

The Fort Funston Panama Mounts of Battery Bluff

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Introduction

In 1934, a battery of four 155 mm Grande Puissance Filloux (GPF) mobile tractor-drawn guns was approved for Fort Funston, at the southwest corner of San Francisco. The guns would be sited on a bluff 1,200 feet north of Battery Davis. (Figure No. 1) The battery was unofficially known as “Battery Bluff” after this location on the bluff at Fort Funston. It will be referred to herein as Battery Bluff (I). (Figure No. 2) However, 155 mm guns field carriages were limited to 60° traverse, inadequate against naval targets.

The 1937 “Annexes to the Harbor Defense Project, Harbor Defenses of San Francisco,” Annex A (Seacoast Guns), under “Present Armament,” listed an un-named battery for four M1918A1 155 mm GPF guns at Fort Funston. Since the existing secondary armament did not provide the desired flexibility in covering the mine fields, and failed to provide sufficient firepower on the beaches adjacent to the defenses, under “Additional Armament Required,” the annexes recommended construction of concrete “Panama mounts” for the four 155 mm guns, to increase their field of fire.(1)



1. Detail of map showing Battery Davis and the Panama mounts of Battery Bluff (I) (top right) U.S. Engineer Office, San Francisco, CA, August 5, 1939. HAER No. CA-193-A and Library of Congress Prints and Photographs Division Washington, D.C. website (<http://www.loc.gov/pictures/resource/hhh.ca2388.photos.193021p/?co=hh>)



2. Battery Bluff (I), January 1938. *NARA, College Park, MD, RG 499, Entry 118.*

Development of the Panama Mount

The 155 mm gun was initially designed during World War One for firing at land targets from a wheeled field carriage. Although the M1918 carriage allowed a wider traverse than the average field gun, the lateral movement was still insufficient for engaging naval targets. The solution for coast defense applications was to mount the gun on a concrete emplacement known as a "Panama mount." During the late-1920s, a simple platform mount was developed which consisted of a curved rail embedded in concrete on which the gun's twin trails could easily slide as the gun traversed. As this type of mount was initially developed and tested in the Panama Canal Zone, it was known as a "Panama mount."

These mounts were designed as simple and inexpensive platforms, consisting of a central round base raised above a circular rim. The rim could be 180°, 270°, or 360°, depending on the field of fire required. The gun carriage would rest on the central base, while a recoil pit allowed the gun to fire at higher elevations. The normal spade plates on the tail ends of the gun were removed and replaced by plates which fit a segment of curved steel rail embedded in the concrete rim of the mount, on which the gun's two tails could easily be moved. This provided a traverse of 180-360°, in addition to the 60° traverse allowed by the carriage.(2)

Design and Construction of Panama Mounts

Typically, overseas Panama mounts were constructed by either coast artillery unit personnel or engineer troops. In the United States, Panama mounts were constructed by private contractors under contract to Army Corps of Engineer Districts. Construction averaged 5.32 months per battery.(3)

