

BC station

phone bracket right
rear corner

3 EE-91 type leaded
wires supported by pigtails
looks 3 ft. apart
T-1 time interval bell

from
Model 1910A1 Azimuth
telescope on 8" pipe
pedestal mount.

Possibly: Ship ID charts,
weather charts, duty roster,
intelligence info, table
cannot be verified but
reported from similar
installations

Glass windows + ceiling
bargers for clean

(Persian instead of glass,
permanently + securely mounted
leaving shutters permanently
open?)

The olive drab/per green paint is not accurate
actually a light sand color.

OD used only on shutters + door

Glass windows +
ceiling bargers for clean

Markham stressed the spartan nature of these
positions with little entertainment items like books or magazines
mostly required gear (ammunition? bullets?)

Base End Station equipment

phone bracket

3 EE-91 type leaded
wires supported by pigtails
looks 3 ft. apart
T-1 time interval bell

from 0 to 10 wall mounted phones

Model 1910
DPF (depression
position finder)
(concrete octagonal
base w. rotating
observer + reader)

Model 1910A1 Azimuth
telescope on 8" pipe
pedestal mount.

Message Board

DPS Chart

Weather Chart

Back Rm Equipment

single ceiling mt.
light bulb

terminal block

telephone box

2 fuses attached
to back wall.

**Research and Recommendations for the Restoration of
Base Commander Station 3 and Base End Station 1/3,
Battery Ashburn**

Cabrillo National Monument, National Park Service, San Diego California

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In the aftermath of WWI, many seacoast defense structures fell out of use and/or were closed down by the military. For the build-up to WWII, the War Department began a "modernization" of coast defense structures in the early 1940's.¹ Many of the remaining structures from the WWI period were modified for use again during WWII. This modernization program resulted in the building of Battery Ashburn (16-inch guns) and several Base End and Base Commander Stations, among others at Fort Rosecrans, San Diego. During World War II, the Nineteenth Coast Artillery Regiment occupied Fort Rosecrans and operated these Batteries and base end stations.² Following the war, these structures were closed down and abandoned. Roughly fifty years later, there has developed both a need and a want for the Park Service to open one or some of these structures, which reside on Park lands, to the public. During the past month, an investigation has been launched to determine the possibility and requirements for opening and restoring a base end station. This report and enclosed recommendations are a result of this inquiry.

The recommendation of this paper is to open the Base Commander Station (BC3) and Base End Station (BS1/3) for Battery Ashburn, located within the park, to the viewing public. What follows is a discussion and further recommendations regarding the logistics of opening these structures to the public as well as interpretive themes for restoration inside the structures. More detailed discussions of the functions and history of WWII-era base end stations and seacoast defenses in general can be found in Mark Berhow's American Seacoast Defenses: A Reference Guide, and Erwin Thompson's The Guns of San Diego, San Diego Harbor Defenses, 1796-1947, as well as a wealth of other reference material in the Cabrillo NM library and will not be presented here. Caveats, stipulations and assumptions for this paper are stated here.

Over the past decade, a great deal of research has been done on the subject of San Diego's coast defense structures and more specifically on Fort Rosecrans.³ This report draws upon all those sources and should be viewed as a working status of knowledge toward the goal of restoring BC3, BS1/3 for the public. Changes can and should be made at any time in light of new information or changing theories. It is noted that a large amount of information presented in this report is based on oral history from men who operated the base end stations of Fort Rosecrans. Such information can often be conflicting and spotty at best.

Ft. Rosecrans is home to several WWII-era batteries as well as multiple base end stations and base commander stations that were built to support the big guns. This report will focus on the base end station and base commander station for Battery Ashburn. In general, WWII-era base end stations on Ft. Rosecrans are similar in nature, according to Richard Markham of the 19th Coast Artillery, who was an observer working in the Ft. Rosecrans base end stations in the early 1940's.⁴ Markham notes that the men of the 19th Coast Artillery often rotated around, working in different base end stations at different times, and that all stations of similar function usually maintained the same appearance and interior. Consequently, where specific information regarding the base end station and base commander station for Battery Ashburn is absent, general knowledge and educated speculation based on a comparative framework of other base

end stations in the area will be used and duly noted as such. Furthermore, the restoration of this structure will draw upon comparative restorations of coastal defense structures at other forts including base end stations at Fort McArthur and coastal defense structures at the Presidio in San Francisco.

Description

The Battery Commander Station and Base-End Station for Battery Ashburn (referred to as BC3, BS1/3 for the remainder of the paper), is a two-story, three room structure located just above the Military History Exhibit on the west facing slope of Pt. Loma, within the park grounds.⁵ BC3 occupies the top level of the station, while BS1/3 is contained in the two rooms on the lower level. Battery Ashburn had a separate plotting and spotting room for data analysis at an alternate location at Fort Rosecrans.⁶ Consequently, BS1/3 was used simply for observation and collection of data. This was performed by a three man team including an "observer," "spotter" and "reader." BC3 served as the main commanding station for the Battery, also a three man team comprised of a Commander, Sergeant and Officer in Charge.⁷

BC3, BS1/3 is one of six structures associated with Battery Ashburn. Constructed c. 1936-1942, it was closed in 1948.⁸ During the years following WWII, BC3, BS1/3 was used and reused in several different functions, including use by the Park Service as a dark room and many years as an abandoned structure left open to vandalism and destruction by the public.⁹ Consequently, the current condition of BC3, BS1/3 is historically inaccurate as well as deteriorated and worn down. The process needed to restore this structure to its original appearance and function will be discussed shortly. The following is a summary of the appearance and function of the original BC3, BS1/3 to be used as a guide to restoration of the structure. It should be noted that, information regarding the appearance of the interior of this particular base end station as well as others within the park, is somewhat conflicting and definitive answers may not be available at this time or in the future. In light of this, all information will be presented and recommendations will be given based on educated speculation and realistic expectations for restoration.

Exterior: The multilevel station was constructed of reinforced concrete with observation slots on both levels facing west, containing six solid metal, rectangular shutters.¹⁰ These shutters rise two feet above the concealed station and are all that is visible and thus unprotected on the station, beginning at a distance of 75 yards.¹¹ A stairwell leads down to the entrance of the upper level of the structure to a metal door. The roof was a continuation of the concrete camouflage walls, formed of large aggregate, rough concrete.¹² The steel rings on the roofs of each level served as anchoring points for camouflage netting that would have covered the structure during WWII.¹³

Structural Plan: BS1/3 consists of two concrete rooms, rectangular in plan, measuring approximately 11 feet by 16 feet, with a height of 7 feet and an elevation of about 400 feet.¹⁴ The upper level room, BC3, retains similar measurements with slightly less height. Included in this report is an Army Corps of Engineers "Report of Completed Works", which illustrates the plan for the harbor defense structure BC3, BS1/3 with more detailed measurements than is presented here. Also included and used as reference are three detailed Army Corps of Engineers construction plans/drawings of similar base end stations within the park.¹⁵ These plans outline the structural design of "fire control

stations," also known as base end stations that were built during this time at Fort Rosecrans. The plans include measurements of the structures as well as some details for construction of the metal shutters and other miscellaneous parts. Restoration and interpretation of the BC3, BS1/3 should refer to these drawings for structural details of a typical station.

The interiors of the base end stations and base commander stations at Fort Rosecrans were generally very simplistic and limited. These stations were hurriedly assembled in preparation for war and it follows that the interiors would be primarily functional and thus sparse and requiring low maintenance.

Electric/plumbing: BC3, BS1/3 was not heated and was not connected to either sewer or water mains. There was also no latrine built for BC3, BS1/3.¹⁶ The records indicate that both levels of the station were electrically powered by connection to a civilian commercial source, most likely SDG&E, as well as one auxiliary generator (3 KVA).¹⁷ The only lighting fixture within the entire two-story structure is listed as one 4 inch porcelain bulb, located down in the lower level back room.¹⁸ Lighting in this structure is limited and most likely reflects the effort to keep these stations dark and camouflaged from enemy sight. The one light source is appropriately placed in the "bunk room" which was the back room of the lower level and often used for sleeping. This area contains a single-bulb light, miscellaneous conduit, a terminal block and telephone box.¹⁹ Observation of electrical wiring configurations preserved in other base end stations in the park can give an example of the wiring configuration most likely used in BS1/3. These configurations run flat against the wall and are overlain with wood paneling. This system most likely ran along the walls of BC3 and was fed down to the power boxes in the lower level.²⁰ Original conduit feeding holes in the concrete walls of BC3, BS1/3 have been plugged in most cases.²¹

Communication: The Report of Completed Works details two separate telephone brackets, one in the front room of the lower level of BS1/3 and one in the rear right corner of BC3.²² According to Richard Markham who worked as an observer in this particular base end station, there were three phones, one for each man operating the base end station. Each man had a headset and a mouthpiece which hung around his neck, allowing his hands free at all times.²³ The general use of these headsets by the men is confirmed in the Army Corps of Engineers Project Administration Records.²⁴ In contrast to Markham's report, Greg Hagge an employee of the Army and member of the Coast Defense Study Group, an authority on such topics, argues that this station would have had "many phones, at least 8-10 and likely more than two terminal boxes."²⁵ Hagge also notes that the phones would have been "the EE-91 type and mounted on parallel wood slates about 8-10 inches apart on the back or side walls. The wires were often held by pig tail eye hooks spaced about three feet apart." The pattern of screw holes seen on the walls of several stations and remnants of both the wood slates and one pig tail eye hook in the base end station for Battery Humphreys confirm Hagge's hypothesis. Taken together with Markham's account, it is likely that three phones were used in the lower base end station by the men and several more were used upstairs in the base commander station. Regardless of number, all phones were used to communicate data to the plotting and spotting room for Battery Ashburn. Army Corps of Engineers Project Administration Records also describe the time interval bell, located in the corner of both

base end stations and base commander stations, which rang every 10 or 15 seconds to signal the taking of a simultaneous reading from the instruments. Markham recalls the use of this T1 bell in the base end station and base commander station for Battery Ashburn.²⁶

Instruments: BS1/3 contained a depression position finder (DPF) which was used to determine the vertical azimuth of the target from the base-end station and an azimuth telescope, used to determine horizontal angles of the azimuth to the target from the base-end station.²⁷ The Azimuth telescopes were mounted on concrete columns and depression range finders were mounted on large eight sided concrete bases.²⁸ This base was surrounded by a metal track along which a wooden bench rotated for the observer and reader to sit upon and take readings.²⁹ The spotter stood separately. Typically, the standard issue for Coast Artillery was the Model 1910A1 azimuth telescope and would have most likely been used in BS1/3.³⁰ BC3 also contained one azimuth telescope instrument, most likely the same make and model.³¹

Paint/walls: This structure was built of reinforced concrete and most likely remained unpainted during operations in the mid-1940's. Richard Markham, an observer in the 19th Coast Artillery, recalled no paint of any kind on the walls of the station.³² However, there is contradictory evidence on this point. In several other base end stations within the park, a light sand color is observed painted directly on the original cement surface and in some instances then overlaid by what appear to be original azimuth markings. It is possible that different base end stations had different paint schemes for various reasons or that base end stations were painted at different times throughout their existence.

Whichever the case may be, according to oral histories and documentation, the olive drab and pea green color found currently in BC3, BS1/3 is not historically accurate and was painted on in 1999.³³ Richard Markham also notes that on one of the walls of the front room of BS1/3, hung a message board upon which was hung type written instructions and data orientation for the instruments being used. Markham does not recall the presence of any duty rosters, or ship identifiers, or maps.³⁴ However, such material may have appeared in other stations or possibly in the base commander station above. Julius Gary, for instance, who also served in this particular base end station for Battery Ashburn, recalls a DPS chart and weather chart on the wall.³⁵ Similarly many sources describing typical WWII base end stations make reference to ship identification charts. The upstairs base commander station most likely contained similar information such as weather charts, duty rosters or intelligence information, however there is at present no written evidence for what was in the base commander station and should be taken as educated speculation.

The olive drab color used pervasively by the army would have been applied to both the entrance door and the steel shutters which lined the outside of the structure.³⁶ These would have been the only areas visible to the outside and thus camouflage would have been necessary. Markham recalls that when in operation, all shutters would be swung open and fastened. He also recalls plates of glass installed in front of the shutters to allow the men to see out, but keep out the cold and wind at the same time.³⁷ This is supported by the presence of auxiliary glass shutters found in the Navy coast defense structures as a means of protection from adverse weather and extreme cold. Keniston Architects found auxiliary glass shutters and their wooden hangers in Battery Strong's

primary base end station.³⁸ Glass remained in the "wooden, ceiling mounted hangers" of the "auxiliary shutter windows" in Battery Woodward's BC station.³⁹ The ghosts and remnants of these "wooden hangers" can be observed in the base end station for Battery Ashburn, confirming their existence.

Furniture: Within the base end station and base commander station, there may have been a table or bench that was used to make calculations or read maps, however this particular station was used only for the collection and transmission of data and thus was simplistic and sparse in furnishings. Markham does not recall any furniture at all in the station.⁴⁰ However, he does recall a window in the base end station, which no longer exists and the *Historic Structures Report for Harbor Defense Structures*, performed by Carey & Co Inc., confirms this report. The Historic Structures Report also notes that another built in furnishing, a chart shelf, is also missing from the forward lower level room.⁴¹ It stands to reason that there may have been a small table or bench in either the base commander station or the base end station, but that the items currently in the structure are not original. A separate plotting and spotting room for Battery Ashburn also eliminated the need for a plotting table which is documented as typical in other base commander stations. There were, however, two bunks that were hung from the back wall of the "bunk room" in the lower base end station.⁴² Hung in hammock style, these bunks were used unofficially for sleeping during the 24 hour shift, as explained by Markham. Three men worked shifts of 24 hours on and 24 hours off in this particular base end station. Markham recalls that two men would be on duty while one slept. However if there was any sign of enemy activity, all three men would take up their positions within the station. According to Markham food for the 24 hour shift was taken in with the men, most likely in "field" fashion.⁴³

Personal Effects: Finally, none or very few personal items were present in the base end and base commander stations. The majority of downtime was spent sleeping and possibly playing a game or two of cards. However, Markham notes that while on shift, the men engaged in very little personal entertainment.

As is evident, there is much less information regarding the interiors and details of Base Commander Stations as opposed to Base End Stations in general. Oral histories collected to date have been from the men who worked in the base end stations and there are no first hand accounts from the officers who would have worked in the base commander stations. Both Berhow and Thompson discuss the history and function of base commander stations in general and at Fort Rosecrans.⁴⁴ John Martini of GGNRA is also a good source of information on base commander stations.

Recommendations

Drawing upon the information set forth previously in the document, the following recommendations are made regarding an interpretive theme for restoration of BC3, BS1/3. There are several different themes and variations on themes that may be used when interpreting this base end and base commander station for Battery Ashburn. The following is a list of various options available for restoration of this station. All possibilities are presented. A recommendation by this author will then be made in support of one of these interpretive themes.

One option would be to interpret both BC3 and BS1/3 exactly as they would have appeared and been used in the 1940's. This option will require the most effort by park staff, will be the most expensive and will be hindered by any remaining data gaps for these structures. To restore and interpret BC3 and BS1/3 one hundred percent would involve repair and cleaning of the structures, removal of everything modern, stripping of the olive drab paint, an overhaul of the electrical system to simulate the original configuration complete with wood paneling, installation of phone brackets or replicated terminal boxes, installation of two bunks in the lower back room, installation of three specific instruments and their required base structures and simulation of the appropriate wall décor. This option would also require a visual or physical corridor from the upper level of the BC station to the lower BS station. Currently, entrance to the lower level room is gained by way of metal ladder rungs through a manhole in the floor. Accessibility here is limited and is seen as a liability and safety hazard. Entrance to the lower rooms will likely remain closed to public access. If the lower rooms do remain closed, the public could be allowed to view the lower levels of the observation station through a plexi glass surface installed over the entrance hatch.

