

Dick Henderson Memorial Bridge Replacement

ENVIRONMENTAL ASSESSMENT

July 8, 2011

Cities of Nitro and St. Albans, Kanawha County, West Virginia

State Project No. S220-P25-0.05 00

Federal Project No. BR-0025(102)E



DICK HENDERSON MEMORIAL BRIDGE REPLACEMENT

Kanawha County, West Virginia

State Project S220-P25-0.05 00

Federal Project No. BR-0025(102)E

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332(2)(C)

U.S. Department of Transportation, Federal Highway Administration and

West Virginia Department of Transportation, Division of Highways

7/8/11

DATE OF APPROVAL

Paul A. Motter, Jr.
FOR WEST VIRGINIA DIVISION OF HIGHWAYS

7/8/11

DATE OF APPROVAL

Mark A. Hanson
FOR FEDERAL HIGHWAY ADMINISTRATION

The following persons may be contacted for additional information concerning this document.

Mr. Jason Workman

Environmental Protection Specialist

Federal Highway Administration

700 Washington Street, East

Charleston, WV 25301

(304) 347-5271

Email: Jason.Workman@dot.gov

Mr. Ben Hark

Environmental Section Head

Engineering Division- WVDOT

State Capital Complex, Building Five

Charleston, WV 25305

(304) 558-9670

Email: Ben.L.Hark@wv.gov

This proposed project consists of rehabilitation or replacement of the superstructure of the Dick Henderson Memorial Bridge, which is currently posted with a 12-ton weight restriction, located between the cities of Nitro and St. Albans, in Kanawha County, West Virginia.

Comments on this Environmental Assessment are due by AUG 26 2011 and should be sent to:

Mr. Gregory L. Bailey, P.E., Director
Engineering Division
West Virginia Division of Highways
State Capital Complex, Building Five
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305-0430

Introduction

The West Virginia Department of Transportation, Division of Highways (WVDOH), in cooperation with the Federal Highway Administration (FHWA), has proposed to rehabilitate or replace the superstructure of the Richard J. “Dick” Henderson Memorial Bridge, also known as the St. Albans-Nitro Bridge or Dick Henderson Bridge. Rehabilitation or replacement of the deteriorating superstructure will allow a weight restriction to be removed and provide a structure that better meets current design standards. As detailed in the Environmental Assessment (EA), careful consideration of potential environmental impacts has led to selection of a Preferred Alternative that avoids, minimizes and mitigates for environmental impacts, all of which will fall below a level of significance.

The Dick Henderson Bridge provides an important connection between the cities of Nitro and St. Albans across the Kanawha River in Kanawha County, West Virginia (Exhibit 1 and Exhibit 2). For many St. Albans residents, the bridge and WV 25 provide the quickest access to the closest interstate (I-64), and the cities’ fire departments have a mutual aid agreement in place to assist one another, which often requires using the bridge.

The Dick Henderson Bridge was constructed in 1934 and is eligible for listing on the National Register of Historic Places (NRHP). Deterioration of the historic structure has warranted placement of a 12-ton weight limit for vehicles using the bridge, and the current narrow lane width (10 feet) as well as other bridge elements (e.g., lack of shoulders and narrow bridge railing) are not suitable for modern vehicles. Without the project, the bridge will be closed at some point in the future for safety considerations. Consequently, several alternatives for either rehabilitating or replacing the bridge have been analyzed.

Alternatives Analysis

Background

The WVDOH, local planning organization, and cities of Nitro and St. Albans have recognized that the Dick Henderson Bridge has reached the end of its functional life and is in need of rehabilitation and/or replacement. While the region has traffic problems other than those related directly to this bridge crossing, the purpose of this project relates to avoiding closure of the only bridge currently available between the two cities. In 2007, WVDOH began an engineering and environmental study focused on rehabilitating or replacing the bridge’s superstructure as quickly and cost-effectively as possible. Testing of the bridge’s piers (river supports) confirmed that they could be used in making the bridge strong enough to remove the vehicle weight restriction. Following completion of the proposed superstructure rehabilitation or replacement, the WVDOH will continue to address transportation needs in the region through pursuing and supporting other long-term and short-term strategies.

Need

Use of the existing Dick Henderson Bridge is restricted by structural deficiencies, functional inadequacies, and geometric deficiencies, as detailed in the EA. In summary, the Nitro and St. Albans communities have the following needs related to the Dick Henderson Bridge:

- Avoidance of permanent bridge closure.
- Improved safety of the bridge, through such measures as providing shoulders and wider travel lanes.
- Maintained or improved service of the bridge, through such measures as avoiding additional weight limits or removing the weight limit and providing a wider sidewalk.

Purpose

The purpose of the project is to rehabilitate or replace the existing Dick Henderson Bridge (i.e., its superstructure) utilizing the existing river piers so that the rehabilitation or replacement meets current design standards to effectively serve the transportation needs of first responders (e.g., fire trucks, ambulances, and hazardous materials response vehicles), through travelers, and the residential, commercial, and business communities of the cities of St. Albans and Nitro, West Virginia.

No Build Alternative

Under the No-Build Alternative, the proposed project will not be implemented. This alternative will include all currently adopted and planned transportation improvements, including routine maintenance of the bridge. With only routine maintenance, the bridge will continue to deteriorate and will eventually require further weight restrictions and ultimately its permanent closure. Closing the bridge will require the diversion of traffic over detour routes and will result in lost time and additional costs.

The No-Build Alternative will not provide a structure that meets current design standards and will not be able to maintain or improve the services the bridge currently provides travelers. Therefore, the No-Build Alternative will not meet the project purpose and need. However, it was retained in the EA's alternative analysis as a basis for comparison with other alternatives.

Build Alternatives

To fulfill the purpose and need for the project, various alternatives were considered at the current location of the bridge. Findings from pier core testing confirmed the existing piers could be utilized in a rehabilitation or superstructure replacement that will allow for removing the weight restriction. Using the existing pier locations allows for minimal disturbance in the river and facilitates compliance with Coast Guard requirements. Therefore, all Build Alternatives include rehabilitating the existing river piers and eliminate the weight restriction.

With regard to the bridge superstructure, two (2) alternatives rehabilitate the existing superstructure to improve conformity with present day design standards, and four alternatives (4) replace the superstructure with a design that meets present day standards. Each of the Build Alternatives is depicted in Exhibit 3. Alternatives 1 and 2 rehabilitate the existing truss superstructure and are represented on Exhibit 3 by a rendering of the existing bridge. Alternatives 3, 4, 5, and 6 replace the truss with different types of superstructure.

Important factors in assessing alternatives included the extent to which they could be designed to conform to current design standards, such as minimum sidewalk and lane widths. WVDOH also estimated the project costs associated with each alternative as well as the amount of time each alternative would require for bridge closure during construction. Additional considerations included the degree to which the cost and

bridge closure time estimates are at risk for adjustment because of unknown factors such as cost of materials or weather, and the degree to which the alternatives can help improve the flow of traffic across the river.

Although Alternatives 1 and 2 provide some improvements to service, including removal of the weight restriction and a safer railing, these rehabilitation alternatives do not meet current design standards, and, therefore, do not fulfill the project's purpose and need. Any of the superstructure replacement alternatives improve the service of the bridge, including removal of the weight limit, and allow the bridge to meet current design standards. Therefore, Alternatives 3, 4, 5, and 6 fulfill the purpose and need of the project.

Additionally, after conducting a traffic analysis, WVDOH determined that the rehabilitation alternatives (Alternatives 1 and 2) do not improve the storage for left-turning vehicles nor the design capacity of the bridge, while the superstructure replacement alternatives (Alternatives 3, 4, 5, and 6) improve both of these conditions and thus improve the flow of traffic.

Between the different replacement alternatives, WVDOH has selected Alternative 3, using a plate girder superstructure, as the Preferred Alternative. With respect to cost, time of closure, and risk for either of these factors to be underestimated, Alternative 3 is a better alternative than Alternatives 4, 5, or 6.

Coordination

The alternatives development and assessment process has included coordination with the public, city and regional representatives, and local, state and Federal agencies. In particular, WVDOH has met several times with the cities of Nitro and St. Albans and the Boone, Clay, Kanawha, and Putnam County Regional Intergovernmental Council, the area's Metropolitan Planning Organization (MPO) to discuss the project as well as broader regional traffic issues. These groups were assured that this project does not preclude work toward long-term solutions to other transportation issues in the region. The cities expressed support for the Dick Henderson Bridge replacement. The MPO has sent WVDOH a letter of support for the project and similar support letters are anticipated from both cities.

Informational public workshops were held in March 2011 to review and provide opportunity for comment on the project. Additional meetings will be held in the summer of 2011 for presentation and comment on the EA's findings. Comments from the EA public comment period will be considered by WVDOH and FHWA, and responses to substantive comments will be provided. WVDOH is requesting of FHWA that there be a Finding of No Significant Impact (FONSI) for this proposed project. If issued, the FONSI documentation will include responses to substantive comments and any substantive updates to the information provided in the EA.

Summary of Preferred Alternative

The Preferred Alternative includes reinforcing and "armoring" the existing bridge piers (the supports located in the river) and replacing the existing bridge superstructure (the portion of the bridge that carries traffic over the piers) with a plate girder superstructure. This alternative will remove the existing approaches, including the land-based bridge supports. The superstructure and land-based supports will be replaced with two mechanically stabilized earth (MSE) retaining walls and two river bank abutments. Minimal additional right-of-way (approximately one acre) will be required, mostly on the downstream side

of both bridge approaches. The proposed construction will eliminate the weight restriction on the bridge and will provide a structure that meets current design standards, improving safety and ease of travel for the project area.

Exhibit 4 shows a generalized profile and typical section of the proposed bridge replacement, to be refined by the design-build team during final design. The EA presents impacts associated with both the Preferred Alternative and the No-Build Alternative.

In summary, the Preferred Alternative impacts include no relocations of residences or businesses; improved emergency services; very limited right-of-way impact and temporary traffic impact to recreational resources near the St. Albans bridge approach; temporary economic impact to travelers and local businesses from the detour necessitated by construction; improved bicycle, pedestrian and wheelchair access; one crossing of waters of the U.S. (the Kanawha River); no impacts to Federally listed threatened or endangered species; no air quality or long-term noise impacts; temporary noise, traffic, and aesthetic impacts from construction; and impacts to cultural resources, as detailed further in the following paragraph. Additionally, during the limited intrusive activities, such as installation of new bridge supports, there is a moderate potential for encountering material from potential hazardous waste sites (e.g., oil) adjacent to the project area, mitigated by appropriate worker and environmental protection protocols.

Within the project's area of potential effect (APE), one historic property (the bridge itself) and two archaeological sites were identified, determined eligible for the NRHP, and found to be subject to adverse effect by the project. The SHPO concurred with these findings. Coordination is currently ongoing with the SHPO for planning additional archaeological investigations and mitigation for impacts to the bridge. Coordination will also be completed with the Advisory Council on Historic Preservation (ACHP) prior to construction. Also, because it is eligible for listing on the NRHP, the Dick Henderson Bridge itself is a resource subject to protection under Section 4(f) of the Department of Transportation Act of 1966 ("Section 4(f)"; 49 USC Section 303 and 23 CFR Part 774). FHWA has found that the project will have met all conditions of the "Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges" once coordination with the SHPO and ACHP has been finalized.

1.0 Purpose and Need..... 1

1.1 Introduction 1

1.2 Project Area 2

1.3 Project Background 4

1.4 Project Need 5

1.5 Project Purpose..... 10

2.0 Alternatives 11

2.1 No-Build Alternative..... 11

2.2 Build Alternatives 11

2.3 Factors for Comparison of Alternatives 11

2.4 Comparison of Alternatives 13

2.5 Additional Assessment of Traffic Concerns 18

2.6 Selection of Preferred Alternative 19

3.0 Impacts 21

3.1 Socio-Economics 21

3.2 Pedestrian and Bicyclist Facilities 23

3.3 Historic and Archaeological Resources..... 24

3.4 Surface Waters and Floodplains 27

3.5 Fish and Wildlife 28

3.6 Air Quality 29

3.7 Noise 35

3.8 Hazardous Materials..... 38

3.9 Visual and Aesthetic Impacts 39

3.10 Indirect and Cumulative Effects 40

4.0 Coordination..... 42

4.1 Public Involvement 42

4.2 Agency Coordination 44

5.0 References..... 45

TABLES

Table 1: Alternatives Comparison	17
Table 2: National Ambient Air Quality Standards (NAAQS).....	30
Table 3: NAAQS Worst-Case Intersection: WV 25/ WV 25 Spur (Nitro).....	32
Table 4: Noise Abatement Criteria in 23 CFR 772.....	36
Table 5: WDOT Criteria to Define Noise Increase	36
Table 6: Hazardous Materials Sites with Potential to Impact the Project	39
Table 7: Public Workshops for Dick Henderson Bridge Replacement Project	43

FIGURES

Figure 1: Profile schematic and photograph of the existing Dick Henderson Bridge, looking downstream.....	3
Figure 2: Dick Henderson Bridge from Nitro approach heading south (left) and from St. Albans approach heading north (right).	4
Figure 3: Graphic representation of deficient members on existing truss (Michael Baker Jr., Inc., 2010)....	7
Figure 4: Shortest detour route (approx. 10.2 miles) between neighborhoods on either side of the Dick Henderson Bridge	8
Figure 5: Typical Section of Rehabilitation Alternative 1 (top) and Rehabilitation Alternative 2 (bottom).	14
Figure 6: Logo and fireworks from the St. Albans Riverfest, a popular annual event near the Dick Henderson Bridge.	22

EXHIBITS

Exhibit 1: Project Location
Exhibit 2: Project Area
Exhibit 3: Build Alternatives
Exhibit 4: Preferred Alternative
Exhibit 5: Community Resources
Exhibit 6: Measured and Modeled Noise Receptor Locations
Exhibit 7: Hazardous Materials

APPENDICES

Appendix A: Letter of Support from the MPO

Appendix B: U.S. Coast Guard Coordination

Appendix C: Section 106 Consultation

Appendix D: Section 4(f) Programmatic Agreement Finding

Appendix E: Section 7 Coordination

LIST OF ACRONYMS

ACHP – Advisory Council on Historic Preservation	NAC – noise abatement criteria
ADT – average daily traffic	NAAQS – National Ambient Air Quality Standards
ASTM – American Society of Testing and Materials	NEPA – National Environmental Policy Act
BMP – best management practice	NPS – National Park Service
CAA – Clean Air Act	NRHP – National Register of Historic Places
CAAA – Clean Air Act Amendments	O ₃ – ozone
CFR – Code of Federal Regulations	PM – particulate matter
CO – carbon monoxide	RCRA – Resource Conservation and Recovery Act
CY – cubic yards	RIC – Regional Intergovernmental Council
dBA – A-weighted equivalent sound level in decibels	ROW – right-of-way
DD – Design Directive	SHPO – State Historic Preservation Office
DFIRM – digital Flood Insurance Rate Map	TNM 2.5 – FHWA’s Traffic Noise Model, Version 2.5
DHV – design hourly volume	USACE – U.S. Army Corps of Engineers
EA – Environmental Assessment	USDOT – U.S. Department of Transportation
EPA – Environmental Protection Agency	USFWS – U.S. Fish and Wildlife Service
ESA – Environmental Site Assessment	UST – underground storage tank
FEMA – Federal Emergency Management Agency	VHT – vehicle hours of travel
FHWA – Federal Highway Administration	VMT – vehicle miles of travel
GHG – greenhouse gas	VPD – vehicles per day
GIS – geographic information system	WVDEP – West Virginia Department of Environmental Protection
LOS – level of service	WVDNR – West Virginia Division of Natural Resources
LUST – leaking underground storage tank	WVDOH – West Virginia Division of Highways
MPO – metropolitan planning organization	WVDOT – West Virginia Department of Transportation
MSAT – mobile source air toxics	
MSE – mechanically stabilized earth	

1.0 PURPOSE AND NEED

1.1 Introduction

The West Virginia Department of Transportation, Division of Highways (WVDOH), in cooperation with the Federal Highway Administration (FHWA), is proposing to rehabilitate or replace the superstructure of the Richard J. “Dick” Henderson Memorial Bridge, also known as the St. Albans-Nitro Bridge or Dick Henderson Bridge. Rehabilitation or replacement of the deteriorating superstructure will allow a weight restriction to be removed and provide a structure that better meets current design standards. As detailed in the following Environmental Assessment (EA), careful consideration of potential environmental impacts has led to selection of a Preferred Alternative that avoids, minimizes and mitigates for environmental impacts, all of which will fall below a level of significance.

Located in the cities of Nitro and St. Albans in Kanawha County, West Virginia (Exhibit 1 and Exhibit 2), the Dick Henderson Bridge was constructed in 1934 and is eligible for listing on the National Register of Historic Places (NRHP). As discussed further in Section 1.0, deterioration of the historic structure has warranted placement of a 12-ton weight restriction for vehicles using the bridge, and the current lane width and other bridge elements (e.g., lack of shoulders and short vertical clearance) are no longer suitable for modern vehicles. Consequently, several alternatives for either rehabilitating or replacing the bridge have been analyzed, as detailed in Section 2.0.

The Preferred Alternative includes reinforcing and “armoring” the existing bridge piers (the supports located in the river) and replacing the existing bridge superstructure (the portion of the bridge that carries traffic over the piers). Particularly because this alternative will impact elements of the bridge that qualify it for listing on the NRHP, WVDOH is closely coordinating with the State Historic Preservation Officer (SHPO) to develop a mitigation plan for the project.

This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and related laws and regulations, as well as FHWA’s Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (FHWA, 1987) and the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) (Pub. L. 109-59, Aug. 10, 2005, 118 Stat. 1144) and related guidance. Evaluations conducted for the proposed project included coordination with project stakeholders, the general public, landowners, city officials, and Federal and state regulatory agencies.

Because of the need for the project, it has been identified at both regional and Federal levels of planning. The Dick Henderson Bridge Project will be financed in part with Federal funding. The Boone, Clay, Kanawha, and Putnam County Regional Intergovernmental Council (BCKP RIC), the area’s Metropolitan Planning Organization (MPO), has included the project in its 2040 Long Range Transportation Plan (as modified in the 2010 Addendum) and its Fiscal Year 2010 – 2013 Transportation Improvement Program (TIP) (BCKP RIC, 2009a, 2010 and 2009b). Construction and right-of-way funding were identified on the TIP for the years 2011 and 2012. In addition, the MPO has sent WVDOH a letter of support for the project (Appendix A).

1.2 Project Area

Crossing the Kanawha River, the Dick Henderson Bridge connects West Virginia Route 25 (WV 25) in the city of Nitro to United States Route 60 (US 60 or MacCorkle Avenue) in the city of St. Albans, in Kanawha County, West Virginia. The Dick Henderson Bridge consists of a three-span cantilever Warren through truss with an overall length of 1,367 feet (Figure 1). The truss bridge is one of the oldest types of modern bridges, and consists of vertical and horizontal connected elements (“members”).

The roadway crossing the bridge is designated as the WV 25 Spur, which carries approximately 19,100 vehicles per day. Traffic on the current structure uses two 10-foot lanes, one northbound and one southbound. There are no shoulders and there is a 4-foot wide sidewalk on the downstream side (Figure 2).

The bridge is located in an urban setting outside the city of Charleston, the capital of West Virginia (Exhibit 1). The project area encompasses the current footprint of the Dick Henderson Bridge, its approaches from the railroad crossing in Nitro and from the first intersection (MacCorkle Avenue) in St. Albans, as well as the properties immediately adjacent to this stretch of roadway (Exhibit 2). Development in the neighborhoods surrounding the bridge is a mix of residential, commercial, and industrial to the north in Nitro, and commercial and industrial with some recreation areas to the south in St. Albans. As of the 2010 U.S. Census, Nitro had a population of 7,178, and St. Albans had a population of 11,044 (U.S. Census Bureau, 2011).

The bridge provides an important connection between the two cities. The two fire departments have a mutual aid agreement in place to provide back-up to one another for all structural fires. For many St. Albans residents, the bridge and WV 25 provide the quickest access to the interstate; the I-64 exit in the town of InSTITUTE is 3.7 miles from the St. Albans side of the bridge, while other interstate access points are over five miles away. However, as revealed in a 2000 study of bridge users’ origins and destinations (URS Greiner Woodward Clyde, 2000), most traffic on the bridge is coming from or going to locations within Nitro, St. Albans, or the residential areas south of St. Albans. Each city offers many businesses, restaurants, interscholastic activities, churches, or other activity centers that are useful or even necessary parts of the lives of adjacent city residents.



Figure 2: Dick Henderson Bridge from Nitro approach heading south (left) and from St. Albans approach heading north (right).

1.3 Project Background

The WVDOH, local planning organization, and cities of Nitro and St. Albans have recognized that the Dick Henderson Bridge has reached the end of its functional life and is in need of rehabilitation and/or replacement. Recently, the MPO sent WVDOH a letter of support for this specific project (Appendix A), but also studies have been ongoing for over a decade to find modern solutions to the region's aging transportation system.

In 2000, the MPO commissioned a study known as the *St. Albans Bridge/Underpass Study* (URS Corporation, 2003), the purpose of which was "to identify potential solutions to the challenges associated with crossing the Kanawha River between the communities of St. Albans and Nitro, and issues associated with multiple crossings of the CSX and Norfolk/Southern Railroad lines in St. Albans and Nitro respectively." While this study did recognize the geometric and functional deficiencies of the bridge, its focus was on the development of long range conceptual solutions to various traffic flow issues, primarily within the city of St. Albans.

Recognizing that the development and implementation of the range of conceptual solutions identified in the *St. Albans Bridge/Underpass Study* were not immediately implementable, and recognizing that the current Dick Henderson Bridge was rapidly approaching the end of its useful life, the WVDOH in 2007 began an engineering and environmental study focused on the rehabilitation or replacement of the bridge's superstructure as quickly and cost-effectively as possible. To that end, the WVDOH directed its bridge engineers and engineering and environmental consultants to examine the feasibility of

rehabilitating or replacing the bridge's superstructure on its current location, utilizing the current river piers that support the current superstructure of the Dick Henderson Bridge. There were three major steps in the engineering study. They were:

1) Conduct studies to determine the feasibility of utilizing the current river piers

Multiple core borings were taken from each of the river piers as well as in the river bottom around the piers. The core samples taken from each of the river piers were subjected to standard engineering analyses and were found to be sufficient to support a new superstructure. Additionally, the current foundation of the piers on the river bottom was found to be strong enough to support the new superstructure. Even so, it was decided to reinforce and "armor" the piers to increase their strength and resistance to possible damage from a barge collision.

2) Coordinate with the United States Coast Guard

Current U.S. Coast Guard standards for new bridges over the Kanawha River have a height requirement that is not met by the current Dick Henderson Bridge. Therefore, coordination with the U.S. Coast Guard was required to determine that if a new superstructure was constructed on the current river piers, that the new superstructure will be permissible at its current height. The U.S. Coast Guard responded by letter dated March 16, 2010 that "it appears that your proposal will maintain or increase navigational clearances provided by the bridge. This is acceptable to the Coast Guard." (Appendix B)

3) Conduct environmental studies (i.e., NEPA) and develop designs, cost estimates and schedules (i.e., likely days of closure of the current river crossing) for rehabilitation or construction of various bridge type superstructures.

Following the pier strength analysis and U.S. Coast Guard coordination, project engineers developed two rehabilitation and four bridge type superstructures. Details of each are discussed in Section 2.0 (Alternatives). The environmental studies that were performed in coordination with the engineering activities are the focus of this EA.

Following completion of the proposed superstructure rehabilitation or replacement, the WVDOH will continue to address transportation needs in the region through pursuing and supporting other long-term and short-term strategies. Other long-term strategies may include those identified in the *St. Albans Bridge/Underpass Study* or those that may be addressed in the MPO's forthcoming *St. Albans Railroad Crossing Study*. Any long-term projects requiring Federal funds will need to be part of an approved TIP that conforms to air quality standards, which involves coordination between the WVDOH and MPO. Short-term solutions that can alleviate some congestion might include implementation of intelligent transportation systems (ITS) strategies, such as upgrading traffic signals and adjusting signal timing.

1.4 Project Need

The replacement of the Dick Henderson Bridge is necessitated by its current condition. Use of the bridge is restricted by structural deficiencies, functional inadequacies, and geometric deficiencies, as detailed in the following sections.

Structural Deficiencies

The most recent inspection of the bridge was conducted in 2009. For Deck Geometry, the bridge received a rating of 2 out of 9, indicating that the bridge deck is “basically intolerable requiring high priority of replacement” (WVDOH, 1990).

In 2010, an analysis was conducted to assess structural deficiencies of the bridge. No deficiencies were analyzed on the approach structures because in any of the alternative scenarios (i.e., rehabilitation or replacement) both the St. Albans and Nitro approach structures will be completely replaced. Also no deficiencies in the truss stringers were considered because all truss stringers will be replaced as well.

For those superstructure components that were analyzed it was found that:

- No section loss was documented for the upstream truss.
- There was a documented Section Loss in Member U14-L15 (diagonal) only.