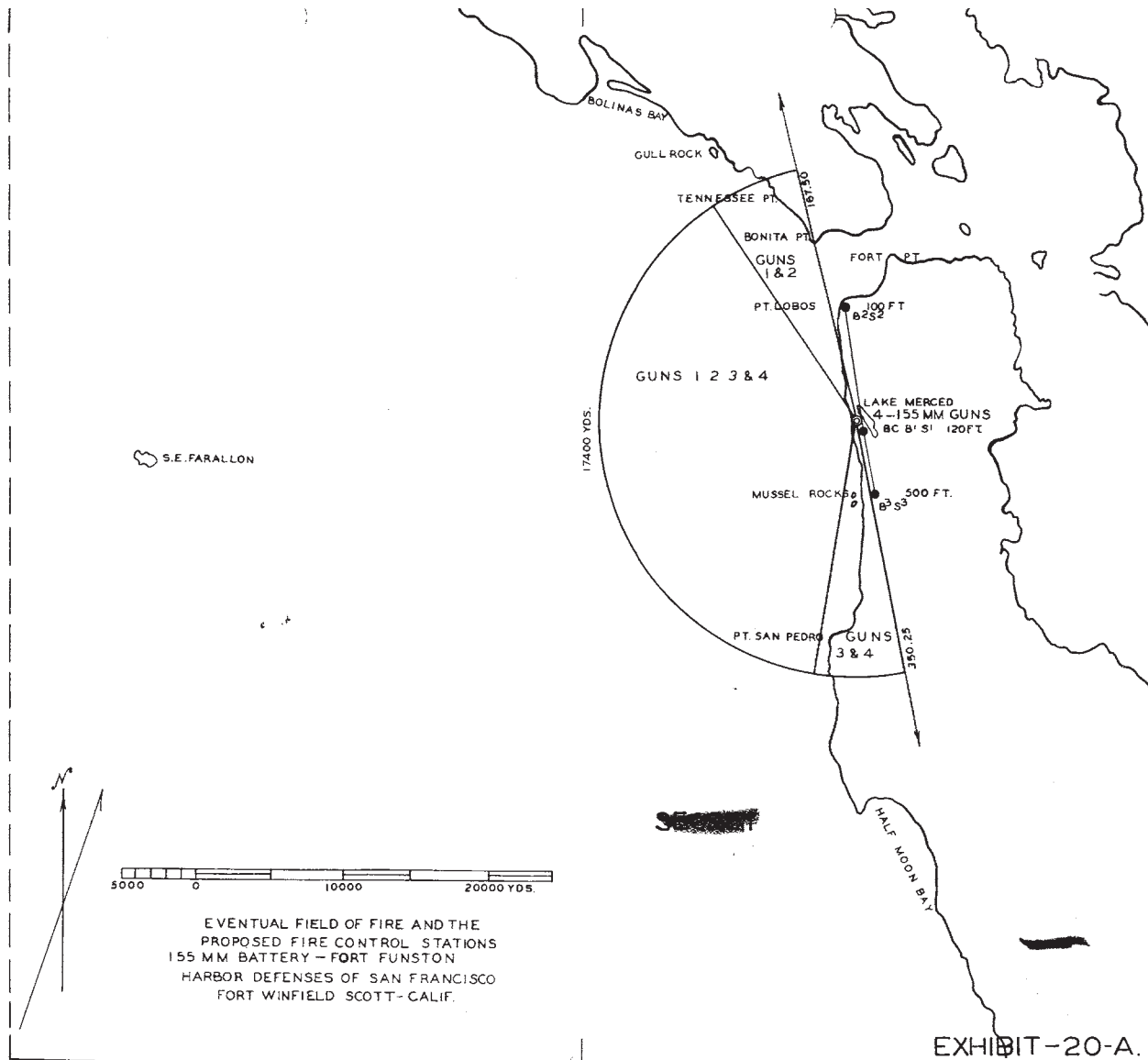
The extent of the traverse circle was dictated by the field of fire determined for the area. The reinforced-concrete raised center circle was surrounded by an outer reinforced-concrete arc, from a half to a full circle. The gun block and rails were joined by two reinforced-concrete beams. The center circle was 10 feet in diameter and 4.5 feet to 4.66 feet high, buried in the ground with the top at ground level. Radial supports to the outer ring extended on both sides of the forward portion of the center circle. These radials were 1 foot thick and 1.9, 4.66, or 5.583 feet deep, depending on the soil conditions, and were at the same grade level as the center and outer circles. The inner face of the spoke was lined through the middle of the center circle. The open end of the partial circle faced the direction of fire. On each end, the partial circle extended 3.09-feet beyond the center line of the center circle. This extension consisted of 1.545-foot overrun and a 1.545-foot raised stop block to prevent the trails from running off the imbedded rail. The 180° 70 lb "T" rail was 63.57 feet of continuous welded rail. The extension overrun included the 1-foot-thick radials or spokes joined into the outer circle and a 0.545-foot gap between the outer face of the radial or spoke and the raised stop block. Because of soil conditions, especially on sandy beaches, the outer half circle was normally constructed to a depth of 4.66 feet or 5.585 feet. The radials or spokes, the center circle, and the outer circle depth were the same to provide for stability.

