

MARE ISLAND NAVAL SHIPYARD
Vallejo
Solano County
California

HABS No. CA-1543

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48-MAR 1
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PHOTGRAPHS

~~WRITTEN HISTORICAL AND DESCRIPTIVE DATA~~

HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
Department of the Interior
Washington, D.C. 20240

HABS No. CA-1543

ADDENDUM TO:
Mare Island Naval Shipyard
Mare Island
Vallejo
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

**Historic American Buildings Survey
National Park Service
Western Region
Department of the Interior
San Francisco, California 94107**

HISTORIC AMERICAN BUILDINGS SURVEY

MARE ISLAND NAVAL SHIPYARD

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HABS No. CA-1543

Location:

Mare Island Naval Shipyard, Vallejo, California. The property treated in the HABS record includes a selected group of buildings and structures located within the Mare Island Historic District, a property that is listed in the National Register of Historic Places. The Mare Island Historic District is contained within a Navy-owned property that was called the Mare Island Naval Shipyard until the base closed in the early 1990s. The historic district includes about 65 percent of the land at the former Mare Island Naval Shipyard.

USGS Mare Island Quadrangle (7.5'), Benicia Quadrangle (7.5')

UTM Coordinates: 10/562220/4217220
10/562520/4217900
10/564000/4218380
10/563760/4217940
10/566480/4214110
10/565200/4213120

Present Owner:

U.S. Navy, EFA West
900 Commodore Drive
San Bruno, CA 94066

Present Use:

The Mare Island Naval Shipyard has closed under mandates of the Base Realignment and Closure Commission (BRAC). The buildings and structures at the former Mare Island Naval Shipyard have, with exceptions, been put into a layaway status, pending transfer of the property to the Local Reuse Authority (LRA), City of Vallejo. Some buildings will be transferred to other Federal agencies. A few buildings are still being used by the Navy. A larger group of buildings are being used by private parties under interim leases with the Navy and the LRA. Most buildings are unused. The use of these buildings, however, is likely to change rapidly in the near- and long-term.

Significance:

The Mare Island Historic District was listed in the National Register of Historic Places for its significance under National Register criteria A, C, and D, in the areas of military history, industry, architecture, engineering, and historic archeology. The period of significance extended from 1854, when the shipyard was founded, to 1945, the end of World War II. The significance of this property is discussed in greater detail under "Historic Context." Briefly, Mare Island was the first Navy yard on the West Coast and was at the forefront of ship construction and repair on the Pacific Ocean from the 1850s through World War II. In addition to its shipyard function, Mare Island was also home to an important Naval Hospital, Marine Corps detachment, and ammunition depot, and includes a very substantial stock of historic housing. It is arguably the most important Navy facility on the West Coast and was listed in the National Register at the national level of significance.

1. PHYSICAL SETTING AND GENERAL DESCRIPTION

1. Relationship to Previous Historic American Buildings Survey Work and to National Register and National Historic Landmarks Properties

This Historic American Buildings Survey (HABS) document records the present condition and historical significance of 66 buildings and structures within the Mare Island Historic District, as well as provides documentation on the general context for those many buildings and structures. The Mare Island Historic District is contained entirely within what was called the Mare Island Naval Shipyard, the oldest Navy installation on the West Coast until it was closed due to Base Realignment and Closure (BRAC) decisions in the early 1990s. Parts of the historic district were designated as a National Historic Landmark in 1975. A more expansive historic district was listed in the National Register of Historic Places in 1997. The following description applies to the state of that historic district in 1998. The buildings, structures, and landscapes within the district are being converted to civilian uses at the time of this writing and the condition of those properties is likely to change over time.

This recordation represents an addendum to existing HABS documentation for buildings and structures at Mare Island. HABS recordation of the buildings at Mare Island began in the 1930s. Small-scale HABS recordation was implemented during the 1930s, focusing on reproduction of historic views and current photography of the oldest buildings at the shipyard. As the base was closing, the Navy recorded selected buildings in anticipation of possible modifications resulting from leasing to private parties. In all, 33 buildings have been recorded in some manner. HABS documentation has been initiated for all of these buildings, most of which, but not all, have been completed. A list of those buildings is included at the end of this chapter. The current project re-records seven of those buildings. Where appropriate, older HABS identifiers were reused. Building 46, for example, was previously recorded as HABS CA-1543-D; that identifier was retained in this document.

This recordation is not comprehensive. At the time it was listed in the National Register in 1997, the Mare Island Historic District included 661 buildings and structures, 502 of which were contributing elements. It also includes 12 historic landscape areas, all of which contribute to the historic significance of the district. The 66 buildings that are recorded individually in this HABS document were selected to reflect the full range of property types that are found within the historic district. These buildings and structures were selected on two bases: 1) for individual significance; and 2) as representative elements of the larger body of historic properties within the district. In the following discussion, the various areas of the historic district are described in general terms, followed by discussion of the place of the recorded buildings within the larger context of each area. This general description is designed to establish a context for appreciating the significance of the 66 individual buildings and structures, which are treated in individual forms.

2. General Description of the Historic District

The Mare Island Historic District comprises about 65 percent of the usable land at the Mare Island Naval Shipyard. Much of the district is built on a natural island – Mare Island – located at the edge of San Pablo Bay, across the Mare Island Strait from Vallejo, California. San Pablo Bay extends northward from San Francisco, and is surrounded by Contra Costa County on the east, Marin County on the west, and Sonoma and Solano counties on the north. Mare Island is at the northeastern extreme of the bay and is part of Solano County. The island is surrounded on the west by San Pablo Bay, on the east by the Mare Island Strait of the Napa River, and on the south by the Carquinez Strait, which connects San Pablo Bay with Suisun Bay. On the north, the island blends imperceptibly into the marshlands that extend along the northern edge of San Pablo Bay. The location of the island in relation to Vallejo and San Pablo Bay is shown on the map at the end of this chapter.

As discussed in the historic context, Mare Island today is approximately 50 percent man-made, comprising fill lands as well as flat lands created by the leveling of natural hills (the cut being used to create fill lands). Generally speaking, the southern end of the island represents the least-disturbed natural setting, the center of the island retains a few natural features, and the northern half of the island is almost entirely man-made. The vast majority of all buildings, including most of the 66 treated in this documentation, are clustered along or near the Mare Island Strait, within 1000 feet of the waterfront.

The Mare Island Historic District includes a rich collection of buildings, structures, and sites that represent more than a century of naval activities at this, the oldest shipyard and naval facility on the West Coast of the United States. The core of Mare Island has always been the shipyard, the *raison d'être* of the facility. Within the shipyard, the most precious and impressive aspects of the historic district may be seen. These include the oldest buildings on the station and some of the oldest shipyard buildings anywhere in the United States, as well as the huge shop buildings from the 20th century, some of which are larger than 300,000 square feet on a single floor. The naval station, however, was always more than just a shipyard. The historic district is dotted with buildings, structures, and sites that reflect the presence of a naval community, as comparable to a municipality as to a military base. Included therein are properties associated with a wide range of military missions, including a large ammunition depot, a major naval hospital, a Marine Corps detachment and, during the 20th century, a submarine base. Also reflective of the diverse military missions are the dozens of buildings and structures that supported the base: warehouses, public works facilities, and so forth. Included as well are the accoutrements of a community of full-time residents. These include pockets of residences, ranging from mansions for ranking officers to bungalows for junior grade officers and cottages for civilian employees. Finally, the historic district includes dozens of small, ancillary buildings that, while individually unimpressive, add to the diversity and richness of the sense of time and place within the district. The smaller buildings date from both the 19th and 20th centuries and include such functions as garages, power substations, small ammunition magazines, and, from the World War II era, bomb shelters and first aid stations.

In addition to its buildings and structures, the historic district includes several impressive landscape architectural features – parks, allees, and so forth. Landscape architecture is a less important element at Mare Island than in some historic military bases because it was from the outset an industrial facility, dominated by shipworks that allowed for minimal landscaping. In some areas of the base, however, very old plantings and landscape schemes may be seen and appreciated. These historic landscape elements evolved over a long period of time. No landscape reflects a single formal plan. Rather, these landscaped areas, like many of the older buildings, are significant for the manner in which they have been adapted by succeeding generations over the course of a century of use.

The street pattern at Mare Island is built around five major north-south axes: the waterfront; California Avenue; Railroad Avenue; Walnut Avenue; and Cedar Avenue. The waterfront is on the east side of the island, facing Mare Island Strait. It is irregular, the axis being broken by dry docks, ways, and other port facilities. Along most of its length, the waterfront is served by railroad tracks. California Avenue is the main access route for the shipyard and most of the important shipyard buildings front on California Avenue. Along most of its length, Railroad Avenue serves as the western boundary for the shipyard, separating the shipyards from the residential and administrative area. At the south end of the island, Railroad Avenue is effectively the only through street. Walnut Avenue is the main residential street on the island. The commandant's house was located on Walnut Avenue, as were the homes for all senior officers. Cedar Avenue is also a residential street and serves as the main access for the hospital and Marine Corps areas. The street pattern includes east-west streets as well, but these are minor streets compared with the north-south boulevards and rarely extend more than a few blocks. The most important east-west street is the Causeway, which links with the bridge across Mare Island Strait and also forms the northern boundary for the historic district. In the heart of the historic district, the east-west streets are identified by numbers, letters, and names.

The dominant characteristic of the historic district is its diversity. The Mare Island Historic District is not unified around a single architectural style or functional building type, as might be the case with a military base that was built as a single unit at a single time. The great diversity of buildings, structures, and landscapes on the island may be attributed to three factors. The first and most important factor is time. The period of significance for the historic district extends from 1854 to 1945. This 91-year span extends from the era of wooden sailing ships to the eve of the nuclear era, from the early American occupation of California through World War II. The second factor is function. The diversity in the district reflects the presence of discrete functional units at the base. This functional diversity is expressed in a wide range of architectural and structural types. More specifically, the buildings at Mare Island reflect the diversity of commands assigned to the island. The shipyard was under one command, the ammunition depot under another, and so on with the hospital, Marine Corps detachment, as well as a few smaller separate commands. To a large extent, the diversity of architectural styles and building types reflects the differing preferences of the various commands. The Marine Corps, for example, made little effort to

coordinate its buildings with the general architectural program of the Navy. The third factor is location, which duplicates in many respects the diversity associated with the different functional units. When the base was laid out in the 1850s, the different functional units were assigned different parts of the island, in a manner similar to zoning in a modern city plan. The hospital was assigned one area, the Marines another, the ammunition depot another, and so forth. To a remarkable degree, the original zones of activity were preserved throughout the long history of this base, although the edges of the zones began to blur as the base became intensively built up during the 20th century.

In the following discussion, the Mare Island Historic District is described as comprising seven areas, which coincide with the functional zones mentioned above. These areas are: 1) North End; 2) Residential-Administrative Area; 3) Shipyard North; 4) Shipyard South; 5) Hospital Area; 6) Marine Corps Area; and 7) Ammunition Depot. The seven areas are shown in Figure 2, entitled *Areas of Mare Island*. Virtually all of areas two through seven are within the boundaries of the Mare Island Historic District; most of the North End was excluded from the district.

The North End extends to the northern tip of the island. Most buildings in the remainder of the North End were built after the period of significance for this historic district. The North End is built on fill lands and cutaway hillsides and was unavailable for use until the early 20th century. It was used for miscellaneous purposes not contemplated when the base was originally laid out in the 1850s. The Residential-Administrative Area is at the center of the historic district, located south of the North End, west of the Shipyard North, and north of the Hospital and Marine Corps areas. The Shipyard North is along the waterfront, just east of the Residential-Administrative Area. The Hospital and Marine Corps areas are located in naturally hilly sites south and generally west of the Residential-Administrative Area. The Ammunition Depot is at the southeastern tip of the island. Only the Ammunition Depot, Hospital, and Marine Corps areas were built on landforms that approximated their original natural conditions, although a great deal of earthmoving occurred in these areas as well.

The following discussion describes the general character of each of these seven areas. Where appropriate, reference is made to the contextual photographs included as part of this documentation. Those contextual views are numbered in sequence, with the general HABS number CA-1543: CA-1543-1, CA-1543-2, and so forth. The photograph references below use only the last number: 1, 2, 3, etc. The 66 buildings are described and assessed in terms of how each fits into the pattern of historical and architectural development in each area. The individual building forms will provide greater detail about any one of the buildings.

3. Resources in the North End

Mare Island is essentially oriented north-south; the following discussion treats the island as if it were truly north-south, although it actually trends southwest to northeast. Historically, the term "North End" was used to refer to everything north of the A Street. During the 19th

century, A Street was effectively the northern end of the island. Nearly all land north of A Street is man-made, reclaimed from natural wetlands. Only a small part of the North End was included within the Mare Island Historic District. The historic district in the north end area includes only the land between A Street and the Causeway (the Causeway is a combination lift bridge and fixed trestle that links the island to Vallejo). The remainder of the North End was excluded from the historic district because the bulk of the buildings there are less than 50 years old and not historically significant.

The portion of the North End that is within the historic district developed much later than the rest of the historic district and was used for miscellaneous purposes that did not fit within the physical confines of the original shipyard. For example, during the early 20th century the shipyard began to repair submarines, a function that could not have been foreseen in the 19th century master plan for the base. The submarine repair station was located on unused land in the North End for lack of space elsewhere. The public works section of the base was also placed in the North End because it required land for storage and equipment, acreage that was not available in the older part of the island. From the standpoint of historic architecture, the North End is the least interesting of the seven areas.

The Causeway is the principal gateway to Mare Island, although a secondary entrance exists at the northern end of the island as well. The entrance to the Causeway is highlighted by ceremonial fixtures, including the lantern and cannon shown in Photograph 2. The Causeway itself is shown in Photograph 3. Photograph 6 is looking back toward Vallejo from Mare Island. The major north-south corridors – California, Railroad, Walnut, and Cedar Avenues – all pass through this part of the North End. The character of these streets, however, is different in the North End than elsewhere on the island, again, reflecting the fact that this area developed later and outside the original master plan. Photograph 8 is a view of Walnut Avenue in the North End. Here, the buildings are widely dispersed and there are relatively few trees or shrubs along the roadway. Elsewhere Walnut Avenue is a residential street with mature vegetation.

Three buildings in the North End are recorded in this report: Buildings 231, 459, and 505. Consistent with the history of this area, all three are 20th century buildings that were used for different purposes. Building 231 is a 1918 structure that was used to repair the locomotives that powered the extensive industrial rail system that ran through the shipyard. It illustrates the utilitarian design of buildings in the public works section. The building also signifies just how important that rail system was to the operation of the shipyard; rarely have American military installations included a separate locomotive repair facility.

Building 459 was associated with the submarine repair facility. It was built in 1931 and served as temporary housing for the crews of submarines brought to Mare Island for repair. The Mission Revival detailing on this building reflects an unusual development at Mare Island during the 1920s and 1930s. The 19th and early 20th century building stock at Mare Island was built around a reasonably coherent architectural program in which industrial buildings were designed in a neoclassical, essentially Greek Revival design, while

residences were, with rare exceptions, designed in Colonial Revival. That program began to dissolve in the 1920s when industrial buildings were built in the frankly modern steel-framed, curtain wall form pioneered by Albert Kahn, while residential and office buildings were designed in the Mission Revival. The Mission Revival styling of Building 459 was repeated in a much grander scale in the Hospital Area. Building 459 is of interest functionally in that it housed enlisted personnel as well as officers in the same building, an unusual development in the historic or modern Navy.

