MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Management Plan for Historic Highway Bridges

August 1, 2024

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Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

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Acronyms and Abbreviations

Abbreviation or Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
CDE	Character Defining Element
DNR	Maryland Department of Natural Resources
FHWA	Federal Highway Administration
MASH	AASHTO Manual for Assessing Safety Hardware
MD	Maryland
MDOT	Maryland Department of Transportation
MHT	Maryland Historical Trust
MIHP	Maryland Inventory of Historic Properties
NCHRP	National Cooperative Highway Research Program
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
No.	number
NPS	National Park Service
NRHP	National Register of Historic Places
SHA	Maryland Department of Transportation State Highway Administration
SHPO	State Historic Preservation Officer
Section 106	Section 106 of the National Historic Preservation Act
SOI	Secretary of the Interior
the Standards	Secretary of the Interior's Standards for the Treatment of Historic Properties
USACE	United States Army Corps of Engineers

1. Introduction

This report presents technical revisions to the Maryland Department of Transportation (MDOT) State Highway Administration's (SHA) *Management Plan for Historic Highway Bridges* (Management Plan) to reflect current design and safety standards, best practices in historic preservation, and updated information on SHA's Preservation Priority Historic Bridges (priority bridges). The original Management Plan was completed in 2012 as a guide for the preservation and maintenance of SHA's historic bridges, or those that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP). A total of 168 historic bridges split into three categories were identified in the Management Plan, with a focus on the 17 bridges categorized as priority bridges. The priority bridges were selected as noteworthy examples of bridge design and significance in Maryland's transportation history. The document also included best practice treatments to guide the maintenance and repair of all Maryland's historic bridges.

This report contains updated information regarding the 17 priority bridges, including photographs, data from the most recent bridge inspection reports, a record of completed work and improvements, and recommendations and guidance for their maintenance, preservation, and future rehabilitation. An individualized list of best practices, based on structure type, is also provided for each bridge. Additional information on the specific best practices can be found in the corresponding entry in Section 5, which is adapted from an appendix in the 2012 Management Plan entitled *Best Maintenance & Conservation Practices for Older Bridge Types*. Incorporated into this report, the updated section on best practices provides a framework for regular maintenance activities and treatment of potential problems prior to repairs or rehabilitation. The best practices are in accordance with applicable state and federal preservation standards and are appropriate for all historic bridges.

This report also summarizes the methodology of the 2012 study and the approach of the current update, the regulatory context as it applies to the priority bridges, and federal and state preservation/rehabilitation guidelines. An extensive updated bibliography is also included.

It should be noted that several priority bridges have been successfully rehabilitated since 2012 in accordance with the recommendations and best practices included in the earlier Management Plan and additional rehabilitations are proposed. The goal is for this plan to serve as a reference for the future maintenance, rehabilitation, and preservation of all Maryland's historic highway bridges in accordance with the procedures the historic bridge Programmatic Agreement executed on July 19, 2013 and revised in 2024, as included in Appendix A.

2. Methodology, Environmental Compliance, and Federal and State Guidelines

This section contains a summary of the methodology from the 2012 Management Plan, methodology employed for this updated version, the regulatory context that dictates the process for historic rehabilitation, and applicable federal and state guidelines for the preservation and rehabilitation of historic bridges.

2.1 2012 Methodology

Prior to completion of the 2012 Management Plan, SHA re-evaluated existing bridges based on research of bridge files, field survey, and a statewide historic context that assigned values to their Character Defining Elements (CDEs), ranking each element as Primary, Secondary, or Tertiary.

As a result of the re-evaluation, SHA identified 168 historic bridges and selected 17 of those to be managed as priority bridges.

In deciding which bridges would be designated as priority bridges, several criteria were considered:

- was the bridge a part of early state transportation legislation.
- was the average daily traffic volume low.
- was the bridge located along a scenic by-way.
- was the bridge located within a heritage area.
- was the bridge not planned for replacement within the next 20 years.
- was the bridge used for local traffic only and has since been bypassed with a modern bridge.
- was the bridge a good example of its type with strong integrity; and
- did the bridge have a high degree of preservation potential.

The priority bridges were selected based on their designs and materials - stone, concrete and metal arches; through and pony metal trusses; bascule and swing movable bridges; and the state's only aluminum girder bridge. The structures also represent Maryland's history of bridge building on nineteenth and twentieth century highways such as the National Road and US 13 Business. In addition to historic significance, consideration was given to physical characteristics and safety data such as the bridge's condition and accident history. The 17 priority bridges included in the following table (Table 1) represent the best of SHA's bridge building efforts from across the state.

2.2 2024 Methodology

Periodic revision of the Management Plan is necessary for SHA to remain up-to-date on the latest standards and practices. These revisions are to reflect the current regulatory context, engineering standards, new research, and historic preservation best practices. Updated information for each priority bridge is based on a comprehensive review of as-built plans, inspection reports, and field reconnaissance. The best practices included in the original Management Plan were reviewed by AECOM engineers and revised based on changes to engineering requirements, particularly those related to character defining railings and balustrades on historic bridges and their replacement with crash worthy safety barriers. References collected in the original management plan were reviewed and updated by an AECOM architectural historian, who also examined and assembled national and state-level publications for inclusion as resources in the bibliography as they might apply to current and future best practices.

Table 1. SHA's 17 Priority Bridges

Name	SHA Bridge Number	MIHP* Number	City/Town	County	Built Date	Bridge Type
MD 144E (National Pike) over Town Creek	010035001	AL-II-A-149	Flintstone	Allegany	1925	Closed Reinforced Concrete Arch
MD 51 over Chesapeake & Ohio Canal	010048001	AL-I-C-075	Keifars	Allegany	1932	Steel Pony Truss
Blue Bridge (MD 942 over N. Br. Potomac River)	010066001	AL-IV-A-153	Cumberland	Allegany	1955	Steel Tied Arch
MD 214 over the Patuxent River	020054001	AA-761	Davidsonville	Anne Arundel & Prince Georges	1935	Steel Through Truss
Parkton Stone Arch Bridge (MD 463 over Little Gunpowder Falls)	030105001	BA-593	Parkton	Baltimore	1809	Stone Masonry Arch
Patapsco River Bridge (US 40, Edmondson Ave Extended)	030109001	BA-2557	Catonsville Ellicott City	Baltimore Howard	1936	Open Reinforced Concrete Arch
US 40 (National Pike) over Middle Creek	100031001	F-4-116	Myersville	Frederick	1936	Closed Reinforced Concrete Arch with Veneered Stone
US 40 Alternate over Casselman River	110007001	G-II-C-101	Grantsville	Garrett	1932	Steel Through Truss
Old MD 32 over River Road, Patapsco River, and CSX Railroad	130046002	HO-673	Sykesville	Howard & Carroll	1963	Aluminum Box Girder
Dover Bridge (MD 331 over Choptank River)	200023001	T-487	Tanyard	Talbot & Caroline	1933	Steel Through Truss Swing Bridge
Little Antietam Creek Bridge (MD 845A)	210004001	WA-II-1125	Keedysville	Washington	1927	Closed Reinforced Concrete Arch
US 40 over Licking Creek	210010001	WA-V-416	Big Pool	Washington	1938	Steel Wichert Girder
US 40 (National Pike) over Conococheague Creek	210012001	WA-V-211	Wilson	Washington	1936	Open Reinforced Concrete Arch
Booth's Mill/Delemere Bridge (MD 68 over Antietam Creek)	210038001	WA-II-0009	Boonsboro	Washington	1833	Stone Masonry Arch
Wicomico River Bridge (MD 991 over Wicomico River)	220009001	WI-117	Salisbury	Wicomico	1928	Steel Double Bascule

Name	SHA Bridge Number	MIHP* Number	City/Town	County	Built Date	Bridge Type
Snow Hill Bridge (MD 12 over Pocomoke River)	230002001	WO-178	Snow Hill	Worcester	1932	Steel Single Bascule
Pocomoke City Bridge (US 13 Bus over Pocomoke River)	230004001	WO-177	Pocomoke City	Worcester & Somerset	1920	Steel Double Bascule

*Maryland Inventory of Historic Places (MIHP)

This has been condensed and reformatted into a more streamlined and cohesive document. No updates or re-evaluations were undertaken of earlier historic highway bridge eligibility determinations, and outdated content related to bridge conditions was removed.

Accepted bridge rehabilitation practices have largely not changed since the original Management Plan. As noted, the primary revisions and updates to best practices are related to changes in the design and engineering of protective barriers. Resources on updated barrier design are included in the bibliography and clarification was added to Section 5.8. Innovative approaches such as the strengthening of bridges through the use of fiber reinforced polymers, lessening the dead load of a rehabilitated bridge with a composite lightweight deck and/or cable traffic barrier as included in the bibliography, or painting all or part of a rehabilitated bridge with anti-graffiti coating (see Section 5.2.4) are not widespread or typically accepted rehabilitation strategies. Practices such as these are subject to review, approval, and adoption by federal and state transportation agencies, and may be utilized on a case-by-case basis if determined to be an appropriate treatment for a particular bridge or circumstance. Content in Section 5 related to these best practices, and others, may not reflect the latest consultation with the Maryland Historical Trust (MHT) regarding appropriate treatments or SHA design standards and engineering practices. For advances in bridge rehabilitation that may eventually become best practices, see the bibliography .

2.3 Environmental Compliance

If a bridge project requires a federal action (funding or permitting) the project would require review under one or more of the environmental and cultural resource laws outlined below. If the Federal Highway Administration (FHWA) is not providing funding for a project, agencies such as Maryland's Department of Natural Resources (DNR) and the United States Army Corp of Engineers (USACE) often require permits for bridge projects.

Two important laws related to historic preservation are Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Section 106) and Section 4(f) of the U.S. Department of Transportation Act of 1966. These two laws assist in the preservation of historic resources at the planning stage and consider resources of national significance, as well as those important at the local and state levels. The National Environmental Policy Act of 1969 (NEPA) also considers impacts to historic properties in the context of the natural, social and cultural environment. These three federal laws are often implemented together and studies for each are often interrelated. Other applicable legislation that assists historic preservation within the state of Maryland is the Maryland Historical Trust Act of 1985; the State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland. Coordination should be undertaken with SHA's environmental and cultural resources staff to complete the appropriate studies and documentation to fulfill the requirements of Section 106, Section 4(f), NEPA, and Maryland's historic preservation laws.

Section 106

Section 106 of the NHPA, as amended, (Public Law 89-665 as amended by Public Law. No. 96-515; 54 U.S.C. § 100101.) requires that the federal agency consider the effect of its undertaking/project on resources listed in or determined eligible for listing in the NRHP and provide those concerned with the opportunity to comment.

Guidelines for the evaluation of historic properties are set forth in the regulations of the Advisory Council on Historic Preservation (ACHP) at 36 CFR Part 800. The guidelines define an effect on an historic property as an alteration to the characteristics of the historic property that qualify it for inclusion in or eligibility for listing in the NRHP [36 CFR § 800.16(i)]. An adverse effect is defined in the guidelines as an alteration of

> …any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. [36 C.F.R. § 800.5(a)(1)]

Adverse effects on historic bridges could include:

- Physical destruction of all or part of the bridge or related features;
- Alteration of the bridge or related features, including restoration, rehabilitation, repair, maintenance, stabilization, and hazardous material remediation that is not consistent with the Secretary's *Standards for the Treatment of Historic Properties* (36 CFR Part 68) and applicable guidelines;
- Removal of the bridge from its historic location;
- Change in the character of the bridge's use or of physical features within the bridge's setting that contribute to the historical significance;
- Neglect of the bridge which results in its deterioration,
- Transfer, lease or sale of the bridge out of state ownership without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the bridge's historic significance.

The MHT, which serves as the State Historic Preservation Officer (SHPO), oversees the application of Section 106 with regard to impacts to historic resources, including modifications to the priority bridges. The applicability and appropriateness of Best Practices will be determined during consultation between SHA and MHT. Additional guidance related to the treatment of priority bridges is included in the following section.

Section 106 requires that agencies solicit the views of those with an interest in projects affecting historic resources. Consulting parties, which include MHT, local governments with jurisdictional authority, federally recognized tribal nations; and may include regional historical societies and preservation groups, review and comment on documents and recommendations prepared as part of Section 106 studies. They also assist in the development of mitigation measures for projects where resources are adversely affected. National advocates dedicated to the preservation of historic bridges, such as the Historic Bridge Foundation and HistoricBridges.org may also choose to participate in the Section 106 process. These groups can present case studies of rehabilitation projects and raise community awareness of bridge preservation.

Section 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, applies to projects that require involvement by the U.S. DOT, which includes the FHWA. The regulation can now be found at 23 C.F.R. 774. Information about Section 4(f) along with policy papers, tutorials, regulatory text, and the nationwide *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges* can be found at FHWA's Environmental Review Toolkit https://www.environment.fhwa.dot.gov/legislation/section4f.aspx.

For actions taken involving historic bridges, these laws require that FHWA consider whether there are alternatives, such as rehabilitation or relocation, that do not require the use of a historic bridge, and that the project should include planning to minimize harm to the bridge. Compliance with these laws will require coordination with SHA environmental, cultural resources and engineering staff to develop and consider alternatives and prepare the appropriate documentation.

NEPA

NEPA considers the impacts of a project on historic resources through an evaluation and analysis of project needs, project alternatives, and other project related studies and investigations. NEPA review is generally integrated with Section 106 review.

Outreach opportunities where the public is invited and encouraged to comment on proposed project plans, engineering alternatives and mitigation measures are required by NEPA. These can include public meetings or displays and can also be used to gather feedback and comply with Section 106's requirements for public involvement.

The full text of NEPA can be found at https://www.fsa.usda.gov/Internet/FSA_File/nepa_statute.pdf.

Maryland Historical Trust Act of 1985 and the State Finance and Procurement Article §§ 5A- 325 and 5A-326 of the Annotated Code of Maryland

Article §§ 5A-325 requires departments within the state to consult with MHT, the State Historic Preservation Office, on any state-financed capital projects that are not subject to Section 106 review. . In consultation with the state department, MHT may determine if a project has an adverse effect on historic properties. Article §§ 5A-326 outlines the protection and use of historic properties. The full text of the statute can be found at https://mht.maryland.gov/Documents/MHTAct5A325-326.pdf.

Programmatic Agreement

The 2013 Programmatic Agreement between the FHWA, SHA, ACHP, and the Maryland SHPO regarding SHA's historic highway bridges in Maryland established the procedures governing the selection, treatment, and preservation of the priority bridges. These included requirements to follow the Secretary of the Interior's (SOI) Standards for the Treatment of Historic Properties *(Standards)*, conduct bi-annual inspection, train maintenance personnel, and seek appropriate funding. Additional considerations outlined procedures for replacement or relocation of historic bridges, mitigation for bridge replacement and adverse effects to other historic properties, annual reporting, and process review. An updated or amended version of this agreement has been finalized in 2024. The 2024 Programmatic Agreement is included in Appendix A.

2.4 Federal and State Guidelines

The following guidelines were utilized to create the preservation plans for priority bridges. They can also be used to rehabilitate other historic bridges, by providing guidance for the treatment of historic materials and identification of primary CDEs, which should be preserved.

Secretary of the Interior's *Standards for Rehabilitation*

The SOI *Standards* are guidelines which assist in the preservation of a resource's character-defining features and historic materials. Summarizing the relevant Standards as applied to bridges:

- The removal of historic materials or alteration of features that characterize a property shall be avoided;
- Changes that create a false sense of historical development shall not be undertaken;
- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved;
- Deteriorated historic features shall be repaired rather than replaced;
- Alterations or related new construction will not destroy historic materials and features. The new work will be differentiated from the old and will be compatible with historic materials, features, size, scale and proportion, and massing.

The SOI's Standards are codified in 36 CFR Part 67 and were developed to guide preservationists and planners for Federal tax credit projects and other government grant programs. The Standards, in conjunction with the best maintenance and conservation practices developed for this Management Plan, provide guidance for rehabilitation, repair and maintenance of the priority bridges. The SOI's Standards can be found here: https://www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties.htm.

Historic Context Reports

State historic bridge and transportation contexts assist in placing bridges in their historic context, the identification of their CDEs, and provide information about materials and techniques used in their construction. SHA has four historic contexts that apply specifically to historic bridges:

- *Historic Highway Bridges in Maryland: 1631-1960, Historic Context Report*
- *Small Structures on Maryland's Roadway's, Historic Context Report*
- *"Tomorrow's Roads Today" Expressway Construction in Maryland, 1948-1965*
- *Historic Context of Maryland Highway Bridges Built Between 1948 and 1960*

A Context for Common Historic Bridge Types, a broad historic context that covers bridges built in the United States through 1955, was produced under the National Cooperative Highway Research Program (NCHRP), Project 25-25, Task 15 (October 2005). The report is available online at http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(15)_FR.pdf.

3. Treatment of Historic Bridges

All historic bridges, including the priority bridges selected by SHA for preservation in perpetuity, would benefit from utilization of the best practices presented in Section 5. Appropriate treatments may involve repair, strengthening or replacement of bridge components and/or design exceptions for those carrying traffic, directed at keeping them in long term use; “long-term” equals approximately 20 additional years of use.

The most effective and routine practice related to the lifespan and longevity of a historic bridge is the implementation of regular maintenance activities. These activities should be performed regularly:

- Remove Accumulated Debris by Regularly Washing Bridge
- Keep Concrete Decks in Good Condition
- Enforce Load Limits

Actions other than those listed above should begin with least invasive and proceed toward major rehabilitation as needed, with regular maintenance being the best initial approach to extending the lifespan of all bridges. For example, maintenance activities as detailed in Section 5.1 include debris and vegetation removal, and are preferred as the best and most efficient way to prolong the life of a historic bridge. The following best practices are included in Section 5, and are grouped by degree of effort below:

Maintenance

- Keep Vegetation Off Bridge Elements
- Create a Maintenance Plan
- Concrete Bridges: Waterproof and Water-Repellent Coatings Only When and Where Necessary
- Concrete Bridges: Clean Bridge Only When Necessary and with the Gentlest Means Possible
- Steel Bridges: Keep Bridge Free of Debris to Prevent Moisture Penetration and Rust
- Keep Mortar Joints Watertight

Repair

- Repair Concrete with Compatible Material that Matches the Existing Concrete
- Keep Deck in Good Condition
- Provide Good Waterproofing and Proper Drainage
- Repoint Stone Masonry
- Steel Bridges: Keep Bridge Paint or Coating System in Good Condition
- Steel Bridges: Keep Concrete Deck Components of Steel Bridges in Good Condition
- Steel Bridges: Heat Straighten Minor Damage
- Steel Bridges: Replace Section in Kind to Address Localized Impact Damage
- Steel Bridges: Raising Portal and Lateral Bracing to Increase Vertical Clearance
- Whenever Possible, Keep Original Railings Behind Crash Worthy Traffic Barriers
- Care Attaching Modern Guide Rail Systems

Rehabilitation

- Investigate Safety Barrier Requirements and Alternatives
- Install Weep Holes
- Stone Arch: Spandrel Wall Rehabilitation
- Steel Bridges: Strengthening /Replacement of Components/Members
- Deck Replacement to Reduce Dead Load and Increase Live Load Capacity
- Steel Bridges: Use of Higher Strength Steel for Flooring Systems
- Steel Bridges: Add Auxiliary Members
- Steel Bridges: Add Section to Existing Members
- Steel Bridges: In-Kind Replacement of Undersized or Deteriorated Members

- Steel Bridges: Connections for In-Kind Replacement
- Steel Bridges: Post-Tensioning to Increase Load Carrying Capacity or Add Redundancy
- Steel Bridges: Strengthening by Reusing Part of Bridge and Placing New Superstructure for Live Loads
- Stone and Concrete Arches: Increasing Load-Carrying Capacity

As previously noted, repair, strengthening or replacement of bridge components should follow the recommended approaches of the SOI's Standards, the guidance contained in the following individual management plans, and the best practices included in Section 5 as much as practicable.

4. Preservation Plans for Priority Bridges

This section contains the individual preservation plans for each of the 17 priority bridges.

SHA Bridge No. 010035001, MD 144AE (National Pike) over Town Creek

Flintstone, Allegany County, MD
MIHP No. AL-II-A-149

Photo 1: Downstream elevation of bridge. Note PVC drains installed in the southwest and southeast abutments. View northwest.

Bridge Details

Bridge Type:	Closed-Spandrel, Reinforced Concrete Arch
Year Built	1925
No. of Spans:	1
Total Length:	71'-0"
Roadway Width:	24'-0"
NRHP Eligibility:	Criteria A and C, as a significant example of concrete arch construction during the upgrading of the National Pike.
Primary CDEs:	Arch barrel, spandrel walls, and balustrades.
Bridge Inspection Date:	2/21/2022
Overall Condition:	Satisfactory
Deck: Satisfactory	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT (Average Daily Traffic):	50 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
1983:	• The ashlar abutments were repointed. • PVC pipe drains were added in locations of loose stone and secured with pneumatically applied mortar. • Cracks in the deck were sealed to prevent the entry of water.
Comments:	The 2012 *Management Plan for Historic Highway Bridges* noted the 1980s application of shotcrete. The 2/21/2022 Inspection Report noted that the bridge had an active job number and recommended the following priority repairs: 1. Repair spandrel arch barrel, spandrel arch rings, spandrel arch walls, and both abutments with cast-in place concrete, areas of repair must be approved by the engineer. 2. Replace stones and repoint Southwest Wingwall. 3. Repair the balustrade rails with cast-in-place concrete, areas of repair must be approved by the engineer.

Preservation Recommendations

The wearing surface was replaced prior to the most recent inspection in 2022, which was recommended in the 2012 Management Plan; installation of a waterproof membrane prior to paving is unknown.

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines.