The construction of the Panama mount was very simple affair. The concrete was reinforced throughout with 5/8-inch steel rods. The plates fit over a curved railroad iron which was imbedded in the circle of concrete and which was anchored in the concrete by steel hooks. A steel curb band surrounded the raised concrete inner circle and served as guide for the wheels of the carriage. The gun was then fired on its wheels. The guide rail and the inside curb band were kept well lubricated to facilitate the movement of the trails, which were moved by hand. When the target approached the limit of traverse permitted by the top carriage, the gun crew was directed to man the trails, four men on each trail. The guns were pulled by M1 10-ton heavy tractors and backed in and over the Panama mount for emplacement.(4)

Battery Bluff before World War II

Construction on the four Panama mounts of Battery Bluff (I) commenced in the late 1930s and it is assumed that the mounts were completed a few months later. Total cost to build the concrete platforms amounted to \$6,500. Battery Bluff (I) had two 180° mounts and two 270° mounts, providing a field of fire from Tennessee Point in the north to Point San Pedro in the south. (Figure No. 3) While Fort Funston's primary mission was to defend against enemy naval attacks through the South Channel, Battery Bluff's primary mission was to defend Battery Davis against attacks from small and fast enemy ships. The 155 mm ammunition was stored below ground in concrete niches near each mount. The battery was also provided a concrete base for a coincidence range finder (CRF).

It is unlikely that the guns for Battery Bluff (I) were ever actually emplaced on their Panama mounts. Because of erosion of the cliff overlooking the beach on which the battery was situated, along with three years of tidal action accelerated by heavy storms during the winter of 1940-1941, about half of the site slid down the bluff, including at least one of the Panama mounts on the bluff.(5) As of January 2012, two of the four mounts are visible today semi-buried on the beach.(6) No permanent fire control stations were built for this battery.