A second possibility would be to interpret the BC station and/or the BS station as a generic type of station typical of the WWII-era coast defenses. This option would not be much different than the previous one and would have similar requirements and level of effort. Through extensive research, a great deal of information about this particular base end and base commander station has been obtained and only a few data gaps remain. In reality then, restoration and interpretation of BC3 and BS1/3 as they originally appeared and functioned, would likely be a combination of knowledge of the specific structure and generic knowledge of WWII-era base end and base commander stations at Fort Rosecrans.

Another way to interpret this structure would be to only interpret and open to the public, the first level of the structure, the base commander station. The previous interpretive options would involve the restoration and interpretation of both levels of the station, with a way for the public to view the lower station through a glass window to the rooms below. In this option, only the upper level will be available and the lower levels will be sealed off completely. The public might still be allowed to view the lower room through a glass hatch, but there will be no restoration and/or interpretation of the lower base end station. Either way, only the upper level base commander station will be restored and interpreted using the process described above. A variation to this option for interpretation would be to interpret the upper room of the structure as a base end station rather than a base commander station, or a generic combination of both. This option would be used to maximize the interest of the public and current status of knowledge regarding base end stations in the limited space allowed. There is a great deal more information available for base end stations of WWII rather than base commander stations. Also of note is that this particular base commander station would have been uniquely sparse given that Battery Ashburn maintained a separate structure for plotting and spotting. In this particular case, the base end station for Battery Ashburn that occupied the lower levels of the structure would have been distinctly more interesting than the base commander station above. In executing this option, the upper level base

commander station would be restored as a base end station in a manner similar to the process mentioned above. The most simplistic way to interpret and open this station to the public would involve a combination of themes. The station would be cleaned out and repaired. Basic elements of both the base end stations and base commander stations of WWII would be installed. These include, replication of the original wiring configuration and telephone brackets, installation of the one porcelain light bulb, installation of an azimuth instrument and possibly recreated DPF instrument, removal of all paint, restoration of the metal shutters including metal supports, bolts and plexi glass window inserts, and generic orientation data and instructions for the walls. The combination of base end and base commander station interiors as an interpretive theme would need to be clearly stated to the public.

Finally, another way to interpret this structure would be to use the space for a museum style display. This option mirrors that which has been done in the current military history exhibit, presently located in the old Radio Station. This option would require a great deal of effort in the creation of interpretive displays and textual displays. The upper level of the structure would not be restored as a WWII-era base end or base commander station and would instead be used as a modern museum space for public edification.

It is the recommendation of this paper to interpret only the upper level of the structure as a base end station rather than a base commander station or a combination of both for the following reasons. Public access is limited to only the upper level of the structure and although a view to the lower level could be established, the viewing area would be small and the degree of effort from the park staff would far outweigh the benefit to the public. Furthermore, limiting the public to only a glimpse of a restored lower level might encourage vandalism and/or trespassing. As a result, it is recommended that only the upper level of the two-level observation station for Battery Ashburn be open to the public. The portal to the lower level may be sealed off with a hatch that can be locked or unlocked by park staff. The metal railings may be left in or removed.

With limited space available, restoration of the base end station for Battery Ashburn would likely be of more interest to the public than the base commander station due to general public knowledge and interest in WWII base end stations. Ultimately, the volume of information available to the park on base end stations in general and on this particular station is far greater than that of base commander stations. It would be a more appropriate use of historic resources and a simplification of park staff effort to restore the upper level of the BC3, BS1/3 as that of BS1/3, or a simplified combination of both stations.

The following are specific recommendations for the interior of BC3, both in general and for restoration as a base end station/ base commander station combination. These recommendations are ultimately the opinion of the author and it should be noted that judgments made regarding the age or historical nature of objects in these coast defense structures are educated speculation and should therefore not be taken as final conclusions.

In general, the entire structure of BC3, BS1/3 needs to be cleaned out and scrubbed down. All modern equipment on the upper level needs to be stripped, including the overhead lights, the wooden window ledge and metal supports, both the table and cabinet currently in the station and all excess wiring. The door to BC3 from the outside is in poor condition and should be replaced. The new door can remain the olive drab color and may contain a plexi glass window through which the public can see when the exhibit is closed. Modern debris in the lower rooms of the structure should be cleared out as well unless used by the park as storage. This includes the wooden door separating the front and back rooms, which was most likely an addition made years later.

To restore the upper level of this structure as BS1/3 in an over simplified, basic manner, it is recommended that the green paint be stripped and the walls returned to either the natural cement surface or painted a light sandy color as is seen in other base end stations in the park. It is noted that painting the walls a light sandy color is a more cost effective option than stripping the current color of paint. The steel shutters should remain the olive drab color. The shutters can either remain closed for safety purposes or one or two left open with plexi glass plates installed for viewers to see through. Work by a qualified electrician would be necessary to return to the original electrical configuration of the station. The power box and ceramic power grid, along with the singular porcelain bulb currently located in the back corner of the lower room should be moved to the upper room and installed to simulate the base end station configuration. Electrical wiring may be run along the wall to the phone bracket or terminal box. The electrical overhaul would also include recreation of the wood paneling, pigtail eye hooks and space for multiple telephones along the wall in a similar fashion to what is documented in the base end station that served Batteries Woodward and Grant. Recreations of the headsets described by Markham, hung along the wood paneling would be a great asset to the restoration of the communication systems that were used. Electrical wiring should also be run to connect to a T1 bell attached to the wall in the front upper right or left hand corner of the station. All other extant wiring and/or electrical equipment should be removed. Recreations or original instruments would be installed in the upper level of the station. The azimuth spotting telescope instrument, model 1912, which Cabrillo NM has acquired, should be placed on a mounting pedestal, near the windows, where it most likely would have stood while in operation. A DPF instrument would be a great addition for the restoration of a base end station, but since Cabrillo NM does not have such an instrument and the top level base commander station is not equipped to support one, it is suggested that the DPF instrument not be installed for this restoration project. The walls should be bare except for the possible recreation of a message board with various information including maps, weather charts and instrument instructions and orientation. The wooden hangers that originally attached to the ceiling to hold the glass windows may be re-installed using either recreations or originals from the other base end stations in the park. It is recommended there be no excess furniture in the upper level of the station due to limited space and to convey the sparseness of the original station. This is a basic level of restoration that would be necessary to interpret BC3 as BS1/3. More involved and extensive interpretation could be done with more attention to detail and a larger collection of artifacts. Likewise, a more "bare bones" approach might include only a cleaning of the station, repair and maintenance and installation of a few specific artifacts

such as the azimuth instrument. This approach would require a greater level of oral interpretation in order to give visitors an idea of what would have been in a base end station.

The following recommendations are made regarding public access and the level of interpretation needed to open BC3, BS1/3 to the public. Just as there are multiple interpretive themes that may be employed in the restoration of BC3, BS1/3, there are several options for degree of public access and participation for the opening of BC3, BS1/3. BC3 may be opened to the public on a limited basis with the guidance of a park ranger or volunteer or it may be opened at all times for visitors to enter freely on their own. The degree of public access that is made available for this structure will directly affect the degree of interpretation and number of artifacts present in the structure.

It is the recommendation of this paper that public access be unlimited on a general basis and that interpretive talks be given one day a week, possibly by specific WWII veteran volunteers. The Public appears to maintain a high level of interest in regards to WWII structures and artifacts. The military has always played a large role in San Diego history and visitors as well as locales are often connected to the military in one way or another. Consequently, San Diego's military history is of great interest to many of the visitors to the park and the preservation of which should be seen as a priority. Unlimited access of the base end station to the public will allow the park to fulfill and maintain its mission to visitors.

In order to provide unlimited access, several steps will need to be taken. The base end station may be restored using the guidelines provided above. The azimuth instrument pedestal should be secured to the floor, but is otherwise relatively indestructible. The scope itself could be easily removed when interpretive personnel are not present. It is recommended that both the headset display and the electrical artifacts (porcelain bulb, ceramic panel) be encased in glass for protection. These artifacts may be left unprotected with the understanding that the public will have full access to them and possible damage may occur. The message board on the wall of the base end station may be constructed of specific materials to ensure protection, i.e. lamination of charts and maps and permanently secured to the board. Finally the shutters would remain closed except for two with plexi glass inserts through which the public could look out and see a view of the Pacific Ocean.

On Sundays, the WWII veteran volunteers could lead guided tours into the base end station which would be more illuminating and educational for those that attend. They would be available to answer questions and give oral histories. An alternative to the above recommendation would be to limit public access to only during guided tours by park staff or volunteers. With this alternative, viewing access might possibly be provided to the public through a glass window in the door during times when guided tours are not scheduled. It should be noted that whether the public views the restored base end station during guided tour or by unlimited access, visitors should be informed of the differences and inaccuracies that would be caused by restoring the base commander station as either a base end station or a combination of both stations.

Preservation and Future Research:

Guidelines specifically set forth for the preservation of seacoast fortification as well as other historic structures under the jurisdiction of the National Park Service management are presented in the Seacoast Fortifications Preservation Manual for the Golden Gate National Recreation Area in San Francisco (www.nps.gov/history/seafort). This manual addresses specific preservation issues affecting the fortifications and provides technical information about appropriate treatments and standard procedures. This manual should be used as a guideline when restoring and preserving the seacoast fortifications of San Diego. John Martini is an excellent contact for this preservation manual.

Research for this project was done using many different resources including detailed oral histories, a large volume of reference material, solicited input from experts in the field, Coastal Defense Study Group publications, military websites and libraries and archival research at the Laguna Nigel branch of the National Archives. The visit to Laguna Nigel recovered only three maps that detail the interior of fire control stations at Fort Rosecrans. In general, results of the archival search at Laguna Nigel were negative. There is a great deal of Army Corps of Engineer documentation, the majority of which dates to WWI or is not applicable to Fort Rosecrans specifically. Consequently there are many data gaps, including specifications and plans for the construction of the base end and base commander stations at Fort Rosecrans. Future researchers are advised that this information does not exist at the Laguna Nigel branch of the National Archives and archival searches should focus on alternate locations. The National Archives in College Park, MD contains a file called San Diego Harbor Project File, Appendix B., which is among Records of the Adjutant General's Office (Record Group 407). The file includes twenty-two pages of narrative, and approximately eighty oversize maps and drawings. Cabrillo NM should consider obtaining a copy of this file. Further information might also be housed in the archives for the National Park in San Francisco.

Future research may continue to be done on the coast defense structures of Fort Rosecrans by the Cabrillo NM Park staff. However, depending on the interpretive goals for restoration, a great degree of additional contextual research may not be required.

Lastly, it is recommended that when restoring BC3, BS1/3, the Park Service contact Mark Berhow of the Coast Defense Study Group Projects Committee. In the February CDSG newsletter, Berhow encourages organizations with coast artillery-related public sites to submit requests for money from the CDSG Fund to help with restoration and interpretation projects. The CDSG Fund can provide up to \$500 (and possibly more) in funds towards a project. A short description of the work to be done and an estimate of the cost are required. The point of contact is Mark Berhow at berhowma@ncaur.usda.gov or the Coast Defense Study Group at www.cdsg.org.

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- ¹ Erwin N. Thompson, ed. Howard B. Overton, *The Guns of San Diego; San Diego Harbor Defenses, 1796-1947*, (San Diego: National Park Service, 1991), Chapter 6.
- ² Erica, Spinelli, *Cabrillo National Monument's World War II-era Base End Stations: A Preliminary Step Toward Restoration*, (National Park Service) July 2002.
- ³ Extensive research has been conducted by Erica Spinelli in July 2002, *Cabrillo National Monument's World War II-era Base End Stations: A preliminary Step Toward Restoration*, and Howard Overton 1992-3, *The 19th Coast Artillery and Fort Rosecrans: Remembrances*.
- ⁴ Markham, Richard, Oral history interview with Julia Speer, February 20, 2004.
- ⁵ Carey and Co. Inc. Architecture, *Historic Structures Report for Harbor Defense Structures, Cabrillo National Monument, San Diego, California* (Prepared for the National Park Service, April 15, 2000), 41.
- ⁶ Keniston Architects, *Fort Rosecrans: Point Loma Coastal Defenses- National Register of Historic Places Nomination*, (Prepared for Naval Command, Control and Ocean Surveillance Center, RDT&E Division, NRD, May 1996), serves as the definitive cultural resources inventory of Fort Rosecrans coastal defense structures surviving on Navy and National Park Service property. Pages 7-7 through 7-15 list the extant structures as of 1996. Thompson, *Guns of San Diego*, 109.
- ⁷ Markham, Oral history interview, February 20, 2004.
- ⁸ Carey and Co. Inc., *Historic Structures*, 41.
- ⁹ Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ¹⁰ Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹¹ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹² Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹³ Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ¹⁴ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁵ Army Corps of Engineers, Los Angeles District, "Fire control station B2/1 Miscellaneous Metals, sheet #6" 1941; "Fire control station B1/4 Structural Details, sheet #2" 1943; "BC-Battery Point Loma Structural Details, sheet #2" 1942, Record Group 77- Maps and Drawings Collection, Drawer 54-4-1, 54-4-2; National Archives, Laguna Nigel.
- ¹⁶ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁷ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁸ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ²⁰ Photographs of base end station interiors taken by Nancy Parkinson Walton on February 19, 2004.
- ²¹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ²² Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²³ Markham, Oral history interview, February 20, 2004.
- ²⁴ Army Corps of Engineers, Los Angeles District, "Fire control system, type installation" 1917, Series H-5; box 46; Record Group 77- Records of Office of the Chief of Engineers, Project Administration Records; National Archives, Laguna Nigel.
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- ²⁶ Markham, Oral history interview, February 20, 2004.
- ²⁷ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²⁸ Fort MacArthur Museum Association: Base End Station Instruments Information Page (www.ftmac.org/baseend2.htm), 1.
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³¹ Army Corps of Engineers, Los Angeles District, "Fire control system, type installation" 1917, Series H-5; box 46; Record Group 77- Records of Office of the Chief of Engineers, Project Administration Records; National Archives, Laguna Nigel.

³² Markham, Oral history interview, February 20, 2004.

³³ Bob Munson, park historian, was informed by Charles, Chief of Maintenance that the green color seen currently in the base end station was painted in 1999. Carey and Co. Inc, *Historic Structures Report*, also confirms this fact.

³⁴ Markham, Oral history interview, February 20, 2004.

³⁵ Julius C. Gary, Oral history interview with Howard Overton, June 13, 1992, in Howard B. Overton, *19th Coast Artillery*, 70.

³⁶ Phone conversation with John Martini (GGNRA) regarding the interiors of typical base end stations, February 23, 2004.

³⁷ Markham, Oral history interview, February 20, 2004.

³⁸ Keniston, *Fort Rosecrans*, 7-104 through 7-107.

³⁹ Keniston, *Fort Rosecrans*, 7-104 through 7-107.

⁴⁰ Markham, Oral history interview, February 20, 2004.

⁴¹ Carey and Co. Inc., *Historic Structures*, 39-42.

⁴² Markham, Oral history interview, February 20, 2004.

⁴³ Markham, Oral history interview, February 20, 2004.

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In the aftermath of WWI, many seacoast defense structures fell out of use and/or were closed down by the military. For the build-up to WWII, the War Department began a "modernization" of coast defense structures in the early 1940's.¹ Many of the remaining structures from the WWI period were modified for use again during WWII. This modernization program resulted in the building of Battery Ashburn (16-inch guns) and several Base End and Base Commander Stations, among others at Fort Rosecrans, San Diego. During World War II, the Nineteenth Coast Artillery Regiment occupied Fort Rosecrans and operated these Batteries and base end stations.² Following the war, these structures were closed down and abandoned. Roughly fifty years later, there has developed both a need and a want for the Park Service to open one or some of these structures, which reside on Park lands, to the public. During the past month, an investigation has been launched to determine the possibility and requirements for opening and restoring a base end station. This report and enclosed recommendations are a result of this inquiry.

The recommendation of this paper is to open the Base Commander Station (BC3) and Base End Station (BS1/3) for Battery Ashburn, located within the park, to the viewing public. What follows is a discussion and further recommendations regarding the logistics of opening these structures to the public as well as interpretive themes for restoration inside the structures. More detailed discussions of the functions and history of WWII-era base end stations and seacoast defenses in general can be found in Mark Berhow's American Seacoast Defenses: A Reference Guide, and Erwin Thompson's The Guns of San Diego, San Diego Harbor Defenses, 1796-1947, as well as a wealth of other reference material in the Cabrillo NM library and will not be presented here. Caveats, stipulations and assumptions for this paper are stated here.