For an 80,000 pound (40-ton) load limit bridge (i.e., the current load limit standard for a bridge at a major river crossing), any member that is not capable of carrying 40 tons, using inventory stresses, is considered deficient. For the Dick Henderson Bridge:

- On the upstream truss, there are six members (four diagonals and two verticals) that are rated less than 40 tons, and four of these are listed as Fracture Critical in the September 14, 2007 Periodic Inspection Report (Figure 3).
- On the downstream truss, there are seven members (five diagonals and two verticals) that are rated less than 40 tons, and five of these are listed as Fracture Critical in the September 14, 2007 Periodic Inspection Report (Figure 3).
- The load capacity of the intermediate floorbeams on the truss has a rating of only 26.2 tons, and the load capacity of the end floorbeams on the truss has a rating of only 26.8 tons (Figure 3).

Functional Inadequacies

In 2008, a 12-ton weight limit was placed on the Dick Henderson Bridge for safety reasons. This weight limit reduces the functionality of the bridge. For example, full-sized school busses, fire trucks and large delivery trucks all can be in excess of 14 tons and are thus precluded from legally and safely using the bridge. As the bridge superstructure further deteriorates, additional weight restrictions will likely be required to further restrict usage of the bridge.

Eventually, deterioration of the superstructure will result in the closure of the Dick Henderson Bridge, necessitating detours - employing either the Kanawha River Interstate 64 (I-64) bridge between Nitro and Teays Valley, West Virginia, approximately five miles downstream to the west, or the Dunbar Bridge between Spring Hill and Dunbar, approximately six miles upstream to the east. The shorter of these detours (using I-64) is highlighted in Figure 4.

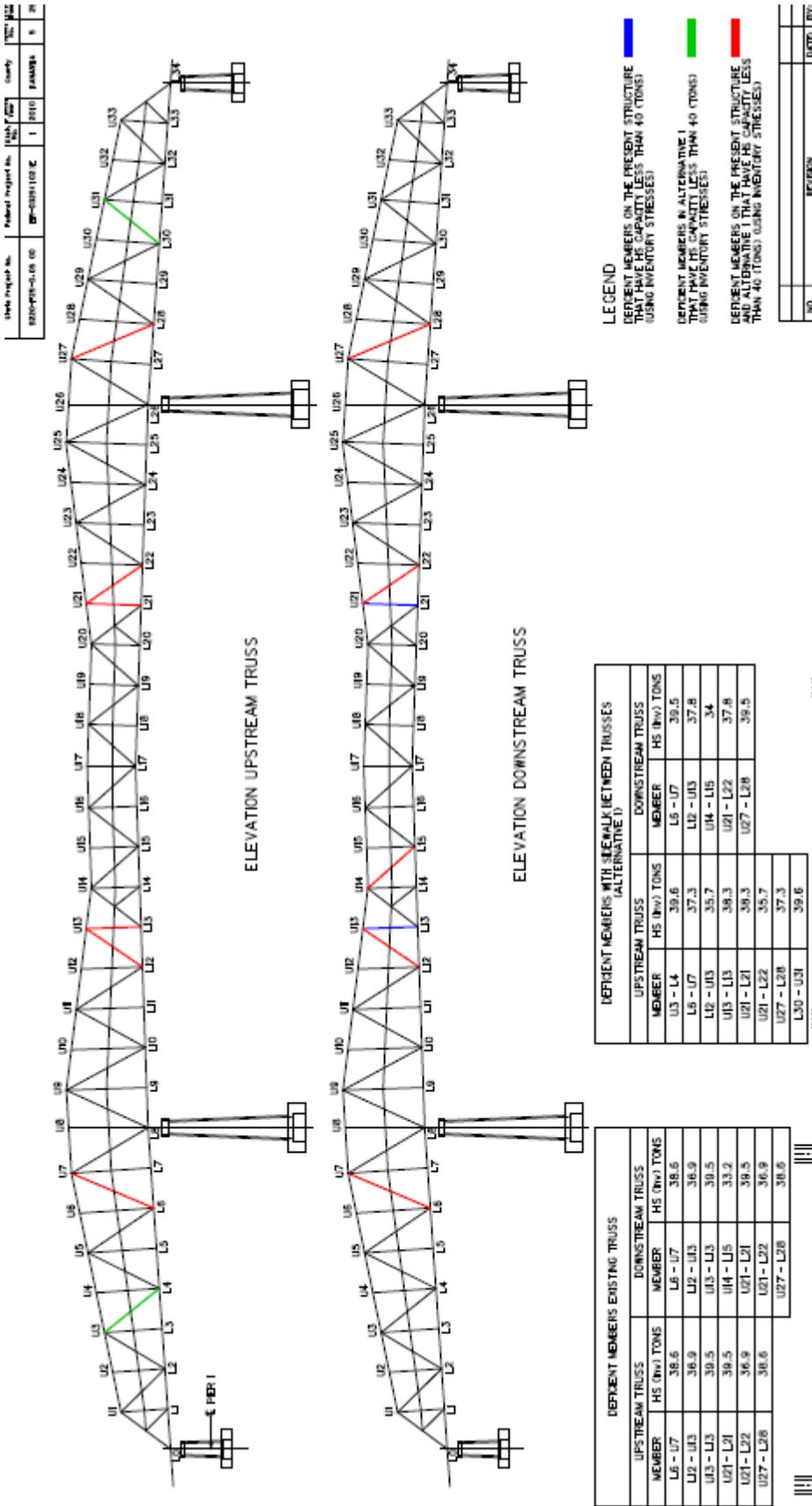


Figure 3: Graphic representation of deficient members on existing truss (Michael Baker Jr., Inc., 2010)

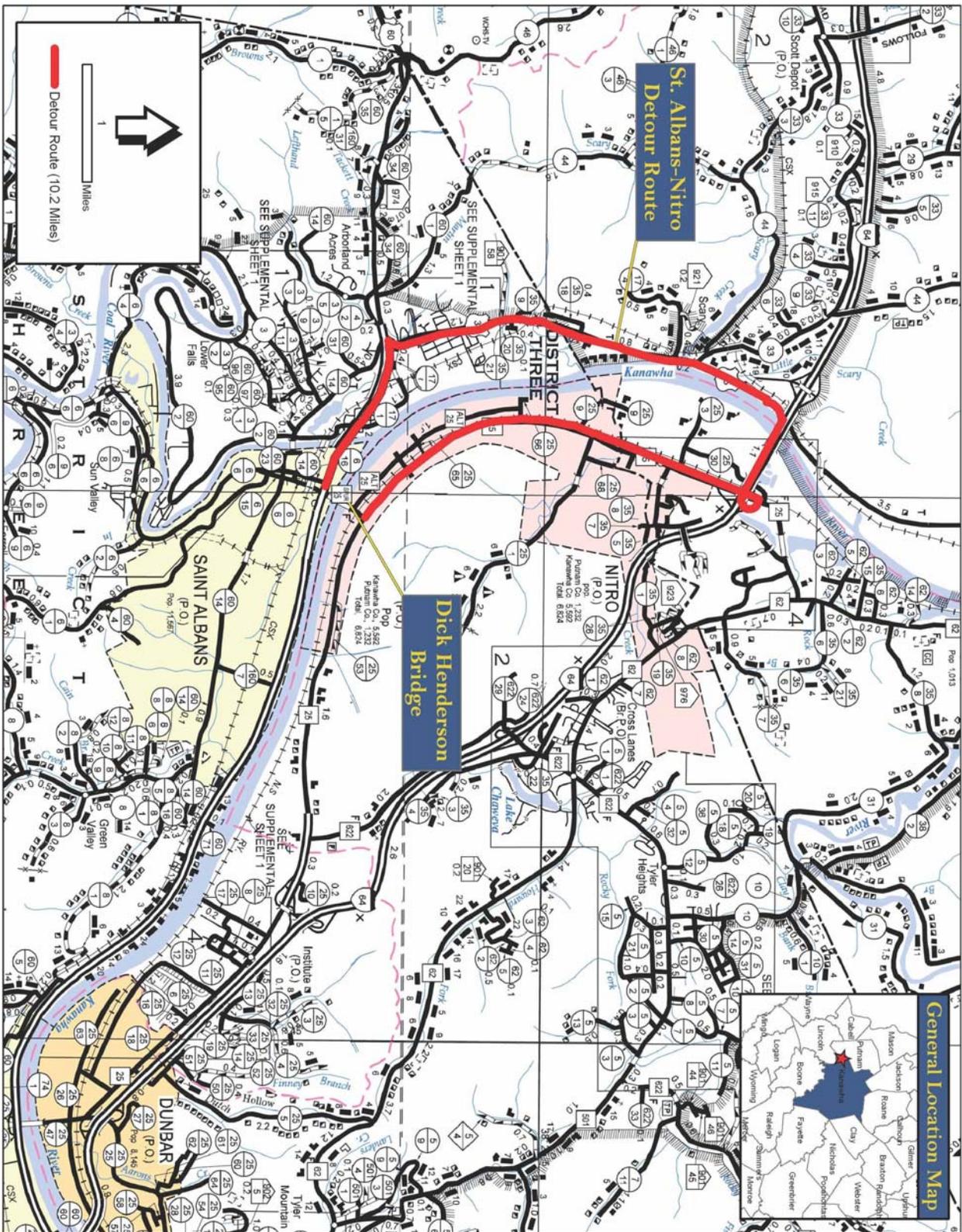


Figure 4: Shortest detour route (approx. 10.2 miles) between neighborhoods on either side of the Dick Henderson Bridge

Geometric Deficiencies

The bridge's superstructure is seriously deficient geometrically.

- Width of vehicle travel lanes – Design standards require minimum 11-foot lane widths (WVDOH Design Directive [DD] 610). Currently, the lanes are 10 feet wide. The “closed-in” character of the truss and lack of lane division can tend to make drivers feel unsafe and slow down, further reducing the bridge's traffic flow.
- Parapet size and design – The bridge currently has five-inch parapets (bridge railings). These bridge safety barriers must be over two times wider by today's crash-tested standard. Current parapet design standards require 12- to 15-inch wide parapets that are designed to divert vehicles back onto the bridge if they are struck in a crash. WVDOH considers this design standard to be the highest priority for rehabilitation of the superstructure, and all project alternatives have been designed to include current, crash-tested railing styles.
- Sidewalk width – The width of sidewalks on the current bridge is four feet. WVDOH design standards require five-foot wide areas for pedestrians and wheelchairs to safely pass one another at least every 200 feet (WVDOH DD-811). This is consistent with recommendations of American's with Disabilities Act (ADA) guidance because a five-foot width is necessary for wheelchairs to safely pass one another. Therefore, a new bridge will either have to have a five-foot wide sidewalk for its entire length or have areas of sidewalk that are five feet wide at 200-foot intervals along its entire length (over 1,300 feet, including approaches). The existing sidewalk on the Dick Henderson Bridge does not conform to WVDOH standards or ADA guidance.
- Shoulders – There are no roadway shoulders on the existing bridge. WVDOH design standards require two shoulders that are a minimum of two feet wide. With no shoulders, the bridge is not conducive to bicycle use, does not provide areas for disabled vehicles to avoid blocking a travel lane, and complicates snow removal.
- Vertical Clearance on the Bridge - The height of the cross bracings on the truss is 16 feet, whereas American Association of State Highway and Transportation Officials (AASHTO) bridge design specifications state that “the vertical clearance from the roadway to the overhead cross bracing of through truss structures should not be less than 17.5 ft,” (AASHTO, 2010).

While the piers of the Dick Henderson Bridge were not designed to current standards, their condition was not what necessitated the existing 12-ton weight limit. Rather, it was the superstructure that has deteriorated to a point where the weight limit needed to be imposed. WVDOH investigations (Michael Baker Jr., Inc., 2010) have confirmed that the bridge piers could remain in use without a weight restriction and do not require replacement. Therefore, while the bridge piers should be improved to meet current design standards, replacement of the bridge piers is not a project need.

In summary, the Nitro and St. Albans communities have the following needs related to the Dick Henderson Bridge:

- Avoidance of permanent bridge closure.
- Improved safety of the bridge, through such measures as providing shoulders and wider travel lanes.
- Maintained or improved service of the bridge, through such measures as avoiding additional weight limits or removing the weight limit and providing a wider sidewalk.

1.5 Project Purpose

Based on the needs discussed in the previous section, a project purpose has been developed. The purpose of the project is to rehabilitate or replace the existing Dick Henderson Bridge (i.e., its superstructure) utilizing the existing river piers so that the rehabilitation or replacement meets current design standards to effectively serve the transportation needs of first responders (e.g., fire trucks, ambulances, and hazardous materials response vehicles), through travelers, and the residential, commercial, and business communities of the cities of St. Albans and Nitro, West Virginia.

2.0 ALTERNATIVES

2.1 No-Build Alternative

Under the No-Build Alternative, the proposed project will not be implemented. This alternative will include all currently adopted and planned transportation improvements, including routine maintenance of the bridge. With only routine maintenance, the bridge will continue to deteriorate and will eventually require further weight restrictions and ultimately its permanent closure. As discussed in Section 1.0, closing the bridge will require the diversion of traffic over detour routes and will result in lost time and additional costs.

The No-Build Alternative will not provide a structure that meets current design standards and will not be able to maintain or improve the services the bridge currently provides travelers. Therefore, the No-Build Alternative will not meet the project purpose and need. However, environmental regulations (NEPA) require that it be retained in the environmental assessment as a basis for comparison with other alternatives.

2.2 Build Alternatives

To fulfill the purpose and need for the project, various alternatives were considered at the current location of the bridge. As discussed in Section 1.3, findings from pier core testing confirmed the existing piers could be utilized in a rehabilitation or superstructure replacement that will allow for removing the weight restriction. Using the existing pier locations allows for minimal disturbance in the river and facilitates compliance with Coast Guard requirements. Therefore, all Build Alternatives include rehabilitating the existing river piers and eliminate the weight restriction.

With regard to the bridge superstructure, two (2) alternatives rehabilitate the existing superstructure to improve conformity with present day design standards, and four alternatives (4) replace the superstructure with a design that meets present day standards.

Each of the Build Alternatives is depicted in Exhibit 3. Alternatives 1 and 2 rehabilitate the existing truss superstructure and are represented on Exhibit 3 by a rendering of the existing bridge. Alternatives 3, 4, 5, and 6 replace the truss with different types of superstructure.

2.3 Factors for Comparison of Alternatives

The following sections detail factors used to assess the alternatives and to identify a Preferred Alternative.

Projected Time of Closure

Because there are no other crossings of the Kanawha River for approximately five miles to the west and six miles to the east of the Dick Henderson Bridge, closing of this bridge for construction will impose a substantial inconvenience to residents and businesses. In addition to the inconvenience, there is time loss and associated financial cost associated with detouring travelers. Finally, there is a safety and public health cost of detours associated with possible increase of response time by first responders. Therefore, the length of time that detours will be

required during construction of an alternative is an important factor in the screening of alternatives.

Projected Cost

Project cost is obviously an important consideration when making decisions involving public funding sources. Cost estimates were developed based on preliminary designs of the alternatives and are expressed as a range because of unknown external factors (e.g., cost of materials and inflation). It is not possible to develop an absolute cost at this time, and, as with all transportation projects, costs will be continually updated and refined as the project proceeds through engineering and construction stages.

Cost estimates presented below include the costs construction items as well as miscellaneous other costs associated with project activities such providing for areas of material storage and handling, utility relocation and accommodation, and incentives in cases where the completion of the work is on a reduced time schedule.

Risk (Added Time of Closure and Cost)

Despite the best efforts of engineers at developing preliminary estimates for project cost and time required for construction, these elements can unpredictably change because of external events (such as labor costs, material costs, weather, etc.) not under the control of WVDOH. The risk of this happening for any given alternative is different based on engineering and construction uncertainties associated with each of the alternatives. For example, in the truss rehabilitation alternatives, it cannot be known which elements of the current superstructure can be re-used until construction has begun, and, therefore, more time and cost may be incurred to complete those alternatives. In this assessment, risks are rated for each alternative as “High,” “Medium,” or “Low.”

Design Standards

Over time, engineering design standards have been developed to assure safe and consistent standards are applied to transportation projects. The most current design standards are required by WVDOH and FHWA and are contained in the West Virginia Department of Transportation (WVDOT) *Design Directives* (2006) and *Bridge Design Manual* (2004) and in the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (2004) and *AASHTO LRFD Bridge Design Specifications, 5th ed.* (2010). Design standards applicable to the Dick Henderson Bridge are those specific to bridges and to roadways classified as a Principal Arterial, Urban roadway.

There are many design standards that will have to be incorporated into any of the alternatives, but design standards that particularly assist in the comparison among alternatives are those related to the deficiencies discussed in Section 1.4 (Project Need).

In summary, the rehabilitated or new superstructure and its roadway must have at least 11-foot travel lanes; shoulders that are a minimum of two feet wide; parapet railings that are 12 to 15 inches wide; and sidewalk that provides 5-foot wide passing space.

WVDOH is aware that the current grade (steepness) of the bridge approaches has been a concern for some travelers. The current maximum grade on the bridge is 7% and meets current design standards, which can actually range from 7% to 11% at this location. However, care is being taken in the design of alternatives to minimize the grade as much as possible.

Other Factors

Among other factors for comparing the alternatives are possible impacts to property of residences or businesses and possible impacts to traffic flow. Specifically:

- Whether or not the alternative will require relocation of a residence or business;
- Whether or not the alternative will require the temporary or permanent use of right-of-way not currently used for transportation; and
- Whether or not the alternative provides an additional lane to improve the flow of traffic.

2.4 Comparison of Alternatives

Table 1 provides a summary of the comparison factors for each alternative, and the following sections provide a detailed summary of each alternative relative to these factors and fulfillment of the project's purpose and need.

Alternative 1: Rehabilitate Current Truss Superstructure with Sidewalk to Inside

This alternative was designed to provide minimal changes to the Dick Henderson Bridge while improving conditions and eliminating the weight restriction. In this alternative, the two main river piers are reinforced and strengthened, and members of the bridge truss are rehabilitated. Alternative 1 also raises the cross-bracing of the bridge's truss to achieve 17.5 feet of vertical clearance (see "Design Standards" in Section 2.3). A typical section of Alternative 1 is shown in Figure 5.

In order to prioritize incorporation of a safer parapet railing that is wider than the existing parapet railing, this alternative reduces the sidewalk width to 3 feet, 5 inches and the vehicle lanes to 9 feet, 10 inches. Alternative 1 does not include shoulder improvements or an additional vehicle lane. With the narrow sidewalk, narrow vehicle lanes, and lack of shoulder, this alternative does not meet current design standards.

Alternative 1 does not require any relocations or any additional right-of-way for construction. The estimated cost for Alternative 1 is \$27-30 million, and its construction requires closing the river crossing for 360-520 calendar days. The risk for the cost and closure days to increase is high.

Although Alternative 1 provides some improvements to service, including removal of the weight restriction and a safer railing, Alternative 1 does not meet current design standards; therefore, Alternative 1 does not fulfill the project's purpose and need.

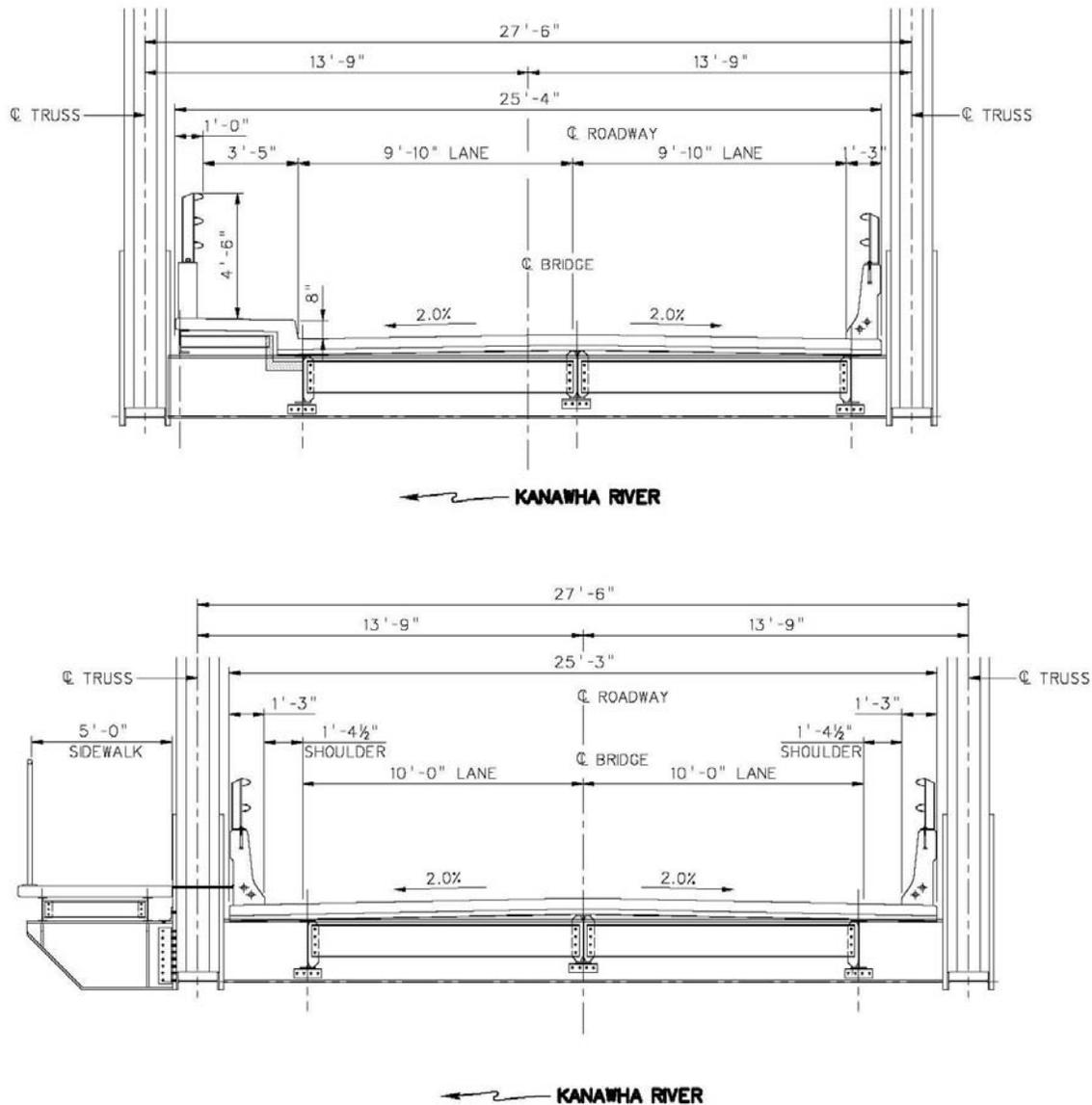


Figure 5: Typical Section of Rehabilitation Alternative 1 (top) and Rehabilitation Alternative 2 (bottom).

Alternative 2: Rehabilitate Current Truss Superstructure with Sidewalk Cantilevered to Outside

This alternative was also designed to provide minimal changes to the Dick Henderson Bridge while improving conditions and eliminating the weight restriction. In this alternative, the two main river piers are reinforced and strengthened, and members of the bridge truss are rehabilitated. Alternative 2 raises the cross-bracing of the bridge's truss to achieve 17.5 feet of vertical clearance, and widens the sidewalk to 5 feet. A typical section of Alternative 2 is shown in Figure 5.

To allow for the increased sidewalk width and an increased parapet railing width while maintaining the existing vehicle lane width, this alternative includes cantilevering the sidewalk to the outside of the bridge truss. Alternative 2 does not include shoulder improvements or an additional vehicle lane. With the narrow vehicle lanes (less than 11 feet wide) and lack of shoulder, this alternative does not meet current design standards.

Alternative 2 does not require any relocations or any additional right-of-way for construction. The estimated cost for Alternative 2 is \$29-32 million, and its construction requires closing the river crossing for 410-570 calendar days. The risk for the cost and closure days to increase is high.

Although Alternative 2 provides some improvements to service, including removal of the weight restriction, a safer railing, and a wider sidewalk, Alternative 2 does not meet current design standards; therefore, Alternative 2 does not fulfill the project's purpose and need.

Alternative 3: Plate Girder Superstructure

This alternative replaces the existing superstructure of the Dick Henderson Bridge and transforms the bridge into a bridge type called a plate girder. A plate girder bridge is a bridge supported by two or more plate girders, which are typically I-beams made up from separate structural steel plates that are bolted or welded together. In this alternative, the two main river piers are reinforced and strengthened. This alternative provides three 12-foot wide vehicle lanes, two 6-foot shoulders, and a 5-foot wide sidewalk (Exhibit 3).

This alternative does not require any relocations. However, approximately 16,000 square feet of right-of-way is required for permanent conversion to transportation use, and approximately 2,000 square feet is required for temporary conversion during construction. The estimated cost for Alternative 3 is \$25-28 million, and its construction requires closing the river crossing for 320-460 calendar days. The risk for the cost and closure days to increase is low.