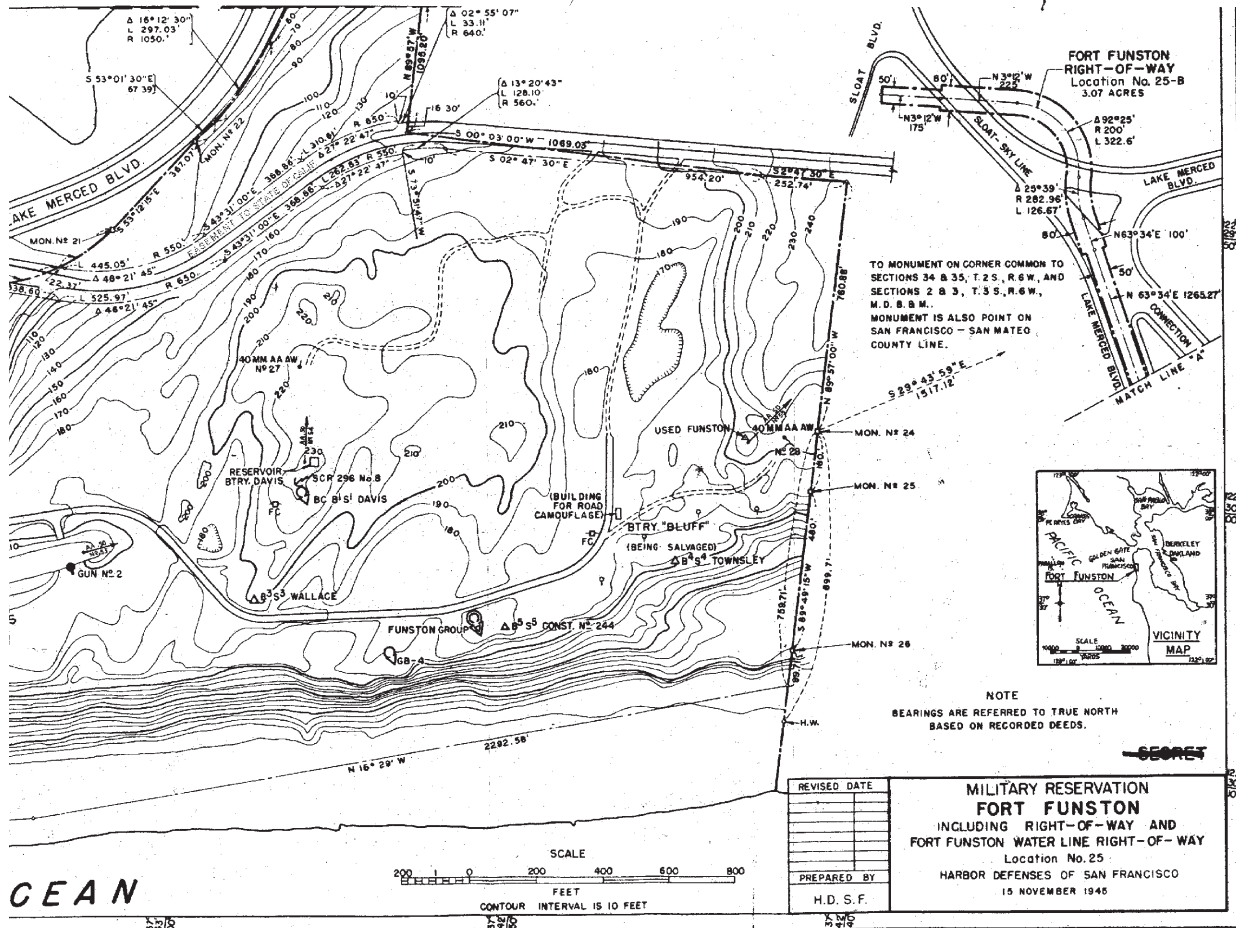


3. Field of Fire for Battery Bluff (I). HAER No. CA-193-A

Battery Bluff during World War II

Immediately after Pearl Harbor, Battery D, 18th Coast Artillery Regiment, with their four 155 mm M1918M1 GPF guns on M2 carriages with pneumatic tires and air brakes arrived at Fort Funston and was sent to the southern part of the reservation where the guns were emplaced in field emplacements not far from the southern reservation boundary. (Figure No. 4) This was typical, as many GPFs were quickly emplaced by the army all along both coasts to supplement the fixed artillery. The crews for Battery Bluff lived nearby in wooden boxes or "rabbit huts," dug into the hillside next to the guns, until September 12, 1942, when they moved into newly constructed theater-of-operations barracks at South Fort Funston.(7)

Construction on a second set of Panama mounts at this new location south of Battery Davis, which we will refer to as Battery Bluff (II), commenced on December 29, 1941, and was completed on February 18, 1942, at a cost of \$13,904.71. This new battery was not connected to water or sewer, and