Building 505 is a very isolated element of the Mare Island Historic District. It is part of a small complex of buildings located at the edge of the marshlands northwest of the remainder of the historic district. This building was constructed in 1940 as a high-frequency radio transmission building. Its remote location reflects the Navy's desire to isolate this building from the bulk of activities at the shipyard. Built just before World War II, the building has a distinctly Art Deco character, a rarity among the buildings at Mare Island.

The utilitarian character of the North End blends into the margins of the Residential-Administrative Area as well as the Shipyard North area. There is no obvious dividing line between the North End and the Shipyard North, as there is, say, between the Residential-Administrative Area and the Hospital Area.

4. Resources in the Residential-Administrative Area

The Residential-Administrative Area is at the center of the historic district, bounded on the north by the North End, on the east by the brick industrial buildings of the old shipyard (Shipyard North), on the south by the Shipyard South, the hospital, and the Marine Corps Areas. To the west, the Residential-Administrative Area was historically bounded by a natural hillside, although the bulk of that open land was filled with Capehart housing during the 1960s and later.

The Residential-Administrative Area, as the name suggests, is filled with homes and office buildings. As such, it was the area of the station that most resembled a city, as opposed to a factory, which was the essential character of the shipyard. The area possesses the accoutrements of a well-planned urban area, lacking only a commercial zone to represent a self-sufficient small city. It has the additional quality of being very old, giving it very mature landscaping and layers of historical resources.

The Residential-Administrative Area is built around three north-south axes and two major open spaces. The north-south streets are Railroad Avenue, which separates the Residential-Administrative Area from the Shipyard North, Walnut Avenue, the central boulevard of this area, and Cedar Avenue, which separates the Residential Area from other areas, including the Marine Corps and Hospital Areas. The major open spaces are Alden Park and Chapel Park, both of which face Walnut Avenue. A third, smaller formally landscaped area is

called Farragut Plaza. Several east-west streets cross through this area, the most important of which is 8th Street.

The character of Railroad Avenue is addressed below in the discussion of the Shipyard North. Railroad Avenue is, as the name implies, an industrial street, lined on the east by the shops of the shipyard. No residences were built on Railroad Avenue; administrative buildings, many of which front on Railroad Avenue, serve as a buffer between the shipyard and the residential area. Alden Park, however, fronts Railroad Avenue, creating a situation in which the most formally landscaped area at Mare Island actually fronts the most industrialized zone of Mare Island.

Walnut Avenue is the showplace of residential architecture and landscape architecture at Mare Island. The grandest senior officers' quarters – called “Captains' Row” – exist along the west side of Walnut, as well as smaller junior officers' housing. Chapel Park exists at the south end of the officers' housing on the west side of Walnut Avenue. The east side of Walnut is dominated by Alden Park as well as the administrative buildings. Mature trees line both sides of Walnut Avenue, with the larger trees being those in the two parks. Photographs 10, 11, and 12 offer typical views of the streetscape along Walnut Avenue, showing the important relationship between architecture and landscape architecture along that street.

Mature landscapes exist on the west side of Walnut Avenue as well, contained within the yards of the homes along Captains' Row. Although the Captains' Row homes are nearly identical, the landscaping there has evolved over many years, reflecting the preferences of many different residents in the various houses. Photographs 15 through 23 illustrate the diversity of landscapes in this area.

Cedar Avenue is similar to Walnut Avenue in that it includes mature landscaping as well as many residences. For the most part, the street is residential on the east side only; on the west side, various non-residential uses may be found. Near the southern end of the Residential-Administrative Area, however, the residences are on the west side of the street, while Chapel Park is on the east. Photograph 27 shows the northern end of Cedar Avenue, with World War II-era officers' quarters on the right (east). Photograph 28 shows the southern end of Cedar Avenue, with Chapel Park on the right (east) and turn-of-the-century residences on the left.

As noted, the Residential-Administrative Area is the most city-like area at Mare Island. In addition to its human-scaled buildings, this area includes most of the significant formal landscaped areas within the historic district. Of these, Alden Park, Farragut Plaza, and Chapel Park are the most important.

Chapel Park is the most conventional open space, i.e. most comparable to a city park. It is unusual only in that it is centered on the 1901 St. Peter's Chapel.¹ It is a large triangular open space between Alden Park and Walnut and Cedar Avenues and surrounds St. Peter's Chapel. It contains many varieties of trees, especially eucalyptus. This area has been known as Chapel Park since the dedication of St. Peter's Chapel in 1901. Some of the oldest and best cared for trees at Mare Island may be observed in this park. The park is approximately as old as the chapel building, although landscaping likely developed somewhat more slowly than building construction. The park has no formal order and is dominated by large trees and open lawn. Shrubs are planted as foundations to the chapel. Other large shrubs are pruned as small trees in the lawn area. Very large eucalyptuses form a row along Walnut Street. The park area is dominated by eucalyptus, coast redwood, incense cedar, pittosporum, and a giant redwood (*Sequoia giganteum*) at the front of the chapel. Photograph 33 shows the chapel in the context of the mature trees. Photograph 34 shows the edge of Chapel Park on Walnut Avenue

Alden Park was the busier of the two major open spaces. It is located directly across 8th Street from the Headquarters Building (Building 47) and also across Walnut Avenue from the home of the shipyard commander. Long the site of military ceremonies, Alden Park is an irregularly shaped park area that provides a clear demarcation between residential and industrial areas. Its two most notable features are the bandstand (Building 56) and the flagpole. The present flagpole is mounted in the spot occupied by the original shipyard flagpole. Named for Commodore James Alden, a former installation commandant, the park contains a variety of exotic trees brought from the many ports visited by Mare Island's ships.

Alden Park, unlike Chapel Park, is specifically a military open space, i.e. a park that could exist only on a military base. It includes a grassy open space. The landscape is very mature with large stands of Monterey pine, deodar cedar, eucalyptus, redwoods, beefwoods, locust, maples and black walnuts. Shrubs include cotoneaster, oleander, pittosporum, spirea and escallonia. Ivy is the dominant groundcover. It also includes Building 56, a remarkably well preserved late 19th century bandstand. Building 56, recorded as part of this documentation, is an octagonal wood framed pavilion structure. Its raised base is paneled by flat trim. A wooden stairway with a turned baluster railing leads to the pavilion floor. Right turned and fluted columns with square caps ornamented with circular turnings support a lacy architrave of curving braces and spaced turned spindles. A railing of straight turned balusters runs between columns. The building was built in 1895.

The park is also filled, however, with military displays, most of them from the 20th century. The permanent displays include a Dahlgren and several other Navy guns, a ship's bell, and a Japanese World War II human torpedo. The oldest artifact, a ship's anchor, contrasts with

¹ St. Peter's Chapel, locally identified as Building 104, is one of the best-known and handsome elements of the Mare Island Historic District. This building was recorded to HABS standards on an individual basis, and is not treated in this documentation. Its HABS identifier is CA-1543-C. It is, of course, the focus of Chapel Park and a key contributor to the human-scale and city-like qualities of the Residential-Administrative Area.

Cold War Polaris A-1 and SUBROC missiles. Photograph 41 shows the bandstand and Polaris, side by side. In addition, Alden Park was fitted with numerous reinforced concrete bomb shelters during World War II. Never used, the shelters are now covered with vines and create a jungle like feeling to the southern portion of the park. Alden Park is significant as a remnant of the original park layout and as an illustration of the continuing evolution of ceremonial functions and symbols at the island.

The final open space in this area is Farragut Plaza. Located at the main entrance to Building 47, Farragut Plaza provides parking for selected occupants of Building 47 and official visitors to Mare Island. From the flat parking surface the plaza's southernmost extremity slopes to 8th Street which separates the plaza from Alden Park. A double run of granite steps with a high granite curb rail with squat square bollards leads from the sidewalk on 8th Street to the parking area. A wrought iron archway sign over the stairway identifies Farragut Plaza. A commemorative plaque and the archway style were mounted during Mare Island's centennial anniversary celebration. Farragut Plaza is dominated by a circular drive with some very old trees at either side of it. Of particular interest are two old bunya-bunya trees framing the old building. Labels on the trees date them to the 1880s. An old entry gate exists at the base of the slope. Granite chip gutters are seen at the eastern end of the driveway. These appear to be very old and contribute to the significance of this landscape. Other large trees seen here are deodar cedars, camphor, and a Chinese fan palm from the early 1900s. Other smaller plants include crepe myrtles, photinia, arborvitae, dracena, pyracantha, and silk oaks. Ice plant was planted on the slope.

The residential area was laid out according to the shipyard's original master plan, generally called the "Sanger Plan" after William P. Sanger who designed the shipyard in 1854. The Residential-Administrative Area and the Shipyard North are the only areas within the Mare Island Historic District that today generally conform to that 1854 plan. The Residential-Administrative Area may be seen as comprising five major clusters of buildings: 1) "Captains' Row"; 2) officers' housing outside Captains' Row; 3) civilian housing; 4) World War II-era housing; and 5) the headquarters complex.

Captains' Row is the dominant element of this area and arguably the most attractive single element of the Mare Island Historic District. Captains' Row comprises 12 stately Colonial Revival homes, built in a row along Walnut Avenue, either facing Alden Park, the dominant formal landscape within the historic district, or the headquarters complex. These 12 buildings collectively represent one of the finest examples of historic officers' quarters in California, rivaling the equivalent groups at the Presidio of San Francisco or any other historic military installation in the state. Three of these homes are recorded in this document: Quarters A, the home of the shipyard commander; and Quarters E and M, the homes of other ranking officers. These homes are essentially identical, although Quarters A is somewhat larger than the rest. All were built in 1900 and replaced unreinforced masonry officers' houses that were destroyed in a major earthquake at Mare Island in 1898.

The homes of Captains' Row are remarkable in three ways. First, they are highly successful interpretations of the Colonial Revival design of the early 20th century. It appears that all work on these homes was accomplished by the architects of the Navy's Bureau of Yards and Docks, with no assistance from outside consulting architects. The Colonial Revival design is not unique to Mare Island; the Bureau, for example, designed similar homes for a small training station at Yerba Buena Island in San Francisco. The homes at Mare Island are remarkable, however, for the skill with which the Colonial Revival motif was executed. Second, the homes are remarkable for their scale, individually and as a group. This row of twelve massive single-family residences dominates the Residential-Administrative Area from almost any vantage point. Third, the homes are important for their degree of integrity, interior as well as exterior. Measured in terms of their scale, design quality, and integrity, the 12 homes along Captains' Row represent an exceptional example of historic military family housing.

A series of outbuildings behind the homes of Captains' Row is also recorded as part of this document. As built, the homes of Captains' Row included generous rear yards, originally extending west to Cedar Avenue. Over time, these rear yards were fitted with numerous outbuildings, from servants' quarters to chicken coops to automobile garages. The outbuildings were built over a long period of time, with each being constructed by local craftsmen at the request of the individual residents of the homes. Consequently, the outbuildings are not uniform in the manner of the homes. The outbuildings recorded in this document include: Building A-A, a servants quarters for Quarters A; Building A-J, a greenhouse for Quarters A; Building E-F, originally a chicken coop for Quarters E; Building EC, a garage for Quarters E; and Building E-D, a storage shed behind Quarters E. These many outbuildings are unexceptional when considered individually, but collectively add to the historic landscape of the area and are suggestive of the lifestyles of ranking Navy officers in the early 20th century.

The second major element of the Residential-Administrative Area are the officers' quarters located outside Captains' Row. In 1900 and in later years, the Navy elected to build other officers' quarters south of Captains' Row along Cedar Avenue, facing Chapel Park. The most impressive member of this group is Quarters I-T, a huge duplex built at the southern end of the Residential-Administrative Area, just north of the Marine Corps Area. This 1900 duplex continues the Colonial Revival tradition of Captains' Row, although it is geographically far removed from the 12 homes in that group. Quarters U was built in 1920 in the vicinity of Building I-T. It is a small, unexceptional home that nonetheless continues the Colonial Revival tradition of the other homes. A small outbuilding, U-D, is located behind Quarters U. Quarters I-T and U as well as Building U-D are recorded in this document.

A third element of the Residential-Administrative Area is a small cluster of homes that was originally built to house prized civilian employees at the shipyard. Over time, these homes were renovated for use as officers' quarters. In the late 19th and early 20th centuries, the shipyard decided to allow a small number of civilian employees to build their own homes at

Mare Island. The favor was granted to civilians whose presence was required on a 24-hour basis, including: supply, account, and freight clerks; electrical machinists; and mail messengers. Four homes have been documented from this area: Buildings 17, 21, 29, and P. The cluster of civilian housing was often called “Dublin Hill,” in recognition of the fact that many people of Irish descent lived there. The hill was located just north of the headquarters complex, between Walnut and Railroad avenues. Today, however, Dublin Hill essentially no longer exists. Beginning in the 1920s the hill was gradually destroyed to make room for new construction and to serve as fill for other areas on the island. Of the four homes recorded, only Buildings P and 17 are on their original sites. The others were moved to the Residential Administration area from Dublin Hill. This row of homes faces Walnut Avenue north of 5th Street, just north of Captains’ Row. The houses were modified substantially, chiefly through additions to make them acceptable as officers’ housing units. Nonetheless, this pleasant cluster represents an important collection of 19th century vernacular homes.

A fourth cluster of buildings in the Residential-Administrative Area includes a group of residences constructed along Cedar Avenue during World War II. The heart of this group is a cluster of 10 duplexes (20 quarters), one of which is documented in this report. The recorded duplex is Quarters 1-2. These 10 duplexes are of interest in that they represent a rare example of permanent residential construction from the wartime era; virtually all housing from this period was built to temporary standards. As such, the homes – which are best described as California Modern with a feel of post-war Ranch House informality – are highly unusual military expressions of the civilian fashions of the early 1940s. The homes are of interest as well in that they include servants’ quarters at the rear (the servants’ quarters are also duplexes, set atop duplex garage units). One such duplex garage/servants’ quarters is recorded (Building 17a-18a in this document).

The fifth building cluster in the Residential-Administrative Area is the headquarters complex. Laid out according to the 1854 Sanger Plan, Building 47, the first permanent headquarters building, was built in 1870. It is recorded in this document.² The site of Building 47 was important both symbolically and functionally. It is on a short street, now 8th Street, but formerly Central Avenue, which leads from the earliest shipyard buildings to Quarters A, the home of the shipyard commander. It faces Alden Park, the site of the main shipyard flagpole and locale for ceremonial functions. Building 47 has been modified extensively through the years but retains sufficient integrity to convey both its original design and function.

