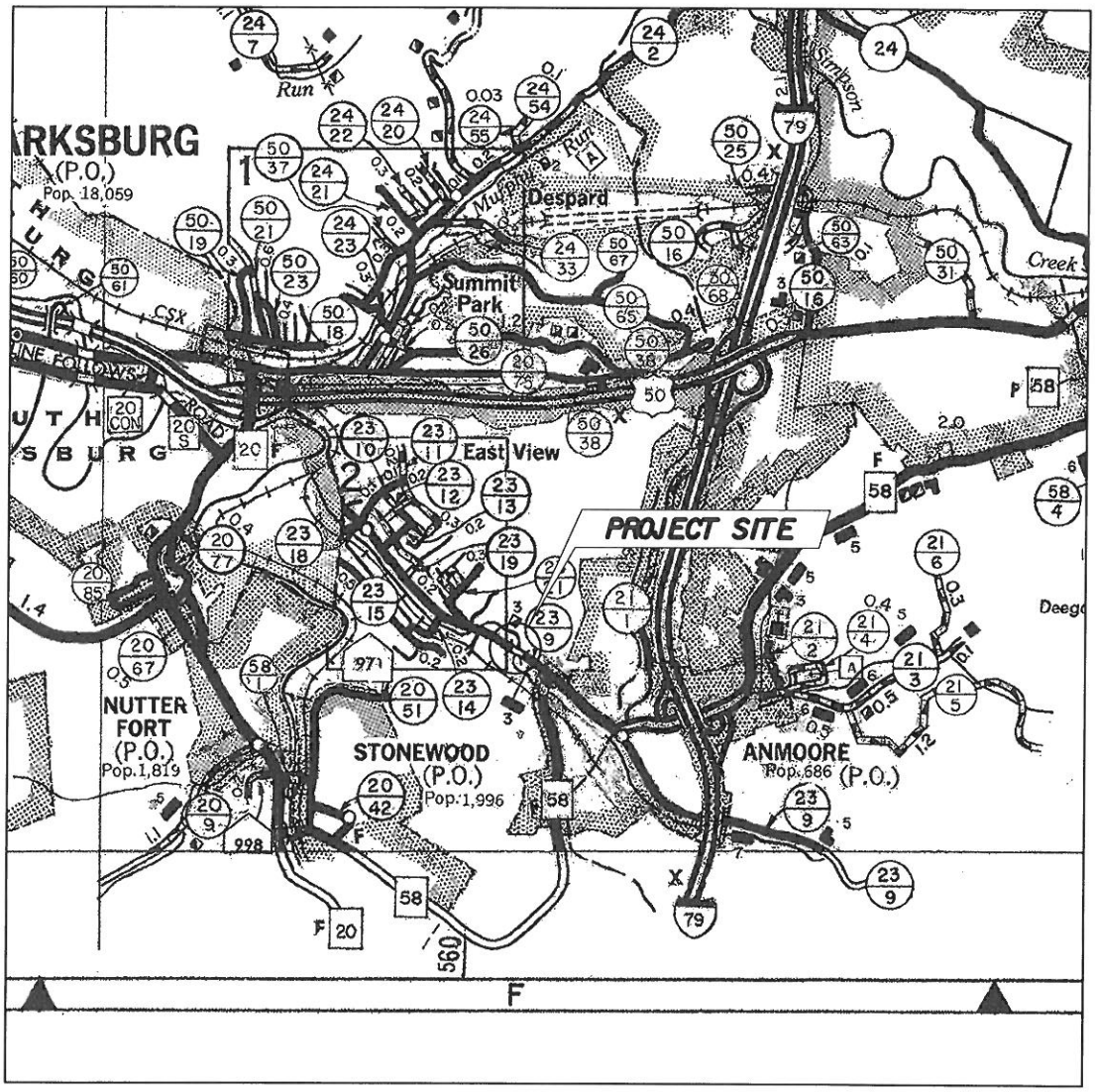
BRIDGE REPLACEMENT STUDY

ANN MOORE BRIDGES

STATE PROJECT S217-23/9-8.40

FEDERAL PROJECT BR-0239(003)D

HARRISON COUNTY



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

ENGINEERING DIVISION

AUGUST 2009

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LOCATION MAP

ANN MOORE RUN BRIDGES
STATE PROJECT S217-23/9-8.40
FEDERAL PROJECT BR-0239(003)D
HARRISON COUNTY

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PROJECT SUMMARY

The Initial Design Section (DDC) conducted a study to evaluate and determine the most suitable and economical location for the replacements of the existing Ann Moore Run Bridges in Harrison County. The four bridges are on County Route 23/9, crossing over Ann Moore Run. Anmoore Bridge 1 is located at mile marker 8.40 which is approximately 0.11 miles south of CR 23/19. This bridge is 28 feet 4 inches in length and 22 feet 9 inches wide, and has a sufficiency rating of 24.2. Anmoore Bridge 2 is located at mile marker 8.28 which is approximately 0.01 miles south of CR 23/14. This bridge is 28 feet 4 inches in length and 35 feet 2 inches wide, and has a sufficiency rating of 41.2. Anmoore Bridge 3 is located at mile marker 8.13 which is approximately 0.05 miles south of CR 23/21. This bridge is 28 feet in length and 30 feet wide, and has a sufficiency rating of 22.3. Anmoore Bridge 4 is located at mile marker 8.00 which is approximately 0.18 miles south of CR 23/21. This bridge is 29 feet 3 inches in length and 23 feet 9 inches wide, and has a sufficiency rating of 41.2. County Route 23/9 is functionally classified as an urban collector with a posted speed limit of 35 mph. Traffic consists of all types of vehicles, including trucks, school buses and mail carriers. Current traffic data obtained indicates the 2009 Average Daily Traffic (ADT) to be 5,900 Vehicles per Day (VPD) with a 20-year (2029) projected design ADT of 8,400 VPD.

