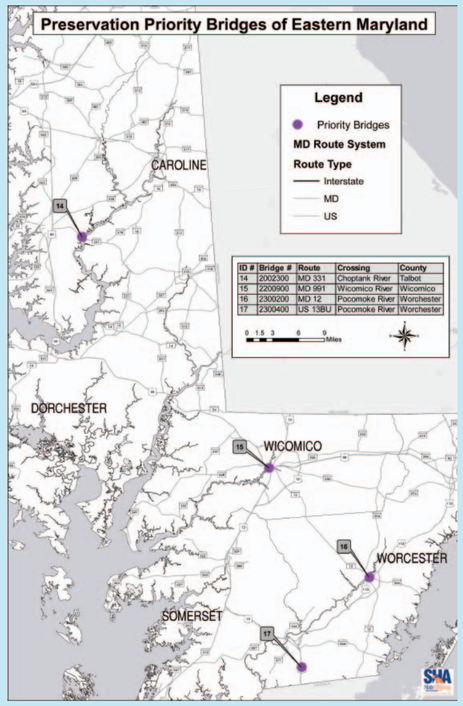
Eastern Shore of Maryland (continued)

Snow Hill Bridge (MD 12 over Pocomoke River)
1932, Snow Hill, Worcester County **16**

The Snow Hill Bridge is a single bascule bridge with Neoclassical detailing by J. E. Greiner Company, that is another of the collaborative efforts with the SRC. While the movable bridges on the Eastern Shore were built at a time of increasing standardization at the SRC, the uniqueness of each river crossing led Greiner to develop a different solution for each of the movable bridges. In other places, the double leaf bascule and movable spans enabled larger ships to cross through the passage. The former Corddry Company Warehouse has stood on the banks of the Pocomoke River since 1915, and its frequent appearance in photographs of the Snow Hill Bridge makes for an iconic image of the bridge and the town's industrial area.

Pocomoke City Bridge
(US 13 Business over Pocomoke River)
1920, Pocomoke City, Worcester County **17**

The Pocomoke City Bridge is a double-leaf Trunnion bascule movable bridge designed in the Classical Revival style by J. E. Greiner Company for the SRC. By the 1920s, vehicular traffic was taking precedence over steamboats. Although the double-leaf bascule easily accommodated the larger ships, the decline of bigger steamboats left the Eastern Shore isolated and its economy damaged. Highway transportation was faster, but it required building better and wider roads and bridges that could accommodate increased traffic volumes, loads and speeds. Goods were still shipped across the Bay, but the roads helped to connect the Eastern Shore towns. The Classical Revival style Pocomoke City Bridge is an example of the City Beautiful Movement and is a contributing resource to the Pocomoke City Historic District.



Bridge Basics

Movable Bridges

Because navigation was so vital in Maryland, especially in the Tidewater region, ship passage was an important consideration for bridge builders. When it was not practical to build high enough for ship clearance, movable bridges were constructed. These crossings have one or more spans that open in addition to several fixed approach spans. Movable bridges in Maryland are one of two types: bascule bridges, which have one or two leaves or deck sections that lift upward by mechanical means; or swing spans, which rotate horizontally around a central pier. Both are known as drawbridges. Most of Maryland's movable bridges were built in the eastern part of the state.

Masonry Arch Bridges

The durability of stone and the strength of the arch make a powerful combination for a strong long-lasting bridge. Using methods perfected by the Romans more than two-thousand years earlier, Maryland masons placed stones side by side over a wooden barrel-shaped brace and locked them into place with a keystone. Once the keystone was set, the wooden bracing was removed. Rubble, large rocks, and dry soil filled in the space behind stone retaining walls, known as spandrels. The roadway was built on top. Stone arch bridges are the oldest bridges in existence in Maryland. Plentiful native stone made them popular in the north-central and western areas of the state.