The most imposing element of the headquarters complex is Building 521. This building was built during World War II on the design of Austin Wilmott Earl, a consulting engineer whose firm designed many of the industrial buildings in the Shipyard South area before and during the war. Building 521 is a massive L-shaped reinforced concrete building that wraps

² Building 47 was HABS recorded on two occasions and was assigned two HABS identifiers. It is listed as CA-1543-A and is also recorded under CA-1824.

around the old headquarters, Building 47. A frankly modern building, Building 521 nonetheless defers to the historic presence of the historic headquarters; its brick facing repeats the material of the older building, and the new building was built almost entirely at the rear of Building 47.

5. Resources in the Shipyard North

The Shipyard North area comprises the industrial core of the 19th and early 20th century shipyard at Mare Island. It includes some of the most important 19th century industrial buildings in California, whether seen in the military or civilian context. Arguably, the brick industrial buildings in the Shipyard North area represent the heart of this historic district, the complex that best defines the historic character of the district and best illustrates the importance of Mare Island in American military history.

The viewsheds of the Shipyard North area follow three north-south axes: the waterfront, California Avenue; and Railroad Avenue. The waterfront is, of course, essential to understanding the character of the old shipyards. The waterfront includes several major elements: the quay wall (a concrete retaining wall to which ships could berth); a railroad running along the length of the waterfront; the dry docks, which pierce the quay wall and extend across California Avenue in places; and the miscellaneous machinery of the shipyard, such as overhead cranes. Photographs 42 through 45 capture the character of the waterfront area.

California Avenue is in many respects simply an extension of the waterfront in most areas. California Avenue is a street on the west side of the waterfront, but there often is no obvious eastern edge to California Avenue. California Avenue may be seen as the Main Street of the old shipyards. The oldest buildings were designed to face California Avenue and the water; to the extent that these industrial buildings have façades, those façades face California Avenue. The row of old brick shops along California Avenue arguably comprise the single most interesting viewscape at Mare Island. The character of California Avenue is captured in Photograph 47, at the northern end of the Shipyard North, and Photograph 48, at the center of the Shipyard North.

Railroad Avenue exists on the west side of the row of brick (and other) shops. In relation to the shops, Railroad Avenue is on the back side of the buildings. It is also the juncture between the industrial area of the Shipyard North and the Residential-Administrative Area. The character of Railroad Avenue is shown in views 58 through 62.

For analytic purposes, the buildings of the Shipyard North area may be seen as comprising four clusters; 1) the oldest brick industrial buildings, which face California Avenue behind Alden Park; 2) the waterfront resources between California Avenue and the waterfront due east of Alden Park; 3) a major cluster of shops near the waterfront at the northern edge of the Shipyard (where Shipyard North meets the North End); and 4)

miscellaneous buildings between Railroad and Walnut Avenue at the northern edge of the Shipyard North area.

The cluster of brick industrial buildings between Railroad and California Avenues, just east of Alden Park, comprise the core of the 19th century shipyard. This cluster includes the oldest industrial building at Mare Island (and also the oldest building in the historic district): Building 46. Constructed in 1856, Building 46 – historically called the Smithery – established the architectural theme for the old shipyard. It was built of brick; it had temple-like proportions; and it was built around Greco-Roman architectural elements, including brick piers, round-headed arched openings, a classical cornice, and so forth. Building 46, which is recorded in this document, is the single most important industrial building at Mare Island.³

In effect, however, Building 46 is not a separate building. As the mission of the shipyard expanded, the Navy built new buildings as additions to the older structures. This created a complex of structural elements – each of which was given a separate building number – that are effectively different wings of a unified building. The Building 46 cluster also includes Buildings 50 and 52 – both of which are recorded in this document – as well as Buildings 58 and 164. Buildings 50 and 52, built in 1871 and 1873, respectively, conform to the 1856 character of Building 46. This cluster of buildings is arguably the most important industrial complex on Mare Island and among the most important shipyard complexes anywhere in the nation. The California Avenue façades of this complex are shown in Photograph 49, taken from Dry Dock 1.

Building 106 is located just south of the Building 46 complex. Built in 1904, it was one of the last shipyard buildings to be faced in brick, although it is a steel framed structure. (The steel frame was almost certainly included for seismic reasons; much of the Shipyard North area was damaged or destroyed in an earthquake in 1898). It represents a transitional building at Mare Island, continuing the design traditions of the 19th century while adopting building methods of the turn-of-the-century. Architecturally, it stands midway between the earliest shops and the steel-framed, curtain wall buildings of the World War I- and World War II-eras. It has been recorded as part of this documentation.

The waterfront area just east of the Building 46 complex includes three very important structures: Dry Dock 1 (DD1), Dry Dock 2 (DD2), and Building 110, all of which are recorded in this document. When it was commissioned in the mid-1850s, the shipyard at Mare Island relied upon a floating dry dock for ship repair work. The Navy intended from the outset that Mare Island be fitted with a permanent dry dock facility. The funds for that construction – over \$2 million – were not available, however, until the 1870s. In preparation for construction of the first dry dock, chief engineer Calvin Brown toured facilities throughout the United States and Europe. His design called for a great granite-lined inverted arch, measuring about 122 x 508 feet, with a depth of 32 feet. This

³ Building 46 was previously recorded and assigned HABS identifier CA-1543-D.

structure – Dry Dock 1 – was not completed until 1891. It was obsolete almost at the time it was built, owing to vast increases in the size of American capital ships during the late 19th century. This massive piece of granite stone masonry still exists and is largely unmodified from its original appearance.

The deficient capacity of Dry Dock 1 forced the Navy to begin construction of a new dry dock, almost as soon as the original structure had been completed. Work on Dry Dock 2 was initiated in 1899 under the supervision of noted engineer, Alexis Von Schmidt. Dry Dock 2, at 120 x 750 feet, was several hundred feet longer than Dry Dock 1, so long that it had to be built at a 45 degree angle to the shoreline to avoid demolition of the older shops buildings. This great dock was lined in concrete, with granite masonry used only at selected critical areas.

Building 110 is located between the two old Dry docks and houses pumping equipment for both. This unusual octagonal brick building has been substantially modified but retains enough of its original appearance to contribute to the general character of this part of the Shipyard North area.

A third cluster of important buildings in the Shipyard North exists near the waterfront at the northern edge of this area. This cluster is more than 1000 feet north of Dry Dock 1 and is visually and functionally distinct from the Building 46 complex as well as the Dry Dock complex. This cluster includes two different resources: a long row of coal sheds, and a group of industrial buildings that was pieced together over many years, similar in some respects to the Building 46 complex.

The coal sheds, numbered Buildings 141 through 153, are not separate buildings but rather are separate storage units within a long building that is nearly 700 feet long. These sheds were built in 1903 but were abandoned almost as soon as they were built, reflecting the Navy's rapid transformation from coal to fuel oil propulsion. The sheds have been extensively modified through the years. One shed, Building 153, has been recorded in this document.

A major cluster of industrial buildings exists just north of the coal sheds, between the waterfront and California Avenue. This cluster, historically called the Steam Engineering Complex, is even more remarkable than the Building 46 complex in that it includes an improbable mix of building types. Like the Building 46 complex, this group includes a series of wings that were added to one another, each of which was assigned a separate building number. This cluster today includes Building 85, 87, 89/91, and 271. Buildings 87, 89/91, and 271 have been recorded for this documentation.

The oldest element of this complex is Building 87, which was built in 1858 and was the second brick industrial building to be built in the shipyard, after Building 46. Construction began on Building 89/91 in 1858 as well, but this composite building was not completed until 1871. For several decades, Building 87 and 89/91 served as the

machine shop area for the shipyard. These very old shops were built to conform to the Greek Revival character of the shipyard industrial buildings to the south, including Buildings 46, 50, and 52.

The function and appearance of this complex was radically altered, however, with construction of Building 271 in 1918. As discussed in greater detail with respect to the Shipyard South area, the Navy in the early 20th century adopted a radically different design for its shipyard buildings. The new building form borrowed heavily from the design of civilian manufacturing buildings, particularly those used in the automobile industry. This new design was built around large open assembly spaces. To achieve these spaces, the Navy adopted the steel framed curtain wall structural system, pioneered by architect Albert Kahn in the design of automobile plants.

Building 271 represents the earliest use of the curtain wall building form at Mare Island. The use of this form in 1918 is remarkable in the history of industrial design. It is also remarkable in that Building 271 was grafted onto the Buildings 87 and 89/91 complex, which is dominated by brick Green Revival forms. The resulting complex may be unique in the history of American industrial design for the diversity of building forms represented there. The new complex was designated as the Steam Engineering Complex. This fact points as well to the rapid pace of technological change at Mare Island in the early decades of the 20th century.

In addition to the three clusters of buildings described above, the Shipyard North includes a large number of important buildings, scattered along the waterfront and at the northwestern edge of the area. Five additional buildings in this area have been recorded as part of this documentation: Buildings 65, 69, 77, 121, and 253.

Buildings 65 and 69 are situated along the waterfront, between the coal sheds and the Building 46 complex. Building 65 is a rectangular two-story brick office and warehouse building built in 1901. Its walls are divided into bays by pilasters, capped by a projecting course of brick and supporting an entablature of brick courses and a cornice. The gabled roof is capped with glazed monitors. The large pediments at the gabled ends feature large circular windows. Although built in 1901, it conforms to the appearance of its many Classical Revival neighbors built earlier. Building 65 has housed the apprentice school, offices, and printing facilities. Building 69, along with Building 71, is located in an area designated for storehouses by the Sanger Plan. Initially constructed in 1865 as storage for equipment and recruitment supplies, Building 69 experienced two subsequent expansions. In the early 20th century two separate additions, each to the north end of the building, brought the storehouse to its present size. Building 69 is a two-story brick structure whose exterior appearance evidences the work of more than a single designer.

Building 77 is a somewhat isolated brick industrial building, located due west of the coal sheds, between Railroad and California Avenues. This two-story rectangular brick building was originally used for ordnance storage and administrative offices. (Ordnance stored

comprised such non-explosive material as small arms, gun tackle, and boarding pikes.) The exterior materials of this 1870 building are in good condition and maintain their appearance of over 100 years ago.

Building 121 is the central power plant building, located at the western edge of the shipyard across Railroad Avenue from Building 521, the headquarters annex. It is a large rectangular steel frame, masonry clad structure with walls 50 feet in height. Its original appearance is dampened by the addition of various tanks, pipes, and other appendages necessitated by changes in technology. Building 121 is significant as a major effort of Civil Engineer C. A. Carlson, who brought a knowledge of private sector technology into his Mare Island work. It is also important as a visual landmark at the base. Its 1938 concrete exhaust stack rises above its surroundings to a height of 200 feet. Most significant, though, is the technological statement made by the power plant's existence. Most shops had depended upon independent power sources to drive their equipment, often by mechanical means. The 1918 construction of Building 121 implemented the new industrial concept of a central generating point from which electrical power could be dispatched. The centralizing of power changed the use and in some cases the form of many of the existing shop buildings.

Building 253 is the final building that was recorded in the Shipyard North area. Building 253 is far removed from the waterfront, at the juncture of the North End, the Shipyard North, and the Residential-Administrative Areas. It is one of many wooden storage buildings that were constructed at Mare Island during the large build-up during the World War I-era. Built in 1918, it is of heavy timber construction and clad with corrugated steel. It features a tall gable-roofed clerestory monitor with shed-roofed aisles. Three-story side aisles with floors on each story open onto a center gallery of free space that reaches over 60 feet to the roof trusses. The timber framing in Building 253 serves as a reminder of the availability of wood and the comparative paucity of steel on the Pacific Coast.

6. Resources in the Shipyard South

The Shipyard South area exists along the waterfront between the Shipyard North and the Ammunition Depot. This industrial area was built up in the years between World War I and World War II and differs fundamentally from the historic shipyard to the north. The area was little used before about 1920, serving as a buffer between the older shipyard and the Ammunition Depot. After World I, the technology of shipbuilding and repair was transformed to mimic the assembly line methods of civilian industries, particularly those of the automobile industry. The architecture of shipyard buildings was fundamentally transformed as well. Not surprisingly, the Navy turned to Albert Kahn, the principal architect of American industry in the early 20th century, to design the new buildings for the modern shipyard. The Shipyard South reflects this transformation as well as any shipyard in the United States. Massive steel framed, curtain wall industrial buildings define the character of this area. The Shipyard South area could hardly be more different

from the human-scaled, Greek Revival industrial buildings of the older shipyard to the north.

The area is dominated by two huge buildings: Buildings 680 and 386/388/390, which are complemented by dozens of smaller (but nonetheless very large) industrial buildings. The scale of the buildings is difficult to perceive because most of the buildings in the area are very large. Photograph 72 offers some perspective on the scale of Building 386/388/390, in relation to a series of one-story buildings and vehicles along side it. Photograph 73 shows the relationship between the Shipyard South and the Hospital Area; the hospital may be seen in the center background of that view.

Four buildings have been recorded in the Shipyard South area: Buildings 88, 208, 386/388/390, and 680. Building 88 is the exception within this group; it is an old stables building, constructed in 1862. It reflects two facts about the 19th century history of this area and Mare Island generally. First, it illustrates how little used was the Shipyard South area until the 1920s. Second, the high-quality brick masonry and Greek Revival detailing of this building demonstrate the care that was taken in the design of even utilitarian buildings during the early construction program at the shipyard.

Building 208 exists at the northern end of Shipyard South and illustrates the gradual move of the shipyard into the largely undeveloped area that would become Shipyard South. Building 208 was constructed in 1917 and was used as part of a training school that was established at Mare Island during World War I. A modest two-story frame school, the building is important chiefly as a symbol of the gradual accretion of new functions at Mare Island in the years up to and including World War I. From the 1920s forward, most of these naval training functions were transferred elsewhere, chiefly to San Diego. Building 208 was reused for various functions, including that of a cafeteria.

The core buildings in the Shipyard South area are Building 386/388/390 and Building 680. Building 271, a 1918 curtain wall shops building mentioned earlier in the Shipyard North area, set the pattern for all subsequent shipyard construction. The technology and materials of ship repair and construction during the early 20th century forced the Navy to rethink the architecture of shipyard buildings. The new construction in the Shipyard South continued the pattern set by Building 271, but at a scale and with production efficiencies that were fundamentally different.

The first significant construction in the Shipyard South area was Building 386/388/390. Built in 1922, the complex was the main metal fabrication shop at Mare Island from the 1920s through the early 1990s. Structurally, it is one large building with three large bays. The combined floor space of the three bays is about 340,000 square feet, with massive clear spans and roof heights for ship construction. The only single structure at Mare Island designated with three separate building numbers, the west bay (Building 386) was the Forge Shop, the central bay (Building 388) was the Structural Shop, and the Shipfitting Shop occupied the east bay (Building 390). Structural steel components that became destroyers,

nuclear submarines, and other vessels were cut, rolled, welded, or formed in this complex. The building plainly expresses its function as the shipbuilding core of the base and is highly significant as an example of 20th century factory design in addition to its obvious significance in the business of shipbuilding. This building established the viability of the Shipyard South area and formed the nucleus of the shipyard operations during World War II.

The most imposing industrial structure in the area is Building 680, which housed the Machine Shop. It was built in 1940, on the eve of American involvement in World War II. Among the largest buildings at Mare Island, it encompasses a footprint of 257,000 square feet but is much taller than Building 386/388/390. The central main bay is the equivalent of ten stories in height. It is flanked by two-story elements about one-third its height. The central block is capped with a short extra story with a metal balcony which displays an illuminated sign stating, "Mare Island Naval Shipyard." Building 680 and Building 386/388/390 formed the core of the ship building and repair capabilities at Mare Island during World War II.

