

COLONIAL PARKWAY,  
BALLARD CREEK CULVERT  
spanning Ballard Creek  
Yorktown vicinity  
York County  
Virginia

HAER No. VA-48-E

HAER  
VA  
100-YORK,  
18E-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
Department of the Interior  
P.O. Box 37127  
Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

BALLARD CREEK CULVERT  
Colonial National Historical Park  
HAER No. VA-48-E

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VA  
100-YORK,  
18 E

Location: Colonial Parkway, .8 mile northwest of  
Yorktown, York County, Virginia  
Quad: Yorktown, VA  
UTM: 18/364675/4122600

Date of Construction: 1931

Structure Type: Arch culvert

Designer/Engineer: Eastern Division, Branch of Plans and  
Design, National Park Service

Builder: Nello L. Teer, Durham, North Carolina

Owner: National Park Service

Use: Drainage structure

Significance: Ballard Creek culvert was part of Unit I  
construction on the Colonial Parkway  
which included all grading, excavations,  
and construction of drainage features  
between Ballard Creek and Hubbard Lane,  
a distance of about 8 miles. In keeping  
with the colonial character of the  
roadway, the arch culvert was faced with  
hand-made "Virginia style" brick with  
granite spillway crest stones.

Project Information: Documentation of the Ballard Creek  
Culvert is part of the Colonial National  
Historical Park Roads & Bridges project,  
conducted in the summer 1995 by the  
Historic American Engineering Record.

Historian: Michael G. Bennett, HAER Historian, 1995

## INTRODUCTION

Along with photographs, measured drawings, and an overview history of the Colonial National Historical Park roads and bridges (HAER No. VA-115), individual reports on certain bridges, park tour roads (Jamestown Island Tour Road HAER No. VA-116, and the Yorktown Battlefield Roads HAER No. VA-117), and other structural features of the Colonial Parkway are part of this documentation. These reports provide a more detailed history of a structure's design and construction. Similar documentation for Colonial National Historical Park was completed by HAER in 1988 for the Colonial Parkway (HAER No. VA-48), the Navy Mine Depot Overpass (HAER No. VA-48-A), Capitol Landing Underpass (HAER No. VA-48-B), the C & O Railroad Underpass (HAER No. VA-48-C), and the Williamsburg Tunnel (HAER No. VA-48-D).

## CONTEXT

Constructed between 1931 and 1957, the Colonial Parkway is the key transportation feature of Colonial National Historical Park. Crossing the Tidewater peninsula, the road is a scenic link between the "historic triangle" of Jamestown, Williamsburg, and Yorktown--a distance of about 23 miles--designed to provide continuity in the transition from one historical era to another. The Colonial Parkway represents one of the first attempts of the National Park Service to integrate parkway design principles standardized in Westchester County, New York during the 1920s with its own traditions of landscape architecture. Under the initial direction of Charles E. Peterson, chief landscape architect for the Eastern Division of the Branch of Plans and Design, the parkway was constructed to harmonize the scenic qualities of the Tidewater environment with the region's colonial material culture.

Modern highway design and engineering practices were utilized in the construction of the parkway. The alignment of the road is comprised of a variation of spiral and single-centered curves with limited tangents, set in a right-of-way averaging 500' with broad landscaped slopes. Commercial development is prohibited, and access to the road is limited to provide motorists an

uninterrupted flow through the landscape thought to be essential to the historic experience of the park. Extensive "cut and fill" operations were used to create a road with maximum curves of 5° and grades no greater than 5 percent.

The decision to align the parkway along both the York and the James Rivers required the use of hydraulic fill to create a road embankment. Low level concrete slab bridges blend with the sandy areas of fill, providing open views of the rivers and marshes. In the vicinity of Williamsburg, filled spandrel concrete arch bridges with colonial style brick veneer provide separated grade underpasses for federal, state, and county roads. To simulate the character of a "country road," the parkway's pavement was limited to a width of 30' and specially treated to expose the extra large aggregate in the concrete. All of these features, along with interpretive markers, create a roadscape with unity, variety, and character, three common elements of NPS landscape design tradition.