Over the past decade, a great deal of research has been done on the subject of San Diego's coast defense structures and more specifically on Fort Rosecrans.³ This report draws upon all those sources and should be viewed as a working status of knowledge toward the goal of restoring BC3, BS1/3 for the public. Changes can and should be made at any time in light of new information or changing theories. It is noted that a large amount of information presented in this report is based on oral history from men who operated the base end stations of Fort Rosecrans. Such information can often be conflicting and spotty at best.

Ft. Rosecrans is home to several WWII-era batteries as well as multiple base end stations and base commander stations that were built to support the big guns. This report will focus on the base end station and base commander station for Battery Ashburn. In general, WWII-era base end stations on Ft. Rosecrans are similar in nature, according to Richard Markham of the 19th Coast Artillery, who was an observer working in the Ft. Rosecrans's base end stations in the early 1940's.⁴ Markham notes that the men of the 19th Coast Artillery often rotated around, working in different base end stations at different times, and that all stations of similar function usually maintained the same appearance and interior. Consequently, where specific information regarding the base end station and base commander station for Battery Ashburn is absent, general knowledge and educated speculation based on a comparative framework of other base

end stations in the area will be used and duly noted as such. Furthermore, the restoration of this structure will draw upon comparative restorations of coastal defense structures at other forts including base end stations at Fort McArthur and coastal defense structures at the Presidio in San Francisco.

Description

The Battery Commander Station and Base-End Station for Battery Ashburn (referred to as BC3, BS1/3 for the remainder of the paper), is a two-story, three room structure located just above the Military History Exhibit on the west facing slope of Pt. Loma, within the park grounds.⁵ BC3 occupies the top level of the station, while BS1/3 is contained in the two rooms on the lower level. Battery Ashburn had a separate plotting and spotting room for data analysis at an alternate location at Fort Rosecrans.⁶ Consequently, BS1/3 was used simply for observation and collection of data. This was performed by a three man team including an "observer," "spotter" and "reader." BC3 served as the main commanding station for the Battery, also a three man team comprised of a Commander, Sergeant and Officer in Charge.⁷

BC3, BS1/3 is one of six structures associated with Battery Ashburn. Constructed c. 1936-1942, it was closed in 1948.⁸ During the years following WWII, BC3, BS1/3 was used and reused in several different functions, including use by the Park Service as a dark room and many years as an abandoned structure left open to vandalism and destruction by the public.⁹ Consequently, the current condition of BC3, BS1/3 is historically inaccurate as well as deteriorated and worn down. The process needed to restore this structure to its original appearance and function will be discussed shortly. The following is a summary of the appearance and function of the original BC3, BS1/3 to be used as a guide to restoration of the structure. It should be noted that, information regarding the appearance of the interior of this particular base end station as well as others within the park, is somewhat conflicting and definitive answers may not be available at this time or in the future. In light of this, all information will be presented and recommendations will be given based on educated speculation and realistic expectations for restoration.

Exterior: The multilevel station was constructed of reinforced concrete with observation slots on both levels facing west, containing six solid metal, rectangular shutters.¹⁰ These shutters rise two feet above the concealed station and are all that is visible and thus unprotected on the station, beginning at a distance of 75 yards.¹¹ A stairwell leads down to the entrance of the upper level of the structure to a metal door. The roof was a continuation of the concrete camouflage walls, formed of large aggregate, rough concrete.¹² The steel rings on the roofs of each level served as anchoring points for camouflage netting that would have covered the structure during WWII.¹³

Structural Plan: BS1/3 consists of two concrete rooms, rectangular in plan, measuring approximately 11 feet by 16 feet, with a height of 7 feet and an elevation of about 400 feet.¹⁴ The upper level room, BC3, retains similar measurements with slightly less height. Included in this report is an Army Corps of Engineers "Report of Completed Works", which illustrates the plan for the harbor defense structure BC3, BS1/3 with more detailed measurements than is presented here. Also included and used as reference are three detailed Army Corps of Engineers construction plans/drawings of similar base end stations within the park.¹⁵ These plans outline the structural design of "fire control

stations,” also known as base end stations that were built during this time at Fort Rosecrans. The plans include measurements of the structures as well as some details for construction of the metal shutters and other miscellaneous parts. Restoration and interpretation of the BC3, BS1/3 should refer to these drawings for structural details of a typical station.

The interiors of the base end stations and base commander stations at Fort Rosecrans were generally very simplistic and limited. These stations were hurriedly assembled in preparation for war and it follows that the interiors would be primarily functional and thus sparse and requiring low maintenance.

Electric/plumbing: BC3, BS1/3 was not heated and was not connected to either sewer or water mains. There was also no latrine built for BC3, BS1/3.¹⁶ The records indicate that both levels of the station were electrically powered by connection to a civilian commercial source, most likely SDG&E, as well as one auxiliary generator (3 KVA).¹⁷ The only lighting fixture within the entire two-story structure is listed as one 4 inch porcelain bulb, located down in the lower level back room.¹⁸ Lighting in this structure is limited and most likely reflects the effort to keep these stations dark and camouflaged from enemy sight. The one light source is appropriately placed in the “bunk room” which was the back room of the lower level and often used for sleeping. This area contains a single-bulb light, miscellaneous conduit, a terminal block and telephone box.¹⁹ Observation of electrical wiring configurations preserved in other base end stations in the park can give an example of the wiring configuration most likely used in BS1/3. These configurations run flat against the wall and are overlain with wood paneling. This system most likely ran along the walls of BC3 and was fed down to the power boxes in the lower level.²⁰ Original conduit feeding holes in the concrete walls of BC3, BS1/3 have been plugged in most cases.²¹

Communication: The Report of Completed Works details two separate telephone brackets, one in the front room of the lower level of BS1/3 and one in the rear right corner of BC3.²² According to Richard Markham who worked as an observer in this particular base end station, there were three phones, one for each man operating the base end station. Each man had a headset and a mouthpiece which hung around his neck, allowing his hands free at all times.²³ The general use of these headsets by the men is confirmed in the Army Corps of Engineers Project Administration Records.²⁴ In contrast to Markham’s report, Greg Hagge an employee of the Army and member of the Coast Defense Study Group, an authority on such topics, argues that this station would have had “many phones, at least 8-10 and likely more than two terminal boxes.”²⁵ Hagge also notes that the phones would have been “the EE-91 type and mounted on parallel wood slates about 8-10 inches apart on the back or side walls. The wires were often held by pig tail eye hooks spaced about three feet apart.” The pattern of screw holes seen on the walls of several stations and remnants of both the wood slates and one pig tail eye hook in the base end station for Battery Humphreys confirm Hagge’s hypothesis. Taken together with Markham’s account, it is likely that three phones were used in the lower base end station by the men and several more were used upstairs in the base commander station. Regardless of number, all phones were used to communicate data to the plotting and spotting room for Battery Ashburn. Army Corps of Engineers Project Administration Records also describe the time interval bell, located in the corner of both

base end stations and base commander stations, which rang every 10 or 15 seconds to signal the taking of a simultaneous reading from the instruments. Markham recalls the use of this T1 bell in the base end station and base commander station for Battery Ashburn.²⁶

Instruments: BS1/3 contained a depression position finder (DPF) which was used to determine the vertical azimuth of the target from the base-end station and an azimuth telescope, used to determine horizontal angles of the azimuth to the target from the base-end station.²⁷ The Azimuth telescopes were mounted on concrete columns and depression range finders were mounted on large eight sided concrete bases.²⁸ This base was surrounded by a metal track along which a wooden bench rotated for the observer and reader to sit upon and take readings.²⁹ The spotter stood separately. Typically, the standard issue for Coast Artillery was the Model 1910A1 azimuth telescope and would have most likely been used in BS1/3.³⁰ BC3 also contained one azimuth telescope instrument, most likely the same make and model.³¹

Paint/walls: This structure was built of reinforced concrete and most likely remained unpainted during operations in the mid-1940's. Richard Markham, an observer in the 19th Coast Artillery, recalled no paint of any kind on the walls of the station.³² However, there is contradictory evidence on this point. In several other base end stations within the park, a light sand color is observed painted directly on the original cement surface and in some instances then overlaid by what appear to be original azimuth markings. It is possible that different base end stations had different paint schemes for various reasons or that base end stations were painted at different times throughout their existence.

Whichever the case may be, according to oral histories and documentation, the olive drab and pea green color found currently in BC3, BS1/3 is not historically accurate and was painted on in 1999.³³ Richard Markham also notes that on one of the walls of the front room of BS1/3, hung a message board upon which was hung type written instructions and data orientation for the instruments being used. Markham does not recall the presence of any duty rosters, or ship identifiers, or maps.³⁴ However, such material may have appeared in other stations or possibly in the base commander station above. Julius Gary, for instance, who also served in this particular base end station for Battery Ashburn, recalls a DPS chart and weather chart on the wall.³⁵ Similarly many sources describing typical WWII base end stations make reference to ship identification charts. The upstairs base commander station most likely contained similar information such as weather charts, duty rosters or intelligence information, however there is at present no written evidence for what was in the base commander station and should be taken as educated speculation.

The olive drab color used pervasively by the army would have been applied to both the entrance door and the steel shutters which lined the outside of the structure.³⁶ These would have been the only areas visible to the outside and thus camouflage would have been necessary. Markham recalls that when in operation, all shutters would be swung open and fastened. He also recalls plates of glass installed in front of the shutters to allow the men to see out, but keep out the cold and wind at the same time.³⁷ This is supported by the presence of auxiliary glass shutters found in the Navy coast defense structures as a means of protection from adverse weather and extreme cold. Keniston Architects found auxiliary glass shutters and their wooden hangers in Battery Strong's

primary base end station.³⁸ Glass remained in the “wooden, ceiling mounted hangers” of the “auxiliary shutter windows” in Battery Woodward’s BC station.³⁹ The ghosts and remnants of these “wooden hangers” can be observed in the base end station for Battery Ashburn, confirming their existence.

Furniture: Within the base end station and base commander station, there may have been a table or bench that was used to make calculations or read maps, however this particular station was used only for the collection and transmission of data and thus was simplistic and sparse in furnishings. Markham does not recall any furniture at all in the station.⁴⁰ However, he does recall a window in the base end station, which no longer exists and the *Historic Structures Report for Harbor Defense Structures*, performed by Carey & Co Inc., confirms this report. The Historic Structures Report also notes that another built in furnishing, a chart shelf, is also missing from the forward lower level room.⁴¹ It stands to reason that there may have been a small table or bench in either the base commander station or the base end station, but that the items currently in the structure are not original. A separate plotting and spotting room for Battery Ashburn also eliminated the need for a plotting table which is documented as typical in other base commander stations. There were, however, two bunks that were hung from the back wall of the “bunk room” in the lower base end station.⁴² Hung in hammock style, these bunks were used unofficially for sleeping during the 24 hour shift, as explained by Markham. Three men worked shifts of 24 hours on and 24 hours off in this particular base end station. Markham recalls that two men would be on duty while one slept. However if there was any sign of enemy activity, all three men would take up their positions within the station. According to Markham food for the 24 hour shift was taken in with the men, most likely in “field” fashion.⁴³

Personal Effects: Finally, none or very few personal items were present in the base end and base commander stations. The majority of downtime was spent sleeping and possibly playing a game or two of cards. However, Markham notes that while on shift, the men engaged in very little personal entertainment.

As is evident, there is much less information regarding the interiors and details of Base Commander Stations as opposed to Base End Stations in general. Oral histories collected to date have been from the men who worked in the base end stations and there are no first hand accounts from the officers who would have worked in the base commander stations. Both Berhow and Thompson discuss the history and function of base commander stations in general and at Fort Rosecrans.⁴⁴ John Martini of GGNRA is also a good source of information on base commander stations.

Recommendations

Drawing upon the information set forth previously in the document, the following recommendations are made regarding an interpretive theme for restoration of BC3, BS1/3. There are several different themes and variations on themes that may be used when interpreting this base end and base commander station for Battery Ashburn.

One option would be to interpret both BC3 and BS1/3 exactly as they would have appeared and been used in the 1940’s. This option will require the most effort by park staff, will be the most expensive and will be hindered by any remaining data gaps for

these structures. To restore and interpret BC3 and BS1/3 one hundred percent would involve repair and cleaning of the structures, removal of everything modern, stripping of the olive drab paint, an overhaul of the electrical system to simulate the original configuration complete with wood paneling, installation of phone brackets or replicated terminal boxes, installation of two bunks in the lower back room, installation of three specific instruments and their required base structures and simulation of the appropriate wall décor. This option would also require a visual or physical corridor from the upper level of the BC station to the lower BS station. Currently, entrance to the lower level room is gained by way of metal ladder rungs through a manhole in the floor. Accessibility here is limited and is seen as a liability and safety hazard. Entrance to the lower rooms will likely remain closed to public access. If the lower rooms do remain closed, the public could be allowed to view the lower levels of the observation station through a plexi glass surface installed over the entrance hatch.

A second possibility would be to interpret the BC station and/or the BS station as a generic type of station typical of the WWII-era coast defenses. This option would not be much different than the previous one and would have similar requirements and level of effort. Through extensive research, a great deal of information about this particular base end and base commander station has been obtained and only a few data gaps remain. In reality then, restoration and interpretation of BC3 and BS1/3 as they originally appeared and functioned, would likely be a combination of knowledge of the specific structure and generic knowledge of WWII-era base end and base commander stations at Fort Rosecrans.

Another way to interpret this structure would be to only interpret and open to the public, the first level of the structure, the base commander station. The previous interpretive options would involve the restoration and interpretation of both levels of the station, with a way for the public to view the lower station through a glass window to the rooms below. In this option, only the upper level will be available and the lower levels will be sealed off completely. This upper level base commander station may then be restored and interpreted using the process described above. A variation to this option for interpretation would be to interpret the upper room of the structure as a base end station rather than a base commander station, or a generic combination of both. This option would be used to maximize the interest of the public and current status of knowledge regarding base end stations in the limited space allowed. There is a great deal more information available for base end stations of WWII rather than base commander stations. Also of note is that this particular base commander station would have been uniquely sparse given that Battery Ashburn maintained a separate structure for plotting and spotting. In this particular case, the base end station for Battery Ashburn that occupied the lower levels of the structure would have been distinctly more interesting than the base commander station above. In executing this option, the upper level base commander station would be restored as a base end station in a manner similar to the process mentioned above. The most simplistic way to interpret and open this station to the public would involve a combination of themes. The station would be cleaned out and repaired. Basic elements of both the base end stations and base commander stations of WWII would be installed. These include, replication of the original wiring

configuration and telephone brackets, installation of the one porcelain light bulb, installation of an azimuth instrument and possibly recreated DPF instrument, removal of all paint, restoration of the metal shutters including metal supports and bolts, and generic orientation data and instructions for the walls. The combination of base end and base commander station interiors as an interpretive theme would need to be clearly stated to the public.

*glass window inserts
of plexiglass
or lexan*

Finally, another way to interpret this structure would be to use the space for a museum style display. This option mirrors that which has been done in the current military history exhibit, currently located in the old Radio Station. This option would require a great deal of effort in the creation of interpretive displays and textual displays. The upper level of the structure would not be restored as a WWII-era base end or base commander station and would instead be used as a modern museum space for public edification.

*keep this
a "discovery"
space. Radio
Room is exhibit
this is chance for
public to experience
the entire prison*

It is the recommendation of this paper to interpret only the upper level of the structure as a base end station rather than a base commander station or a combination of both for the following reasons. Public access is limited to only the upper level of the structure and although a view to the lower level could be established, the viewing area would be small and the degree of effort from the park staff would far outweigh the benefit to the public. Furthermore, limiting the public to only a glimpse of a restored lower level might encourage vandalism and/or trespassing. As a result, it is recommended that only the upper level of the two-level observation station for Battery Ashburn be open to the public. With limited space available, restoration of the base end station for Battery Ashburn would likely be of more interest to the public than the base commander station due to general public knowledge and interest in WWII base end stations. Ultimately, the volume of information available to the park on base end stations in general and on this particular station is far greater than that of base commander stations. It would be a more appropriate use of historic resources and a simplification of park staff effort to restore the upper level of the BC3, BS1/3 as that of BS1/3, or a combination of both stations.