The other buildings in the Shipyard South area fall into three categories: more steel framed curtain wall buildings; small support buildings, such as freestanding restrooms and pump houses; and larger support buildings, including a large cafeteria building. All contribute to the utilitarian, heavily industrialized character of this area. The Shipyard South is the area at Mare Island that most closely resembles a large civilian industrial complex, such as an aircraft or automobile plant.

The Shipyard South is also the site of most of a series of bomb shelters that were built at Mare Island in the early years of World War II. Photograph 76 shows a group of these shelters in the area of Building 208. These sturdy concrete structures were never used and have survived chiefly because it would be prohibitively expensive to demolish them. A large group of these shelters exist in Alden Park as well; these are illustrated in Photograph 79.

7. Resources in the Hospital Area

The remaining areas of the Mare Island Historic District – the Hospital, Marine Corps, and Ammunition Depot areas – illustrate one important fact about Mare Island: it was always much more than a shipyard. Between its founding in 1854 and construction of large naval facilities in San Diego, California and Bremerton, Washington in the 1920s, Mare Island was the only major Navy facility on the West Coast. Additional activities accrued to the island, sometimes as an adjunct to the shipyard function and sometimes almost by default. The Ammunition Depot, for example, was needed to temporarily store the ordnance of a ship in for repair. The Ammunition Depot grew to be larger than necessary for that function, however, simply because the Navy needed an ordnance depot and Mare Island had the necessary land and personnel. Similarly, the hospital came to

Mare Island because the Navy needed a naval hospital on the West Coast and Mare Island had land available; there was no direct relationship between the hospital and the functions of the shipyard.

The Hospital Area is uphill (west) and slightly south of the Shipyard South area. It is bounded by Railroad Avenue on the east and by Club Drive on the west. Club Drive is essentially a continuation of Cedar Drive, which terminates as it reaches the Hospital Area. On the north, the area is bounded by 14th Street, which connects Cedar Drive with Railroad Avenue. On the south, the Hospital Area is bounded by the Mare Island Golf Course, which extends from the Hospital Area to the Ammunition Depot. Small east-west and north-south streets provide access within the Hospital Area. The terrain of the Hospital Area is hilly, moving uphill from north to south and from east to west.

The 1854 Sanger Plan included a provision for a ten-acre hospital site. No construction occurred in the area, however, until the end of the Civil War. In 1869, the Navy began construction of a large brick masonry building with a Mansard roof. This Second Empire edifice was destroyed in the massive earthquake that struck Mare Island in 1898. The use of a Second Empire design for this building illustrates an architectural fact that is common to the Hospital, Marine Corps, and Ammunition depot areas. These non-shipyard functions were separate commands and each designed buildings according to its separate tradition. The eclecticism of the building stock in the Mare Island Historic District is attributable to a large degree to the multiplicity of commands that operated there.

A new hospital was built in 1899 on the foundation of the 1869 structure. The 1899 hospital – Building H1 – is recorded in this document. It was designed by William Poindexter, a Washington, D.C.-based architect that specialized in military hospital design. The Beaux Arts Classicist Building H1 is one of the most handsome buildings anywhere within the Mare Island Historic District. The fact that it does not conform to the general architectural program at the shipyard is diminished by the fact that it is an isolated element; the entire hospital complex is largely outside the viewshed of the other historic buildings at Mare Island. Building H1 should be regarded as one of the key elements of the Mare Island Historic District. It is the heart of the Hospital Area; it is one of the largest 19th century buildings within the historic district, and it retains a very high degree of integrity, including intact interior elements.

During the 1920s and 1930s, the Hospital Area was transformed fundamentally through construction of a host of new buildings. Three buildings from this era are recorded in this documentation: Buildings H70, H72, and 926. This new construction established the hospital at Mare Island as a major element in the Navy's medical program. It also changed dramatically the character of the architecture and landscape architecture within the Hospital Area.

The most important new construction occurred in 1926, when Building H72 and its counterpart, Building H80, were built. (Only H72 has been recorded in this documentation. Building H80 was planned in 1926 but was not built until more funding was made available in 1939). Buildings H72 and H80 were massive “bookend” buildings constructed at either end of Building H1. The two are nearly reverse images of one another. Each is an L-shaped reinforced concrete structure in a Mission Revival design, including a hipped, Mission-tiled roof. The bookends are essentially freestanding; they link to Building H1 via small concrete walkways. The buildings conform to the natural hillside topography of this area, such that their east (downhill) sides are one story taller than the west sides. The buildings include several towers, reaching a maximum of five stories in height.

The addition of these L-shaped buildings had a dramatic effect on the landscape of the area. There had always been a formal park area on the east (downhill) side of Building H1. The two L-shaped bookends created two additional formal landscaped areas, one at either end of each “L” extension. These three landscapes together comprise the grandest formal landscape at Mare Island, so large that the three can hardly be viewed from a single vantage point. Photographs 81 and 82 offer a perspective on the scale of the H1-H72-H80 complex and the landscape there.

The buildings also changed the general architectural character of the area by introducing Mission Revival design into the context of the Beaux Arts Building H1. Buildings H72 and H80 are each much larger than Building H1; together, of course, they dwarf the original building. The incongruous mixing of building styles is mitigated, however, by the scale of the entire complex. The entire complex – Buildings H1, H72, and H80 – is more than 1000 feet long. Although linked to the larger Mission Revival buildings, Building H1 retains its separate identity, as demonstrated in Photograph 83.

Buildings H70 and 926 were built west (uphill) from the H1-H72-H80 complex. Building H70 was built in 1926, as part of the same construction program that created Building H72. Not surprisingly, it too was executed in the Mission Revival style. It is a two story rectangular structure with a Spanish tile hip roof. A central bay is accented by projection of four feet and end bays are recessed and flat roofed. The structure is reinforced concrete and has horizontal markings at the base. It also has a continuous flat belt course at the windowsills and a continuous plain frieze band at the head. It was built as a contagious disease ward and for that reason was sited some distance from the main hospital complex.

Building 926 was built as nurses’ quarters, as part of the general build-up of the Hospital Area during the mid- to late 1920s. The building is of interest architecturally because it is the most elegant and successful of the various Mission Revival buildings constructed during this period. It comprises three wings which take the form of a capital “Y.” Built into a hillside overlooking the hospital, the building was fitted with balconies that take

advantage of the view of the site. These include a cantilevered Monterey style balcony as well as a recessed arched balcony.

The Hospital Area includes the largest number of formal landscaped areas, outside of the Residential-Administrative Area. One park area is Clubhouse Drive Park, located on Clubhouse Drive uphill (west) of the main hospital complex. This open space was not planned as a park. Rather, it is a remnant of a formal landscape that was originally created as part of the setting for the residence of a chief medical officer, which was built on this site in the early 1890s but destroyed at some point after 1918. What remains, then, is a remnant of a formal residential design, now adapted for general park use. Probably the most detailed of all the landscape spaces at Mare Island, the park now lacks a structure to support the different landscape improvements (or rooms). The entry drive to the north is framed by gateposts. An old sundial remains near the walk that edges the east boundary. An old fence aligns the walk. A row of Canary Island palms at the eastern edge of the park are a continuation from Cedar Avenue to the north. A mature grove of eucalyptus trees protects the western edge. Street gutters of old brick probably date to the 1890s. At the east edge near the road a formal pond/fountain parallels the walk. A date of 1919 is engraved into the fountain. Photographs 91 through 95 show this park, including details of structural elements there.

The principal hospital complex – Building H1 and its major wings from the 1920s, Building H72 and H80/81 – includes two significant formal landscape areas on the east side of the buildings. The buildings are built into a hillside, facing Cedar Avenue to the west, on the uphill side. To the east – the location of the referenced landscaped areas – there exists a substantial open space, leading ultimately to the industrial area east of Railroad Avenue. This formal landscaped area occurs in two locations – directly behind Building H1 and directly behind H72, the north wing of the complex. The two areas were installed at slightly different periods. The landscaped area behind H1 was installed during World War I; the area to the north was installed after Building H72 was constructed during the mid-1920s.

The formal entry area to the east of the original hospital structure consists of a classic approach walk with arch, flag pole, a single palm tree, and bandstand (recently destroyed by a falling tree during a storm) forming an axis line with the front doors. The large lawn is dotted with cannons, missiles, benches, and other historic artifacts. Concrete walks (many in need of repair) lead visitors through the space. The steepness of the slope in the landscape probably never allowed the space to be used for a gathering of any size. Trees of note in this area include a big bunya-bunya tree (*Araucaria Bidwillii*), hawthorn, celtis, monterey pine, atlas cedar, black acacia, and camphor. To the south near the nurses' barracks are chinese elms and large eucalyptus. Planting in the parking lot between the nurses' barracks and hospital wing includes ash trees and one incense cedar.

A similar open space is found to the north of the main entry of the original structure, east of Building H72. The grade in this area is somewhat flatter than the entry to H1. An old

bandstand that marked the center of the landscape is missing from its foundation. Concrete walks and a bench greet guests. Trees in this area include redwoods, deodar cedars, southern magnolia, and arborvitae (at the bandstand). A grove of aleppo pines is to the north of the open space. North edge plantings consist of oleander, giant redwoods (*Sequoia giganteum*) and deodar cedar. Catalpa trees line the west edge of the old hospital wing and are not very old. Many new landscape improvements have recently been completed at the west edge near the new parking lot.

8. Resources in the Marine Corps Area

The Marine Corps Area of the Mare Island Historic District exists west of Cedar Avenue, uphill and to the west of the Shipyard South. Like the hospital, the Marine Corps Area was only distantly related to the primary function of the shipyard. The 1854 Sanger Plan included provisions for a small Marine Corps detachment at Mare Island; the Marine Corps often acted as the internal police force for Navy stations. Whether acting as guard for the shipyard or serving some other function, the Marine detachment was always an independent command at Mare Island, a fact that is reflected in the architecture of the area as well as its general isolation from the rest of the base.

Although called for in the Sanger Plan, the construction in the area did not begin until 1870, when Quarters M1 (the home of the Marine Corps commander) was built, along with a Marine Corps barracks building, Marine prison, and several other officers' quarters. As planned, all of this construction was to be centered on a large parade ground located just to the west side of Cedar Avenue, and just south of Alden Park. Gradually, however, the Marine Corps Area was moved to a new site on the hilltop west of its original location. The relocation was voluntary, i.e. it was not related to the earthquake of 1898 or any other external factor, although the Marine barracks were damaged in the earthquake of 1906. In 1917, the Marine barracks were rebuilt on the new site and, in time, all Marine Corps functions other than the commander's residence were relocated there. The original barracks stayed in place until the 1950s, when the building was demolished to make way for new construction.

Marine Corps-related resources, then, exist in two locations: at the old location on Cedar Avenue, of which only Building M1 remains; and at the hilltop site, where several important resources still exist. Building M1, which stands alone in the old Marine Corps Area, illustrates the degree of independence of the Marine detachment at Mare Island. The Italianate design of this 1870 home has no real equivalent in the architectural vocabulary of the large shipyard. This home is recorded in this document.

Four other buildings that are recorded in this document exist in the Marine Corps Area, only three of which were actually used by the Marines. The largest and arguably most important element of the Marine Corps Area is Building M37, a huge Marine Barracks, built at the new Marine Corps parade ground in 1917. Building M37 is a three-story E-

shaped structure on a raised basement with a tile hip roof. Two hip roof wings project slightly on either end of the façade. The building is of reinforced concrete construction and the basement and first story are formed with deep horizontal grooves to give it a rusticated base. Cornice molds of concrete project to support the eaves. The façade between the wings is glazed with horizontally paned windows and separated by piers of paired flat columns that form nine bays. Seven hip tiled dormers project from the roof. Photograph 96 shows Building M37 in the context of the parade ground. Photograph 98 shows Building M37 and the parade ground in the context of the hilltop location of the Marine Corps Area. That view was taken looking west toward San Pablo Bay.

Building M2 is an officers' quarters that now stands on the south side of the Marine parade ground, along with Buildings M3/4 and M5. The three homes are in the Eastlake Style, a stylistic anomaly at Mare Island. These are the only characteristic Victorian buildings at Mare Island, a somewhat surprising fact in that major proportions of the buildings were constructed during the late 19th and early 20th centuries. The architectural program for the Navy Shipyard was established early on, built around the essentially Greek Revival shops along the waterfront. When it was given the challenge of rebuilding much of the base after the 1898 earthquake, the Navy adopted a Colonial Revival theme for the residential area. As shown in the Italianate Building M1, the Marine Corps was an independent tenant at Mare Island and showed little interest in conforming with the general architectural program of the Navy's shipyard complex. Buildings M2, M3/4 (this home is a duplex) and M5 were originally built at the site of the original Marine parade ground (near Building M1), but were moved to the new parade ground in 1952. All three were also modified substantially at the time they were moved. The three Victorian homes are shown in Photograph 105 in the context of the parade ground.

Building 84 is located within the Marine Corps Area, about midway between the original and second parade grounds. It was built in 1895 to serve as the Marine Prison (or "brig") for Mare Island. For reasons not explained in the literature, the Marine Corps, which had followed its own architectural program elsewhere, built the prison in the manner of the shipyard buildings at Mare Island, i.e. of brick masonry with Greek Revival detailing. This building was augmented through a series of additions, some in brick, others in reinforced concrete. This rambling building does not retain integrity to any one period of construction. The original brick masonry is such high quality that the building makes a visual contribution to the character of the historic district, despite the many modifications that have been made to it.

Building 733 is the final building in the Marine Corps Area that has been recorded as part of this document. It is located in the general vicinity of the Marine Corps Area but had no relationship historically to the Marines. It was built in 1944 as part of a complex of buildings for the Women Accepted for Volunteer Emergency Service, or WAVES. In 1944, four buildings were constructed at Mare Island to accommodate a contingent of WAVES. Located on the west side of Cedar Avenue between 7th and 9th Street, the original compound consisted of two large east to west oriented WAVES Enlisted

Barracks (no longer in existence) and two other buildings oriented north-south (Buildings 733 and 737). Building 733 was originally designated a WAVES Officers' Quarters. This building is important for its association with the WAVES. It is also a good example of World War II temporary construction. Mare Island was filled with temporary buildings during the war, almost all of which have been destroyed.

9. Resources in the Ammunition Depot Area

The Ammunition Depot area is the most isolated and distinct area of the Mare Island Historic District. The Ammunition Depot was built at the south end of the island, as far removed as practicable from the rest of the shipyard. Further, the ordnance storage and handling buildings were built far apart from one another; in modern terminology, the buildings were separated by their respective explosive arcs. This wide separation of buildings from one another and from the rest of the shipyard gives the Ammunition Depot a unique character. In some respects, it has a park-like quality. The magazines and other buildings within the Ammunition Depot were fitted into the existing hillside with relatively little disturbance to the natural topography and vegetation. In other respects, however, the Ammunition Depot is distinctively industrial in character. With a few exceptions, the buildings of the Ammunition Depot are strictly utilitarian in design, particularly buildings constructed after 1900. This juxtaposition of natural hillside and industrial complex is illustrated in Photograph 107, taken from a hillside above the Ammunition Depot, looking northeast across Mare Island Strait toward the City of Vallejo.

