

FORTS BAKER-BARRY TUNNEL
(BAKER TUNNEL)
LOCATED UNDER LIME POINT RIDGE ON BUNKER ROAD
SAUSALITO
MARIN COUNTY
CALIFORNIA

HAER No. CA-139

HAER
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21-SALS.V,
3-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
NATIONAL PARK SERVICE
WESTERN REGIONAL OFFICE
DEPARTMENT OF THE INTERIOR
SAN FRANCISCO, CALIFORNIA 94102

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HISTORIC AMERICAN ENGINEERING RECORD

FORTS BAKER-BARRY TUNNEL(Baker Tunnel) HAER No. CA-139

Location: Under Lime Point Ridge on Bunker Road between Fort Baker and Fort Barry, Sausalito Vicinity Marin County, California

Date(s) of Construction: Constructed in 1917-18, enlarged by 167 feet in 1925-27, enlarged and improved in 1935-37, 50 feet addition in 1953.

Engineer/Builder: U. S. Army

Present Owner: Golden Gate National Recreation Area
National Park Service
Fort Mason Building 201
San Francisco, CA 94123

Present Use: not used

Significance: Fort Baker, initially constructed between 1900 and 1910 and Fort Barry, established between 1905 and 1907, were the first artillery posts to be established on the north side of the Golden Gate. They were an important part of the coastal defenses of San Francisco Bay. The Baker-Barry Tunnel is a significant element of this National Register district and was an important engineering feat which enhanced the development of Forts Baker and Barry by enhancing the transportation between the two facilities.

Report Prepared by: Ana B. Koval
Associate
Architectural Resources Group
Pier 9, The Embarcadero
San Francisco, CA 94111

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Summary

The contiguous military reservations of Forts Baker and Barry are historically and architecturally significant for their role in the seacoast defenses of San Francisco Bay, one of the largest, most important, and most beautiful harbors of the world. San Francisco was the second most heavily defended port in the United States, especially during the period from the national modernization of coastal defenses from the 1890s through World War II. These forts contained all the coastal batteries on the north side of the Golden Gate, thus they played a key role in the harbor's defenses. The array of batteries found on the Marin Headlands date from pre-Civil War through several "modernizations" through World War II. After missiles and atomic bombs made traditional coastal defenses obsolete, the Marin Headlands continued to play a role in the defense of San Francisco with the installation of Nike missile facilities in 1955.

The surviving elements of these forts are considered one of the best collections of military history resources within the United States. These forts contribute significantly to military architecture and history. The original structures of the coast artillery post at Fort Baker, those built between 1900 and 1910, are significant because they represent the first purely coast artillery post of the Endicott period in San Francisco Bay, and they were erected when the batteries were first manned. They are a handsome illustration of army architecture of that period, with all its grace and charm, and set in a bowl of green created by the army out of dust and swamp. The somewhat similar, but smaller, post at Fort Barry, constructed between 1905 and 1907, is also significant because it represents a coast artillery post of the late Endicott period, when it was realized that the guns and troops had to be shifted to the outer headlands and that the inner harbor defense was no longer important.

The Forts Baker-Barry Tunnel is a contributing feature of the Forts and is important for increasing the ease of transportation between the two facilities. The main 2,200 foot section of the tunnel was completed in 1918. The original lining was timber. The timber lining was replaced in 1925-27 in a major project that included repairs to the west end. The 16 foot by 167 foot long west end extension appears to have been constructed at this time. The concrete lining was completed in a WPA project in 1935 and 1936. Further concrete repair work was completed in 1936 after a cave-in at the west end. The east end of the tunnel was extended in 1953 for the construction of Highway 101.

Location

The Forts Baker-Barry Tunnel is in the Marin Headlands District of the Golden Gate National Recreation Area. The east portal is below the north approach to the Golden Gate Bridge and can be accessed from the first exit off the bridge on US Highway 101 or by a secondary road from Sausalito, California. The tunnel has a general southeast to northwest orientation and carries Bunker Road from East Fort Baker to Rodeo Lagoon on the coast. The tunnel has one-lane, two-way traffic controlled by a signal on each end. The signal provides six minutes for alternating traffic direction.

History & Description

In July 1904 the Secretary of War authorized a two-company garrison of Coast Artillery for the batteries at Point Bonita. Later that year, on December 27, General Orders No. 194 of the War Department, announced the establishment of Fort Barry on the western part of the Fort Baker military reservation. The boundary between the two forts was a true north line from the tip of Point Diablo. Travel between the two posts was a serious problem because of the intervening steep hills.

While most transportation to Fort Barry was by boat, a crude and treacherous road connected the two posts. In 1911, the post commander complained about the condition of the road between Fort Barry and Fort Baker. He described the road as being exceedingly dangerous. It was steep and too narrow in certain parts for teams to pass. There was no fence or other protection to keep a team from falling over the side— at points the slope of the road was seventy-five percent and a wagon could fall 400 feet. The commander described several accidents on the road and suggested that the best solution was a tunnel under the hill. Apparently, the War Department did not agree. It approved the expenditure of \$1,500 for materials to build a board fence at the more dangerous places. Probably because of the condition of the road, a school was established in 1913 at Fort Barry so the children did not have to travel from the Fort to Sausalito daily over this road.