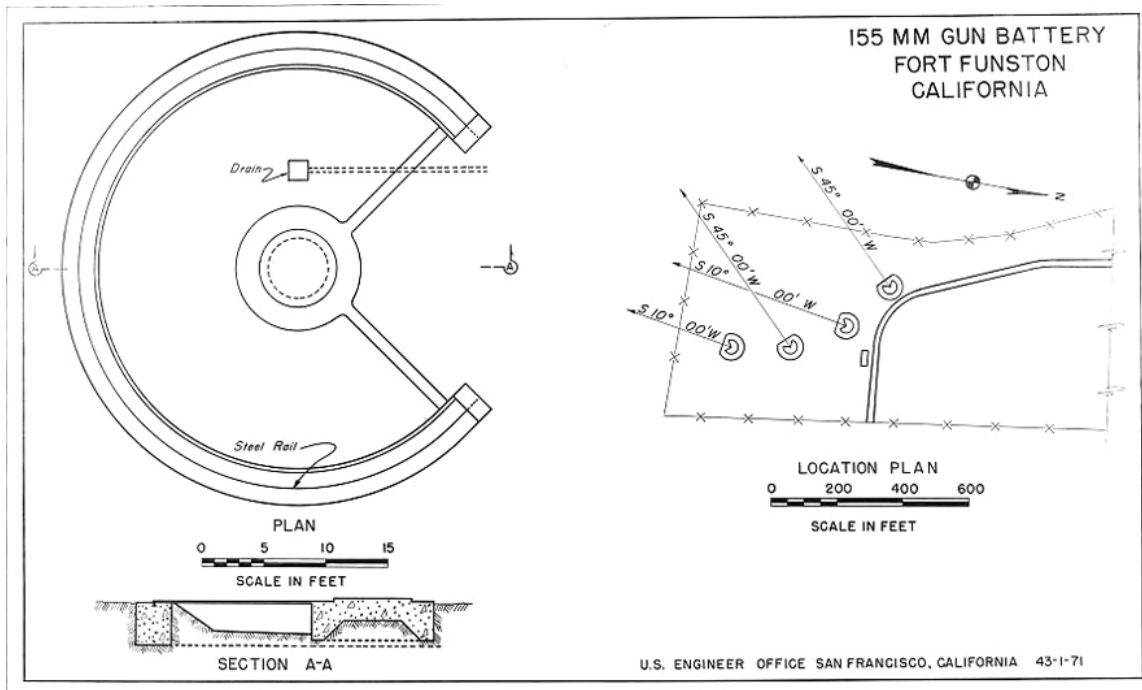


4. Battery Bluff (II). NARA

was not provided with a latrine. The battery, containing four 270° Panama mounts, was transferred to the Coast Artillery Corps on July 9, 1943.(8) (Figure No. 5) Battery Bluff (II) was armed with four 155 mm GPF guns, Serial Nos. 46, 578, 80, and 45, mounted on carriage Nos. 64, 89, 1117, and 1145. All guns and carriages are described as being manufactured in France by Puteaux.(9) Photographic evidence shows that ammunition was stored in a “temporary” dug-in magazine located behind the battery.

Battery Bluff’s Tactical Organization

The Funston Groupment was a tactical element of the Harbor Defenses of San Francisco established several months prior to the start of World War II to man the guns, mortars, and other harbor defense elements located at Fort Funston. The Funston Groupment was made up of two gun groups: Group 4 consisted of Battery Walter Howe’s four 12-inch mortars and Group 5 consisted of Battery Bluff’s four 155 mm guns. In addition, the groupment also contained Battery Richmond P. Davis, a separate battery of two 16-inch guns. The groupment was initially manned by 2nd Bn, 18th Coast Artillery (Harbor Defense) Regiment. The battalion HQ and HQ Battery, manning the groupment command post, provided command and control of the armament and administered the coast artillery troops posted at Fort Funston, while Battery D manned Battery Bluff, Battery E manned Battery Howe’s mortars, and Battery F was detached to Fort Miley.(10)



5. Design for the new 270° Panama mounts at Battery Bluff (II). *HAER No. CA-193-A*



6. Battery Bluff (II) under camouflage netting. *NARA, College Park, MD, RG 77, Entry 1007, D.F. 618.33.*



7. Battery Bluff (II) with camouflage netting retracted. *NARA, College Park, MD, RG 77, Entry 1007, D.F. 618.33.*

Deactivation of Battery Bluff

By September 1944, Battery Construction No. 244 at Milagra Ridge and Battery Construction No. 243 at Fort Miley were complete except for installation of their guns, and were transferred to the coast artillery garrison. This, along with the two 6-inch guns of Battery Lobos at Point Lobos made it no longer necessary to retain Battery Bluff (II) in active service. The battery was taken out of service and provided with a caretaking detachment from Battery C, 6th Coast Artillery, later redesignated Battery A, 179th CA Bn, through the end of the war. The four 155 mm guns of Battery Bluff (II) were ordered disposed of by secret letter, HQ Army Service Forces, file SPOPS 660 (29 Oct 45), to the commanding general, Western Defense Command, dated 8 November 1945, subject: "Salvage of Battery "Bluff" (4-155 mm guns) and Battery "Lobos" (2-6 inch navy guns)." (11) Battery Bluff (I) contains the only Panama mounts extant in the entire Harbor Defenses of San Francisco. No remains are extant at Battery Bluff (II).