Rehabilitation Recommendations

- Repair the concrete balustrades and spandrel walls, particularly along the interfaces between the spandrel walls and arch barrel. Other areas on the bridge may require similar concrete repairs.
- Balustrade replacement would require investigation of American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH)-compliant aesthetic traffic barriers, either a solid barrier with indentations similar to the openings of the original design, or a new approved open balustrade. A design waiver and the AASHTO guidance available for very low volume roads may apply, considering the very low ADT and prevailing speeds at this bridge.
- Acceptable rehabilitation would involve the removal of all or portions of the fill material over the arch, placing a waterproof membrane along the top of the exposed barrel, and replacing the fill with an engineered backfill. Adequate drainage should be provided, and another waterproof membrane should be placed on top of the new fill prior to placing the new wearing surface.
- Loose portions of shotcrete should be inspected and removed periodically, and the stone masonry repointed as needed. It is not recommended to forcibly remove the shotcrete all at once, as this may damage the underlying stone masonry.
- Plastic drains in the wingwalls should be removed, replaced, or otherwise made less visible, while providing for adequate drainage behind the stone masonry.
- Wingwalls can be stabilized with the placement of tie-back rods through the face into the backfill. The tie-back anchorages can be countersunk and covered with a non-shrink grout. If needed, wingwalls should be replaced in-kind.

Applicable Best Practice Treatments

Section 5.2 – Reinforced Concrete Conservation and Repair

Section 5.3 – Addressing Moisture Penetration in Stone and Reinforced Concrete Arches

Section 5.4 – Repointing Stone Masonry

Section 5.8 – Appropriate Railing Treatments

Photo 2: East approach. National Pike/MD 144 successor bridge is visible upstream/north, view west.

Photo 3: Note failing concrete at barrel of arch, view northeast.

Photo 4: Detail of mortar deterioration and exposed rebar on original balustrade.

SHA Bridge No. 010048001, MD 51 over Chesapeake & Ohio Canal

Keifars, Allegany County, MD (near Paw Paw, WV)
MIHP No. AL-I-C-075

Photo 1: View of bridge from towpath, looking northwest. Note plating in channel of lower chord.

Bridge Details

Bridge Type:	Steel Sub-Divided Warren Camelback Pony Truss
Year Built	1932
No. of Spans:	1
Total Length:	89'-0"
Roadway Width:	24'-7"
NRHP Eligibility:	Criteria A and C, as a good example of pony truss construction during the Good Roads Movement in the 1930s.
Primary CDEs:	Steel trusses, steel floor beams, and concrete abutments.
Bridge Inspection Date:	2/1/2023
Overall Condition:	Good
Deck: Very good	**Superstructure:** Satisfactory	**Substructure:** Satisfactory
ADT:	1,642 (2018)

Bridge Repairs and Modifications

Date	Scope of Work
1992:	According to the 1995 MIHP inventory update, the deck, one abutment, and the "approach walls" were replaced. Modern stringers were installed and supported the new deck.
2022:	Bridge was rehabilitated, including replacement of the deck, repairs to structural members and abutments, new curb-mounted, MASH-compliant three-strand structural tube rail traffic barrier with fiberglass shielding, and anti-graffiti coating

Comments: The extent of rehabilitation was not confirmed. Based on a review of recent photos and earlier data, repairs to the lower chord, upper chord and floor beams consisted of extensive plating of beam channels and bottom flanges. Repairs to date have been consistent with best practices and have not altered the original design or function of the truss. The updated safety barrier is mounted to curbing rather than the trusses. The original pipe railing and channel rail remain behind the updated barrier and fiberglass shield. The efficacy of the fiberglass screening, installed to protect the lower truss members from road salt, should be monitored.

Preservation Recommendations

Several of the recommended actions listed in the 2012 *Management Plan* have been addressed in the recent rehabilitation, including painting of the truss, repairs to the abutments and deteriorated truss members, deck replacement, and new barrier.

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Maintain vegetation beneath the bridge.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines, truss members, and abutment seats.
- If additional live load capacity becomes necessary, the member(s) governing the bridge's capacity may be addressed by adding auxiliary members carefully detailed and positioned so as not to detract from the scale of the bridge or the make-up of the connections.
- The size and type of the bridge would allow for relocation as a feasible preservation option if faced with demolition.
- Widening or alteration of this bridge is unlikely due to the rural location with low traffic volume.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.3 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 - Repair of Damaged Steel Bridge Components/Members

Photo 2: View northwest of 3-rail barrier and fiberglass spray shield. Rehabilitation date at curb.

Photo 3: Historic handrail behind fiberglass shield and new 3-rail barrier, view west.

Photo 4: View of repaired abutment from towpath. Additional plating and new rivets visible on floor beam flange, view west.

Photo 5: Detail of replica plaque mounted to west end of south truss.

SHA Bridge No. 010066001, Blue Bridge (MD 942 over Potomac River (Johnson St. / Bridge Ave.)

Cumberland, Allegany County, MD and Ridgeley, Mineral County, WV
MIHP No. AL-IV-A-153

Photo 1: Downstream elevation of bridge. Berms, dam, bridge pier, abutments, and river channelization were constructed by the USACE, view north.

Bridge Details

Bridge Type:	Steel Tied Arch
Year Built	1955
No. of Spans:	2
Total Length:	320'-8"
Roadway Width:	28'-0"
NRHP Eligibility:	Criterion C, as a rare example of steel tied-arch construction in Maryland.
Primary CDEs:	Steel arches, suspenders, ties, concrete pier and abutments.
Bridge Inspection Date:	11/8/2023
Overall Condition:	Fair

Deck: Fair **Superstructure:** Fair **Substructure:** Satisfactory

ADT: 7,278 (2023)

Bridge Repairs and Modifications

Date	Scope of Work
1995:	Bridge deck was rehabilitated, which included replacement of the steel open-grid deck along each gutter line with concrete, removal of the steel curb stringers, addition of exterior steel stringers under the new portions of deck, addition of concrete curbs, in-kind replacement of the concrete sidewalks, installation of new scupper drains, installation of new utility supports under the sidewalks, and a complete repainting of the steel superstructure.
2017:	SHA proposed repairs to the bridge, including cleaning, plating, painting, and other minor repairs.
2023:	SHA proposed grinding, polishing, and painting a mechanical cut in one of the steel members.
Comments:	Repairs to date have been in-kind and have not altered the original design or function of the bridge. The consultant inspector noted two open jobs for the bridge in the 11/8/2023 Inspection Report. The following work items are to be scheduled and completed in 2024: 1. Clean, plate, and paint areas of section loss on stringers and floor beams as shown on plans. 2. Install pre-compressed foam sealant in bridge joints at north and south abutments. 3. Clean, reweld, and paint cracked railing post welds as needed. 4. Clean, plate, and paint areas of section loss at railing posts (6 locations). 5. Install new steel plates, pourable joint seals, and pre-compressed foam sealant at arch rib closure panels adjacent to sidewalks. 6. Install fiberglass protective shields on railings. 7. Replace neoprene trough fabric at joints as needed. 8. Clean out scuppers as needed. 9. Replace rivets which are missing, broken, and with greater than 50% section loss at several locations. 10. Replace vermin screens at arch rib openings. 11. Repair deteriorated concrete in sidewalk fascia. 12. Clean and epoxy coat exposed rebar at the pier and both abutments Additional proposed work includes the installation of wire mesh following the removal of trash from the arch ports. An evaluation of the existing paint coating was also scheduled.

Preservation Recommendations

Many of the proposed recommendations included in the 2012 *Management Plan* are included in the current work items. Other actions listed in the plan remain applicable, as well as additional recommendations.

- Keep bridge free of vegetation.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines, sidewalks, and pier and abutment seats.
- Periodically remove debris from the river.
- Continue routine condition inspections and regular maintenance.
- Repeat the previous work tasks on an as-needed basis.
- Perform needed repairs as discovered during the routine biennial inspections.
- Repair spalls and delamination in the concrete pier, abutments, and wingwalls as required.

- Replace the bituminous wearing surface following removal of the existing wearing surface, so that no additional dead load is added to the bridge.

Rehabilitation Recommendations

- If required as part of a future rehabilitation, investigate and install an appropriate MASH-compliant barrier separating vehicular and pedestrian traffic, or consider a design waiver based on the volume and speed of traffic.
- Replace or supplement the existing bridge railings with context sensitive fencing or additional railing to meet current requirements.
- If additional live load capacity is needed, member(s) governing the bridge's capacity can be augmented with carefully detailed and positioned auxiliary members, so as not to detract from the scale of the bridge, or the make-up of the connections.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck showing width of traffic lane and sidewalk as well as the original 3-rail railing and top rail extension that are attached to arch and suspenders, view northwest.

Photo 3: Detail of suspender and hangers.

Photo 4: Upstream elevation, view south.

SHA Bridge No. 020054001, MD 214 over the Patuxent River

Davidsonville, Anne Arundel & Prince Georges Counties, MD
MIHP No. AA-761

Photo 1: Downstream view of bridge, looking west.

Bridge Details

Bridge Type:	Steel Parker Through Truss
Year Built	1935
No. of Spans:	1
Total Length:	200'-0"
Roadway Width:	28'-6"
NRHP Eligibility:	Criterion A for its association with continuing advances in metal truss technology and fabrication in the early 20th century, and Criterion C as a good example of a Parker through truss.
Primary CDEs:	Steel trusses, sway-bracing portals, floor beams, and concrete abutments and wingwalls.
Bridge Inspection Date:	2/14/2022
Overall Condition:	Satisfactory
Deck: Good	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT:	8,875 (2015)

Bridge Repairs and Modifications

Date	Scope of Work
2007:	Extensive rehabilitation of the bridge included replacement of the deck, splice plates, lateral bracing in the floor system, bottom chord batten plates, rivets with high strength bolts, batten plates on diagonals, a damaged vertical member, and selective replacement of floorbeams and stringers. Repairs were made to a damaged portal member, and the abutments. Following the removal of pack rust and installation of cover plates, the truss was cleaned and painted. New two-tube curb-mounted railing and fiberglass splash panels were installed. The original pipe handrail and rectangular channel rail remain behind the updated barrier.

Comments: Based on the condition of the bridge, the following priority repairs were recommended by the consultant inspector in the 2/14/2022 Inspection Report:

1. Replace lattice bracing and batten plates at two locations.
2. Replace missing connection bolts at several floor beams and web connections.
3. Replace missing connection bolts at several floor beams bottom flange connection plates at the bottom chords.
4. Replace missing cross bracing connection plate nuts.
5. Replace anchor bolt nuts at the South and North Bearings.
6. Replace missing connection bolts at gusset plate connections.
7. Perform an as-inspected load rating analysis to evaluate areas of section loss for plating repairs.

Preservation Recommendations

The recommended actions listed in the 2012 *Management Plan* remain applicable:

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Periodically cut vegetation beneath and overhanging the bridge.
- Maintain a strict schedule of cleaning dirt and debris from the curblines, truss members, and abutment seats.
- Periodically remove graffiti from the abutments.
- Repaint the superstructure steel.
- Repair general deterioration (spalls and delamination) in the concrete abutments and wingwalls.

Rehabilitation Recommendations

- Steel deterioration following the 2007 rehabilitation will continue. Replace secondary structural members as needed. Repair deteriorated truss members by adding new plates or shapes. Deteriorated rivets can be replaced with high-strength bolts.
- If additional live load capacity becomes necessary, the member(s) governing the bridge's capacity may be addressed by adding auxiliary members carefully detailed and positioned so as not to detract from the scale of the bridge or the make-up of the connections.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members

Photo 2: Bridge approach, view southwest. Note grime and vegetation.

Photo 3: Detail of original handrail and channel at southwest end of upstream truss, view east. Note debris accumulation at base of splash shield.

Photo 4: Painted floor system and deck, completed in 2007.

Photo 5: Builder's plaque attached to northeast corner of upstream/north truss.

SHA Bridge No. 030105001, Parkton Stone Arch Bridge (MD 463 over Little Gunpowder Falls)

Parkton, Baltimore County, MD
MIHP No. BA-593

Photo 1: View of east/downstream spandrel walls and pier, view northwest. Note abundance of vegetation.

Bridge Details

Bridge Type:	Stone Masonry Arch
Year Built	1809
No. of Spans:	2
Total Length:	62'-0"
Roadway Width:	27'-0"
NRHP Eligibility:	Criterion A for its association with transportation and commerce on an early turnpike, and Criterion C as a well-preserved example of a stone arch bridge.
Primary CDEs:	Arch barrels, spandrel walls, parapets, pier, and wingwalls.

Bridge Inspection Date:	8/2/2021	
Overall Condition:	Fair	
Deck: Fair	**Superstructure:** Fair	**Substructure:** Fair
ADT:	499 (1994)	

Bridge Repairs and Modifications

Date	Scope of Work
1994	Removed bedload from stream channel, repointed intrados of both spans, underpinned the invert slab beneath span 2 with concrete, repointed inside face of parapets and endwalls, placed riprap, remove vegetation, and asphalt overlay of bridge deck.
2015	Completed repairs included repointing the west spandrel wall, pier nose, underside of Span 1 arch, southwest corner of Span 2 arch, as well as removal of loose granite, replacement of missing stones, and filling of cracks with epoxy mortar.
2019	Emergency repair measures were installed, consisting of a system of chain-link netting and timber bracing secured to the upstream spandrel wall and pier face with cables and tension rods anchored to deadmen concrete blocks resting on the bridge deck. Silt cloth covered concrete blocks were placed to support the upstream abutments.

Comments: The bridge is closed to traffic and continues to deteriorate based on the 8/2/2021 Inspection Report. Funding for rehabilitation of the bridge was being sought in 2022.

Preservation Recommendations

Several of the recommended actions listed in the 2012 *Management Plan* have been addressed, based on review of plans, visual evidence and the findings of the 8/2/2021 Inspection Report. The remaining recommendations are:

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Also, periodically cut back the vegetation beneath the bridge and overhanging the sides of the bridge. If needed, coordinate with adjacent property owners for access and easements to clear trees.
- Maintain a strict schedule of cleaning dirt and debris from the bridge.
- Periodically remove debris from the stream channel at the bridge.
- Place rock protection at the pier and abutments.

Rehabilitation Recommendations

- Replace the existing wearing surface, installing a waterproof membrane beneath the new pavement, as well as an adequate drainage system along the curblines, to move water and de-icing salts off of the bridge.
- Acceptable rehabilitation would involve the temporary shoring of the arches, removal of all or portions of the fill material over the arch, repairing/repointing the exposed stone masonry, placing a waterproof membrane along the top of the exposed barrel, and replacement of fill with an engineered backfill or relieving structure. Adequate drainage should be provided, as above, and another waterproof membrane should be placed on top of the new fill prior to the new wearing surface.
- If an updated safety barrier is a requirement of a future rehabilitation, a design waiver may apply based on the low volume and speed of traffic. If the design requirements cannot be waived, measures protecting the rehabilitated parapet, such as context sensitive MASH-compliant traffic barriers, should be investigated. MASH alternatives may include railings placed inside the parapets to protect the original masonry, or complete reconstruction of the parapets utilizing similar stone as a veneer over a new solid concrete barrier (see Section 5.8.3 and bibliography).

Applicable Best Practice Treatments

- Section 5.3 – Addressing Moisture Penetration in Stone and Reinforced Concrete Arches
- Section 5.4 – Repointing Stone Masonry – Including Stone Veneer
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck showing emergency repair measures in foreground, view south. Bridge is closed to traffic.

Photo 3: Emergency chain-link netting and timber bracing on west/upstream spandrel walls and pier, view south. Note fabric covered blocks at upstream abutments.

Photo 4: Detail of tension rod/cable system with deadmen anchor at northeast approach. Similar anchorage is present at southwest end of bridge deck. View northwest.

Photo 5: Detail of emergency repair. Note chain-link netting suspended from cable and held in place against spandrel wall by timber bracing secured and tightened by threaded rod and turnbuckles.

SHA Bridge No. 030109001, Patapsco River Bridge (US 40, Edmondson Ave Extended)

Catonsville, Baltimore County, MD
Ellicott City, Howard County, MD
MIHP No. BA-2557

Photo 1: Downstream view of center span (left) and south approach span, looking east.

Bridge Details

Bridge Type:	Open-Spandrel, Ribbed, Reinforced Concrete Arch
Year Built	1936
No. of Spans:	1
Total Length:	334-0"
Roadway Width:	50’-0”
NRHP Eligibility:	Criterion C, as a strong example of an open spandrel reinforced concrete arch.
Primary CDEs:	Arch ribs, spandrel columns, abutments, wingwalls, and balustrades
Bridge Inspection Date:	4/24/2023
Overall Condition:	Good
Deck: Good	**Superstructure:** Good **Substructure:** Very good
ADT:	37,530 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
1975	A precast concrete median barrier was added to the bridge, dividing the eastbound and west bound lanes, which were each narrowed by 12”.
2011	Rehabilitation of the superstructure, including replacement of the spandrel beams, floorbeams, deck, spandrel columns, and struts. The slightly wider deck was bracketed with new TL-4 solid barriers with exterior indentations closely matching the arched pigeonholes and panels of the original open balustrade.

Comments: None

Preservation Recommendations

Many of the measures recommended in the 2012 report were addressed as part of the rehabilitation, including those related to drainage and erosion protection. Applicable recommendations include:

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines.
- Periodically remove graffiti from the lower portions of the bridge. Investigate the application of anti-graffiti coating to facilitate easier cleaning.

Rehabilitation Recommendations

No recommendations due to 2011 rehabilitation.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair

Photo 2: Detail of spandrel columns and brackets supporting new deck. Note indentations in solid safety barrier.

Photo 3: Detail repaired arch ring and new struts.

Photo 4: South approach and deck. View northwest.

SHA Bridge No. 100031001, US 40 (National Pike) over Middle Creek

Myersville, Frederick County, MD
MIHP No. F-4-116

Photo 1: Downstream view of bridge, looking south from MD 17.

Bridge Details

Bridge Type:	Closed-Spandrel, Filled, Reinforced Concrete Arch with Stone Masonry Veneer
Year Built	1936
No. of Spans:	2
Total Length:	144'-0"
Roadway Width:	40'-0"
NRHP Eligibility:	Criteria A and C, as a significant example of concrete arch construction during the relocation and widening of US 40 in the 1930s.
Primary CDEs:	Arch barrels, spandrel walls, parapets, and all of the stone veneer and architectural treatments on the wingwalls, buttresses, and parapets.
Bridge Inspection Date:	9/14/2022
Overall Condition:	Satisfactory
Deck: Satisfactory	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT:	5,552 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
2018	Wearing surface was replaced.

Comments: Based on the condition of the bridge, the following priority repair recommendations were made in the 9/14/2022 Inspection Report:

1. Repair all loose/missing mortar joints at pier, wing walls and parapets.
2. Replace missing stones as needed.
3. Replace deteriorated concrete with cast-in-place concrete, where shown.

Preservation Recommendations

Several of the recommended actions listed in the 2012 *Management Plan* have been addressed, based on visual evidence and the findings of the 2022 bridge inspection. .

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Also, periodically cut back the vegetation beneath the bridge and overhanging the sides of the bridge. If needed, coordinate with adjacent property owners for access and easements to clear trees.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines.
- Periodically remove debris from the stream channel at the bridge.
- Place rock protection at the pier and abutments.
- Perform periodic repointing of the mortar joints as needed. Reset any missing stones if recovered on-site. Efflorescence throughout the stone veneer should be removed by careful cleaning.
- Repair the concrete portions of the structure, particularly the curbs. Any concrete behind a stone veneer will not need to adhere to the Best Practice Treatments for matching concrete.
- When necessary, replace existing metal guardrails and parapet anchorages with context-sensitive traffic barriers that meet current highway safety standards.

Rehabilitation Recommendations

- If initial movements are detected in the wingwalls, they may be stabilized by placing tie-back rods through the face of the wingwall and into the backfill. The tie-back anchorages can be hidden behind the veneer. However, if the movements are significant, the wingwall should be replaced in-kind.
- If a more major rehabilitation is needed beyond replacement of the wearing surface, then an acceptable treatment involves the removal of all or portions of the fill material over the arch, placing a waterproof membrane along the top of the exposed barrel, and replacing the fill with an engineered backfill. Adequate drainage should be provided, as above, and another waterproof membrane should be placed on top of the new fill prior to placing the new wearing surface.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.3 – Addressing Moisture Penetration in Stone and Reinforced Concrete Arches
- Section 5.4 – Repointing Stone Masonry – Including Stone Veneer
- Section 5.8 – Appropriate Railing Treatments

Photo 2: Northeast parapet with attached w-beam guardrail. Note proximity of trees, view north.

Photo 3: Northwest end of parapet. Note debris accumulation at base and proximity of trees, view north.

Photo 4: Detail of mortar deterioration on interior face of veneer parapet. Note accumulation of leaf litter.

SHA Bridge No. 110007001, US 40 Alternate over Casselman River

Grantsville, Garrett County, MD
MIHP No. G-II-C-101

Photo 1: West portal of bridge, view east.

Bridge Details

Bridge Type:	Steel Pratt Through Truss
Year Built	1932
No. of Spans:	1
Total Length:	133'-0"
Roadway Width:	40'-0"
NRHP Eligibility:	Criteria A and C, as one of a small but significant number of metal truss bridges erected in Maryland from the 1920s through the 1940s.
Primary CDEs:	Steel trusses, sway-bracing portals, floorbeams, and concrete abutments and wingwalls.
Bridge Inspection Date:	8/3/2023
Overall Condition:	Fair
Deck: Good	**Superstructure:** Satisfactory **Substructure:** Fair
ADT:	3,841 (2014)

Bridge Repairs and Modifications

Date	Scope of Work
1994	Substructure and superstructure repairs. Bridge was repaired, with selective replacement of truss members (lower chords at both portals), repairs of several floorbeams, backwall repairs, and installation of new w-beam traffic barrier on bridge and approaches.
2007	Deck replacement and rehabilitation. Repairs were made to the abutments at the bearings. Splice plates at the bottom chord, several vertical and diagonal members, splice plates, lateral bracing, and bearings were replaced. New 2-tube railing barrier and fiberglass screen were installed inside the truss. Rehabilitation of the superstructure, including replacement of the spandrel beams, floorbeams, deck, spandrel columns, and struts. The slightly wider deck was bracketed with new TL-4 solid barriers with exterior indentations closely matching the arched pigeonholes and panels of the original open balustrade.