#### BALLARD CREEK CULVERT

The Ballard Creek culvert was constructed as part of the Unit I contract for the Colonial Parkway, the first phase of the parkway's development. Unit I consisted of grading, and the excavation and construction of drainage structures (except over Indian Field, Felgate, and King creeks) between Ballard Creek (station 74+) and Hubbard Lane (station 577), a distance of about 8 miles. Specifications for Unit I construction established the standards which guided the construction of the parkway throughout its length. Consistent with National Park Service road-building techniques, special efforts were made to preserve the landscape and avoid unnecessary destruction of the natural environment. According to construction provisions,

Any timber or other landscape features scarred or damaged by the contractor's operations shall be removed, neatly trimmed up as required by the engineer, or restored as nearly as

possible to their original condition.<sup>1</sup>

Plans and specifications were prepared and submitted by the Bureau of Public Roads in May 1931. Bids for the work were opened in Yorktown, and the contract was awarded to Nello L Teer of Durham, North Carolina, who began work on 8 July 1931.<sup>2</sup> For all structures that would be in view of the motorist, special attempts were made to recreate a "colonial atmosphere." While reinforced concrete pipe was used for all pipe culverts, one length of vitrified clay pipe was attached to both ends to screen the interior concrete walls of the culverts from view. Drainage structures which required an opening greater than 24" were constructed as reinforced concrete arches with spans of 4', 6' and 8'. All exposed concrete surfaces, including culvert head-walls, walls of arches, and bridges were clad with oversized "hand-made Virginia style" clay brick manufactured by the Jamestown Brick Company of Virginia.<sup>3</sup>

To ensure an antique finish, all clay was pit-pugged for twelve hours and mixed to produce a variety of shades. The bricks were sand struck and oversized, averaging 2 5/8" x 8 1/2" x 4". The contractor was required to hire only "expert" bricklayers, and use both Flemish and English bonds depending upon the location of the structure and the specifications of the Eastern Division of the Branch of Plans and Design. Beveled and half round parapet bricks of the same color and texture were used as coping for parapet walls

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<sup>1</sup>U.S. Department of Agriculture, Bureau of Public Roads, "Special Provisions, Proposal and Contract Forms for Colonial National Monument Parkway," 29 May 1931, 2, file 630.C-2.4, "Planning the Parkway, 1931," Colonial National Historical Park.

<sup>2</sup>Oliver Taylor, Superintendents Monthly Narrative Reports, May-June 1931, file 207.02.3, Colonial National Historical Park.

<sup>3</sup>William H. Smith, U.S. Department of Agriculture, Bureau of Public Roads, "Final Construction Report--1932, Colonial National Memorial Parkway, Units I and II," 3-4, Colonial National Historical Park, Engineer's office, Maintenance Division, Yorktown, Virginia.

along the parkway. Arch rings were pre-molded and delivered to the job site packed in sawdust. Mortar consisted of one part portland cement, one part lime putty, and three parts sand free of any salt that could produce a yellow shade. Upon completion, the brick was scrubbed with bristle brushes and a solution of water with 10 percent muriatic acid.<sup>4</sup>

Ballard Creek, like all stream crossings along the York River to King Creek was at tidewater level, providing a poor bearing for foundations. Consequently, all culverts and bridges were supported by untreated timber piles of varying lengths.<sup>5</sup> The trench for culverts was cut to the grade and flow specified in the plans and made wide enough to allow working space between the concrete and the earth. Once the concrete footings were poured, Wakefield pilings between 2" and 3" were driven and anchored to the concrete by steel hook bolts. With the footings set, form work was constructed for the arch culverts, and concrete was poured and allowed to set up. The culvert trench was then packed and back-filled. Concrete used varied in the proportion of portland cement, fine aggregate, coarse aggregate, and water. Generally, only class A and class B concrete was used for the arch culverts and footings in Unit 1 construction on the parkway.<sup>6</sup>

Special attention was made to bond the brickwork to the concrete in order to insure a lasting seal. According to Unit 1 construction specifications,

Just before concrete is to be deposited against the masonry, the surfaces shall be thoroughly washed with a stream of water from a hose. The brick masonry shall be coated with a mixture of neat cement and water immediately ahead of the placing of the concrete. The concrete backing shall be

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<sup>4</sup>"Special Provisions," 15-17.