In 1916, the Army announced an expansion of Fort Barry to include longer range guns and additional batteries. With the expansion, the communications and transportation between Fort Barry and Fort Baker needed to be improved. This was accomplished by driving a 2,000-foot tunnel under the ridge west of Fort Baker and constructing over 8,000 feet of new roadway to connect Fort Baker with the head of Rodeo Valley. America's entry into World War I heightened the need for the tunnel. It was pushed through to completion in 1918. Most of the tunnel was driven through serpentine rock that varied from very hard material to quite soft and broken rock. Consequently, the entire tunnel was lined with sets of ten by ten inch timbers, placed five feet apart and covered on the outside with two-inch lagging. The dimensions inside the timbers were sixteen by sixteen feet.

In 1922, a transmission line was installed through the tunnel, replacing an old line that had run over the hills between the two posts. At some early date a six-inch water main was also laid through the tunnel to supply Fort Barry. By 1925 a considerable amount of rotting had occurred in the timbers of the always-damp tunnel. The construction quartermaster undertook a repair program that lasted two years. In his completion report he said that the repairs had cost \$16,618, and that the tunnel was now safe and sound. The particulars of the report included:

Removal of rotted two-inch lagging and replacing same with 13,000 board feet of creosoted cedar lagging. Installing 200 additional 3-inch x 10-inch x 16-foot collar braces. Removal of rotted arch rings and substituting with forty-four completely new creosoted ten by ten inch cedar arch sets, including plumb posts.

Replacing rotted plumb posts with twenty new creosoted cedar ones.

Removal of rotted segmental arch pieces and substituting thirty-five new ten-inch creosoted segments.

Removal of 121 rotted arch sets in the clay formation from station 17 plus 81 to west portal and replacing the same with reinforced concrete lining complete.

Removal of wooden supports under the six-inch water main and substituting 182 cement blocks, and caulking the joints of the water main.

Cutting off the ends of rotted plumb posts and substituting concrete in their place.

Installing 1,785 feet of three by six-inch creosoted redwood filler along the edge of the concrete road and the six inch water pipe to fill up cavity.

Installing eleven street lights in the tunnel and repairing all electric wiring and cable.

Creosoting the lining and timbers the entire length of the tunnel.

Installing 155 linear feet of galvanized iron in the arch of the tunnel to deflect seepage.

Digging 1,200 linear feet of trenches over western end of the tunnel to deflect seepage.

Constructing 1,500 linear feet of barbed wire fencing around the trenches to keep cattle (there by permit) out.

Repairing concrete road in the west end of the tunnel from station 17 plus 81-82 plus 66.

A 16 foot wide by 167 foot long addition to the west end of the tunnel appears to have been constructed at this time. Additional repairs and improvements were made on the tunnel in 1935-37 as a Works Progress (later, Projects) Administration undertaking — a CCC camp had been established just west of the tunnel on the Fort Barry boundary. Work began in October 1935 on widening the tunnel to twenty feet and increasing its height to seventeen feet. Air hammers were used on the rock. The men also lined the enlarged tunnel with unreinforced concrete to a depth of twelve inches. On May 31, 1936 a serious, fifty-foot-long cave-in occurred at the west end of the timbered section of the tunnel. This occurred at station 8 plus 00, where the material over the tunnel was mainly earth. Because funds were exhausted at this time, further work was suspended. A summary of the work completed showed that the concrete had been placed (by a compressed air concrete gun) on both side walls up to the spring lines for a distance of 1,785 feet. The construction quartermaster estimated that the project was eighty-five percent complete.

Work resumed in August 1936. The concrete work was completed and, in addition, the six-inch iron water main was moved and re-laid on galvanized steel brackets fastened to the north wall about fifteen inches above the floor. Also, a new lighting system was installed that consisted of thirty ceiling lights, Type I-3, placed in the center of the tunnel. The construction quartermaster reported that the total cost was \$358,664 and the work was completed on June 30, 1937.

The tunnel is located under Lime Point Ridge on Bunker Road. The road was named in honor of Col. Paul D. Bunker, CAC, who died in a Japanese prison camp on Formosa in March 1943. In 1953, Caltrans extended the east end by 50 feet during reconstruction of US Highway 101. The current length of the tunnel is about 2,200 feet with the western 200 feet 4 feet narrower than the rest. The US Army relinquished all rights to the tunnel to the NPS by memo in December 1990.

Current Status

Inspection reports from the 1960s mention cracks in the concrete lining. In late 1988, an inspection indicated that the cracks were growing in number and size. Installation of monitoring devices was recommended. During February 1989, while the devices were being installed, the inspectors found that the cracks were getting bigger and recommended that the tunnel be closed until an in-depth investigation could be made. The tunnel has not been open to the public since that time.

In the west central portion of the tunnel there are several cracks, some in excess of 100 feet long, in the crown and spring line of the concrete lining. The cracks vary from less than an inch to an inch and one half wide with displacement of about an inch. The pressure causing the offset seems to be from the south. Large pieces of concrete have spalled off, particularly in the crown cracks, landing on the deck. While imminent catastrophic failure is not likely, the falling concrete is a safety hazard and warrants continued closure of the tunnel.

The goal is to repair and reopen the tunnel. To accomplish this, construction documents for repair have been prepared. HAER documentation is being prepared to comply with section 106 of the Historic Preservation Act prior to reconstruction of the tunnel.

Bibliography

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