Comments: Repairs to date have been in-kind and have not altered the original design or function of the truss. The updated safety barrier is mounted to the bridge deck rather than the trusses, which is the preferred approach for their protection; the existing width of the bridge was decreased by 6". The original pipe railing remains behind the updated barrier. The efficacy of the fiberglass screening, installed to protect the lower truss members from road salt, should be monitored.

Preservation Recommendations

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Periodically cut back vegetation overhanging the sides of the bridge.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines, truss members, and abutment seats.
- Repaint the superstructure steel.
- If needed, perform an analysis of the portal sway braces to determine if they can be modified to increase the vertical clearance available to vehicles.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members

Photo 2: Detail of historic handrail and updated 2-rail railing and fiberglass shield to left, view east. Note deposition of material at curb.

Photo 3: Northwest end of portal. Predecessor bridge (1813) is visible upstream/north of truss, located within Casselman River State Park.

SHA Bridge No. 130046002 , Old MD 32 over River Road, Patapsco River and CSX Railroad

Sykesville, Howard & Carroll Counties, MD
MIHP No. HO-673

Photo 1: Bridge from River Road, Span 3 in foreground, view north. Note box girder profile and vegetation. Patapsco River (Span 2) and CSX Railroad (Span 1) in distance.

Bridge Details

Bridge Type:	Aluminum Box Girder
Year Built	1963
No. of Spans:	3
Total Length:	296'-0"
Roadway Width:	30'-0"
NRHP Eligibility:	Criterion C as a significant and rare example of an aluminum bridge in Maryland. The bridge is one of six built in the United States between 1948 and 1963 and is the only example in Maryland.
Primary CDEs:	Aluminum box girders.
Bridge Inspection Date:	6/3/2022
Overall Condition:	Fair
Deck: Fair	**Superstructure:** Fair **Substructure:** Fair
ADT:	0 (Bypassed)

Bridge Repairs and Modifications

Date	Scope of Work
2003-2004	The previous management plan noted the following work was completed per a preservation agreement with MHT as a condition of the closure of the bridge: • Installed interpretive signage at the bridge. • All spalled and delaminated areas of the concrete curbs and parapets were repaired. • Roadway joints were sealed. • All debris from inside the aluminum box beam and beam seat areas was removed. • Steel post barricades at each end of the bridge were installed to close the bridge to traffic.
Comments:	The 6/3/2022 Inspection Report noted the bridge's inclusion as an active project on the worklist, with the following scope of repairs: 1. Clean and apply clear coating to the beam ends. 2. Install pigeon netting to seal entrance ways into the beams. 3. Seal all joints. 4. Investigate corrosion protection system or supplemental bearing plates.

Preservation Recommendations

- Continue routine condition inspections and regular maintenance.
- Repeat the previous work tasks on an as-needed basis.
- Perform any other repairs to defects that are discovered during the routine biennial inspections.
- Concrete substructure should be repaired when warranted.
- Investigate the transfer of ownership to a private organization or local jurisdiction, with adherence to a preservation plan.
- If it is determined that the bridge can no longer be safely maintained in place, SHA should coordinate with FHWA, MHT, and a suitable consulting party for the transfer of bridge ownership (if a suitable owner can be identified) and the development of appropriate mitigation measures, as part of review under the MHT Act or Section 106 review, as applicable.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair

Photo 2: View of bridge deck, view south. Bridge was removed from service due to deterioration and bypassed in 2006.

Photo 3: Underside of superstructure, view west. Girder is formed of five connected hollow triangular box beams.

SHA Bridge No. 200023001, Dover Bridge (Pedestrian Bridge over Choptank River)

Talbot & Caroline Counties, MD
MIHP No. T-487

Photo 1: South approach spans and fixed truss span. Note new bridge upstream/left and original railings.

Bridge Details

Bridge Type:	**Steel Sub-Divided Warren Through Truss, with Center Swing Span, and Reinforced Concrete Slab Approach Spans**
Year Built	1933
No. of Spans:	3 Truss Spans (1 Swing) 8 Approach Spans
Total Length:	842'-0"
Roadway Width:	24'-0"
NRHP Eligibility:	Criterion A for its association with bridge construction during the 1920s and 1930s to meet growing vehicular demands, and Criterion C as a strong example of a Warren truss/swing span bridge.
Primary CDEs:	Steel trusses, sway-bracing portals, floorbeams, pivot girder, and pivot, drive, and wedge mechanisms. Also, the concrete pivot pier and rest piers of the truss spans.
Bridge Inspection Date:	8/26/2021
Overall Condition:	Fair

Deck: Fair **Superstructure:** Fair **Substructure:** Fair

ADT: 0 (Pedestrian Bridge)

Bridge Repairs and Modifications

Date	Scope of Work
2020	Original swing bridge has been rehabilitated for use as a fishing pier, downstream of the new bridge. The swing span has been left in the open position, facilitating the movement of boats.

Comments: None

Preservation Recommendations

Several of the repairs recommended in the 2012 *Management Plan* have been completed, including deck patching and repainting. Other recommended actions include:

- Continue routine condition inspections and regular maintenance.
- Establish and follow a maintenance schedule for the swing span and mechanical systems, including regular lubrication and testing (more frequent than yearly) of the mechanical and operating systems, as well as regular maintenance of the navigational lights, electrical system, and regular maintenance and upkeep of the tender's house.
- Keep bridge free of vegetation. Maintain vegetation around the ends of the bridge, and periodically cut back the vegetation beneath and alongside the approach spans.
- Maintain a strict schedule of cleaning dirt, debris, and bird droppings from the bridge, particularly the deck, truss members, and pier and abutment seats.
- Repair the timber fenders as needed over time.
- Investigate the transfer of ownership to a private organization or local jurisdiction, with adherence to a preservation plan.
- Verify the functionality of the QR codes on the mitigation panels located at the southern approach.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion

Photo 2: Swing span resting in open position with new bridge overhead, view north.

Photo 3: Northern portal of fixed approach span, view south.

Photo 4: Detail of pivot pier, drum, and pivot mechanism.

Photo 5: Northern approach showing the new bridge and tender's house, view south.

SHA Bridge No. 210004001, Little Antietam Creek Bridge (MD 845A)

Keedysville, Washington County, MD
MIHP No. WA-II-1125

Photo 1: Downstream elevation of bridge from SHA Photo Archive, view southeast.

Bridge Details

Bridge Type:	Closed-Spandrel, Filled Reinforced Concrete Arch
Year Built	1927
No. of Spans:	1
Total Length:	50'-0"
Roadway Width:	24'-0"
NRHP Eligibility:	Criterion A for association with the State Roads Commission and their 1920s elimination of dangerous geometry, and Criterion C for engineering and architecture
Primary CDEs:	Arch barrel, spandrel walls, and balustrades.
Bridge Inspection Date:	8/25/2022
Overall Condition:	Satisfactory
Deck: Satisfactory	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT:	490 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
2019	Repairs were made per the recommendations of the earlier management plan, consisting of concrete patching, and replacement of sections of the parapet coping, parapet panels and balusters as needed.
2020	Streetscape project that encompassed the bridge was completed along the Main Street corridor and included the wearing surface..

Comments: None

Preservation Recommendations

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Also, periodically cut back the vegetation beneath the bridge and overhanging the sides of the bridge. If needed, coordinate with adjacent property owners for access and easements to clear trees.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines.
- Continue concrete repairs as needed, including the spandrel walls, arch barrel, and cantilevered sidewalk brackets.

Rehabilitation Recommendations

- Balustrade replacement would require investigation of MASH-compliant aesthetic barriers, either a solid barrier with indentations resembling the original design, or a new approved open balustrade. A design waiver and AASHTO guidance for very low volume roads may apply considering the very low ADT and prevailing speeds at this bridge. Work may also include replacement of sidewalks and cantilever brackets. Attached utilities should be relocated within new balustrades or sidewalks. Historical plaques should be preserved, refurbished, and reinstalled on the new balustrades.
- Rehabilitation should include removal of all or portions of fill material over the arch, placing a waterproof membrane along the top of the exposed barrel, and replacing fill with an engineered backfill. Adequate drainage should be provided, and another waterproof membrane should be placed on top of new fill prior to placement of the new wearing surface.
- Repointing of mortar joints at the wingwalls should match the original design. Delaminated or cracked stones should be repaired or replaced in-kind where possible.
- Wingwalls can be stabilized with the placement of tie-back rods through the face into the backfill. The tie-back anchorages can be countersunk and covered with a non-shrink grout. If needed, wingwalls should be replaced in-kind.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.3 – Addressing Moisture Penetration in Stone and Reinforced Concrete Arches
- Section 5.4 – Repointing Stone Masonry
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck. Note areas of repaired balustrade, new approach fencing and sidewalk, view west.

Photo 3: Detail of repaired balustrade, matching the original rectangular openings and railing profile.

SHA Bridge No. 210010001, US 40 over Licking Creek

Big Pool, Washington County, MD
MIHP No. WA-V-416

Photo 1: Downstream elevation of bridge, view northeast.

Bridge Details

Bridge Type:	Steel Wichert Girder/Truss System
Year Built	1938
No. of Spans:	3
Total Length:	306'-0"
Roadway Width:	28'-0"
NRHP Eligibility:	Criterion C, as a significant example of a metal truss and girder bridge.
Primary CDEs:	Steel girder/truss system, concrete abutments and piers, and the ornamental bridge railings.
Bridge Inspection Date:	8/17/2020
Overall Condition:	Satisfactory
Deck: Good	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT:	1,092 (2018)

Bridge Repairs and Modifications

Date	Scope of Work
1997	Post-tensioning systems were installed on the exterior face of both girders at each pier, consisting of brackets attached to the girder webs holding pairs of adjustable threaded tension rods spanning the pin connection. The sidewalks and west abutment were repaired with the application of pneumatic mortar.
2005	Rehabilitation included abutment and wingwall repairs, removal of the bridge deck, preserving the historic railing for repair and reinstallation, removal of stringers to access floorbeams, selective replacement of floorbeams using high strength bolts for new connections, reinstallation of stringers, new deck, curbing, salvaged and repaired railing, and railing pilasters. The dimensions of the pilasters and replacement railing matched the originals. New f-shaped barrier was installed to protect the railing.
Comments:	Scheduled repairs were recommended in the 8/17/2020 Inspection Report, including plating and minor replacement of members, and painting as needed. Areas of spalling on the pier caps were also to be repaired. Traffic barriers at the approaches were to be inspected and repaired if needed. Based on review of plans, photos and inspection data, repairs to date have been consistent with best practices and have not altered the original design or function of the truss.

Preservation Recommendations

Recommendations not addressed by the proposed work are listed below.

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation. Periodically cut back vegetation beneath and adjacent to the bridge.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines, pier and abutment seats, and at the base of the ornamental railings.
- Repaint the superstructure steel and the metal portions of the ornamental railings.
- Periodically remove debris from the stream channel at the piers.
- Install scour and erosion protection along the bottoms of the piers, along the adjacent stream banks, and on the steep embankments in front of each abutment, as needed.
- Repair general deterioration (spalls and delaminations) in the concrete abutments, wingwalls, and piers, as needed over time.
- Maintain and track the monitoring system attached to the post-tensioning retrofit rods.
- If additional live load capacity becomes necessary, the member(s) governing the bridge's capacity may be addressed by adding auxiliary members carefully detailed and positioned so as not to detract from the scale of the bridge or the make-up of the connections.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5. 2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Components/Members

- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck, view northwest. Note safety barrier.

Photo 3: Detail of salvaged railing, replicated pilaster, and safety barrier.

SHA Bridge No. 210012001, US 40 (National Pike) over Conococheague Creek

Wilson, Washington County, MD
MIHP No. WA-V-211

Photo 1: Downstream view of bridge, view northwest.

Bridge Details

Bridge Type:	Open-Spandrel, Ribbed, Reinforced Concrete Arch
Year Built	1936
No. of Spans:	3
Total Length:	370-0"
Roadway Width:	44’-0”
NRHP Eligibility:	Criteria A and C, as a significant example of a reinforced concrete open- spandrel arch bridge constructed by the State Roads Commission as part of the Good Roads Movement.
Primary CDEs:	Arch ribs, spandrel columns, abutments, wingwalls, piers, and balustrades.
Bridge Inspection Date:	4/6/2023
Overall Condition:	Fair
Deck: Fair	**Superstructure:** Satisfactory	**Substructure:** Fair
ADT:	11,832 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
1952	Lighting was installed at several locations on the balustrade, utilizing pre-existing conduit. Based on review of the as-built plans and an historic photo, lighting was not present at the time of the bridge's completion.
1992	Drains were installed at each abutment; repairs were made to sheet piling and deck joints at the piers, as well as roadway joints at the approaches.

Comments: Remedial repairs were recommended beginning in 2016, based on continuing deterioration of the piers, abutments, arches, columns, and floorbeams. Extensive rehabilitation of the bridge was proposed following an assessment of the bridge condition in 2018. Planned improvements are to be similar in scope to the rehabilitation of SHA Bridge No. 030109001 over the Patapsco River.

Preservation Recommendations

The following measures should continue prior to the planned rehabilitation:

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines and sidewalks.
- Periodically remove debris from the stream channel at the piers.

Rehabilitation Recommendations

- Replacement of the concrete deck and floor beams should be in- kind, closely matching the dimensions and scale of the current bridge. New sidewalks should meet current criteria if there is adequate width for two lanes of traffic. Investigate the installation of a barrier between the sidewalks traffic lanes and the possible lengthening of cantilever brackets as needed for required width.
- New balustrades should resemble the original design and meet state and federal requirements. Balustrade replacement may require investigation of MASH-compliant aesthetic barriers, either a solid barrier with indentations resembling the original design, or a new approved open balustrade (see Section 5.8 and bibliography). A design waiver and AASHTO guidance for very low volume roads may apply considering the very low ADT and prevailing speeds at this bridge.
- Utilities should be incorporated (hidden) within the new balustrades or sidewalks or installed beneath the new deck. Historical plaques should be preserved, refurbished, and properly installed on the new balustrades.
- If replacement of current or modern non-historic lighting is desired, new lamp posts and luminaires should resemble the period of original bridge construction and provide roadway lighting in accordance with current highway safety standards.
- The new drainage system should not drain onto any concrete elements and should not be visually obtrusive.
- Install scour and erosion protection per current design standards.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.8 – Appropriate Railing Treatments

Photo 2: Detail of spandrel columns and brackets supporting sidewalk at east span.

Photo 3: Detail of east span (left) and abutment, view north.

Photo 4: View of deck. Note pedestal and pigeonhole design of original balustrade, sidewalk, and non-historic lighting.

SHA Bridge No. 210038001, Booth's Mill/Delemere Bridge (MD 68 over Antietam Creek)

Hopkin Lappans, Washington County, MD
MIHP No. WA-II-009

Photo 1: Upstream elevation of bridge, view southwest. Note shoring of southeast parapet wall due to accident damage and overhanging mature trees.

Bridge Details

Bridge Type:	Stone Masonry Arch
Year Built	1833
No. of Spans:	3
Total Length:	133-0"
Roadway Width:	16'-0"
NRHP Eligibility:	Criterion C, for its stone arch engineering and architectural design.
Primary CDEs:	Arch barrels, spandrel walls, parapets, piers, abutments, and wingwalls.
Bridge Inspection Date:	3/28/2023
Overall Condition:	Satisfactory
Deck: Satisfactory	**Superstructure:** Satisfactory **Substructure:** Satisfactory
ADT:	2,592 (2009)

Bridge Repairs and Modifications

Date	Scope of Work
1986	Placement of gabions to arrest bulge in downstream/southwest spandrel wall.
1996	New concrete parapet walls were erected behind the original masonry following the removal of the bridge deck and historic fill. Rock bolts and anchors were installed to tie the parapet walls together, followed by lightweight concrete fill. New precast concrete parapet caps and timber approach traffic barriers were installed.

Comments: Based on review of rehabilitation plans and recent photos, work has been consistent with best practices.

Preservation Recommendations

- Continue routine condition inspections and regular maintenance.
- Keep bridge free of vegetation.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the curblines.
- Periodically remove debris from the stream channel at the piers and abutments.
- If the bituminous wearing surface requires replacement, it should be removed, which would not add additional dead load to the bridge. As part of the wearing surface replacement, a waterproof membrane should be installed beneath the new pavement, as well as an adequate drainage system along the curblines, to move water and de-icing salts off of the bridge.
- Repair the damaged ends of the parapets in-kind when damaged. Pursue more strict enforcement of existing vehicle weight and length restrictions.

Rehabilitation Recommendations

- If rehabilitation is needed beyond replacement of the wearing surface, consider coring to investigate the condition of the fill placed during the earlier rehabilitation. If needed, work similar to the 1996 rehabilitation should be undertaken, including temporarily shoring of the arches, partial or complete removal of the fill material over the arch, repairing/repointing exposed stone masonry, placement of waterproof membranes along the top of the exposed barrels, and replacement of fill with an engineered backfill or relieving structure. Adequate drainage should also be provided, and waterproof membrane installed prior to the new wearing surface.
- Replace the existing timber traffic barriers with new MASH-compliant context-sensitive barriers along the approaches and in-kind when deteriorated or damaged beyond serviceable limits.

Applicable Best Practice Treatments

- Section 5.3 – Addressing Moisture Penetration in Stone and Reinforced Concrete Arches
- Section 5.4 – Repointing Stone Masonry – Including Stone Veneer
- Section 5.8 – Appropriate Railing Treatments

Photo 2: North approach, view southeast. Note context-sensitive steel-backed timber traffic barrier and posted restrictions.

Photo 3: Detail of downstream parapet with concrete parapet caps.

Photo 4: South approach. Both parapets show vehicular damage, view northeast.

SHA Bridge No. 220009001, Wicomico River Bridge (MD 991 over Wicomico River)

Salisbury, Wicomico County, MD
MIHP No. WI-117

Photo 1: Downstream elevation of bridge. Rehabilitated Bridge Tender's house at left, southwest of the bridge, view northwest.

Bridge Details

Bridge Type:	Steel Double-Leaf Trunnion Bascule
Year Built	1928
No. of Spans:	1
Total Length:	45'-6"
Roadway Width:	26'-0"
NRHP Eligibility:	Criterion A for its association with the development of vehicular traffic, which began to take over as the primary means of transport on the Eastern Shore, and Criterion C as a significant example of a Chicago trunnion-style bascule bridge and for the architectural aspects of the tender's tower.
Primary CDEs:	Bascule girders, trunnions, counterweights, drive machinery, tender's tower, and bascule piers.
Bridge Inspection Date:	9/21/2020
Overall Condition:	Fair
Deck: Good	**Superstructure:** Satisfactory **Substructure:** Fair
ADT:	12,662 (2009)

Bridge Repairs and Modifications

Deck	Scope of Work
1980-1981	Deck repairs included new floorbeams, joists, and cross bracing, timber curbing, steel wheel guards, and sidewalk brackets. The trunnion support and support bracing were also replaced.
1994-1996	Repair and Rehabilitation Fender replacement and undermining repair.
2005	Electrical upgrade and rehabilitation, consisting of a new bridge deck, new electrical/control system, restoration of the interior of the tender's house, bascule girder repairs, selective replacement of bracing and connection steel, minor concrete pier repairs, and replacement of the nose locks and brakes.
2021-2022	Repairs and upgrades were made to the interior and exterior of the tender's house, including the HVAC system, new windows, and interior painting. The wood sidewalks on the bridge were also repaired.
Comments:	Based on review of plans, photos, inspection data, and proposed work items, repairs to date have been consistent with best practices and have not altered the original design or function of the bridge. Planned repairs include filling undermined voids at the abutments with underwater cementitious grout, patching areas of severe scaling and honeycombing with hydraulic cement, replacement of two timber dolphin clusters with concrete filled pipe piles, and replacement of damaged and broken timber fender planks and walers.

Preservation Recommendations

Several of the repairs recommended in the 2012 *Management Plan* have been completed. The remaining preservation recommendations include:

- Continue routine condition inspections and regular maintenance.
- Repaint the bridge as needed.
- Install ornamental lamp posts and luminaires, which replicate the originals, at the original lamp post locations. The new fixtures should provide roadway lighting in accordance with current highway safety standards.
- Establish and adhere to a maintenance schedule for the mechanical and control systems, including regular lubrication and testing of the mechanical and operating systems, maintenance navigational lights, traffic safety system, electrical system, and maintenance and upkeep of the tender's tower.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly the sidewalks, curblines at the counterweights, machinery and counterweight pits, and bascule superstructure.
- Repair deteriorated concrete (spalls and delaminations) at the counterweights, parapets, approach sidewalks, and bascule piers, as needed.
- Repair deteriorated timber and steel fenders, and bulkheads, as needed.

Rehabilitation Recommendations

- Replace the deteriorated concrete riding surface of each counterweight as needed, including replacement of curbs. Replace the steel deck, flooring system, and timber sidewalk as needed.

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck, looking northeast. Note historic railing.

Photo 3: View of timber sidewalk railing, steel deck and bascule girder. View west.

Photo 4: Detail of bridge plaque at southwest pedestal.

SHA Bridge No. 230002001, Snow Hill Bridge (MD 12 over Pocomoke River)

Snow Hill, Worcester County, MD
MIHP No. WO-178

Photo 1: Downstream elevation, fixed span to the northwest. Bridge Tender's house at left, view northwest.