Alternative 3 improves the service of the bridge, including removal of the weight limit, and allows the bridge to meet current design standards. Therefore, Alternative 3 fulfills the purpose and need of the project.

Alternative 4: Through Truss Superstructure

This alternative replaces the existing superstructure of the Dick Henderson Bridge and transforms the bridge into a bridge type called a through truss, which is somewhat similar in appearance to the current bridge. In this alternative, the two main river piers are reinforced and strengthened. This alternative provides three 12-foot wide travel lanes, two 6-foot shoulders, and a 5-foot wide sidewalk (Exhibit 3).

This alternative does not require any relocations. However, approximately 16,000 square feet of right-of-way is required for permanent conversion to transportation use, and approximately 2,000 square feet is required for temporary conversion during construction. The estimated cost for Alternative 4 is \$26-29 million, and its construction requires closing the river crossing for 380-520 calendar days. The risk for the cost and closure days to increase is medium.

Alternative 4 improves the service of the bridge, including removal of weight limit, and allows the bridge to meet current design standards. Therefore, Alternative 4 fulfills the purpose and need of the project.

Alternative 5: Cable Stayed Superstructure

This alternative replaces the existing superstructure of the Dick Henderson Bridge and transforms the bridge into a bridge type called a cable stayed bridge. A cable stayed bridge is a bridge that consists of one or more columns (often referred to as towers), with cables supporting the bridge deck. In this alternative, the two main river piers are reinforced and strengthened. This alternative provides three 12-foot wide travel lanes, two 6-foot shoulders, and a 5-foot wide sidewalk (Exhibit 3).

This alternative does not require any relocations. However, approximately 16,000 square feet of right-of-way is required for permanent conversion to transportation use, and approximately 2,000 square feet is required for temporary conversion during construction. The estimated cost for Alternative 5 is \$32-35 million, and its construction requires closing the river crossing for 540-680 calendar days. The risk for the cost and closure days to increase is high.

Alternative 5 improves the service of the bridge, including removal of weight limit, and allows the bridge to meet current design standards. Therefore, Alternative 5 fulfills the purpose and need of the project.

Alternative 6: Extradosed Superstructure

This alternative replaces the existing superstructure of the Dick Henderson Bridge with an extradosed superstructure. An extradosed superstructure is frequently described as a cross between a girder and a cable stayed structure. In this alternative, the two main river piers are reinforced and strengthened. This alternative provides three 12-foot wide travel lanes, two 6-foot shoulders, and a 5-foot wide sidewalk (Exhibit 3).

This alternative does not require any relocations. However, approximately 16,000 square feet of right-of-way is required for permanent conversion to transportation use, and approximately 2,000 square feet is required for temporary conversion during construction. The estimated cost for Alternative 6 is \$32-35 million, and its construction requires closing the river crossing for 460-600 calendar days. The risk for the cost and closure days to increase is high.

Alternative 6 improves the service of the bridge, including removal of weight limit, and allows the bridge to meet current design standards. Therefore, Alternative 6 fulfills the purpose and need of the project.

Table 1: Alternatives Comparison

	No-Build	Alternative 1 Rehab. Truss, Sidewalk to Inside	Alternative 2 Rehab. Truss, Sidewalk to Outside	Alternative 3 Plate Girder	Alternative 4 Through Truss	Alternative 5 Cable Stayed	Alternative 6 Concrete Extradosed
Estimated Cost (million \$)	N/A	27 – 30	29 - 32	25 - 28	26 - 29	32 - 35	32 - 35
Estimated Time of Bridge Closure (calendar days)	N/A	360 - 520	410 - 570	320 - 460	380 - 520	540 - 680	460 - 600
Relative Risk of Added Cost and Delay	N/A	High	High	Low	Medium	High	High
Residential and Commercial Relocations	0	0	0	0	0	0	0
Temporary ROW Required (square feet)	0	0	0	~2,000	~2,000	~2,000	~2,000
Permanent ROW Required (square feet)	0	0	0	~16,000	~16,000	~16,000	~16,000
Number of Lanes	2	2	2	3	3	3	3
Lane Width (feet)	10	9.8	10	12	12	12	12
Shoulder Width (feet)	0	0	1.4	6	6	6	6
Sidewalk Width (feet)	4	3.4	5	5	5	5	5
Maximum Grade	7.0%	7.0%	7.0%	7.6%	7.0%	7.3%	7.5%
Weight Restriction	Yes (12 tons)	No	No	No	No	No	No
Meets Current Design Standards	No	No	No	Yes	Yes	Yes	Yes
Extends Bridge Service Life	No	Yes	Yes	Yes	Yes	Yes	Yes
Fulfills Purpose and Need	No	No	No	Yes	Yes	Yes	Yes

Note: Highlighted table cells indicate elements that do not meet current design standards.

2.5 Additional Assessment of Traffic Concerns

The project area, particularly on the St. Albans side of the river, experiences heavy vehicle congestion. For example, at the WV 25 Spur intersection with US 60 (south of the bridge), all but one turning movement currently experiences a level of service (LOS) of F, which is the lowest rating and means the average delay is greater than 80 seconds per vehicle (Baker, 2011). While some short-term solutions at the intersections, such as improved signal timing, may reduce congestion, traffic operations in the St. Albans region are impacted by other constraints. Most notably, the railroad crossings south of US 60 require traffic to stop periodically for trains and to use only one or two lanes.

Additional factors reduce the flow of traffic in the project area. These include 1) limited lane length available to store vehicles waiting to turn at the intersections, and 2) a higher volume of vehicles using the bridge than the bridge's design capacity (Baker, 2011). Design capacity is estimated based on the Highway Capacity Manual methodology (TRB, 2011) and roadway design components such as number of lanes and width of lanes and shoulder.

Given these conditions, WVDOH and FHWA considered traffic congestion in its analysis of alternatives for rehabilitating or replacing the Dick Henderson Memorial Bridge. Traffic findings are summarized below for each of the problems discussed above that contribute to reduced traffic flow in the project area:

- **Train crossing:** This issue is not addressed by any alternative for this project and must be addressed with a different project in the future.
- **LOS:** None of the Build Alternatives (either rehabilitation or replacement) degrade LOS when compared to the No Build Alternative for each of the analysis years (2013 Opening Year and 2031 Design Year). LOS is a course rating system, meaning there is a wide range of values for each LOS designation. Therefore, it is not surprising that there can be some changes in delay times, but there is no difference in LOS values between the alternatives.
- **Queuing:** Using traffic conditions predicted for 2031, the minimum storage length required for traffic waiting to take a left turn off the bridge is 720 feet heading north and 660 feet heading south (Baker, 2011). With the No Build Alternative or rehabilitation alternatives (Alternatives 1 and 2), the minimum required storage cannot be provided. The minimum required storage can be accommodated under the replacement alternatives (Alternatives 3, 4, 5, or 6). The replacement alternatives provide more storage for vehicles at the intersections, while the rehabilitation alternatives do not improve this condition.
- **Capacity:** The existing bridge and rehabilitation alternatives have an estimated capacity of 17,700 vehicles per day (VPD). With the replacement alternatives, capacity is estimated at 20,500 VPD because of the increased number and width of the lanes and shoulders.

With the No Build Alternative, including the weight restriction, Opening Year (2013) average daily traffic (ADT) is estimated to be 20,200 VPD, which is over the bridge's capacity. Traffic volume will be even higher with the Build Alternatives because the

bridge will not have a weight restriction. Opening Year ADT for either the rehabilitation or replacement alternatives is estimated at 20,500 VPD.

Given these results, the No Build Alternative at Opening Year will have more traffic than its design capacity (20,200 VPD vs. 17,700 VPD), and the rehabilitation alternatives will have even more traffic than its design capacity (20,500 VPD vs. 17,700 VPD). However, the replacement alternatives will have adequate design capacity (20,500 VPD) for the anticipated traffic volume (20,500 VPD).

In summary, none of the Build Alternatives improve the conditions for crossing the railroad or the LOS designation at the intersections; they also do not make the LOS worse as compared to the No Build Alternative. Rehabilitation alternatives do not improve the storage for left-turning vehicles nor the design capacity of the bridge. Replacement alternatives improve both of these conditions, which will improve the flow of traffic.

2.6 Selection of Preferred Alternative

Summary of Selection Process

The rehabilitation alternatives (Alternatives 1 and 2) were eliminated because they will not meet the project purpose and need. Specifically, these two alternatives will not correct current geometric deficiencies and will not improve safety issues (i.e., provide breakdown lanes or shoulders) or the bridge's capacity to accommodate vehicular, pedestrian, and bicycle travel.

After elimination of the rehabilitation alternatives, WVDOH considered each of the new superstructure alternatives. All of the Build Alternatives will satisfy the project's purpose and need and will have similar environmental impacts. However, specifically with respect to cost, time of closure, and risk for either of these factors to be underestimated, Alternative 3 is a better alternative than Alternatives 4, 5, or 6 (Table 1). In addition, Alternative 3 was selected by more commenters during the public scoping process than were other Build Alternatives (see Section 4.1).

With all these factors considered, WVDOH and FHWA have advanced Alternative 3 as the Preferred Alternative for the Dick Henderson Bridge Replacement Project. A preliminary engineering design for the Preferred Alternative is being used for analysis in this EA along with the No-Build Alternative as a basis of comparison. Consideration of a single build alternative in an EA is consistent with FHWA and CEQ guidelines and regulations (23 CFR 771.125, 40 CFR 1502 and FHWA, 1987).

Summary of Preferred Alternative

The Preferred Alternative includes construction of a new superstructure and reinforcing the two existing river piers. This alternative will remove the existing approaches, including the land-based bridge supports. The superstructure and land-based supports will be replaced with two mechanically stabilized earth (MSE) retaining walls and two river bank abutments. Minimal additional right-of-way (approximately one acre) will be required, mostly on the downstream side of both bridge approaches. The proposed construction will eliminate the weight restriction

on the bridge and will provide a structure that meets current design standards, improving safety and ease of travel for the project area.

Exhibit 4 shows a generalized profile and typical section of the proposed bridge replacement, to be refined by the design-build team during final design. Section 3.0 presents impacts associated with both the Preferred Alternative and the No-Build Alternative.

3.0 IMPACTS

3.1 Socio-Economics

Encroachments and Relocations

Construction for this project will occur within a very limited footprint that is already dominated by the existing roadway. The replacement construction will entail converting a total of approximately 0.4 acre of adjacent developed land to transportation land use but will not require any relocations. The additional right-of-way is spread over 15 parcels. The largest proposed encroachment to any one property is approximately 2,400 square feet (0.055 acre) on the backyard and garage of a residence.

The Preferred Alternative does not require any relocations of businesses or residences. Only minimal land disturbance is necessary for the proposed action. Construction will primarily take place within existing right-of-way. Approximately 0.40 ac of adjacent properties will be incorporated to the bridge right-of-way. Acquisition will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended. Additionally, approximately 2,000 square feet (0.045 ac) of additional area will be temporarily used for construction purposes.

The No-Build Alternative will not require any relocations.

Emergency Services

Emergency service facilities in the vicinity of the project area are shown on Exhibit 5. None are located within the project area.

Nitro has one fire station, located 2.3 miles northwest of the project area (on 20th Street), and St. Albans has two fire stations, approximately one half mile and two miles from the project area (Central Station on 6th Avenue and Highlawn Station on Walnut Street, respectively). The two cities' fire departments have an "automatic aide agreement" in place (<http://www.nitrofd.com/bridge.html>). Under this agreement, the fire departments automatically help one another for structure fires no matter where the emergency is within either city. Consequently, emergency vehicles regularly use the Dick Henderson Bridge. Under current conditions, heavy emergency vehicles will be using the bridge at some risk, and, in the future when the bridge is closed, the cities will not be able to assist each other as quickly. This is a particularly important impact for Nitro, which has only one fire department located toward one end of the city (to the north and not appearing on Exhibit 5).

Parks and Recreation

In the vicinity of the proposed project there is one city park, Roadside Park, one publically owned recreational facility specifically and exclusively used for football, Crawford Field, and one private marina.

The marina operations will be temporarily impacted by the construction activities, and a portion of the property may be overlapped by the proposed project; however, no significant impact to recreation is anticipated. Acquisition will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended.

The entrance to the public Roadside Park is approximately 0.5 mile east of the project area along MacCorkle Avenue, however, the park extends west to within approximately 0.3 mile of the bridge. The park provides a two-lane concrete boat ramp for access to the Kanawha River, a playground, picnic shelters, and overnight camping spaces. Also, every June, Roadside Park is the focal point of St. Albans' biggest event, Riverfest (<http://www.saintalbansriverfest.com>).

Riverfest is based out of Roadside Park, where a stage is erected for the event, although other venues around the city are also incorporated to the event. Riverfest includes a road race, parade, pageant, singing contest, food and craft vendors, many musical performances, a series of riverboat cruises, and fireworks (Figure 6). Throughout the festival, MacCorkle Avenue (US 60) near the park is narrowed down to three lanes and even down to one lane in either direction at the busiest times of the festival, e.g., Saturday night, in order to provide safer pedestrian crossing (Kennedy, 2011).

During construction of the proposed project, Riverfest could potentially see reduced attendance because of the detour necessary coming from Nitro. Bridge construction activities will be coordinated with event organizers and the St. Albans Police Department to minimize impacts to the event.



Figure 6: Logo and fireworks from the St. Albans Riverfest, a popular annual event near the Dick Henderson Bridge.

Also in St. Albans, the proposed right-of-way overlaps a sliver of the Crawford Field property that is adjacent to the St. Albans bridge approach (Exhibit 5). The project will not directly impact the areas where any activities take place in Crawford Field, as all construction will be south of the field itself and its associated buildings. Approximately 2,100 square feet of the

property will be incorporated to the roadway right-of-way, and Crawford Field may experience temporary noise impacts during construction. Potential noise impacts are detailed in Section 3.7.

The No-Build Alternative will not directly impact any recreational facilities; however, when the bridge is closed, usership of the Roadside Park may decrease.

Economics

The Dick Henderson Bridge is an important river crossing for the region as evidenced in the number of vehicles using the bridge and an analysis of the potential economic effects of its closure. The 2011 average daily traffic (ADT) on the bridge is 19,500. In twenty years (2031), traffic is projected to be 26,400 with the current weight restriction, or 26,700 if the weight restriction can be removed. In an analysis conducted for WVDOH, it was found that closure of the Dick Henderson Bridge costs between \$35,700 and \$68,700 per day (2009 dollars) in total vehicle operating costs and travel time-related costs (Michael Baker Jr., Inc., 2011a).

In the existing condition, the bridge restricts commercial activity because the weight restriction does not allow trucks larger than 12 tons. The Preferred Alternative will improve this economic condition for the two cities in the long-term. With respect to temporary effects, the Preferred Alternative will have costs associated with the bridge closure during construction.

With the Preferred Alternative, the bridge must be closed temporarily. It is anticipated that the river crossing will be closed between 320 and 460 calendar days. In vehicle operating costs and travel-time related costs, this closure will cost citizens a total of \$11.42 million to \$31.60 million. In addition to these costs, construction will temporarily eliminate easy access to certain businesses close to the bridge for some potential customers, likely resulting in lowered returns for those businesses during bridge closure.

The No-Build Alternative will not create the temporary economic effects associated with temporary bridge closure in the near future. However, with the No-Build Alternative, commercial traffic will experience increased restrictions and more and more heavy vehicles will need to detour. Eventually, with the No-Build Alternative, the bridge will close, affecting vehicle operating costs and travel time-related costs in perpetuity.

3.2 Pedestrian and Bicyclist Facilities

The Preferred Alternative will not disturb any officially designated pedestrian or bicycle trails, and it will provide an improved facility for pedestrians and bicyclists wanting to cross the Kanawha River. Because of the residential and commercial areas adjacent to the bridge, improved access and wide roadway shoulders will provide for bicycle traffic.

With the No-Build Alternative, existing conditions will continue for as long as deemed safe, but the bridge will eventually have to be closed to all traffic including pedestrian and bicyclists. Under the existing conditions, two wheelchairs cannot safely pass one another along the bridge, as stated in the ADA Accessibility Guidelines (28 CFR Part 36, Appendix A, Section 4.2.2), yet the current bridge sidewalk is only 48 inches (four feet). Under the existing conditions, bicyclists must

ride in line with vehicular traffic in narrow travel lanes (less than 11 feet, which is the design standard) without any shoulder for avoiding crashes.

The Preferred Alternative will have a beneficial impact on pedestrians and bicyclists. With the Preferred Alternative, the bridge will have a five-foot wide sidewalk, providing a more accessible and user-friendly link between Nitro and St. Albans than with the No-Build Alternative. Also, the Preferred Alternative will provide 12-foot travel lanes and six-foot shoulders, as compared to 10-foot travel lanes without shoulders with the No-Build Alternative. This wider travel space provides greater opportunity for drivers and bicyclists to avoid collisions, and makes the choice of bicycling a more inviting transportation option between the two cities.

With residential neighborhoods and myriad dining and shopping opportunities across the river from one another, this project area could particularly benefit from improved pedestrian and bicyclist facilities. Several comments from the March, 2011 public meetings specifically mentioned that an improved sidewalk was an important component of the project.

3.3 Historic and Archaeological Resources

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, and Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, WVDOH identified archaeological and historic resources within the area of potential effects (APE) of the Dick Henderson Bridge Replacement project, and subsequently evaluated the effects on identified resources, as detailed in the following sections.

Archeological Resources

A Phase I archaeological survey and geomorphological assessment within the proposed project APE was conducted in January and February of 2011. The archaeological APE includes areas beneath the current Dick Henderson Bridge on either side of the Kanawha River. Results of this survey are documented in a report submitted to the SHPO (Michael Baker Jr., Inc., 2011b).

Following archival research to establish a historic and prehistoric context for the effort, the survey and assessment consisted of a pedestrian reconnaissance, subsurface testing in undisturbed portions of the right-of-way, and a study of the project area's geomorphology.

Within the APE, two sites were identified that were determined eligible for the NRHP, and it was determined that they would be adversely affected by the project. The SHPO concurred with these findings in a letter dated June 28, 2011 (Appendix C). Coordination is currently ongoing with the SHPO for planning additional archaeological investigations to be completed prior to construction. A draft Memorandum of Agreement (MOA) for mitigation is included in Appendix C. Coordination will also be completed with the Advisory Council on Historic Preservation (ACHP) prior to construction.

Historic Resources

Investigations of the project area and vicinity concluded that only one historic resource will be impacted by the proposed project (Michael Baker Jr., 2011c and d). That resource is the bridge

itself. In a letter dated June 27, 2011 (Appendix C), the SHPO concurred with the finding that the Dick Henderson Bridge will be adversely affected by the proposed project.

The Dick Henderson Bridge meets NRHP Criterion C for its engineering merit as a good example of an infrequently-occurring three-span cantilevered Warren through truss structure. A cantilevered truss bridge consists of anchor arms supported by piers, and a suspended span that is supported by the anchor arms. The bridge was designed by J.E. Greiner Company of Baltimore, Maryland, and was built by the McClintic-Marshall Corporation of Bethlehem, Pennsylvania, which is the same company that built locks for the Panama Canal (Historical Society of Pennsylvania, 2011). The bridge is noted for its unusual nine-section top chord arrangement, which demonstrates a linear upwards slope and incorporates towers with flat tops (Figure 1). The bridge is also unusual for other specific engineering elements, as detailed in the Determination of Effects Report (Michael Baker Jr., Inc., 2011d) submitted to the SHPO.

Impact to the historic integrity of the bridge cannot be avoided with implementation of the Preferred Alternative. WVDOH is coordinating with the SHPO as well as with the local historical society to form an agreement on mitigation measures for the project impacts on this resource. The most recent correspondence with the SHPO and a draft MOA are included in Appendix C.

Section 4(f)

The project area was assessed for the presence of Section 4(f) resources, which are properties that are provided protection under Section 4(f) of the Department of Transportation Act of 1966 (49 USC Section 303 and 23 CFR Part 774). Under Section 4(f) provisions, FHWA may not approve the “use” of land from a significant publicly-owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

- 1) There is no feasible and prudent alternative to the use of land from the property; and
- 2) The action includes all possible planning to minimize harm to the property resulting from such use.

A “use” under Section 4(f) can be any of the following:

- direct use – property is permanently incorporated into the transportation project;
- temporary use – property is temporarily occupied in a way that is adverse to the property’s purpose; or
- constructive use – occurs when “the transportation project does not incorporate land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished.” (23 CFR Section 774.15(a).

1) Crawford Football Field

A portion of Crawford Field, a recreational facility in the project area, will be impacted by the project. However, this facility is not a Section 4(f) resource because, although it is publically owned by the St. Albans school district, it is not a publically owned public park. The facility is exclusively used for St. Albans High School football events and fundraisers for the team. The city's Parks and Recreation website does not list the facility as a park available for recreation, and the city's recreation football for children younger than High School age use fields located elsewhere in the city. Therefore, Crawford Field is not a Section 4(f) resource and it was not assessed for impact under the provisions of Section 4(f).

2) Dick Henderson Memorial Bridge

Because it is eligible for listing on the NRHP, the Dick Henderson Bridge itself is a Section 4(f) resource. The proposed action for the Dick Henderson Bridge Replacement Project involves removal of the existing truss superstructure of historic bridge and thus will obviously have an adverse effect on the resource. Therefore, the proposed action qualifies as a use of a Section 4(f) resource.

In 1983, FHWA issued a Programmatic Evaluation that could be applied to projects that were proposing to use an historic bridge if certain conditions applied. A programmatic evaluation supplants the need for an individual evaluation for a project to satisfy Section 4(f) requirements. The complete "Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges" can be found at the FHWA website (<http://www.environment.fhwa.dot.gov/4f/4fnationwideevals.asp>).

This Programmatic Section 4(f) Evaluation may be used for projects that meet the following criteria:

- 1) The bridge is to be replaced or rehabilitated with Federal funds.
- 2) The project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places.
- 3) The bridge is not a National Historic Landmark.
- 4) The FHWA Division Administrator determines that the facts of the project match those set forth in the Programmatic Section 4(f) Evaluation for assessing alternatives, findings, and measures to minimize harm.
- 5) Agreement among the FHWA, SHPO, and the ACHP has been reached through procedures pursuant to Section 106 of the NHPA.

FHWA has determined that the Dick Henderson Bridge Replacement project will have met all of these conditions once Section 106 coordination is complete for impacts to the bridge. Specific findings are provided in Appendix D.

3.4 Surface Waters and Floodplains

Surface Waters

The Dick Henderson Bridge crosses the Kanawha River. There are no other surface waters and no identified wetlands within or in proximity to the Preferred Alternative right-of-way. The Kanawha River is the largest waterway entirely within West Virginia. The Kanawha is a tributary of the Ohio River and extends approximately 100 miles from its origin in the middle of the state to the southeastern state border. The river has been an essential part of the state's industrial history since the middle of the 19th century.

Permitting through the US Coast Guard is discussed below ("Protection of Navigable Waters").

Placement of dredged or fill material into jurisdictional waters of the United States associated with construction activities is regulated under Sections 401 and 404 of the Clean Water Act (CWA). Noncompliance with the CWA is subject to enforcement action by the U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), and/or the WVDEP. When a project involves only an existing footprint as the proposed action does, bridge replacement projects may qualify for a Nationwide Permit (NWP) 3 – Maintenance. The Contractor shall be responsible for preparing a 404 permit application for impacts to all jurisdictional streams and/or wetlands associated with the project.

Roadway runoff from the bridge will be consistent with WVDEP requirements. Therefore, there will be no significant impacts to surface waters with the Preferred Alternative.

Floodplains

As of September 2010, FEMA has made available a digital Flood Insurance Rate Map (DFIRM) for Kanawha County. The DFIRM has been incorporated to the project GIS.

The FEMA DFIRM No. 54039C0214E for Kanawha County, dated February 6, 2008, indicates that the Kanawha River 100-year floodplain elevation within the project area ranges between 565 and 614 feet. A detailed hydraulic analysis for the Kanawha River will be performed during the final design phase for the Preferred Alternative. The bridge will be designed such that the presence of a bridge structure will not cause increase in backwater that will have adverse impacts on the surrounding community.

Protection of Navigable Waters

The proposed project will involve construction within navigable waters; therefore, WVDOH has consulted with the U.S. Coast Guard (USCG) in accordance with the Rivers and Harbors Act of 1899 and its associated regulations (23 CFR 650, Subparts D & H, 33 CFR 114-115). USCG has stated that the general plan for the proposed project is acceptable; however, final determination as to whether or not the bridge permit needs to be amended cannot take place until final design (Appendix B). Final design will include approvals from USGS of navigation lights and signals.

The No-Build Alternative will have no impact on river navigation until the bridge deteriorates to an unsafe condition and must be demolished. With the Build Alternative, there will be limited

disruption to commercial and recreational river navigation; however, there will not be long-term changes for river traffic. With both the No-Build Alternative and the Build Alternative, the bridge piers will remain in the same position and the vertical clearance from the river to the superstructure will also remain the same as the current condition. Final design details will be determined by the contractor, but ongoing coordination with the USCG will ensure that impacts to boating traffic are minimized.