Concrete Bridges

The use of local materials and labor made concrete bridges popular in Maryland during the Great Depression of the 1930s. Reinforced concrete was fashioned into beams, slabs, and arches and was particularly suitable in standardizing bridge design. All of Maryland's concrete arch bridges are deck arches, meaning the arch is located below the roadway. If the wall ofthe arch are solid, it iscalled a closed spandrel arch. Engineers often built open-spandrel concrete arches where they wanted to complement a beautifulsetting. Closed-spandrel designs are sometimes faced in stone or sport decorative parapets. A popular closed-spandrel form is the Luten arch, recognized by its very narrow crown and long, shallow arch.

Metal Suspension, Arch, and Cantilever Bridges

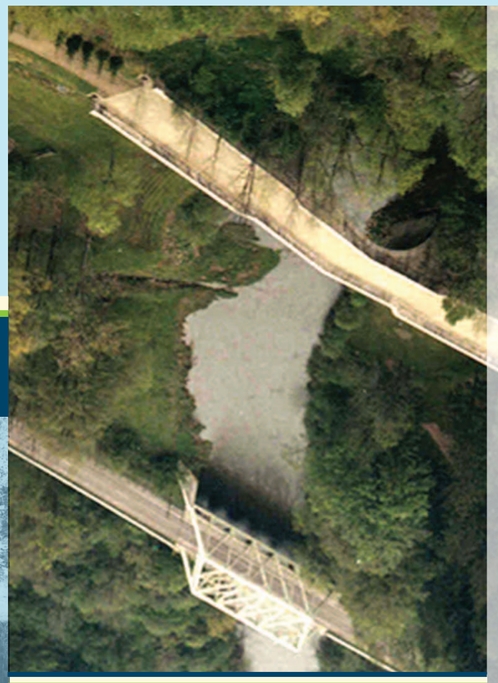
Metal suspension, arch, and cantilever bridges are all suitable for long-span crossings such as the Potomac and Susquehanna Rivers and Chesapeake Bay. In a metal suspension bridge, the roadway is supported from above, rather than below. It hangs from suspenders, or metal rods, attached to cables draped over towers, which are attached to heavy masonry anchorages. A metal arch bridge consistsof two or more parallel arches of iron or steel. If the arches are above the roadway, they are trough arches. If the arches are below the roadway, they are deck arches. A cantilever bridge is a type of metal trusssupported in the middle or at one side, rather than at both ends; the bridge extends, or cantilevers, beyond the supporting pier.

Metal Truss Bridges

Steel truss bridges are among Maryland's most familiar historic bridges. Truss bridges are defined by their arrangement of triangular panels, which work in compression or tension against the forces of gravity. The most frequently used in Maryland and the simplest was the Pratt truss, which has diagonal elements in tension and vertical elements in compression. Its numerous variations include the Whipple, or double-intersection Pratt; the Parker and the Camelback; the bowstring; the Warren; and the Howe. A through truss rises above the road and has overhead bracing; a pony truss has no overhead bracing; a deck truss is entirely below the road. Early metal trusses were connected with pins and I-bars; later they were riveted and then bolted.

Timber Bridges

Although there is no known pre-nineteenth century example, Maryland's abundant forests provided ample resources for wooden bridges, the first bridge type built in the state. Wooden bridges were reliable, cheap, and easy to build, but they weathered rapidly. The earliest were as elemental as logs lashed together to form simple beam bridges. Later, supports made by hammering boards into triangles allowed timber to span greater distances than a single beam could. Beginning in the 1800s, wooden bridges were covered to protect them from deterioration. They were supported by various truss types: the king-post truss (one large wooden triangle with one vertical member), multiple king-post trusses (a series of smaller triangles), queen-post truss (a triangle with two vertical members), or Burr arch truss (a wooden arch combined with a multiple king-post truss).