The study was conducted utilizing information obtained from an initial field visit, bridge inspection reports, detailed topographic surveys, District Bridge Engineer's comments and information gathered from various other sources. Major factors taken into consideration were; determining if a physical location was available that would be suitable for construction of a replacement bridge, cost comparison of the alternative alignments, safety, right-of-way acquisitions, constructability issues, and environmental impacts.

Because this is a project utilizing bridge replacement funding, the focus and evaluation of this project centered solely on the most suitable and feasible location for the replacement bridges with only minimal impact or changes to the roadway.

From the information collected and evaluated, it is recommended that new single-span bridges with integral stub abutments be placed at the locations of the existing bridges. By utilizing stop lights, one lane of alternating traffic will be maintained on the existing bridge utilizing a-lane-at-a-time type construction.

Alternative 1 maintains the most suitable roadway alignments within the limits of this project for vehicles operating along this portion of CR 23/9.

Based on the evaluations of all the alternatives studied, it is the recommendation of the West Virginia Department of Highways to accept Alternative 1 as the preferred alignment.

EXISTING CONDITIONS[1]

Three of the existing bridges were built in 1916 and the fourth was built in 1920. At least two of them were built by the Concrete Steel Bridge Company of Clarksburg, West Virginia. The structures consist of single reinforced cast in place concrete slab spans (SCSL) supported by reinforced concrete abutments on unknown foundation types. The four bridges have widths that vary from 22 feet 9 inches to 35 feet 2 inches between the faces of the guardrails or parapets and lengths that vary from 28 feet to 29 feet 3 inches. Each bridge has been widened over the years by extending the abutments and adding onto the deck. None of the bridges have a raised sidewalk, but foot traffic can be accommodated on the shoulders. The original reinforced concrete decks vary from 11 inches to 2 feet thick and have been overlaid with at least 2 inches of a Hot Laid Bituminous Concrete (HLBC) wearing surface. Some of the decks have a layer of sand and a layer of bricks under the HLBC. The distance from the lowest point on the bottom of the bridge decks down to the stream channel bottom varies from 5 feet 3 inches to 7 feet 3 inches at the deepest points. No feasible detour is available within the community of East View, but traffic could be detoured completely around the town by using various existing routes. These various detour routes would function more as a bypass than an actual detour and would be many miles in length.

Existing Roadway Geometry

The existing structures 1, 3 and 4 are located in a tangent section of roadway, while 2 is located on a right-hand curve. The abutments of the structures in general are parallel to the stream and the sight distance is adequate.

[1] See Figure 1

Ann Moore Run Hydraulic Analysis

Ann Moore Run enters into Elk Creek approximately 1 mile downstream from Bridge 1. The FEMA Flood Insurance Rate Map[2] No. 540053 0087 B for Harrison County, dated July 4, 1988, shows that all the bridges are located within Flood Zone A.

Existing Properties and Utilities

These bridges are situated in an urban area of Harrison County south of the city of Clarksburg. Various city streets intersect CR 23/9 at or near each bridge. There are several business properties adjacent to all the bridges. There are no encroachments on the roadway portion of any of the structures. Utility poles facilitating electric, telephone and TV lines run along the left-hand side of CR 23/9, as do two gas lines and a sewer line which are all visible over the waterway. The gas and sewer lines pass thru the wingwalls of Bridge 4. Markers indicate that a waterline runs under the stream on the right-hand side of the roadway on Bridges 1, 2 and 3.

DESIGN CRITERIA AND GUIDELINES

Harrison County Route 23/9 is currently classified as a Rural Minor Collector with a 2009 Average Daily Traffic count of 5,900 vehicles. During our site visit, it was determined that the project falls within rolling terrain criteria.

No sidewalk currently exists on the bridges or along the roadway; therefore, we do not anticipate the need to accommodate pedestrian or bicycle traffic on a designated raised sidewalk on the bridges. Pedestrians will be able to use the shoulders to cross the bridges.

GEOTECHNICAL OVERVIEW

A geotechnical engineer visited the area and performed limited research of available information. Based on our records, previous boring information is not readily available from our Charleston office. All four bridges where reviewed considering the lane-at-a-time and the temporary bridge alternatives. Based on our visit, we believe that bedrock is relatively shallow at all four bridge sites. The streambed is gravelly with numerous cobbles.

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[2] See Appendix C

The topography of this portion of the Clarksburg area consists of relatively low hills with steep hillsides. The valleys are generally narrow and the hilltops are sharp. The relief near the bridges is about 400-ft from the flood plane to the hilltop. Based on the Doddridge and Harrison Counties geologic map, dated 1912, the site is situated on the eastern rising limb of the Shinnston Syncline. The dip of the strata is to the northwest at an average rate of 0.023 feet per foot.

Strata exposed at the surface are Pennsylvanian aged rock which contains the productive Pittsburgh coal seam. Based on our review of the WVDEP Interactive Mapping and the WVGES Inactive Coal Bed Mapping web pages, both underground and contour mining is the prevalent in the Pittsburgh seam on both hillsides above the project site. No productive coal seams appear beneath the valley floor and Pittsburg seam is above bridges by about 200-ft.

Based on our overview, we do not anticipate unusual mining, geologic, or geotechnical hazards within the project area for either alternative. We do not have geotechnical concerns for either alternative; however, the lane-at-a-time method may find it difficult to embed temporary shoring into the anticipated shallow bedrock.

ENVIRONMENTAL OVERVIEW

From the biological standpoint, no RTE species were found and the project is not near any listed mussel streams. We are still awaiting a response from DNR to confirm. Archaeology/History is not needed because all construction activities will be within our existing right of way. A report needs to send to SHPO for concurrence.

DESIGN ALTERNATIVES

Due to special site conditions, the following alternatives were evaluated for this project. Alternative 1 proposes placing a new bridge at the same location of each existing bridge using prestressed precast concrete box beams with a cast in place reinforced concrete deck supported on reinforced concrete stub abutments. Construction would be accomplished by using part of each existing bridge to maintain traffic while building more than one-half of the new bridge. Traffic would be diverted onto the newly constructed section of the bridge and then the second section of the bridge constructed. Alternative 2 suggests maintaining traffic on temporary

bridges while building new ones at the same locations. The third alternative would be a No-Build alternative.