With the No-Build Alternative, the piers will remain under-reinforced using present design criteria. The piers are not designed for barge impact or an extreme event occurrence. This leaves the bridge more vulnerable to closure should an extreme event occur. With the Build Alternative, the piers will be reinforced to current design standard, thus reducing chances for bridge closure which could impact river traffic.

Recreational boaters along this stretch of the Kanawha River rely on public access via the boat ramps at Roadside Park (Exhibit 5 and Section 3.1). In-river construction activities may have an impact on recreational boaters, including temporary closures of portions of navigable waterway. The USCG will require a minimum clear channel width during construction in the navigation channel; recreational boaters will have to use this same passage when pier construction or demolition activities make other channels unsafe.

3.5 Fish and Wildlife

The proposed project has little potential to directly impact fish and wildlife species or habitat. Construction for this project will occur within a limited footprint that is already dominated by the existing roadway. The proposed widening of the right-of-way includes approximately 0.4 acre of upland and 0.7 acre of area over the river. The No-Build Alternative will not have any known impact on fish or wildlife.

All of the upland areas proposed for right-of-way widening have been disturbed previously. Some scrubby growth and a few trees, but no forestland, will be cleared with the Preferred Alternative. Wildlife species found in the upland areas likely include those typically associated with residential development (e.g., mice, squirrels, and a limited number of bird species).

As currently designed, the proposed bridge will span approximately 1,020 feet over the river and river banks (Exhibit 4). Impact to the aquatic habitat will occur with the Preferred Alternative from enlarging the pier footprint on the riverbed as part of reinforcing the existing piers and from temporary construction activities, particularly with removal of the existing superstructure. Disturbance to the stream bed and riverbanks could alter flow patterns that result in scouring or sediment deposition elsewhere in the river.

As mitigation for potential impact to aquatic habitat, WVDOH will employ best management practices during construction, including silt fencing and minimized clearing of riparian vegetation. In addition, a mussel salvage operation (also called a translocation survey) will be conducted in the primary impact area beneath the existing bridge and within a buffer area to allow for demolition and removal activities without crushing or smothering these animals.

In considering potential impacts to protected species, WVDOH consulted with both the USFWS and the WVDNR. In April 2011 correspondence, WVDNR stated their records did not reveal any known occurrences of rare, threatened, or endangered species nor any natural trout streams at the Dick Henderson Bridge project site. However, as mentioned above, a translocation survey will be conducted, as required for protection of all mussel species in West Virginia. USFWS, in a letter dated June 2, 2011 concluded the project will have No Effect on any Federally listed threatened, endangered, or candidate species, and that “no further Section 7 consultation under the ESA [Endangered Species Act] is required.” (Appendix E)

3.6 Air Quality

Transportation projects can create localized impacts on air quality through the changes they introduce to the volume, location, and character of motor vehicle traffic. The frequency and magnitude of these impacts, which manifest themselves as health risks and a general decreased quality of life, can be identified through monitoring and projected through modeling.

In addition to the NEPA-based imperative for assessing potential environmental impacts of the proposed project, the Federal Clean Air Act (CAA) and its subsequent amendments (CAAA) have established specific procedures and limitations for evaluating transportation projects in designated air quality nonattainment areas. These procedures, generally referred to as the “conformity regulations,” are outlined in 42 USC Part 7401 (et. seq.) and are further detailed in Federal regulations (40 CFR Part 93). National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants are applied as the standards for evaluating proposed projects and actions. The NAAQS are shown in Table 2. Only O₃, CO, and PM (both PM₁₀ and PM_{2.5}) are currently of concern to mobile sources (motor vehicles). The State of West Virginia adheres to the same standards.

Overview of Study

The proposed project is located Kanawha County, which has been designated by the Environmental Protection Agency (EPA) as a nonattainment area for PM_{2.5}. (EPA, 2011). The county is also a maintenance area for 8-hour ozone with a federally approved maintenance plan and is in attainment for the other NAAQS pollutants.

FHWA, EPA and WVDOH guidance and regulations were followed in the assessment. The potential for air quality impacts were documented on a regional and project level. The current ADT of the roadway is approximately 19,500 vehicles per day (vpd). If the bridge were to remain open with weight restrictions, the predicted ADT will be 26,400 in the design year. If the bridge is improved, it is predicted to increase by an additional 300 vpd for a total of 26,700 ADT.

Table 2: National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary	Secondary
CO	35 ppm (40 µg/m ³), 1-hour Average ¹	None
	9 ppm (10 µg/m ³), 8-hour Average ¹	None
Pb	0.15 µg/m ² , Rolling 3-month Average	Same as Primary
	1.5 µg/m ² , Maximum Quarterly Average	Same as Primary
NO ₂	53 ppb ³ , Annual Arithmetic Mean	Same as Primary
	100 ppb, 1-hour ⁴	Same as Primary
PM ₁₀	150 µg/m ³ , 24-hour Average ⁵	Same as Primary
PM _{2.5}	15 µg/m ³ , Annual Arithmetic Mean ⁶	Same as Primary
	35 µg/m ³ , 24-hour Average ⁷	Same as Primary
O ₃	0.075 ppm (2008 standard), Maximum Daily 8-hour Average ⁸	Same as Primary
	0.08 ppm (1997 standard), Maximum Daily 8-hour Average ⁹	Same as Primary
	0.12 ppm, Maximum Daily 1-hour Average ¹⁰	Same as Primary
SO ₂	0.03 ppm (80 µg/m ³), Annual Arithmetic Average	0.50 ppm, 3-hour Average ¹
	0.14 ppm, 24-hour Average ¹	
	75 ppb ¹¹ , 1-hour Average	None

Source: USEPA, June 3, 2010 (last update).

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

(9) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation

purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

(c) EPA is in the process of reconsidering these standards (set in March 2008).

⁽¹⁰⁾ (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1 .

⁽¹¹⁾ (a) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

1-Hour and 8-Hour Ozone (O₃)

The proposed project is in an area that is no longer subject to the 1-hour standard as of June 15, 2005. Additionally, it is in an area designated as being in maintenance 8-hour standard as of August 10, 2006.

The project is listed as a recommended project in the *2040 Regional Intergovernmental Council Long Range Transportation Plan* (2040 LRTP; BCKP RIC, 2009a). The project ID is K12 and is catalogued in the 2040 LRTP as project ID K-15 St. Albans Bridge (Henderson Bridge-Center Street). The 2040 LRTP has an accompanying air quality conformity analysis. Therefore, it meets its regional air quality requirements. No further analysis is required.

Carbon Monoxide (CO)

The proposed project is in an area designated as being in attainment of the CO standard. Nonetheless, NEPA regulations still require that the impacts of the proposed project be analyzed to document why the proposed action will not cause an impact (exceedance) of the NAAQS for CO.

All traffic volumes were developed by Baker and approved by WVDOH. As mentioned, the current ADT of the roadway is approximately 19,500 vpd. If the bridge were to remain open with weight restrictions, the predicted ADT will be 26,400 vpd in the design year. (Please note that is estimated that the bridge will likely be closed to all traffic in the design year if it is not rehabilitated.) If the bridge is improved, it is predicted to increase by an additional 300 vpd for a total of 26,700 ADT.

The current Design Hourly Volume (DHV) for the bridge is approximately 2,340 vehicles. If the bridge were to remain open with weight restrictions, the predicted DHV will be approximately 3,170 the design year. If the bridge is improved, it is predicted to increase by an additional 30 vehicles for a total of approximately 3,200 ADT.

For CO project level requirements, the CAAA do not require a CO analysis for an attainment area and NEPA requires some level of analysis. The proposed action does not increase through-lane capacity, only adding a turning lane at each end of the bridge. Also, based on the predicted vpd of 26,400, it is not likely that the project will cause a CO impact.

Typically, on-line bridge replacements are exempt from detailed CO analysis when there is no additional added capacity. In this case, the bridge has a weight restriction for heavy trucks

because of its structural condition. The proposed action will allow these vehicles to use it again. As a result of the traffic draw, a CO assessment was performed for the worst-case intersection (WV 25/WV 25 spur, LOS F). It was performed for the design year Build Alternative to disclose (as part of NEPA) that there will not be a CO exceedance of the NAAQS. Since the additional vehicles are all heavy diesel trucks, and heavy diesel vehicles are not large emitters of CO, the CO levels were not expected to significantly change. Also, the intersection is LOS F for the existing and design year conditions. The intersection will also remain at LOS F even if the bridge were to be closed. Please note that the LOS is not the reason for the project. The reason for replacing the bridge lies in the structural deficiency and that the bridge is approaching the end of its lifespan (see Section 1.0).

Design year build CO concentration results from the EMIT model (emission factors) and subsequent CAL3QHC intersection dispersion model analysis were well below the NAAQS as shown in Table 3. The CO analysis for the WV 25/WV 25 spur (bridge) intersection produced design year build total CO levels of 5.5 and 3.5 ppm for the 1-hour and 8-hour concentrations, respectively, including background. Both are well below the NAAQS of 35 and 9 ppm for their respective 1- and 8-hour criteria.

Based on the analysis, the proposed action will not cause an impact to the NAAQS for CO. No further action is needed.

Table 3: NAAQS Worst-Case Intersection: WV 25/ WV 25 Spur (Nitro)

Pollutant	NAAQS Criteria	Design Year (2031) No-Build Alternative	Design Year (2031) Build Alternative
CO	35 ppm (1-hour Average)	4.1	4.2
	9 ppm (8-hour Average)	2.5	2.5

Note 1: Concentrations include background.

Note 2: A persistence factor of 0.7 was used for 8-hour concentration conversions.

PM_{2.5}

The proposed project is in an area designated as being in nonattainment of the PM_{2.5} standard. For projects located in nonattainment areas, EPA has issued public draft guidance for quantitative hot-spot analysis in nonattainment areas (May, 2010). EPA intends to finalize the guidance, then after a grace period of two years, quantitative hot-spot analyses will apply in PM nonattainment and maintenance areas. Until then, qualitative analysis continues to apply in these areas, using previously issued joint EPA-FHWA guidance.

Typically, on-line bridge replacements are usually exempt from PM_{2.5} analysis when there is no additional added capacity. In this case, the bridge has a weight restriction for heavy trucks because of its structural condition. The proposed action will allow these vehicles to use it again. As a result of the traffic draw, a PM_{2.5} assessment was performed for the worst-case intersection

(WV 25/WV 25 Spur) for the design year build alternative to disclose that the proposed action will not be a project of air quality concern.

For projects with affected intersections with LOS D, E, or F (now or in the future), a qualitative PM_{2.5} analysis is required based on a qualitative consideration of local factors (40 CFR Part 93.123(b)(2)). This project's worst-case intersection (WV 25/WV 25 Spur) is predicted to be LOS F for the design year build alternative. Note: the intersection will also remain at LOS F even if the bridge were to be closed.

Since the worst-case intersection was LOS F, the next step was to determine if the proposed action is a "Project of Air Quality Concern." Based on the ADT of 26,700 and the diesel truck volume of 800 vehicles per day, it is not a project of air quality concern. The FHWA criterion is an ADT of 125,000 with a maximum of 8% (10,000) diesel trucks per day. As a result, the proposed actions will not adversely affect PM_{2.5}. Further analysis is not required.

Mobile Source Air Toxics (MSAT)

There are currently no established criteria for determining the scope of MSAT emissions analyses. Therefore, a range of options should be considered when addressing this issue in NEPA documentation. FHWA has developed a tiered approach for analyzing MSAT emissions in NEPA documents. Depending on the specific project circumstances, FHWA identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; and
- Quantitative analysis for projects with higher potential MSAT effects.

The proposed action is a "Project with No Meaningful Potential MSAT Effects." Three types of projects are included in this category:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117(c);
- Projects exempt under the CAA Conformity rule under 40 CFR; and
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

This project is classified as "Other projects with no meaningful impacts on traffic volumes or vehicle mix." The proposed action increases the heavy truck percentage by 1% and does not change the medium truck volumes nor the passenger car volumes. Therefore, no analysis or discussion of MSAT emissions is necessary. Additionally, the following prototype language is included as per FHWA's interim guidance:

The purpose of this project is to replace the bridge on the same alignment because of structural deficiencies. This project has been determined to generate no air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in regional traffic volumes, regional vehicle mix, basic project location,

or any other factor that will cause an increase in MSAT impacts of the project from that of the No-Build Alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOBILE6.2 model forecasts a combined reduction of 72 percent in the total annual emission rate for the priority MSAT from 1999 to 2050 while vehicle-miles of travel are projected to increase by 145 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

Additionally, and specific to this project, the rehabilitation of the bridge will decrease regional heavy truck VMTs because these vehicles will have regained the shortest route between both sides of the river.

Greenhouse Gases and Climate Change

Transportation sources contribute to greenhouse gas emissions (GHG) through the burning of petroleum-based fuel. According to the FHWA, transportation sources are responsible for approximately one-quarter of the GHG emissions in the US. Under the CAA, the EPA has the authority to establish motor vehicle emissions standards for CO₂ and other greenhouse gases although such standards have not yet to be established as part of the NAAQS. FHWA is actively involved in efforts to initiate, collect, and disseminate climate-change-related research and to provide technical assistance.

FHWA does not believe it is informative at this point to consider GHG in an environmental report as the climate impacts are global in nature. Analyzing how evaluated alternatives might vary in their relative contribution to a global issue does not necessarily make for better informed alternative decisions. Once standards are established and guidance for assessing the potential greenhouse gas effects of transportation projects becomes available, a more in-depth assessment may be possible.

NEPA requires an analysis of air quality but it does not expressly refer to climate change or GHG. Nonetheless, on February 18, 2010, the Council on Environmental Quality (CEQ) produced a memorandum entitled "Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions." In this memorandum, CEQ provided draft guidance for public consideration and comment on the ways in which Federal agencies can improve their consideration of the effects of GHG emissions and climate change in their evaluation of proposals for Federal actions under NEPA, 42 U.S.C. §§ 4321 et seq.

Using NEPA's "rule of reason" governing the level of detail in any environmental effects analysis, agencies should ensure that they keep in proportion the extent to which they document their assessment of the effects of climate change. Based on that rule, generally speaking, a bridge replacement project does not require a formal GHG analysis. Furthermore, it is expected that the replacement of the bridge will decrease regional heavy truck VMTs (and subsequent emissions) because these vehicles will have regained the shortest route between both sides of the river. No further action is required.

3.7 Noise

Detailed discussions of the noise analysis are provided in the noise technical report for the project (Michael Baker Jr., Inc. , 2011e), included with the Administrative Record for the project. The noise analysis was completed in accordance with FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise, 23 CFR 772*, and the WVDOT's *Design Directive DD-253 Noise Analysis and Abatement Guidelines* (2006) and included the following tasks:

- Identification of noise-sensitive land uses;
- Determination of existing sound levels;
- Determination of future sound levels for the No-Build and Build Alternatives;
- Determination of traffic noise impacts;
- Noise abatement evaluation;
- Discussion of construction noise; and,
- Coordination with local officials.

Criteria for Determining Noise Impacts

Noise impact is determined by comparing future project sound levels: (1) to a set of Noise Abatement Criteria (NAC) for a particular land use category, and (2) to existing sound levels.

The FHWA noise standards (contained in 23 CFR 772) and WVDOT's noise policy state that traffic noise impacts that warrant consideration of abatement occur when worst-hour equivalent sound levels approach or exceed the NAC listed in Table 4. WVDOT's policy defines "approach" as one decibel below the NAC, or 66 dBA for Category B land uses.

Identification of Noise-Sensitive Land Uses

Review of available electronic mapping, GIS data, and field reconnaissance revealed that noise-sensitive land uses exist in the project area that might be impacted by the project. Category B land uses include residences and Crawford Field. There are some Activity Category C land uses in the project area that include various commercial activities such as auto repair, car wash, restaurants, a car dealership, and other retail stores.

Determination of Existing Sound Levels

Existing conditions were measured in the field at representative locations. They were also modeled with the FHWA Traffic Noise Model Version 2.5 (TNM 2.5) computer program. Existing year ADT traffic is approximately 19,500. The existing levels range from approximately 52 to 65 dBA. The primary noise sources at these locations include US 60, WV 25, and the bridge traffic (WV 25 Spur). Modeled and measured receptor locations are shown in Exhibit 6.

No-Build Alternative

Noise modeling of the No-Build Alternative was completed using the FHWA Traffic Noise Model (TNM 2.5) computer program. The program calculated design year 2031 sound levels at the noise-sensitive properties in the project area (Exhibit 6). Design Year ADT traffic is approximately 26,400. Predicted design year sound levels for the No-Build Alternative range from 53 to 67 dBA.

Table 4: Noise Abatement Criteria in 23 CFR 772

Activity Category	L_{eq} (1h) dBA	Description of Activity
A	57 (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The FHWA noise standards and WVDOT’s policy also define impacts to occur if there is a substantial increase in design year sound levels above the existing sound levels when the predicted design year sound levels increase by 16 or more dBA. Table 5 presents WVDOT’s criteria used to define noise increases.

Table 5: WDOT Criteria to Define Noise Increase

Increase (dBA)	Subjective Descriptor
0 to 15	No Impact
16 or more	Substantial Increase

Build Alternative

Noise modeling of the Build Alternative was completed using the FHWA Traffic Noise Model (TNM 2.5) computer program. The program calculated design year 2031 sound levels at the noise-sensitive properties in the project area (Exhibit 6). Design Year ADT traffic is approximately 26,700. Predicted design year sound levels for the Build Alternative range from 55 to 67 dBA.

Determination of Traffic Noise Impacts

The impact assessment indicated that zero (0) noise receptors are predicted to be impacted in the design year with sound levels of 66 dBA or higher for residences and 71 dBA or higher for commercial land uses. There were no predicted substantial increase impacts.

Noise Abatement Evaluation

Abatement is generally evaluated when impacts are predicted to occur. Since there were no impacts according to WVDOT noise policy, no further consideration for permanent abatement measures was analyzed.

Construction Noise

Temporary noise from construction activities will be louder than the traffic noise from the Dick Henderson Bridge. For example, from a 50-foot distance, sound levels from a jackhammer and a paver are 88 dBA and 89 dBA, respectively. Sound levels from a pile driver at the same distance can be 100 dBA. (Reagan and Grant, 1977)

Particularly because residences are adjacent to the project area, construction contractors will follow special mitigation measures to lesson temporary noise impacts. Control of construction noise will be governed by WVDOT's Standard Specifications for Road and Bridge Construction and any additional abatement measures developed specifically for the action. The following additional abatement measures may be used to address construction noise for this project:

- Limited hours allowed for construction activities (e.g., 6AM to 10PM).
- Limited days allowed for construction activities (e.g., Monday through Saturday, with no holiday operations).
- Require contractors to monitor noise so that if predetermined thresholds are exceeded, operations cease until mitigation measures are emplaced.
- Require contractors to include appropriate mufflers and maintain equipment to control equipment noise.
- Incorporate alternatives to pile-driving when practicable.
- Require contractors to use temporary noise barriers around particularly noisy equipment near sensitive receptors.

Coordination with Local Officials

The results of traffic noise analyses are available in environmental documents such as Environmental Impact Statements or Environmental Assessments, copies of which are routinely furnished to local government offices. The WVDOH encourages, but cannot mandate, local communities and developers to practice noise compatible development.

Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate development in such a way that noise sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized.

The area near the bridge is densely developed. Open land for future development is not readily available, particularly for noise sensitive sites such as residential land uses.

3.8 Hazardous Materials

The locations of permitted and non-regulated hazardous waste sites have been identified and assessed for their potential to impose environmental risk or liability on the Dick Henderson Bridge Replacement project. Ten (10) different government databases were used for identification of potential sites within specified American Society of Testing and Materials (ASTM) search distances from the project area.

A total of 48 potential hazardous waste sites were found within one mile of the project area, 31 of which were within $\frac{1}{4}$ mile. The known or potential waste sites in the vicinity of the project area are identified and located on Exhibit 7. After further investigation of results, all but five (5) sites were deemed highly unlikely to pose concern for impacts to or from the project. These five remaining sites are detailed in Table 6.

Table 6: Hazardous Materials Sites with Potential to Impact the Project

Database	Facility Type	Address	Name	Distance from Project Area
LUST / UST	Boat Dealership And Dock	418 1st Ave, Saint Albans	Lou Wendell Marine Sales And Service	<100 feet
RCRA-NonGen	Car Dealership	300 MacCorkle Ave, Saint Albans	Love Nissan	<100 feet
LUST / UST	Former Gas Station	1428 Main Street, Nitro	High Risk Investment Company	<100 feet
RCRA-NonGen FINDS	Wrecker and Used Auto Parts	506 1st Avenue South/ 504 1 Ave South	Abbott's Garage and Wrecker / Nitro Auto Repair	<100 feet
LUST / UST RCRA-NonGen FINDS	Bus Service	200 MacCorkle Ave, St. Albans	St. Albans School Bus Garage/ Terminal	<500 feet

Notes: LUST = Leaking underground storage tank; UST = underground storage tank; RCRA = Resource Conservation and Recovery Act

Because the project is to be conducted almost exclusively within existing right-of-way, limited to shallow intrusive activities, and because the closest potential hazardous waste sites are related to subsurface releases, there is a low likelihood of encountering hazardous material for the majority of the project. During the limited intrusive activities, such as installation of new bridge supports, there is a moderate potential for encountering material impacted from adjoining potential hazardous waste sites, and appropriate worker and environmental protection protocols may be required.

3.9 Visual and Aesthetic Impacts

Special views in the project area include views of the Kanawha River afforded by the bridge's elevation and river crossing. Particularly for members of the community who appreciate the history of the bridge and its historic features, views of the bridge may be aesthetically pleasing. Other portions of the project area, which are dominated by dense residential and commercial development, do not constitute a unique or sensitive viewshed. Impacts to views both of and from the project area are discussed in the following sections.

Views of the Project

In a general sense, the Preferred Alternative will not impact the view of a bridge along this stretch of the Kanawha River. The proposed action provides a bridge in the same location, and the new bridge can remain a backdrop for fireworks (Figure 6) and serve as an iconic structure

for the community. More specifically, the Preferred Alternative will impact views primarily in three ways:

- The view of the bridge will no longer be tied to an historic structure. Mitigation for removal of the historic truss is discussed in Section 3.3.
- Because the proposed new plate girder superstructure has a lower profile than the truss, it will afford a more open view along the river.
- Because MSE walls are proposed as replacement for the viaduct pedestals (land-based bridge supports), views underneath the bridge approaches will be more obstructed than with the existing or No-Build conditions.

With the No-Build Alternative, views of the bridge will only change in minor ways through time. Although routine maintenance will be performed, it is likely more signs of deterioration will appear through the decades ahead. When the bridge is closed to vehicular traffic at some point in the future, it is uncertain what will be done with the bridge.

Views from the Project

The proposed project will provide a more open view of the Kanawha River for users of the bridge. Because the design affords improved facilities for pedestrians and bicyclists (see Section 3.2), it is likely that more people will enjoy the views from the project area. The No-Build Alternative will not impact the views from the project area.

Overall, impacts to the aesthetic and visual environment of the project area will not be significant with the Preferred Alternative.

3.10 Indirect and Cumulative Effects

Although the Dick Henderson Bridge Replacement Project will not by itself have significant environmental impacts, consideration has been given to how the project impacts may rise to a level of significance when considered in conjunction with possible impacts of other foreseeable projects in the area.

Indirect impacts are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” 40 CFR 1508.8(b). Indirect impacts are discussed where applicable for each individual resource or issue in Sections 3.1 through 3.8.

Often when environmental evaluations consider potential for indirect impact, they consider possibilities of residential or commercial development that could be induced by a project, which will, in turn, impact habitat, water quality, quality of life etc. Such indirect impacts are not likely with the proposed project, largely because the areas surrounding the project have little land available for new development.

5.0 REFERENCES

- American Association of State Highway and Transportation Officials (AASHTO). 2004. *Policy on Geometric Design of Highways and Streets*.
- _____. 2010. *AASHTO LRFD Bridge Design Specifications, 5th ed.*
- Boone, Clay, Kanawha, and Putnam County Regional Intergovernmental Council (BCKP RIC). 2009a. *The FY 2010-2013 Transportation Improvement Program for the Charleston, WV Metropolitan Statistical Area*. December, 2009, as amended November 16, 2010. Charleston, WV.
- _____. 2009b. *2040 Regional Intergovernmental Council Long Range Transportation Plan for Kanawha and Putnam Counties*. Charleston, WV.
- _____. 2010. *2040 Regional Intergovernmental Council Long Range Transportation Plan Addendum for Kanawha and Putnam Counties*. September 9, 2010. Charleston, WV.
- Bridgemappper.com. 2011. *Dick Henderson Memorial Bridge*. Electronic document, http://www.bridgemappper.com/bridge_detail.php?ID=1624, accessed 24 February 2011.
- Environmental Protection Agency (EPA). 2011. *Nonattainment Status for Each County by Year for West Virginia*. Accessed on May 15, 2011 via the internet: http://www.epa.gov/oar/oaqps/greenbk/anay_wv.html.
- _____. December 2010. *Official Release of the MOVES2010a and EMFAC2007 Motor Vehicle Emissions Models for Transportation Conformity Hot-Spot Analyses and Availability of Modeling Guidance*.
- _____. May 2010. *Draft Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas*.
- Federal Highway Administration (FHWA). 1987. *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. FHWA Technical Advisory T 6640.8A. October 30.
- _____. 1983. *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges*.
- Historical Society of Pennsylvania. 2011. *Around the World With Bethlehem Steel*. Electronic document, <http://www.hsp.org/default.aspx?id=944>, accessed 24 February 2011.
- Michael Baker Jr., Inc. 2011a. *Diversion Travel Cost Analysis: Dick Henderson Bridge (St. Albans-Nitro)*. Prepared for WVDOH, February 2, 2011.
- _____. 2011b. *Phase I Archaeological and Geomorphological Investigations in the Dick Henderson Bridge Replacement Project Area, Kanawah County, West Virginia*. Prepared for WVDOH, April 2011.