The following are specific recommendations for the interior of BC3, both in general and for restoration as a base end station. These recommendations are ultimately the opinion of the author and it should be noted that judgments made regarding the age or historical nature of objects in these coast defense structures are educated speculation and are therefore not the final word on the subject.

In general, the entire structure of BC3, BS1/3 needs to be cleaned out and scrubbed down. All modern equipment on the upper level needs to be stripped, including the overhead lights, the wooden window ledge and metal supports, both the table and cabinet currently in the station and all excess wiring. Modern debris in the lower rooms of the structure should be cleared out as well unless used by the park as storage. This includes the wooden door separating the front and back rooms, which was most likely an addition made years later.

To restore the upper level of this structure as BS1/3 in a basic manner, it is recommended that the green paint be stripped and the walls returned to either the natural cement surface or painted a light sandy color as is seen in other base end stations in the park. The steel shutters should remain the olive drab color. The shutters can either remain closed for safety purposes or one or two left open with plexi glass plates installed for viewers to see through. Work by a qualified electrician would be necessary to return to the original electrical configuration of the station. The power box and ceramic power grid, along with the singular porcelain bulb currently located in the back corner of the lower room should be moved to the upper room and installed to simulate the base end station configuration. Electrical wiring may be run along the wall to a phone bracket or terminal box. The electrical overhaul would also include recreation of the wood paneling, pigtail eye hooks and space for multiple telephones along the wall in a similar fashion to what is documented in the base end station that served Batteries Woodward and Grant. Recreations of the headsets described by Markham, hung along the wood paneling would be a great asset to the restoration of the communication systems that were used. Electrical wiring should also be run to connect to a T1 bell attached to the wall in the front upper right or left hand corner of the station. All other extant wiring and/or electrical equipment should be removed. Recreations or original instruments could be installed in the upper level of the station. Both a DPF instrument, complete with rotating bench and an azimuth telescope would be placed in front of the windows looking out to sea.

the painting is most cost effective. Stripping will not recreate original raw cement surface

We have the instrument and a painting Per (.

The walls should be bare except for the possible recreation of a message board with various information including maps, weather charts and instrument instructions and orientation. The wooden hangers that originally attached to the ceiling to hold the glass windows may be re-installed using either recreations or originals from the other base end stations in the park. It is recommended there be no excess furniture in the upper level of the station due to limited space and to convey the sparseness of the original station. This is a basic level of restoration that would be necessary to interpret BC3 as BS1/3. More involved and extensive interpretation could be done with more attention to detail and a larger collection of artifacts. Likewise, a more "bare bones" approach might include only a cleaning of the station, repair and maintenance and installation of a few specific artifacts such as the azimuth instrument. This approach would require a greater level of oral interpretation in order to give visitors an idea of what would have been in a base end station.

requires a cement pedestal a feature this room never had, extensive restoration to rotating seat, and a DPF instrument we do not have

I like this

The following recommendations are made regarding public access and the level of interpretation needed to open BC3, BS1/3 to the public. Just as there are multiple interpretive themes that may be employed in the restoration of BC3, BS1/3, there are several options for degree of public access and participation for the opening of BC3, BS1/3. BC3 may be opened to the public on a limited basis with the guidance of a park ranger or volunteer or it may be opened at all times for visitors to enter freely on their own. The degree of public access that is made available for this structure will directly affect the degree of interpretation and number of artifacts present in the structure.

It is the recommendation of this paper that public access be unlimited on a general basis and that interpretive talks be given one day a week, possibly by specific WWII veteran volunteers. The Public appears to maintain a high level of interest in regards to WWII

1912

structures and artifacts. The military has always played a large role in San Diego history and visitors as well as locales are often connected to the military in one way or another. Consequently, San Diego's military history is of great interest to many of the visitors to the park and the preservation of which should be seen as a priority. Unlimited access of the base end station to the public will allow the park to fulfill and maintain its mission to visitors.

In order to provide unlimited access, several steps will need to be taken. The base end station may be restored using the guidelines provided above. The azimuth instrument should be secured to the floor, but is otherwise relatively indestructible. The DPF instrument should also be secured and the bench recreated with the knowledge that the public will be allowed to have physical contact with the structure. It is recommended that both the headset display and the electrical artifacts (porcelain bulb, ceramic panel) be encased in glass for protection. These artifacts may be left unprotected with the understanding that the public will have full access to them and possible damage may occur. The message board on the wall of the base end station may be constructed of specific materials to ensure protection, i.e. lamination of charts and maps and permanently secured to the board. Finally the shutters would remain closed except for two through which the public could look out and see a view of the Pacific Ocean.

*Pedestal
the base itself would be
easily removed
when interp
personnel are
not there.*

On Sundays, the WWII veteran volunteers could lead guided tours into the base end station which would be more illuminating and education for those that attend. They would be available to answer questions and give oral histories. An alternative to the above recommendation would be to limit public access to only during guided tours by park staff or volunteers. With this alternative, viewing access might possibly be provided to the public through a glass window in the door during times when guided tours are not scheduled. It should be noted that whether the public views the restored base end station during guided tour or by unlimited access, visitors should be informed of the differences and inaccuracies that would be caused by restoring the base commander station as either a base end station or a combination of both stations.

Preservation and Future Research:

Guidelines specifically set forth for the preservation of seacoast fortification as well as other historic structures under the jurisdiction of the National Park Service management are presented in the Seacoast Fortifications Preservation Manual for the Golden Gate National Recreation Area in San Francisco (www.nps.gov/history/seaforts). This manual addresses specific preservation issues affecting the fortifications and provides technical information about appropriate treatments and standard procedures. This manual should be used as a guideline when restoring and preserving the seacoast fortifications of San Diego. John Martini is an excellent contact for this preservation manual.

Research for this project was done using many different resources including detailed oral histories, a large volume of reference material, solicited input from experts in the field, Coastal Defense Study Group publications, military websites and libraries and archival

research at the Laguna Nigel branch of the National Archives. The visit to Laguna Nigel recovered only three maps that detail the interior of fire control stations at Fort Rosecrans. In general, results of the archival search at Laguna Nigel were negative. There is a great deal of Army Corps of Engineer documentation, the majority of which dates to WWI or is not applicable to Fort Rosecrans specifically. Consequently there are many data gaps, including specifications and plans for the construction of the base end and base commander stations at Fort Rosecrans. Future researchers are advised that this information does not exist at the Laguna Nigel branch of the National Archives and archival searches should focus on alternate locations. The National Archives in College Park, MD contains a file called San Diego Harbor Project File, Appendix B., which is among Records of the Adjutant General's Office (Record Group 407). The file includes twenty-two pages of narrative, and approximately eighty oversize maps and drawings. Cabrillo NM should consider obtaining a copy of this file. Further information might also be housed in the archives for the National Park in San Francisco.

Future research may continue to be done on the coast defense structures of Fort Rosecrans by the Cabrillo NM Park staff. However, depending on the interpretive goals for restoration, a great degree of additional contextual research may not be required.

Lastly, it is recommended that when restoring BC3, BS1/3, the Park Service contact Mark Berhow of the Coast Defense Study Group Projects Committee. In the February CDSG newsletter, Berhow encourages organizations with coast artillery-related public sites to submit requests for money from the CDSG Fund to help with restoration and interpretation projects. The CDSG Fund can provide up to \$500 (and possibly more) in funds towards a project. A short description of the work to be done and an estimate of the cost are required. The point of contact is Mark Berhow at berhowma@ncaur.usda.gov or the Coast Defense Study Group at www.cdsg.org.

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- ¹ Erwin N. Thompson, ed. Howard B. Overton, *The Guns of San Diego; San Diego Harbor Defenses, 1796-1947*, (San Diego: National Park Service, 1991), Chapter 6.
- ² Erica, Spinelli, *Cabrillo National Monument's World War II-era Base End Stations: A Preliminary Step Toward Restoration*, (National Park Service) July 2002.
- ³ Extensive research has been conducted by Erica Spinelli in July 2002, *Cabrillo National Monument's World War II-era Base End Stations: A preliminary Step Toward Restoration*, and Howard Overton 1992-3, *The 19th Coast Artillery and Fort Rosecrans: Remembrances*.
- ⁴ Markham, Richard, Oral history interview with Julia Speer, February 20, 2004.
- ⁵ Carey and Co. Inc. Architecture, *Historic Structures Report for Harbor Defense Structures, Cabrillo National Monument, San Diego, California* (Prepared for the National Park Service, April 15, 2000), 41.
- ⁶ Keniston Architects, *Fort Rosecrans: Point Loma Coastal Defenses- National Register of Historic Places Nomination*, (Prepared for Naval Command, Control and Ocean Surveillance Center, RDT&E Division, NRaD, May 1996), serves as the definitive cultural resources inventory of Fort Rosecrans coastal defense structures surviving on Navy and National Park Service property. Pages 7-7 through 7-15 list the extant structures as of 1996. Thompson, *Guns of San Diego*, 109.
- ⁷ Markham, Oral history interview, February 20, 2004.
- ⁸ Carey and Co. Inc., *Historic Structures*, 41.
- ⁹ Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ¹⁰ Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹¹ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹² Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹³ Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ¹⁴ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁵ Army Corps of Engineers, Los Angeles District, "Fire control station B2/1 Miscellaneous Metals, sheet #6" 1941; "Fire control station B1/4 Structural Details, sheet #2" 1943; "BC-Battery Point Loma Structural Details, sheet #2" 1942, Record Group 77- Maps and Drawings Collection, Drawer 54-4-1, 54-4-2; National Archives, Laguna Nigel.
- ¹⁶ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁷ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁸ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ²⁰ Photographs of base end station interiors taken by Nancy Parkinson Walton on February 19, 2004.
- ²¹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ²² Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²³ Markham, Oral history interview, February 20, 2004.
- ²⁴ Army Corps of Engineers, Los Angeles District, "Fire control system, type installation" 1917, Series H-5; box 46; Record Group 77- Records of Office of the Chief of Engineers, Project Administration Records; National Archives, Laguna Nigel.
- ²⁵ Email correspondence with Greg Hagge at Gregory.J.Hagge@us.army.mil, February 27, 2004. Greg Hagge was a point of contact given by John Martini (GGNRA).
- ²⁶ Markham, Oral history interview, February 20, 2004.
- ²⁷ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²⁸ Fort MacArthur Museum Association: Base End Station Instruments Information Page (www.ftmac.org/baseend2.htm), 1.
- ²⁹ Markham, Oral history interview, February 20, 2004.
- ³⁰ Fort MacArthur Museum Association: Base End Station Instruments Information Page (www.ftmac.org/baseend2.htm), 1.

³¹ Army Corps of Engineers, Los Angeles District, "Fire control system, type installation" 1917, Series H-5; box 46; Record Group 77- Records of Office of the Chief of Engineers, Project Administration Records; National Archives, Laguna Niguel.

³² Markham, Oral history interview, February 20, 2004.

³³ Bob Munson, park historian, was informed by Charles, Chief of Maintenance that the green color seen currently in the base end station was painted in 1999. Carey and Co. Inc, *Historic Structures Report*, also confirms this fact.

³⁴ Markham, Oral history interview, February 20, 2004.

³⁵ Julius C. Gary, Oral history interview with Howard Overton, June 13, 1992, in Howard B. Overton, *19th Coast Artillery*, 70.

³⁶ Phone conversation with John Martini (GGNRA) regarding the interiors of typical base end stations, February 23, 2004.

³⁷ Markham, Oral history interview, February 20, 2004.

³⁸ Keniston, *Fort Rosecrans*, 7-104 through 7-107.

³⁹ Keniston, *Fort Rosecrans*, 7-104 through 7-107.

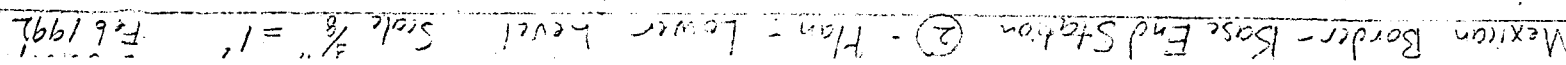
⁴⁰ Markham, Oral history interview, February 20, 2004.

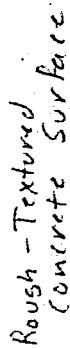
⁴¹ Carey and Co. Inc., *Historic Structures*, 39-42.

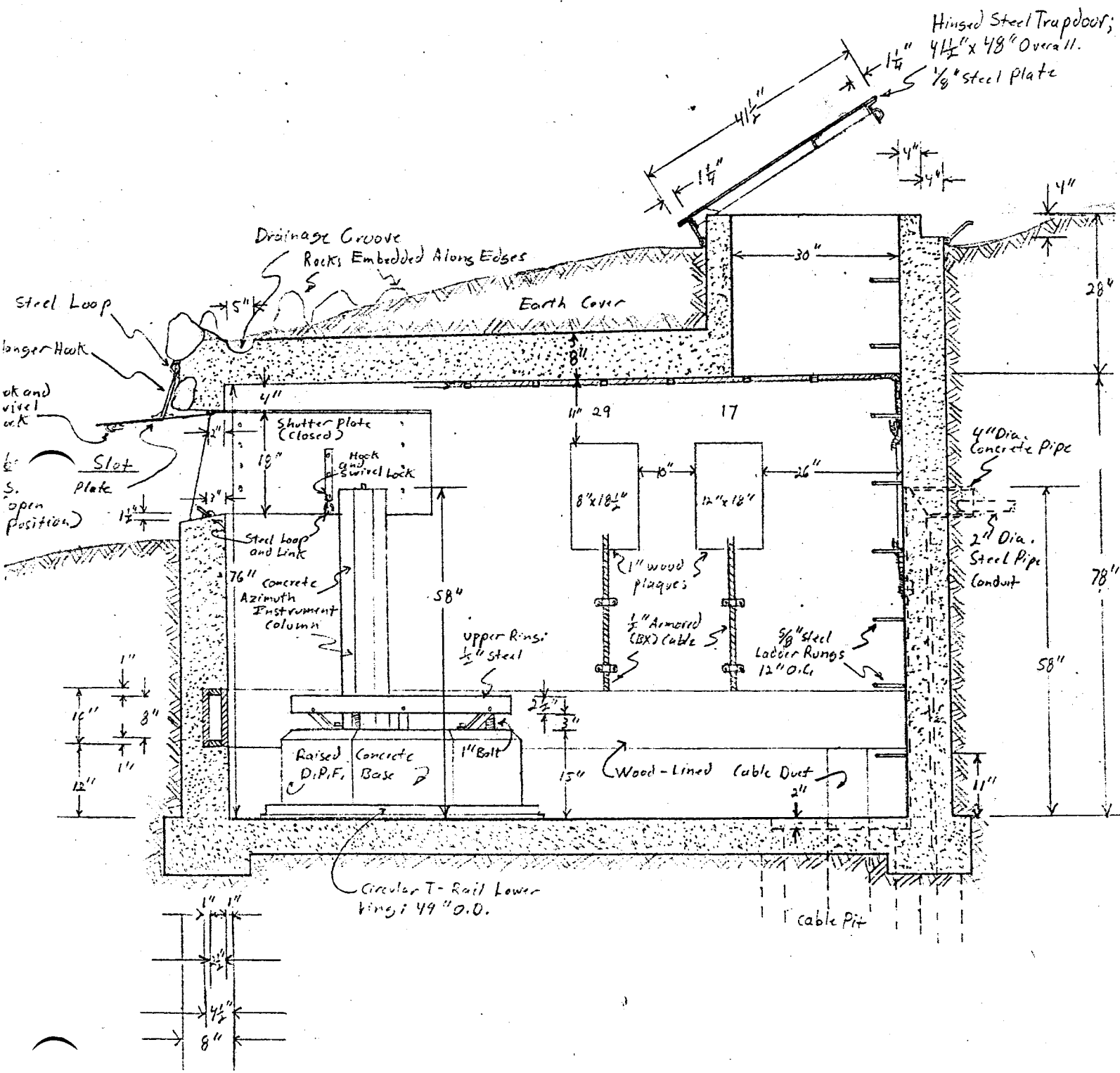
⁴² Markham, Oral history interview, February 20, 2004.

