

Stone Arch Railroad Bridges

Equivalent to turnpike bridges in their historic engineering importance, stone arch railroad bridges constitute a second category of significant stone masonry structures built in Maryland during the nineteenth and early twentieth centuries. The Baltimore and Ohio Railroad, the first railroad in the United States to cross the Appalachian range, pioneered the design and construction of many important stone arch bridges, including the early Carrollton and Thomas Viaducts, both recognized as nationally significant civil engineering landmarks. The B&O's promotion of well-engineered stone arch spans extended to smaller bridges as well, such as culverts to cross the many streams intersecting the state's railroads and roads. Throughout the nineteenth century, under such prominent B&O chief engineers as Benjamin H. Latrobe, Jr., and Leonor Loree, the Baltimore and Ohio Railroad constructed stone arch bridges at sites where the piers and abutments necessary for such spans did not block water flow or interfere with traffic beneath the bridge (Harwood 1979).

Historical research was not undertaken into the surviving operating and engineering records of Maryland's railroads; thus, no estimate is possible concerning the approximate number of stone arch railroad bridges, underpasses, and overpasses constructed in the state until such research is performed. Based on investigation of prior Maryland Historical Trust historic resource survey forms, Historic American Engineering Record (HAER) documentation, and secondary sources, the following are concise descriptions of some outstanding or representative examples of stone arch bridges built in connection with the Baltimore and Ohio and other railroads in Maryland:

Carrollton Viaduct: Old B&O Main Line over Gwynn's Falls, Baltimore City (HAER No. MD-9). This historic structure was the earliest stone masonry bridge built for railroad use in the United States. Designed by B&O engineer Caspar Weaver and built in 1828-1829 by James Lloyd (of the Lloyd family of Chambersburg, Pennsylvania, prominent masons who were responsible for many of Washington County's stone arch highway bridges), the Carrollton Viaduct is a 312-foot-long bridge consisting of a full-centered arch with clear span length of 80 feet above the stream. An arched passageway, or underpass, was also included in the structure in one of the masonry-walled approaches. Heavy granite blocks utilized in the bridge were brought from quarries near Ellicott City and Port Deposit, then erected and dressed on the site. The falsework supported over 1,500 tons of such granite, a remarkable engineering accomplishment. The Carrollton Viaduct, a National Historic Landmark and National Civil Engineering Landmark, remains in service after 164 years.

Thomas Viaduct: Washington Branch (now main line) of the B&O over Patapsco River near Relay, between Baltimore and Howard counties (HAER No. MD-3). Built in 1835 as part of the construction of the Washington Branch of the B&O Railroad, this monumental structure was the first multiple-span masonry railroad

bridge in the United States and the earliest to be built on a curving alignment. Named for railroad president Philip Thomas, the bridge was designed by B&O Chief Engineer Benjamin H. Latrobe, Jr., and was built by John McCartney, an Ohio master mason, under the supervision of Latrobe and the B&O chief of construction, Caspar Weaver. The Thomas Viaduct includes eight Roman arches built on a 4-degree curve, which was accomplished by laying out the lateral pier faces on radial lines, thus creating wedge-shaped piers. Due to the construction on the curve, there are variations in span and pier width between the two sides of the bridge. The viaduct is constructed of roughly dressed Maryland granite ashlar, quarried along the Patapsco River. Essentially unaltered except for repairs to the masonry and drainage system in 1937-1938, the Thomas Viaduct is a National Historic Landmark and a National Civil Engineering Landmark.

Waring Viaduct: B&O Metropolitan Branch over Big Seneca Creek, near Germantown, Montgomery County (HAER No. MD-22). The Waring Viaduct, a 274-foot-long, 74-foot-high stone viaduct with three 65-foot arches, is a good representative of the early twentieth century masonry arch viaducts built under the B&O leadership of Leonor Loree, a prominent civil engineer formerly employed by the Pennsylvania Railroad who was brought in to repair and upgrade the B&O rail network in Maryland. Loree utilized stone viaducts as well as plate girders to replace the various metal trusses, including some Bollman trusses, on the Metropolitan Branch. The Waring Viaduct was erected in 1905-1906, and attests to the continued construction of stone arch bridges, well into the twentieth century.

Small Stone Arches: Various locations, along the old B&O Railroad Main Line and Washington and Metropolitan Branches in Maryland. A group of representative examples of stone arch bridges and culverts constructed by the B&O were extant at the time of the 1979 publication of historian Herbert Harwood's *Impossible Challenge: The Baltimore and Ohio Railroad*. Like the railroad viaducts along the B&O lines, these smaller spans date from two distinct building campaigns: the initial construction and expansion of the railroad under Latrobe (1830-1850), and the later upgrading of the whole line under Pennsylvania Railroad veteran engineer Leonor Loree (first decade of twentieth century). On the oldest route, or Main Line, of the B&O, Harwood noted over 10 stone bridges dating to 1830-1850 (several may have had later additions or may have undergone reconstruction) and at least one structure (a twin arch southeast of Mt. Airy) dating to 1901. One other 1835 bridge (the Bascom Creek Bridge) was noted by Harwood on the Washington Branch of the B&O (Harwood 1979).