It is proposed that the approaches have two (2) 11-foot lanes with two (2) 4-foot shoulders to match the existing approach typical sections. The bridges will also have two (2) 11-foot lanes with two (2) 4-foot shoulders.

Design Criteria Description	Design Criteria	Design Exception
Design Speed	35 mph	No
Roadway width	22 feet	Yes
Shoulder Width	4-foot shoulders	Yes
Bridge Clear Width curb to curb	30 feet	Yes

a) Alternative 1 (Recommended)

Alternative 1[3] consists of replacing the four Ann Moore Run Bridges at their current locations utilizing a lane-at-a-time type construction while maintaining traffic on a portion of the existing bridges and approaches. A temporary traffic signal will be needed during construction. The new roadway centerline will be shifted to the right of the existing bridges. The easterly edge of pavement will be at about the same location. A temporary concrete barrier (TCB) will be placed on the deck and approaches of each bridge providing at least a 12-foot traffic lane. The portion of the bridge behind or to the right of the TCB will be removed, allowing a portion of the proposed bridge to be built to accommodate a TCB and one finished traffic lane and shoulder, to shift traffic onto while constructing the remaining section of the new bridge. The new bridges would be constructed with prestressed precast concrete box beams made composite with a cast in place reinforced concrete deck supported on stub abutments. Traffic would be shifted onto the new section of each bridge and then the remainder of the existing bridges would be removed and the rest of the new bridges constructed. This alternative proposes single-span bridges of approximately 38 feet, 40 feet, 38 feet and 38 feet in length with a clear width of 35 feet, 38 feet, 35 feet, 35 feet consisting of two (2) 11-foot lanes, with a 4-foot shoulder to the west and a 9-foot shoulder on the east

[3] See Figures 2, 6 and 7.

side of the roadway, except bridge # 4 where an extra beam was added to fit a turning radius of 30 feet. A minimal amount of new approach work would be necessary at each end of the proposed bridges to tie back with the existing roadway.

Utility relocations are anticipated to be moderate with possibly telephone, power lines and water lines being affected. All work will be performed within our right of way.

Our construction estimate is based on using adjacent 17 inch, 21 inch, 17 inch and 17 inch deep prestressed precast concrete box beams with a 5.5-inch thick reinforced concrete deck supported on reinforced concrete stub abutments.

Estimated cost for Alternative 1 is as follows:

4 Bridges	$1,896,200
Roadway	$ 908,000
E&C (19%)	$ 532,800
Total Construction	$3,337,000
Future Value[5]	$4,212,000
Preliminary Engineering	$ 440,000
ROW/Utilities	$ 120,000
Total	$4,772,000

b) Alternative 2

Alternative 2[4] consists of replacing the four Ann Moore Run Bridges at their current locations while utilizing a temporary bridge and roadway to maintain traffic either upstream or downstream, depending on the current locations of the existing bridges relative to the stream flow. This alternative would maintain the existing roadway geometry, keeping the new bridges at the same location. This alternative proposes single-span bridges ranging between 38 feet, 40 feet, 38 feet and 38 feet in length with a 30-foot clear width, except bridge # 4 where an extra beam was added to fit a turning radius of 30 feet. The bridge type would be the same as proposed in Alternative 1. Minimal new approach work would be necessary north and south of the proposed bridges.

[4] See Figures 2, 3, 4 and 5.

Each proposed temporary detour will have a total length of approximately 300 feet, including the temporary bridge. The temporary detour will have two (2) 10-foot lanes with two (2) 2-foot shoulders and will be designed for 20 mph.

Construction of the temporary detour would not require placement of any fill material into the creek.

Right-of-way involvement would be moderate. It may include temporary construction easements for the temporary detour. Utility relocations are anticipated to be minimal with possibly telephone, power lines and waterlines being affected.

Our construction estimate is based on using adjacent prestressed precast concrete box beams with a 5.5 inch thick reinforced concrete deck supported on reinforced concrete stub abutments.

Estimated cost for Alternative 2 is as follows:

4 Bridges	$1,572,600
Roadway	$ 990,500
Detour	$ 423,100
E&C (19%)	$ 567,400
Total Construction	$2,563,100
Future Value[5]	$4,486,000
Preliminary Engineering	$ 460,000
ROW/Utilities	$ 320,000
Total	$5,266,000

c) No-Build Alternative

Due to the deteriorating condition of the existing structures, the No-Build Alternative would eventually result in the permanent closure of the bridges to traffic. No feasible detour is available within the community of East View, but traffic could detour completely around the town by using various existing routes. These various detour routes would be more of a bypass than an actual detour which would be many miles in length.

[5] Note: Future value of construction cost using compound interest { FV=PV(1+i)^n} has been calculated from the estimate date of June, 2009 to construction period midpoint of spring 2014, using inflation rate of 4%.

If just one of the bridges were to need to be closed to traffic a minor problem would be created. But if a second one would need to be closed, a major problem would arise in that certain sections of the town would not have any available detour route to access the rest of the town. Therefore, the No-Build Alternative would not be a prudent alternative.

CONCLUSION / RECOMMENDATION

Alternative 1 provides an acceptable flow for the future traffic within the project area. It is the West Virginia Department of Highways', Engineering Division, Initial Design Section's recommendation to construct Alternative 1. This alternative proposes the construction of four new Ann Moore Run Bridges at their current locations, utilizing a lane-at-a-time type construction while initially maintaining traffic on a portion of the existing bridges and approaches. A temporary traffic signal system will be required to regulate the flow of traffic. The recommended bridge type would be adjacent prestressed precast concrete box beams with a cast in place reinforced concrete deck with integral reinforced concrete stub abutments and approach slabs. It is further recommended that the new abutments be placed behind the existing ones. This will allow the existing abutments to act as cofferdams during the construction of the new abutments.