Fire Control

The 1937 harbor defense annex outlined plans to furnish complete fire control installations, equipment, and communication for a list of new or incomplete seacoast batteries. The list included Batteries Wallace, Davis, and Townsley, as well as the four 155 mm guns at Fort Funston [Battery Bluff (I)], and

shore installations for underwater mine defense, antiaircraft communication systems, and an 8-inch railway battery sited near Lake Merced that was never constructed. The existing available observation stations for the defenses listed were described as barely sufficient to provide the minimum requirements for the present armament. The desirable minimum installation for the 6-inch and 155 mm batteries included a secondary station to provide observation over that part of the field of fire not visible from the battery location. Annex B noted that since the high ground which was available at almost any desired locality provided the necessary elevation, there was no need for towers anywhere in the region. The conclusion was that dug-in-type of stations were ideal for the terrain, since they would be invisible from the sea and air, and would provide almost complete protection for personnel and material.

Annex B implies that no fire control stations for Battery Bluff (I) existed in 1937. However, the annex called for no permanent stations to be constructed, presumably because GPF batteries were generally considered as only temporary. Instead, temporary stations for tripod-mounted azimuth instruments should be constructed, consisting solely of concrete monuments for accurately siting the tripods. Careful surveys were to provide orientation data for the following locations:

BC B'S' - battery commanders station and primary observation and spotting station. Marker and CRF base to be provided 150 yards southeast of the battery position for two M1910 azimuth instruments with tripods and a 15-foot Bausch and Lomb CRF, at an elevation of 120 feet.

B²S² - secondary observation and spotting station. Marker to be provided at Point Lobos, north of Fort Funston for two M1910 azimuth instruments with tripods at an elevation of 100 feet.

B³S³ - tertiary observation and spotting station. Marker to be provided in the vicinity of Mussel Rock, south of Fort Funston for two M1910 azimuth instruments with tripods at an elevation of 500 feet.

While not mentioned in the text, Exhibit B-1 of the 1937 Annex also shows a plotting room, one of the structures recommended for Battery Bluff (I).(12)

Battery Bluff (I) was never assigned a permanent fire control station. Battery Bluff (II) was probably provided with temporary primary and secondary stations, one to the north and one to the south of the battery. If so, today nothing remains of these two stations. It is also reported that Battery Bluff (II) used the permanent fire control station originally built at the Sutro Heights as B²S² for never completed Battery Const. No. 129.(13)

Demise of the Panama Mounts

By May 1979, one of the concrete Panama mounts at Battery Bluff (I) had been lost to continuing erosion, and a second mount was badly deteriorated and in danger of sliding down the cliff. The remaining two Panama mounts were still in a good state of preservation, but it was thought that they would eventually suffer the same fate as the first two. Erwin Thompson's *Historic Resource Study, Seacoast Fortifications San Francisco Harbor*, recommended that at least one of the surviving Panama mounts should be removed and placed near Battery Davis to be interpreted.(14) (Figure No. 8)

In 1997, the National Park Service attempted to stabilize the structures and to initiate a full Section 106 compliance for adverse effect to the Panama mounts. The NPS hired a structural engineer at a cost of \$16,000 to determine the cost of stabilization and create an initial plan. Subsequently, several moving contractors offered bids of approximately \$250,000, which precluded saving the structures. The high cost was apparently due to the difficulty of accessing the original site of Battery Bluff and protecting the concrete mounts in the process. The NPS then decided leave the mounts to be eroded by nature. As mitigation, the NPS, through the architecture firm of Backen Arrigoni & Ross, hired the historic preservation firm of Carey & Co. to undertake a Historic American Engineering Record (HAER) documentation of the Panama mounts.