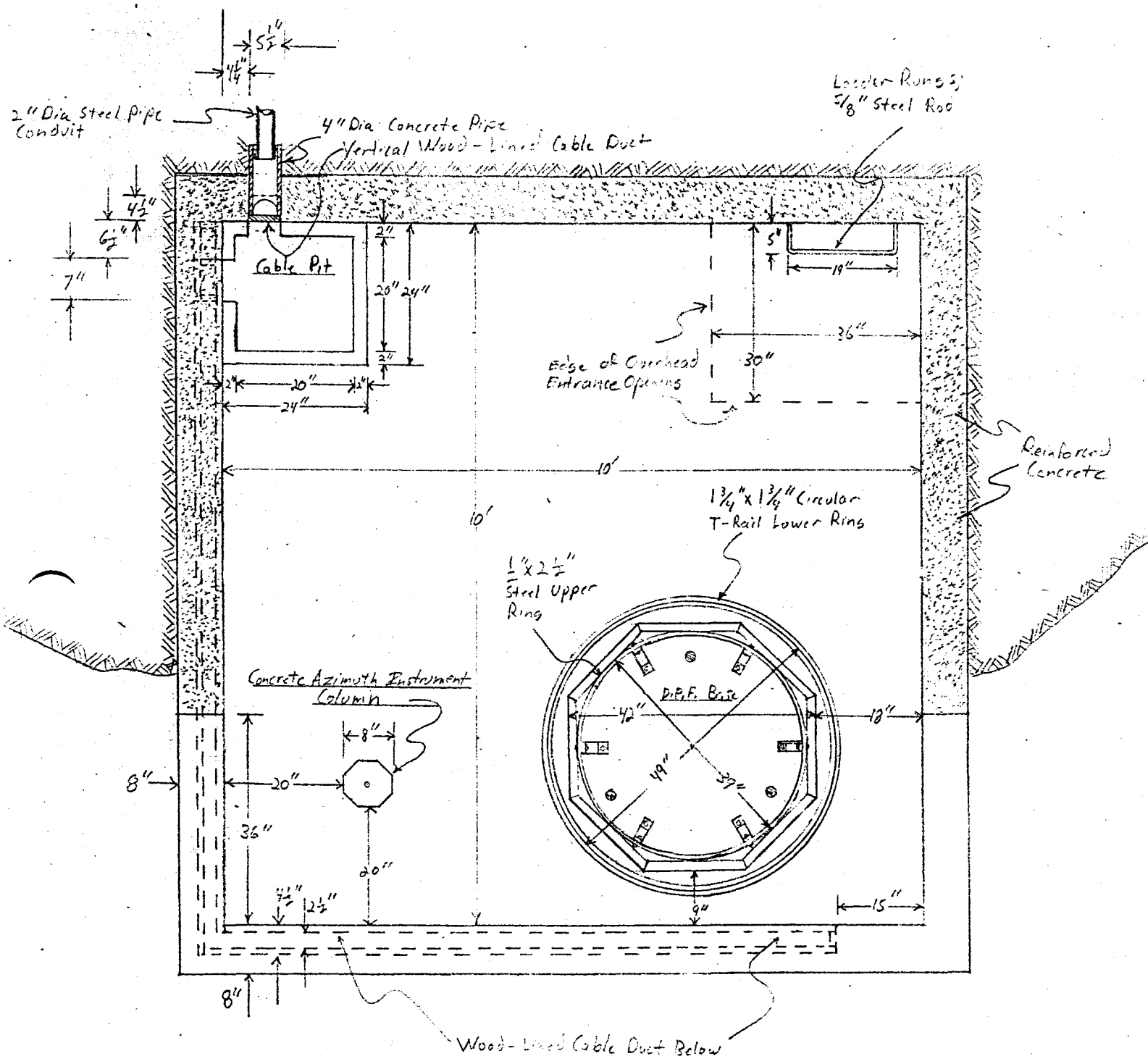
⁴³ Markham, Oral history interview, February 20, 2004.

⁴⁴ Berhow, *American Seacoast Defenses*, 61-104; Thompson, *Guns of San Diego*, 126.