Our recommendation is to split the construction into two phases, bridges 1 & 2 as Phase I and bridges 3 & 4 as Phase II

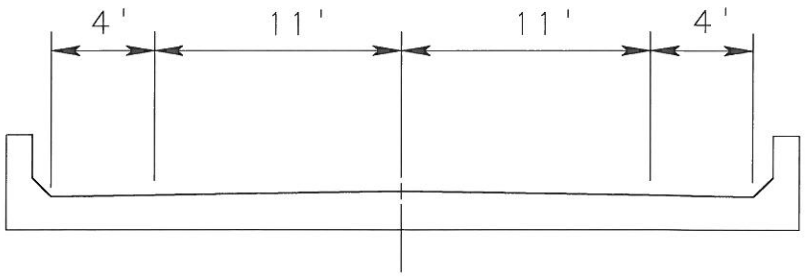
APPENDIX "A"

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.				200			

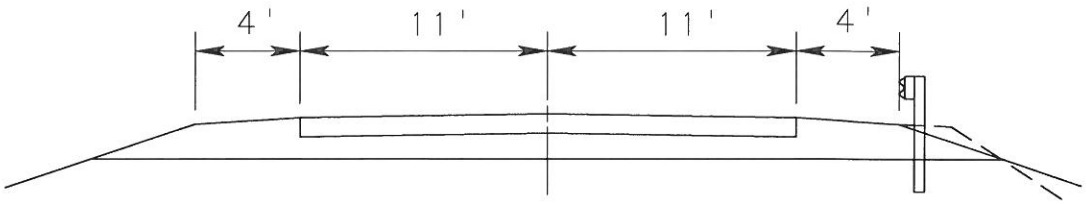
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

EXISTING CONDITIONS



PROPOSED BRIDGE

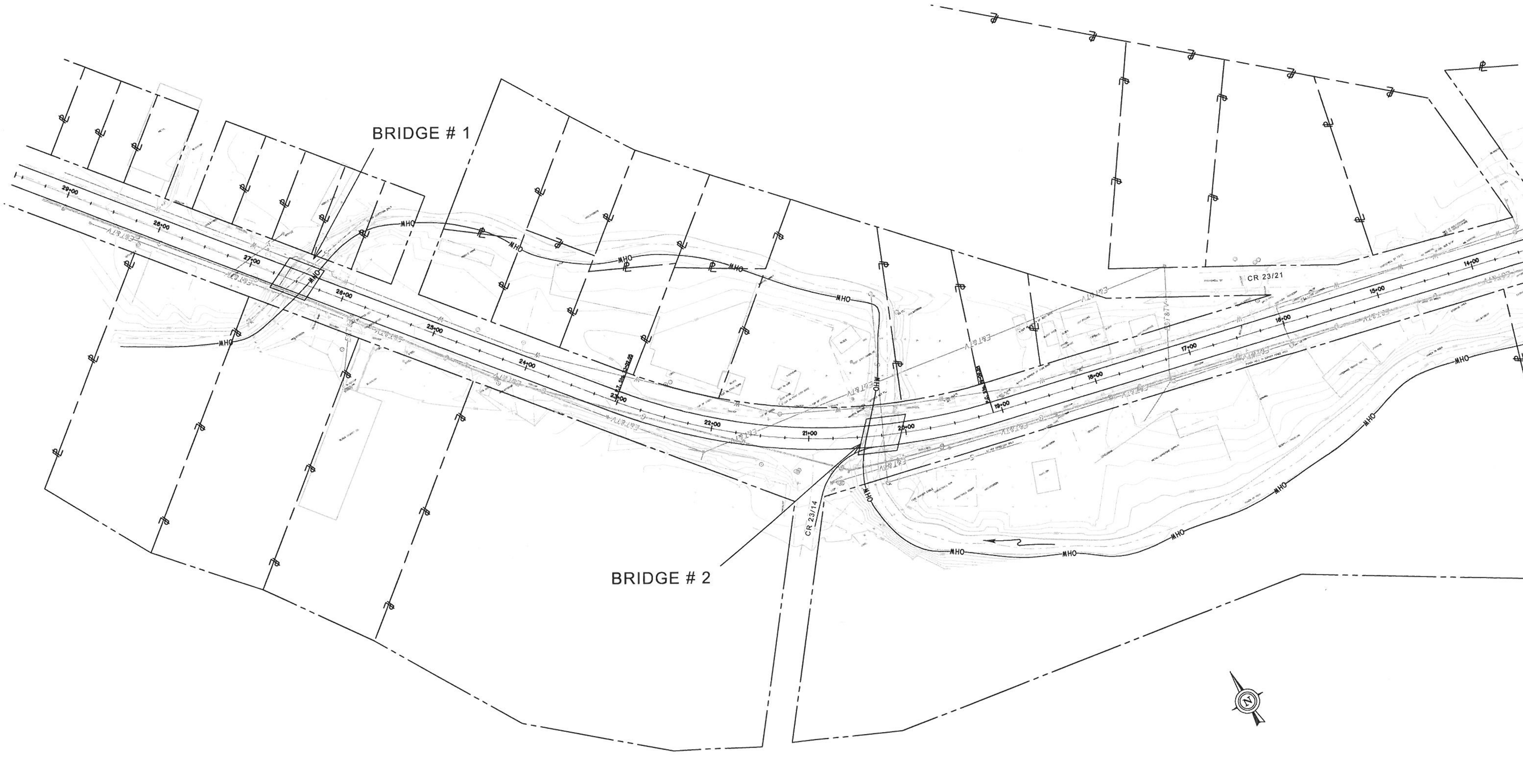


ROADWAY TYPICAL SECTION

FIGURE 2

ROADWAY FUNCTION CLASSIFICATION URBAN COLLECTOR DESIGN EXCEPTION NEEDED YES	A.D.T. (2009) 5,900	BRIDGE REPLACEMENT STUDY ANN MOORE BRIDGES STATE PROJECT S217-23/9-8.40 FEDERAL PROJECT BR-0239(003)D HARRISON COUNTY
SUFFICIENCY RATE. 24.2 INVENTORY NO. 17A138	(2029) 8,400	THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.				200			