Bridge Details

Bridge Type:	Steel Single-Leaf Trunnion Bascule
Year Built	1932
No. of Spans:	2
Total Length:	116'-10"
Roadway Width:	30-0"
NRHP Eligibility:	Criterion A for its association with the development of vehicular traffic, which replaced steamboats as the primary transport of local agricultural and maritime goods on the Eastern Shore. The bridge is also eligible under Criterion C as a significant example of a Chicago trunnion-style bascule bridge, and for the architectural aspect of the tender's house.
Primary CDEs:	Bascule girders, trunnions, counterweights, drive machinery, and tender's house.
Bridge Inspection Date:	10/31/2022
Overall Condition:	Fair
Deck: Satisfactory	**Superstructure:** Fair **Substructure:** Fair
ADT:	5,525 (2017)

Bridge Repairs and Modifications

Date	Scope of Work
1950s	Upgrades to the electrical control system, new timber sidewalks, open steel deck, and concrete curbing on bascule span.
1983	Emergency repairs to the bridge deck, including replacement of floorbeams and concrete curbing.
1990	Emergency replacement of floorbeam.
1994	Placement of riprap and grout bags at base of pier.
2019-2023	Repairs included pile protection beneath the tender's house as well as HVAC upgrades, interior painting, and window repairs. Replacement of timber sidewalks, and electrical equipment in the below-grade mechanical room were also completed.

Comments: The 10/31/2022 Inspection Report noted the bridge's inclusion as an active project on the worklist, with the following scope of priority repairs:

1. Repair spalled areas of concrete encased steel beams and soffit.
2. Patch spalls and delaminated areas on rest pier and tender's house
3. Replace the corroded bolts and rivets in the movable span.
4. Repair welds and broken grating bars along the open grid steel deck.
5. Replace missing tie-down fastener on the northwest fender grating.

Additional work included on another worklist focused on the retrofit of several stringers and floorbeams, bascule and trunnion girders, cross beams, moveable bearings, and as needed floorbeam repairs. Based on review of plans, photos, inspection data, and proposed work items, repairs to date have been consistent with best practices and have not altered the original design or function of the bridge.

Preservation Recommendations

Several of the repairs recommended in the 2012 *Management Plan* have been completed. The remaining preservation recommendations include:

- Continue routine condition inspections and regular maintenance.
- Repaint the bridge as needed.
- Establish and adhere to a maintenance schedule for the mechanical and control systems, including regular lubrication and testing of the mechanical and operating systems, maintenance navigational lights, traffic safety system, electrical system, and maintenance and upkeep of the tender's house.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly from the movable span bearings on the rest pier, the bascule superstructure, and the machinery and counterweight pit.
- Repair deteriorated concrete (spalls and delaminations) at the counterweight, parapets, approach sidewalks, and bascule rest pier, as needed.
- Repair deteriorated timber and steel fenders, and bulkheads, as needed.
- Replace the steel deck, flooring system, and timber sidewalk as needed.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View north of bridge deck, note historic steel railing on bascule span.

Photo 3: Detail of Tender's House, with original lighting, concrete parapet, metal railing, and bascule girder, view east.

Photo 4: Detail of bridge plaque at southeast pedestal.

SHA Bridge No. 230004001, Pocomoke City Bridge (US 13 Business over Pocomoke River)

Pocomoke City, Worcester & Somerset Counties, MD
MIHP No. WO-177

Photo 1: View of bridge looking north, lift span to the left of Bridge Tender's house.

Bridge Details

Bridge Type:	Steel Double-Leaf Trunnion Bascule with Steel Beam Approach Spans
Year Built	1920
No. of Spans:	1 Bascule Span, 6 Approach Spans
Total Length:	276'-0"
Roadway Width:	24-0"
NRHP Eligibility:	Criterion A for its association with the development of vehicular traffic, which replaced steamboats as the primary transport of local agricultural and maritime goods on the Eastern Shore, and Criterion C as a significant example of a bascule bridge and for the architectural aspects of the tender's house and end pylons.
Primary CDEs:	Bascule girders, trunnions, counterweights, drive machinery, tender's house, bascule piers, and end pylons.
Bridge Inspection Date:	10/26/2022
Overall Condition:	Fair
Deck: Fair	**Superstructure:** Fair **Substructure:** Fair

ADT: 3,062 (2017)

Bridge Repairs and Modifications

Date	Scope of Work
1980s	Bascule spans: Emergency repairs to the bridge deck, including replacement of floorbeams and concrete curbing. Rehabilitation of the machinery frame, bearings, bascule spans, and deck. Repairs to the bascule span decks, concrete counterweight surfaces, post-tensioning of the counterweight girders, and pier foundations. Rehabilitation encompassing deck replacement with a new half-filled steel deck, new stringers at each machine room, painting as needed, selective stringer replacement, floorbeam flange repairs, upgrades to the electrical control system, new timber sidewalks, open steel deck, and concrete curbing on bascule span. Approach spans: Replacement of approach spans and abutments, new replica lighting, metal pedestrian railing, and traffic and pedestrian gates.
1998	Emergency replacement of bascule span floorbeam.
2005	Machinery supports repaired, new windows and doors on Bridge Tender's house.
2022	Additional improvements to the Tender's House included interior painting, HVAC upgrade, window replacement, and roof finial repair. Timber sidewalks on the bascule spans was also completed.

Comments: The 10/26/2022 Inspection Report notes several items included as an active repair project, including replacement of the bascule span counterweights, steel decks, stringers, joint seals, pedestrian railing as-needed, trunnion bearings, machine shafts, drive motors, and other parts of the lift mechanisms, and repairs to the floorbeams and concrete approach sidewalks.

Preservation Recommendations

- Continue routine condition inspections and regular maintenance.
- Repaint the bridge as needed.
- Install matching additional ornamental lamp posts and luminaires at original (removed) lamp post locations.
- Establish and adhere to a maintenance schedule for the mechanical and control systems, including regular lubrication and testing of the mechanical and operating systems, maintenance of navigational lights, traffic safety system, electrical system, and maintenance and upkeep of the tender's house.
- Maintain a strict schedule of cleaning dirt and debris from the bridge, particularly curblines on the deck, the pier and abutment seats, the bascule pier areas, and the bascule superstructure. Also, the scupper drains along the deck should be kept free of debris.
- Repair deteriorated concrete (spalls and delaminations) at the concrete decks, parapets, abutments, wingwalls, piers, and end pylons, as needed.
- Repair deteriorated timber fenders, and sidewalks, as needed.

Rehabilitation Recommendations

None

Applicable Best Practice Treatments

- Section 5.2 – Reinforced Concrete Conservation and Repair
- Section 5.5 – Protecting Steel from Rust/Corrosion
- Section 5.6 – Strengthening of Steel Bridges/Replacement of Components/Members
- Section 5.7 – Repair of Damaged Steel Bridge Components/Members
- Section 5.8 – Appropriate Railing Treatments

Photo 2: View of bridge deck from eastern approach spans, note replica light fixtures and non-historic steel railing.

Photo 3: West approach. Note historic parapet and pylons, view east.

Photo 4: View of replacement steel girder replacement spans, looking southwest.

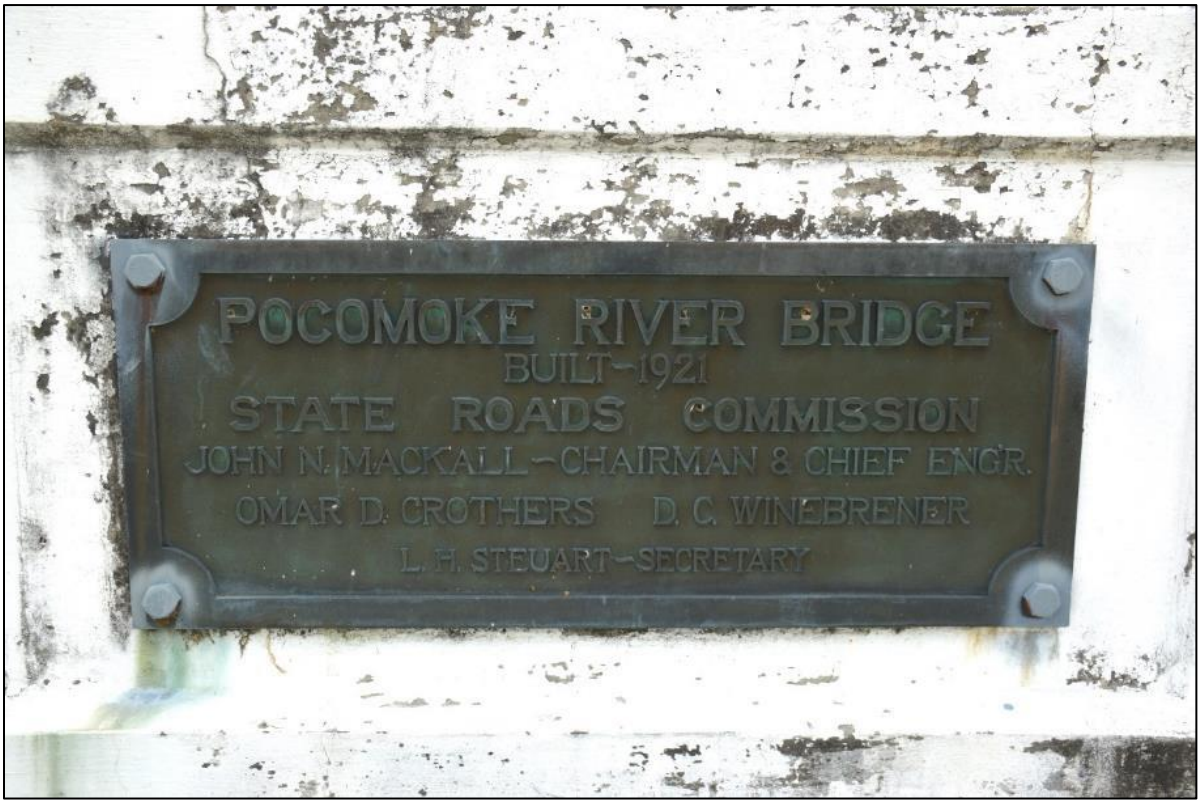

Photo 5: Detail of Builder's plaque.

5. Best Maintenance and Conservation Practices for Older Bridge Types

The following section largely replicates Part II of the 2012 Management Plan, prepared by TranSystems and KCI Technologies, which was meant to serve as a guide for the proper treatment, conservation, and preservation of historic bridges. Updates to the previous text reflect changes in accepted practice and design requirements, primarily changes to the safety and engineering standards for approved safety barriers as noted in Section 5.8 and referenced in the bibliography.

As noted earlier, the applicability and appropriateness of the repairs and rehabilitation strategies detailed in these Best Practices will be determined for individual bridges during project consultation between SHA and the MHT.

5.1 Best Practice Maintenance Treatments Common to All Bridge Types

Best practices for preservation of historic bridges start with the same maintenance and conservation strategies used for all bridges – performing routine maintenance and addressing problems when they first appear. In many instances, this proactive approach stops deterioration before it becomes so pervasive that it adversely affects the bridge. Routine maintenance activities are effective and seemingly obvious yet are sometimes not performed. This includes tasks such as ensuring that all drains are kept open and in good repair, seasonally removing accumulated debris, and washing the bridge.

5.1.1 Remove Accumulated Debris by Regularly Washing Bridge

Washing a bridge with potable water is one of the simplest yet most cost-effective preventative treatments. Debris accumulates on exposed horizontal surfaces, such as the deck joints and abutment seats at the bearings of most bridges and on the lower chords of truss bridges. Accumulated debris can act like a poultice to accelerate material deterioration, and its presence greatly reduces the evaporation of water thus providing favorable conditions for metal to rust and concrete and mortar joints to deteriorate. It should be removed using a low-pressure washing at least annually. In locations where deicing salts are used, a wash each spring is recommended. Verify the water quality designation of the watercourse spanned by the bridge and coordinate with the relevant state environmental agency prior to washing.

5.1.2 Keep Concrete Decks in Good Condition

The most effective maintenance/conservation strategy for any bridge with a reinforced concrete deck is to keep it in good repair and watertight. Moisture penetration from a failing deck can start with cracked or deteriorated deck pavement, depressions that collect and retain water, roadway drains that are clogged or not functioning properly, or failed expansion joints. Leaking utility pipes buried within the fill of a closed spandrel arch are also a source of damaging moisture.

Keeping a deck watertight is accomplished by making sure that the pavement on the bridge and where it joins the curb are not so deteriorated that there is water infiltration. Any detected deck cracks should be patched, and scuppers and bridge drainage systems should be cleaned and kept open. Any expansion joints should also be cleaned and kept in good repair or replaced as needed.

If not already in place, adequate means of draining water away from the bridge should be installed. Depending on the type of bridge, scuppers can be installed at the deck level either on or adjacent to the bridge. Weep holes or pipes wrapped in filter fabric can be installed into cored holes placed inconspicuously at the bottom of a closed spandrel arch to drain any moisture that gets into the fill.

5.1.3 Enforce Load Limits

Enforcing posted load restrictions protects the bridge from structural damage and prolongs its useful life. Many older bridges were designed for lighter loads. They are often posted for restricted loads, but the posted restrictions may be ignored. Repeatedly exceeding the posted load limits results in the eventual loss of the bridge. Some jurisdictions have adopted programs to protect their posted historic bridges enforcing weight restrictions by deputizing public works employees who then use a portable scale. Violators are then ticketed and fined. Others use vertical clearance barriers on approaches to the bridge to prevent overloaded vehicles on the bridge.

5.2 Reinforced Concrete Conservation and Repair

Most deterioration of reinforced concrete is caused by moisture that leads to corrosion of the embedded reinforcing steel and degradation of the concrete itself. Other problems can arise from a variety of reasons, like use of improper material at time of construction or structural issues. Understanding the cause(s) of deterioration is central to identifying an effective conservation and rehabilitation plan. Excellent explanations of the cumulative deterioration that affects reinforced concrete and its manifestations are found in *Preservation Briefs 15* (see Bibliography). Of particular interest are the problems related to concrete used before air-entrained concrete was introduced in the 1930s.

5.2.1 Keep Vegetation Off Bridge Elements

Keeping bridges free of vegetation prolongs the useful life of all types of concrete and reinforced-concrete bridge components, from mortar joints to piers, wingwalls, and railings/parapets. Vegetation such as lichen, moss, or trees can break down concrete resulting in moisture penetration and deterioration that when severe enough can cause movement of walls. All vegetation should be killed (in order to destroy the root system) and then removed from concrete before it has the opportunity to grow and become well established.

5.2.2 Have a Maintenance Plan

Having and implementing a maintenance plan to prevent water-related deterioration is the most effective conservation treatment for avoiding deterioration associated with moisture penetration. The plan should begin with an in-depth inspection that establishes the baseline condition information and then continues with careful, periodic inspection and monitoring of the structure.

5.2.3 Make Repairs with Compatible Material that Matches the Existing Concrete

Use of prepackaged concrete materials is never appropriate for the repair of historic concrete bridges. Any new concrete or repair material needs to visually match the existing material as closely as possible and also match its physical properties. And while it is acceptable to use air-entrained or polymer-modified material, it is important that the properties of the historic and new materials, such as the coefficient of thermal expansion, modulus of elasticity, and strength, are compatible so that the old and new material will bond well. The new material should be applied only to a properly prepared substrate where all deteriorated concrete has been removed exposing sound concrete. Rusted or lost reinforcing steel must be cleaned or replaced. Removal of concrete will typically extend beyond the level of the reinforcing steel so that the patch encapsulates it and thus provides the mechanical attachment for the repair. Failure to address the soundness of the substrate often results in the failure of the repair and continued deterioration of the bridge. If color matching of patches and repairs is a concern, investigate the use of a permeable coating, which can create a unified color for the structure following a comprehensive rehabilitation (see following subsection).

15 Preservation Briefs: Preservation of Historic Concrete: Problems and General Approaches (see Bibliography) describes the proper strategy for planning and executing concrete repairs, including laboratory testing. Test patches, including finishing techniques, on inconspicuous parts of the structure should be done and allowed to cure completely before being evaluated. The new material should match the existing in color, composition, and finish. Finish is often the hardest to replicate and requires understanding of the original finishing techniques and skill. This may require rubbing or a mild pressure

wash to achieve the “weathered” appearance. The techniques described in *2 Preservation Briefs: Repointing Mortar Joints in Historic Masonry Buildings* (see Bibliography) should be followed to achieve a proper patch. The *Briefs* should also be consulted for the suitable strategy for repairing or replacing lost mortar joints on railings and any architectural detailing on the bridge.

Hiding problems under a pneumatically or troweled application of cementitious materials, including *shotcrete* and bagged masonry cement, does not address the cause(s) of the problems or contribute to their solution, and it is not a suitable strategy. With proper substrate preparation, shotcrete can be used to repair reinforced concrete, but it should never be used to “solve” moisture penetration problems without first making sure that the structure is watertight.

All repairs should be done in a manner that reproduces original detailing, like scoring or cornices/string courses.

5.2.4 Use Waterproof and Water-Repellent Coatings Only When and Where Necessary

While coatings and sealers are common for non-historic concrete, waterproof and water- repellent coatings as well as anti-graffiti coatings are not recommended for historic concrete because of the visual change they cause and the fact that they are not reversible. Clear or opaque waterproof coatings seal the surface from liquid water and water vapor and make it impervious to water. Water-repellent coatings keep liquid water from penetrating the surface but allow water vapor to enter and leave through “pores” that are part of the concrete. Once water vapor is inside the material, however, it can condense into liquid water and then cannot get back out through the water-repellent coating. These coatings seldom stop the source(s) of moisture penetration, and they can trap moisture and salts resulting in efflorescence and spalling. If conditions are severe enough to require a coating, only the affected areas of the bridge should be treated, not the whole structure. A test patch that is allowed to go through a freeze-thaw cycle is recommended.

5.2.5 Clean Bridge Only When Necessary and with the Gentlest Means Possible

Cleaning is a highly technical and specialized process that should be undertaken only under professional direction and after a test patch has been prepared and permitted to weather for an extended period. The proper strategy for cleaning is first to define the reason for cleaning. If it is determined to be necessary, then define what is to be cleaned. Is it to remove dirt and discoloration, or rust stains or mold stains? The nature and source of what is to be removed should drive selection of the gentlest means possible for cleaning. Chemical and abrasive cleaning can change the appearance of the bridge and can damage the concrete. The same considerations should also apply to stone masonry.

There are various water, chemical, poulticing, and mildly abrasive cleaning processes. Water tends to soften the deposits and eventually washes them from the surface. Chemical cleaners react with the deposits to hasten the removal process; the deposits, reaction products, and excess chemicals are then washed away from the surface with water. Poulticing is a technique used for removing stains by drawing them out of the material. Abrasive methods include all techniques that physically abrade the surface; they can be particularly destructive to architectural detailing.

The advantages and appropriateness of masonry cleaning are thoroughly described in several NPS publications including *A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments* and *6 Preservation Briefs: Dangers of Abrasive Cleaning to Historic Buildings* (see Bibliography). These and other publications on the conservation of historic masonry are available online at nps.gov or from the MHT.

5.2.6 Increasing Load-Carrying Capacity

Increasing the load-carrying capacity of a closed-spandrel arch or stone arch bridge should be done in an unobtrusive manner and should preferably be performed internally to avoid an adverse visual effect.

Saddle or Relieving Slabs. Relieving slabs are used to relieve the existing arch from some or all of its live load. One method to accomplish this is to construct a reinforced concrete saddle directly over the extrados

of the existing arch. Another method is to construct the reinforced concrete slab on the fill at the roadway level thereby more evenly distributing the live load away from the arch. Since installing a saddle or relieving slab may require excavation of some fill, replacement of unsuitable fill with a properly draining material and an adequate drainage system should be done at the same time.

Construct a New Bridge Within the Confines of the Spandrel Walls. When there is sufficient fill above the arch crown to fit the depth of a new superstructure, a new bridge can be constructed over the existing arch. This is accomplished by constructing abutments and piers, in the case of multi-span arches, behind or at the base of the existing arch and then spanning the distance between these units with a new superstructure (usually reinforced or prestressed concrete slab or box beams). If there is not sufficient depth of fill, it is sometimes possible to re-profile the existing roadway slightly in order to accommodate the depth of the new member. A reconstruction or modification of the existing bridge railings may also be required.

Replace Earth Fill with Flowable Backfill. Flowable fill, the excavational backfill material that is frequently used in utility trenches, can be used to replace fill material. When used in a closed spandrel arch bridge, it creates a “solid” structure where the fill, spandrel walls and arch ring act together allowing for better load distribution. Replacement of fill material has no effect on historic bridges.

5.3 Addressing Moisture Penetration in Stone and Reinforced Concrete Arches

5.3.1 Routinely Remove Vegetation

Keeping bridges free of vegetation prolongs the useful life of all types of masonry components from mortar joints to wingwalls and parapets. Vegetation such as lichen, moss, or trees can break down both the masonry and the bond between the masonry units. This permits moisture penetration, deterioration, and when severe enough, movement of walls, and if on the arch itself, moisture penetration into the fill. All vegetation should be killed and removed from masonry bridges, including load-bearing masonry spandrel walls, parapets, and wingwalls, before it has the opportunity to grow and become established.

If vegetation has established itself on or adjacent to a stone or brick bridge or the wingwalls, it should be killed and then removed. Attempting to remove vegetation that has established its root structure in the masonry can dislodge or loosen the units and affect structural integrity. Trees of any size should be cut as close to the ground or wall as possible, and the root system should be left to decompose. Holes can be drilled in the stumps and an approved herbicide used to accelerate decomposition. Any voids caused by vegetation should be repaired in accordance with sections 4.1 and 4.3.

Additionally, the seasonal accumulation of natural debris on and adjacent to the structure should be routinely removed. The build up of debris, including leaves and branches, holds moisture and prevents the structure from drying out. All roadway and structure drains should also be cleared of debris.

5.3.2 Keep Deck in Good Condition

Keep the deck watertight. This is accomplished by making sure that the pavement on the bridge and where it joins the curbs or railings/parapets is not so cracked that there is water infiltration, that there is adequate means of draining water away from the bridge, and that any utility pipes buried within the fill are not leaking. Deck cracks should be patched, and scuppers and bridge drainage systems should be cleaned and kept open. If not already in place, adequate means of draining water away from the bridge should be installed. Weep holes or pipes wrapped in filter fabric can be installed into cored holes placed inconspicuously at the bottom of the arch ring to accommodate draining moisture. Expansion joints should also be cleaned and kept in good repair or replaced as needed.