Maryland Historic Highway Bridges

Maryland's Historic Highway Bridges

In order to honor Maryland's engineering heritage and preserve the best of Maryland's bridges from across the state, SHA has identified 17 historic bridges to be retained as Preservation Priority Bridges in SHA's Historic Highway Bridge Program. The Preservation Priority Bridges exemplify Maryland's essential bridge types: fixed and movable spans of stone, concrete, iron, steel, and aluminum. Retention of these superb structures spotlights the significant history of Maryland's principal transportation routes, such as the National Road and tributaries of the Chesapeake Bay, the towns and regions they transformed, as well as the engineering marvels of our roadways from the past two centuries. The bridges were constructed by turnpike companies, the Maryland State Roads Commission and its predecessor agency, the Maryland State Highway Administration. Each bridge is eligible for inclusion in the National Register of Historic Places.

Find out More

Maryland State Highway Administration
(Community Improvement/Cultural Resource Protection)
http://www.roads.maryland.gov/Index.aspx?PageId=729

Maryland Scenic Byways
(Community Improvement/Scenic Byways)
http://roads.maryland.gov/Index.aspx?pageId=50&d=102

Maryland Historical Trust
www.mht.maryland.gov

Maryland Office of Tourism
www.visitmaryland.org

Photo credits:
MDOT Photo Archive: Bridge Basics - Movable Bridge, Masonry Arch Bridge, Concrete Bridge, Metal Suspension, Arch and Cantilever Bridge, Metal Truss Bridge and Timber Bridge; and Bridge No. 10; SHA Copyright, photos by Carol Highsmith: Bridge Nos. 2, 6, 7, 14, and 16
_____, photo by Dan Breitenbach: Three Bridges (cover photo)
_____, photo by Stephanie Foell: Bridge No. 5
SHA Photo Archive: Bridge Nos. 1, 3, 4, 8, 9, 11, 12, 13, 15 and 17

Maryland's Historic Highway Bridges

Western Maryland

US 40 Alternate over Casselman River 1932, Grantsville, Garrett County **1**

When viewed from Casselman River Park, the 1932 Pratt through-truss bridge provides a dramatic counterpoint to the 1813 Casselman River Bridge, one of the National Road's stone arch bridges. In the early 20th century, standardized concrete bridges eclipsed metal truss bridges at small-to-moderate length crossings. However, the metal truss remained the go-to bridge for larger crossings, since the trusses could be shipped to the construction site preassembled and be quickly built.

Blue Bridge (MD 942 over Potomac River) 1954, Cumberland, Allegany County **2**

This 315-foot-long, double-span bridge is one of the state's few steel tied-arch designs. An unmistakable Cumberland landmark, the Blue Bridge carries Johnson Street (MD 942) over the North Branch of the Potomac River. A tied-arch bridge works much like a bow (as in a bow and arrow) turned on its side. Just as a bow forms an arch because it is tied together by a string, the arch of this bridge curves and is tied into place by long steel I beams. The road hangs from the arch by metal suspenders. In the 1950s, blue was a popular paint color for bridges – a choice made iconic at this location.

MD 144A over Flintstone Creek 1925, Flintstone, Allegany County **3**

The Flintstone Bridge is a single span, closed spandrel concrete arch bridge that was originally built in 1900 and was widened in 1925. Maryland's motor vehicles on state highways tripled in the decade between 1920 and 1929 and shipping increasingly moved overland by highway. The transformation of America's transportation system between the first and second World Wars spurred construction of wider and stronger bridges along the National Road in the decades prior to the mid-20th century construction of dualized US 40. However, the engineers continued to utilize more elegant arched forms in picturesque locales statewide. Flintstone, a remote valley town surrounded by Polish, Martin, and Warrior Mountains, retains its unspoiled setting and the pioneering spirit that settled the western part of Maryland.

MD 51 over C&O Canal 1932, Keifars, Allegany County [near Paw Paw, WVA] **4**

MD 51 over C&O Canal is a single span, steel Warren Camelback pony truss commissioned by the SRC in 1932 with a design likely from the Roanoke Iron and Bridge Works. Pony trusses lack both full height walls and the connecting struts and bracing that form the through-truss bridge. With roots in Baltimore's 19th century railroad system, such bridges were built throughout the state as part of the SRC's early 20th century Good Roads Movement in locations where long, reliable spans were required.

