WATERFALL BRIDGE
Acadia National Park Roads & Bridges
Spanning Upper Hadlock Brook on West Sargent Mountain Road
Northeast Harbor Vicinity
Hancock County
Maine

HAER NO. ME-35

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of the Interior
P.O. Box 37127
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WATERFALL BRIDGE

HAER No. ME-35

LOCATION: Spanning Hadlock Brook on Jordan-Sargent Mountain carriage road (Around-the-Mountain Loop), 1½ miles NNE of Brown Mountain Gate, Northeast Harbor vicinity, Mount Desert Island, Hancock County, Maine

Quad: Seal Harbor, ME
UTM: 19/557200/4908800

DATE OF CONSTRUCTION: 1925

ARCHITECT: William Welles Bosworth, New York

ENGINEER: Paul D. Simpson, for John D. Rockefeller, Jr.

CONTRACTOR: Sam Candage, Seal Harbor, ME

STRUCTURE: Stone-faced reinforced concrete filled spandrel arch bridge

FHWA NO.: 1700-015S

OWNER: Acadia National Park, National Park Service

SIGNIFICANCE: This massive stone-faced bridge carries the West Sargent Mountain Road alongside a picturesque cascade which serves as a focal point for users of the road. Like several of the other bridges, the bridge serves as a viewing platform, offering a splendid vista of the Northeast Harbor area to the south.

PROJECT INFORMATION: Documentation of Waterfall Bridge is part of the Acadia National Park Roads and Bridges Recording Project, conducted in 1994-95 by the Historic American Engineering Record of the National Park Service. This is one in a series of project reports. HAER No. ME-13, ROCKEFELLER CARRIAGE ROADS, contains more specific information on the park carriage road system.

Richard H. Quin, HAER Historian, 1994

This report is part of the Acadia National Park Roads and Bridges Recording Project. HAER No. ME-13, ROCKEFELLER CARRIAGE ROADS, contains more specific information on the carriage road system.

HISTORY

In 1921, John D. Rockefeller, Jr. began planning the West Sargent Mountain Road, the western segment of a grand loop carriage road which would encircle the Sargent-Penobscot-Jordan mountain mass, as part of his comprehensive carriage road system for Mount Desert Island. To carry the road across Hadlock Brook, a large stone-faced bridge was required. Rockefeller and his engineer located the crossing to the side of a small waterfall, which gave the structure its name, Waterfall Bridge. The massive granite-faced structure spans the stream to the side of the cascade on a large semicircular arch. Semicircular viewing platforms or "turrets" to either side of the arch on both elevations entice users to stop and view the waterfall (sometimes called Hadlock Brook Falls) on the upstream side of the bridge, or to enjoy a vista of the Hadlock Ponds, Brown (Norumbega) Mountain and Somes Sound to the west.

The bridge and a neighboring span over Maple Spring Brook (Hemlock Bridge, HAER No. ME-34) were designed for Rockefeller by New York architect William Welles Bosworth (1869-1966), who had designed Rockefeller's townhouse in New York City and the gardens at Kykuit, the family estate at Pocantico Hills in the Hudson Valley. Paul D. Simpson, Rockefeller's carriage road engineer, did the topographic work to locate the structure and oversaw its construction.

Bosworth and Simpson collaborated on the specifications for the two bridges which were issued in May 1923. They called for the arch and superstructure to be built on solid rock, leveled by blasting if necessary. Wooden forms of spruce or hemlock were to be used to frame up the arch and for foundations, beams and walls. The concrete masonry would be strengthened with steel reinforcing bars.[1] Stone masonry on the exterior would give the bridges a rustic appearance appropriate to their wild locations.

In May 1923, Simpson reported that he was having difficulty in locating suitable face stone for the bridge near the site, and stated that the stone would have to be procured from Brown's quarry, about three miles from the site. On account of the long

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[1]"Specification for the Bridges on Jordan-Sargent Mountain Road at Waterfall Bridge Site and at Hemlock Bridge Site at Seal Harbor, Maine for J. D. Rockefeller, Jr.," 15 May 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 121 Folder 1217.

haul which would be required, Simpson asked Rockefeller to consider having the bridge constructed as a concrete arch. He admitted that concrete construction would be less attractive, but pointed to savings in cost and time which would result.[2]

In reply, Rockefeller indicated he would ask Bosworth to prepare a design for a concrete arch bridge, recognizing it would cheaper and easier to construct. However, he expressed his fear that such a bridge would look "artificial" in the wild setting.[3] In the end, Rockefeller decided on the stone-faced bridge, which, while it would be more expensive than a concrete structure, would be more appropriate for the setting.

Rockefeller invited Seal Harbor mason and general contractor Sam Candage, who had constructed several other bridges for the carriage road system, to submit a bids for the two bridges. Candage estimated the cost of the bridge at $35,000,[4] though Rockefeller evidently thought he bid $25,000 for the work. Candage was awarded the combined contract on a cost-plus basis, and began work with the construction of Hemlock Bridge.

Later in the month, Simpson reported he located a good source for stone about half a mile south of the bridge site. However, as the stone would not be available during the construction season, a decision was reached to use the stone from Brown's quarry. He again asked if a concrete masonry arch could be employed. Rockefeller again rejected the idea. Simpson also recommended eliminating decorative motifs to either side of the central arch, a suggestion which was ultimately adopted.[5]

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[2]Paul D. Simpson, Seal Harbor, ME to John D. Rockefeller, Jr., New York City, 4 June 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 121 Folder 127.

[3]Rockefeller to Simpson, 12 June 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 121 Folder 127.

[4]"Bridges Built by B. W. Candage," MSS, 19 August 1927. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 121 Folder 1217.

