STONEMAN BRIDGE
Yosemite National Park Roads and Bridges
Spanning Merced River on Stoneman Crossover Road
Yosemite National Park
Mariposa County
California

HAER NO. CA-95

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
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I. INTRODUCTION

Location:	This bridge carries the Stoneman Crossover Road over the Merced River, one half-mile northwest of Curry Village, Mariposa County, Yosemite National Park, California. QUAD: El Capitan, CA UTM: 11/273360/4179555
Date of Construction:	1932
Designer and Builder:	Designed by the Bureau of Public Roads, U.S. Department of Agriculture. Contractors: Sullivan & Sullivan; later Kuckenberg & Wittman.
Original and Present Owner	Yosemite National Park, National Park Service.
Present Use:	Park road bridge.
Significance:	The Stoneman Bridge was the last of seven stone-faced reinforced concrete spandrel arch bridges in Yosemite National Park and reflects the National Park Service "rustic style" of architecture as applied to park road bridges.
Project Information:	This document was prepared as part of the 1991 Yosemite Roads and Bridges Recording Project, undertaken by the Historic American Engineering Record. Richard H. Quin, Historian, 1991

II. HISTORY

This is one in a series of reports prepared for the Yosemite National Park Roads and Bridges Recording Project. HAER No. CA-117, YOSEMITE NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads.

HISTORY OF STONEMAN BRIDGE

In 1886 or 1887, the Yosemite Grant's Board of Commissioners laid out "Royal Arch Avenue" to connect the new Stoneman House hotel, then under construction, with the "Grand Round Drive" at the base of the Royal Arches. To cross the Merced River just north of the imposing new hotel, they constructed a substantial wooden truss bridge resting on granite abutments. The bridge was designed with a low wooden truss so as not to block the view of travelers seated in their carriages. It was called the "Royal Arch Bridge" for a while, but soon came to be known as the Stoneman Bridge after the nearby hotel.[1]

The wooden bridge remained in use for about three decades. The replacement bridge was built by the newly created National Park Service around 1918 on the same site. Historic photographs in the Yosemite Research Library collection show it to have been a reinforced concrete girder bridge resting on concrete and granite abutments. It featured raised concrete piers with molded caps topped by globe lanterns at the four corners.[2] In many aspects it was similar to the Sentinel Bridge [HAER No. CA-94] constructed at about the same time. The structure was probably designed by the NPS engineering division, then located in Portland, Oregon.

In the late 1920s, the National Park Service decided that, due to the narrow width of the bridge's roadway and sidewalks, it would require substantial reconstruction or replacement to bear the increasing traffic loads. The NPS studied rehabilitating the existing bridge, but concluded it could not be renovated to bear the heavier vehicles of the day, and decided to replace the structure.[3] The Park Service turned to the Bureau of Public Roads for assistance. The BPR had been responsible for major road improvements in the national parks since 1925, and undertook the design and construction of the new bridge.

Surveys for the new bridge were conducted in early summer 1930, with test piles driven in August. Plans were prepared by the San Francisco district office of the Bureau of Public Roads in July and August 1931. The new bridge was to be a 72' stone-faced reinforced concrete arch bridge with two equestrian subways or tunnels provided in the abutments.[4] The subways were designed as part of a new system of bridle paths being installed in the Valley; the tunnels would allow riders to cross roads below grade level and thereby avoid the increasing levels of traffic.

Bids for construction of the new Stoneman Bridge, along with the construction of the replacement for the El Capitan Bridge which failed in April 1930, were opened at the BPR San Francisco office on 20 October 1931. The Oakland, California construction firm of Sullivan & Sullivan submitted the low combined bid of $106,862.40 and was awarded both projects on 10 November.[5] Original BPR construction drawings estimated that the bridge would utilize the following materials:

Class "A" Concrete	710 cu. yds.
Class "B" Concrete	770 cu. yds.*
Reinforcing Steel	100,000 lbs.
Rock Facing	285 cu. yds.
Arch Ring Stones	170 sq. yds.
Curb Stones	414 lin. ft.
Membrane Waterproofing	1060 sq. yds.
Pilings	13,280 lin. ft.
Stairways	
Steps	420 lin. ft.
Border Stones	110 lin. ft.
Wet Excavation (removed)	600 cu. yds.
Dry Excavation (removed)	1200 cu. yds.
Borrow	300 cu. yds.
Imported Loam	75 cu. yds.