_____. 2011c. *Historic Resources Survey and Determination of Eligibility Report, Richard J. "Dick" Henderson Bridge (St. Albans-Nitro Bridge) Project*. Prepared for WVDOH, April 2011.

_____. 2011d. *Determination of Effect Report, Richard J. "Dick" Henderson Bridge (St. Albans-Nitro Bridge) Project*. Prepared for WVDOH, May 2011.

_____. 2011e. *Noise Analysis Technical Report. Dick Henderson Bridge*. Prepared for WVDOH, May, 2011.

_____. 2010. *Draft Evaluation of Structure Rehabilitation Strategies for the Dick Henderson (St. Albans-Nitro) Bridge No. 1341 (20A068) for West Virginia Department of Transportation Division of Highways*. Submitted January 28, 2010.

Reagan, Jerry A. and Charles A. Grant. 1977. *Special Report Highway Construction Noise: Measurement, Prediction and Mitigation*. Washington DC: FHWA.

Transportation Research Board (TRB). 2011. *Highway Capacity Manual, 5th Edition*. TRB: Washington, D.C.

URS Corporation. May 2003. *St. Albans Bridge/Underpass Study. Final Report*. Prepared for the Regional Intergovernmental Council, South Charleston, WV.

URS Greiner Woodward Clyde. July 2000. *St. Albans Bridge/Underpass Study. Technical Memorandum No. 1: Problem Definition and Development of Conceptual Alternatives*. Prepared for the Regional Intergovernmental Council, South Charleston, WV.

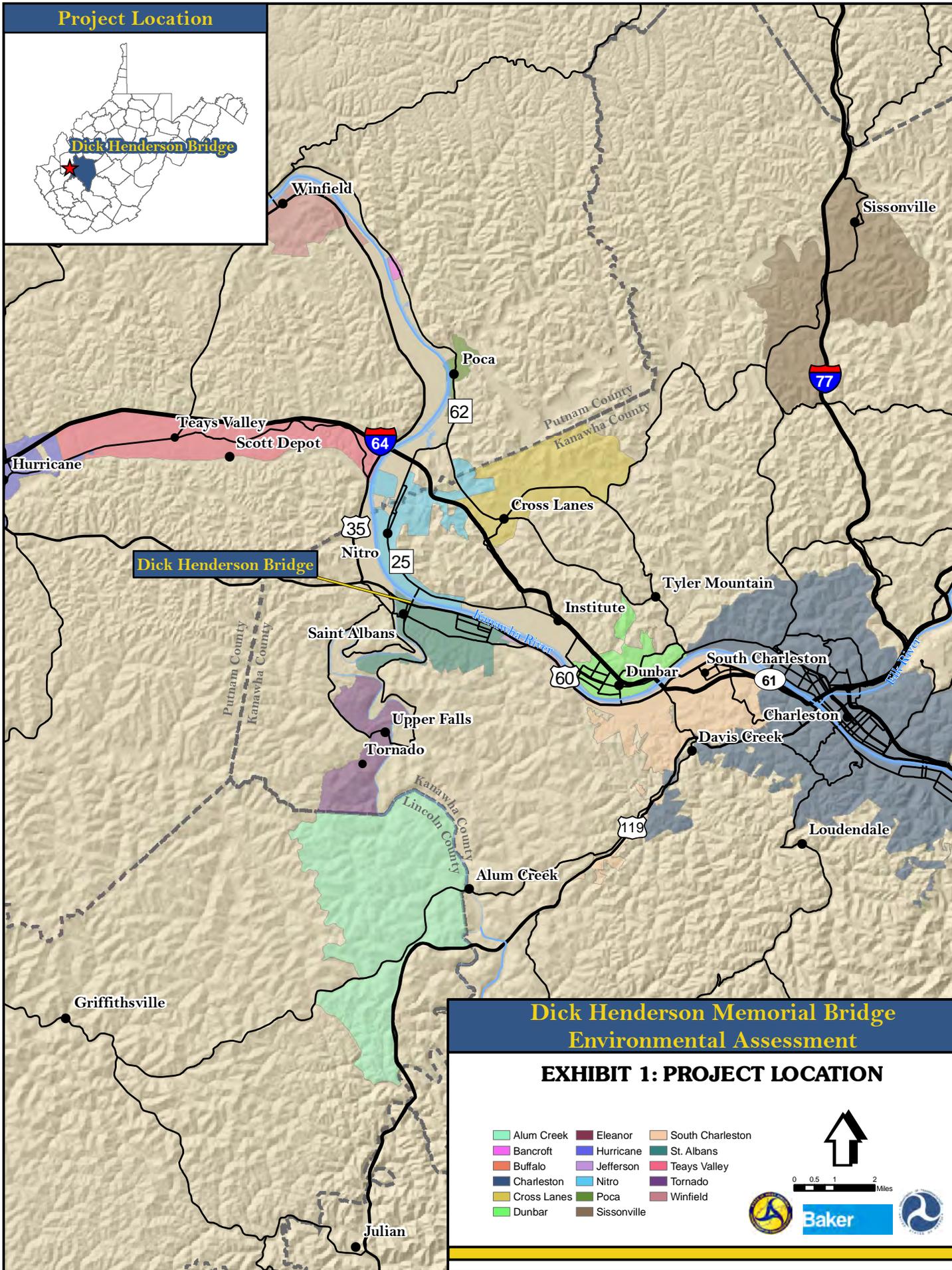
U.S. Census Bureau. 2011. 2010 Census results, Table DP-1 for the cities of St. Albans and Nitro, WV.

West Virginia Department of Transportation (WVDOT). 2006. *Design Directives*.

_____. 2004. *Bridge Design Manual*.

Exhibits

Project Location



Dick Henderson Memorial Bridge Environmental Assessment

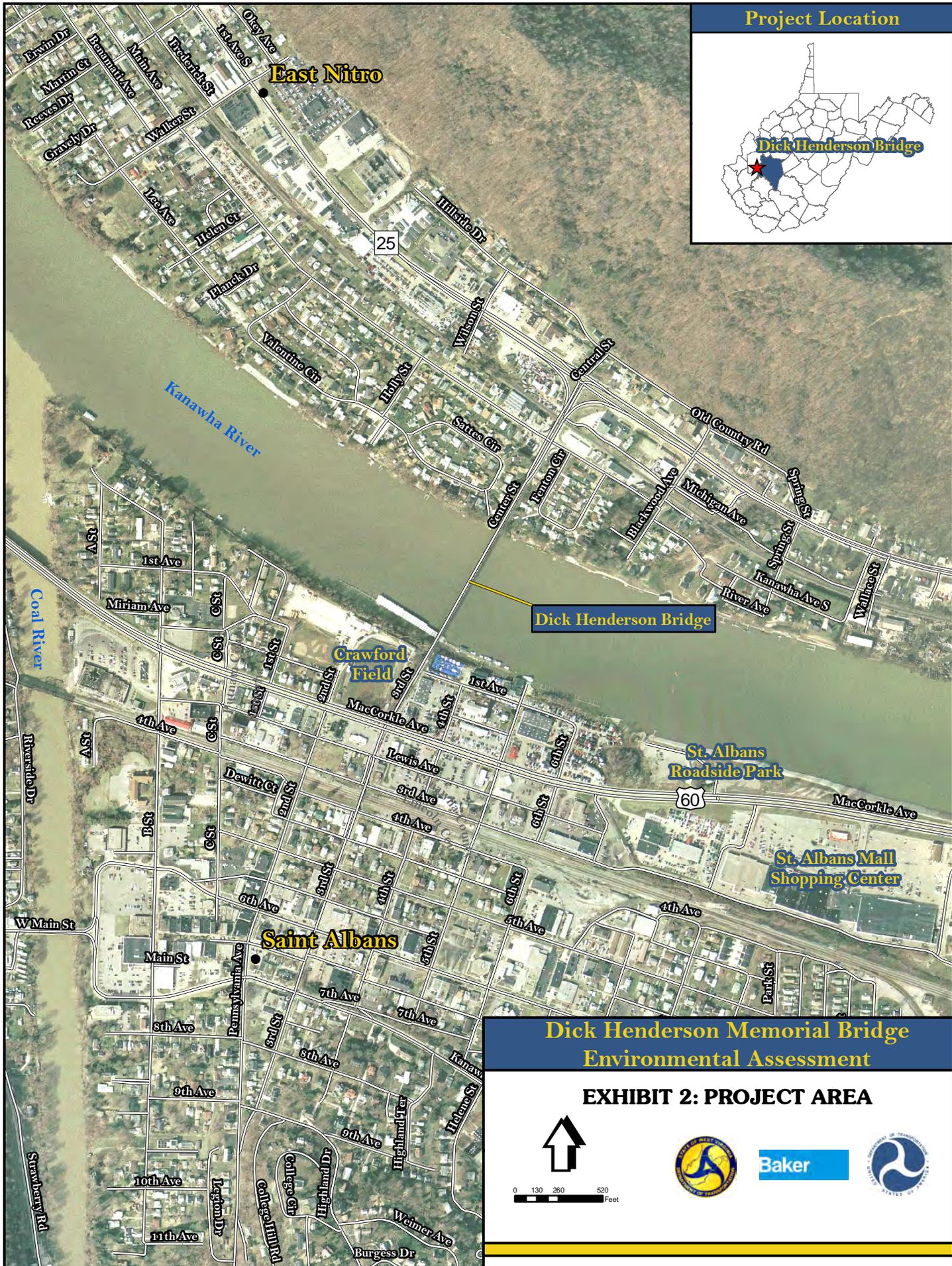
EXHIBIT 1: PROJECT LOCATION

- | | | |
|-------------|-------------|------------------|
| Alum Creek | Eleanor | South Charleston |
| Bancroft | Hurricane | St. Albans |
| Buffalo | Jefferson | Teays Valley |
| Charleston | Nitro | Tornado |
| Cross Lanes | Pocca | Winfield |
| Dunbar | Sissonville | |

↑

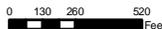
0 0.5 1 2 Miles

Project Location



**Dick Henderson Memorial Bridge
Environmental Assessment**

EXHIBIT 2: PROJECT AREA



\$ = Cost* (millions)
🕒 = Closure Time* (days)
*Both cost and closure time are estimated ranges.

Alternative 4
 Complete Superstructure Replacement
 3-Lane Main Span & Approaches
 Steel Through Truss Design

Alternative 3
 Complete Superstructure Replacement
 3-Lane Main Span & Approaches
 Steel Plate Girder Design

Alternatives 1 and 2
 Rehabilitation of Existing Structure
 2-Lane Main Span
 Alternative 1: 9'-10" Lanes, Sidewalk Between Trusses
 Alternative 2: 10' Lanes, Sidewalk Outside Truss

Alternative 5
 Complete Superstructure Replacement
 3-Lane Main Span & Approaches
 Cable Stayed Design

Alternative 6
 Complete Superstructure Replacement
 3-Lane Main Span & Approaches
 Extradosed Design

Where will the bridge cross the river?
 All alternatives being considered will cross the river at the existing location. In fact, all alternatives will make use of the existing piers. The bridges are depicted alongside each other here for a visual comparison of the replacement alternatives.

\$ 32-35
 🕒 540-680

\$ 27-32
 🕒 360-570

\$ 25-28
 🕒 320-460

\$ 26-29
 🕒 380-520

\$ 32-35
 🕒 460-600

Kanawha River

Shoulders
 6ft-wide for each replacement alternative

Sidewalk
 5ft-wide for each replacement alternative

Travel Lanes
 Three 12ft-wide lanes for each replacement alternative

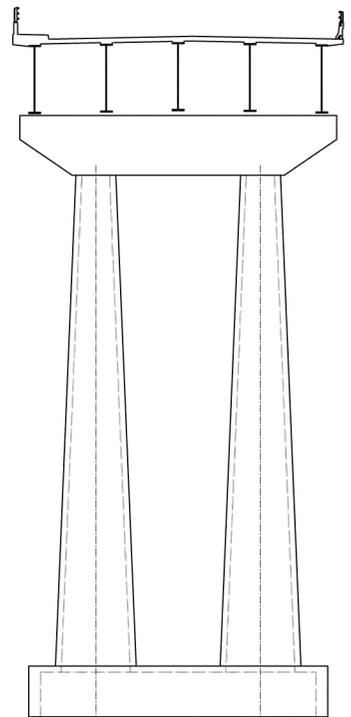
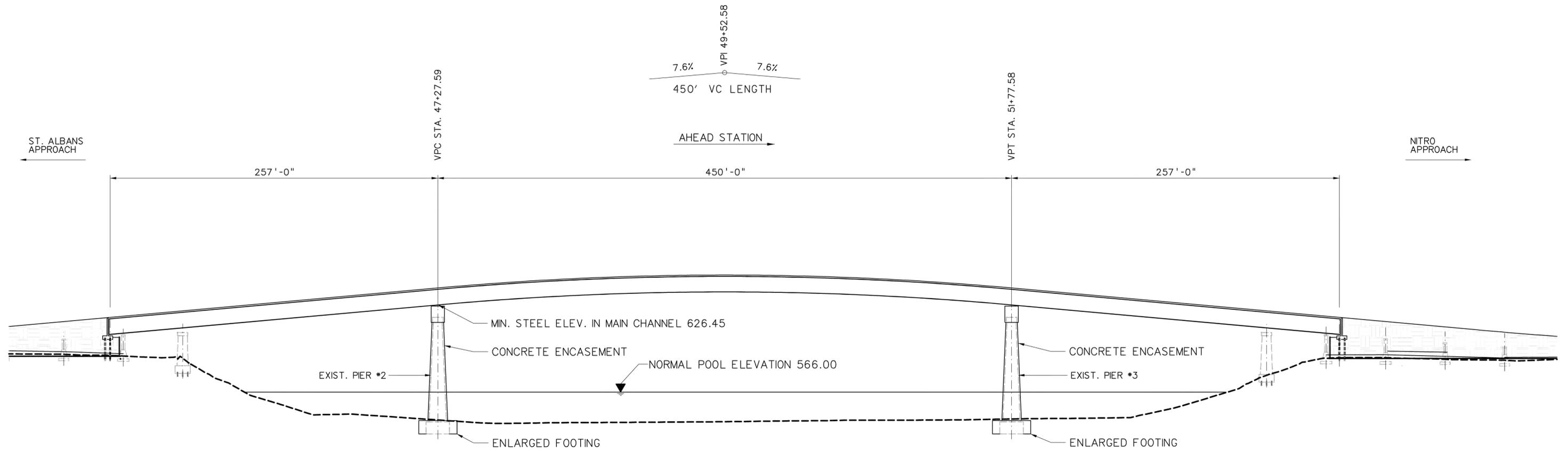
St. Albans

Nitro

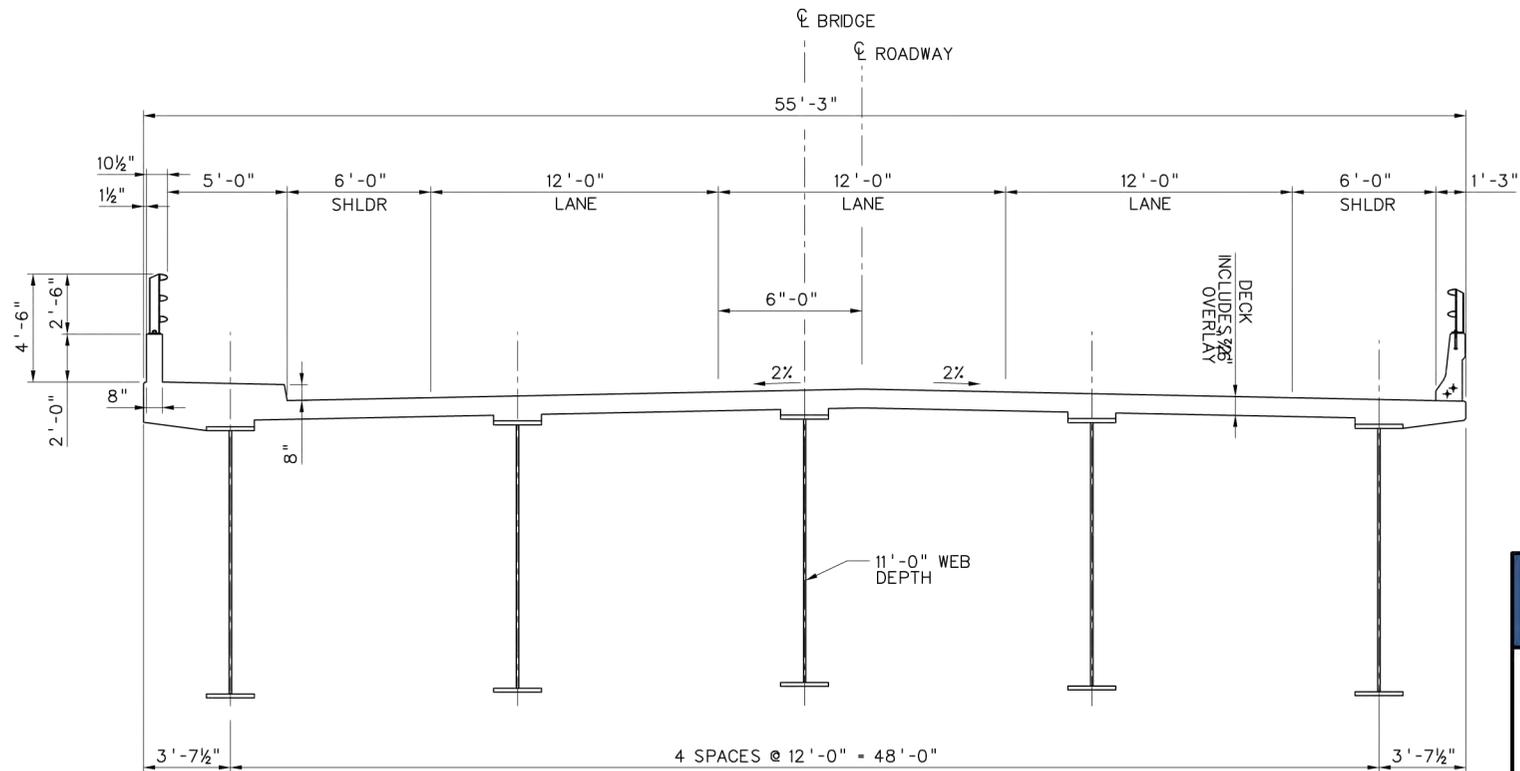
Dick Henderson Memorial Bridge Environmental Assessment

EXHIBIT 3: ALTERNATIVES





SECTION AT PIERS
PLATE GIRDER OPTION



TYPICAL SECTION NEW PLATE GIRDER
3 LANE ALTERNATIVE

**Dick Henderson Memorial Bridge
Environmental Assessment**

**EXHIBIT 4: PREFERRED ALTERNATIVE
SECTION AND PROFILE**



Baker



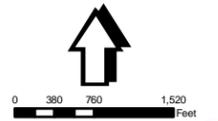


**Dick Henderson Memorial Bridge
Environmental Assessment**

EXHIBIT 5: COMMUNITY RESOURCES

Legend

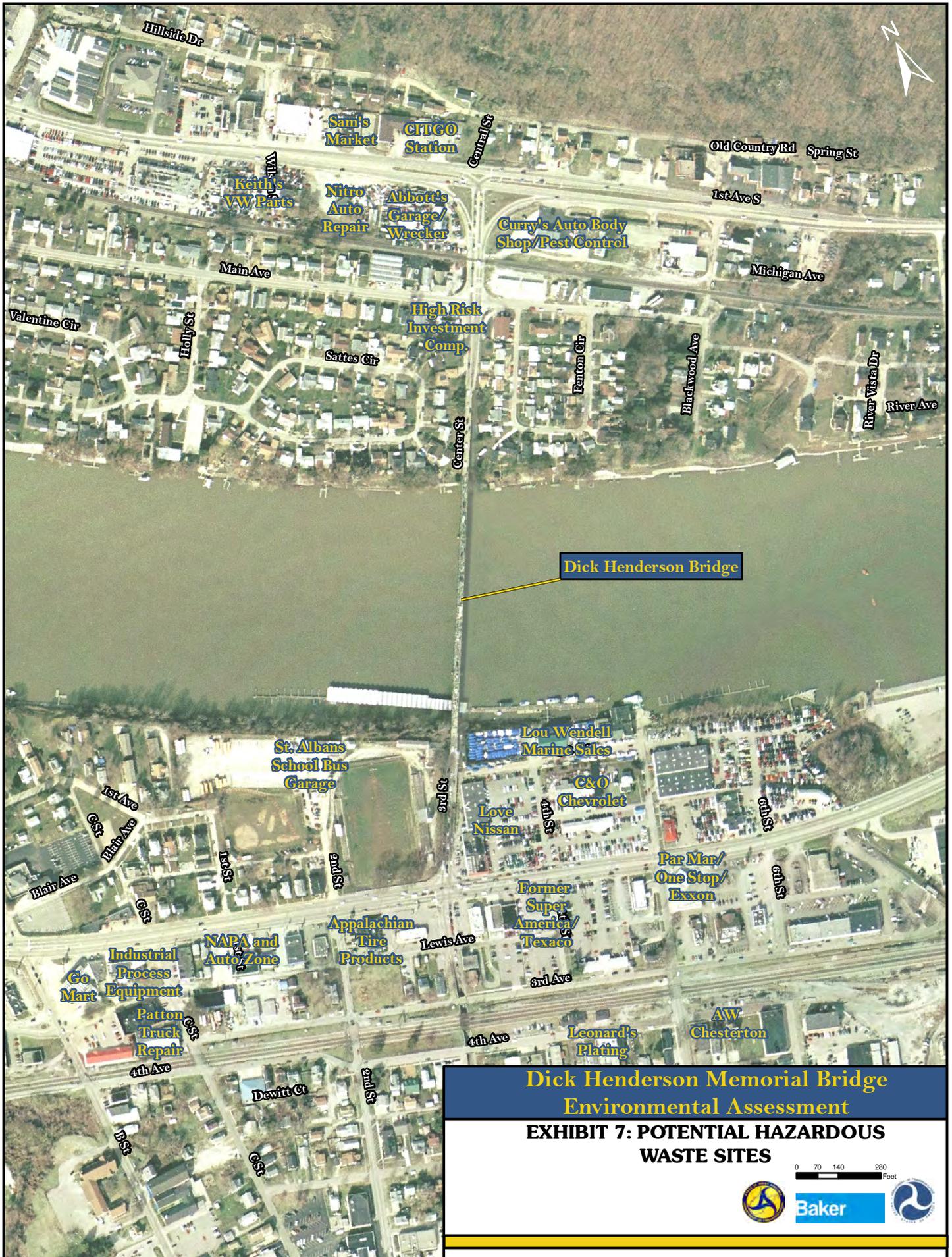
- Cemeteries
- Churches
- Schools
- Community Facilities
- Fire Departments
- Law Enforcement



Kanawha County
Sheriff's Office

Bayer Crop Science





Hillside Dr

Sam's Market

CRITGO Station

Keith's VW Parts

Nitro Auto Repair

Abbott's Garage/Wrecker

Curry's Auto Body Shop/Pest Control

Old Country Rd Spring St

1st Ave S

Main Ave

Michigan Ave

Valentine Cir

Holy St

High Risk Investment Comp.

Sattes Cir

Penton Cir

Blackwood Ave

River Vista Dr

River Ave

Dick Henderson Bridge

St. Albans School Bus Garage

Lou Wendell Marine Sales

C&O Chevrolet

Love Nissan

Par Mar/One Stop/Exxon

Appalachian Tire Products

Former Super America/Texaco

Go Mart

Industrial Process Equipment

NAPA and Auto Zone

Patton Truck Repair

Leonard's Plating

AW Chesterton

Dewitt Ct

Dick Henderson Memorial Bridge Environmental Assessment
EXHIBIT 7: POTENTIAL HAZARDOUS WASTE SITES

0 70 140 280 Feet



Baker

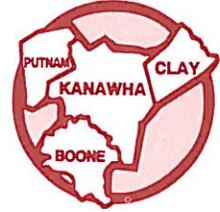


Appendix A
Letter of Support from the MPO

Regional Intergovernmental Council

Patrick Hill
Chairman

Mark A. Felton
Executive Director



July 6, 2011

Gregory L. Bailey, P.E.
West Virginia Division of Highways
Building 5, Room A-317
1900 Kanawha Blvd., East
Charleston, WV 25305

Dear Mr. Bailey:

This letter is to express our support for the proposed renovation of the Richard Henderson Bridge, as currently proposed by the WV Division of Highways. This facility, which connects the cities of St. Albans and Nitro, is in poor condition and weight-restricted. The WVDOH proposal, we believe, will provide a cost effective solution to the current deficiencies.