5.3.3 Provide Good Waterproofing and Proper Drainage

When moisture penetration has fouled the fill and failed the waterproofing, the saturated fill material should be removed, and a new waterproofing membrane installed along with an adequate means for drainage. Fill is not a significant feature of any arch bridge. The replacement of the existing fill with a solid engineered

backfill material or flowable fill will decrease the dead load on the structure and increase the live load capacity of the bridge and minimize water infiltration. If solid fill is placed, the waterproofing membrane should be placed between the pavement and the new fill. Proper drains direct the water to either storm drains or through drains in the abutment into a stream. Weep holes need to be installed in the spandrel walls and arch ring of stone arch bridges.

During the excavation to install any of these options, extreme care must be exercised to avoid uneven excavation of the fill which may cause the arch to lose its shape and therefore its load carrying capabilities. This situation can be avoided by providing temporary centering below the arch during the operation. Additional information on excavation is outlined in the Construction Division section of the AASHTO Standard Specifications. Also, there may be utilities present in the fill that could be the source of the problem, such as leaks from a water main.

5.3.4 Keep Mortar Joints Watertight

Mortar bonds masonry units together, and whether a bridge is stone or brick, the most effective maintenance strategy is to keep all mortar joints in good condition. This will keep moisture from penetrating into the structure. Watertightness is achieved by replacing lost and failing mortar joints with an appropriate mortar before moisture penetration damage affects the masonry units, and thereby the structural integrity of the bridge.

5.4 Repointing Stone Masonry – Including Stone Veneer

Repointing is the process of removing failing mortar, preferably by hand, from joints and replacing it, as well as filling open joints, with new mortar. When properly done, repointing restores the visual appearance and ensures the structural integrity of the masonry. The new mortar should be compatible with the historic mortar in physical properties; compressive strength, texture, color, and style (size and finish of joint). Improperly done repointing can be unsightly, can adversely affect the historical significance of the bridge, and can cause damage to the masonry units.

Before repointing, the cause of the failure of the joints must be determined and corrected. Joints may have failed for reasons other than age-related deterioration. Open joints may be providing relief of hydraulic pressure for moisture trapped behind the wall. Closing the joints will only worsen the problem of improper drainage of the bridge deck.

It should be noted that filling failing or lost mortar joints with a modern masonry cement (premixed, bagged mixture) is not considered repointing, and the practice is not a suitable strategy for historic masonry. Modern masonry cement does not bond well with the historic mortar because it is too hard, and it never matches the historic mortar in color or properties. Consequently, application of masonry cement is generally irreversible. It is also a common error to assume that hardness or high-strength in repointing mortar is appropriate for historic masonry, particularly lime-based mortars. Stresses will, and do, occur in a masonry structure, and if the mortar is too hard, the stress will be relieved by cracking the softer masonry units rather than the too-hard mortar joints. While stresses can also break the bond between the mortar and the masonry units, it is much easier to correct the problem by repointing the joints than by replacing cracked bricks and stones or rebuilding the structure.

5.4.1 Proper Repointing

It is important to use accepted conservation standards when repointing historic masonry, and this starts with understanding the physical make-up of the old mortar. The setting and pointing mortars used before World War I are different from modern, Portland cement-based mortar and premixes and have many advantages over their modern counterparts. Lime-based mortars are generally and purposely softer/weaker than the masonry units. New mortar with high lime content bonds well with old mortar, is porous, and changes little in volume during temperature fluctuations. It is slightly water soluble and thus able to re-seal any hairline cracks that may develop. Portland cement, on the other hand, can be extremely hard, is resistant to movement of water, shrinks upon setting, and undergoes relatively large thermal movements.

An appropriate mortar mix is composed of sand, a small part of Portland cement, and lime, which are then mixed with water to make a paste. A commonly used mix ratio is not greater than one part white, nonstaining Portland cement (to achieve workability and plasticity), two parts lime, and six to eight parts sand for setting mortar and up to 12 parts sand for pointing mortar. Pointing mortar is usually softer than the setting mortar. While mortar analysis by a qualified laboratory can provide useful information about the historic mortar, it is not always crucial to success. The most useful information that can come out of laboratory analysis is the identification of the sand gradation and color. This information is useful in achieving a match of color and texture. A fracture test will identify the compressive strength of the historic mortar.

The color and texture of the new mortar will usually fall into place if the sand is successfully matched, but it is important to understand that if the bridge is not being cleaned (see below), the new mortar should match the existing mortar, which is usually weathered. Matching the original mortar in color and texture rather than the existing appearance of the mortar can result in mortar that is too light in color. There are many appropriate finishing techniques to match the existing texture of weathered concrete, including rubbing or a mild water blast to expose the sand. Crushed or manufactured sand is generally not the appropriate type of sand to use. Rounded or natural sand is preferred because (1) it is usually similar to the original sand and is thus a better match, and (2) it has better working qualities or plasticity and can be forced into joints more easily. Test patches to determine how well a mortar mix will match the existing mortar should always be done in an inconspicuous part of the structure.

The proper methodology for repointing historic masonry is clearly and thoroughly explained in the NPS's *Preservation Briefs 2: Repointing Mortar Joints in Historic Masonry Buildings* (see Bibliography). The guidance is directly applicable to historic bridges as well as buildings.

5.4.2 Install Weep Holes

Any repointing, especially on the barrel of an arch or intrados, should include installation of weep holes. Strategically located weep holes will ensure relief of water pressure and provide a drainage path for any moisture that does penetrate the fill.

5.4.3 Stone Spandrel Wall Rehabilitation

Bulging of stone spandrel walls and wingwalls must be addressed by remedial action or the failing component will eventually collapse. The failing sections need to be dismantled, the cause of the problem (usually moisture penetration, lateral pressure from live loads, or roots dislodging the stonework) addressed, and the stone then re-laid in the same bond/pattern with a mortar mix that matches the existing mortar in texture, color, and composition in accordance with proper repointing described above.

Replacing damaged or missing masonry units with concrete patches is not appropriate. All damaged and lost units should be replaced in-kind. Lost stones that have fallen from the structure may well be nearby or in the stream bed. They can be reset using a stronger setting mortar and mechanical connections (rock anchors) when necessary.

If the bulging is minor, consideration can be given to addressing the source of the bulging and then installing metal tie rods through the structure and anchor plates. This will stabilize the wall or section of wall without reconstructing it. The technique has successfully been used on buildings and bridges for centuries.

5.5 Protecting Steel from Rust/Corrosion

5.5.1 Keep Bridge Free of Debris to Prevent Moisture Penetration and Rust

The best maintenance and conservation strategy for preservation of iron and steel bridges of all types is to keep them free from accumulated debris, which is frequently found on exposed horizontal surfaces such as abutment seats at the bearings, top flanges of stringers and floorbeams, and at lower chord panel points. Rust also occurs at the interface of rivet- and bolt-connected members, a condition known as impacted rust. Routinely removing accumulated debris and cleaning bridges with a low-pressure, potable-water wash after the danger of frost has passed is an easy and cost-effective methodology. It eliminates conditions that promote rust and markedly increases the longevity of metal bridge members, including stringers, bearings,

and members at lower chord panel points on metal truss bridges. This has proven to be the single most effective practice for preventing rust.

5.5.2 Keep Bridge Paint or Coating System in Good Condition

The paint or coating system is the most significant mechanical tool for preservation of all types of steel bridges, so its initial application should be done properly with careful attention to surface preparation and then maintained. Paint and coating failures should be addressed on a spot basis, and all touch ups should be applied only after proper surface preparation.

Even with increased understanding of capturing hazardous materials and the development and availability of cost-effective and long-lived coating systems, painting/coating is still the biggest issue related to metal truss bridges. It is frequently the most expensive factor associated with their maintenance, rehabilitation, and preservation. On a large truss bridge, the painting/coating cost alone, which will include all environmental considerations for containment of lead-based paint, can drive the decision on the prudence of preserving it. Much of the expense, as much as 85 to 90 percent of the total cost, is associated with the containment system that must be erected to capture and contain the removed paint and blast medium, protect the workers, and address proper disposal of the collected waste.

Because of the singular importance of paint and coatings, any maintenance and conservation activities related to them should be done in a manner to ensure maximum benefit to the structure. Research should be done to determine the best coating system for a given bridge and the most cost-effective way to clean and coat the structure. For a small bridge, moving it to an offsite location for cleaning and coating is often a cost- effective strategy. There is a great deal of technical assistance on paint and coating systems available from sources such as FHWA, state departments of transportation, and paint/coating system manufactures and contractors.

5.5.3 Keep Concrete Deck Components of Steel Bridges in Good Condition

It is important to keep deck components, including the deck itself, curbs, drains, and expansion joints, in good repair and sufficiently crack free in order to prevent water infiltration that can affect the structural steel components below the deck. Deck cracks should be patched, and scuppers and bridge drainage systems should be periodically cleaned and kept open. If not already in place, adequate means of draining water away from the bridge should be installed in a manner that does not mar the elevation view.

Expansion joints should also be cleaned and kept in good repair or replaced as needed. Deck joints should be replaced or rehabilitated to eliminate leakage through the joints. There are various deck joint systems available that can be adapted successfully to the various types of structures and the full range of expansion and contraction that must be accommodated. The type chosen should be properly sized and based on performance and adaptability and not on historic issues because expansion joints do not affect historical significance.

5.6 Strengthening of Steel Bridges/Replacement of Components/Members

There are many cost-effective approaches to increasing the load-carrying capacity of old bridges that do not have an adverse effect on what makes them historic. Generally accepted preservation guidance, including the NPS's The SOI *Standards*, allows for in-kind replacement of deteriorated fabric/members and adding new members, so there are a variety of successful methodologies ranging from replacing decks with lighter ones to post- tensioning longitudinal beams or tension truss members.

Truss members that have deteriorated or need to be strengthened can be replaced with higher strength steel equivalents as long as the connections are done in the original manner. Bolts are an acceptable substitute for rivets and have been since the 1960s. It is also acceptable to use bolts to attach new material to existing members and to weld plate to existing cover plates, upper chords, end posts, and beam flanges in order to strengthen the bridge, if it is known for certain that the coverplate and beams are steel. Field

welding, however, is generally discouraged due to its lack of a controlled environment. If welding is performed, then a full understanding of fatigue design issues is an absolute must.

Most post-1895 truss bridges are steel, but the transition from wrought iron to steel in the middle to late 1890s was gradual. There are two low-cost, non-destructive tests that can be performed to characterize ferrous material as to whether it is wrought iron, mild steel, or steel. These include the spark test and field metallography where the metal is polished, etched and then its microstructure is replicated for examination in the laboratory. Iron and steel each have a distinctive microstructure that reveals which material it is.

5.6.1 Deck Replacement to Reduce Dead Load and Increase Live Load Capacity

Decks, wearing surfaces, and pavements on fill are generally not historically significant features of a bridge. Therefore, replacing them with lighter concrete decks, timber, fiber reinforced plastic (FRP), or grid decks is often an effective way to reduce dead load, as is removing layers of overlay on the bridge and corresponding approach roadways, and thus increasing load-carrying capacity. Such work should not be considered an adverse effect, or even an effect, on a historic bridge. Before any decisions can be made about the extent of the replacement or repair of an existing deck, if its condition is not already obvious, a deck condition survey must be conducted. The survey will indicate whether partial or full deck replacement is required.

5.6.2 Use of Higher Strength Steel for Flooring Systems

The floorbeams and stringers (flooring system) on truss, girder-floorbeam, and steel through arch bridges can be upgraded to increase load-carrying capacity as long as the members are replaced in-kind (steel with steel even if the replacement steel is a higher strength). The floorbeams should be connected in the original manner, meaning with eye heads or pin plates at pin connections or with bolts at gusset plates at rigid connections. Stringer-to- floorbeam connections are not as critical, which means that angle shelves or notching does not necessarily need to be reproduced. In-kind replacement of flooring system members with higher strength steel is an appropriate way to increase load-carrying capacity, again, as long as the type of connection of the floorbeam is maintained.

Another way to increase capacity of floorbeams or indeed any beam is to weld or bolt coverplate to beam flanges. Welding has been a common means of attachment since the development of arc-welding equipment in the late 1920s. Care needs to be taken to never weld the connection, pinned or riveted, just the attachment of the coverplate to the flanges of the floorbeam. From both the historical and the structural perspectives, it is important to not change the original manner of connection at the panel point or gusset plate. Again, any field welding needs to be carefully controlled.

When adequacy of the waterway opening permits, longitudinal stringers and transverse floorbeams can also be post-tensioned using rods or strands to add load-carrying capacity into the member and the bridge.

5.6.3 Add Auxiliary Members

This option involves the placement of additional members to help increase load capacity. Methodologies will vary with bridge type. A good rule-of-thumb, which is also in accordance with SOI *Standards,* is to sensitively add material but not to take historical material away. For stringer bridges or bridges with stringer/floorbeam flooring systems, this can include placing new beams between the interior beams and retaining the existing fascia beams (i.e., not a bridge/deck widening). This treatment should have no adverse effect. The same members can also be post- tensioned with rods or strands (see Post-Tensioning below).

When analysis reveals that some of the truss bridge members require strengthening, consideration should be given to adding new members to take all or part of the load. For increasing the capacity of tension members, post-tensioning has proven to be cost effective when there is enough room at the panel points to accommodate the additional material. Additional material can be added to compression members, but, as with post- tensioning, the members must be large enough in the first place for this approach to be appropriate. Additional members can generally be added without shoring the bridge, but then the new members will only support live loads. One way for additional members to support dead load is to add them

prior to the placement of a new deck so that the dead load is now shared by the existing and new members. The new members should be positioned in the least conspicuous location and not be visually intrusive. For truss bridges, it is also important to remember that new members must structurally tie into the existing joint/panel point connections. To install auxiliary members, a temporary means of supporting the existing trusses may be necessary.

5.6.4 Add Section to Existing Members

Shapes built-up from angles and plates (i.e., members like floorbeams, girders, and verticals, chords, and end posts on truss bridges) lend themselves well to being strengthened by using the conventional method of adding material to the flanges and webs. Adding section is a way to keep historic fabric in place, but it can also involve the removal of existing rivets and their subsequent replacement with high-strength bolts. If the rivets are visually prominent and it is important to preserve the historic appearance and mechanical connection, button-head bolts can be used. It is important to define which side will have the head and which will have the shank. If not specified, the contractor will generally do whichever is easiest, not which is best for the appearance of the bridge. The same treatment can be used to replacing/repairing deteriorated sections of built-up members.

5.6.5 In-Kind Replacement of Undersized or Deteriorated Members

Existing steel members can be replaced in-kind, wholly or in part, with steel members that have better material properties such as higher strength when the member being replaced is not the source of historical significance. This can be achieved without an adverse effect, but only when the replacement material is used in the same manner and configuration of the member it is replacing. How a particular bridge type performs, like the bending strength of a longitudinal beam resisting the live loads or how stresses are transferred at panel-point connections on a truss bridge, must be maintained since pinned and rigid connection designs handle stresses differently. Replacing a failed eye bar on a pin-connected bridge with a modern steel rod with end eyes that fit around the original pin is proper. While the appearance is different, the detail permits the bridge to continue to accommodate stresses as it was originally designed.

5.6.6 Connections for In-Kind Replacement

When rivets at gusset plated panel points need to be replaced or when new section is being added to strengthen or replace deteriorated original fabric, high-strength bolts are generally an acceptable substitute, especially for bridges that remain on system and in service. Rivets do represent period technology, and they should be preserved whenever possible, but they are generally not what make a bridge historic. Selected replacement of rivets with high-strength bolts has been a generally accepted rehabilitation technique for decades. A bolt also provides a more fatigue-resistant, as well as a stronger and more reliable, connection. If appearance of the connection is important, a high-strength, button-head bolt can be used, but it is generally not necessary. What is important, however, is to define which side will have the head and which will have the shank. If not specified, the contractor will generally do whichever is easiest, not which is best for the appearance of the bridge.

On truss bridges, welding new or replacement members to a pin, or welding the pin itself, should never be done. It is incompatible, both from the historical and structural perspectives as it changes how the bridge performs. Welding will make the joint a rigid connection and will introduce bending moments for which the members were not originally designed. High residual stresses are then introduced, particularly into the tension members, and could lead to the initiation of cracks. Likewise, welding counters together to eliminate noise from vibration should not be done. Welding is seldom reversible since the base metal is permanently changed at the weld location, even if the weld itself is removed.

5.6.7 Post-Tensioning to Increase Load Carrying Capacity or Add Redundancy

When analysis reveals that truss bridge tension members, longitudinal beams or floorbeams require strengthening consideration should be given to adding new members to take part of the load. Post-tensioning consists of installing a post-tension cable or high-strength rod to reduce some of the dead load stress and transfer it to the post- tensioning system. It has proven to be a cost-effective means to increase

load carrying capacity for undersized members or where redundancy is desired. This treatment is most appropriate for larger and heavier truss bridges.

5.6.8 Strengthening by Reusing Part of Bridge and Placing New Superstructure for Live Loads

When load-carrying capacity and geometry are sufficiently low that widening or placing a new superstructure to carry live loads is warranted, there are treatments that, while not generally considered “best practices”, have gained acceptance because a high percentage of the historic metal bridge can be reused and preserved. These are treatments that the public has come to embrace as a way to balance preservation with the need to provide a safe and efficient transportation system. Often, reusing part of a historic steel bridge is the only prudent alternative given site conditions and other environmental considerations. Or there may no prudent way to strengthen the bridge enough to meet the needs of the crossing without destroying what it is that made the bridge significant in the first place.

When approach road geometry and sight lines are adequate, there are many ways to widen a steel bridge. When the superstructure is underneath the deck, it is possible to preserve the historic beams in place and add additional beams in-kind to increase width. Stringer bridges can easily be widened by extending abutments/wingwalls and then placing additional beams. Another approach is to add cantilevered deck sections. In either of these approaches, railings may become an issue as they will need to be removed and replaced or reset (see Railings below). If possible, a parallel bridge can be constructed, leaving the historic bridge in place to carry one direction of traffic.

When widening a stringer or girder-floorbeam bridge is considered, the proposed treatment needs to be balanced against what is making the bridge historic. If, for example, the bridge is important as an early and complete example of continuous beams, it is the continuous beams that are the important feature. Consideration could be given to reusing historic beams as the fascia beams so that they are visible and reflect the original design of the historic bridge. This consideration is particularly important to continuous design and girder-floorbeam bridges.

Increasingly historic truss bridges are being reused as part of new stronger and wider stringer bridges. While this does change how the bridge supports loads and is not generally accepted as a “best practice,” it is nevertheless one that the public has come to embrace and demand as a way to “preserve” truss bridges. Consequently, it cannot be dismissed. Consideration needs to be given to ensure that any widening is still within a realistic sense of proportion for the original truss lines. Widening out a light, 60'-long pony truss from 18' to 40' by placing a new superstructure would be unrealistic where a 100'-long through truss might convincingly accommodate such a change. When widening trusses, be mindful of the original proportions and scale the widening accordingly.

In any fascia treatment, it is important for the fascia beams or truss lines to be more than decorative; they need to convey that they are load bearing, supporting at least themselves and some of the deck, whether that be sidewalks, safety walks or part of the shoulder. Relocated or reused fascia beams and truss lines need to convincingly relate to substructure units and be an integral part of the bridge. It is particularly important to retain enough of the floorbeams on truss bridges in order to make the connection to the new superstructure.

5.6.9 Bearings

If the existing bearings on a steel beam or truss bridge are not functioning as designed and pose an imminent threat to the structure, they should be replaced. Bearings are not significant, and their replacement should be considered no adverse effect to the bridge. Replacement bearings, however, should function similar to the ones being replaced in how they accommodate rotation and expansion, and they should maintain the position of the superstructure.

5.7 Repair of Damaged Steel Bridge Components/ Members

5.7.1 Heat Straighten Minor Damage

Over the past decades, research has demonstrated that instead of mechanical force, which can further damage a member or impose residual stresses, heat straightening can be an efficient and economical way to repair steel members that have been deformed as a result of impact damage. The technique is a procedure of applying repetitive heating and cooling cycles to produce a gradual straightening of the material. Its advantages are that it is economical as it does not require removal of the member nor temporary shoring. The work should be performed by skilled professionals as the location and the amount of heat is critical to the success of the process. Additionally, extreme care needs to be exercised to remove nicks and other defects so there is no chance of future fatigue or fracture occurring. In 2000, FHWA issued *Heat-Straightening Repairs of Damaged Steel Bridges: A Technical Guide and Manual of Practice.* More in-depth discussion of the technique can be found NCHRP 10-63: *Heat Straightening Repair of Damaged Steel Bridge Girders: Fatigue and Fracture Performance.*

5.7.2 Replace Section in Kind to Address Localized Impact Damage

In certain cases, it may be cost effective to remove damaged steel sections/members and splice in new material or to plate over a damaged section. When the affected members are not subjected to full live loading, the need for shoring is eliminated.

Impact-damaged material is removed by flame cutting, and the adjacent remaining steel is ground smooth. A new steel section, similar in cross section to what was removed, can then be spliced to the existing member using bolts. Plating over damaged material typically involves adding steel plates using bolts to provide additional section to compensate for losses or holes.

5.7.3 Raising Portal and Lateral Bracing to Increase Vertical Clearance

When analysis supports that it is structurally acceptable to do so, the lower strut and knee braces and lateral bracing can be raised to increase vertical clearance across a bridge. This is a common technique to preserve vulnerable members from impact damage, and it generally has no adverse effect on the bridge. It is also a technique that has been successfully used over the decades to resolve the very common problem of ever-increasing vertical overloading. It is also possible that the lower strut of many portal braces is already an in-kind replacement of the original fabric. The raising, however, needs to be kept in scale with the overall proportions of the bridge, which means that less increase is possible on shorter and smaller spans than on longer and larger spans.