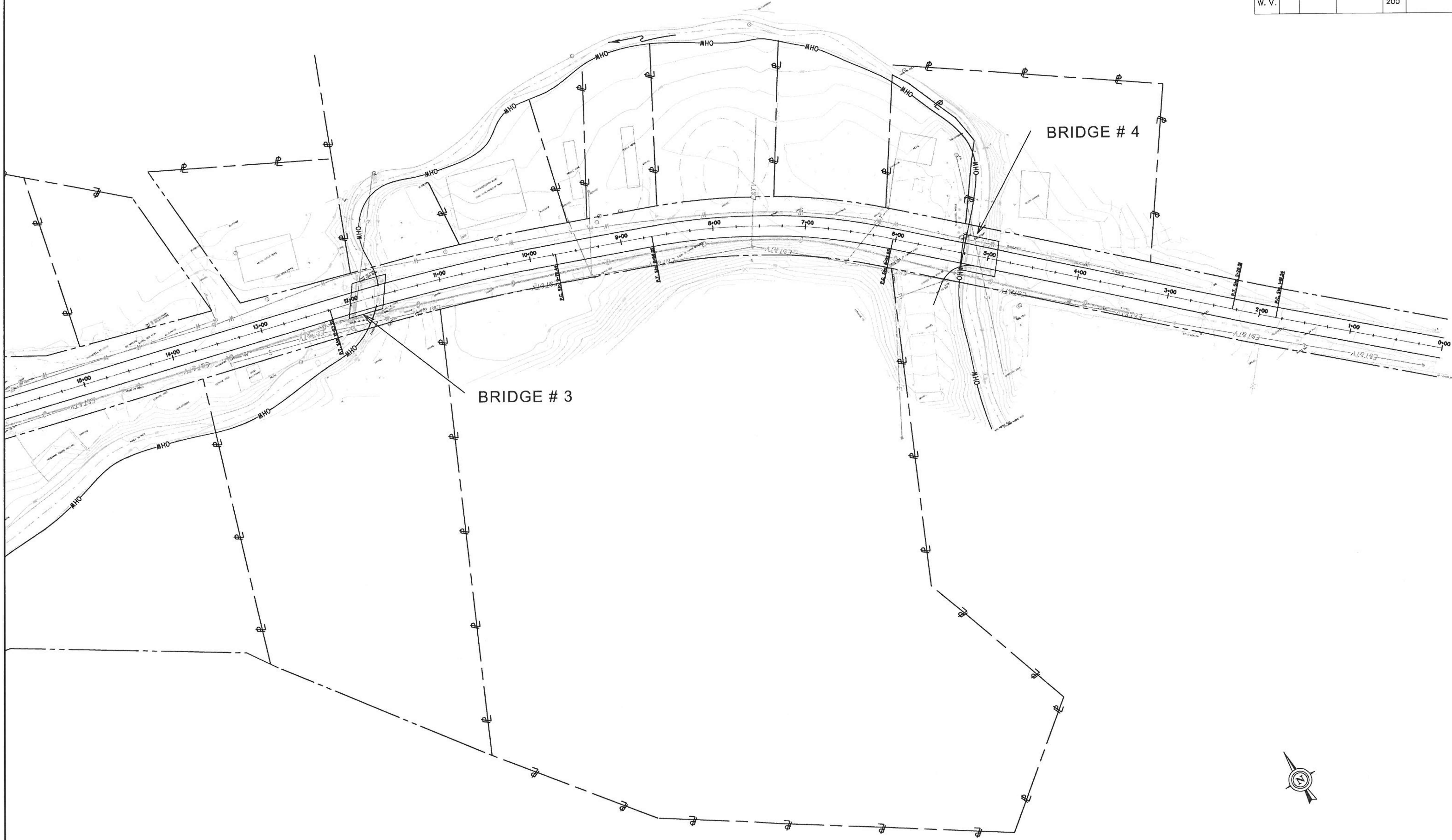
SCALE : 0 50 ft.