This project has been included in the long-range transportation plan for the Charleston area for many years and was the subject of an extensive study by RIC, which was completed in 2002.

The planned project will provide a 3-lane superstructure at the current location on the existing piers, which will be renovated to accommodate the new wider structure. We understand that the new superstructure will also include ample shoulders and a sidewalk.

Although our original concept was for four-lanes, it is expected that the 3-lane design will adequately serve traffic as well as pedestrians and bicyclists.

We wholeheartedly support this project and hope that it can be accomplished as expeditiously as possible. We also encourage the WVDOH to limit the bridge closure time period to the absolute minimum in order to reduce inconvenience and economic disruption.

Sincerely,



Mark A. Felton
Executive Director

Cc: Mayor Rusty Casto, Nitro
Mayor Dick Callaway, St. Albans

315 D Street • South Charleston, West Virginia 25303
Telephone (304) 744-4258 • Fax (304) 744-2534 • Email: ric@wvregion3.org

Appendix B

Coordination with U.S. Coast Guard

U.S. Department of
Homeland Security

United States
Coast Guard



Commander
Eighth Coast Guard District

Aug 13 00 *File*
1222 Spruce Street
St. Louis, MO 63103
Staff Symbol: (dwb)
Phone: 314-269-2381
Fax: 314-269-2737
Email: David.H.Studt@uscg.mil

16591.1/46.2 KAN
April 13, 2010

Mr. Marvin Murphy, P.E., P.S.
State Highway Engineer
West Virginia Department of Transportation
1900 Kanawha Blvd. East, Bldg. Five
Charleston, WV 25305-0430

Subj: ST. ALBANS-NITRO BRIDGE, MILE 46.2, KANAWHA RIVER

Dear Mr. Murphy:

Please refer to your letter of March 16, 2010. It appears that your proposal will maintain or increase navigational clearances provided by the bridge. This is acceptable to the Coast Guard. Until plans are finalized and presented to us for review, we cannot determine whether an amendment to the bridge permit will be required. Please provide design drawings as soon as they have been developed.

If you should have a question or need to discuss, please contact Mr. Dave Studt at the above number.

Sincerely,

A handwritten signature in black ink that reads "RKW".

ROGER K. WIEBUSCH
Bridge Administrator
By direction of the District Commander

RECEIVED
APR 19 2010
WVDOH
STATE HIGHWAY ENGINEER

Appendix C
Section 106 Coordination



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

July 7, 2011

Ms. Susan Pierce, Deputy State
Historic Preservation Officer
Division of Culture and History
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

Dear Ms. Pierce:

State Project Bridge S320-P25-0.05
Federal Project ACR-0025(091)
Dick Henderson Bridge
FR#: 11-563-KA-1
Kanawha County

The West Virginia Division of Highways (WVDOH) received your letter of June 27, 2011 regarding the Dick Henderson Bridge (St. Albans-Nitro Bridge) replacement in Kanawha County. The purpose and need of the project is to provide a safe structure that meets current design standards to effectively serve the transportation needs of first responders, through travelers, and the residential, commercial, and business communities of the cities of St. Albans and Nitro, West Virginia. The existing bridge is in poor condition and is restricted by structural deficiencies, functional inadequacies, and geometric deficiencies.

The rehabilitation alternative (Alternative 1) was examined in detail in the Programmatic Section 4(f) Evaluation prepared for FHWA. This alternative was developed to provide minimal changes to the historic bridge while improving the condition of the bridge along with eliminating the bridge weight restriction. Alternative 1 will raise the cross-bracing of the truss to achieve 17.5 feet of vertical clearance. The sidewalk width will be reduced to 3 feet 5 inches; therefore, it will not meet current WVDOH design standards or the recommendations of the American's with Disabilities Act (ADA). Under this act, 5 feet sidewalks are necessary for two wheelchairs to safely pass one another. This alternative does not include shoulder improvements or an additional vehicle lane. With the narrow lanes and lack of shoulder this alternative does not meet current design standards. Also, the turn lane on the existing bridge can't be lengthened without the removal of the truss. Preferred Alternative 3 lengthens the turn lane allowing for more storage capacity.

In addition the WVDOH considered traffic congestion in its analysis of alternatives for rehabilitating or replacing the existing bridge. The lengthening of the turn lane will improve the user delay at the intersection, and increase weight limits for commercial vehicles and buses.

Alternative 2 is the rehabilitation of the superstructure with a sidewalk cantilevered to the outside of the truss. This alternative was also developed to provide minimal changes to the historic bridge. As in Alternative 1 these changes will not meet current design standards and the addition of the cantilevered sidewalk changing the overall appearance of the historic structure.

The Preservation Alliance of West Virginia was contacted by letter on February 18, 2011. No comments have been received from this group. Comments were received from the Kanawha Valley Historical & Preservation Society on December 22, 2010. The group has requested to see the approach details when available. Both letters are attached to this letter.

This bridge provides an important connection between the two cities. Emergency personnel from both cities provide backup to help cut down on response times in the communities. Most of the traffic on the bridge is coming from or going to locations within Nitro, St. Albans, or the residential areas of south of St. Albans. Therefore, the purpose and need of this project is providing a safe structure for the traveling public, and Alternative 1 and 2 do not meet the purpose and need of this project and were not selected as the preferred alternative.

Enclosed for your signature is a Memorandum of Agreement (MOA) for the above referenced project. This MOA is pursuant to your determination that the Dick Henderson Bridge removal will have an adverse effect to the National Register of Historic Places (NRHP)-eligible bridge and archaeological sites 46KA60 and 46KA640.

FHWA transmitted project information to the ACHP for participation on July 5, 2011 (See attached email) we will forward you documentation from their office in the near future.

If you have any questions please contact Sondra Mullins of our Environmental Section by writing to the above address, by calling (304)558-9487, or via e-mail at Sondra.L.Mullins@wv.gov.

Very truly yours,

Gregory L. Bailey, P.E.
Director
Engineering Division

By: 

Ben L. Hark
Environmental Section Head

GLB:Hk
Attachments
Bcc: DDE(SM)



RECEIVED

JUL 05 2011

ENGINEERING DIVISION
WV DOH

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

June 28, 2011

Mr. Gregory L. Bailey
WV Division of Highways
Building Five, Room 110
Capitol Complex
Charleston, WV 25301

RE: State Project S220-P25-0.05 02
Dick Henderson Bridge Replacement Project
FR#: 11-563-KA-2

Dear Mr. Bailey:

We have reviewed the "*Phase I Archaeological and Geomorphological Investigations in the Dick Henderson Bridge Replacement Project Area, Kanawha County, West Virginia*" and the addendum report, "*Considerations Regarding Additional Archaeological Investigations in the Dick Henderson Bridge Project Area.*" As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the report provided, two archaeological sites were identified within the area of potential effect for the Dick Henderson Bridge replacement project. 46-KA-60 was relocated within the North Test Area and 46-KA-640 was identified in the South Test Area. Both sites were determined eligible for the National Register of Historic Places. We concur with this determination. However, both sites are located under the existing bridge. The addendum report enclosed describes how additional excavations of these sites will be hazardous and would likely preclude deep testing due to the low clearance of the bridge and may compromise the stability of the bridge. Therefore, alternative mitigation has been suggested in conjunction with archaeological monitoring of the project area during construction. It is our understanding that the WVDOH plans to develop an off-site mitigation plan in conjunction with our office, the FHWA and other consulting parties "that would focus on the prehistory of the Kanawha Valley and its environs or other areas that may be deemed appropriate."

While it is not explicitly stated in the material provided, it is our assumption that the WVDOH has determined that the proposed Dick Henderson Bridge project will have an adverse effect on 46-KA-60 and 46-KA-640. We concur that this project will have an adverse effect to these resources. While we are amenable to the proposed archaeological monitoring and off-site mitigation ideas put forth by Michael Baker Jr. Inc and the WVDOH, please ensure that you seek comments from appropriate consulting parties and notify the Advisory Council on Historic Preservation prior to continuing project development, as per 36CFR800.6. We look forward to continued participation in the the consultation process.

We appreciate the opportunity to be of service. If you have questions regarding our comments or the Section 106 process, please contact Kristin D. Scarr, Archaeologist, at (304) 558-0220.

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/KDS



June 27, 2011

RECEIVED

JUL 05 2011

ENGINEERING DIVISION
WV DOH

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562

EEO/AA Employer

Mr. Gregory Bailey
Director
Engineering Division
West Virginia Division of Highways
Capitol Building
Building 5, Room 110
Charleston, WV 25305

Re: Dick Henderson Bridge
State Project Bridge S320-P25-0.05
FR#: 11-563-KA-1

Dear Mr. Bailey:

We have reviewed the above referenced project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the report, it is your opinion there are two historic resources located in the Area of Potential Effect (APE), the Dick Henderson Bridge and the K&M Railroad. In our letter dated May 10, 2011 we concurred with these findings. Based on further review of the project, it is our understanding that Alternative number three was chosen as preferred over the additional five that were proposed. Alternative three will require demolition of the existing bridge and construction of a plate girder superstructure.

After reviewing the determination of effect report, it is our understanding that you are seeking our concurrence with your findings. It is your opinion that the proposed alternative *will have no effect* on the K&M Railroad. We concur with this finding. It is your opinion that the proposed alternative *will have an adverse effect* on the Dick Henderson Bridge and necessitate a Memorandum of Agreement. However, it is our opinion that more information regarding alternative one, rehabilitation of the current bridge, and why it was not chosen, is needed before we progress to the mitigation stage.

It is our opinion options and/or alternatives to avoid or minimize the adverse effect were not considered. Alternative One, or rehabilitation of the existing bridge, in our opinion, would have the least impact on the historic resources. According to the report, rehabilitation was not chosen because it does "not fulfill the project's purpose and need." Please submit to our office, any documentation describing any rehabilitation strategies that were considered that would "fulfill the project's purpose and need." For example, along with raising the cross bracing of the bridge's truss, was construction of a separate pedestrian walkway ever considered, either attached to the old bridge or built apart from the old bridge? This would eliminate the existing sidewalk and provide extra width to the existing traffic lanes. Please forward any other plans or alternatives that were considered if any that would save the existing bridge.

Additionally, if you have not already done so, we ask that you submit all project information to the following

June 27, 2011
Mr. Bailey
Fr#: 11-563-KA-1
Page 2

organization. Please forward any remarks received to our office for review.

Ms. Martha Ballman
Preservation Alliance of West Virginia
179 Summers St # 702
Charleston, WV 25301

We will comment further upon receipt of the requested information.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the review process, please contact Aubrey Von Lindern, Historian, in the Historic Preservation Office at 304-558-0240.*

Sincerely,



Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/ACV

KANAWHA VALLEY HISTORICAL & PRESERVATION SOCIETY,

Inc.

714 Peoples Building, Charleston, WV 25301

POB 2283, Charleston, WV 25328

(304) 342-7676

hbattle1@frontier.com

RECEIVED

DEC 22 2010

**ENGINEERING DIVISION
WV DOH**

Sondra L. Mullins
WV Department of Transportation
1900 Kanawha Boulevard E
Charleston, WV 25305

December 20, 2010

Re: St. Albans Bridge replacement
State Project Bridge
S320-P25-0.05

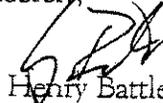
Dear Ms. Mullins

We have reviewed the proposal to replace the Dick Henderson St. Albans—Nitro Bridge. Currently we have no information related to the project as described by your office in a letter with maps dated November 24, 2010 which would affect the construction from an historical point of view.

Once the approach details are determined, historical resources may be impacted. Please keep us abreast of approach planning and share with us for comment the pertinent maps and plans and any other information developed in the process.

Thank you for the opportunity to participate -

Sincerely,



Henry Battle, President

Mullins, Sondra L

From: Jason.Workman@dot.gov
Sent: Tuesday, July 05, 2011 1:52 PM
To: ngabriel@achp.gov
Cc: Mullins, Sondra L
Subject: Dick Henderson Bridge located in Kanawha County, West Virginia
Attachments: ACHP -Dick Henderson Determination of Effect 5.26.11.pdf

Dear Ms. Duvall-Gabriel:

The Federal Highway Administration (FHWA) in consultation with the West Virginia State Historic Preservation Officer has determined that the above referenced undertaking will have an adverse effect on the Dick Henderson Bridge located in Kanawha County, West Virginia. This correspondence is intended to serve as the notification of an adverse effect finding as required under 36 CFR 800.6(a)(1). Supporting documentation prepared in accordance with 36 CFR 800.11(e) has been enclosed to assist in your review of this undertaking.

Please advise the FHWA within fifteen (15) days of receipt of this notice whether or not the Council wishes to enter the Section 106 process for this undertaking. Should you have any questions regarding the accompanying information, please contact me at (304) 347-5271 or via e-mail at jason.workman@dot.gov. Thank you for your attention to this matter.

Thanks, no hard copy will follow

Jason Workman
Environmental Protection Specialist
Federal Highway Administration
West Virginia Division
jason.workman@fhwa.dot.gov
Phone: (304) 347-5271
Fax: (304) 347-5103



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

February 18, 2011

Preservation Alliance of West Virginia, Inc.
P.O. Box 3371
Charleston, WV 25333-3371

To Whom It May Concern:

State Project Bridge S320-P25-0.05
Federal Project ACBR-0025(091)
Dick Henderson Bridge
Kanawha County

The Division of Highways is developing the subject project at the location shown on the attached vicinity maps. The project consists of replacing the existing bridge.

The existing bridge was built in 1934 by McClintic Marshall Corporation. The existing structure consists of a three span cantilever through truss, five wide flange beam spans on the south approach, and six wide flange beam spans on the north approach. The three span cantilever through truss consists of two anchor spans each 200'0" in length and a main span 450'0" in length. The main span consists of two 125'0" cantilever arms and one 200'0" suspended span. The south approach Spans No. 1 through Span No. 5 each measure 46'8 3/16" between centerlines of bearing to the centerline of Pier No. 1. The north approach Spans No. 9 through Span No. 14 each measure 46'8 3/16" between the bearings for an overall length of 280'1 1/8" from the centerline of Pier No. 4 to the north abutment bearing. The overall length of the bridge is 1,367'4 3/16".

The West Virginia State Historic Preservation Office (WVSHPO) will be notified by the WVDOH that the bridge is considered eligible for the National Register of Historic Places under Criterion C and was on the WVDOH/SHPO final list of historic bridges in 1990.

**MEMORANDUM OF AGREEMENT
BY AND AMONG
THE WEST VIRGINIA STATE HISTORIC PRESERVATION OFFICER
THE WEST VIRGINIA DIVISION OF HIGHWAYS
AND THE FEDERAL HIGHWAY ADMINISTRATION**

**REGARDING IMPLEMENTATION OF THE DICK HENDERSON BRIDGE
REPLACEMENT PROJECT
STATE PROJECT #S220-P25-0.05 00
FEDERAL PROJECT #BR-0025(102)E
KANAWHA COUNTY, WEST VIRGINIA
JULY 2011**

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the West Virginia Division of Highways (WVDOH) proposes to replace Dick Henderson Bridge, which spans the Kanawha River in Kanawha County, hereinafter referred to as the "Project." The Project involves replacing the existing bridge utilizing the existing river piers.

WHEREAS, the FHWA has determined that the Project will have an adverse effect upon the Dick Henderson Bridge, a property eligible for the National Register of Historic Places (NRHP); and an adverse effect on archaeology sites 46KA60 and 46KA640; and

WHEREAS, the FHWA has consulted with the West Virginia State Historic Preservation Officer (WVSHPO) pursuant to West Virginia Code Chapter 29, Article 1 and its implementing regulations (82 CSR 2), as well as 36 CFR Part 800.5 (implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)); and

WHEREAS, the FHWA has consulted with the City of Nitro, City of St. Albans, St. Albans Historical Society and the Kanawha Valley Historical & Preservation Society regarding the effects of the undertaking on historic properties; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), the Federal Highway Administration (FHWA) has notified the Advisory Council on Historic Preservation (ACHP) of the adverse effect determination and provided the specified documentation, and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii);

NOW, THEREFORE, the FHWA, the WVSHPO, the WVDOH agree that the Project will be implemented in accordance with the following stipulations in order to take into account the effects of the Project on historic properties.

STIPULATIONS

The FHWA shall ensure that the following stipulations are carried out:

Dick Henderson Bridge

- I. The Dick Henderson Bridge will be documented in its present historic setting. The documentation package will include 5"x7" black and white digital prints prepared in accordance with the Interim National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion of January 2009.
- II. A brief history of the structure will be included in the aforementioned documentation package, along with fully completed West Virginia Historic Property Inventory forms.
- III. WVDOH staff will provide the St. Albans Historical Society and the Kanawha County Public Library Branches in St. Albans and Nitro with a copy of the Dick Henderson Bridge State Level Historic Documentation package for reference and educational purposes.
- IV. In conjunction with Nitro High School and St. Albans High School the WVDOH will sponsor an essay contest among Graduating Seniors Class of 2012 for a one time scholarship of \$5,000 awarded to each school. The essay will consist of a historical paper relating to their communities.
- V. The WVDOH will provide a sum of \$20,000 to St. Albans and \$20,000 to Nitro for a total of \$40,000 to be used for preservation activities and projects within St. Albans and Nitro. The historical society along with the city governments will help identify projects to be completed using the funds in consultation with the WVDOH and WVSHPO. The project(s) will be identified by the within six (6) months of the execution of this MOA. Funding will be provided upon identification of specific projects. Any work completed on historic buildings must comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and must be submitted for review by the WVSHPO prior to commencement of work. Any interpretive material, such as signs, posters or brochures, will be submitted for review by the WVSHPO and the WVDOH. The cities will provide status reports summarizing progress and financial information in writing or via email to the WVDOH every six (6) months.
- VI. The Dick Henderson Bridge Replacement will contain historic style lighting matching the St. Albans Historic District.
- VII. The WVDOH agrees to perform archaeological monitoring of the project area during construction.
- VIII. The WVDOH agrees to provide a monument or educational display marker discussing previous indigenous lifeways in the Kanawha River Valley to be placed at a publically accessible location nearby.
- IX. WVDOH will provide \$50,000 to be used for off-site mitigation of archaeological resources. This mitigation may be in the form of data recovery, site acquisition, site preservation, education or academic research activities. The mitigation action must be context sensitive in that it contributes to our understanding of indigenous lifeways in

the Kanawha River drainage and related area. Mitigation projects receiving funds must be approved by both The WVDOH and WVSHPO and must conform to guidelines set forth by the WVSPHO and the Secretary of the Interior.

X. Duration

This MOA will expire if its stipulations are not carried out within five (5) years from the date of its execution. At such time, and prior to work continuing on the Project, the FHWA shall either (a) execute a MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. Prior to such time, FHWA may consult with other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation X below. The FHWA shall notify the signatories as to the course of action it will pursue.

XI. Post-Review Discoveries

If any unanticipated discoveries of historic properties or archaeological sites, including human burial sites and/or skeletal remains, are encountered during the implementation of this Project, work shall be suspended in the area of the discovery until the WVDOH has developed and implemented an appropriate treatment plan in consultation with the WVSHPO pursuant to 36 CFR 800.13(b).

XII. Monitoring and Reporting

Each year following the execution of this MOA until it expires or is terminated, the FHWA shall provide all parties to this MOA a summary report detailing work carried out pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in the FHWA's efforts to carry out the terms of this MOA.

XIII. Dispute Resolution

Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the FHWA shall consult with such party to resolve the objection. If the FHWA determines that such objection cannot be resolved, the FHWA will:

- A. Forward all documentation relevant to the dispute, including the FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy

of this written response. The FHWA will then proceed according to its final decision.

- B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.
- C. The FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

XIV. Amendments

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XV. Termination

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation X, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the Project, the FHWA must either (a) execute a MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. The FHWA shall notify the signatories as to the course of action it will pursue.

EXECUTION of this Memorandum of Agreement by the FHWA, the WVSHPO, the WVDOH and the ACHP, and implementation of its terms evidence that the FHWA has afforded the ACHP an opportunity to comment on the Dick Henderson Bridge Replacement project and its effects on historic properties, and that the FHWA has taken into account the effects of the Project on the historic property.

Federal Highway Administration

Date

West Virginia Deputy State Historic Preservation Officer

Date

APPROVED:

Advisory Council on Historic Preservation

Date

CONCUR:

West Virginia Division of Highways

Date

CONCUR:

City of Nitro

Date

CONCUR:

City of St. Albans

Date

CONCUR:

St. Albans Historical Society

Date

Appendix D

Section 4(f) Programmatic Agreement Finding

**DRAFT PROGRAMMATIC SECTION 4(f) EVALUATION
DICK HENDERSON MEMORIAL BRIDGE PROJECT
KANAWHA COUNTY, WEST VIRGINIA**



June 3, 2011

Table of Contents

- A. Introduction/Section 4(f) Applicability 1
- B. Section 4(f) Regulations..... 1
- C. Description of the Section 4(f) Resource 2
 - C.1 Physical Description 2
 - C.2 Significance of the Section 4(f) Property 4
 - C.3 Effects on the Historic Resource 4
- D. Proposed Project 5
 - D.1 Project Need 5
 - D.1.1 Structural Deficiencies 5
 - D.1.2 Functional Inadequacies 6
 - D.1.3 Geometric Deficiencies 6
 - D.2 Project Purpose 7
- E. Summary of Proposed Action..... 7
- F. Alternatives and Findings..... 7
 - F.1 Alternatives Analysis Requirements for Programmatic Section 4(f) Evaluation 7
 - F.1.1 Do Nothing Alternative 8
 - F.1.2 New Location Alternatives 9
 - F.1.3 Bridge Rehabilitation Alternatives 11
 - F.1.4 Replace Historic Bridge- Recommended Alternative 13
- G. Measures to Minimize Harm 14
- H. Conclusions..... 14
- I. References 14

List of Tables

- Table 1 Summary Results, 2003 RIC Study of New Location Alternatives (URS, 2003) 9
- Table 2 Preliminary Alternative Screening Results, March 20011 13

List of Figures

- Figure 1 Project Area and Shortest Detour Route
- Figure 2 Photograph of existing Dick Henderson Bridge and rendering of Recommended Alternative’s new plate girder superstructure.
- Figure 3 Graphic representation of deficient members on existing truss.
- Figure 4 New Location Alternatives Studied in 2003 by the Regional Intergovernmental Council (the local Metropolitan Planning Organization) (URS, 2003).
- Figure 5 Typical Section of Rehabilitation Alternative 1 (top) and Rehabilitation Alternative 2 (bottom).

A. Introduction/Section 4(f) Applicability

The West Virginia Division of Highways (WVDOH), in cooperation with the Federal Highway Administration (FHWA), is proposing to replace the superstructure and rehabilitate other portions of the Richard J. “Dick” Henderson Memorial Bridge, also known as the St. Albans-Nitro Bridge or Dick Henderson Bridge. The current bridge piers that support the current Dick Henderson Bridge will be reinforced, armored and utilized to support the new superstructure. This current Dick Henderson Bridge provides access over the Kanawha River connecting West Virginia Route 25 (WV 25) in the city of Nitro to US 60 (MacCorkle Avenue) in the city of St. Albans, in Kanawha County, West Virginia (Figure 1). The roadway crossing the bridge is designated as WV 25 Spur and known locally as Center Street or 3rd Street.

The Dick Henderson Bridge Project will be funded in part with Federal funding, and is listed as Federal Project No. BR-0025(102)E. With respect to local planning, the Boone, Clay, Kanawha, and Putnam County Regional Intergovernmental Council’s (BCKP RIC) 2010 addendum to its 2040 Long Range Transportation Plan included the project and its Fiscal Year 2010 – 2013 Transportation Improvement Program (TIP) includes construction and right-of-way funding for the years 2011 and 2012 (BCKP RIC, 2009 and 2011).

The Dick Henderson Bridge is eligible for listing on the National Register of Historic Places (NRHP), making the bridge an historic resource. The proposed action will result in a use of the NRHP-eligible bridge. In accordance with 23 CFR 774, the following Section 4(f) Evaluation provides a discussion recommending that there are no feasible and prudent alternatives to the use of the bridge and the proposed action includes all possible planning to minimize harm to the historic bridge resulting from such use.

B. Section 4(f) Regulations

Under Section 4(f) of the Department of Transportation Act of 1966 (49 USC Section 303 and 23 CFR Part 774), the Federal Highway Administration (FHWA) may not approve the “use” of land from a significant publicly-owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

- 1) There is no feasible and prudent alternative to the use of land from the property; and
- 2) The action includes all possible planning to minimize harm to the property resulting from such use.