US 40 over Licking Creek 1938, Big Pool, Washington County **5**

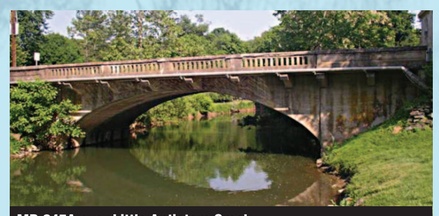
An unusual example among the sturdy 1930s metal bridges along the historic National Pike, US 40 over Licking Creek is a Wichert deck truss and girder bridge that is further distinguished by the Art Deco detailing that enlivens the balustrade. The Wichert truss is a continuous type of truss. Before computers, engineers struggled to calculate the interaction of tension and compression on truss bridge spans. E. M. Wichert of Pittsburgh developed a new solution to the problem in 1930. In a Wichert Truss, an open, hinged quadrilateral over the intermediate pier allows the force of each span to be calculated independently.

US 40 over Conococheague Creek 1936, Wilson, Washington County **6**

US 40 over Conococheague is a triple-span, reinforced-concrete, open spandrel arch bridge that replaced the Wilson Stone Arch Bridge in 1936 when the traffic on the National Road surpassed the older bridge's capacity. The current bridge elegantly pays tribute to its predecessor. The columns in the bridge's open spandrel support the deck which gives it a lighter appearance.

Booth's Mill Bridge (MD 68 over Antietam Creek) 1833, Boonsboro, Washington County **7**

Charles Wilson led construction of the Booth's Mill Bridge to Washington County's specifications, replacing an earlier timber bridge. The bridge is of coursed local limestone set in three segmental arches supported by bullnose piers. These rounded piers prevent debris from damaging the bridge. Early bridges are often found alongside water-powered mill sites because farmers needed to bring their grain and lumber to local mills. The stone arch bridges on the National Road quickly proved their utility and in the early 19th century Commissioners in stone-rich areas like Washington County specified them for main routes between farms and mills.

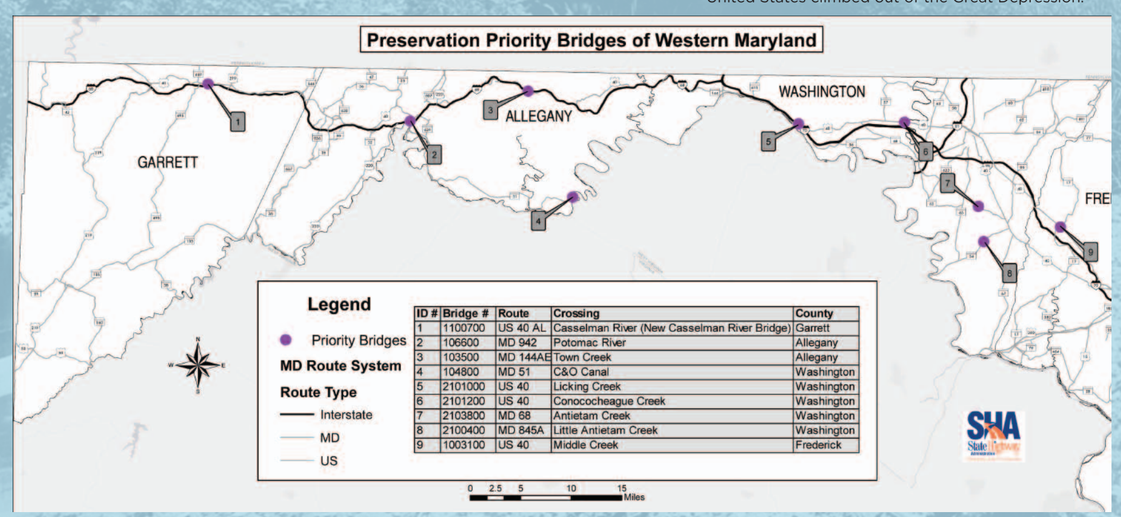


MD 845A over Little Antietam Creek 1927, Keedysville, Washington County **8**

MD 845 over the Little Antietam Creek is a single-span, closed-spandrel concrete arch bridge built by the Luten Bridge Company. The Keedysville bridge shows how the SRC used concrete arch bridges to complement Maryland's picturesque small towns in the interwar period at the same time as they developed standardized plans to construct a safe and economical transportation system. The experience of crossing the bridge is enriched for both the driver and pedestrian by the bridges' elegant open parapet design, distinctive Luten flattened arch form, and cantilevered sidewalks extending out over the waterway.