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALTERNATIVE # 1

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.				200			



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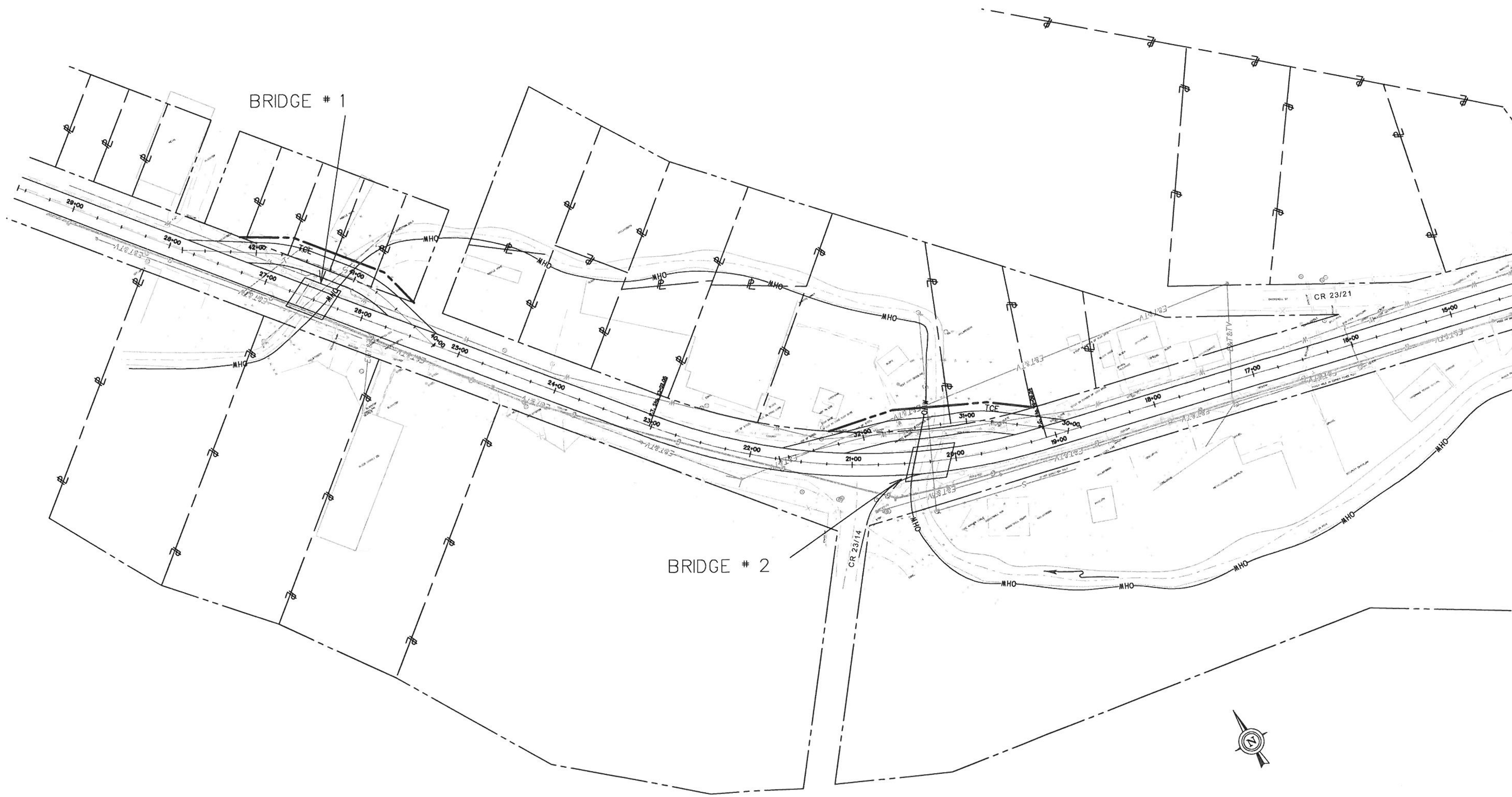
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALTERNATIVE # 1

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.				200			



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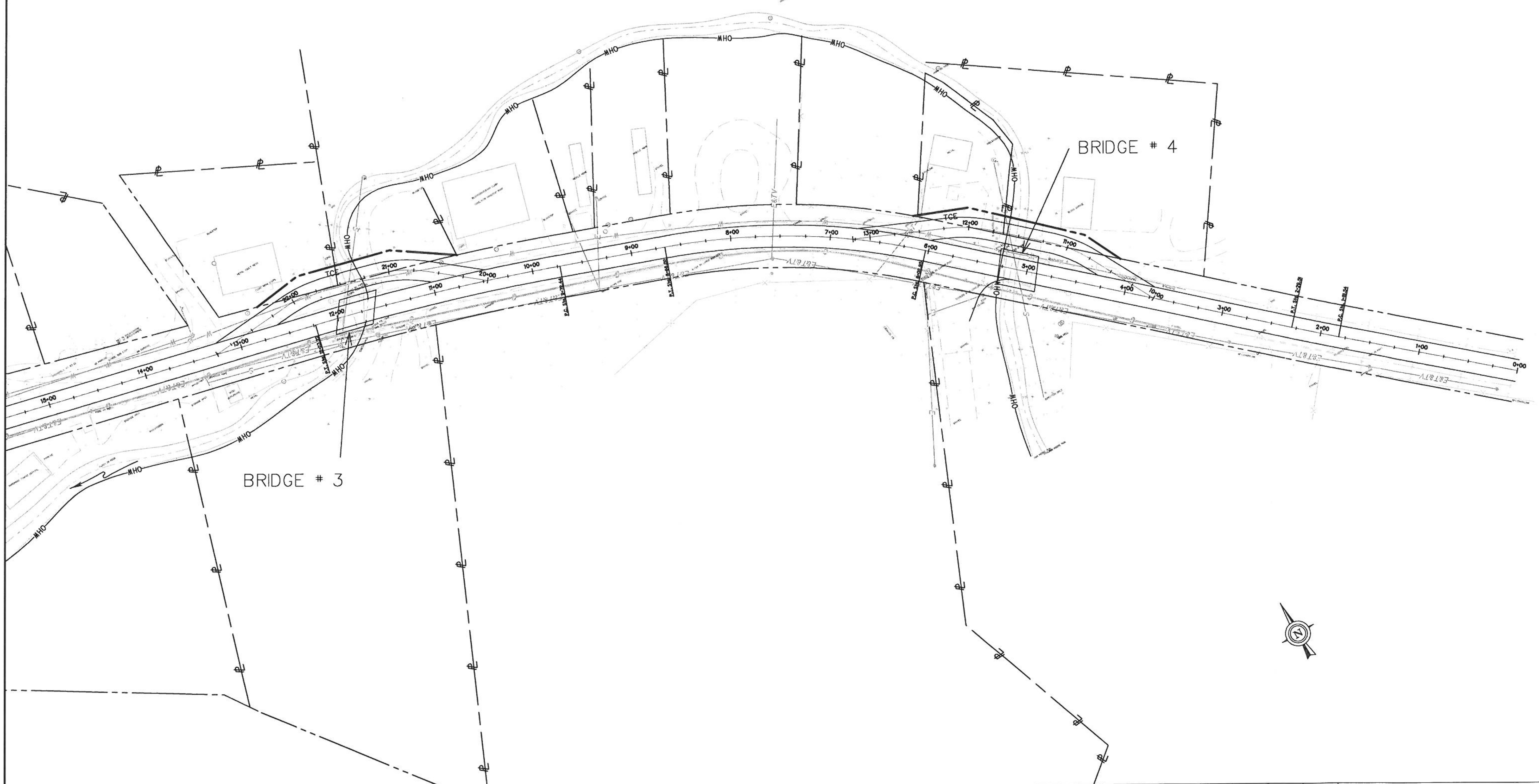
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALTERNATIVE # 2

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.				200			



SCALE : 0 50 ft.