8. Panama mount in rear. Foundation in foreground is base for ammunition depot. Looking 328° NNW - Fort Funston, Panama mounts for 155 mm Guns, Skyline Boulevard & Great Highway, San Francisco, San Francisco County, CA. HAER CAL,38-SANFRA, 214A—3. <http://hdl.loc.gov/loc.pnp/hhh.ca2388/photos.190946p>



9. Collapsed Panama mount on beach as seen in Figure 8. Exposed underside to extant Panama mount and ammunition depot are seen at top of cliff left of center. Looking 342° NNW. - Fort Funston, Panama Mounts for 155mm Guns, Skyline Boulevard & Great Highway, San Francisco, San Francisco County, CA. HAER CAL,38-SANFRA, 214A—6. <http://hdl.loc.gov/loc.pnp/hhh.ca2388/photos.190949p>

By 1997, erosion had caused the two 270° Panama mounts and one 180° mount to slip over the cliff and fall to the beach, where they were visible. (Figure No. 9) Generally, only two were visible on the beach, but during the winter, the third was uncovered by tidal action. During the completion of the HAER report in December 1997, the last remaining 180° Panama mount slid intact onto the beach below, where it is still visible.(15) When this site was inspected by the author in January 2012, two of the four mounts were visible, semi-buried on the beach.(16) (Figure No. 10)



10. Panama mount buried on the beach, January 2012. *Author.*

Sources

1. War Department, "Annexes to the Harbor Defense Project, Harbor Defenses of San Francisco, (CCA-AN-SF), April 4, 1937," NPSGGNRA Archives.
2. Emanuel Raymond Lewis, *Seacoast Fortifications of the United States: An Introductory History* (Annapolis, MD: Leeward Publications, Inc., 1979), p. 108
3. Darlene Keyer, "Historic American Engineering Record, Fort Funston Panama Mounts For 155mm Guns, HAER No. CA-193-A" (San Francisco: NPS, 1998, p. 11. (Hereafter cited as HAER No. CA-193-A.) It should be noted that the HAER report in some cases is based on oral conversations, as opposed to documentary evidence. Some of the dimensions cited in the HAER report appear to be misprints.
4. HAER No. CA-193-A, pp. 10-13.
5. William C. Gaines, "The 2nd Battalion, 18th Coast Artillery (HD) Regiment and the Funston Groupment, Fort Funston 1939-1945," unpublished manuscript. Hereafter cited as Gaines, "2nd Bn, 18th CA."
6. Site inspection by author, January 16, 2012.

7. Gaines, "2nd Bn, 18th CA."
8. War Department, Report of Completed Works (RCW), Battery Bluff, Fort Funston, January 18, 1943, RG 77, Entry 1007, NARA, College Park, MD.
9. Armament Data Sheet, RG 165, Entry 257, Box 68, NARA, College Park, MD. The reference to "Puteaux" guns and carriages should mean M1917A1 guns and either M1917, or more likely M1917A1, carriages. However, there are errors in this document, and it is possible that the reference may simply be a general reference to GPFs, of French or American manufacture.
10. Gaines, "2nd Bn, 18th CA."
11. Ibid. War Department, "Supplement to the Harbor Defense Project, Harbor Defenses of San Francisco, 1945," Annex A, Armament, p. 16.
12. War Department, "Annexes to the Harbor Defense Project, Harbor Defenses of San Francisco, (CCA-AN-SF), April 4, 1937," Annex B, Fire Control Installations, pp. 2-3, 22, Exhibit B-1.
13. HAER No. CA-193-A, p. 16.
14. Erwin N. Thompson, *Historic Resource Study: Seacoast Fortifications, San Francisco Harbor* (Denver, CO: GGN-RA, NPS, 1979), p. 449.
15. HAER No. CA-193-A, p. 26.
16. Site inspection by author, January 16, 2012.