5.8 Appropriate Railing Treatments

5.8.1 Whenever Possible, Keep Original Railings Behind Crash Worthy Traffic Barriers

Railings on historic bridges are often substandard because they do not meet today's test level (TL) safety standards for crash worthiness (capability to effectively redirect an errant vehicle and to safely stop it in a controlled manner), adequacy of geometry and safety, or the guidelines for height. Most are too low and therefore do not guard against vehicle rollover. They are generally set back at less-than-the-required offset distance, increasing the probability of being struck by an errant vehicle. Some old railings can also create snagging and pocketing problems that result in excessive and unacceptable vehicular deceleration and damage.

While railings can be a visually important aspect of an old bridge, they are first and foremost a safety feature that has to meet the current safety requirements at the crossing. Safety is paramount, but that does not mean that all old railings have to be replaced. There are several effective practices for retaining original railings or placing new ones that are historically compatible and crashworthy. Whenever possible, it is

always preferred to leave the existing railings in place and then put a new crash-tested barrier system at the curbline in front of the old railings rather than remove and replace them. This practice works well when there are sidewalks and thus space for the traffic railing that segregates vehicular and pedestrian traffic, but any change in the width of sidewalks should comply with ADA requirements. There are many appropriate choices for crashworthy traffic railings including the TL-3 Kansas corral rails, several designs of tubular railings, and even powder-coated finish beam guide rail systems. There are also ways to achieve the desired stiffness by burying I beams in the horizontal members of architectonic railings such as Oregon DOT's "stealth" railings. Additionally, Eastern Federal Lands Highway Division has been a national leader in developing aesthetic railings that vary in TL rating.

5.8.2 Care Attaching Modern Guide Rail Systems

In many instances, there is no alternative but to attach the end of an approach guide rail system to the end posts of the old railings. Such attachments should be done in the least intrusive manner possible. Any plaques that are in the location of the attachment should be relocated to ensure their preservation and conservation.

5.8.3 Investigate Safety Barrier Requirements and Alternatives

If it is not possible to place a new traffic railing in front of an existing railing because of roadway/bridge width limitations, it may be appropriate to construct new aesthetically pleasing railings that are similar in appearance to the historic versions with a contemporary design that is similar to the original, appropriate for the setting and bridge type, and meets current safety requirements. Older railings were not designed for modern design impact loads, and replication of historic railings that meet crash test requirements is difficult.

Depending on the style of the original, it may be feasible to replace deficient railings on existing bridges with designs that defer to the historic design and shape while meeting safety and load requirements specified in the AASHTO Standard Specifications for Highway Bridges, 17th Edition (*Standard Specifications*). MASH is the new state of the practice for the crash testing of safety hardware devices for use on the National Highway System (NHS). It updates and replaces NCHRP Report 350. Previously designed NCHRP 350 barriers that also meet newer MASH criteria have been compiled by the Texas A&M Transportation Institute (see bibliography) and can be utilized along with the latest approved aesthetic designs. This approach, when used with FHWA and SHPO concurrence, provides the opportunity to design new railings that are visually similar to the original while meeting the design load requirements for railing strength. When railings are a CDE and an important part of the original design and historic value of a bridge, this approach should be considered.

Existing reinforced concrete railings should be replaced in-kind, as should open railings when possible. Other options include utilizing an appropriate crash-tested barrier, such as the open balustrade Texas Railing (T411), that recalls the appearance of a commonly used historic design. Inset panels on solid barriers can be designed to replicate the pattern of the historic railing. Existing stone parapets can also be rebuilt as reinforced concrete barriers to meet current MASH criteria and faced with a stone veneer. This approach, which is in keeping with SOI and NPS guidance for working on historic structures, permits use of safer, stronger, and/or crash- tested railings.

The design of new railings or barriers should not create a false sense of history or rely on inappropriately applied decoration to mitigate the loss of the original treatment. Railing types should also match bridge type. For example, it is not acceptable to specify metal lattice traffic railings on an all-reinforced concrete unit T beam bridge, which would have had open concrete railings or solid parapets. Use of form liners as a way to decorate new work is also discouraged. See Table 2 for a list of priority bridges with new or modified railings or barriers.

Table 2. Priority Bridges with New or Modified Railings or Barriers

Name	SHA Bridge Number	Date	Bridge Type	Comments
MD 51 over Chesapeake & Ohio Canal	010048001	1932	Steel Pony Truss	New barrier placed in front of original railing
MD 214 over the Patuxent River	020054001	1935	Steel Through Truss	New barrier placed in front of original railing
Patapsco River Bridge (US 40, Edmondson Ave Extended)	030109001	1936	Open Reinforced Concrete Arch	New barrier with exterior indentations replicating original design
US 40 Alternate over Casselman River	110007001	1932	Steel Through Truss	New barrier placed in front of original railing
US 40 over Licking Creek	210010001	1938	Steel Wichert Girder	New barrier placed in front of original railing

See the Bibliography for an extensive list of publications and online resources related to context sensitive barrier design.

5.8.4 Consider Design Waivers if Applicable

Many historic and priority bridges carry little daily traffic. Bypassed by successor bridges, or located in sparsely populated rural areas, they may be exempt from design requirements related to the speed and frequency of traffic. In cases such as these, standards such as MASH may not apply and less invasive rehabilitation approaches can be pursued, minimizing loss of original materials.

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Appendix A: Programmatic Agreement

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER, AND
THE MARYLAND STATE HIGHWAY ADMINISTRATION
REGARDING
HISTORIC HIGHWAY BRIDGES IN MARYLAND

WHEREAS, the Maryland Division of the Federal Highway Administration (FHWA) administers the Federal Aid Highway Program (FAHP) in Maryland authorized by 23 U.S.C. 101 et seq. through the Maryland State Highway Administration (SHA) (23 U.S.C. 315); and

WHEREAS, FHWA has determined that the FAHP may be used to rehabilitate or replace SHA-owned highway bridges listed in or eligible for listing the National Register of Historic Places (NRHP) (hereafter referred to as "historic bridges"); and

WHEREAS, FHWA has consulted with the Advisory Council on Historic Preservation (ACHP) and the Maryland State Historic Preservation Officer (MD SHPO) pursuant to ACHP's regulations found at 36 CFR §800.14(b) implementing Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. §306108); and

WHEREAS, FHWA, MD SHPO and ACHP are signatories to this programmatic agreement (PA); and

WHEREAS, FHWA has invited SHA to be a signatory to this PA; and

WHEREAS, FHWA, MD SHPO, ACHP, AND SHA are collectively referred to as signatories in this PA; and

WHEREAS, FHWA, MD SHPO, ACHP, and SHA originally entered into a programmatic agreement regarding SHA's Historic Highway Bridges in Maryland on July 19, 2013, establishing a Section 106 review process for approximately 160 NRHP-eligible highway bridges, and the parties to the original programmatic agreement have consulted and agreed to amend the programmatic agreement pursuant to Stipulation XVI of the 2013 agreement, and this PA herein supersedes the earlier programmatic agreement; and

WHEREAS, SHA has participated in the consultation, has responsibilities under this agreement, and has been invited to be a signatory to this PA; and

WHEREAS, FHWA and SHA have identified and invited the following parties to consult in the Section 106 process for the development of this PA: Maryland County Historic Preservation and Historic District Commissions, Maryland Certified Heritage Areas, the Maryland Scenic Byways Commission, Preservation Maryland, and the National Park Service – National Capital Region, The Maryland Commission on Indian Affairs; and

WHEREAS, the FHWA provided a draft of this PA and invited the participation of the following Federally-Recognized Tribal Nations: Oneida Indian Nation, Onondaga Nation, Saint Regis Mohawk Tribe, Tuscarora Nation, Seneca-Cayuga Nation, Delaware Nation, Delaware Tribe of Indians, Absentee-Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe, Shawnee Tribe, and Pamunkey Indian Tribe; and

WHEREAS, no Tribal Nation(s) provided comments; and

WHEREAS, the following organizations responded and have been identified as consulting parties, as defined in 36 C.F.R. §800.2(c), for the development of this PA: the National Park Service National Capital Region, the Harford County Department of Planning and Zoning, the Howard County Department of Public Works, the Montgomery County Department of Transportation, the Prince George's County Department of Parks and Recreation, and the Prince George's County Historic Preservation Commission; and

WHEREAS, SHA administers state funded bridge projects as defined in Section 2-103.1 of the Transportation Article, and the SHA and the MD SHPO agree that SHA shall use the applicable provisions of this PA to fulfill its compliance responsibilities under the Maryland Historical Trust Act of 1985, as amended, State Finance and Procurement Article Sections 5A-325 and 5A-326 of the Annotated Code of Maryland (Act); and

WHEREAS, SHA has a staff of cultural resources professionals and contracts with consultant firms who meet the Secretary of the Interior's Professional Qualifications Standards published in 48 FR 44738-44739 in the fields of archaeology, architectural history, and history to carry out its historic preservation programs and responsibilities (hereafter referred to as "cultural resources professionals"), including the terms of this PA; and

WHEREAS, the signatories to this agreement have previously executed an agreement on August 19, 2021, entitled *Amended Programmatic Agreement Among The Federal Highway Administration, The Maryland Department of Transportation State Highway Administration, Maryland Transportation Authority, The Maryland State Historic Preservation Officer and The Advisory Council on Historic Preservation Implementing Section 106 of The National Historic Preservation Act for Federal Highway Administration Undertakings In Maryland (Statewide PA),* and this PA takes into account the Statewide PA and any subsequent versions; and

WHEREAS, the provisions of this PA only apply to projects involving SHA- owned historic bridges in Maryland; and

WHEREAS, SHA identifies bridge projects through a variety of means, including long-range planning, its bridge management system, system preservation programs, responding to issues identified during annual inspections, emergency actions; and

WHEREAS, this PA establishes the basis for SHA's administration of its Historic Highway Bridge Program (HHBP) and establishes how FHWA and the MD SHPO will be involved in both the HHBP and individual bridge projects under the HHBP; and

WHEREAS, SHA proposes to administer the HHBP in accordance with this PA, in order to manage its assets and ensure that Maryland's engineering heritage is preserved and protected for the benefit of Maryland's citizens; and

WHEREAS, SHA, with concurrence by the MD SHPO, has identified SHA-owned bridges that are eligible for or listed in the NRHP (hereafter referred to as "historic bridges") and which are subject to the terms of this PA; and

WHEREAS, SHA has completed the Maryland's Historic Bridges NRHP Multi-Property Documentation Form (MPDF) and NRHP nominations for twelve of the Tier I Preservation Priority Bridges, and SHA, the MD SHPO and FHWA have agreed that the MDPF form and the twelve nominations have satisfied the requirement of the 2013 Agreement; and

WHEREAS, SHA has developed a *Management Plan for Historic Highway Bridges (Management Plan)* dated April 2012 that includes general guidance for best practices and individual management plans for those historic bridges designated for long-term preservation; and

NOW, THEREFORE, FHWA, ACHP, the MD SHPO, and SHA agree that the rehabilitation or replacement of SHA-owned historic bridges shall be administered in accordance with the following stipulations to satisfy FHWA's Section 106 responsibilities for all individual undertakings under the HHBP.

STIPULATIONS

FHWA and SHA will ensure that the following measures are carried out:

I. Applicability

A. This PA addresses provisions for the appropriate management and corresponding review processes for SHA's historic bridges. It provides streamlined review procedures under certain circumstances and standardized mitigation treatments.

B. This PA applies to any FHWA assisted work conducted on SHA-owned historic bridges including, but not necessarily limited to, bridge maintenance, preservation, rehabilitation, restoration, reconstruction, relocation, and/or replacement projects. This PA is not applicable to individual undertakings that may affect other historic properties beyond the historic bridges described in this PA.

C. Effect on Existing Agreements: The measures contained in this PA do not supersede stipulations contained in previously executed Memoranda of Agreement regarding the rehabilitation or replacement of individual historic bridges in Maryland. Furthermore, this PA does not replace those provisions for minor bridge and small structure work established in the Statewide PA (or any subsequent amendment).

D. Other Bridges in Maryland: The provisions of this PA do not apply to bridges in Maryland owned by local governments, federal agencies, or other entities, or to SHA-owned bridges that are not individually NRHP-eligible but may be NRHP-eligible as contributing elements to a historic district.

II. Responsibilities of FHWA, ACHP, SHA, and the MD SHPO

A. In compliance with its responsibilities under the NHPA, and as a condition of its award to SHA of any assistance for bridge rehabilitation or replacement projects under the FAHP, FHWA shall require the SHA to carry out the provisions of this PA to meet the requirements of 36 CFR Part 800, and the applicable ACHP standards and guidelines, for all such projects involving historic bridges included in Attachments 1-3 that receive Federal assistance. FHWA, ACHP, and the MD

SHPO will participate in the process as specified in the Statewide PA (see link in Attachment 5) and subsequent stipulations.

B. SHA shall employ cultural resources professionals meeting Professional Qualifications Standards established by the Secretary of the Interior in the fields of history, archaeology and/or architectural history. These SHA cultural resources professionals shall oversee project review for SHA and perform all actions where "SHA" is specified in this PA.

III. Historic Bridges Subject to this PA

A. Identified Historic Bridges: The attachments to this PA include SHA-owned bridges that are individually listed in the NRHP or that have been determined, with concurrence by the MD SHPO, individually eligible for the NRHP.

1. Attachment 1: Tier I Preservation Priority Historic Bridges (formerly Preservation Priority Historic Bridges in earlier versions of this PA) - historic bridges designated for long-term preservation in place.

2. Attachment 2: Tier II Historic Bridges (formerly Eligible Historic Bridges) - historic bridges that may have obstacles that preclude long-term preservation in place and will be managed on a case-by-case basis.

3. Attachment 3: Tier III Historic Bridges (formerly Non-Priority Historic Bridges)- historic bridges that are primarily NRHP-eligible as representative examples of their type, and the parties agree that options other than preservation in place may be appropriate.

4. Attachment 4: Removed Bridges – a record of bridges formerly listed in Attachments 1-3, but which have been replaced, recategorized, or determined not eligible for the NRHP and are no longer subject to this PA.

B. Inventory Updates and Revisions to Attachments 1-4: SHA shall continue to evaluate the NRHP eligibility of its bridges on a case-by-case basis as need arises, in consultation with the MD SHPO and appropriate consulting parties. Annually, SHA will update Attachments 1-4 to reflect the results of any inventory updates based on consultation between SHA and the MD SHPO. SHA shall provide copies of any revised attachments to this PA to the signatory parties with its annual report produced pursuant to Stipulation IX of this PA.

IV. Management Plan, Guidelines, Standards, Regulations and Contexts

It is the intention of the signatories to interpret this PA in accordance with any standards, revisions of standards, or applicable Program Comments promulgated by the Secretary of Interior, ACHP, or MD SHPO as then in force during the course of this PA. The signatories also intend this PA to be construed in accordance with the National Historic Preservation Act in matters of interpretation.

A. Management Plan: SHA shall incorporate guidance found in the *Management Plan for Historic Highway Bridges* into project design. SHA will update the *Management Plan* within one year of execution of this agreement, in consultation with MHT; SHA will provide MHT with a 30-day review period for the document prior to finalization.

B. Guidelines, agreements, standards, regulations, contexts, and management plans relevant to this PA and its purposes include:

- 36 CFR Part 800: *Protection of Historic Properties* (2004);
- *Amended Programmatic Agreement Among The Federal Highway Administration, The Maryland Department of Transportation State Highway Administration, Maryland Transportation Authority, The Maryland State Historic Preservation Officer and The Advisory Council on Historic Preservation Implementing Section 106 of The National Historic Preservation Act for Federal Highway Administration Undertakings In Maryland (Statewide PA);*
- *Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System (70 Federal Register,* 11928-11931);
- *Program Comment Issued for Streamlining Section 106 Review of Actions Affecting Post-1945 Concrete and Steel Bridges* (77 FR 68790-68795);
- *Secretary of Interior's Standards for Treatment of Historic Properties (36 CFR Part 68);*
- *Historic Highway Bridges in Maryland: 1631-1960: Historic Context Report* (Spero & Company and Berger & Associates, 1995;
- *Phase II State Historic Bridge Context & Inventory of Modern Bridges, Survey Report and Assessments of Significance* (URS 2004);
- *'Tomorrow's Roads Today,' Expressway Construction in Maryland 1948-1965* (Bruder 2010);
- *Standards and Guidelines for Architectural and Historical Investigations in Maryland* (Maryland Historical Trust 2000);
- *Standards and Guidelines for Archeological Investigations in Maryland* (Shaffer and Cole, 1994);
- *AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 9th Edition (or current edition);* and
- *FHWA Design Exceptions Code of Federal Regulations Title 23 Part 625.3 (f) (23 CFR 625.3).*

V. Categorization of SHA Historic Bridges

A. Tier I Preservation Priority Historic Bridges: SHA has selected the historic bridges listed in Attachment 1 for preservation in perpetuity to the maximum extent possible. SHA will continue to maintain and preserve these bridges, in accordance with relevant guidance contained in the *Management Plan.*

1. In accordance with the specific bridge management plan developed for each of these bridges, SHA will maintain the Tier I Preservation Priority Historic Bridges in long-term use to the extent practicable, for the duration of this PA.

2. All repair, strengthening or replacement of bridge components will follow the recommended approaches of the *Secretary of Interior's Standards for Treatment of Historic Properties,* as well as the guidance contained in the individual management plans that will be found in the *Management Plan*.

B. Tier II Historic Bridges*:* SHA has assigned the historic bridges listed in Attachment 2 to the treatment category Tier II Historic Bridges. SHA will continue to maintain and preserve these bridges, as feasible. Since these bridges may not be ideal candidates for long-term preservation in place, SHA will manage these structures on a case-by-case basis.

C. Tier III Historic Bridges: SHA has assigned historic bridges listed in Attachment 3 to the treatment category Tier III Historic Bridges. SHA will continue to maintain these bridges, in accordance with relevant guidance contained in the *Management Plan*, as feasible.

D. FHWA and SHA will, where practicable, explore the use of design variances and exceptions to encourage context sensitive solutions and maintain historic features in consideration of safety and other design standards.

VI. Review Process for SHA's Historic Bridges

If a proposed project for the type of undertakings listed in Stipulation I of this PA includes work on any bridge in Attachments 1-3, SHA will review the project to determine the Area of Potential Effects (APE) and if it may have an adverse effect on the bridge, applying the Criteria of Adverse Effect set forth in 36 CFR §800.5(a)(1).

A. Consultation: SHA will identify appropriate consulting parties per 36 CFR 800.2(c) and 800.3(f), including the relevant local government planning department, Maryland Heritage Area, Maryland Scenic Byway, and other appropriate entities.

B. Potential Effects to Other Historic Properties:

1. If there are other historic properties within the APE that may be affected by the undertaking, SHA will follow the requirements of the Statewide PA; the signatories acknowledge that this agreement identifies appropriate mitigation for bridges covered under this PA; completed mitigation will be given consideration in development of agreements resolving adverse effects for undertakings reviewed under the Statewide PA that may include additional historic properties.

2. Undertakings that may incidentally include Tier I Preservation Priority, Tier II, or Tier III Historic Bridges within their APE may be reviewed by SHA under the provisions of the Statewide PA, provided the primary purpose of the undertaking is not maintenance or modification of the bridge or bridges.

C. No Properties Affected:

1. If SHA determines that the proposed undertaking will not affect historic properties, no further consultation with the MD SHPO is required.

2. SHA shall document its review as part of the annual report required in this PA.

D. No Adverse Effect:

1. SHA will seek to avoid adverse effects by incorporating the treatments and guidance contained in the *Management Plan*.

2. If SHA determines that the proposed undertaking will have no adverse effect on historic properties, no further consultation with the MD SHPO is required.

3. SHA shall document its review as part of the annual report required in this PA.

E. Adverse Effect:

1. If SHA determines that an undertaking will have an adverse effect to a historic bridge, SHA will thoroughly investigate and document all prudent and feasible alternatives. SHA will provide information to the MD SHPO and consulting parties on how alternatives, including the following, were evaluated:

   a. No build;
   b. Structural rehabilitation to the existing bridge for continued vehicular use;
   c. Reducing traffic volumes on the existing bridge, including one-way pair;
   d. Bypassing and preserving the existing bridge in place; and
   e. Relocating the existing bridge to another site.

2. If SHA determines that the undertaking will have an adverse effect, and that there are no viable alternatives that would avoid causing adverse effects, SHA will follow the procedures in its Statewide PA, incorporating the standard treatments defined below in Stipulation VII as mitigation.

F. Documentation:

1. For all undertakings reviewed under this PA, SHA will maintain records, including forms, photographs, and field notes, if any. SHA will make the documentation accessible, consistent with SHA and FHWA's records retention schedules and this PA. Pertinent records for each project covered under this PA should include:

   a. A description of the project and its APE;
   b. The location of the project area on USGS 7.5 minute topographic maps and/or project mapping; or on mapping generated from the SHA GIS at a scale of 1:90,000 or less for project location and 1:24,000 or less for cultural resources information;
   c. The type, extent, and degree of existing disturbance within the APE;
   d. The assessment by qualified SHA cultural resource professionals of the potential for properties within the APE, including justification, a listing of inventoried properties, and new or updated Maryland Inventory of Historic Properties forms, as warranted;
   e. Justification for the determination of no historic properties affected (as appropriate); and
   f. Associated notes and correspondence.

VII. Resolution of Adverse Effects to Historic Bridges

A. Tier I Preservation Priority Historic Bridges

1. If there is an adverse effect to a Tier I Preservation Priority Historic Bridge, an individual Memorandum of Agreement (MOA) or programmatic agreement, including specific mitigation or other treatment measures, will be developed by SHA in consultation with

signatories and any other appropriate consulting parties for that undertaking, per the requirements of the Statewide PA.