<sup>5</sup>Smith, "Final Construction Report--1932," 4.

<sup>6</sup> U.S. Department of Agriculture, Bureau of Public Roads, "Specifications for Concrete," supplement to FR 50 specifications for Forest Road Construction, February 1931.

placed in layers not more than six inches thick. All bonding pockets shall be completely filled and the concrete worked around the projecting headers and thoroughly spaded and worked until it is brought into intimate contact with every part of the back face of the brick.<sup>7</sup>

By November 1931, all small arch culverts including Ballard Creek were completed.<sup>8</sup> Ballard Creek is a small tributary of the York River which forms a marshy area at its confluence with the river. It is located about .25 miles northwest of the Royal Welsh Fusiliers' Redoubt which was the parkway's Yorktown terminus until the extension of the road in 1957 to a new visitor center. The arch culvert provides drainage for the creek under the Colonial Parkway.

The arch is 8'2" wide on both the inlet and outlet sides of the culvert (Only the outlet side was measured due to lack of access to the inlet end. Individual construction reports are unavailable since the structure was built during Unit 1 construction.) The spillway is laid up with granite crest stones, and the 1'-2" wide arch ring is comprised of three courses of brick headers with no keystone. The headwall is 34'-4" long and lies just below the road grade. Extending from the end of the headwalls 10' toward the culvert arch, the brick projects approximately 3" from the wall face flush with the arch. The bottom ten courses extend an additional 3" to form a buttress-like wall.

From the top of the culvert arch to the coping of the headwall measures 4'-7" high. A projecting string course of stretchers is located 2' above the top of the arch ring. The headwall coping is comprised of a single course of headers topped with special 8" long, 4-1/2" wide beveled bricks stamped with the words "Colonial Parkway" (the stamp can be seen where two bricks have been removed from the coping). The beveled bricks slant in 4" from the vertical line of the headwall, and are topped with a 3" flat

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<sup>7</sup>Smith, "Final Construction Report--1932," 16.

<sup>8</sup>William Robinson, Superintendent's Monthly Narrative Report, November 1931.

brick coping. Earth has been backfilled behind and around the ends of the headwalls, and a vegetated shoulder extends to the line of the pavement. All the flat area of the headwalls are laid in an English bond consistent with the specifications for Unit I construction.<sup>9</sup>

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<sup>9</sup>Field survey undertaken in July, 1995.

BIBLIOGRAPHY

- Robinson, William. Superintendent's Monthly Narrative Reports, November 1931. Collection of the Colonial National Historical Park, file 207.02.3.
- Smith, William H. U.S. Department of Agriculture. Bureau of Public Roads. "Final Construction Reports--1932, Colonial National Monument Parkway, Units I and II." Collection of the Colonial National Historical Park, Engineer's office, Maintenance Division, Yorktown, Virginia.
- Taylor, Oliver. Superintendent's Monthly Narrative Reports, May - June 1931.
- U.S. Department of Agriculture. Bureau of Public Roads. "Special Provisions, Proposals and Contract Forms for Colonial National Monument Parkway, 29 May 1931." Collection of the Colonial National Historical Park, file 630.C-2.4, "Planning the Parkway, 1931."
- U.S. Department of Agriculture. Bureau of Public Roads. "Specifications for Concrete." Supplement to FR 50 specifications for Forest and Road Construction, February 1931.