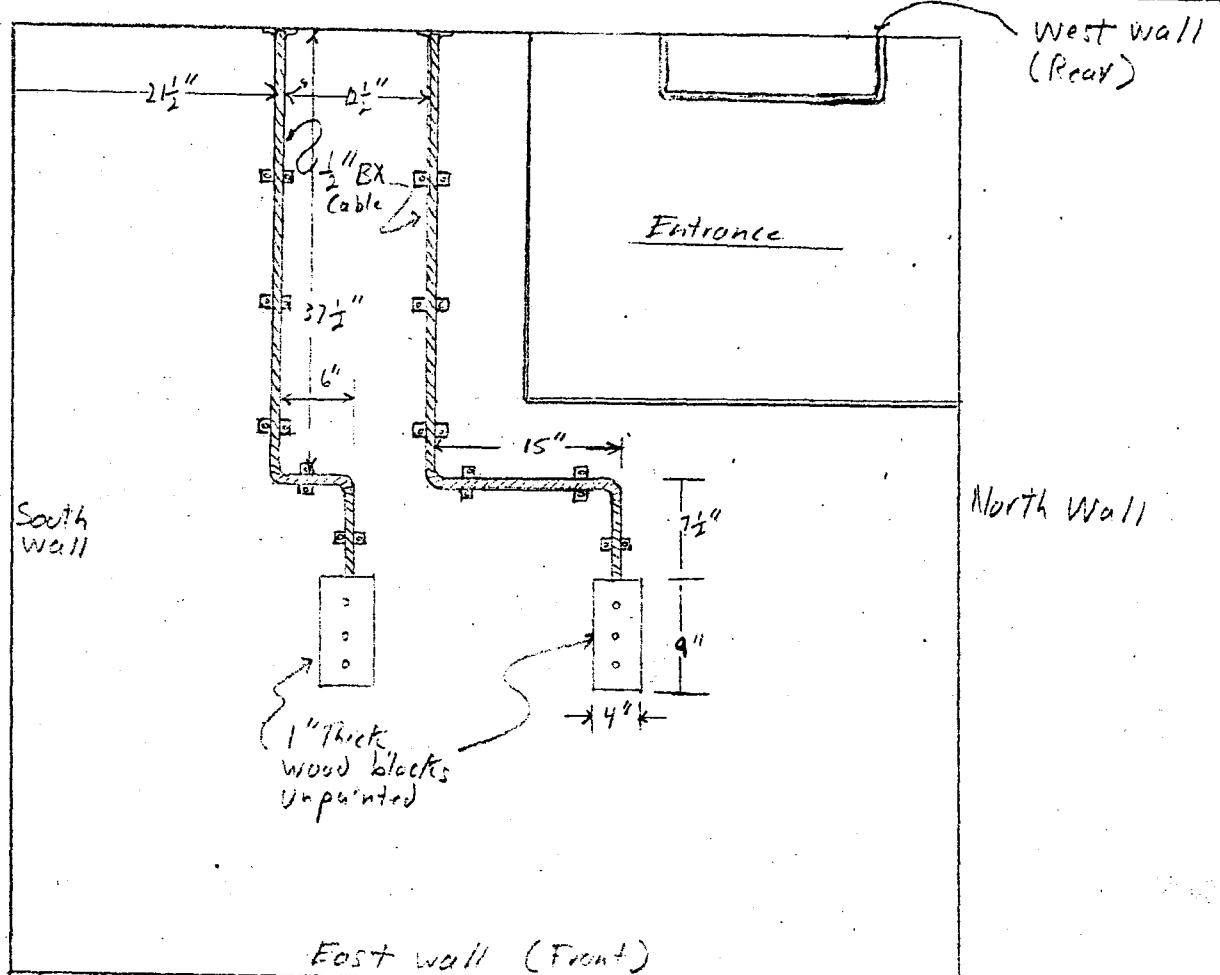








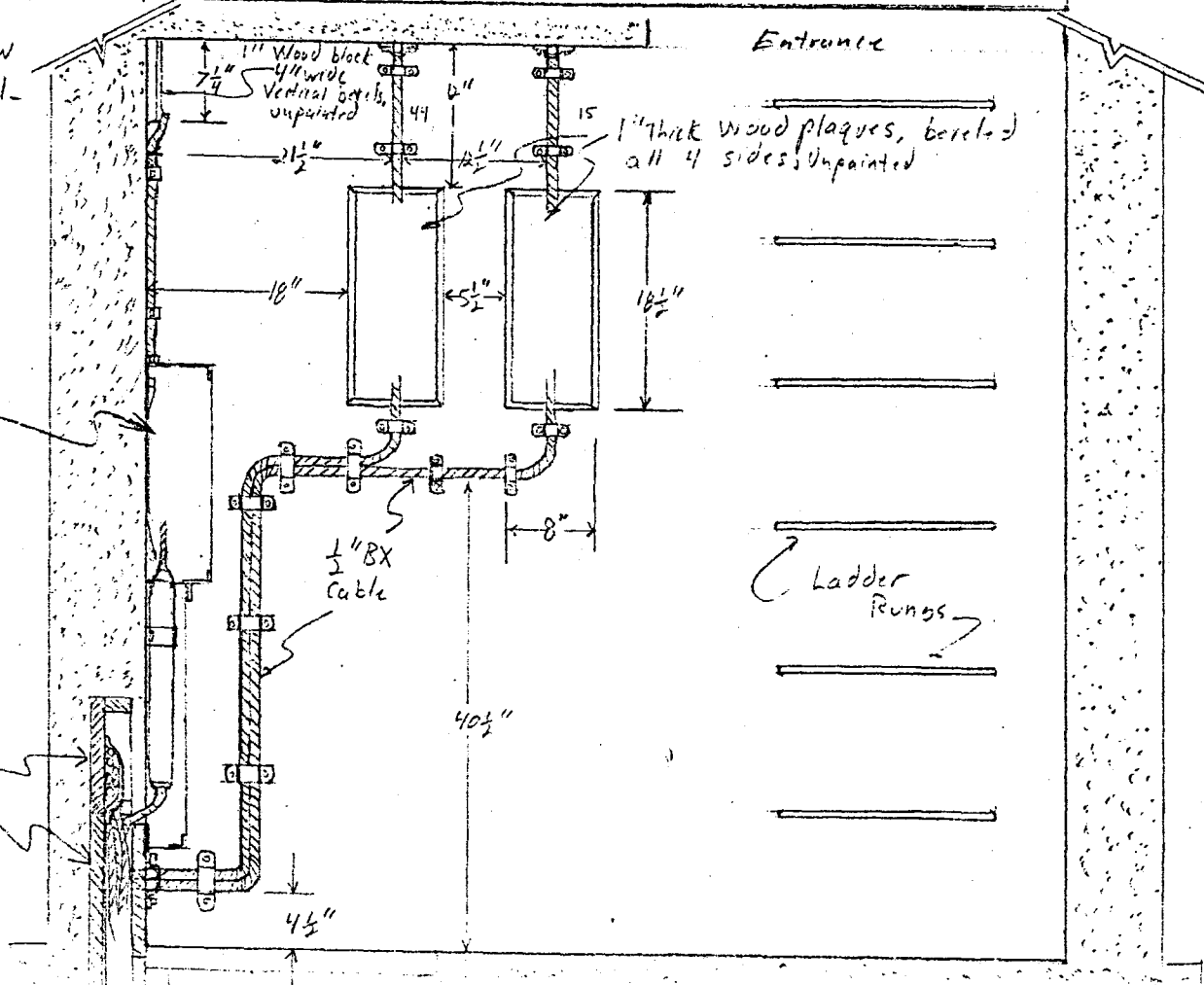
Plan - Wires on
side of roof
view above



Section - View
of Rear Wall
looking West

Steel
Panel Box

Alum-lined
cable duct
Painted inside

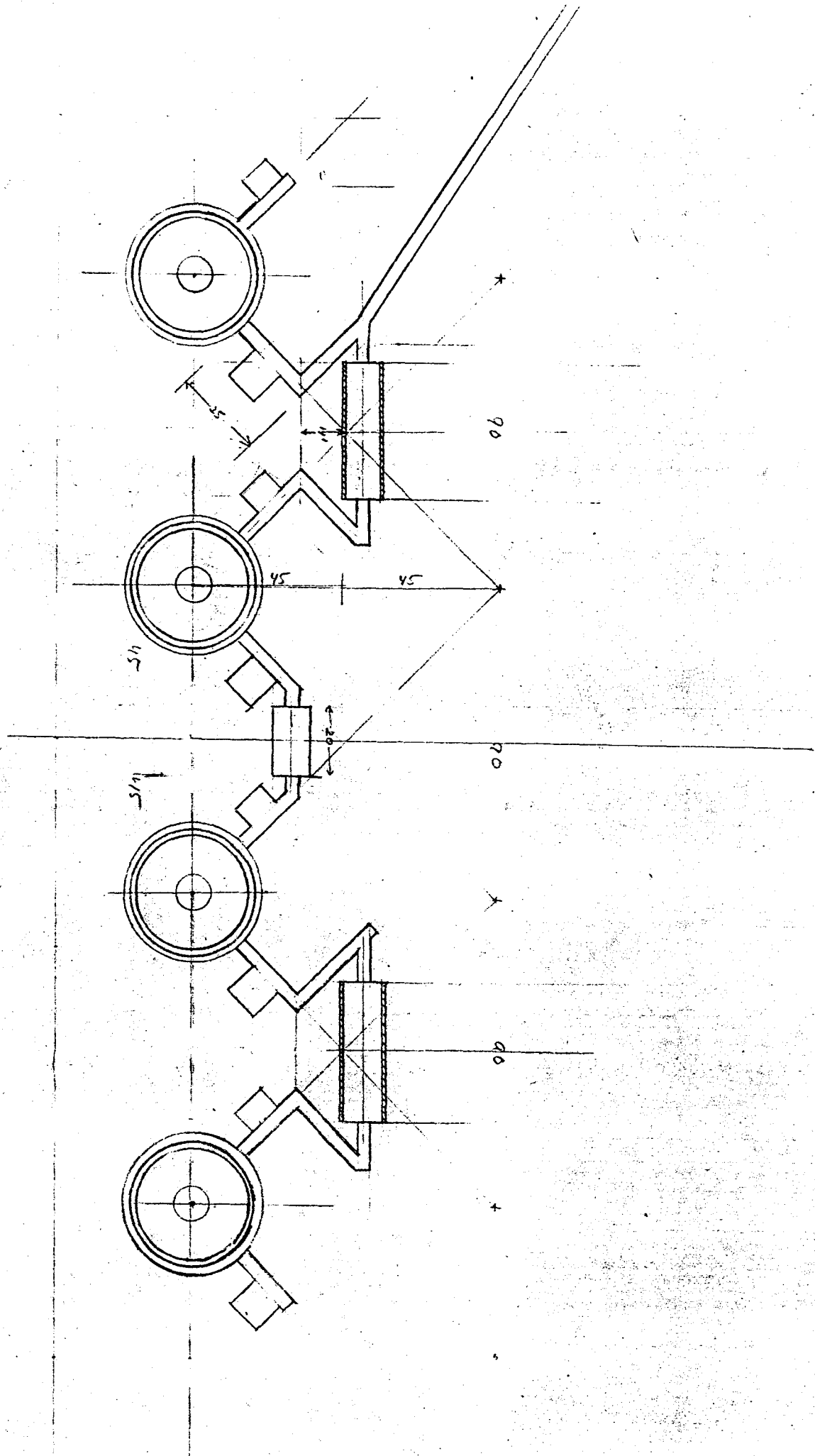


Battery D. + Loma - Plan of Tunnels and Shelters

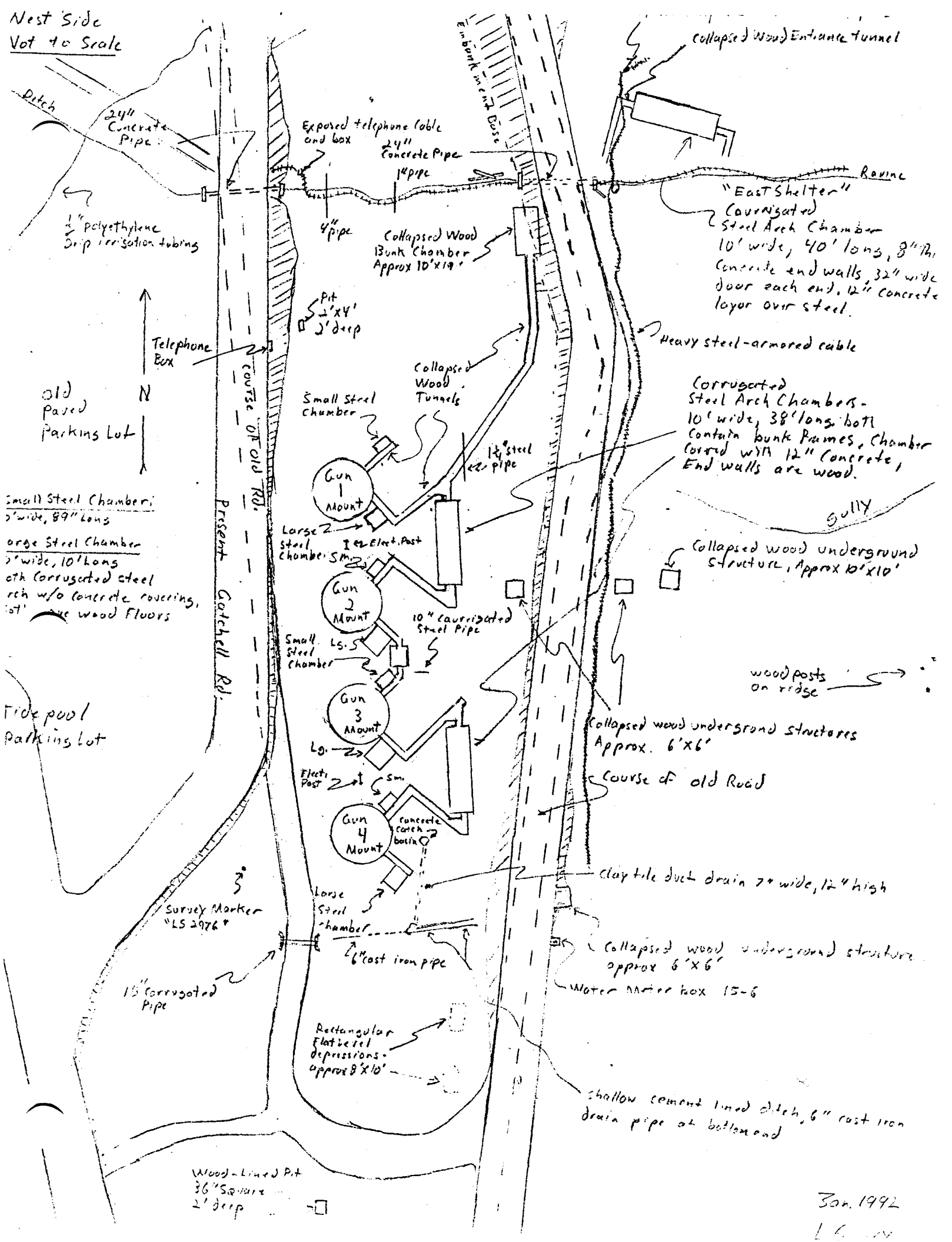
Scale 1/10" = 1' (1/4" = 10')

March 1992

L. G. Gidd



Nest Side
Vot to Scale



Jan. 1992

L. G. ...

In the early 1940's - modernization

→ building of base end station/BC for Ashburn.
~~Since then, After the war, abandoned~~ → now

The recommendation of this paper is to open the Base Commander Station (BC3) and Base End Station (BS1/3) for Battery Ashburn, located within the park, to the viewing public. What follows is a discussion and further recommendations regarding the logistics of opening these structures to the public as well as interpretive themes inside the structures. More detailed discussions of the functions and history of WWII-era base end stations and seacoast defenses in general can be found in Mark Berhow's American Seacoast Defenses: A Reference Guide, as well as a wealth of other reference material in the Cabrillo NM library and will not be presented here. ^{over the past decade} A great deal of research has been done on the subject of San Diego's coast defense structures and more specifically on Fort Rosecrans.¹ This report draws upon ^{many of} those sources and should be viewed as a working status of knowledge toward the goal of restoring BC3, BS1/3 for the public. Changes can and should be made at any time in light of new information or changing theories. It is noted that a large amount of information presented in this report is based on oral history from men who operated the base end stations of Fort Rosecrans. Such information can often be conflicting and spotty at best.

Ft. Rosecrans is home to several WWII-era batteries and multiple base end stations and base commander stations that were built to support the big guns. ~~In particular~~ this report focuses on the base end station and base commander station for Battery Ashburn. In general, WWII-era base end stations on Ft. Rosecrans are similar in nature, according to Richard Markham of the 19th Coast Artillery, who was an observer working in the Ft. Rosecrans's base end stations in the early 1940's.² Consequently where specific information regarding the base end station and base commander station for Battery Ashburn is absent, general knowledge and educated speculation based on a comparative framework of other base end stations in the area will be used and duly noted as such. Furthermore, the restoration of this structure will draw upon comparative restorations of coastal defense structures at other forts including base end stations at Fort McArthur and coastal defense structures at the Presidio in San Francisco.

Description

The Battery Commander Station and Base-End Station for Battery Ashburn (referred to as BC3, BS1/3 for the remainder of the paper), is a two-story, three room structure located just above the Military History Exhibit on the west facing slope of Pt. Loma, within the park grounds.³ BC3 occupies the top level of the station, while BS1/3 is contained in the two rooms on the lower level. ~~Supposedly, the front room housed the instruments while the back room was used for unofficial business such as sleeping or playing cards.~~⁴ Battery Ashburn had a separate plotting and spotting room for data analysis at an alternate location at Fort Rosecrans.⁵ BS1/3 was used simply for observation and collection of data by a three man team of an "observer," "spotter" and "reader," ~~while~~ ^{this was conducted} BC3 served as the main commanding station for the Battery, with a three man team of a Commander, Sergeant and Officer in Charge.⁶

BC3, BS1/3 is one of six structures associated with Battery Ashburn. Constructed c. 1941-1942, it was closed in 1948.⁷ During the years following WWII, BC3, BS1/3 was used and reused in several different functions, including use by the Park Service as a dark room as well as an abandoned structure left open to vandalism and destruction by the public.⁸ Consequently, the current condition of BC3, BS1/3 is historically inaccurate as

Laguna Nigel Negative Results
- Research Section

* Site drawings
for further
detail

used during
14th Coast
artillery

Thompson
*
interval
BC1/1

Markham
notes
that the
manned
around &
all the
base stations
were the
same
inside.

An investigator
launched
to determine
possibility
report/research
is result of
that.

needed to restore shortly

well as deteriorated and worn down. The process of restoring this structure to its original appearance and function will be discussed later in the document. The following is a summary of the appearance and function of the original BC3, BS1/3 to be used as a guide to restoration of the structure. It should be noted that, information regarding the appearance of the interior of this particular base end station as well as others within the park, is somewhat conflicting and definitive answers may not be available at this time or in the future. In light of this, all information will be presented and recommendations will be given based on educated speculation and realistic expectations for restoration.

Exterior: The multilevel station was constructed of reinforced concrete with observation slots on both levels facing west, containing six solid metal, rectangular shutters.⁹ These shutters rise two feet above the concealed station and are all that is visible and thus unprotected on the station, beginning at a distance of 75 yards.¹⁰ A stairwell leads down to the entrance of the upper level of the structure to a metal door. The roof was a continuation of the concrete camouflage walls, formed of large aggregate, rough concrete.¹¹ The steel rings on the roofs of each level served as anchoring points for camouflage netting that would have covered the structure during WWII.¹²

Structural Plan: BS1/3 consists of two concrete rooms, rectangular in plan, measuring approximately 11 feet by 16 feet, with a height of 7 feet and an elevation of about 400 feet.¹³ The upper level room, BC3, retains similar measurements with slightly less height. Included in this report is an Army Corps of Engineers "Report of Completed Works", which illustrates the plan for the harbor defense structure BC3, BS1/3 with more detailed measurements than is presented here. The interiors of the base end stations and base commander stations at Fort Rosecrans were generally very simplistic and limited. These stations were hurriedly assembled in preparation for war and it follows that the interiors would be primarily functional and thus sparse and requiring low maintenance.

Electric/plumbing: BC3, BS1/3 was not heated and was not connected to either sewer or water mains. There was also no latrine built for BC3, BS1/3.¹⁴ The records indicate that both levels of the station were electrically powered by connection to a civilian commercial source, most likely SDG&E, as well as one auxiliary generator (3 KVA).¹⁵ The only lighting fixture within the entire two-story structure is listed as one 4 inch porcelain bulb, located down in the lower level back room.¹⁶ Lighting in this structure is limited and most likely reflects the effort to keep these stations dark and camouflaged from enemy sight. The one light source is appropriately placed in the "bunk room" which was the back room of the lower level and often used for sleeping. This area contains a single-bulb light, miscellaneous conduit, a terminal block and telephone box.¹⁷ Observation of electrical wiring configurations preserved in other base end stations in the park can give an example of the wiring configuration most likely used in BS1/3. These configurations run flat against the wall and are overlain with wood paneling. This system most likely ran along the walls of BC3 and was fed down to the power boxes in the lower level.¹⁸ Original conduit feeding holes in the concrete walls of BC3, BS1/3 have been plugged in most cases.¹⁹

Communication: The Report of Completed Works details two separate telephone brackets, one in the front room of the lower level of BS1/3 and one in the rear right corner of BC3.²⁰ According to Richard Markham who worked as an observer in this particular base end station, there were three phones, one for each man operating the base end station. Each man had a headset and a mouthpiece which hung around his neck,

allowing his hands free at all times.²¹ Most likely, these three headsets were connected by cables back to the telephone bracket installed in the wall. All three phones were used to communicate data to the plotting and spotting room for Battery Ashburn. Markham also notes that the base commander station was equipped with two phones, one for the Commander and one for the Sergeant of the station.²²

Instruments: BS1/3 contained a depression position finder (DPF) which was used to determine the vertical azimuth of the target from the base-end station and an azimuth telescope, used to determine horizontal angles of the azimuth to the target from the base-end station.²³ The Azimuth telescopes were mounted on concrete columns and depression range finders were mounted on large eight sided concrete bases.²⁴ This base was surrounded by a metal track along which a wooden bench rotated for the observer and reader to sit upon and take readings.²⁵ The spotter stood separately. Typically, the standard issue for Coast Artillery was the Model 1910A1 azimuth telescope and would have most likely been used in BS1/3.²⁶ BC3 also contained one azimuth telescope instrument, most likely the same make and model.

Paint/walls: This structure was built of reinforced concrete and most likely remained unpainted during operations in the mid-1940's. Richard Markham, an observer in the 19th Coast Artillery, recalled no paint of any kind on the walls of the station.²⁷ However, there is contradictory evidence on this point. In several other base end stations within the park, a light sand color is observed painted directly on the original cement surface and in some instances then overlaid by what appear to be original azimuth markings. It is possible that different base end stations had different paint schemes for various reasons or that base end stations were painted at different times throughout their existence.

Whichever the case may be, according to oral histories and documentation, the olive drab and pea green color found currently in BC3, BS1/3 is not historically accurate and was painted on in 1999.²⁸ Richard Markham also notes that on one of the walls of the front room of BS1/3, hung a message board upon which was hung type written instructions and data orientation for the instruments being used. Markham does not recall the presence of any duty rosters, or ship identifiers, or maps.²⁹ However, such material may have appeared in other stations or possibly in the base commander station above. Julius Gary, for instance, who also served in this particular base end station for Battery Ashburn, recalls a DPS chart and weather chart on the wall.³⁰ Similarly many sources describing typical WWII base end stations make reference to ship identification charts. The upstairs base commander station most likely contained similar information such as weather charts, duty rosters or intelligence information, however there is at present no written evidence for what was in the base commander station and should be taken as educated speculation.

The olive drab color used pervasively by the army would have been applied to both the entrance door and the steel shutters which lined the outside of the structure.³¹ These would have been the only areas visible to the outside and thus camouflage would have been necessary. Markham recalls that when in operation, all shutters would be swung open and fastened. He also recalls plates of glass installed in front of the shutters to allow the men to see out, but keep out the cold and wind at the same time.³² This is supported by the presence of auxiliary glass shutters found in the Navy coast defense structures as a means of protection from adverse weather and extreme cold. Keniston

Architects found auxiliary glass shutters and their wooden hangers in Battery Strong's primary base end station.³³ Glass remained in the "wooden, ceiling mounted hangers" of the "auxiliary shutter windows" in Battery Woodward's BC station.³⁴ The ghosts and remnants of these "wooden hangers" can be observed in the base end station for Battery Ashburn, confirming their existence.

Furniture: Within the base end station and base commander station, there may have been a table or bench that was used to make calculations or read maps, however this particular station was used only for the collection and transmission of data and thus was simplistic and sparse in furnishings. Markham does not recall any furniture at all in the station.³⁵ However, he does recall a window in the base end station, which no longer exists and the *Historic Structures Report for Harbor Defense Structures*, performed by Carey & Co Inc., confirms this report. The Historic Structures Report also notes that another built in furnishing, a chart shelf, is also missing from the forward lower level room.³⁶ It stands to reason that there may have been a small table or bench in either the base commander station or the base end station, but that the items currently in the structure are not original. A separate plotting and spotting room for Battery Ashburn also eliminated the need for a plotting table which is documented as typical in other base commander stations. There were, however, two bunks that were hung from the back wall of the "bunk room" in the lower base end station.³⁷ Hung in hammock style, these bunks were used unofficially for sleeping during the 24 hour shift, as explained by Markham. Three men worked shifts of 24 hours on and 24 hours off in this particular base end station. Markham recalls that two men would be on duty while one slept. However if there was any sign of enemy activity, all three men would take up their positions within the station. According to Markham food for the 24 hour shift was taken in with the men, most likely in "field" fashion.³⁸

Personal Effects: Finally, none or very few personal items were present in the base end and base commander stations. The majority of downtime was spent sleeping and possibly playing a game or two of cards. However, Markham notes that while on shift, the men engaged in very little personal entertainment.

As is evident, there is much less...Base Commander Station details...we have much less information for BC3. Erica's stuff on bc stations.

Recommendations

Drawing upon the information set forth previously in the document, the following recommendations are made regarding an interpretive theme for restoration of BC3, BS1/3. There are several different themes and variations on themes that may be used when interpreting this base end and base commander station for Battery Ashburn.

One option would be to interpret both BC3 and BS1/3 exactly as they would have appeared and been used in the 1940's. This option will require the most effort by park staff, will be the most expensive and will be hindered by any remaining data gaps for these structures. To restore and interpret BC3 and BS1/3 one hundred percent would involve repair and cleaning of the structures, removal of everything modern, stripping of the olive drab paint, an overhaul of the electrical system to simulate the original configuration, installation of phone brackets, installation of a bunk in the lower back

complete
w/ wood
panelling

room, installation of three specific instruments and their required base structures and simulation of the appropriate wall décor. This option would also require a visual or physical corridor from the upper level of the BC station to the lower BS station. Currently, entrance to the lower level room is gained by way of metal ladder rungs through a manhole in the floor which is a liability and safety hazard and will thus likely remain closed to public access. If the lower rooms do remain closed, the public could be allowed to view the lower levels of the observation station through a plexi glass surface installed over the entrance hatch.