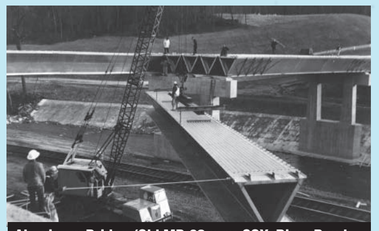
US 40 over Middle Creek 1936, Meyersville, Frederick County **9**

Built in 1936 as part of the highway's relocation and widening, US 40 over Middle Creek is a closed spandrel, concrete arch bridge. The simple grace of the bridge's Woodstock granite-faced arches and refined details enhance its bucolic setting. Public Works projects such as this show how infrastructure projects employed local tradesmen to bolster the economy, enrich communities, and support commerce and personal mobility as the United States climbed out of the Great Depression.



ID #	Bridge #	Route	Crossing	County
1	1100700	US 40 AL	Casselman River (New Casselman River Bridge)	Garrett
2	106600	MD 942	Potomac River	Allegany
3	103500	MD 144AE	Town Creek	Allegany
4	104800	MD 51	C&O Canal	Washington
5	2101000	US 40	Licking Creek	Washington
6	2101200	US 40	Conococheague Creek	Washington
7	2103800	MD 68	Antietam Creek	Washington
8	2100400	MD 845A	Little Antietam Creek	Washington
9	1003100	US 40	Middle Creek	Frederick

Central Maryland

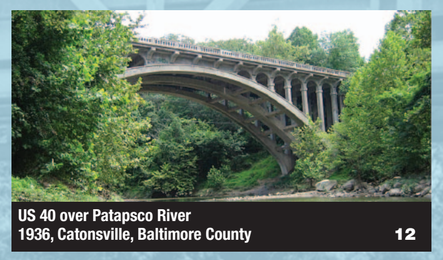


Aluminum Bridge (Old MD 32 over CSX, River Road, and Patapsco River Road) 1963, Sykesville, Howard County **10**

The Aluminum Bridge is a three-span, aluminum box girder bridge that the Kinetics Division of Fairchild Engine and Airplane Corporation, Hagerstown designed. The aluminum box is made up of 5 triangular cells called "Unistress" semi-monocoque, which was an airframe design. After World War II, bridge engineers explored non-traditional metals, such as aluminum, in metal girder bridge design and a few aluminum bridges appeared on American's roadways. The Aluminum Bridge is the only one of its type in Maryland and one of only seven in the US and Canada.

Parkton Stone Arch Bridge (Old MD 463 over Little Gunpowder Falls) 1809, Parkton, Baltimore County **11**

The classic two-span stone-arch bridge was one of five built on the Baltimore and York Turnpike between 1800 and 1810. As Maryland's oldest bridge, the Parkton Stone Arch Bridge is a rare survivor of the turnpikes that provided the state's first reliable overland transportation in the early 19th century. Spanning Little Gunpowder Falls, the 37-foot-long bridge was probably designed by the British-born engineer John Davis (1770-1864). In 1910 the SRC purchased the turnpike and began to make improvements. SHA continues to maintain the bridge which is in Parkton, near the NCR Trail.