The Ammunition Depot hugs the flats at the base of the natural hillside at the southeastern corner of Mare Island. The area is accessed through a narrow roadway (a continuation of Railroad Avenue), leading from the Shipyard South. A distance of about 3000 feet separates the major buildings of the Shipyard South and the Ammunition Depot. There is an apparent randomness to the placement of buildings in this area, with buildings placed where possible in the hilly area, as shown in Photograph 108. Along the waterfront, however, the buildings were often built in neat rows, as shown in Photograph 111.

The Ammunition Depot may be seen as comprising five distinct areas: two separate clusters of historic magazines; a major ordnance processing area; a residential area; and the naval cemetery.

The oldest cluster of magazines was built on a natural flat at the very tip of the island. The oldest building (Building A1) in the Ammunition Depot (and the second oldest building at Mare Island) was constructed in 1857. It is distinctive historically and architecturally. Historically, it was the first Navy magazine to be built on the West Coast. Architecturally, this sandstone structure is an unusually good example of stone masonry,

in a station that was built around brick masonry during the 19th century. Building A1 is recorded in this document.⁴

Building A1 was soon joined by other buildings. In 1858, the Navy built two shell houses (Buildings A3 and A4), for the storage of loaded shells that were ready to be returned to their vessels. These were brick magazines, in the general form of the original sandstone structure and are located just east of Building A1. Building A3 has been recorded as part of this documentation. This cluster of magazines, including Buildings A1 and A3, is important because of the integrity of setting. Virtually no 20th century buildings are visible from this cluster, making it an interesting and important historical scene.

A second cluster of old magazines exists in a flat area just north of Buildings A1 and A3. One building has been recorded in this area: Building A20, an 1870 powder magazine. It is a one-story magazine structure, rectangular in plan with a hip roof and wide overhanging boxed eaves. Walls are constructed of buff sandstone blocks and the roof contains metal trusses and roof cover. The masonry is coursed ashlar set on a smooth watertable with quoins at the corners. It represents a second generation of magazine construction in the Ammunition Depot, built more than a decade after Buildings A1 and A3. The chiseled sandstone ashlar reflects the continuing tradition of fine stone masonry involved with construction of the early magazines at Mare Island, used in Building A1 in 1857 and in this building in 1870. The setting for Building A20, however, has been compromised through many generations of later construction.

The third area of the Ammunition Depot recorded in this documentation is a huge ordnance processing area, located along the waterfront immediately east of Building A20. The heart of this area is Building A266, which has been recorded in this document. Building A266 was built in 1945, nearly at the end of the World War II effort, as a joiner and machine shop for the Ammunition Depot. It was used to machine ordnance as well as to maintain other ordnance handling machinery. This massive reinforced concrete industrial building has an almost sculptural quality because of the many large geometric concrete shapes. The height of the building varies, from a tall one-story on the end bays to a very tall central segment, rising the equivalent of three stories. Building A266 is important for its role in ordnance handling and machining during World War II, as well as for its design. The heavily reinforced building was built too late to make a sustained contribution to the war effort, but does signify the intensity of Ammunitions Depot activities during the war.

In a somewhat surprising development, the Navy built a small residential compound on the hillside overlooking the magazines. The development is surprising in the context of the dangers faced by the residents; although infrequent, there were several major explosions through the years within the magazine areas. It is less surprising, however, within the context of the security that was needed in the area; no area of Mare Island was

⁴ Building A1 was recorded previously and assigned HABS identifier CA-1543-B.

more closely watched than the Ammunitions Depot. In response to the need for 24 hour supervision, the Navy built (or allowed to be built) six homes and related outbuildings on the hillside above the Ammunitions Depot. All six homes (Buildings A25, A42, A43, A44, A45, and A58) as well as an associated garage (Building A110) have been recorded in this document.

This group of homes exists in two clusters. One cluster includes Buildings A42, A43, A44, and A45; A25 and A58 are in a separate cluster at the southern tip of the island. The entire residential enclave is accessed via a small road (Maseda Road) which has no function except to serve these homes. The oldest and arguably the most important building in this group is Building A45, which includes a two-story brick element that was constructed in 1860. That building is a remarkably rare pre-Civil War home in California and is highly significant, despite many alterations to it. Building A44 was built in 1874 as the first home for a watchman in the Ammunition Depot. Building A43 is the only one of the group to be built as officers' quarters; it was constructed in 1908 to serve as the home for the commander of the Ammunition Depot. Building A42 is a handsome gable-front with wing two-story vernacular home that was built in 1890 and served as a second watchman's house in the area. Building A110 is a common garage in this area, assigned to the residents of Buildings A43, A44, and A45.

Buildings A25 and A58 are located within a second cluster of homes at the southern end of the island. Building A25 was apparently built as an office for the Ammunition Depot in 1910 but was converted to residential use before 1938. The most recently-constructed home is Building A58, which was apparently built in 1930.

A final area of note in the Ammunitions Depot area is the Cemetery (Facility A0). The Mare Island Cemetery was established in 1858. The first remains interred were those of a quartermaster from the USS *Massachusetts*. The remains of others from around the world have since been added including Anna Key Turner, daughter of Francis Scott Key and wife of Daniel Turner, the Shipyard's first Civil Engineer, and Reverend McAlister, founder of St. Peter's Chapel. The cemetery has undergone several expansions to accommodate its 996 graves. Its northern limits were increased in 1893 and 1910. In 1920, it was expanded 50 feet to the south. Not long afterward the cemetery was closed to general interment. The Mare Island Cemetery contains many significant landscape features including an old white picket wood fence, wrought iron gates, old brick and plaster retaining walls, and several species of Australian native flora including eucalyptus and acacia trees. The plants include California pepper trees, Monterey pines, large upright junipers, and roses planted along the road. The cemetery is shown in Photographs 116 through 120. Photographs 119 and 120 illustrate the hillside setting for the cemetery and its proximity to the waterfront; both were taken looking east across the Mare Island Strait toward the City of Vallejo.

II. HISTORIC CONTEXT FOR MARE ISLAND NAVAL SHIPYARD

Established in 1854, Mare Island Naval Shipyard was the first permanent naval base on the West Coast. It remained the only such Navy facility for many years and the only California shipyard until the years just prior to World War II. In short, Mare Island was the pioneering Navy station on the Pacific Ocean throughout the 19th and much of the 20th century. If we are to understand the history of the Navy on the West Coast, the discussion must begin with Mare Island.

Although the Mare Island Historic District is filled with rare and interesting architectural specimens, the context in which those buildings were constructed has far less to do with architectural history than with military history, specifically the mission of repairing and constructing ships and, later, submarines, for the fleet of the Navy. If valuable architectural elements exist there, those buildings were built and retained because they fulfilled a need for the Navy.

Recognizing this fact, the following historical context emphasizes the military realities under which the building program at Mare Island took place. This context analyzes the development of Mare Island in five chronological periods: 1854-1865; 1866-1897; 1898-1918; 1919-1938; and 1939-1945. These periods reflect the military history of the base; indeed, these periods are defined chiefly by periods of increased military activity, such as the Spanish-American War or World War II. This context does, however, attempt to explain the connection between the military mission of the base and the types of buildings that were constructed during each of these periods.

1. 1854-1865 – Founding of the Navy Base through the Civil War

The founding of the Mare Island Naval Shipyard may be traced to the exigencies of military occupation of California after the cession of the area from Mexico in the 1848 Treaty of Guadalupe Hidalgo, and the closely-related need to preserve civil peace during the chaotic Gold Rush years in California. California, admitted to the Union in 1850, was slow to develop institutions to manage the huge task of the transfer from Mexican authority and the burgeoning population associated with the Gold Rush. The United States military had an important stabilizing impact on the civil institutions of California during this period.

The Army in particular established many small installations throughout California during the 1850s, of which only a few remain. The Navy, however, established just one base on the West Coast during this period – Mare Island. The first West Coast naval installation, Mare Island was also the only such facility in California for many years. Because it was such a pioneering facility, Mare Island owns a long string of other "firsts" in California and Western American naval history. These various distinctions are highlighted throughout this narrative.

The Navy was first involved in patrolling the Pacific Ocean in the early 19th century, in defense of American commerce. In 1818, the USS *Macedonian* sailed for the Pacific with the express duty of protecting American commercial interests on that ocean. She was the first American warship in those waters assigned the specific mission of commerce protection; as such her sailing marked the founding of the United States Navy's Pacific Station. Early in the 19th century, the Navy adopted a policy of dispersing warships to distant cruising stations to protect American shipping. Attacks from Barbary Coast pirates prompted the establishment of the first distant station shortly after the War of 1812. The Pacific Station was the second, followed by several others.⁵ Within a decade following the cruise of the *Macedonian*, the range of the Pacific Station had greatly expanded as American commercial interests flourished. By 1835, the Pacific Station consisted of the Pacific Squadron of four ships. Although equipped for three-year voyages, the ships of the Pacific Squadron suffered from a lack of a permanent base on the West Coast. At that time the only coastal area owned by the United States was near the Columbia River, an area completely undeveloped and lacking the manufactured supplies required by the Pacific Squadron. —

After the Mexican War, the Pacific Squadron, now 14 vessels strong, remained the most obvious representative of U.S. strength in California. As such, the Navy was an important participant in the Gold Rush. Conversely, the Gold Rush would have a significant impact on the Navy as well. With the signing of the Treaty of Guadalupe Hidalgo, the Navy was left with the task of defending a nation with two sea frontiers some 2,500 miles apart by land but 14,000 miles apart by sea. The maritime commerce and trade spurred by the Gold Rush and the growth of San Francisco demonstrated the importance of the new sea frontier in the Pacific. The task of protecting California's shores and the ships that sailed to and from her various ports led to expansion of the Pacific Squadron.⁶ Yet, by the late 1840s the Navy was still lacking a permanent base and naval shipyard on the West Coast. Older ships and vessels in poor repair could not make the trip around Cape Horn without considerable risk and had to be left in California. New vessels took up to a year to reach the Pacific Station from eastern seaboard Navy yards. The need for a permanent shipyard was recognized as early as 1848.⁷

The initial interest in a West Coast naval base concerned the need for a safe haven in the region both for repairing and refitting ships cruising in the Pacific Ocean and for the health of the crews. Additionally, a permanent base in the West would free the Navy from dependence on private establishments for the building and repair of public vessels in the region. It was also argued that in times of war a permanent naval base with the means to construct and outfit warships was necessary for the protection of American commercial

⁵ Robert E. Johnson, *Thence Round Cape Horn* (Annapolis: United States Naval Institute, 1963), 1, 7.

⁶ James P. Delgado, *To California By Sea* (Columbia, South Carolina: University of South Carolina Press, 1990), 123.

⁷ Delgado, *To California By Sea*, 129.

interests in the Pacific. The San Francisco Bay was long held to be the ideal location for such a base.⁸ In 1852, Secretary of the Navy William A. Graham commissioned a board of naval officers to survey San Francisco Bay for a protected site for a Navy yard. Once they found a suitable location, they would plan the best locations for dry docks, piers, wharves, shops, storehouses, offices, a hospital, residences, and other facilities.

In July 1852, the board, led by Commodore John Drake Sloat and composed of Commander William S. Ogden, Lieutenant Simon F. Blunt, and Bureau of Yards and Docks Engineer William P. S. Sanger, notified Secretary Graham that they considered Mare Island to be the most suitable location. In August of that same year, a sectional floating dry dock, authorized by the Secretary of the Navy for use in California, arrived at San Francisco. The dry dock had been built in New York and shipped in pieces around Cape Horn. It remained the dominant feature at the Mare Island shipyard for more than a decade. In 1853, on the recommendation of the Board of Officers, the government bought the island for \$83,491 and the dry dock was moved into place in the Mare Island Strait.⁹

Based on observations at the site, William P. S. Sanger conceived the original plan for the Navy Yard at Mare Island. These drawings were then formalized by planners in the Navy Bureau of Yards and Docks in Washington, D.C. Born in Massachusetts in 1810, Sanger had a long and illustrious career with the Navy Department both as a civilian and as an officer. One of his first assignments was as "Resident Engineer" during the construction of the U.S. Navy's first dry dock at Norfolk, Virginia in 1831. After the formation of the Navy's Bureau of Yards and Docks in 1842, Sanger served for many years as its only civil engineer. As the value of Sanger's accomplishments and contributions to the Navy became obvious, many other civil engineers were employed at Navy yards under his direction. In 1867, Sanger became the first officer commissioned into the Navy's new Civil Engineering Corps. He retired in 1871 with the rank of Captain and died in 1890 at the age of seventy-two.¹⁰

The Sanger Plan for the Mare Island shipyard covered the relatively level plateau at the north end of the natural island (now the center of the island, owing to reclamation of marshlands to the north). The plan called for a wharf a mile in length along the Mare Island Strait at a point where the depth of water at mean low tide was approximately 25 feet. Sanger planned the yard level at the quay line at ten feet and planned to use excess dirt from the uplands as fill. The fill would extend from 200 to 1000 feet. A 100-foot wide quay was to extend the length of the wharf, interrupted in the center by a permanent dry dock flanked by building ways with ship houses and a wet basin for the existing floating dry dock. Although Sanger appreciated the utility of the floating dry dock for making slight repairs, he believed it to be unsafe for extensive repairs unless firmly grounded in a shallow, protected

⁸ Senate Committee on Naval Affairs, *Report to Accompany Bill S.15*, 32d Cong., 1st sess., 1852, Senate Report 14.

⁹ Lott, *A Long Line of Ships*, 8-9

¹⁰ Kenneth Cardwell, *Historical Survey of Mare Island Naval Complex, Final Report* (Berkeley: Mighetto and Youngmeister, 1985), 31.

basin.¹¹ To the north of the central permanent dry dock, the Sanger Plan designated an area for 300-foot long timber sheds. These sheds were to include spaces for the molding lofts, house joiners, and paint shops. Next to the shed, Sanger proposed several warehouses for ships stores. Further north, separated by a 500-foot wide gun shot and anchor park, was the site for a machine shop with foundry and boiler room. To the south of the dry dock, Sanger planned three large shop buildings, with work area over storage space, for mast production and repair. Further south, beyond the warehouses, his plan called for a large wet basin with eight dry docks.¹²

Sanger's plan called for a second row of buildings to be located west of the main shipyard buildings and separated from them by a 100-foot wide street. These were to include: stables and cart yard; a bakery; flour storage; a cooperage; an administrative building with library and courtrooms; the smithery flanked by copper, tin, and plumbers' shops; the powerhouse for the marine railway; storehouses for timber, rigging, sails, and oakum; and shops for ship joiners. Backing the shipyard was another 100-foot wide street, three blocks of unassigned space, each 300 x 900 feet. Next were three blocks for residential buildings. The middle block of the residential quarter was to contain the commandant's residence, flanked on either side by houses for the chaplain, surgeon, and purser. Lieutenants, sailing masters, the naval constructor, the civil engineer, the steam engineer, the storekeeper, carpenter, boatswain, sailmaker, and clerks were to occupy houses on the blocks to the north and south. The flagstaff was located in the central park space, opposite the commandant's residence. At the southernmost end of the residential block, a chapel and schoolhouse were to be erected. Sanger designated the area behind the residential area as a 1500-foot rope walk with hemp storage. A tract of about 600 feet by 700 feet located about 250 yards southwest of the residential zone was reserved for a hospital. A similar sized district was also reserved for a Marine compound.¹³ Thus, Mare Island was planned as a multiple-function Navy station from the outset. The diversity of functional and architectural types at the island today reflects the multiple-function nature of the base. The inclusion of so many functional units in the original master plan also reflects one simple fact: Mare Island was the only Navy station on the West Coast.