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALTERNATIVE # 2

APPENDIX "B"

Bridge Cost Estimate
Anmoore Bridges
Alternative # 1, In-Place, All 4 bridges

	Estimated Cost	
ROADWAY	Actual	Rounded
Clearing and Grubbing	$ 15,000.00	$ 15,000.00
Earthwork	$ 35,000.00	$ 35,000.00
HMA Wearing & Base	$ 16,130.40	$ 16,100.00
Aggregate (Base & Sh)	$ 19,660.25	$ 19,700.00
Subgrade	$ 8,555.56	$ 8,600.00
Drainage	$ 62,500.00	$ 62,500.00
M.O.T.	$ 105,000.00	$ 105,000.00
Erosion Control	$ 60,000.00	$ 60,000.00
Approach Slab	$ 106,600.00	$ 106,600.00
All Other Items	$ 301,016.93	$ 301,000.00
Mobilization	$ 133,533.16	$ 133,500.00
Total Roadway Construction	$ 862,996.29	$ 863,000.00
FOUR BRIDGES		
Dismantling Structures	$ 140,000.00	$ 140,000.00
Structure Excavation	$ 90,801.00	$ 90,800.00
Select Material for B.F.	$ 37,774.00	$ 37,800.00
Slope Protection	$ 149,200.00	$ 149,200.00
Class B Conc	$ 377,452.00	$ 377,500.00
Class K Conc	$ 22,533.00	$ 22,500.00
Class H Conc	$ 151,433.00	$ 151,400.00
Reinforced Steel Bars	$ 115,367.00	$ 115,400.00
Epoxy Reinforced Steel Bars	$ 43,786.00	$ 43,800.00
Box Beams	$ 330,220.00	$ 330,200.00
All Other Items	$ 437,571.00	$ 437,600.00
Total Bridge Construction	$ 1,896,137.00	$ 1,896,200.00

	Estimated Cost	
	Actual	Rounded
4 Bridges	$ 1,896,200.00	$ 1,896,200.00
Roadway	$ 907,996.29	$ 908,000.00
E&C (19%)	$ 532,797.30	$ 532,800.00
	$ 3,336,993.58	$ 3,337,000.00
Future V alue	$4,211,921.03	$4,212,000.00
Engineering	$ 440,000.00	$440,000.00
R/W	$ 50,000.00	$ 50,000.00
Utilities	$ 70,000.00	$ 70,000.00
Total	$4,771,921.03	$4,772,000.00

Bridge Cost Estimate
Anmoore Bridges
Alternative # 2, In-Place

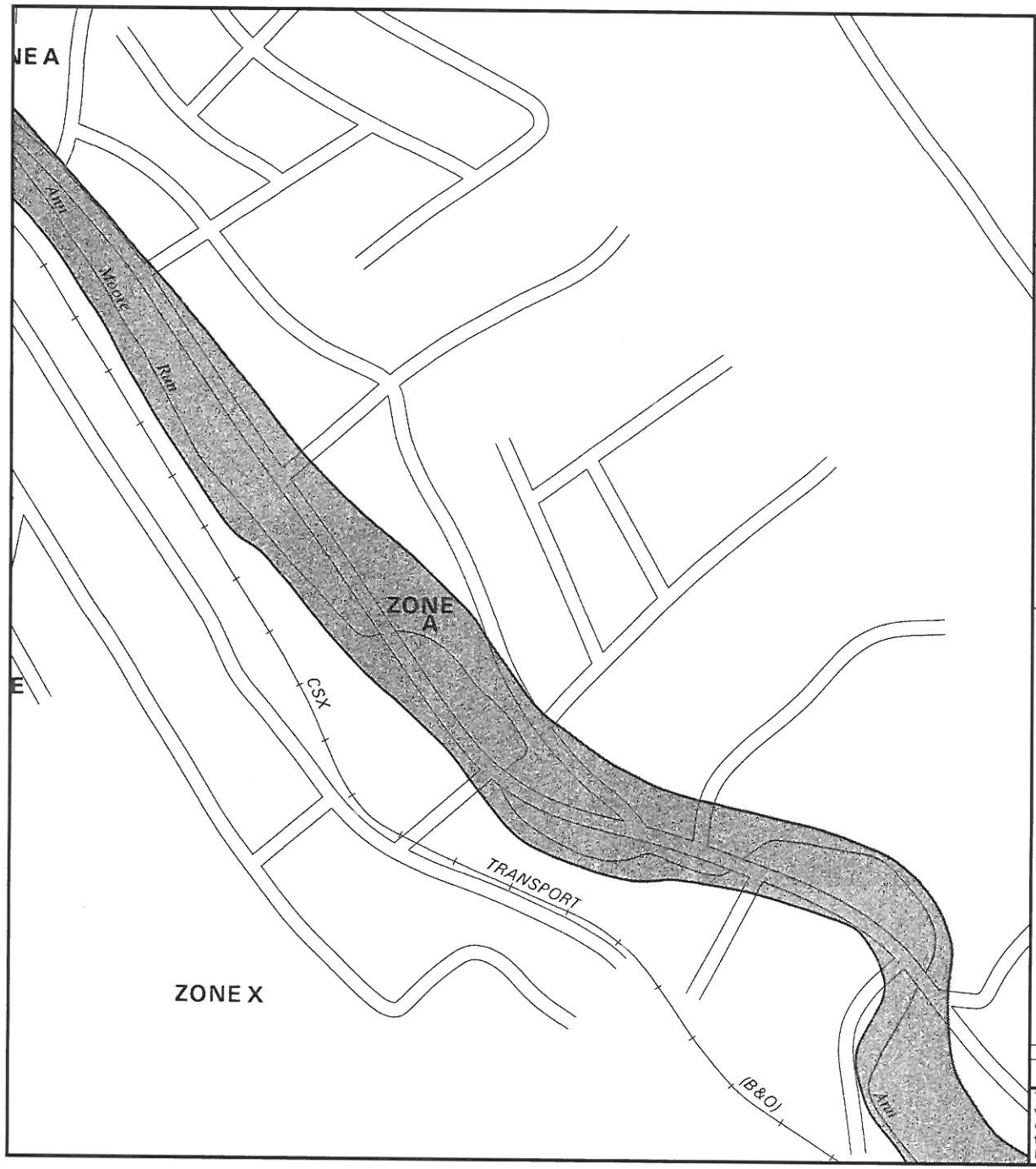
	Estimated Cost	
ROADWAY	Actual	Rounded
Clearing and Grubbing	$ 15,000.00	$ 15,000.00
Earthwork	$ 75,000.00	$ 75,000.00
HMA Wearing & Base	$ 16,130.40	$ 16,100.00
Aggregate (Base & Sh)	$ 19,660.25	$ 19,700.00
Subgrade	$ 8,555.56	$ 8,600.00
Drainage	$ 62,500.00	$ 62,500.00
M.O.T.	$ 169,200.00	$ 169,200.00
Erosion Control	$ 60,000.00	$ 60,000.00
Approach Slab	$ 106,600.00	$ 106,600.00
All Other Items	$ 310,646.93	$ 310,600.00
Mobilization	$ 142,199.45	$ 142,200.00
Total Roadway Construction	$ 985,492.58	$ 985,500.00
FOUR BRIDGES		
Dismantling Structures	$ 100,000.00	$ 100,000.00
Structure Excavation	$ 80,919.00	$ 80,900.00
Select Material for B.F.	$ 34,936.00	$ 34,900.00
Slope Protection	$ 149,200.00	$ 149,200.00
Class B Conc	$ 341,748.00	$ 341,700.00
Class K Conc	$ 22,534.00	$ 22,500.00
Class H Conc	$ 133,467.00	$ 133,500.00
Reinforced Steel Bars	$ 105,156.00	$ 105,200.00
Epoxy Reinforced Steel Bars	$ 39,445.00	$ 39,400.00
17" Box Beams	$ 303,240.00	$ 303,200.00
All Other Items	$ 262,129.00	$ 262,100.00
Total Bridge Construction	$ 1,572,774.00	$ 1,572,600.00