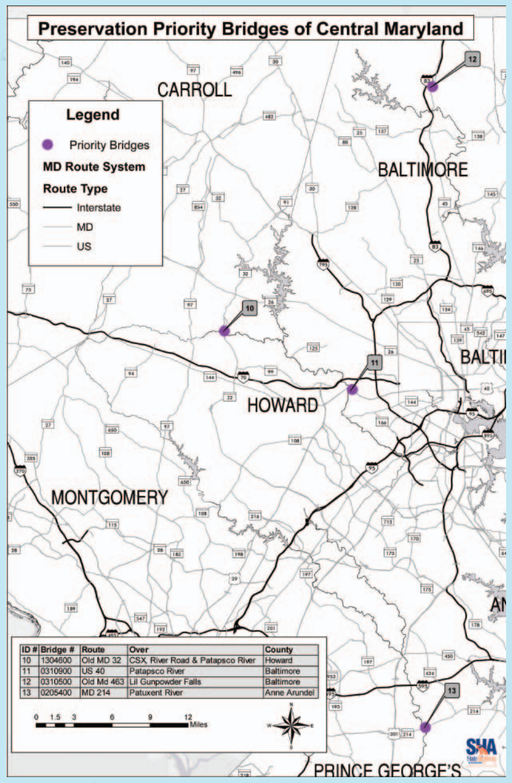


US 40 over Patapsco River 1936, Catonsville, Baltimore County **12**

US 40 over the Patapsco River is a single-span, open-spandrel concrete arch bridge located in the Patapsco River State Park. The SRC engineers celebrated the natural beauty of the Patapsco River Bridge's setting and employed new reinforced concrete technology at this important crossing. The new material also transformed the appearance of arch bridges because it allowed engineers to dispense with heavy filled barrel arches and instead construct a series of delicate ribs and spandrel walls that decreased dead load. This made the concrete arches flatter and multi-centered and lengthened the possible spans. The attenuated beauty of US 40 over Patapsco River takes the open spandrel concept even further than most arch bridges with open abutments as well.

MD 214 over Patuxent River 1935, Davidsonville, Anne Arundel County **13**

Displaying one of Maryland's most characteristic bridge forms, this 1935 steel Parker through-truss bridge carries MD 214 over Patuxent River on the boundary between Prince George's and Anne Arundel counties west of Annapolis. The Parker truss is a Pratt truss with an inclined rather than horizontal top chord. It was popular for longer span bridges well into the twentieth century. The SRC constructed the Roanoke Iron and Bridge Works - designed bridges as part of the Good Roads Movement that helped lift Maryland out of the Great Depression in the mid to late 1930s.

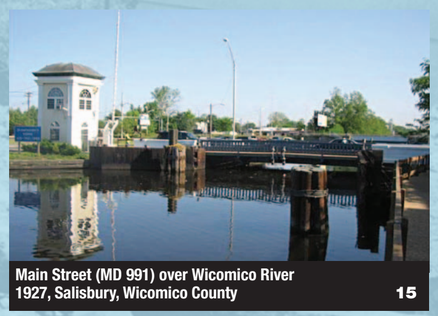


ID #	Bridge #	Route	Over	County
10	1304600	Old MD 32	CSX, River Road & Patapsco River	Howard
11	0310900	US 40	Patapsco River	Baltimore
12	0316500	Old Md 463	Lil Gunpowder Falls	Baltimore
13	0205400	MD 214	Patuxent River	Anne Arundel

Eastern Shore of Maryland

Dover Bridge (MD 331 over Choptank River) 1932, Easton, Talbot County **14**

MD 331 over Choptank River is a 65-foot riveted through truss, center-bearing swing span with two 215-foot steel six-panel Warren steel through truss spans on either side of the swing span. The J. E. Greiner Company of Baltimore designed this structure for SRC. Between 1904 and 1939, the SRC built at least seventeen swing spans over navigable waters, including this one, constructed in 1932. Swing spans were preferred by many engineers because they were simple, reliable, and economical. The control house of most movable bridges is located on the bridge itself, but here the engineers sited it on the riverbank.



Main Street (MD 991) over Wicomico River 1927, Salisbury, Wicomico County **15**

Main Street over Wicomico River is a double-leaf bascule bridge in the Chicago Trunnion style, which is one in which the movable span swings upward around a pivot point at the center of rotation. Like most of the movable bridges on the Eastern Shore, it was built by the J. E. Greiner Company for the SRC. Movable bridges became the primary technological method for spanning the Eastern Shore's navigable rivers.