The original plan for Mare Island centered around five north-south axes: the wharf or quay wall; California Avenue; Railroad Avenue; Walnut Avenue; and Cedar Avenue. The first three streets provided access to the various locations within the shipyard area while Cedar Avenue served as the primary approach to the Marine Corps and Hospital areas. Although there were several roads extending to the southern tip of the island, these were either poor and muddy much of the year or else wound around over the high bluffs located at that end of the island. Consequently, during the early decades at Mare Island, access to the Ammunition Depot was gained primarily by boat. Mare Island's first commandant, Commander David Glasgow Farragut, added to the plan the island's principal east-west

¹¹ Secretary of the Navy, *Annual Report, 1854*, 398.

¹² Cardwell *Historical Survey*, 31; Plan for a Navy Yard at Mare Island, California, 1854.

¹³ Lott, *A Long Line of Ships*, 24; Plan for a Navy Yard at Mare Island, 1854.

axis, Central Avenue.¹⁴ This street extended from the ferry slip on the wharf past the central administration offices (Building 47) to the Commandant's Quarters. For most of the 19th century, Central Avenue provided the principal point of entry into Mare Island Navy Yard.¹⁵ Central Avenue is now called 8th Street.

The manner in which the buildings were grouped in the Sanger Plan was consistent with the administrative order of the Department of the Navy at the time. When it was initially established, the Secretary of the Navy directed all of the departmental and service activities with the assistance of a handful of clerks. This system, however, proved unsuccessful during the War of 1812 and was replaced in 1815 with an arrangement of the secretary and three senior captains acting as the Board of Naval Commissioners. In 1842, the department was reorganized along bureau lines with carefully delineated responsibilities. The Bureau of Yards and Docks supervised naval installations and was responsible for all buildings, machinery, and so forth; supplies such as sails, cordage, fuel, and such were handled by the Bureau of Equipment; the Bureau of Ordnance was responsible for ordnance and ordnance stores; the Bureau of Construction and Repair oversaw the building and repairing of Navy vessels; charts, chronometers, barometers, and the like were the responsibility of the Bureau of Hydrography; the health of personnel was ensured by the Bureau of Medicine and Surgery; and the Bureau of Provisions and Clothing took care of those needs.¹⁶ Consequently, the buildings at Mare Island were initially grouped according to the bureaus that oversaw their functions. Within the shipyard area those shops that dealt directly with ship construction tended to be clustered around the dry docks and building ways, while those which dealt with manufacturing equipment were grouped at the northernmost end of the yard. The Bureau of Ordnance originally administered two groups of shops, one for manufacturing guns and shells in the shipyard and one for storing explosives at the south end of the island. Personnel from the Bureau of Surgery and Medicine oversaw the original dispensary and then later the hospital.

Although the Sanger Plan for Mare Island was essentially sound and was for the most part implemented, it did have several functional disadvantages. The essential defect of the plan lay in the fact that the station was located on an island. This meant that all raw materials and daily supplies had to be delivered and processed dockside and then distributed to ships which were also dockside. Furthermore, most yard workers arrived and departed the station each day by ferry. The barges, ships, and ferries that daily cruised between the mainland and the island created considerable, and sometimes dangerous, cross traffic patterns. The plan would later suffer from changes in ship building practices that occurred in the last half of the 19th century. For example, had the massive wet basin with eight dry docks been built,

¹⁴ Farragut would go on to be the hero of the Union Navy battles on the Mississippi River during the Civil War. He is one of a long line of Union war heroes who served or lived in California between the Mexican War and the Civil War.

¹⁵ Plan of US Naval Yard, Mare Island 1862, 1874, 1898; Lott, *A Long Line of Ships*, 24.

¹⁶ K. Jack Bauer, ed., *The New American State Papers, Naval Affairs*, v. 6, *Administration* (Wilmington, Delaware: Scholarly Resources, Inc., 1990), 47-49.

it would have soon been made obsolete by the size of ships coming into Mare Island for repairs.¹⁷

In August 1854, the Secretary of the Navy assigned Commander David Glasgow Farragut to Mare Island as the station's first commandant. Upon his arrival on September 16, 1854, Farragut observed additional problems with the plan for the naval yard, chiefly with the arrangement of the buildings. In several cases, Bureau of Yards and Docks planners had ignored the topography of the island and located buildings with one end on level ground near the waters edge and the opposite end extended into the hillside far enough to require the removal of 20 to 30 feet of soil to bring the foundation to grade. The original yard plan also placed the shops and storehouses around the building way; Farragut felt that this was in error and that they would be better relocated around the planned wet basin. Additionally, the Bureau of Yards and Dock's rendering of the plans had many buildings drawn wildly out of scale. Modifying the Sanger Plan to correct these deficiencies and to include the Central Avenue as described above, Farragut and his Superintendent of Yards and Docks, Daniel Turner, set to construction of the naval yard. The first construction included the Smithery, Steam Engineering complex, and several storehouses.¹⁸

In 1854, the Chief of the Bureau of Yards and Docks appointed Daniel Turner as the Civil Engineer for the Navy Yard at Mare Island. Born in 1796, Turner received his primary training in civil engineering while attending West Point. During the War of 1812, he was appointed Acting Assistant Engineer for the purpose of erecting the temporary defenses of New York City. After the war, Turner returned to his home state of North Carolina where he served in the state legislature and later as a member of the U.S. House of Representatives. He served as Civil Engineer at Mare Island from 1854 until 1860. During his tenure at Mare Island, he oversaw the construction of the early buildings and facilities at the station. Of these early buildings, six that are associated with Turner are still standing. These structures are: Building 46, the smithery built in 1856; Building 71, a storage building built in 1858; Building 85, the foundry built in 1858; Building 87, a machine shop built in 1858; Building 89/91, the boiler shop built in 1858; and Building A1, the magazine, built in 1857.¹⁹ Although Farragut and Turner modified the plan for the naval yard, they essentially remained true to Sanger's original vision for Mare Island. The first major break from the plan would not come for another 20 years.

The Ammunition Depot was added to Mare Island very early in the history of the shipyard. Like so many other functional areas of the station, the Ammunition Depot was added to Mare Island almost by default, because the navy had no other usable site for this function. The Ammunition Depot, however, was also an integrated element of the

¹⁷ Cardwell, *Historic Survey*, 32; Lott, *A Long Line of Ships*, 24.

¹⁸ Lott, *A Long Line of Ships*, 24.

¹⁹ Cardwell, *Historic Survey*, 33.

shipyard in the sense that there was a need for a site to store temporarily the ordnance from ships that came to the dry docks for repair.

In 1856, Commandant Farragut received a request from the Acting Chief of the Bureau of Ordnance and Hydrography to temporarily store ordnance material at Mare Island. Around the same time, the Bureau of Yards and Docks also asked for recommendations for a site for a magazine to store ordnance from ships under repair at the Navy Yard. Farragut chose the southern end of the island as the location of the ammunition depot. The site was chosen for two reasons: warships could easily unload their ordnance there for storage before proceeding to the shipyard for repairs; and the bluffs of up to 300 feet provided the shipyard buildings and personnel natural protection in case of an explosion.

In January 1857, work began on Magazine A1, apparently by the same masons who had constructed the Benicia Arsenal, an Army ordnance depot in Suisun Bay. The masonry blocks used in this building, like the foundations of Buildings 46, other industrial shops, and the 1869 hospital, reportedly all came from a quarry on Angel Island. When completed later that same year, the sandstone structure became the first naval magazine on the West Coast. The following year two brick shell houses (A3 and A4) were built at the site. In 1860, the oldest residence still standing on Mare Island, Building A45, was built on the bluffs above the ammunition depot as a residence for the Chief Gunner. During the Civil War, an earthwork redoubt and small brick magazine were built on the headlands above to protect the depot from attack.

The original function of the Ammunition Depot was to store ordnance belonging to ships stopping at Mare Island for repairs. During this time period, the Navy issued each ship its ordnance individually. This meant that the ordnance essentially belonged to that ship and that each ship's crew was responsible for the condition of their ammunition. When a ship put into Mare Island, its first stop was at the Ammunition Depot wharf at the southern end of the island. There the crew would unload all explosive material from the vessel, after which the ship could continue on up the strait to the shipyard. Once the ordnance was unloaded from the ship, the black powder was removed from the shells and stored in the magazine (Building A1), and the empty shells were stacked outside, fuse hole down to prevent moisture buildup. Loaded shells ready to be returned to their vessels were stored in the shell houses (Buildings A3 and A4). These structures were also where crews would reload their empty shells with black powder.

In terms of building technologies, the Mare Island Ammunition Depot buildings from this period are of stone or brick, with only very small openings owing to the fact that most are ordnance magazines. As with the shipyard buildings, the use of masonry construction was typical for the period. Among the early magazines, Building A1 is most distinctive because it is a sandstone structure and because it was so carefully ornamented, with quoins at the corners and wreathed eagle ornamentation at the doorway. It stands as one of the more handsome pre-Civil War stone buildings in California, despite damage it suffered in a 1901 explosion. Buildings A3 and A4 are built of brick with timber trusses.

Although plain by comparison with A1, the brickwork is as handsome as any found in the Shipyard area. The third pre-Civil War building in this area, Building A45, is distinctive chiefly as the oldest residence and oldest timber building on the base.

With the advent of the Civil War, the Pacific Squadron's most important duty turned to protecting the California gold shipments carried by mail steamers to Panama. Not only did the Union need the gold bullion, but also the capture of a single gold steamer would have greatly strengthened the foreign credit of the Confederacy. By July 1861, with only six ships, the Pacific Station was the only one of the U.S. distant stations which still maintained a squadron. To enforce the blockade of the Confederacy, all U.S. warships had been recalled from both the East India and Mediterranean stations, while the Brazil and Africa stations were left with one vessel each. By late summer the Pacific Squadron was reduced to half its force due to damage to three ships. The situation might have been critical had it not been for the Mare Island Navy Yard. The presence of the base meant that the ships of the Pacific Squadron were able to be thoroughly overhauled and repaired without leaving the station. Moreover, Mare Island's magazine was so well stocked that none of the warships was forced to borrow gunpowder or shot from a foreign government or private company as they had in previous years.²⁰

In 1862, in response to a request by Pacific Squadron Commander Flag Officer Charles Bell, Secretary of the Navy Gideon Welles assigned a contingent of 140 Marines to guard Mare Island Navy Yard. Captured and released by the Confederacy while in the Caribbean, the Marines arrived at Mare Island in 1863.²¹

By the close of the Civil War, the basic form of the Mare Island shipyard had been established. The master plan had been adopted and a substantial number of buildings had been constructed in the Shipyard North and Ammunition Depot. A surprising number of those buildings still exist, with Buildings 46 and A1 being the most notable examples. The architectural pattern or program had been established for the shipyard and ammunition depot areas, a classical revival theme that would be followed throughout the remainder of the 19th and into the early decades of the 20th century. The other areas at Mare Island developed little during this period. A handsome group of brick officers' quarters were built along Walnut Avenue, roughly in the locations of today's Captains' Row; these homes would be demolished following a major earthquake in 1898. Although the original plan called for a permanent hospital and Marine Corps garrison, no construction was completed on either prior to the Civil War. The legacy of the 1850s and early 1860s, then, is reflected in three areas: the old brick shops in the Shipyard North; the oldest magazines and one old residence in the Ammunition Depot; and in the master plan for the base, which was established in the 1854 Sanger Plan.

²⁰ Johnson, *Thence Round Cape Horn*, 114.

²¹ Lott, *A Long Line of Ships*, 76; Letter 3 Aug 1863, MINSY Commandants Office, Letters Received from the Bureau of Yards and Docks, RG 181, National Archives, San Bruno, California.

2. 1866-1897 – Civil War to the Spanish-American War

After the Civil War, the Navy lapsed into a period of decline that lasted nearly two decades. At war's end, the Navy numbered over 700 ships, including 65 ironclads, mounting over 5000 guns, making it one of the strongest in the world. By the mid-1870s, however, the government had auctioned off or scrapped more than two-thirds of that force. For the most part, the fleet of ironclad monitors was allowed to rot; those slated for reconstruction, in some cases, sat in ordinary for almost 20 years before repairs were completed. By 1880, the Navy had only 48 ships left capable of firing a shot. In terms of naval strength, the United States stood 12th in the world, behind such countries as Denmark, China, and Chile.²²

Aside from the typical pattern of post-war reduction of force, the reason for the decline in the U.S. Navy stemmed from a new national focus on internal growth that in turn led to a decline in the American merchant marine. Transcontinental railroads opened up the western resources for use and industries rose to meet the increased demands for goods and services. Between 1860 and 1890, the population of the United States doubled, industry produced five times the manufactured goods, and the nation rose from the fourth to the second largest exporter in the world. At the time, British shipbuilding technologies far outdistanced those of the United States. American capital found it less expensive to ship goods in foreign vessels than to try to compete with the advanced British iron ship construction and operation. In the Pacific, the American whaling industry had been all but ruined during the latter days of the Civil War when the Confederate raider CSS *Shenandoah* burned whaleships in the North Pacific and Arctic oceans. The combination of these factors resulted in fewer U.S. merchant vessels on the ocean. Fewer U.S. merchant vessels at sea, in turn, meant that the nation required only a small naval force to protect them.²³

In spite of the diminishing need to protect American shipping, the Navy promptly reestablished its distant stations following the Civil War. In 1866, the Navy reorganized its forces in the Pacific into the North Pacific Station and South Pacific Station. The reorganization was based on the Navy's realization that problems likely to be encountered in the southeastern Pacific differed widely from those in waters contiguous to the continental coastline. The separation of the Pacific Squadron did not last long and over the next decade the Navy Department recombined and separated the two Pacific Stations on several occasions. By 1878, a single Pacific Station was reestablished that remained in place as an administrative body for the next 45 years.

Although the Pacific Station was in a state of nearly constant administrative reorganization, from 1866 to 1897 Mare Island Navy Yard served as home for the ships of both of the Pacific Squadrons. The condition of the ships on the Pacific Station in the years following the Civil War was poor. Hard service and hasty repair during the war shortened the effective lives of the ships. Congress, with an eye more on economy than safety, frequently put off

²² Carroll Storrs Alden, *The United States Navy* (Chicago: J.B. Lippincott Company, 1943), 282.