A second possibility would be to interpret the BC station and/or the BS station as a generic type of station typical of the WWII-era coast defenses. This option would not be too much different than the previous one and would have similar requirements and level of effort. Through extensive research, a great deal of information about this particular base end and base commander station has been obtained and only a few data gaps remain. In reality then, restoration and interpretation of BC3 and BS1/3 as they originally appeared and functioned, would be a combination of knowledge of the specific structure and generic knowledge of WWII-era base end and base commander stations at Fort Rosecrans.

Another way to interpret this structure would be to only interpret and open to the public, the first level of the structure, the base commander station. The previous interpretive options would involve the restoration and interpretation of both levels of the station, with a way for the public to view the lower station through a glass window to the rooms below. In this option, only the upper level will be available and the lower levels will be sealed off completely. This upper level base commander station may then be restored and interpreted using the process described above. A variation to this option for interpretation would be to interpret the upper room of the structure as a base end station rather than a base commander station. This option would be used to maximize the interest of the public in the limited space allowed. There is a great deal more information available for base end stations of WWII rather than base commander stations. Also of note is that this particular base commander station would have been uniquely sparse given that Battery Ashburn maintained a separate structure for plotting and spotting. In this particular case, the base end station for Battery Ashburn that occupied the lower levels of the structure would have been distinctly more interesting than the base commander station above. In executing this option, the upper level base commander station would be restored as a base end station in a manner similar to the process mentioned above, but slightly more simplified.

Finally, another way to interpret this structure would be to use the space for a museum style display. This option mirrors that which has been done in the current military history exhibit, currently located in the old Radio Station. This option would require a great deal of effort in the creation of interpretive displays and textual displays. The upper level of the structure would not be restored as a WWII-era base end or base commander station and would instead be used as a modern museum space for public edification.

It is the recommendation of this paper to interpret only the upper level of the structure as a base end station rather than a base commander station for the following reasons. Public access is limited to only the upper level of the structure and although a view to the lower level could be established, the viewing area would be small and the degree of effort from the park staff would far outweigh the benefit to the public. Furthermore, limiting the public to only a glimpse of a restored lower level might encourage vandalism or trespassing. As a result, it is recommended that only the upper level of the two-level observation station for Battery Ashburn be open to the public. With limited space available, restoration of the base end station for Battery Ashburn would likely be of more interest to the public than the base commander station due to general public knowledge and interest in WWII base end stations. Ultimately, the volume of information available to the park on base end stations in general and on this particular station is far greater than that of base commander stations. It would be a more appropriate use of historic resources to restore the upper level of the BC3, BS1/3 as that of BS1/3.

The following are specific recommendations for the interior of BC3, both in general and for restoration as a base end station. These recommendations are ultimately the opinion of the author and it should be noted that judgments made regarding the age or historical nature of objects in these coast defense structures are educated speculation and are therefore not the final word on the subject.

In general, the entire structure of BC3, BS1/3 needs to be cleaned out and scrubbed down. All modern equipment on the upper level needs to be stripped, including the overhead lights, the wooden window ledge and metal supports, both the table and cabinet currently in the station and all excess wiring. Modern debris in the lower rooms of the structure should be cleared out as well unless used by the park as storage. This includes the wooden door separating the front and back rooms, which was most likely an addition made years later.

To restore the upper level of this structure as BS1/3 in a basic manner, it is recommended that the green paint be stripped and the walls returned to either the natural cement surface or painted a light sandy color as is seen in other base end stations in the park. The steel shutters should remain the olive drab color. The shutters can either remain closed for safety purposes or one or two left open with plexi glass plates installed for viewers to see through. Work by a qualified electrician would be necessary to return to the original electrical configuration of the station. The power box and ceramic power grid, along with the singular porcelain bulb currently located in the back corner of the lower room should be moved to the upper room and installed to simulate the base end station configuration. Electrical wiring may be run along the wall to a phone bracket in a similar fashion to what is documented in the base end station that served Batteries Woodward and Grant. Recreations of the headsets described by Markham could be hung from the ceiling to simulate the communication systems that were used. All other extant wiring and/or electrical equipment should be removed. Recreations or original instruments could be installed in the upper level of the station. Both a DPF instrument, complete with rotating bench and an azimuth telescope would be placed in front of the windows looking out to sea. The walls should be bare except for the possible recreation

of a message board with various information including maps, weather charts and instrument instructions and orientation. It is recommended there be no excess furniture in the upper level of the station due to limited space and to convey the sparseness of the original station. This is the most basic level of restoration that would be necessary to interpret BC3 as BS1/3. More involved and extensive interpretation could be done with more attention to detail and a larger collection of artifacts.

The following recommendations are made regarding public access and the level of interpretation needed to open BC3, BS1/3 to the public. Just as there are multiple interpretive themes that may be employed in the restoration of BC3, BS1/3, there are several options for degree of public access and participation for the opening of BC3, BS1/3. BC3 may be opened to the public on a limited basis with the guidance of a park ranger or volunteer or it may be opened at all times for visitors to enter freely on their own. The degree of public access that is made available for this structure will directly affect the degree of interpretation and number of artifacts present in the structure.

It is the recommendation of this paper that public access be unlimited on a general basis and that interpretive talks be given one day a week, possibly by specific WWII veteran volunteers. The Public appears to maintain a high level of interest in regards to WWII structures and artifacts. The military has always played a large role in San Diego history and visitors as well as locales are often connected to the military in one way or another. Consequently, San Diego's military history is of great interest to many of the visitors to the park and the preservation of which should be seen as a priority. Unlimited access of the base end station to the public will allow the park to fulfill and maintain its mission to visitors.

In order to provide unlimited access, several steps will need to be taken. The base end station may be restored using the guidelines provided above. The azimuth instrument should be secured to the floor, but is otherwise relatively indestructible. The DPF instrument should also be secured and the bench recreated with the knowledge that the public will be allowed to have physical contact with the structure. It is recommended that both the headset display and the electrical artifacts (porcelain bulb, ceramic panel) be encased in glass for protection. These artifacts may be left unprotected with the understanding that the public will have full access to them and possible damage may occur. The message board on the wall of the base end station may be constructed of specific materials to ensure protection, i.e. lamination of charts and maps and permanently secured to the board. Finally the shutters would remain closed except for two through which the public could look out and see a view of the Pacific Ocean.

On Sundays, the WWII veteran volunteers could lead guided tours into the base end station which would be more illuminating and education for those that attend. They would be available to answer questions and give oral histories. An alternative to the above recommendation would be to limit public access to only during guided tours by park staff or volunteers. With this alternative, viewing access might possibly be provided to the public through a glass window in the door during times when guided tours are not scheduled. It should be noted that whether the public views the restored

base end station during guided tour or by unlimited access, visitors should be informed of the differences and inaccuracies that would be caused by restoring the base commander station as a base end station.

Preservation and Future Research:

Guidelines specifically set forth for the preservation of seacoast fortification as well as other historic structures under the jurisdiction of the National Park Service management are presented in the Seacoast Fortifications Preservation Manual for the Golden Gate National Recreation Area in San Francisco (www.nps.gov/history/seaforts). This manual addresses specific preservation issues affecting the fortifications and provides technical information about appropriate treatments and standard procedures. This manual should be used as a guideline when restoring and preserving the seacoast fortifications of San Diego. John Martini is an excellent contact for this preservation manual.

Research may continue to be done on the coast defense structures of Fort Rosecrans by the Cabrillo NM Park staff. However, depending on the interpretive goals for restoration, a great degree of additional contextual research may not be required.

-
- ¹ Extensive research has been conducted by Erica Spinelli in July 2002, *Cabrillo National Monument's World War II-era Base End Stations: A preliminary Step Toward Restoration*, and Howard Overton 1992-3, *The 19th Coast Artillery and Fort Rosecrans: Remembrances*.
- ² Markham, Richard, Oral history interview with Julia Speer, February 20, 2004.
- ³ Carey and Co. Inc. Architecture, *Historic Structures Report for Harbor Defense Structures, Cabrillo National Monument, San Diego, California* (Prepared for the National Park Service, April 15, 2000), 41.
- ⁴ Carey and Co. Inc., *Historic Structures*, 41; Erwin N. Thompson, ed. Howard B. Overton, *The Guns of San Diego: San Diego Harbor Defenses, 1796-1947*, (San Diego: National Park Service, 1991), 126.
- ⁵ Keniston Architects, *Fort Rosecrans: Point Loma Coastal Defenses- National Register of Historic Places Nomination*, (Prepared for Naval Command, Control and Ocean Surveillance Center, RDT&E Division, NROD, May 1996), serves as the definitive cultural resources inventory of Fort Rosecrans coastal defense structures surviving on Navy and National Park Service property. Pages 7-7 through 7-15 list the extant structures as of 1996. Thompson, *Guns of San Diego*, 109.
- ⁶ Markham, Oral history interview, February 20, 2004.
- ⁷ Carey and Co. Inc., *Historic Structures*, 41.
- ⁸ Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ⁹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹⁰ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹¹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹² Spinelli, *Cabrillo National Monument's World War II-era Base End Stations*, 7.
- ¹³ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁴ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁵ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁶ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ¹⁷ Carey and Co. Inc., *Historic Structures*, 39-42.
- ¹⁸ Photographs of base end station interiors taken by Nancy Parkinson Walton on February 19, 2004.
- ¹⁹ Carey and Co. Inc., *Historic Structures*, 39-42.
- ²⁰ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²¹ Markham, Oral history interview, February 20, 2004.
- ²² Markham, Oral history interview, February 20, 2004.
- ²³ Army Corps of Engineers, Los Angeles District, "Report of Completed Works- Seacoast Fortifications Part II," corrected to 28 July 1944.
- ²⁴ Fort MacArthur Museum Association: Base End Station Instruments Information Page (www.ftmac.org/baseend2.htm), 1.
- ²⁵ Markham, Oral history interview, February 20, 2004.
- ²⁶ Fort MacArthur Museum Association: Base End Station Instruments Information Page (www.ftmac.org/baseend2.htm), 1.
- ²⁷ Markham, Oral history interview, February 20, 2004.
- ²⁸ Bob Munson, park historian, was informed by Charles, Chief of Maintenance that the green color seen currently in the base end station was painted in 1999. Carey and Co. Inc., *Historic Structures Report*, also confirms this fact.
- ²⁹ Markham, Oral history interview, February 20, 2004.
- ³⁰ Julius C. Gary, Oral history interview with Howard Overton, June 13, 1992, in Howard B. Overton, *19th Coast Artillery*, 70.
- ³¹ Phone conversation with John Martini (GGNRA) regarding the interiors of typical base end stations, February 23, 2004.
- ³² Markham, Oral history interview, February 20, 2004.
- ³³ Keniston, *Fort Rosecrans*, 7-104 through 7-107.
- ³⁴ Keniston, *Fort Rosecrans*, 7-104 through 7-107.

³⁵ Markham, Oral history interview, February 20, 2004.

³⁶ Carey and Co. Inc., *Historic Structures*, 39-42.

³⁷ Markham, Oral history interview, February 20, 2004.

³⁸ Markham, Oral history interview, February 20, 2004.

Reference Information

Photos, graphs, diagrams, maps



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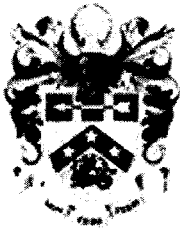
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Base-End Station Instruments

Base-end stations contained various optical instruments for making observations of the target. The standard issue for Coast Artillery was the Model 1910A1 azimuth telescope which was used to determine horizontal angles of the azimuth to the target from the base-end station. A second and much more complex instrument was the depression position finder (DPF). The DPF was used to determine the vertical azimuth of the target from the base-end station. Azimuth telescopes were mounted on concrete columns, depression range finders were mounted on large eight sided concrete bases.



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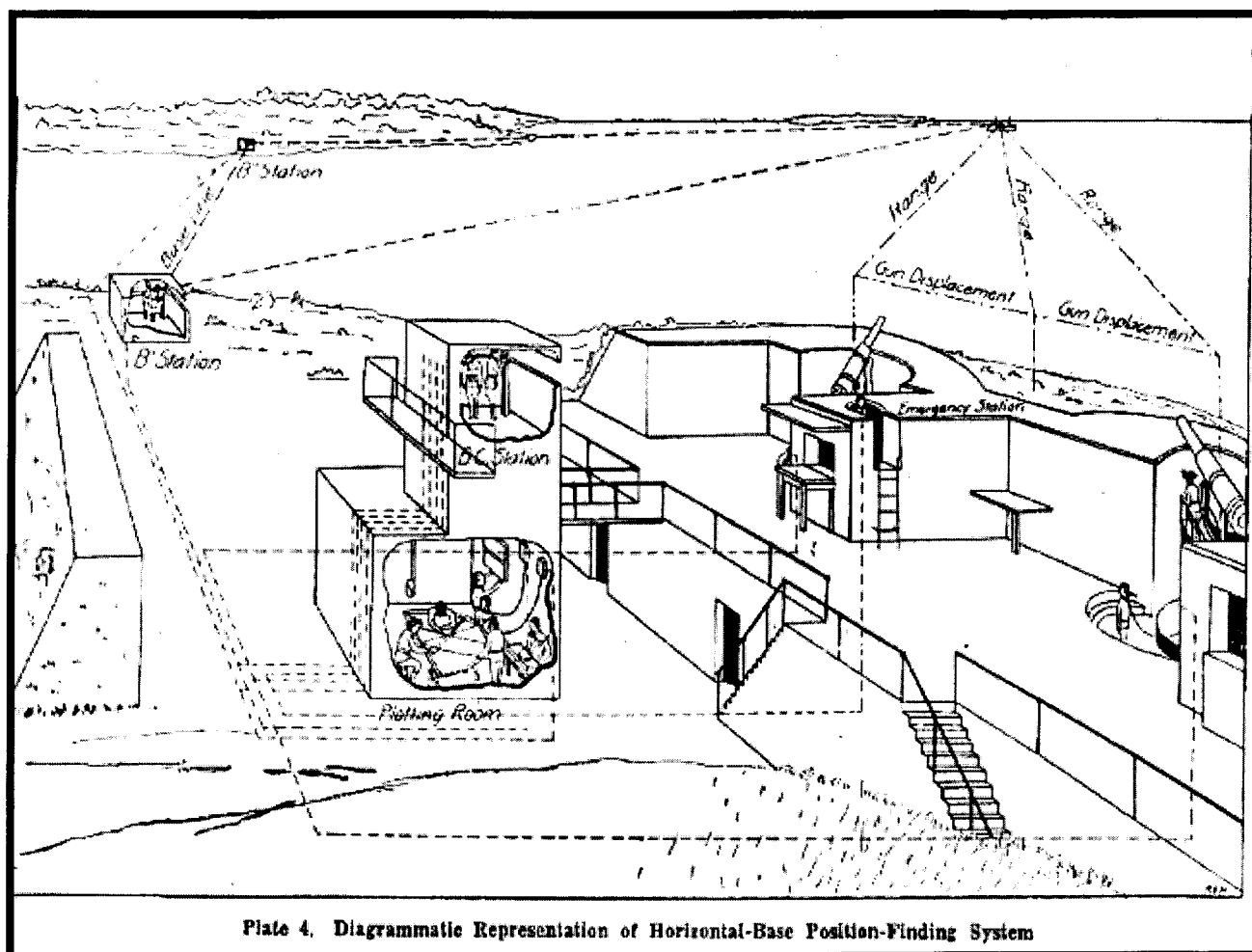
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How did Base End Stations work?

Seacoast artillery position finding was defined as the system used to determine the range and direction of a target from a battery or directing point. Seacoast guns were not aimed at a target, they were aimed at a point called the Setforward Point. The Setforward Point being defined as a point on the course of a target at which it is predicted that the target will arrive at the end of the predicting interval plus the time of flight (of the projectile) for the range (distance). The Coast Artillery utilized three basic systems of position finding.



1. The Horizontal Base System

In the horizontal base system base-end observing stations were placed at each end of a known base line laid out along the coast line. This line constituted the known leg of a triangle. The base line did not necessarily run back in a direct line to the gun position. The displacement of the guns and other factors were calculated by the plotting room. The stations were designated as B' (Prime) and B'' (Secondary). The station closest to the directing point was designated as B'. There were several groupments of base end stations to allow for combat casualties and target tracking from different points of view.