[5]Simpson to Rockefeller, 9 June 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes

In December 1923, Rockefeller told Candage he would have "a little scale model" of the bridge constructed so that the shape of the voussoirs or arch ring stones could be determined. He suggested that Candage might have actual full-sized patterns of the stones prepared before the ring stones were cut. He indicated he would have Bosworth order the model and it would be sent to Candage as soon as possible.[6]

After studying the model with Welles Bosworth, Rockefeller's personal secretary, Charles O. Heydt, determined the curved bridge that was planned might be considerably more expensive to construct than a straight bridge built on a tangent. Heydt figured that since the bridge as planned would be built on a curve, every stone in it would have to be curved, which would make the cost "very excessive." He wrote Candage that Rockefeller was now asking Bosworth if the bridge could be designed with two angles meeting at the center without spoiling the effect.[7] This suggestion was not adopted, and the bridge was constructed as a curved span.

On 21 August 1924, Rockefeller wrote Heydt to inquire about the projected costs, indicating he understood Candage's estimate for totaled $25,000. He also asked if a $739.67 bill recently received from Candage was the first bill for the Waterfall Bridge. Heydt replied that Candage's estimate had been $35,000, not $25,000, and that the $739.67 bill reflected the first charge for the structure.[8]

(Seal Harbor), Box 122 Folder 1227.

[6]Rockefeller to Sam Candage, Seal Harbor, ME, 13 December 1923. to Rockefeller, 9 June 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 122 Folder 1228.

[7]Charles O. Heydt, New York City, to Candage, telegram, 2 August 1924; Heydt to Welles Bosworth, 4 August 1924. to Rockefeller, 9 June 1923. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 122 Folder 1228.

[8]Rockefeller to Heydt, 21 August 1924; Heydt to Rockefeller, 23 August 1924. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 121 Folder 1217.

Construction of Waterfall Bridge closely followed the completion of nearby Hemlock Bridge. Because of Candage's high cost overruns on that structure, some adjustments were made in the specifications, including the use of coarser mortar joints, suspending the work over the winter season, and use of better equipment to reduce the labor involved. Despite these measures, the final cost of the structure still exceeded Candage's estimate by 25 percent.[9]

In late November, Candage reported "we have the third arch stones laid above the spring line and the sixth ones are about cut with a good many of the filling stones." Candage's men had poured most of the concrete, and the weather was cooperating with the work.[10] The work shut down over the winter, and the bridge was completed the following summer.

On 29 July 1925, Rockefeller's agent at Seal Harbor, Robert Gumbel, reported that the last bill for the bridge had been received from Candage. The total cost for the bridge was $44,103.81. Broken down, the charges were $38,048.29 for labor and stock, $2,452.19 for machinery, and a $3,603.33 commission.[11] Another record in the Rockefeller Archives Center indicates the structure was completed at a cost of $45,592.51,[12] nearly double the original estimate. Rockefeller would soon cease having Candage do his bridge work on account of the repeated cost overruns.

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[9]Vanasse Hangen Brustlin, Inc. and McGinley Hart & Associates, *Historic Bridge Reconnaissance Survey, Carriage Road System, Acadia National Park* (Boston, MA: National Park Service, North Atlantic Regional Office, September 1993), 54.

[10]Candage to Rockefeller, 2 November 1924. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 122 Folder 1227.

[11]Gumbel, Robert W., Seal Harbor, ME, to Rockefeller, 29 July 1925. Rockefeller Archives Center, Office of the Messrs. Rockefeller, Record Group 2, Homes (Seal Harbor), Box 122 Folder 1228.

[12]"Bridges Built by B. W. Candage."

The bridge has been little changed since its construction, though it has deteriorated somewhat. Vanasse Hangen Brustlin, Inc., a Boston engineering firm under contract to the North Atlantic Regional Office of the National Park Service, conducted a field inspection of Waterfall Bridge in June 1993. The project team noted cracking of the underside or intrados of the arch in several locations; severe calcium carbonate deposition on the intrados, wing walls and spandrel walls (an indication of drainage problems); mortar joint deterioration; scour at the west abutment footing; and vegetation growth along the insides of the parapet walls. The report recommended waterproofing the entire roadway and outlet off the structure, minor repointing of mortar joints, monitoring the scour, and the removal of the calcium carbonate efflorescence.[13] The vegetative growth was removed in 1994 as part of the carriage road rehabilitation project.

DESCRIPTION

Waterfall Bridge is a hybrid reinforced concrete and granite masonry structure, consisting of a stone-faced reinforced concrete arch barrel and self-supporting granite spandrel and wing walls. The structure, which curves slightly around the downstream face, is approximately 120' long and spans Hadlock Brook on a single semicircular arch with a clear span of 26'. The structure stands 31' high measured from the streambed to the top of the parapet walls. A 16' roadway follows the curve across the bridge.

The bridge is arranged around the semicircular arch, which is skewed from the roadway plane by about 30 degrees and stands about 23' above the streambed. The arch is defined by carefully cut radiating stone voussoirs which decrease in size from the spring line to the crown. Because a foot trail passes under the bridge, the inner walls or intrados of the arch is faced in stone. The bridge walls are constructed of cut granite and feature semicircular plan turrets to either side of the arch. The stone parapet walls are capped by projecting stone coping and terminate in scrolled stone end posts or curtails.

The bridge is located in a wooded hillside setting adjacent to Hadlock Brook Falls. The site was chosen on account of the waterfall for which the bridge was named. The Hadlock Brook Trail, one of the main approaches to Sargent Mountain, passes under the bridge.

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[13]Vanasse Hangen Brustlin and McGinley Hart, 55, 57.

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