A “use” under Section 4(f) can be any of the following:

- a direct use – property is permanently incorporated into the transportation project;
- a temporary use – property is temporarily occupied in a way that is adverse to the property’s purpose; or
- a constructive use – occurs when “the transportation project does not incorporate land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected

activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished.” (23 CFR Section 774.15(a).

In 1983, FHWA issued a Programmatic Evaluation that could be applied to projects that were proposing to use an historic bridge if certain conditions applied. The complete “Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges” can be found at the FHWA website (<http://www.environment.fhwa.dot.gov/4f/4fnationwideevals.asp>).

The Programmatic Section 4(f) Evaluation may be applied by FHWA to projects which meet the following criteria:

- 1) The bridge is to be replaced or rehabilitated with Federal funds.
- 2) The project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places.
- 3) The bridge is not a National Historic Landmark.
- 4) The FHWA Division Administrator determines that the facts of the project match those set forth in the Programmatic Section 4(f) Evaluation for assessing alternatives, findings, and measures to minimize harm.
- 5) Agreement among the FHWA, the State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) has been reached through procedures pursuant to Section 106 of the NHPA.

If the conditions of the Programmatic Evaluation apply to a project, an individual evaluation is not required. The following sections document how the Programmatic Section 4(f) Evaluation applies to the Dick Henderson Bridge Project. With commitment to implement the mitigation measures reviewed herein, FHWA will have completed the Section 4(f) process for impact to the Dick Henderson Memorial Bridge.

C. Description of the Section 4(f) Resource

C.1 Physical Description

The existing bridge’s superstructure which carries Spur 25 over the Kanawha River is 1363.48’ in length from the centerline of bearing at Station 2 + 96.59 at the St. Albans abutment to centerline of bearing at Station 16 + 60.07 at the Nitro abutment. The bridge Typical Section consists of two 10’ travel lanes with no shoulders and an approximately 4’ sidewalk located between the trusses on the downstream side of the bridge.

The St. Albans approach structure consists of five equal spans of 46.68’ each for a total length of 233.4’. The Nitro approach structure consists of six equal spans of 46.68’ each for a total length of 280.08’. The main Kanawha River crossing consists of a three span cantilever through steel truss of a total length of 850’.

The St. Albans and Nitro approach structures consists of a 7” reinforced concrete deck supported on five rolled steel beam stringers framed into a rolled steel beam pier cap which is supported on

concrete pedestals. The longitudinal spacing of the concrete pedestals is 46.68'. One end of the approach structure, adjacent to the main river crossing, is supported on the main pier substructure. There is minimum steel reinforcing in the pedestals.

The main river crossing also consists of a 7" reinforced concrete deck supported on five rolled steel beam stringers framed into a rolled steel beam which is supported at the panel points of the steel main through truss. The panel lengths on the three span steel through truss is 25'. The center to center of trusses is 27'-6". The three span truss is supported on four concrete piers, two of which are located in the Kanawha River and one each on the river bank. The ratio of reinforcing steel to concrete in the main river circular columns is 0.0006 (0.06%). In the piers located on the river bank this ratio is 0.000904(0.09%). Both river piers are founded on very hard "hard" pan shale. The piers located on the river bank are founded on reinforced concrete piles. All the piers are under-reinforced using present criteria and are not designed for barge impact or an extreme event occurrence. In addition, each of the piers has numerous cracks and display other distress which may affect the load carrying capacity of the unit.

The center 8 panels, each 25' in length, of Truss Span 2 is a suspended span. It is supported from the adjoining cantilever portions of the structure by verticals U13-L13 and U21-L21. Both of these verticals are fracture critical as well as the pins at each end of the verticals. The condition of these pins are unknown, and therefore their ability to carry load is not discussed in the report. It is suggested that the pins be non-destructively inspected so that their ability to carry the required load can be assessed.

It is not indicated on the original construction plans, however it assumed that the structural steel has a yield point of 33,000 psi.

The design Live Load is a 15 ton truck, with the front axle carrying 3 tons and the rear axle 14' away carrying 12 tons. The wheels on the truck are located 6' apart and the distance between the wheels of two adjacent trucks is 3'.

The original bridge plans on Drawing C-319-2 indicate a 50'-0" right of way, with a width of 26'-9" on the downstream side of the Centerline of Roadway and 23'-3" on the upstream side of the Centerline of Roadway. These Right of Way widths were the same on both the Saint Albans and Nitro sides of the river. It appears, based on plans available for the 1977 widening (Project M-1087(003), Sheets 8 & 11/52) on the Saint Albans (south) approach, that the Right of Way on the downstream side of the Centerline of Roadway was increased to 32' between Station 4 + 82.35 to Station 1 + 32. The Right of Way on the upstream side of the Centerline of Roadway appears to remain at 23'-3". Based on the 1977 widening on the Saint Albans (south) approach, there appears to be extensive utilities in the area which include gas, water, electric, cable, telephone, sanitary and 12" V.C.P. lines. The plans further indicate that electric, cable and telephone lines are attached to the bridge at existing Pier 1. There is no utility information available for the Nitro (north) approach.

C.2 Significance of the Section 4(f) Property

Originally constructed in 1934 as the St. Albans–Nitro Bridge and later named the Richard J. “Dick” Henderson Memorial Bridge, the structure provides passage over a major waterway, the Kanawha River, and connects two of the county’s collector roadways, U.S. Route 60 (south side of river) and State Route 25 (north side of river), just west of Charleston, the capitol of West Virginia. The 1,367-foot, three-span cantilever Warren through-truss is the oldest cantilever bridge over the Kanawha River (Bridgemapper.com 2011). A cantilevered truss bridge consists of anchor arms supported by piers, and a suspended span that is supported by the anchor arms.

The Dick Henderson Bridge meets NRHP Criterion C for its engineering merit as a good example of an infrequently-occurring three-span cantilevered Warren through-truss structure. The bridge was designed by J.E. Greiner Company of Baltimore, Maryland, and was built by the McClintic-Marshall Corporation of Bethlehem, Pennsylvania (the same company that built locks for the Panama Canal [Historical Society of Pennsylvania 2011]). The bridge is noted for its unusual nine-section top chord arrangement, which demonstrates a linear upwards slope and incorporates towers with flat tops. The bridge is also unusual for its H-section rolled beam members, which were introduced in the 1920s, but were not common until the 1940s and beyond. In the 1930s, when this structure was built, the more common compression members were “built-up v-laced.” Because of this feature, the bridge appears to be newer than it is (Bridgemapper.com 2011).

Several other elements contribute to the bridge’s significance. With respect to the truss portion of the bridge, significant elements include the configuration of the top and bottom chords, diagonals, method of connections, and struts and portal features (e.g., struts, bracing). Other bridge members/components that generally have historical significance include point connections on metal truss bridges; suspended section connections; particular configurations of truss design; and aesthetic railings.

C.3 Effects on the Historic Resource

As detailed in the Determination of Effect Report (Michael Baker Jr., Inc., 2011a), the Recommended Alternative (Alternative 3) will have an adverse effect on the historic integrity of the bridge. A schematic showing a comparison of the existing bridge with truss superstructure to the proposed bridge is shown in Figure 2. In a letter dated June 27, 2011, the SHPO concurred with the finding that the historic property (the Dick Henderson Bridge) will be adversely affected by the proposed project.

D. Proposed Project

D.1 Project Need

The Dick Henderson Bridge is an important river crossing for the region and for the cities of St. Albans and Nitro. The 2011 average daily traffic (ADT) on the bridge is 19,500. In twenty years (2031), traffic is projected to be 26,400 with the current weight restriction or 26,700 if the weight restriction can be removed. Closure of the bridge will cost from \$35,700 to \$68,700 per day (2009 dollars) in total vehicle operating costs and travel time-related costs (Michael Baker Jr., Inc. 2011b).

The replacement of the Dick Henderson Bridge's superstructure is necessitated by its current condition. Deterioration of the Dick Henderson Bridge's superstructure has warranted the placement of a 12-ton weight restriction for vehicles using the bridge. The weight restriction limits use to cars and light commercial trucks and excludes heavy trucks and buses. As the bridge superstructure further deteriorates, additional weight restrictions will likely be required to further restrict usage of the bridge.

Eventually, deterioration of the superstructure will result in the closure of the Dick Henderson Bridge, necessitating detours - employing either the Kanawha River Interstate 64 bridge between Nitro and Teays Valley, West Virginia, approximately five miles downstream to the west, or the Dunbar Bridge between Spring Hill and Dunbar, approximately six miles upstream to the east (Figure 1).

D.1.1 Structural Deficiencies

The most recent inspection of the bridge was conducted in 2009. For Deck Geometry, the bridge received a rating of 2 out of 9, indicating that the bridge deck is "basically intolerable requiring high priority of replacement" (WVDOH, 1990).

In 2010 an analysis was conducted to assess structural deficiencies of the bridge. No deficiencies were analyzed on the approach structures because in any of the alternative scenarios (i.e., rehabilitation or replacement) both the St. Albans and Nitro approach structures will be completely replaced. Also no deficiencies in the truss stringers were considered because all truss stringers will be replaced as well.

- For those superstructure components that were analyzed it was found that:
- No section loss was documented for the upstream truss.
- There was a documented Section Loss in Member U14-L15 (diagonal) only.

For an 80,000 pound load limit bridge, any member that is not capable of carrying 40 tons, using inventory stresses, is considered deficient. For the Dick Henderson Bridge:

- On the upstream truss there are six members (four diagonals and two verticals) that are rated less than 40 tons based on HS truck using inventory stresses. Of these deficiencies, diagonal members L12-U13 and U21-L22 have the lowest rating of 36.9 tons and lowest vertical member rating is 39.5 tons for U13-L13 and U21-L21. See Sheet 5 of 25 for

locations of all deficient members. Of the six members which are deficient in the upstream existing truss, four are listed as Fracture Critical in the September 14, 2007 Periodic Inspection Report.

- On the downstream truss there are seven members (five diagonals and two verticals) that are rated less than 40 tons based on HS truck using inventory stresses. Of these deficiencies, diagonal member U14-L15, which has a documented section loss, has the lowest rating of 33.2 tons. Vertical members U13-L13 and U21-L21 are both rated for 39.5 tons (Figure 3).
- Of the seven members which are deficient in the downstream existing truss, five are listed as Fracture Critical in the September 14, 2007 Periodic Inspection Report. The load capacity of the intermediate floorbeams on the truss has an HS rating of 26.2 tons using inventory stresses. The load capacity of the end floorbeams on the truss has an HS rating of 26.8 tons using inventory stresses (Figure 3).

D.1.2 Functional Inadequacies

In 2008, a 12-ton weight limit was placed on the Dick Henderson Bridge for safety reasons. This weight limit minimizes the functionality of the bridge. For example, full-sized school busses, fire trucks and large delivery trucks all can be in excess of 14 tons and are thus precluded from legally and safely using the bridge.

D.1.3 Geometric Deficiencies

The bridge's superstructure is seriously deficient geometrically.

- **Width of vehicle travel lanes** – Design standards require minimum 11' lane widths (WVDOH DD 610). Currently, the lanes are 10' wide. The "closed-in" character of the truss and lack of lane division, the narrower lanes on this bridge tend to make drivers feel unsafe and slow down, reducing the bridge's flow rate.
- **Parapet size and design** – The bridge currently has five-inch parapets (bridge railings). These bridge safety barriers must be over two times wider by today's crash-tested standard. Current parapet design standards require wider 12'-15' parapets that are designed to divert vehicles back onto the bridge if they are struck in a crash. WVDOH considers this design standard to be the highest priority for rehabilitation of the superstructure, and all project alternatives have been designed to include current, crash-tested railing styles.
- **Sidewalk width** – The width of sidewalks on the current bridge is 4'. The WVDOH Design Directives (DD) require 5' wide areas for pedestrians and wheelchairs to safely pass one another at least every 200' (WVDOH DD-811). This is consistent with recommendations of American's with Disabilities Act (ADA) guidance because a 5' width is necessary for wheelchairs to safely pass one another. Therefore, the "new" Dick Henderson Bridge will either have to have a five-foot wide sidewalk for its entire length or have areas of sidewalk that are 5' wide at 200' intervals along its entire length (over 1,300', including approaches). Neither the current sidewalk on the current Dick

Henderson Bridge nor the rehabilitation alternatives conform to WVDOH standards or ADA guidance.

- **Shoulders** – There are no roadway shoulders on the current bridge. WVDOH design standards require two shoulders that are a minimum of two feet wide. With no shoulders, the current bridge is not conducive to bicycle use, does not provide areas for disabled vehicles to avoid blocking a travel lane, and complicates snow removal.

D.2 Project Purpose

Based on the needs of the study area, a project purpose has been developed. The purpose of the project is to rehabilitate or replace the existing Dick Henderson Bridge (i.e., superstructure) utilizing the existing river piers so that the rehabilitation or replacement meets current design standards to effectively serve the transportation needs of first responders (e.g., fire trucks, ambulances, and hazardous materials response vehicles), through travelers, and the residential, commercial, and business communities of the cities of St. Albans and Nitro.

E. Summary of Proposed Action

WVDOH, in coordination with FHWA, has selected a replacement alternative (Alternative 3-plate girder type) as the Recommended Alternative to satisfy the project's purpose and need. The Recommended Alternative includes construction of a new superstructure and reinforcing and utilization of the two existing river piers. This alternative will also remove the existing land-based bridge supports, including two abutments and eighteen viaduct pedestals. The superstructure and land-based supports will be replaced with two mechanically stabilized earth (MSE) retaining walls and two river bank abutments. Minimal additional right-of-way will be required, mostly on the downstream side of both bridge approaches.

F. Alternatives and Findings

F.1 Alternatives Analysis Requirements for Programmatic Section 4(f) Evaluation

As stated in the guidelines for a Programmatic Section 4(f) Evaluation for Historic Bridges, the following alternatives will avoid any use of the historic bridge:

1. **Do nothing.**
2. **New location alternatives** (i.e., build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA).
3. **Rehabilitate** the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

For each of these alternatives, the Programmatic Evaluation stipulates a list of findings that must apply in order to select a different alternative for the project. An assessment of each of these findings is presented below.

F.1.1 Do Nothing Alternative

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

The Do Nothing alternative has been studied:

The Do Nothing Alternative has been studied and incorporated in the Environmental Assessment prepared for this project.

The Do Nothing ignores the basic transportation need.

The Do Nothing Alternative involves taking no action other than routine maintenance activities, allowing the bridge's superstructure deterioration to continue, which will eventually result in posting additional weight restrictions on the bridge and ultimately its permanent closure. The Do Nothing Alternative does not provide a superstructure that meets current design standards and is not able to maintain or improve the services that the bridge currently provides travelers. Therefore, the Do Nothing Alternative does not meet the basic transportation purpose and need and is not a prudent and feasible alternative.

For the following reasons the Do Nothing alternative is not feasible and prudent:

- a. The do nothing alternative does not correct the situation that causes the bridge to be considered structurally deficient or deteriorated. These deficiencies can lead to sudden collapse and potential injury or loss of life. Normal maintenance is not considered adequate to cope with the situation.**

The Do Nothing Alternative does not correct the situation that causes the bridge to be considered structurally deficient or deteriorated. As discussed in Section D.1.3 ("Geometric Deficiencies"), the most recent bridge inspection concludes that the bridge deck geometry requires high priority for replacement. Routine maintenance activities do not include replacement of the parapets.

- b. Safety - The do nothing alternative does not correct the situation that causes the bridge to be considered deficient. Because of these deficiencies the bridge poses serious and unacceptable safety hazards to the traveling public or places intolerable restriction on transport and travel.**

The Do Nothing Alternative does not correct the situation that causes the bridge to be considered deficient with respect to safety. Routine maintenance activities of the superstructure do not include replacing parapets, widening the sidewalk, nor the vehicle travel lanes. All of these issues pose safety concerns, as detailed in Section D.1.3 above ("Geometric

Deficiencies”). In terms of the “bigger picture” of public safety, the cities of St. Albans and Nitro have mutual assistance agreements between their fire departments. With the eventual bridge closure associated with the Do Nothing Alternative, emergency vehicles from Nitro and Saint Albans could not respond without using the long (over 10-mile) detour route.

F.1.2 New Location Alternatives

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

Investigations have been conducted to construct a bridge on a new location or parallel to the old bridge (allowing for a one- way couplet).

Investigations of New Location Alternatives have been conducted.

In 2003 a comprehensive planning study (St. Albans Bridge/Underpass Study, Regional Intergovernmental Council, 2003) concerning replacement of the Dick Henderson Bridge, replacement or avoidance of the railroad underpass on 3rd street and various intersection improvements at various locations within St. Albans was completed. While this planning study was completed for a different and more comprehensive project than the Dick Henderson Bridge Replacement/Rehabilitation project, it did consider alternative locations and a one-way couplet configuration at the current location (Alternative A) for a new bridge. In addition to considering alternative locations, the study assessed the terrain, adverse socioeconomic impacts and engineering and cost issues. Locational alternatives identified in the 2003 planning study are presented in Figure 4 and relevant socioeconomic and cost data are found in Table 1.

**Table 1
Summary Results, 2003 RIC Study of New Location Alternatives (URS, 2003)**

Issue	A	B	C	D	E	F	G
Cost (millions)	78.5	81.5	172	145	98	181	104
Residential Displacements	25	78	90	70	80	95	53
Business Displacements	20	13	10	10	10	30	27
Community facility displacements	0	1	6	4	6	4	0
Haz Waste Sites	15	2	7	7	8	22	21
Section 4(f) Parks	2	1	1	1	0	3	2
Known Archaeological Sites	16	0	2	0	3	19	16

For one or more of the following reasons, this alternative is not feasible and prudent:

- a. Terrain - The present bridge structure has already been located at the only feasible and prudent site, i.e., a gap in the land form, the narrowest point of the river canyon, etc. To build a new bridge at another site will result in extraordinary bridge and approach engineering and construction difficulty or costs or extraordinary disruption to established traffic patterns.**

Based on the information contained in the 2003 planning study, terrain issues will not preclude construction of a new location alternative. However, all new location alternatives are situated on new river piers. New river piers will have to be constructed to meet new U.S. Coast Guard height requirements. In order for a new location bridge to meet the new height requirements, elaborate ramp configurations will be required for the bridge to serve its major transportation function of connecting U.S. 60 (MacCorkle Avenue) in St. Albans and WV 25 in Nitro. In large part, because of the new height requirement and associated engineering and construction required to meet that height requirement, the cost of new location alternatives ranges from 3 to 5 times greater expenditure of dollars for any of the new location alternative and thus a new location alternative could be considered to be too costly in the current economic environment. Therefore, none of the new location alternatives are prudent or feasible.

- b. Adverse Social, Economic, or Environmental Effects - Building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude. Such impacts as extensive severing of productive farmlands, displacement of a significant number of families or businesses, serious disruption of established travel patterns, and access and damage to wetlands may individually or cumulatively weigh heavily against relocation to a new site.**

Based on the data excerpted from the planning study and presented in Table 1 above, any of the new location alternatives will result in a significant number of displacements of families, businesses and public facilities in St. Albans, WV. In addition, any of the new location alternatives will either have additional Section 4(f) uses, encounter hazardous waste sites and/or impact known archaeological sites. Therefore, because of the cumulative impact on various resources, none of the new location alternatives are prudent or feasible.

- c. Engineering and Economy - Where difficulty associated with the new location is less extreme than those encountered above, a new site would not be feasible and prudent where cost and engineering difficulties reach extraordinary magnitude. Factors supporting this conclusion include significantly increased roadway and structure costs, serious foundation problems, or extreme difficulty in reaching the new site with construction equipment. Additional design and safety factors to be considered include an ability to achieve**

minimum design standards or to meet requirements of various permitting agencies such as those involved with navigation, pollution, and the environment.

As noted in the planning study, new Coast Guard bridge height requirements could be met but in so doing, new location cost will increase 3 to 5 times above the Recommended Alternative (discussed below). Therefore, none of the new location alternatives is prudent or feasible.

F.1.3 Bridge Rehabilitation Alternatives

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

F.1.3.1 Studies have been conducted of rehabilitation measures.

Two (2) Rehabilitation Alternatives have been studied extensively (Figure 5). Specifically:

Rehabilitation Alternative 1: Rehabilitate Current Truss Superstructure with Sidewalk to Inside

Alternative 1 was designed to provide minimal changes to the Dick Henderson Bridge while improving conditions and eliminating the weight restriction. The truss bridge is one of the oldest types of modern bridges, and consists of vertical and horizontal connected elements (members). Alternative 1 raises the cross-bracing of the bridge's truss to achieve 17.5' of vertical clearance. This alternative reduces the sidewalk width to 3' 5", which will not meet current design standards, and reduces the vehicle lanes to 9' 10". Alternative 1 does not include shoulder improvements or an additional vehicle lane.

Alternative 1 does not require any relocations or any additional right-of-way for construction. The estimated cost for Alternative 1 is \$27-30 million, and its construction requires closing the river crossing for 360-520 calendar days. The risk for the cost and closure days to increase is high.

Although Alternative 1 provides some improvements to service, including removal of the weight restriction, Alternative 1 does not meet current design standards; therefore, Alternative 1 does not fulfill the project's purpose and need.

Rehabilitation Alternative 2: Rehabilitate Current Truss Superstructure with Sidewalk Cantilevered to Outside

Alternative 2 also rehabilitates the existing truss of the Dick Henderson Bridge. Alternative 2 raises the cross-bracing of the bridge's truss to achieve 17.5' of vertical clearance (see "Design Standards" above), and widens the sidewalk to 5', which meets current design standards. To allow for the increased sidewalk width and to maintain the

current 10' wide travel lane, this alternative includes cantilevering the sidewalk to the outside of the bridge truss. Alternative 2 does not include shoulder improvements or an additional vehicle travel lane. Alternative 2 does not require any relocations or any additional right-of-way for construction. The estimated cost for Alternative 2 is \$29-32 million, and its construction requires closing the river crossing for 410-570 calendar days.

For one or more of the following reasons, these rehabilitation alternatives are not feasible and prudent:

a. The bridge is so structurally deficient that it cannot be rehabilitated to meet minimum acceptable load requirements without affecting the historic integrity of the bridge.

Both rehabilitation alternatives will allow the bridge to meet minimum acceptable loads and will result in lifting the current weight restrictions. Also, both rehabilitation alternatives will maintain the historic integrity of the bridge and therefore in regards to Reason a, either rehabilitation alternative is feasible and prudent.

b. The bridge is seriously deficient geometrically and cannot be widened to meet the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge. Flexibility in the application of the American Association of State Highway and Transportation Officials geometric standards should be exercised as permitted in 23 CFR Part 625 during the analysis of this alternative.

- As noted above, Rehabilitation Alternative 1 will not affect the historic integrity of the bridge. However, Rehabilitation Alternative 1 does not adequately address the geometric requirements to meet current design standards. Specifically, this rehabilitation alternative does not meet the minimum standard for lane width and does not provide the minimum shoulder width. Additionally, the sidewalk width is substantially less than the minimum design standards (Table 2). Therefore, Rehabilitation Alternative 1 does not meet the project purpose and is not prudent and feasible.
- As noted above, Rehabilitation Alternative 2 will not affect the historic integrity of the bridge. However, Rehabilitation Alternative 2 does not meet minimum required geometric standards for lane or shoulder widths (Table 2). Therefore, Rehabilitation Alternative 2 does not meet project purpose and is not prudent and feasible.

Table 2
Preliminary Alternative Screening Results, March 2011

	Design Standards	Rehabilitation Alternative 1, Sidewalk to Inside	Rehabilitation Alternative 2, Sidewalk to Outside	Recommended Alternative Plate Girder
Number of Lanes	2	2	2	3
Lane Width (feet)	11 minimum	9.8	10	12
Parapet Standard Met	N/A	Yes	Yes	Yes
Shoulder Width (feet)	2'	0	1.4	6
Sidewalk Width (feet)	4	3.4	5	5

F.1.4 Replace Historic Bridge- Recommended Alternative

F.1.4.1 Use of Section 4(f) Resource

The WVSHPO has determined that this alternative will adversely affect this historic resource. Therefore, this alternative will use a Section 4(f) resource.

F.1.4.2 Description of Recommended Alternative

The recommended alternative replaces the existing superstructure of the Dick Henderson Bridge and transforms the bridge into a bridge type called a plate girder (Figure 3). A plate girder bridge is a bridge supported by two or more plate girders, which are typically I-beams made up from separate structural steel plates that are bolted or welded together. In this alternative, the two main river piers are reinforced and strengthened. This alternative provides three 12' wide travel lanes, two 6' shoulders, and a 5' wide sidewalk.

This alternative does not require any relocations. However, approximately 0.37 acre (16,000 square feet) of right-of-way is required for permanent conversion to transportation use, and approximately 0.046 acre (2,000 square feet) is required for temporary conversion during construction. The estimated cost for this alternative is \$25-28 million, and its construction requires closing the river crossing for 320-460 calendar days. The risk for the cost and closure days to increase is low.