²³ Johnson, *Thence Round Cape Horn*, 122; Alden, *The United States Navy*, 283.

overhauling naval vessels as long as possible. Often ships sent to the Pacific as reinforcements to the fleet stayed there until stricken from the *Navy Register*, usually after rotting tied up "in ordinary" at Mare Island.²⁴ The poor condition of the vessels was not improved by the post-war Navy Department prohibition of the use of steam power due to the expense of coal. This was particularly hard on the ships in the Pacific with its vast expanses of calm waters and crosswinds. It was harder still because the sail power of most ships in commission during the Civil War had been reduced so they could operate more efficiently under steam. To remedy this problem, the Navy Department sent all ships in the Pacific Squadron to Mare Island to receive full sail rig.

Despite being home to the Pacific ships, Mare Island was not immune to the post-war malaise that struck the Navy. In the years following the end of the Civil War, the yard suffered from scandal and fraud. In 1870, a time clerk in the Construction Office was found giving workers credit for overtime hours not worked and then splitting the proceeds with them. In 1877, the *San Francisco Chronicle* ran an editorial asserting that the commandants of Mare Island had long been subservient to politicians and hired workers solely on the basis of party allegiance. The article further charged that the yard was hiring incompetent men and paying them twice the wages of workers at East Coast Navy yards. Often the cost to repair a ship at Mare Island was 100 percent more than the initial cost of the vessel. For a time, the Navy Department was reluctant to order ships to Mare Island for overhaul, as the yard had a reputation for making the work last as long as possible, and that a ship entering the yard for even minor repair would be lost to the Pacific Squadron for months.²⁵

In spite of the neglect naval forces suffered during the early years of this period, in 1872 the U.S. Congress authorized construction of a stone dry dock at Mare Island. Designed by Civil Engineer Calvin Brown, the stone dry dock was only the second such structure built for the Navy and the first on the West Coast. Brown's siting of the dry dock represented the first major break from the Sanger Plan for the island.²⁶ Instead of placing the dry dock in line with the smithery (Building 46), Brown moved it to work with the iron plating shop (Building 52), the newest activity on the yard. By authorizing the dry dock with an estimated cost at about \$2,000,000, Congress recognized the fact that a Pacific fleet was vital to the defense of the United States.

Before beginning the dry dock, Brown toured dockyards in Europe looking for innovations in naval construction. The design he brought back was apparently new to America. Brown proposed building the dock's shell out of concrete and then embedding granite blocks into the shell. In his original design, the cross section of the dock formed an inverted arch, with each stone cut to the line of the arch. This arch shape was later lost in a revision of the plan

²⁴ Johnson, *Thence Round Cape Horn*, 128-129.

²⁵ Lott, *A Long Line of Ships*, 97; *San Francisco Chronicle*, November 21, 1877; Johnson, *Thence Round Cape Horn*, 136.

²⁶ Map of the Navy Yard at Mare Island, California 1860, 1874.

that widened the dock. The first concrete was poured in 1874 and the first stone laid the following year. The granite blocks were cut from quarries at Crystal Lake, Pino, Rocklin, Folsom, and Penryn, all in California. The dock was not finished until nearly 20 years later in 1891 at \$400,000 over budget.²⁷

Brown was first assigned to the post of Civil Engineer in charge of the Bureau of Yards and Docks at Mare Island from 1862 to 1864, and then again from 1869 to 1881. Educated in Boston under Loammi Baldwin and Alexander Parris, Brown's first posting with the Navy was in 1841 as Civil Engineer at the United States Navy Yard at Kittery, Maine. He remained there for five years, during which time he oversaw the construction of the quay wall and introduced the practice of blasting rock in deep water. The Navy next assigned Brown to the yard at Norfolk, Virginia, where he superintended the construction of the quay wall and a large number of buildings. In 1861, the Navy posted Brown at Mare Island, where he remained until 1864. Only two buildings associated with Brown during his first term on the island remain: Buildings 45 and 69. After leaving Mare Island, Brown went into private practice where he oversaw the construction of the large dam for the Spring Valley Water Works reservoir at Pilarcitos in the San Francisco Bay Area. He also executed surveys and designs for the canal and locks at Willamette Falls, Oregon. Brown was also associated with the Board of Commissioners on the Central Pacific Railroad, and later was one of the Commissioners in charge of regulating both the Central Pacific and the Southern Pacific railroads. On May 13, 1869, the Navy re-appointed him as Civil Engineer to the Mare Island Navy Yard. During his second and much longer term on the island, Brown supervised the building of a large portion of the foundry and machine shops, the construction of the sawmill, the ordnance storehouse, and the iron plating shop. Also completed during this term were the original Marine Barracks, the original hospital, a powder magazine, and a reservoir system for the protection of the ammunition depot. He also completed Building 87 of the steam engineering complex and designed the stone dry dock.

In addition to Dry Dock 1, Brown was responsible for the design and construction of Buildings 50 and 52, completed in 1871 and 1873, respectively. These buildings were effectively additions to Building 46, the early Smithery; they share a common wall with Building 46 and with each other. Each served at one time as an Iron Platers Shop, reflecting the growing importance of iron-clad ships in the Navy.

At the south end of the island, the function of the ammunition depot changed little during the early years of this period. Crews from each ship were still responsible for the handling and storage of their own ordnance. This being the case, the area needed little improvement save for additional storage space as the number of ships in the Pacific Squadron increased.

²⁷ Lott, *A Long Line of Ships*, 102; Letter, March 24, 1879, Chief Bureau of Yards and Docks to E. R. Calhoun, USN, March 24. MINSY, 1854-1910 Letters from Bureau of Yards and Docks, RG 181, National Archives, San Bruno, California; E.D. Wichels, "Pages From the Past" *Vallejo Time-Herald*, May 8, 1966.

To provide this additional storage area, the depot added a powder magazine in 1870. Made of sandstone, Building A20 is an excellent example of stone masonry, although the work is not as fine as that found in A1. Other buildings constructed in the 1870s include Building A6, a brick shell house used for refilling shells, and Building A44, a Watchman's House situated on the bluffs above the magazine. There were probably wooden storehouses in the area as well. In 1890, an additional shell house (A5) and Watchman's House (A42) were added to the ammunition depot.

Then in 1892, 15 sailors from aboard the USS *Boston* died as a result of an explosion that occurred while they were refilling shells. Soon after, the Navy and the Bureau of Ordnance (BuOrd) changed the policy of ordnance handling. According to the new guidelines, BuOrd designated separate facilities for loading and unloading shells. Additionally, the Navy began training civilians to take the refilling and transfer work full time. The construction of the filling house (Building A16) and the gun cotton magazine (Building A11) in 1895 appear to reflect this policy change. Additionally, several temporary sheds were built on piers in the mud flats. Another improvement to the depot during this period was the reconstruction of the reservoir in the bluffs above the magazine built to provide water in case of fire.²⁸

Although a hospital reservation of approximately 10 acres was included in the original shipyard plans, construction of the base hospital did not begin until after the Civil War. Responding to the need for adequate medical centers demonstrated by the Civil War, Congress authorized funds to enlarge and modernize military hospitals. Prior to this, doctors at Mare Island from the Bureau of Medicine and Surgery nursed the sick and wounded in a temporary facility apparently located in the civilian employee residential area of Dublin. Although given the title, hospital, the facility operated more as a dispensary than a full-fledged infirmary. In 1869, a guardhouse near the ferry landing was sawed in two and half was moved to a site near the ammunition depot to serve as a "pest house," presumably to isolate patients with highly communicable diseases. The same year, work began on a full-fledged hospital at Mare Island under the direction of Calvin Brown and Surgeon J. M. Browne. Sited in the area designated by the Sanger Plan and built at an estimated cost of \$250,000, the brick structure was 256 feet long and 50 feet wide and consisted of three stories and an attic capped with a Mansard roof. This original hospital was destroyed in the 1898 earthquake and the replacement building was constructed on the first building's basement story.²⁹

Like the Hospital Area, the Marine reservation was laid out in the Sanger Plan in 1854 but was not built until after the Civil War. Shortly after the establishment of Mare Island Navy Yard, Commander Farragut requested a Marine guard to protect and ensure the safety of the station. Marines were not ordered to the island, however, until 1862. In response to a request by Pacific Squadron Commander Flag Officer Charles Bell to protect the yard from potential attack by Confederate sympathizers, Secretary of the Navy, Gideon Welles,

²⁸ J. Vann 1995; *Mare Island Grapevine* October 7, 1994; *Vallejo Evening Chronicle* October 14, 1897.

²⁹ Lott, *A Long Line of Ships*, 102.

assigned a contingent of 140 Marines to Mare Island. Captured and released by the Confederacy while in the Caribbean, the Marines arrived at Mare Island in 1863. Because there were no permanent facilities for them on the island, the Marines were at first temporarily quartered on the USS *Independence*. Later they moved into the loft of the unfinished foundry (Building 85). Nearly a decade passed before the Marines stationed on Mare Island received permanent quarters.³⁰

The original Marine Corps Barracks on the island was completed in 1871 and was sited just west of today's Building 866 (a large Electronic Warfare Building, constructed during the Cold War), in the area originally designated by Sanger as the Marine reservation. It was a yellow, two-story, brick structure some 500 feet in length containing a kitchen, bakery, mess hall, and laundry. A prison (Building 84) was located behind the building. Fronting the barracks to the east, a parade ground extended out approximately to Cedar Avenue. Flanking the parade ground on the south was a house for the commander of the Marine Corps detachment, completed in 1870 (Building M1). In the late 1880s, three additional structures for Marine officers quarters (M2, M3/M4, M5) were built on the north side of the parade ground. Usage of the original Marine Barracks changed when the Marine compound moved to a more westerly location on the island and a new barracks building was built in 1917. The original building was used for a variety of purposes until the early 1950s. The original Marine Corps Parade Ground was converted to baseball diamonds. In 1952, the Navy razed the original barracks building to make room for Building 866. At the same time the officers' quarters M2, M3/M4, and M5 were moved to their current location on the base.

A major change in the landscape of Mare Island began in 1868. In August of that year, Commodore James Alden assumed command of the Navy Yard. Prior to this time the only trees on the base were a few native live oak, toyon, and buckeye located on the bluffs at the southern end of the island. Previous commandants believed that the climatic conditions and the prevailing summer winds precluded the growth of large trees on the island. Alden concluded otherwise and shipped in a schooner full of shade, fruit, and ornamental trees including, pine, poplar, acacia, locust, almond, apple, olive, bay, elm, eucalyptus, apricot, fig, and willow. Alden Park was named to honor the commandant who helped to transform the landscape of what had been a bleak, dusty island.³¹

By the late 1870s, the Mare Island Shipyard was threatened with closure for reasons that would plague the facility throughout its history: the narrow passageway up San Pablo Bay and the Mare Island Strait was inadequate for the emerging classes of Navy ships. Adequate for the wooden sailing vessels of the 1850s, the Mare Island facility became increasingly obsolete with each new advance in shipbuilding. In 1878, a *San Francisco Chronicle* article announced that the Mare Island Navy Yard would probably have to be abandoned due to the "rapidly decreasing depth of the harbor" due to silt build-up associated

³⁰ Lott, *A Long Line of Ships*, 76; Letter 3 Aug 1863, MINSY Commandants Office, Letters Received from the Bureau of Yards and Docks, RG181, National Archives, San Bruno, California.

³¹ Lott, *A Long Line of Ships*, 97.

with mining debris. In 1882, Congress ordered the Secretary of the Navy to appoint a three-person committee to assess the condition of the nation's Naval Yards. Additionally, the commission was to report on the advisability of closing any of the yards not suited to the manufacture and repair of ships in the "steel age." In a report dated June 6, 1883, the commission concluded that it was absolutely necessary to retain Mare Island Navy Yard, sparing the base from the first of many efforts at closure.³²

The period between the Civil War and the Spanish-American War, while a languid era for the Navy generally, was one of accelerated activity at Mare Island, a fact that reflects its primary importance on the West Coast. Construction during this period complemented and extended trends from the pre-Civil War era. The major focus remained the Shipyard North, where the great Dry Dock 1 and several large brick industrial buildings were built. Slowly, the base began to fill in the details of the Sanger Plan. The original hospital and Marine Corps barracks were completed in 1870, as was the original administration building (Building 47). Not all of these buildings still exist; many were demolished in a major earthquake of 1898. Enough remain, however, to reflect the character of construction during these years.

3. 1898-1918 – Spanish-American War through World War I

During the 1880s and 1890s, the United States watched the major powers of Europe and Asia expand their spheres of influence through territorial expansion. Key congressional and naval leaders feared that the United States would never be able to participate in such a program of expansion without a strong Navy. America's program of expansion, including that of the Navy, came to fruition during this period and the Mare Island facility grew enormously and modernized its operations as a result.

When the administration of President William McKinley took office in March 1897, John D. Long, former governor of Massachusetts and one-time member of Congress, was named Secretary of War and Theodore Roosevelt became assistant Secretary of the Navy. Both were expansionists who believed with Alfred Thayer Mahan, author of the influential treatise *The Influence of Sea Power Upon History* (1890), that national power came about as a result of foreign trade and from the wealth it created. In their view, sea power played a pivotal role in American defense policy, but also in economic policy by expanding foreign commerce, a keystone of national strength and prosperity. With this philosophy, they helped shape American foreign affairs by advocating the establishment of overseas bases; construction of an isthmian canal to permit rapid reinforcement of the Atlantic and Pacific

³² *San Francisco Chronicle*, January 27, 1878; Memoranda of the Navy-Yard Commission, June 6, 1883, Sen. Doc. 1, 48th Cong., 1st sess., 5-10, 33.

Fleets; and the development of a strong battle force with which to protect overseas holdings.³³

The Spanish-American War (1898) was a momentous event in American history; it gave the United States a colonial empire, and it marked the emergence of this country as a world power. It also showed the American public the importance of a strong Navy. By 1897 when trouble started brewing in Cuba, the Navy was already making long-range plans and improving the fleet's readiness. One of the more important strategies for expanding commerce was to enable American shipping interests to break out of the limited Atlantic Basin by construction of an American controlled canal through Central America. This would open Far Eastern markets to American trade. A festering insurrection in Cuba against the Spanish colonial government aroused American interest in that island, because it was a strategic point to control if the United States were to carry out its plan for an ocean-to-ocean canal in Central America. The Spanish-American War also showed that two fleets were needed, because fighting against even one weak empire required operations in two oceans.

On the night of February 15, 1898, a mysterious explosion ripped through the magazine of the USS *Maine*, killing 251 sailors and leaving the battleship a twisted wreck in Havana harbor. Congress appropriated \$50 million for national defense and the Navy rushed to mobilize. The far western Pacific naval bases were called upon to support the war effort in the Caribbean. When the news reached California of the sinking of the *Maine*, the naval yard at Mare Island had six naval vessels along the waterfront in various stages of repair. Extra men were employed to rush these repairs to completion. In one month the workforce at Mare Island almost doubled from 900 to 1,700. The USS *Oregon*, one of the first true battleships, was in San Francisco Bay when the *Maine* blew up. Victory in the Caribbean was said to depend on her. She steamed to Mare Island to take on 400 tons of ammunition before departing around the Horn to Cuba. Later that month, the ordnance department also shipped off three carloads of munitions on a long railroad trip to the East Coast, bound for Cuba. Sixty-seven days after leaving Mare Island, the *Oregon* arrived at Cuba in time to take part in the Battle of Santiago Bay.