2. The Vertical Base System

In the vertical base system, the target was located by the offset method used in surveying, in which the direction and distance of the target from a known point are determined. The direction was determined by reading the azimuth as in the horizontal base system. The distance was determined by the *depression angle* method which involves the solution of a vertical right triangle of which one leg is the desired range, the other leg is the effective height of the observation instrument above the target, and the hypotenuse is the line of sight from the observer to the target. An instrument called a Depression Position Finder (DPF) was used to determine vertical angles. The vertical base system requires only one observing station as the *depression angle* is solved mechanically by the observation instrument.

3. The Self Contained System

Self-contained range finders were designed to determine both range and azimuth at the same time.

The stereoscopic height finder M1 originally designed for antiaircraft artillery was adopted as the standard self-contained range finder for seacoast artillery.

Base-end stations were manned by an Observing Detail consisting of an observer and a reader. The reader's telephone in a horizontal base system was connected to the earphone set of the appropriate arm setter (B' or B") in the battery plotting room at the gun emplacement. In a vertical base system, the telephone system is connected to the arm setter in the plotting room who repeats the range information to the the plotter who marks the range by means of range graduations along the edge of the arm. In a Battery Commander's station, additional personnel were assigned to maintain the Battery Commander's chart.

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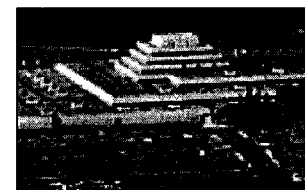
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developed from a series of military air services dating back to 1907. The record group consists of records of the world organization of the USAF and its predecessors.

Records Description**Dates:** 1961-1965**Volume:** less than 1 cubic foot

Records of the 6594th Aerospace Test Wing headquarters. The records concern administration, law enforcement, operations, security, training, transportation, and related matters. Included are directives and orders.

Finding Aid

Draft inventory.

Record Group 392

Records of the U.S. Army Coast Artillery Districts and Defenses, 1901-1942

Administrative History

In 1901, the Artillery Corps was divided into field artillery batteries and coast artillery companies under newly created artillery districts. Each district consisted of harbor defense forts, with accompanying minefields and land defenses. In 1913, the coast artillery districts were redesignated coast defense commands.

Records Description**Dates:** 1901-1937**Volume:** 18 cubic feet

Records of the Coast Defense Commands at Fort MacArthur, Los Angeles, and at Fort Rosecrans, San Diego. The records document defense and protection of these coastal areas including tactical maneuvers at Muroc, California, in 1937. They include correspondence, general and special orders, and a subject index (Fort Rosecrans only).

Finding Aid

Sarah D. Powell, comp., *Preliminary Inventory of the Textual Records of the United States Army Coast Artillery Districts and Defenses, 1901-1942*, NM 88 (1967).

Record Group 430

Records of the Energy Research and Development Administration

Administrative History

The Energy Research and Development Administration (ERDA) was created in 1974, when it assumed many of the functions of the Atomic Energy Commission (AEC, see RG 326).

Records Description

Dates: 1956-1976

Volume: 5 cubic feet

Records of EG&G, Inc., and Holmes and Narver, Inc., Las Vegas, Nevada. The records document construction of test facilities in Nevada and the Pacific Ocean by private companies under contract to ERDA. They are project case files, and containment and survey reports. Nontextual records include charts and maps.

Record Group 435

Records of the Indian Arts and Crafts Board

Administrative History

The Board was established by an act of August 27, 1935 (49 Stat. 891), to serve Indians, Eskimos, Aleuts, and the general public as an informational, promotional, and advisory clearinghouse for all matters pertaining to the development of authentic Indian and Eskimo arts and crafts. It receives administrative support from the Bureau of Indian Affairs.

Records Description

Dates: 1936-1967

Volume: less than 1 cubic foot

programs; construction of homes and roads; home demonstration programs; housing; income; irrigation and land management activities; liquor control, suppression of peyote, and other law enforcement activities on reservations; living conditions; and recreation. Included are project files and reports.

The records document tribal governments and provide insight into tribal politics and Indian reaction to various Federal programs and policies. Included are agendas, minutes, and resolutions of tribal business committees or other elected groups.

Nontextual records include blueprints, maps, and photographs.

Finding Aids

Draft inventory.

Edward E. Hill, comp., *Preliminary Inventory of the Records of the Bureau of Indian Affairs*, PI 163 (2 vols., 1965).

Edward E. Hill, comp., *Guide to Records in the National Archives of the United States Relating to American Indians*, Washington, DC: National Archives and Records Service, 1981.

Related Microfilm Publications

M595, *Indian Census Rolls, 1885-1940*, for southern California and Arizona Indian tribes only; **M734**, *Records of the Arizona Superintendency of Indian Affairs, 1863-1873*; **M1011**, *Superintendents' Annual Narrative and Statistical Reports From Field Jurisdictions of the Bureau of Indian Affairs, 1907-1938*.

Restrictions

Access to case files on individual Indians is restricted because of privacy concerns.

Record Group 77

Records of the Office of the Chief of Engineers

Administrative History

The Corps of Engineers, U.S. Army, with headquarters at Washington, DC, was a result of orders of April 3, 1818. The military responsibilities of the Office of the Chief of Engineers (OCE) have included producing and distributing Army maps, building roads, planning camps, and constructing and repairing fortifications and other installations. Its civil duties have included maintaining and improving inland waterways and harbors, formulating and executing plans for flood control, operating dams and locks, and approving plans for construction of bridges, wharves, piers, and other works over navigable waters. Expansion of the OCE's river and harbor improvement work after the Civil War necessitated the establishment of district offices throughout the United States. The engineer officer in charge of each district reported directly to the Chief of Engineers until 1888 when engineer divisions were created with administrative jurisdiction over the district offices.

Records Description

Dates: 1899-1981

Volume: 1,299 cubic feet

Records of the district office, Los Angeles. The records concern:

- damming the Bolsa Chica Creek, 1900;
- purchasing private land for the construction of Fort Rosecrans, 1909;
- developing the Los Angeles harbors, 1910;
- mining the San Diego Channel during the Spanish-American War;
- constructing the San Francisco-Oakland Bay Bridge, 1930-1934;
- sinking and destroying boats and derelicts in the Santa Barbara Channel, 1929-1930;
- the St. Francis Dam failure, 1928.

The records document military and civilian responsibilities of the OCE, such as maintaining and improving inland waterways and harbors, flood control, and operation of locks and dams, and provide geological, hydrological, and economic data about construction projects and their impact on the surrounding area. There are administrative records, annual coastal defense project reports, engineering studies, monthly river and harbor reports, structural permit files, and topographical and hydrological data files. Construction project files contain correspondence, design memorandums, notes, plans, progress reports, specifications, and test results. Nontextual records include engineering drawings, maps, and photographs.

Finding Aid

Draft inventory.

Record Group 79

Records of the National Park Service

Administrative History

The National Park Service was established in the Department of the Interior by an act of August 25, 1916. It supervises national parks, monuments, historic parks, memorials, parkways, recreation areas, and seashores and is responsible for the promotion and regulation of their use. It establishes and enforces regulations for use, protects parks from fire, regulates concession operators, investigates and recommends proposed new areas, acquires land, and constructs and maintains roads, trails, and buildings. It also engages in research and educational work such as managing guided tours and lectures, marking nature trails, maintaining museums and libraries, and preparing publications and studies in history, archeology, natural history, and wildlife.

Records Description

Dates: 1929-1973

Volume: 226 cubic feet

REPORT OF COMPLETED WORKS - SEACOAST FORTIFICATIONS
(Fire Control Structures)

CONFIDENTIAL

HARBOR DEFENSES OF SAN DIEGO
FORT ROSECRANS

STRUCTURE: BC₃, B₃¹, S₃¹
126

Part II

Corrected to 28 July 1944

BC₃ is Battery Ashburn Command, Bunker upper level

STRUCTURE:

Location (by coordinates) see drawing attached
Location (site description) Site No. 7, Cabrillo
Date of transfer: 27 June 1944
Cost to that date: \$12,713.05
Type: 2-level dug-in
Type of construction
(a) Roof: Reinforced concrete
(b) Remainder of bldg.: Reinforced concrete
How concealed: Earth cover & native growth
How protected: Earth cover
Height above concealment: 2'-0" at slot opening
Height above protection: 2'-0" at slot opening
Conspicuous at 75 yards

UTILITIES:

Electric power
Source of: Commercial & 1 auxiliary generator (3 KVA)
Characteristics: Voltage 125 AC, 3 phase, 60 cycle
Kilowatts required: 0.27
Type of lighting fixtures: 1-4" porcelain (in bunk rm.)
Heat
How heated: Not heated
Water sewer -
Connected to water mains: No
Connected to sewer: No
Type latrine: None

REFERENCE:

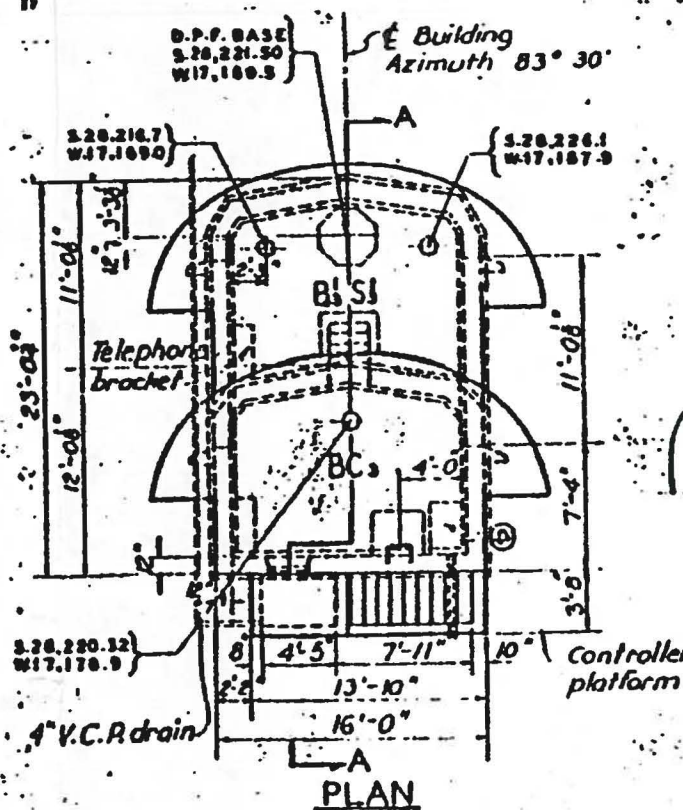
Reference of site: 408.83
Reference of instrument axis: see drawing attached
Datum: Mean Lower Low Water
Origin of U.S.E.D. local coordinates: U.S.C. & G.S.
station "OLD TOWN."

INSTRUMENTS & EQUIPMENT:

Type of observing inst.: B₃¹ S₃¹: 1-DPF & 1-azimuth
BC₃: 1-azimuth
Type of plotting board: None

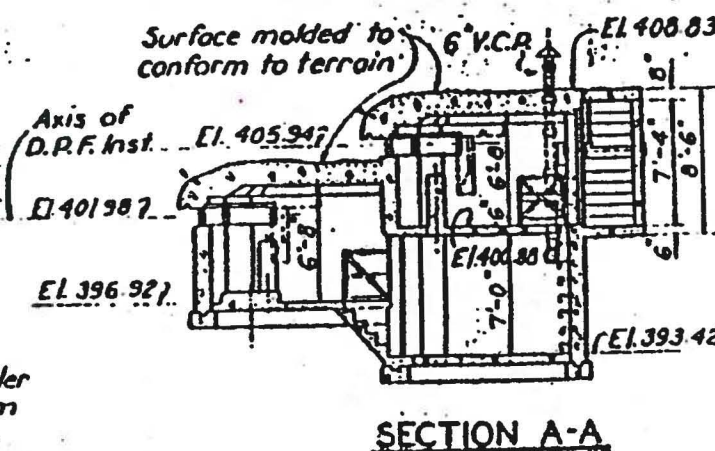
DATA TRANSMISSION:

Type: Telephone
Date of transfer: No record (by Signal Corps)



HARBOR DEFENSES OF SAN DIEGO, CALIF.
FIRE CONTROL STATION BC₃, B₃¹, S₃¹
U.S. ENGINEER OFFICE, LOS ANGELES, CALIF.

SCALE IN FEET



CONFIDENTIAL

F5-467

REPORT OF COMPLETED WORKS - SEACOAST FORTIFICATIONS
(Fire Control Structures)

CONFIDENTIAL

HARBOR DEFENSES OF SAN DIEGO
FORT ROSECRANS
STRUCTURE: BC₃, B₃¹, S₃¹
Command level 17.6

Part II

Corrected to 28 July 1944

Battery Ashburn

STRUCTURE:

Location (by coordinates) see drawing attached
Location (site description) Site No. 7, Cabrillo
Date of transfer: 27 June 1944
Cost to that date: \$12,713.05
Type: 2-level dug-in
Type of construction
(a) Roof: Reinforced concrete
(b) Remainder of bldg.: Reinforced concrete
How concealed: Earth cover & native growth
How protected: Earth cover
Height above concealment: 2'-0" at slot opening
Height above protection: 2'-0" at slot opening
Conspicuous at 75 yards

UTILITIES:

Electric power
Source of: Commercial & 1 auxiliary generator (3 KVA)
Characteristics: Voltage 125 AC, 3 phase, 60 cycle
Kilowatts required: 0.27
Type of lighting fixtures: 1-4" porcelain (in bunk rm.)
Heat
How heated: Not heated
Water sewer
Connected to water mains: No
Connected to sewer: No
Type latrine: None

REFERENCE:

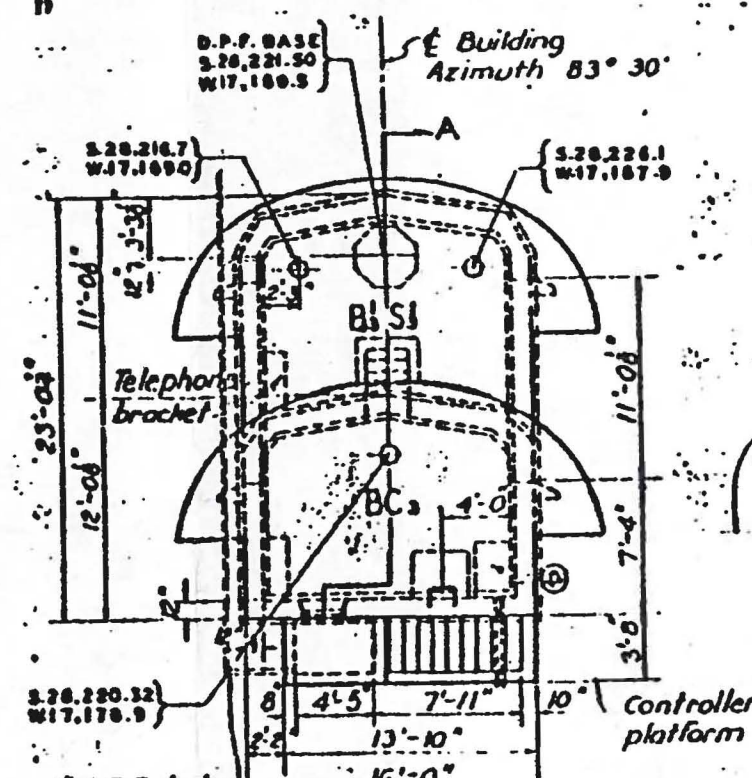
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Reference of instrument axis: see drawing attached
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Origin of U.S.E.D. local coordinates: U.S.C. & G.S.
station "OLD TOWN."

INSTRUMENTS & EQUIPMENT:

Type of observing inst.: B₃¹ S₃¹: 1-DPF & 1-azimuth
BC₃: 1-azimuth
Type of plotting board: None

DATA TRANSMISSION:

Type: Telephone
Date of transfer: No record (by Signal Corps)



HARBOR DEFENSES OF SAN DIEGO, CALIF.
FIRE CONTROL STATION BC₃, B₃¹, S₃¹
U.S. ENGINEER OFFICE, LOS ANGELES, CALIF.

SCALE IN FEET