The Recommended Alternative improves the service of the bridge, including the removal of the weight limit, allows the bridge to meet all current design standards, and corrects all structural and geometric deficiencies and functional inadequacies. Therefore, this alternative fulfills the purpose and need of the project.

G. Measures to Minimize Harm

For the Programmatic Section 4(f) Evaluation to apply to a project, FHWA must ensure that the proposed action includes all possible planning to minimize harm. Coordination with the SHPO and ACHP is currently ongoing to finalize a Memorandum of Agreement.

H. Conclusions

Based upon the above considerations, it is recommended that there is no feasible and prudent alternative to the use of the Section 4(f) property, the Dick Henderson Bridge, and the proposed action includes all possible planning to minimize harm to the property resulting from such use.

I. References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Policy on Geometric Design of Highways and Streets.
- American Association of State Highway and Transportation Officials (AASHTO). 2010. AASHTO LRFD Bridge Design Specifications, 5th ed.
- Boone, Clay, Kanawha, and Putnam County Regional Intergovernmental Council (BCKP RIC). 2009a. The FY 2010-2013 Transportation Improvement Program for the Charleston, WV Metropolitan Statistical Area. December, 2009, as amended November 16, 2010. Charleston, WV.
- Lichtenstein Consulting Engineers, Inc. and Parsons Brinckerhoff, Quade & Douglas, Inc. 2007. Guidelines for Historic Bridge Rehabilitation and Replacement. The American Association of State Highway and Transportation Officials. Washington, D.C.
- Michael Baker Jr., Inc. 2011a. Determination of Effect Report: Dick Henderson Bridge. Prepared for the West Virginia Division of Highways for submission to the State Historic Preservation Office. May 2011.
- Michael Baker Jr., Inc. 2011b. Diversion Travel Cost Analysis: Dick Henderson Bridge (St. Albans-Nitro). Prepared for WVDOH, February 2, 2011.
- URS Greiner Woodward Clyde. July 2000. *St. Albans Bridge/Underpass Study*. Technical Memorandum No. 1: Problem Definition and Development of Conceptual Alternatives. Prepared for the Regional Intergovernmental Council, South Charleston, WV.
- Parsons Brinckerhoff and Engineering and Industrial Heritage. 2005. *A Context for Common Historic Bridge Types*. The National Cooperative Highway Research Program, the Transportation Research Council, and the National Research Council. Washington, D.C.
- Transportation Research Board (TRB). 2011. Highway Capacity Manual, 5th Edition. TRB: Washington, D.C.
- West Virginia Division of Highways (WVDOH). January 1990, Revised July 1996. *Bridge Inspection Manual*.
- West Virginia Department of Transportation (WVDOT). 2006. Design Directives.
- West Virginia Department of Transportation (WVDOT). 2004. Bridge Design Manual.

FIGURES

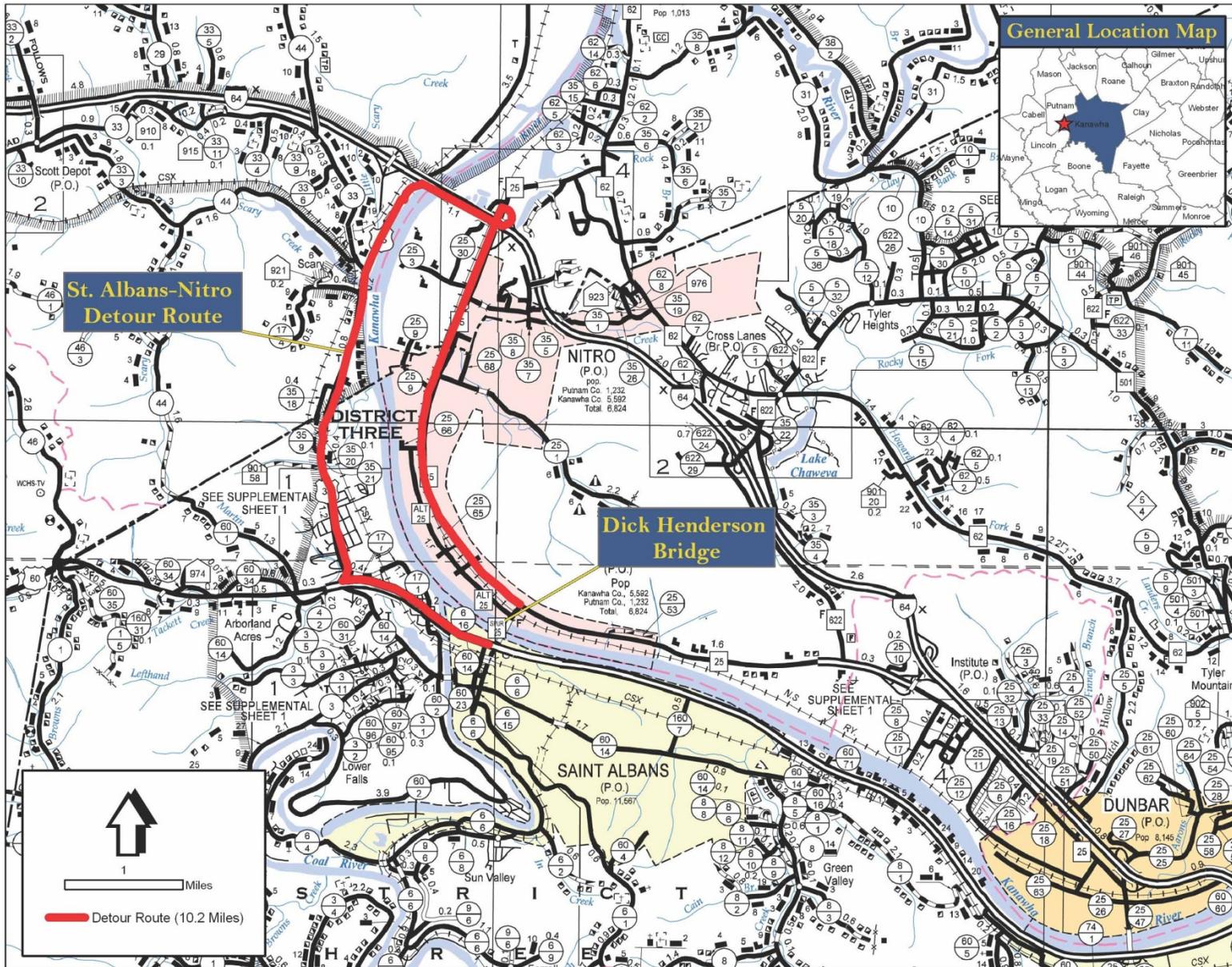


Figure 1: Project Area and Shortest Detour Route (approximately 10.2 miles between project endpoints).

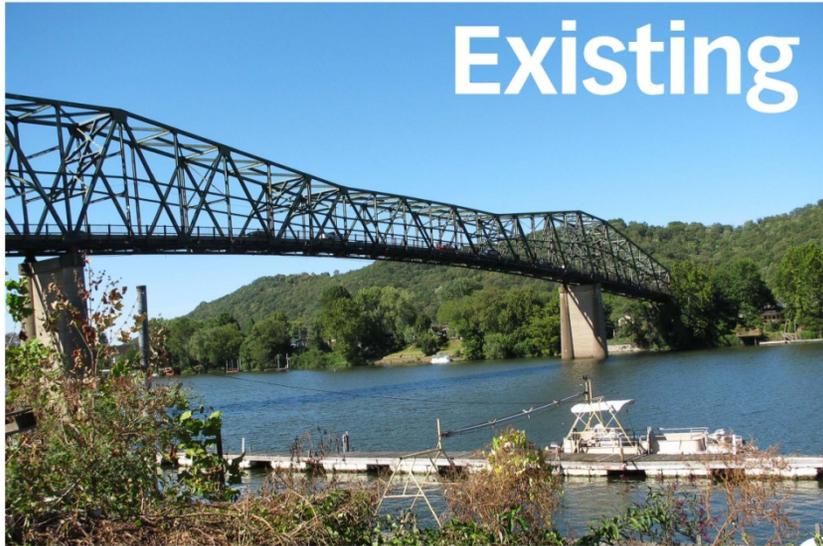
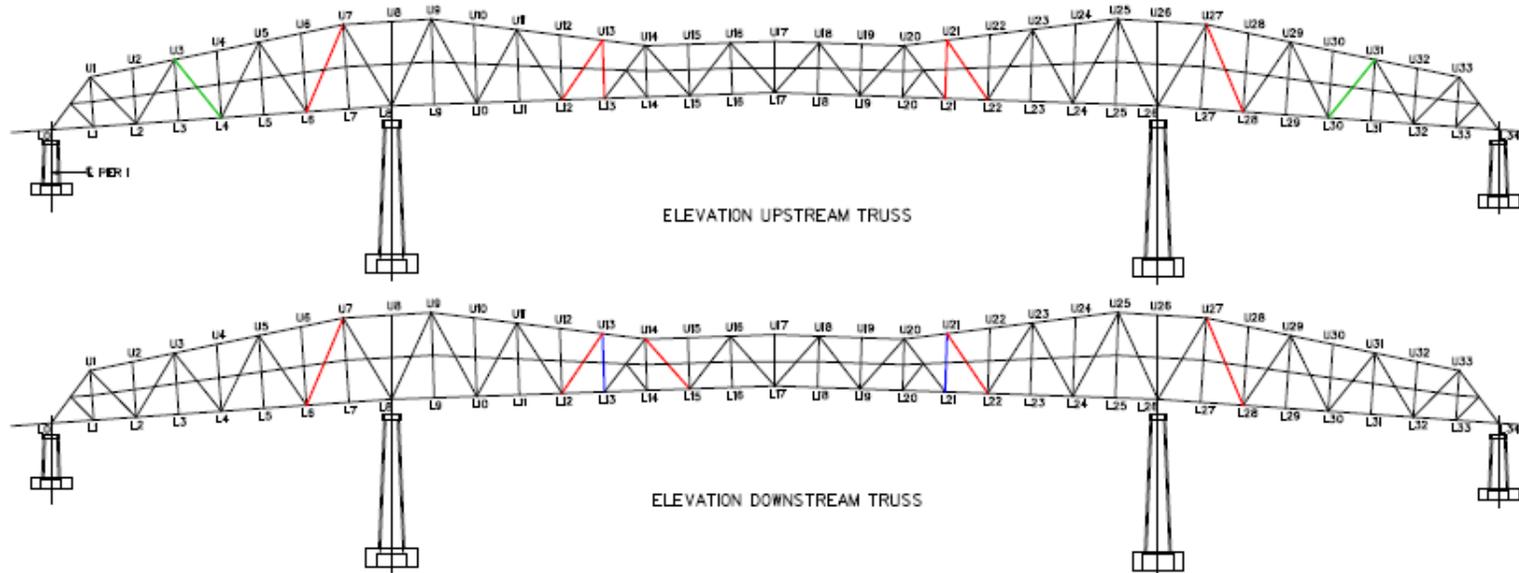


Figure 2: Top is a photograph of existing Dick Henderson Bridge with its cantilever Warren through-truss superstructure. Bottom is a rendering of the Recommended Alternative's new plate girder superstructure formerly known and presented to the public as Alternative 3.

State Project No.	Federal Project No.	Task No.	Year	County	Sheet No.
0220-P15-0.05 00	02-0284 103 E	1	2010	SANAGA	5 of 8



DEFICIENT MEMBERS EXISTING TRUSS			
UPSTREAM TRUSS		DOWNSTREAM TRUSS	
MEMBER	HS (Inv) TONS	MEMBER	HS (Inv) TONS
L6 - U7	38.6	L6 - U7	38.6
L12 - U13	36.9	L12 - U13	36.9
U13 - L13	39.5	U13 - L13	39.5
U21 - L21	39.5	U14 - L15	33.2
U21 - L22	36.9	U21 - L21	39.5
U27 - L28	38.6	U21 - L22	36.9
		U27 - L28	38.6

DEFICIENT MEMBERS WITH SPERALK BETWEEN TRUSSES (ALTERNATIVE 1)			
UPSTREAM TRUSS		DOWNSTREAM TRUSS	
MEMBER	HS (Inv) TONS	MEMBER	HS (Inv) TONS
U3 - L4	39.6	L6 - U7	39.5
L6 - U7	37.3	L12 - U13	37.8
L12 - U13	35.7	U14 - L15	34
U13 - L13	38.3	U21 - L22	37.8
U21 - L21	38.3	U27 - L28	39.5
U21 - L22	35.7		
U27 - L28	37.3		
L30 - U31	39.6		

LEGEND

DEFICIENT MEMBERS ON THE PRESENT STRUCTURE THAT HAVE HS CAPACITY LESS THAN 40 (TONS) (USING INVENTORY STRESSES) █

DEFICIENT MEMBERS IN ALTERNATIVE 1 THAT HAVE HS CAPACITY LESS THAN 40 (TONS) (USING INVENTORY STRESSES) █

DEFICIENT MEMBERS ON THE PRESENT STRUCTURE AND ALTERNATIVE 1 THAT HAVE HS CAPACITY LESS THAN 40 (TONS) (USING INVENTORY STRESSES) █

NO.	REVISION	DATE	BY

Figure 3 – Graphic representation of deficient members on existing truss.

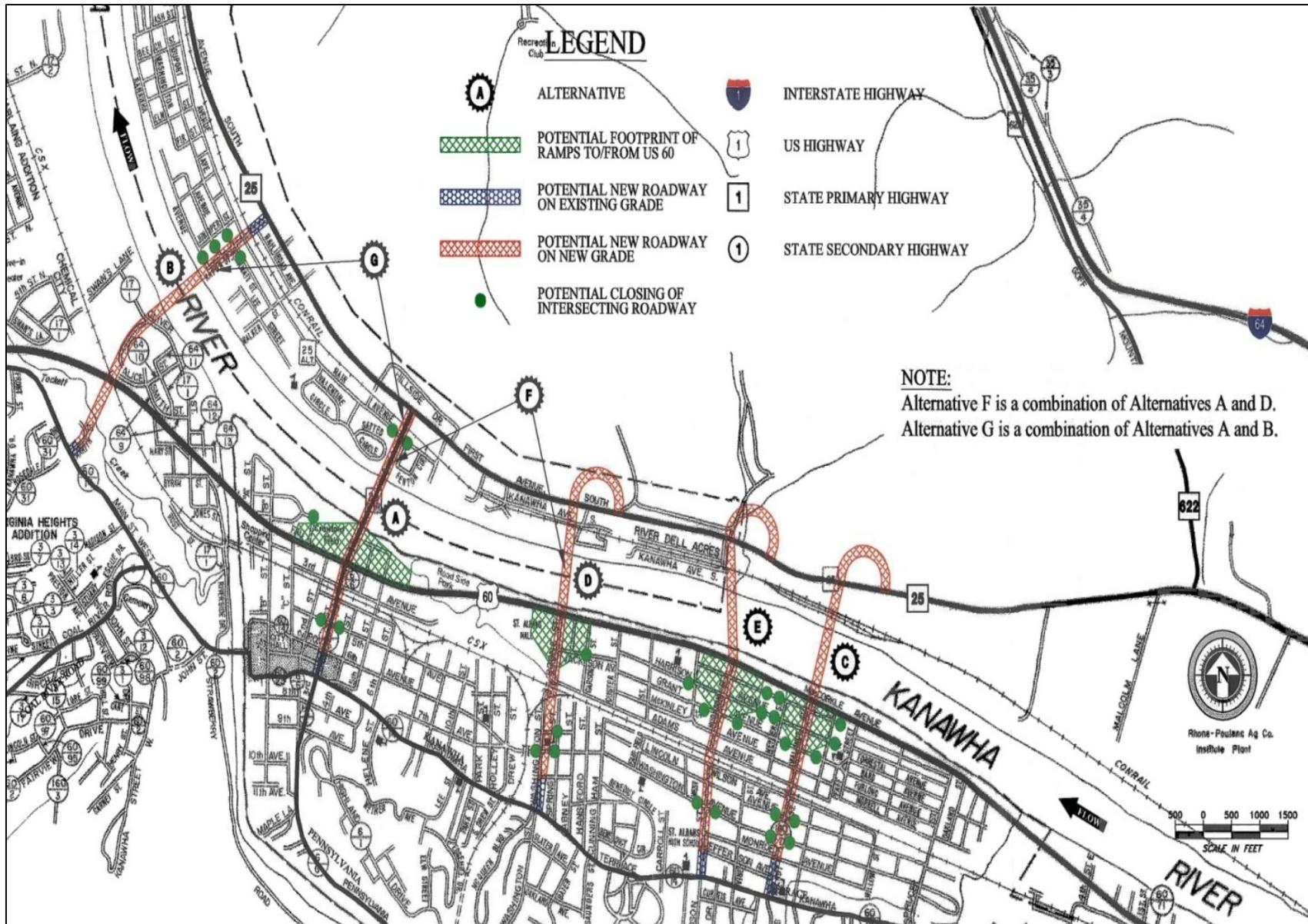


Figure 4: New Location Alternatives Studied in 2003 by the Regional Intergovernmental Council (the local Metropolitan Planning Organization) (URS, 2003).

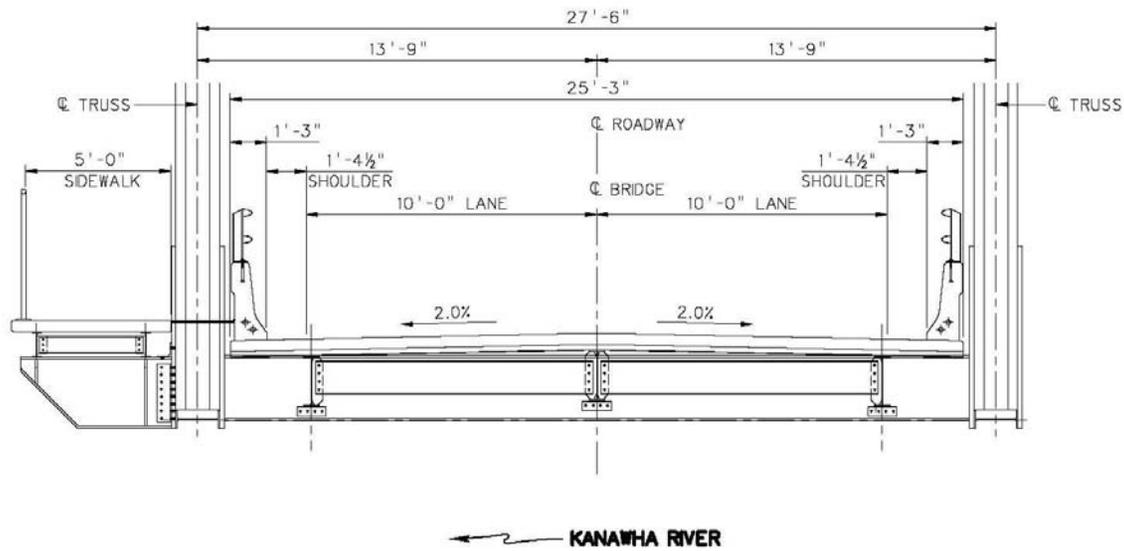
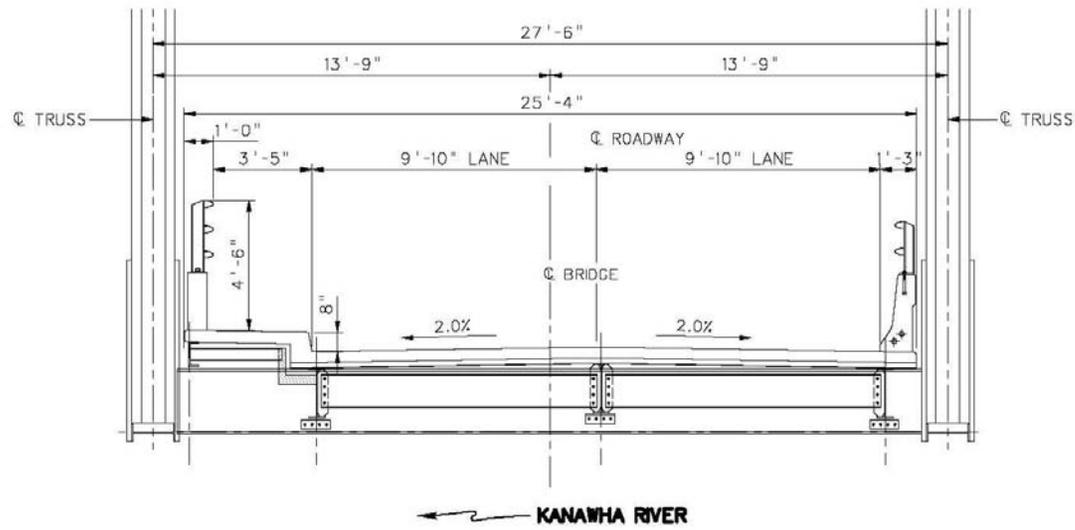


Figure 5: Typical Section of Rehabilitation Alternative 1 (top) and Rehabilitation Alternative 2 (bottom).

Appendix E
Coordination with WVDNR and USFWS



DIVISION OF NATURAL RESOURCES

Wildlife Resources Section
Operations Center
P.O. Box 67

Elkins, West Virginia 26241-3235

Telephone (304) 637-0245

Fax (304) 637-0250

RECEIVED

APR 01 2011

**ENGINEERING DIVISION
WV DOH**

Earl Ray Tomblin
Governor

Frank Jezioro
Director

Mr. Gregory L. Bailey
Division of Highways
1900 Kanawha Boulevard, East
Building Five, Room 110
Charleston, WV 25305-0430

Dear Mr. Bailey:

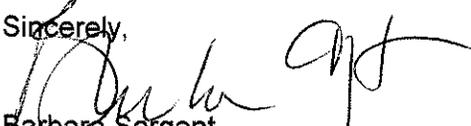
We have reviewed our files for information on rare, threatened and endangered (RTE) species and natural trout streams for the areas of the proposed highway projects:

SM	State Project S220-P25-0.05 00 Federal Project BR-0025 (102)E Dick Henderson Bridge Replacement Kanawha County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
TC	State Project S320-60/29-1.83 Dry Branch Bridge Kanawha County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
GW	State Project S324-8/2-1.51 Anawalt Post Office Bridge Replacement McDowell County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
GA	State Project S324-102/51-0.01 North Railroad Street Bridge Replacement McDowell County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
RE	State Project S328-BLU/E-1.00 Federal Project BR-0160(001)D Martin Luther King, Jr. Bridge Replacement Mercer County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
TC	State Project S352-250/9-0.01 Old 250 Bridge Replacement Wetzel County	Our records indicate no known occurrences of RTE species or natural trout streams at this site. Mussel surveys are required.

TC	State Project S322-7-15.71 Sias Beam Span Replacement Lincoln County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
GA	State Project S345-20-9.07 Federal Project BR-0020(164)E Lilly Bridge Replacement Summers County	Our records indicate no known occurrences of RTE species or natural trout streams at this site. Mussel surveys are required, and surveys for Virginia spireaea may be required by the U.S. Fish and Wildlife Service.
RE ?? ''	State Project U310-16-0.00 Federal Project STP-0016(221)D Blue Circle Ranch Road Intersection Improvement Raleigh County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.
RE ?? ~	State Project U310-16-0.00 Federal Project STP-1106(221)D Bradley Interchange Improvement Raleigh County	Our records indicate no known occurrences of RTE species or natural trout streams at this site.

The Wildlife Resources Section knows of no surveys that have been conducted in these areas for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the areas under review.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048.

Sincerely,

 Barbara Sargent
 Environmental Resources Specialist
 Wildlife Diversity Unit



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

RECEIVED

MAR 30 2011

WVFO

March 24, 2011

Ms. Deborah Carter
US Fish and Wildlife Service
694 Beverly Pike
Elkins, West Virginia 26241

Dear Ms. Carter:

State Project S220-P25-0.05 00
Federal Project BR-0025(102)E
Dick Henderson Bridge Replacement
Kanawha County

We are submitting this project to the Service for individual project review because it is not covered under our current Blanket Letter Agreement because it will require an Environmental Assessment document to be produced. The project has been ran through our GIS layers and no endangered species were flagged.

The preferred alternative (Alternative 3) for the project would repair the existing piers and abutments and replace the thru truss superstructure with a plate girder option. Minimal new right of way will be required and the bridge will be closed to traffic during construction. Since the project is over the Kanawha River, a DNR listed mussel stream, a consultant, Enviroscience, INC.,



United States Department of the Interior

FISH AND WILDLIFE SERVICE



West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

In response to your letter above, we have made a "no effect" determination that the project will not affect federally-listed endangered or threatened species. Therefore no biological assessment or further section 7 consultation under the Endangered Species Act is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed and proposed species becomes available, this determination may be reconsidered.

Definitive determinations of the presence of waters of the United States, including wetlands, in the project area and the need for permits, if any, are made by the U.S. Army Corps of Engineers. They may be contacted at: Huntington District, Regulatory Branch, 502 Eighth Street, Huntington, West Virginia 25701, telephone (304) 399-5710.

James P. Zylus 6/2/2011
Reviewer's signature and date

Deborah Carter 6/2/2011
Field Supervisor's signature and date