Sullivan & Sullivan set up a construction camp at Bridalveil Fall in November, and on the 19th of the month began demolition of the old Stoneman Bridge. The abutments were drilled, then blasting powder was inserted and exploded. The rails were blasted off, and finally the slab was exploded as well. Due to the solid construction of the bridge, heavy charges were required. The old bridge material was piled on the banks and later covered with excavated spoil.[6]

While the old bridge's demolition was in progress, the contractors opened up a quarry near the power house dam on the El Portal Road; the stone was used in the facing of the bridge. Rough excavation for the abutments began in December, using a 3/4 ton P&H crane. Timber falsework was placed for the main arch, along with a trestle to support a moving crane or "traveler". It soon became obvious that the abilities of the company's superintendent had been overestimated. Work began on a cofferdam for the north abutment in January. The BPR engineer noted that the dam soon failed, due to the implementation of a poor design by Sullivan & Sullivan. While this early work was underway, Kelly & Tipton, the subcontractors engaged for the stonework, were making good progress at cutting (with hand tools) the dioritic granite arch rings or voussoirs, using wooden templates for patterns.[7]

In order to make up time lost by the cofferdam's failure, Sullivan & Sullivan went to double shifts in January. Even with the extra shifts, almost no progress was being made. Bureau of Public Roads engineer A. W. Schimberg decided that the firm had little practical experience in bridge construction, especially at foundation work. On 20 February 1932, he terminated the firm's contract for both bridges. The work was only 6 percent complete.[8]

As the north abutment was partially underwater, caissons were employed for its construction. These were erected in January 1932, and excavation work below water level began. At the quarry, ring stones were still being cut. Some boulders were pulled from the river for other masonry work.[9]

The bridge was completed under the auspices of the National Surety Company, which engaged the Portland, Oregon construction firm Kuckenberg & Wittman to finish the job. Work resumed on 21 March 1932. Excavation for the north caisson was completed, and water was being pumped. Wooden pilings to anchor

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* Classes of concrete refer to the amount of Portland cement used in the mixture, with Class "A" having the highest proportion and so on. Class "B" concrete was used for the arch abutments and subway footings; all other work on the bridge used Class "A" concrete.

the abutment were driven in to a depth of 40'. By the end of April, concrete was being poured for the abutment and the footings for the north wing walls. A coffer dam was put in place to divert water from the south abutment, and the cutting of the ring stones was completed.[10]

The arch ring stones or voussoirs were being set in May.[11] These were provided with two 1 3/4" diameter steel rod crimps to anchor to the concrete arch and spandrel walls. The stone arch ring was completed in June, and work began on placing the rock facing on the spandrel and wing walls; these were built up from the base of the footings. The placing of the stones outpaced the work of the quarry crew, causing additional delays; still, by the end of July, the masonry work was complete except for the sidewalk curbs and for the stone steps at the sides. Steel reinforcing rods (1" diameter bars on 8" centers, and 1/2" diameter transverse bars on 2' centers) were then fitted. After the stone was placed came the pouring of the concrete arch and spandrel walls, which took place in several stages (see the pouring schedule on the accompanying HAER drawing of the bridge, HAER No. CA-95, sheet 2). A waterproofing membrane was applied to the concrete before the compacted earth fill was added in August. The wing walls and the stone parapet wall and steps to the side were constructed in September, and work on the roadway began. By the end of November 1932, the bridge was complete except for paving. This work was soon done, and the stone curbs and the sidewalk were placed. The new Stoneman Bridge was accepted by the Park Service before the end of the year.[12] Total cost of the structure was $71,675.08.