	Estimated Cost	
	Actual	Rounded
4 Bridges	$ 1,572,600.00	$ 1,572,600.00
Roadway	$ 990,492.58	$ 990,500.00
detours	$ 423,095.85	$ 423,100.00
E&C (19%)	$ 567,375.80	$ 567,400.00
	$ 2,563,071.65	$ 2,563,100.00
Future V alue	$4,485,274.41	$4,486,000.00
Engineering	$ 460,000.00	$460,000.00
R/W	$ 250,000.00	$250,000.00
Utilities	$ 70,000.00	$ 70,000.00
Total	$5,265,274.41	$5,266,000.00

File: Ann Moore cost estimate, Tab: alt #2

Printed: 10/27/2011, 10:14 AM

APPENDIX "C"



638-6620.

APPROXIMATE SCALE

500 0

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

HARRISON COUNTY,
WEST VIRGINIA
UNINCORPORATED AREAS

PANEL 87 OF 150
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
540053 0087 B

EFFECTIVE DATE:
JULY 4, 1988

Federal Emergency Management Agency

Existing Bridge # 3

Utility encroachments on all bridges

Ann Moore Run, looking upstream, Bridge # 3

Looking north, Bridge # 3

Existing Bridge # 2

Ann Moore Run, looking downstream, Bridge # 2

Existing Bridge # 1

Ann Moore Run, looking downstream, Bridge # 1

APPENDIX "D"

Hydraulic Evaluation Report for Anmoore Bridges
Harrison County Route 23/9 over Anmoore Run
State Project Number: S217-23/9-8.40

The West Virginia Division of Highways plans to replace the existing Anmoore Bridges 1 thru 4 having a 28'-4", 28'-4", 28'-0", 29'-3" spans concrete slab bridges with a new box-beam bridge of length 38'-0", 38'-0", 40'-0", 38'-0" spans. The profile grade of the proposed bridge and approach roadway are essentially the same as the existing. The new beams depth will be 17"-17"- 21"- 17" with 5.5" concrete deck compared to the existing 30" concrete slab. No fill will be placed within the bridge opening, or at any other location where it would obstruct the flow of the creek.

CRITERIA TO DETERMINE THE NEED FOR HYDRAULIC ANALYSIS FOR BRIDGE REPLACEMENTS

When bridges are replaced, there is a potential to increase the water surface elevation of flood events. If the existing conditions will be changed in any of the following ways, then a detailed hydraulic analysis will be required to prove that the water surface elevation will not be raised:

1. The roadway profile or bridge deck elevation is raised.
2. The bottom elevation of the bridge is lowered.
3. The clear span is shorter than the existing bridge.
4. Fill is placed within the bridge opening, or at another location where it obstructs the flow.

If the proposed project does not include any of the changes listed above, then it may be acceptable to construct the replacement structure without performing a detailed hydraulic analysis.

We have evaluated the proposed project and have concluded that it meets the above criteria. There are no elements of the proposed project that may adversely affect the flow of the creek. The replacement bridges described in this letter will be hydraulically identical to the bridge being replaced. In my professional opinion the carrying capacity of the stream will be maintained in accordance with the requirements of the floodplain ordinance. Therefore, we conclude that this project may be constructed as planned without a detailed hydraulic analysis.

Douglas W. Kirk, P.E.
Hydraulic & Drainage Unit
WVDOH Engineering Division

Feras Tolaymat, P.E.
Design Study Unit
WVDOH Engineering Division