2. In the event of removal or replacement of a Tier I Preservation Priority bridge, SHA will review the remaining Tier II historic bridges and evaluate whether a similar bridge should be considered for Tier I Preservation Priority status.

B. Tier II Historic Bridges

If SHA determines that the undertaking will have an adverse effect on a Tier II Historic Bridge, SHA will resolve the adverse effect by developing and implementing an MOA for the Tier II Historic Bridge.

C. Tier III Historic Bridges

1. If SHA determines that the undertaking will have an adverse effect on a Tier III Historic Bridge, SHA will resolve the adverse effect by implementing the Standard Mitigation Treatment for Tier III Historic Bridges.

2. SHA has provided the MD SHPO with a Standard Mitigation Treatment, consisting of an Addendum form for each bridge currently listed in Tier III. This documentation fulfills SHA's mitigation requirement for all Tier III Historic Bridges. If a new bridge is added to the Tier III list, SHA will complete a new Addendum form.

3. When using the Standard Mitigation Treatment, SHA will document the resolution of the adverse effect in consultation correspondence and as part of the annual report described in Stipulation IX.

VIII. Bridge Stewardship and Outreach Efforts

SHA will promote awareness and appropriate stewardship of Maryland's historic bridges through the measures listed below, as funding and resources allow.

A. SHA's Historic Bridges Webpages: SHA will maintain its historic bridge webpages and update with an executed copy of this PA.

B. Public Outreach: SHA will maintain information on its website regarding its historic bridges, accommodate requests from the public for presentations or information on historic bridges, and continue to supply brochures and other interpretive materials at SHA facilities and appropriate public events.

C. Training for SHA Structures Maintenance Personnel: Within one (1) year of the signing of this PA, the SHA Office of Planning and Preliminary Engineering (OPPE) and OOS will provide training to SHA structures engineers, structures inspectors, and district maintenance workers as well as cultural resources professionals to ensure that staff are familiar with the requirements of this PA. SHA will conduct additional trainings on an as-needed basis.

IX. Annual Reporting

A. Beginning December 31, 2024, and on or about the end of the calendar year for the duration of this PA, SHA will prepare an annual report and provide it to the MD SHPO and FHWA by January 31 of the subsequent calendar year. The report will include:

- List of project reviews completed for the Tier I Preservation Priority Historic Bridges;
- List of project reviews completed for the Tier II Historic Bridges, noting relevant effect determinations and outcomes;
- List of project reviews completed for the Tier III Historic Bridges, noting relevant effect determinations and outcomes;
- Progress in updating the SHA Historic Bridge web pages;
- Progress in outreach efforts;
- Updates on planned or proposed replacements or major rehabilitation of historic bridges;
- Any problems or unexpected issues encountered during the year;
- Any revisions to Attachments 1 – 4; and
- Any changes that SHA believes should be made in implementing this PA or the need for formal amendments to the agreement.

B. At the request of any signatory party to this PA, SHA shall hold a meeting or meetings with the signatory parties to facilitate review and comment, to address questions, or to resolve any outstanding issues related to the implementation of this PA.

X. Dispute Resolution

A. Objections related to review of individual actions or projects: Should any signatory, consulting party to the project, or member of the public object to any documentation submitted or actions taken pursuant to a project review under Stipulations VI and VII or other portions of this PA related to a specific review action, FHWA will ensure that the SHA consults with the objecting party in an effort to resolve the objection, provided the objection is made in writing to FHWA or SHA within 30 days of the action under dispute.

1. If the objection is resolved through consultation, FHWA may authorize the disputed action to proceed in accordance with the terms of such resolution.

2. If after initiating such consultation, FHWA determines that the objection cannot be resolved through consultation, FHWA shall forward all documentation relevant to the objection to ACHP and other signatories, including FHWA's proposed response to the objection. Within 30 days after receipt of all pertinent documentation, ACHP shall exercise one of the following options:

   a. Advise FHWA that ACHP concurs in FHWA's proposed response to the objection, whereupon FHWA will respond to the objection accordingly; or

   b. Provide FHWA with recommendations, which FHWA shall take into account in reaching a final decision regarding its response to the objection; or

   c. Notify FHWA that the objection will be referred for comment pursuant to 36 C.F.R. § 800.7(a)(4) and proceed to refer the objection and comment. In this event, FHWA shall ensure that the Agency Official is prepared to take the resulting comments into account in accordance with 36 C.F.R. § 800.7(c)(4).

3. Should ACHP not exercise one of the foregoing options within 30 days after receipt of all pertinent documentation, FHWA may assume ACHP's concurrence in its proposed response to the objection.

4. FHWA shall take into account any ACHP recommendation or comment and any comments from the other signatories to this PA in reaching a final decision regarding the objection. FHWA's responsibility to carry out all actions under this PA that are not the subjects of the objection shall remain unchanged.

5. FHWA shall provide all other signatories to this PA with a written copy of its final decision regarding any objection addressed pursuant to this Stipulation.

6. FHWA may authorize any action subject to objection under this Stipulation to proceed, provided the objection has been resolved in accordance with the terms of this Stipulation.

B. Objections related to NRHP eligibility: Any signatory may object in writing within 30 days to an SHA or FHWA determination of eligibility. If SHA and FHWA are unwilling to revise the determination in response to the objection or other relevant information, FHWA (or SHA on its behalf) will submit the determination to the Keeper of the NRHP for a determination pursuant to 36 C.F.R. Part 63.

C. Objections to implementation or compliance with this PA, or issues unrelated to individual project review actions:

1. Should any signatory object in writing to FHWA regarding the manner in which the terms of this PA are carried out, or if FHWA has an objection related to other signatories, FHWA will immediately notify the other signatories of the objection and proceed to consult with the objecting party to resolve the objection. FHWA will honor the request of any signatory to participate in the consultation and will take any comments provided by such parties into account. FHWA shall establish a reasonable time frame for such consultations.

2. If consultation among the signatories results in agreement on specific actions, definitions, modifications of procedures or other mechanisms that will resolve the objection without formal amendment of this agreement, FHWA will document the resolution and provide such documentation to all signatories.

3. If signatories agree that resolution of the objection requires amendment of this PA, the parties will follow procedures set forth in Stipulation XI.

4. If the objection cannot be resolved through consultation, informal action or amendment, the parties may consider termination of the agreement per Stipulation XII.

XI. Amendment

Any signatory to this PA may request that it be amended, whereupon the signatories will consult in accordance with 36 C.F.R. § 800.14 to consider such an amendment. This PA will be amended only upon execution of an amendment signed by all signatories.

XII. Termination

Any signatory to this PA may terminate it by providing 30 calendar days' notice in writing to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, FHWA will comply with 36 C.F.R. Part 800 with regard to individual undertakings covered by this PA.

XIII. Duration

This PA shall become effective upon execution by FHWA, the MD SHPO, ACHP, and SHA and shall remain in effect for five years or until December 31, 2029. No later than December 31, 2027, FHWA will consult with the signatories to this PA to determine interest in renewing this PA. This PA may be extended for additional terms upon the written agreement of the signatories.

Execution and implementation of this PA evidences that FHWA has afforded ACHP a reasonable opportunity to comment on the HHBP and its effects on historic bridge properties; that FHWA has taken into account the effects of the HHBP and its individual undertakings on historic properties; and that FHWA has complied with Section 106 of the NHPA and 36 C.F.R. Part 800 for the HHBP and its individual undertakings.

LIST OF ATTACHMENTS

ATTACHMENT 1	LIST OF *TIER I PRESERVATION PRIORITY HISTORIC BRIDGES*
ATTACHMENT 2	LIST OF *TIER II HISTORIC BRIDGES*
ATTACHMENT 3	LIST OF *TIER III HISTORIC BRIDGES*
ATTACHMENT 4	LIST OF *REMOVED BRIDGES*
ATTACHMENT 5	LINKS TO DOCUMENTATION REFERENCED IN THE HISTORIC HIGHWAY BRIDGES IN MARYLAND PA

SIGNATORY PAGE

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER, AND
THE MARYLAND STATE HIGHWAY ADMINISTRATION
REGARDING
HISTORIC HIGHWAY BRIDGES IN MARYLAND

FEDERAL HIGHWAY ADMINISTRATION

BY: VALERIYA REMEZOVA Digitally signed by VALERIYA REMEZOVA Date: 2024.06.03 10:03:46 -04'00' Date: 6/3/2024

Valeriya Remezova
Division Administrator

SIGNATORY PAGE

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER, AND
THE MARYLAND STATE HIGHWAY ADMINISTRATION
REGARDING
HISTORIC HIGHWAY BRIDGES IN MARYLAND

THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

BY:  Date: July 9, 2024

Reid Nelson
Executive Director

SIGNATORY PAGE

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER, AND
THE MARYLAND STATE HIGHWAY ADMINISTRATION
REGARDING
HISTORIC HIGHWAY BRIDGES IN MARYLAND

MARYLAND STATE HISTORIC PRESERVATION OFFICER

BY: Elizabeth Hughes Date: 5-13-2014

Elizabeth Hughes
State Historic Preservation Officer

SIGNATORY PAGE

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER, AND
THE MARYLAND STATE HIGHWAY ADMINISTRATION
REGARDING
HISTORIC HIGHWAY BRIDGES IN MARYLAND

MARYLAND STATE HIGHWAY ADMINISTRATION

BY: _____ Date: 5/29/2024

William Pines, P.E.
Administrator

Attachment 1: Tier I Preservation Priority Historic Bridges

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 144AE (Nat'l Pike) over Town Creek	0103500	AL-II-A-149	Concrete Arch	Flintstone	Allegany	1925	Tier I Priority	NRHP 2017
MD 51 over C & O Canal	0104800	AL-I-C-075	Camelback Pony Truss	Keifars	Allegany	1932	Tier I Priority	NRHP 2017
Blue Bridge (MD 942 over N. Br. Potomac River)	0106600	AL-IV-A-153	Arch Through Truss	Cumberland	Allegany	1955	Tier I Priority	NRHP 2018
MD 214 over the Patuxent River	0205400	AA-761	Parker Through Truss	Davidsonville	Anne Arundel	1935	Tier I Priority	NRHP 2018
Parkton Stone Arch Bridge (MD 463 over Little Gunpowder	0310500	BA-593	Stone Arch	Parkton	Baltimore	1809	Tier I Priority	NRHP 2017
Patapsco River Bridge (US 40, Edmondson Ave Extended)	0310900	BA-2557	Open Spandrel Concrete Arch	Catonsville	Baltimore	1936	Tier I Priority	Reconstructed 2013; not nominated
US 40 (National Pike) over Middle Creek	1003100	F-4-116	Concrete Arch w/Stone Veneer	Myersville	Frederick	1936	Tier I Priority	NRHP 2018
US 40 Alternate over Casselman River	1100700	G-II-C-101	Pratt Through Truss	Grantsville	Garrett	1932	Tier I Priority	NRHP 2018
MD 32 over River Rd, Patapsco River and B&O RR	1304600	HO-673	Metal Girder -- Aluminum	Sykesville	Howard	1963	Tier I Priority I	NRHP 2018 Not in service

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
Dover Bridge (MD 331 over Choptank River)	2002300	T-487	Movable -- Pratt Through Truss w/Swing Span	Tanyard	Talbot	1933	Tier I Priority	
Little Antietam Creek Bridge (MD 845A)	2100400	WA-II-1125	Concrete Arch	Keedysville	Washington	1927	Tier I Priority	NRHP as part of (Keedysville HD)
US 40 over Licking Creek	2101000	WA-V-416	Wichert Deck Truss	Big Pool	Washington	1938	Tier I Priority	NRHP 2017
US 40 (National Pike) over Conococheague Creek	2101200	WA-V-211	Open Spandrel Concrete Arch	Wilson	Washington	1936	Tier I Priority	Not nominated; rehab anticipated
Booth's Mill Bridge (Delemere Bridge); MD 68 over Antietam	2103800	WA-II-0009	Stone Arch	Boonsboro	Washington	1833	Tier I Priority	Reconstructed 1997; not nominated
Wicomico River Bridge (MD 991 over Wicomico River)	2200900	WI-117	Movable -- Bascule	Salisbury	Wicomico	1928	Tier I Priority	NRHP 2018
Snow Hill Bridge (MD 12 over Pocomoke River)	2300200	WO-178	Movable -- Bascule	Snow Hill	Worcester	1932	Tier I Priority	NRHP 2017
Pocomoke City Bridge (US 13 Business over Pocomoke River	2300400	WO-177	Movable – Bascule	Pocomoke City	Worcester	1920	Tier I Priority	NRHP 2017

Attachment 2: Tier II Historic Bridges

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
US 40 Alt (Nat'l Pike) over Wills Creek	0102800	AL-V-B-316	Concrete Arch	Cumberland	Allegany	1932	Tier II	
MD 144 (Nat'l Pike) over Flintstone Creek	0103300	AL-II-A-043	Concrete Arch	Flintstone	Allegany	(c) 1900/1925	Tier II	
MD 51 over Town Creek	0104700	AL-II-B-130	Pratt Truss	Town Creek	Allegany	1932	Tier II	
US 40 Scenic over Sideling Hill Creek	0106400	AL-I-B-084	Concrete Arch	Bellegrove	Allegany	1925	Tier II	
Stony Creek Bridge (MD 173 over Stony Creek)	0204500	AA-2196	Movable -- Bascule	Riviera Beach/Orchard Beach	Anne Arundel	1947	Tier II	
Annapolis Eastport Bridge (MD 181 over Spa Creek)	0205300	AA-2195	Movable -- Bascule	Annapolis	Anne Arundel	1946	Tier II	
MD 174 over AMTRAK	0207500	AA-2125	Metal Girder	Severn	Anne Arundel	1931	Tier II	
US 1 Alt. NB, AMTRAK, and Herberts Run	0301100	BA-2782	Metal Girder	Halethorpe	Baltimore	1936	Tier II	
Little Gunpowder Bridge (MD 7 over Little Gunpowder)	0301200	BA-2857	Concrete Arch	Bradshaw	Baltimore	1927	Tier II	
MD 45 (York Rd.) over Western Run	0304200	BA-2858	Concrete Arch	Hunt Valley	Baltimore	1917	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 45 (York Rd) over Little Gunpowder Falls	0304700	BA-2859	Concrete Arch	Parkton	Baltimore	1930	Tier II	
Gunpowder Falls Bridge (MD 45 over Gunpowder Fall)	0304800	BA-2860	Concrete Arch	Hereford	Baltimore	1924	Tier II	
Old Court Road Bridge (MD 125 over Brice Run)	0306600	BA-2861	Concrete Arch	Randallstown	Baltimore	1930	Tier II	
Gwynns Falls Bridge (MD 126 over Gwynns Falls)	0306700	BA-2862	Concrete Arch widened w/Concrete Beams	Woodlawn	Baltimore	1903/1930	Tier II	
MD 128 over Piney Run	0306800	BA-2723	Metal Girder/Beams	Dover	Baltimore	1945	Tier II	Also contributes to Worthington Valley HD.
Glyndon Bridge (MD 128 over WMRR)	0307100	BA-2070	Concrete Slab w/Stone Veneer	Glyndon	Baltimore	1947	Tier II	Also contributes to Glyndon HD
MD 147 (Harford Rd) over Little Gunpowder Falls	0309000	BA-2865	Concrete Arch	Reckford	Baltimore	1928	Tier II	
MD 147 (Harford Rd) over Haystack Branch	0309100	BA-2866	Concrete Arch	Mt. Vista	Baltimore	1915	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 147 (Harford Rd) over Long Green Creek	0309300	BA-2867	Concrete Arc h	Mt. Vista	Baltimore	1915	Tier II	
Rolling Road over CSX RR near MD 166	0310100	BA-2722	Metal Girder	Arbutus	Baltimore	1931	Tier II	
Patuxent River Bridge (Benedict Bridge) (MD 231 over Patuxent River)	0400800	CT-1214	Movable -- Bascule	Bowens/Benedict	Calvert/Charles	1950-1951	Tier II	
MD 304 (Ruthsburg Rd) over Long Marsh Ditch	0501800	CAR-303	Concrete Arch	Bridgetown	Caroline	(C) 1920	Tier II	
Forge Branch Bridge MD 480 (Ridgely Road) over Forge Branch	0501900	CAR-304	Concrete Arch	Greensboro	Caroline	1932	Tier II	
MD 315 (E. Central Ave) over Marshyhope Creek	0503000	CAR-305	Concrete Arch	Federalsburg	Caroline	1910/1936	Tier II	
MD 86 over Branch of Gunpowder Falls	0601800	CARR-1469	Concrete Slab	Lineboro	Carroll	1929	Tier II	
MD 97 over Big Pipe Creek	0603100	CARR-1462	Concrete Rigid Frame	Union Mills	Carroll	1934	Tier II	
MD 32 over Liberty Reservoir	0604900	CARR-1673	Truss -- Deck	Finksburg	Carroll	1952	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
US 1 over Octoraro Creek	0700300	CE-1480	Metal Girder	Richardsmere	Cecil	1934	Tier II	
Northeast Creek Bridge (MD 7C over Northeast Creek)	0700900	CE-1495	Concrete Arch	Northeast	Cecil	1922	Tier II	
US 40 (Pulaski Highway) over Principio Creek	0701400	CE-1496	Concrete Arch	Perryville	Cecil	1941	Tier II	
US 222 over Octoraro Creek	0702600	CE-1482	Metal Girder	Kilby Corner	Cecil	(c) 1877/1930	Tier II	
MD 6 (Port Tobacco Rd) over Wards Run	0801300	CH-495	Concrete Arch	Welcome	Charles	1929	Tier II	
Brookview Bridge (MD 14 over Marshyhope Creek)	0900100	D-584	Movable -- Bascule	Brookview	Dorchester	1931	Tier II	
Cambridge Bridge (MD 795 over Cambridge Creek)	0900800	D-707	Movable -- Bascule	Cambridge	Dorchester	1938	Tier II	
US 15B (Catoctin Mountain Highway) over Flat Run	1000100	F-6-117	Concrete Arch	Emmitsburg	Frederick	1927	Tier II	
Toms Creek Bridge (US 15B over Toms Creek)	1000200	F-6-118	Concrete Arch	Emmitsburg	Frederick	1923	Tier II	
US 15 over B&O RR and Potomac River	1001700	F-2-34	Camelback Through Truss	Point of Rocks	Frederick	1939	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
Green Bridge (MD 17 over Catoctin Creek)	1001800	F-2-37	Pratt Through Truss	Middletown	Frederick	1934	Tier II	
MD 28 over Monocacy River	1002900	F-1-132	Camelback Through Truss	Dickerson	Frederick	1931	Tier II	
US 40 (National Pike) over Catoctin Creek	1003000	F-4-115	Concrete Arch w/Stone Veneer	Myersville	Frederick	1936	Tier II	
US 40 over Little Catoctin Creek	1003200	F-4-117	Concrete Arch w/Stone Veneer	Myersville	Frederick	1936	Tier II	
MD 144FA over the Monocacy River	1003800	F-3-205	Deck Truss	Frederick	Frederick	1955	Tier II	
MD 144FA over the Monocacy River	1003804	F-3-251	Open Spandrel Concrete Arch	Frederick	Frederick	1942	Tier II	
Catoctin Creek Bridge, US 40 Alt. over Catoctin Creek	1004000	F-4-26	Concrete Arch	Middletown	Frederick	1923	Tier II	
MD 77 over Monocacy River	1005500	F-6-23	Pratt Through Truss	Rocky Ridge	Frederick	1932	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 180 (Jefferson Pike) over Catoctin Creek	1008200	F-2-95	Concrete Arch	Petersville	Frederick	1928	Tier II	
MD 355 over Monocacy River	1008500	F-7-117	Parker Through Truss	Frederick	Frederick	1930	Tier II	
MD 733 (former Old US 40) over Little Savage River	1100800	G-I-B-034	Stone Arch	Finzel	Garrett	1840	Tier II	
MD 135 over Savage River	1101800	G-I-E-199	Concrete Rigid Frame	Bloomington	Garrett	1937	Tier II	
US 1 over Susquehanna River/Conowingo Dam	1200100	HA-1971	Concrete Beam	Conowingo	Harford	1927	Tier II	
Winters Run Bridge (US 1 Bel Air Rd)	1200400	HA-1984	Concrete Arch	Bel Air	Harford	1930	Tier II	
MD 24 over Deer Creek	1201600	HA-1576	Pratt Through Truss	Rocks	Harford	1934	Tier II	
Priest Ford Road Bridge (MD 136 over Deer Creek)	1203300	HA-1579	Warren Pony Truss	Trappe	Harford	1931	Tier II	
US 40 over Little Patuxent River	1303200	HO-649	Concrete Rigid Frame	Ellicott City	Howard	1939	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
US 40 over Forest Road Underpass	1303400	HO-656	Concrete Slab w/Stone Veneer	Ellicott City	Howard	1936	Tier II	
MD 299 over Herring Branch of Sassafras River	1401700	K-682	Concrete Arch -- LUTEN	Sassafras	Kent	1913	Tier II	
MD 299 over Jacobs Creek	1401800	K-681	Timber and Concrete Composite	Sassafras	Kent	1938	Tier II	
Hopewell Bridge (MD 291 over Morgan Creek)	1402200	K-453	Pratt Through Truss	Hopewell	Kent	1934	Tier II	
Snell Bridge (MD 108 over Patuxent River)	1500800	M: 15-95	Concrete Arch	Ashton	Montgomery	1928	Tier II	
Sligo Creek Bridge (MD 195 over Sligo Creek)	1503300	M: 37-7	Open Spandrel Concrete Arch	Takoma Park	Montgomery	1932	Tier II	
MD 212 over Indian Creek	1603800	PG: 61-27	Concrete Slab w/Stone Veneer	Greenbelt	Prince George's	1937	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
Northwest Branch Bridge (MD 212) over Northwest Branch	1604200	PG:65-22	Concrete Arch	Takoma Park	Prince George's	1932	Tier II	
MD 412A (Riverdale Rd) over NE Branch of Anacostia	1606900	PG:68-84	Concrete Arch	Riverdale	Prince George's	1931	Tier II	
MD 201 (Edmonston Rd) over Beaverdam Creek	1611100	PG:67-6	Concrete Arch	Greenbelt	Prince George's	1940	Tier II	
MD 18B over Kent Narrows	1700600	QA-542	Movable -- Bascule	Grasonville	Queen Anne's	1951	Tier II	
MD 238 (Maddox Rd) over Burroughs Run	1801800	SM-617	Concrete Arch	Maddox	St. Mary's	1929	Tier II	
US 40 over Branch of Antietam Creek	2101300	WA-I-730	Concrete Rigid Frame	Hagerstown	Washington	1941	Tier II	
US 40 WB (National Pike) over Antietam Creek	2101400	WA-I-842	Concrete Arch	Hagerstown	Washington	1936	Tier II	
US 40 over Landis Spring Branch	2101500	WA-II-1113	Concrete Rigid Frame	Hagerstown	Washington	1936	Tier II	
US 40 over Beaver Creek	2101600	WA-II-0476	Concrete Rigid Frame	Wagners Crossroads	Washington	1936	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
Funkstown Turnpike Bridge (First Funkstown Bridge)	2101800	WA-I-029	Stone Arch w/Alterations	Funkstown	Washington	1823/1931	Tier II	
Kline's Mill Bridge (Newcomer's Mill/US40Alt. over Beaver Creek)	2102000	WA-II-042	Stone Arch w/Alterations	Benevola	Washington	1840/1948	Tier II	
MD 56 (Big Pool Rd) over Little Conococheague Creek	2102300	WA-V-063	Concrete Arch	Clear Spring	Washington	1907	Tier II	
Antietam Creek Bridge (MD 64)	2102800	WA-I-843	Concrete Arch	Hagerstown	Washington	1934	Tier II	
MD 68 over Conococheague Creek	2103600	WA-I-020	Stone Arch w/Alterations	Williamsport	Washington	1829/1984	Tier II	
Devil's Backbone Bridge (MD 68 over Beaver Creek)	2103900	WA-II-017	Stone Arch	Boonsboro	Washington	1824/1979	Tier II	Stabilized in 2018
Sandy Hook Bridge, US 340 over Potomac River, CSX RR, C&O Canal, Sandy Hook Road	2104100	WA-III-168	Arch Deck Truss	Sandy Hook	Washington	1947	Tier II	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
Conococheague Creek Bridge, MD 494 over Conococheague Creek	2104200	WA-I-462	Pratt Through Truss	Fairview	Washington	1932	Tier II	
US 522 over Potomac River, CSX Railroad, and C&O	2104300	WA-VI-053	Wichert Deck Truss	Hancock	Washington	1939	Tier II	
US 522 over MD 144 and Tonoloway Creek	2112400	WA-HAN-349	Wichert Deck Truss	Hancock	Washington	1937	Tier II	
US 13 Business over East Branch of Wicomico River	2200400	WI-224	Timber & Concrete Composite	Salisbury	Wicomico	1937	Tier II	
MD 347 over Quantico Creek	2201400	WI-340	Concrete Slab	Quantico	Wicomico	1926	Tier II	
US 50 EB over Herring Creek	2300603	WO-594	Concrete Girder	Ocean City	Wicomico	1942	Tier II	Added 2023
US 50 WB over Herring Creek	2300604	WO-482	Concrete Girder	Ocean City	Worcester	1942	Tier II	
Ocean City Bridge (US 50 over Sinepuxent Bay)	2300700	WO-461	Movable -- Bascule	Ocean City	Worcester	1942	Tier II	
US 113 over Purnell Branch	2300800	WO-483	Concrete Slab	Snow Hill	Worcester	1952	Tier II	