Workers from the Emergency Conservation Works landscaped the approaches to the bridge in 1934, seeding native plants and planting young willows.[13]

The stone-faced reinforced concrete, earth-filled spandrel arch bridge is 205' long excluding the approaches, and has a main arched span of 72' across the river. The structure's poured concrete footings rest on 40' deep wooden untreated Douglas fir pilings. The bridge is 39' wide, with a clear roadway width of 27' and two 6' sidewalks. The abutments, spandrel walls and cantilevered wing walls are faced in hand-cut native granite. Most of the stones are six-sided, interlocking to create a self-supporting wall. The ends of the bridge are flared slightly. The structure incorporates two equestrian tunnels, measuring 8' 6" wide by 11' high; these pass through the abutments and allow passage of a bridle path below grade level. Expansion joints, 3/4" thick and packed with an asphaltic filler, are located at the juncture of the main arch and the abutments, at the same general location as the subways. The bridge is surfaced in asphaltic concrete. Stone staircases are located on both sides of the bridge for the convenience of pedestrians. The soffit face of the semi-elliptical concrete main span has been carved to resemble cut stone.

The Stoneman Bridge was the last of the series of stone-faced arch bridges erected in Yosemite Valley. It is similar to the Clark's and Happy Isles bridges in having equestrian tunnels through the abutments, but on this bridge the tunnels project slightly from the wing walls to provide additional emphasis. The bridge remains in heavy use, providing the main passage across the Merced River for vehicles crossing the east end of the Yosemite Valley, and bears the bulk of the traffic from Camp Curry to Yosemite Village. In summertime, the bridge is popular with swimmers who enjoy jumping from the structure into the river below. The Stoneman Bridge is an excellent example of the National Park Service "rustic style" of architecture in that it gives the appearance of having been constructed from native materials that help it harmonize with the natural landscape.

III. ENDNOTES

1. Linda Wedel Greene, *Yosemite, The Park and Its Resources: A History of the Discovery, Management, and Physical Development of Yosemite National Park, California.* 3 vols. (Washington: National Park Service, 1987), Vol. I, 283-86. The Stoneman House was itself named after California governor George Stoneman.

2. See Yosemite Research Library photo collection, negative no. RL-8076, 8 December 1927.

3. A. W. Schimberg, "Final Construction Report, Stoneman and El Capitan Bridges, Yosemite National Park, Mariposa County, California" (San Francisco: Bureau of Public Roads, 11 May 1933), 2.

4. *Ibid.*.

5. *Ibid.*, 3.

6. *Ibid.*, 3-4.

7. Charles Goff Thomson, Superintendent's Monthly Report, October 1931, 8; Superintendent's Monthly Report, November 1931, 8; Superintendent's Monthly Report, December 1931, 7; Schimberg, 4-6.

8. Schimberg, 6; Thomson, Superintendent's Monthly Report, February 1932, 6.

9. Thomson, Superintendent's Monthly Report, January 1932, 8.

10. Idem, Superintendent's Monthly Report, March 1932, 6; Superintendent's Monthly Report, April 1932, 8.

11. Idem, Superintendent's Monthly Report, May 1932, 7.

12. Thomson, Superintendent's Monthly Report, June 1932, 9; Superintendent's Monthly Report, July 1932, 10; Superintendent's Monthly Report, August 1932, 7; Superintendent's Monthly Report, September 1932, 7; Superintendent's Monthly Report, November 1932, 7; Superintendent's Monthly Report, December 1932, 9; Schimberg, 7-9. Other construction information from United States Department of Agriculture, Bureau of Public Roads, "Stoneman Bridge, Yosemite National Park Project I B2," construction drawings RG 293 A&B, August 1931.

13. Thomson, Superintendent's Monthly Report, February 1934, 10.

IV. BIBLIOGRAPHY

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Greene, Linda Wedel, *Yosemite, The Park and Its Resources: A History of the Discovery, Management, and Physical Development of Yosemite National Park, California.* 3 vols., (Washington: National Park Service, 1987).

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Schimberg, A.W. "Final Construction Report, Stoneman and El Capitan Bridges, Yosemite National Park, Mariposa County, California" (San Francisco: Bureau of Public Roads, 11 May 1933)

Thomson, Charles Goff. Superintendent's Monthly Report, October 1931.

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United States Department of Agriculture, Bureau of Public Roads. "Stoneman Bridge, Yosemite National Park Project I B2." Construction drawings RG 293 A&B, August 1931.

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