Attachment 3: Tier III Historic Bridges

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 36 over Jennings Run	0100700	AL-V-B-312	Concrete Beam	Mount Savage	Allegany	1929	Tier III	
MD 935 over Georges Creek	0101900	AL-VI-C-327	Metal Girder	Barton	Allegany	1932	Tier III	
MD 51 over Sawpit Run	0104600	AL-II-B-146	Concrete Slab	Town Creek	Allegany	1932	Tier III	
MD 170 over Severn Run	0204400	AA-2119	Concrete Beam	Odenton	Anne Arundel	1936	Tier III	
MD 25 over Jones Falls	0302700	BA-2663	Concrete Beam	Timonium	Baltimore	1932	Tier III	
US 40 over Whitemarsh Run	0303700	BA-2666	Concrete Beam	White Marsh	Baltimore	1935	Tier III	
MD 140 over North Branch of Jones Falls	0307400	BA-2669	Concrete Beam	Garrison	Baltimore	1900	Tier III	
FORMER MD 331 over Hunting Creek	0501300	CAR-289	Rigid Frame	Linchester (Preston)	Caroline	1936	Tier III	Currently not in service
MD 404 Alternate over Tuckahoe Creek	0501700	CAR-297	Concrete Beam	Hillsboro	Caroline	1915	Tier III	
MD 31 over Dickerson Run	0600700	CARR-1557	Concrete Beam	New Windsor	Carroll	1924	Tier III	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 31 over Sams Creek	0600800	CARR-1468	Concrete Slab	New Windsor	Carroll	1929	Tier III	
MD 850 over Talbot Branch	0604200	CARR-1473	Concrete Slab	Franklinville	Carroll	1930	Tier III	
MD 7 over Stoney Run	0700800	CE-1489	Concrete Slab	North East	Cecil	1931	Tier III	
MD 272 SB over North East Creek	0703700	CE -1469	Concrete Slab	North East	Cecil	1944	Tier III	
MD 5 SB over Zekiah Swamp	0800200	CH-487	Concrete Beam	Bryantown	Charles	1931	Tier III	
MD 5 SB over Zekiah Swamp	0800300	CH-488	Concrete Beam	Bryantown	Charles	1931	Tier III	
MD 6 over Nanjemoy Creek	0801500	CH-387	Concrete Slab	Grayton	Charles	1922	Tier III	
MD 224 over Reeders Run	0801800	CH-381	Concrete Beam	Chicamuxen	Charles	1928	Tier III	
MD 806A over Little Hunting Creek	1000700	F-6-107	Concrete Beam	Thurmont	Frederick	1927	Tier III	
MD 85 over Branch of Monocacy River	1001300	F-1-81	Concrete Slab	Buckeystown	Frederick	1929	Tier III	
MD 28 over Branch of Potomac River	1001500	F-1-82	Concrete Slab	Point of Rocks	Frederick	1937	Tier III	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
US 40 over Branch of Little Catoctin Creek (Hawbottom Br)	1003300	F-4-102	Concrete Beam	Myersville	Frederick	1936	Tier III	
US 40 WB over Rock Creek	1003400	F-3-49	Concrete Beam	Frederick	Frederick	1936	Tier III	
MD 75 over Branch of Bennett Creek	1004600	F-7-125	Concrete Slab	Urbana	Frederick	1930	Tier III	
MD 77 over Owens Creek	1005300	F-6-115	Metal Girder	Rocky Ridge	Frederick	1932	Tier III	
MD 140 over Middle Creek	1006300	F-6-112	Concrete Beam	Emmitsburg	Frederick	1932	Tier III	
MD 180 over Little Catoctin Creek	1008100	F-2-90	Concrete Beam	Petersville	Frederick	1912/1932	Tier III	
MD 478 over unnamed tributary of Potomac River	1008800	F-2-92	Concrete Beam	Knoxville	Frederick	1926	Tier III	
MD 17 over Catoctin Creek	1017600	F-4-41	Metal Girder	Myersville	Frederick	1928	Tier III	
MD 17 over Little Catoctin Creek	1017700	F-4-112	Concrete Beam	Myersville	Frederick	1919	Tier III	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 742 over Youghiogheny River	1101100	G-II-A-366	Metal Girder	Friendsville	Garrett	1932	Tier III	
MD 135 over CSX RR	1101600	G-IV-B-271	Metal Girder	Altamont	Garrett	1930	Tier III	
MD 136 over Big Branch	1203000	HA-1977	Concrete Beam	Harkins	Harford	1934	Tier III	
MD 136 over Falling Branch	1203100	HA-1866	Concrete Beam	Pylesville	Harford	1930	Tier III	
MD 176 over Deep Run (aka MD 103?)	1304100	HO-650	Concrete Beam	Dorsey	Howard	1937	Tier III	
MD 291 over Cypress Creek	1401500	K-675	Concrete Beam	Millington	Kent	1928	Tier III	
MD 28 over the Little Monocacy River	1500100	M:12-47	Concrete Beam	Dickerson	Montgomery	1925	Tier III	
MD 97 over Hawlings River	1501100	M:23-125	Concrete Beam	Sunshine	Montgomery	1930	Tier III	
MD 650 over Hawlings River	1501700	M:23-127	Concrete Beam	Ashton	Montgomery	1929	Tier III	
MD 117 over Bucklodge Branch	1501800	M:18-46	Concrete Slab	Bucklodge	Montgomery	1932	Tier III	
MD 547 over Rock Creek	1506200	M:31-16	Concrete Beam	Kensington	Montgomery	1932	Tier III	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 212 over CSX (B&O) Railroad	1603900	PG: 61-28	Metal Girder	Beltsville	Prince George's	1937	Tier III	
MD 978 over Collington Branch	1604800	PG:74B-21	Concrete Slab	Bowie	Prince George's	1929	Tier III	
MD 381 over Swanson Creek	1606000	PG: 87B-37	Concrete Slab	Acquasco	Prince George's	1930	Tier III	
MD 382 over Mataponi Creek	1606200	PG:86A-28	Concrete Slab	Croom	Prince George's	1930	Tier III	
MD 410 over Sligo Creek	1606700	PG:65-20	Concrete Beam	Takoma Park	Prince George's	1934	Tier III	
MD 405 over Southeast Creek	1703300	QA-479	Concrete Beam	Church Hill	Queen Anne's	1933	Tier III	
MD 456 over Branch of Wye River	1703500	QA-482	Concrete Slab	Queenstown	Queen Anne's	1924	Tier III	
MD 5 over Hilton Run	1800700	SM-521	Metal Girder	Park Hall	St. Mary's	1935-36	Tier III	
MD 5 over Church Creek	1801000	SM-519	Metal Girder	Church Cove	St. Mary's	1936	Tier III	
MD 6 over Lockes Swamp Creek	1801200	SM-515	Concrete Slab	Huntersville	St. Mary's	1930	Tier III	
MD 471 over St. Mary's River	1802900	SM-514	Concrete Beam	Great Mills	St. Mary's	1932	Tier III	

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Preservation Level	Status Notes
MD 303 over Norwich Creek	2001000	T-947	Concrete Slab	Queen Anne	Talbot	1928	Tier III	
MD 328 over Wootenaux Creek	2001300	T-943	Metal Girder	Easton	Talbot	1936	Tier III	
MD 662C over Potts Mill Creek	2002200	T-942	Concrete Slab	Easton	Talbot	1911	Tier III	
MD 62 over Little Antietam Creek	2102600	WA-I-735	Concrete Slab	Leitersburg	Washington	1931	Tier III	
MD 353 over Burnt Mill Branch	2201800	WI-220	Concrete Slab	Pittsville	Wicomico	1934	Tier III	
MD 354 over Tilghman Race	2301100	WO-489	Concrete Beam	Whiton	Worcester	1932	Tier III	
MD 374 over Liberty Town Branch	2301400	WO-485	Concrete Slab	Berlin	Worcester	1931	Tier III	Added 2017

Attachment 4: Removed Bridges

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Former Preservation Level	Status Notes
MD 36 over Jennings Run	0100800	AL-V-A-314	Concrete Beam	Mount Savage	Allegany	1929	Tier II	Replaced 2018
MD 25 over George's Run	0301900	BA-2783	Concrete Beam	Hampstead	Baltimore	1932	Tier III	Replaced 2015
US 40 over Gunpowder Falls	0303503/0303504	BA-2720	Metal Girder Beam	Kingsville	Baltimore	1935	Tier III	Replaced 2023
US 40 over Honeygo Run	0303600	BA-2784	Concrete Beam	White Marsh	Baltimore	1935	Tier III	Determined not eligible in 2009 Addendum; removed 2023
MD 150 over MD 700	0309500	BA-2724	Metal Girder	Middle River	Baltimore	1942	Tier III	Removed 2015
MD 151 over Patapsco & Back River Railroad and MD 151B	0309900	BA-2714	Metal Girder/Steel Beam	Sparrows Point	Baltimore	1954	Tier II	Demolished 2021; 2019 MOA; removed 2021
MD 261 over Fishing Creek	0401100	CT-1187	Metal Girder	Chesapeake Beach	Calvert	1940	Tier II	Replaced 2018; 2013 MOA closed in 2019; removed 2015
MD 287 over Choptank River	0500200	CAR-257	Concrete Arch	Goldsboro	Caroline	1919	None	Replaced 2013; 2010 MOA closed in 2012; removed 2015
MD 478 over Branch of the Potomac River	1008900	F-2-92	Concrete Beam	Brunswick	Frederick	1925	Tier III	Replaced 2019; removed 2022

Name	SHA Bridge Number	MIHP Number	Bridge Type	City/Town	County	Date	Former Preservation Level	Status Notes
MD 42 (Friendsville Road) over Buffalo Run	1101000	G-II-A-374	Concrete Arch	Friendsville	Garrett	1930	Tier II	Determined not eligible in 2020 due to condition; removed 2020
MD 118 over B&O Railroad	1501900	M: 19-36	Concrete Beam	Germantown	Montgomery	1905/1927	Tier III	Replaced 1998; determined not eligible and removed 2018
MD 213 over Gravel Run	1702000	QA-480	Concrete Slab	Centreville	Queen Anne's	1934	Tier III	Determined not eligible and removed 2018
MD 6 over Persimmon Creek	1801300	SM-516	Concrete Slab	Cremona	St. Mary's	1932	Tier III	Determined not eligible in 2020 following storm damage; removed 2021
MD 244 over Poplar Hill Creek	1802400	SM-506	Metal Girder	Chingville	St. Mary's	1938	Tier III	Determined not eligible in 2021 based on 1996 alterations; removed 2022
MD 858 over Little Antietam Creek	2104700/210224X01	WA-III-121	Concrete Slab Small Structure	Rohrersville	Washington	1922/1930s	Tier III	Small structure; transferred to Washington County in 1995; removed 2023
US 113 SB over Corkers Creek	2302300/23144X0	WO-486	Concrete Slab Small Structure	Snow Hill	Worcester	1971/1912	Tier III	Small structure misidentified as 2302300 (NB 113); removed 2018
MD 374 over Liberty Town Branch	23136X0	WO-588	Concrete Slab Small Structure	Berlin	Worcester	1931	N/A	Small structure removed 2018

Attachment 5
Links to Documentation Referenced in the Historic Highway Bridges in Maryland PA

Programmatic Agreements

Amended Programmatic Agreement Among The Federal Highway Administration, The Maryland Department of Transportation State Highway Administration, Maryland Transportation Authority, The Maryland State Historic Preservation Officer and The Advisory Council on Historic Preservation Implementing Section 106 of The National Historic Preservation Act for Federal Highway Administration Undertakings In Maryland (Statewide PA)https://roads.maryland.gov/OPPEN/2021_PA_Amendment.pdf

Federal Codes and Regulations

16 U.S.C. 470aa-470mm
Archaeological Resources Protection Act (ARPA)
https://uscode.house.gov/view.xhtml?path=/prelim@title16/chapter1B&edition=prelim

23 U.S.C. § 101 et seq.
Federal Aid Highways
https://www.fhwa.dot.gov/map21/docs/title23usc.pdf

25 U.S.C. Ch. 32 § 3001
Native American Grave Protection and Repatriation Act (NAGPRA)
https://uscode.house.gov/view.xhtml?path=/prelim@title25/chapter32&edition=prelim

36 C.F.R. Part 14 and 54 U.S.C. § 100902
Rights-of-Way
https://www.ecfr.gov/current/title-36/chapter-I/part-14
https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title54-section100902&num=0&edition=prelim

36 C.F.R. Part 63
Dispute Resolution of Determinations of Eligibility for Inclusion in the NRHP
https://www.ecfr.gov/current/title-36/chapter-I/part-63

36 C.F.R. Part 79
Curation of Federally Owned and Administered Archaeological Collections
https://www.ecfr.gov/current/title-36/chapter-I/part-79

36 C.F.R. Part 800
Implementing Regulations of Section 106 of the National Historic Preservation Act
https://www.ecfr.gov/current/title-36/chapter-VIII/part-800?toc=1

40 C.F.R. 1506.6(a)

Public involvement – National Environmental Policy Act
https://www.ecfr.gov/current/title-40/chapter-V/subchapter-A/part-1506#1506.6

54 U.S.C.

- National Park Service and Related Programs
  - § 100101(a) Promotion and Regulation of the National Park Service (NPS Organic Act)
    - https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title54-section100101&num=0&edition=prelim
- National Historic Preservation Act
  - § 306108 Effect of Undertaking on Historic Property
    - https://uscode.house.gov/view.xhtml?req=(title:54%20section:306108%20edition:prelim)
  - § 307103 Access to Information (Section 304)
    - https://www.achp.gov/digital-library-section-106-landing/frequently-asked-questions-protecting-sensitive-information

State Codes and Regulations

Transportation Article
Annotated Code of Maryland § 2-103.1
https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=gtr&section=2-103.1&enactments=false

The Maryland Historical Trust Act of 1985, as amended
Annotated Code of Maryland § 5A-325 and 5A-326
https://mht.maryland.gov/Documents/MHTAct5A325-326.pdf

Guidelines and Standards

Bridge Safety and Design Exceptions

- *AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 9th Edition (or current edition)*
  https://store.transportation.org/item/collectiondetail/202

- *FHWA Design Exceptions Code of Federal Regulations Title 23 Part 625.3 (f) (23 CFR 625.3)*
  https://www.ecfr.gov/current/title-23/section-625.3

Advisory Council on Historic Preservation

- *Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System* (ACHP Program Comment, 2005)
  https://www.achp.gov/sites/default/files/exemptions/2017-01/final_interstate_exemption_notice.pdf

- *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (ACHP February 2007)

https://www.achp.gov/sites/default/files/policies/2018-06/ACHPPolicyStatementRegardingTreatmentofBurialSitesHumanRemainsandFuneraryObjects0207.pdf

- *Program Comment Issued for Streamlining Section 106 Review for Actions Affecting Post-1945 Concrete and Steel Bridges* (77 FR 68790)
  https://www.federalregister.gov/documents/2012/11/16/2012-27866/program-comment-issued-for-streamlining-section-106-review-for-actions-affecting-post-1945-concrete

- *Section 106 Archaeology Guidance* (ACHP, 2009)
  https://www.achp.gov/sites/default/files/guidance/2017-02/ACHP%20ARCHAEOLOGY%20GUIDANCE.pdf

The Maryland Historical Trust

- Standards and Guidelines for Archaeological Investigations in Maryland (Shaffer and Cole 1994)
  https://mht.maryland.gov/documents/PDF/archeology/Archeology_standards_investigations.pdf

- *Technical Update No. 1 of the Standards and Guidelines for Archaeological Investigations in Maryland: Collections and Conservation Standards* (2018)
  https://mht.maryland.gov/documents/PDF/archeology/Archeology_standards_curation.pdf

- Standards and Guidelines for Architectural and Historical Investigations in Maryland (Maryland Historical Trust, Revised 2019)
  https://mht.maryland.gov/documents/PDF/research/Survey_standards_architecture_web.pdf

The Maryland State Highway Administration

- *Historic Highway Bridges in Maryland: 1631-1960: Historic Context Report* (Spero & Company and Berger & Associates, 1995)
  https://roads.maryland.gov/mdotsha/pages/Index.aspx?PageId=196

- *Historic Highway Bridge Management Plan*
  https://roads.maryland.gov/OPPEN/Maryland%20SHA%20Management%20Plan%20for%20Historic%20Highway%20Bridges.pdf

- *Phase II State Historic Bridge Context & Inventory of Modern Bridges, Survey Report and Assessments of Significance* (URS 2004)
  https://roads.maryland.gov/OPPEN/MDBridgeSurvey.pdf

- *'Tomorrow's Roads Today,' Expressway Construction in Maryland 1948-1965* (Bruder 2010)
  https://roads.maryland.gov/OPPEN/Expressway_Construction_web.pdf

The National Park Service

- Management Policies – Section 5, Cultural Resource Management (2006)
  https://www.nps.gov/subjects/policy/upload/MP_2006.pdf

- NPS Museum Handbook, National Park Service, revised 2019
  https://www.nps.gov/museum/publications/handbook.html

- NRHP Bulletin 15 – How to Apply the National Register Criteria for Evaluation (National Park Service revised 1997)
  https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf

- Other NRHP Bulletins
  https://www.nps.gov/subjects/nationalregister/publications.htm#:~:text=national%20register%20of%20historic%20places%20bulletins

- The Secretary of the Interior's Guidelines for the Treatment of Cultural Landscapes (1996)
  https://www.nps.gov/tps/standards/four-treatments/landscape-guidelines/index.htm

- The Secretary of the Interior's Guidelines for the Treatment of Historic Properties (1995, Revised 2017)
  https://www.nps.gov/tps/standards/treatment-guidelines-2017.pdf

- The Secretary of the Interior's Professional Qualifications Standards
  https://www.nps.gov/articles/sec-standards-prof-quals.htm
  OR see 48 FR 44738
  https://www.nps.gov/subjects/historicpreservation/upload/standards-guidelines-archeology-historic-preservation.pdf

- The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983)
  https://www.nps.gov/subjects/historicpreservation/upload/standards-guidelines-archeology-historic-preservation.pdf

- The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995, Revised 2017)
  https://www.nps.gov/tps/standards/four-treatments.htm
  OR https://www.ecfr.gov/current/title-36/chapter-I/part-68


MARYLAND DEPARTMENT
OF TRANSPORTATION
STATE HIGHWAY
ADMINISTRATION