When war broke out in Cuba, Assistant Secretary of the Navy Roosevelt strengthened the Asiatic Squadron and instructed Commodore Dewey to attack the Spanish fleet in the Philippines. Dewey left the China coast and headed for Manila Bay, where the Spanish fleet was stationed. Five of Dewey's six ships had been repaired or re-outfitted at Mare Island in the previous three years. The monitors *Monterey* and the *Monadnock*, the only ships with heavy guns left on the West Coast after the *Oregon* was detached, were urgently

³³ Captain A. T. Mahan, *The Influence of Sea Power Upon History, 1660-1783* (Boston: Little, Brown, and Company, 1898); Fletcher Platt, *Compact History of the United States Navy* (New York: Hawthorne Press, 1962).

prepared by Mare Island crews for the long trip to Manila. When the firing was over, the Spanish fleet was completely destroyed.

What had begun as a war against Cuba in the Caribbean had resulted in the acquisition of colonies in the South Pacific that would enable America to dominate the Oriental trade. The acquisition of the Philippines probably affected America's future more than any other result of the war. With new territory came new problems. In the Philippines, rebels led an insurrection against United States control that led to island to island combat until 1901. Shortly after the United States took possession of the Philippines, the German squadron arrived at Manila Bay and made hostile motions of occupation. American suspicions about Germany lingered and set in motion a movement in the U. S. Navy to surpass Germany's naval strength.

In contrast to the languid decades following the Civil War, the period from 1898 to 1918 was expansive for the Navy and the naval shipyard at Mare Island. During this era the United States engaged in two major wars, built the Panama Canal, and thrust southward into Latin American affairs. President Theodore Roosevelt used the Navy in the Chilean crisis, Nicaragua, Haiti and Dominican Republic campaigns, the Cuban uprisings in 1906 and 1912, the Boxer Rebellion, and the Vera Cruz action. During this period, especially during Roosevelt's presidency (1901-1908), the Navy's fleet of fighting ships expanded dramatically. Before 1900 only eight ships had been built at the Mare Island shipyard. During the next 18 years, 30 ships were constructed at the building ways, ten before World War I and 20 during the war years (1914-1918).³⁴

New territories in the Pacific and the growing presence of a Pacific fleet would have meant expansion of shipyard facilities at Mare Island under any circumstances. The appropriations bill for 1898 included funding for extension of the quay wall, dredging to enable the largest classes of vessels to reach the Navy yard, completion of a coppersmith shop, construction of a new steam engineering building, and an expansion to a storage building (Building 55). A local natural disaster at Mare Island, however, added urgency to the expansion task.³⁵

On the night of March 30, 1898, as yard crews were busy repairing ships for the war effort, a severe earthquake struck Mare Island, sending brick chimneys and walls and slate roofs tumbling down. The quake severely damaged the steam engineering shops at the north end of the shipyard, including the machine shop (Building 87), the boiler shop (Building 91), the smithery (Building 89) and the foundry (Building 85). The east walls of the boiler and foundry, which were constructed on fill, toppled and jagged cracks ran from bottom to top of the sidewalls. The top one-third of the Bureau of Construction and Repair blacksmith shop's smokestack broke off and shifted position, rendering the power plant useless. The

³⁴ Lott, *A Long Line of Ships*, 255; Dana G. Munro, *Intervention and Dollar Diplomacy for the Caribbean, 1900-1921* (Princeton: Princeton University Press, 1964); A. Whitney Griswold, *The Far Eastern Policy of the United States* (New Haven: Yale University Press, 1938); William R. Braisted, *The United States Navy in the Pacific, 1909-1922* (Austin: University of Texas Press, 1971).

³⁵ RG 181, Letters Received, 1854-1910. Box 13 Entry 168, NARA, San Bruno.

north end of the waterfront Supplies and Accounts storehouse (Building 69) fell out. In this building, and at the south end of adjacent storehouse (Building 71), the joists were damaged and had to be substantially rebuilt to render the structures safe. The temblor reduced the two-story brick sawmill and paint shop to rubble. The unreinforced masonry walls of the 14 officers' residences on Walnut Avenue were cracked and crumbling and in some cases the roofs had been shaken off. The hospital building was also severely damaged and had cracks running all through its brick walls. All of the 14 officers' quarters and the hospital were later demolished. Damages to several other buildings were notable but not threatening. For example, a cupola that once sat atop the administration building toppled to the ground and was never replaced.³⁶ The Navy requested \$350,000 for repair and reconstruction of 32 buildings at the Navy yard damaged in the earthquake. The surgeon-general asked for another \$100,000 to rebuild the hospital. The Marine Corps' buildings suffered minor damages with repair costs estimated at \$5,425 for damages to the Marine barracks and officers' quarters.³⁷

Following the earthquake, Lieutenant R. C. Hollyday, who was the Public Works Officer at Mare Island at the time, constructed his major industrial buildings with brick walls reinforced with steel frames (examples include Buildings 99, 101, and 65). Hollyday was born in Maryland in 1859 and was educated in engineering at Washington and Lee University. He spent several decades in private practice, working for railroads and designing steel factories. In 1894, he accepted a position as civil engineer for a naval base at Puget Sound, Washington. Three years later he was reassigned to the post of civil engineer at Mare Island. After leaving Mare Island in 1901, Hollyday went on to become chief of the Bureau of Yards and Docks.

In 1900, the 14 original brick masonry officers' residences, all destroyed in the earthquake, were replaced with 12 new redwood-framed residences set on brick foundations. The same year the hospital was rebuilt in a Beaux-Arts style. The new hospital (Building H1) was designed by William Poindexter, a Washington, D.C.-based architect with prior experience in designing military hospitals. Henry Rousseau and Carl Carlson followed Hollyday as civil engineers at Mare Island and together guided construction at Mare Island for most of this period. Henry Rousseau was born in Troy, New York in 1870 and studied engineering at Rensselaer Polytechnic Institute. He joined the Navy in 1898 and would remain in service until his death in 1930, eventually rising to the rank of Admiral and head of the Bureau of Yards and Docks. He was chief engineer at Mare Island between 1903 and 1906. Carl Carlson was a Swedish immigrant who studied engineering at Case School in Cleveland, Ohio. He joined the Navy engineering corps in 1903 and had three separate tours as Public Works Officer at Mare Island.³⁸

³⁶ Lott, *A Long Line of Ships*, 125-127; RG 181 Letters Sent, Commandant Mare Island to BuDocks, April 1, 1898 and April 16, 1898. Box 5 Entry 168. FARC, San Bruno; *Vallejo Evening Chronicle*, March 31, 1898.

³⁷ Secretary of the Treasury, *Naval Hospital, Mare Island*, Sen. Doc. 235, 55:2 (1898), *Repair and Reconstruction of Buildings, Mare Island Navy-Yard*, H. Doc. 415, 55:2 (1898), and *Marine Barracks, Mare Island, Cal.* Sen. Doc. 240, 55:2 (1898).

³⁸ Cardwell, *Historic Survey*, 1985; Lemmon and Wichels, *Sidewheelers*, 1977.

The development of the waterfront and investment in public works by the Bureau of Yards and Docks was quite remarkable immediately after the Spanish-American War, and the trend continued through the presidency of Theodore Roosevelt. During this ten-year period, 17 officers' quarters, eight civilian employee residences, and 83 workshops, storehouses, offices, and miscellaneous structures were built on the Mare Island Shipyard. The Ammunition Depot, Hospital Reservation, and the Marine Corps area also expanded.

In 1897, there were 18 Navy yards and naval stations in the continental United States. The Bunce Board, an investigating body chaired by the chief of the Bureau of Yards and Docks, inspected the Navy's yards in 1897 and pointed out the inadequacy of existing dry docks and related facilities. The board proposed a massive program of dry dock construction and Congress funded construction of large graving docks at Mare Island, New York, Puget Sound, and Pearl Harbor. With the addition of dry docks came an expansion of related facilities. The existing dry docks and shop buildings on Navy yards were small and old, and were more suited to the repair of wooden sailing ships of 1860 to 1870 than for the modern steel hulled warships of the turn of the century. The shop buildings were inadequately heated and lighted; they were almost devoid of cranes, and the existing power plants were generally insufficient. In the decade following the earthquake at Mare Island, the new construction program in the industrial area included steps to provide more modern shops; addition of ventilating monitors to existing shops (Buildings 55, 69, and 71); extensions to lighting, water, and fire protection systems (Buildings 99 and 99a); conversion of the central power plant from coal to oil fuel; an improved waterfront, including construction of dikes to maintain water depth, new berths, a new ferry slip and reconstruction of the railroad track leading to the freight shed, down Central Avenue and in the area of Dock Street south of Dry Dock 2; an extension of the quay wall south of the entrance to Dry Dock 2; an addition of a larger dry dock (Dry Dock 2) capable of docking any ship of the Navy afloat or under design; and improved coaling facilities.³⁹

During the 19th century, the Navy contracted with private industry to construct most of its vessels. Most ships built by Mare Island before 1904 were wooden and steel-hulled tugboats used by island crews to carry on the work of the shipyard. After the Spanish-American War, Mare Island and other naval yards insisted they be allowed to compete with private yards in shipbuilding. Finally, Mare Island was awarded the contract for building the steel-hulled training ship *Intrepid*, a full-masted sailing vessel. Although obsolete by modern standards, the *Intrepid*, launched on October 8, 1904 signaled the emergence of Mare Island as a shipbuilding plant. Mare Island further proved its efficiency by constructing two steel colliers, the *Prometheus* (1908) and the *Jupiter* (1912). The *Prometheus* was the biggest, longest, heaviest, and most expensive vessel built at Mare Island up to that time and was built for less money than comparable ships at the Brooklyn Navy Yard. In the early 20th century, the Bureau of Steam Engineering began to experiment with electric drives as a

³⁹ *The Bureau of Yards and Docks in World War I* [hereafter BuDocks WWI], 17-18; Annual Report of the Navy Department for the Year 1909, 115-118, 139-147.

means of reducing speed from the turbine to the propeller. The *Juniper* was the first electrically propelled ship constructed for the Navy. The battleship *California*, also constructed at Mare Island between 1915-1919, was the first dreadnought installed with electric drive.⁴⁰ The construction of the two successful collier projects was followed by construction of several smaller river boats – a 36-ton revenue cutter, two 160-ton gunboats, oil and water barges, and a ferry boat – at Mare Island Shipyard in the years leading up to the outbreak of World War I. The only other large ships undertaken at Mare Island prior to the war was the 5,500-ton steel oil tanker *Kanawha* and her sister ship the *Maumee*. The *Kanawha* was the first oil tanker built for the Navy.⁴¹

During the first decade of the 20th century, the Navy Department continuously debated whether or not a battleship squadron could be spared for the Pacific fleet. While the General Board affirmed that the United States needed a "two-ocean Navy," it feared that an attack from Europe while the American battleships were divided between the Atlantic and Pacific might spell defeat for both fleets before they were united. As the actual number of warships increased, concern shifted to whether there was an adequate home base for a battleship fleet in the Pacific. The General Board tried to overcome this in part by establishing bases in the Philippines and at Pearl Harbor, but sending a separate squadron of battleships and armored cruisers to the Pacific Coast required facilities to repair and maintain them. When Roosevelt turned to the Navy to ascertain whether the battleships could be maintained in the Pacific in good condition, he learned that shore facilities on the Pacific Coast were limited. In 1907, only the dry dock at Bremerton in Puget Sound could accommodate the battleships and cruisers, if sent to the Pacific. The shallow channel at Mare Island limited its usefulness for the largest class of warships.⁴²

Many improvements to the shipyard shops, storehouses, dry docks and shipways were undertaken at Mare Island to prepare for the coming of the Pacific Fleet and in preparation for World War I. Shipway No. 1 was enlarged in 1902, 1905, and 1916; and in 1916, a second shipway was added. Shipways Nos. 3 and 4 were completed in 1917 at the south end of the yard. Dry Dock 2 at Mare Island, begun in 1899 and scheduled for completion by April 1902, was finally finished in 1910. But even with all these improvements, channel restrictions inhibited access to Mare Island shipyard by the largest battleships and cruisers of the fleet. Thus, Mare Island constructed only one battleship, the *California*. At 626 feet in length, 97 feet beam, and 32,300 tons displacement, she was the largest ship yet built on the West Coast when she was launched on November 20, 1919. When released down the shipway, the restraining cables broke sending the hull of the *California* across the narrow channel swamping boats and taking out the ferry slip on the Vallejo side.

⁴⁰ Neuhaus, "Fifty Years," Part III: 1908-1921. The *Jupiter* was later outfitted with a flat deck and became the Navy's first aircraft carrier – the USS *Langley*.

⁴¹ Lott, *A Long Line of Ships*, 147-157.

⁴² Braisted, *Navy in the Pacific*, 203-239.

Construction of destroyers remained the yard's specialty. Mare Island set a record with the launching of the destroyer *Ward* in 17 days from keel laying. Eight destroyers were launched at Mare Island during World War I and another eight commissioned during the war were launched by 1920. Supplying these vessels (and all others constructed or repaired at Mare Island) with ammunition was the responsibility of the Mare Island Ammunition Depot.⁴³

The U.S. Radio Reservation, Mare Island also has its origins in this period. Again, like so many other functions that accreted to Mare Island, the Radio Reservation came to Mare Island almost by default, simply because it was the best-equipped Navy station on the West Coast. In 1899, the Navy conducted the first experiments with the use of Marconi's wireless telegraph on U.S. warships. In 1900, a Marconi unit was installed at the Naval Torpedo Station, Newport, Rhode Island. A board of Naval officers conducted further tests in 1902 on communication between two ships at sea and between a ship and land station. The following year seven sets were ordered for as many ships and 13 additional ordered for shore establishments. In 1903, Mare Island and four other Navy yards were provided instructions in fitting radio equipment in naval vessels.⁴⁴

During the mobilization effort, the Navy formulated a six-year building program that included an unprecedented expansion of Navy facilities by the Bureau of Yards and Docks. The preparedness program of 1916 provided for expansion of the fleet and dry docks, Marine bases, fuel depots, training stations, arsenals, and other shore facilities to service that fleet. A large part of the Bureau of Yards and Docks activities pertained to improving and equipping Navy yards for the construction of ships. This was done principally at the main shipbuilding yards – New York, Philadelphia, Norfolk, and Charleston on the East Coast; and Mare Island and Puget Sound on the West Coast. Another of the Navy's immediate needs was trained men. The Bureau built at least 35 training camps, many of which (like the training camp on the South Shipyard at Mare Island) were erected with temporary structures located on ungraded open space at existing naval facilities.⁴⁵ When the country finally entered the war, one of the most complete mobilizations of the personnel and materials resources of the country was undertaken. During World War I, the public works of the Navy increased in value from about \$211,000,000 to \$469,000,000, a total wartime expenditure greater than that spent on all navy yards and naval stations in the previous 125 years.⁴⁶

The Ammunition Depot at the south end of the island experienced one of its greatest periods of growth between the Spanish-American War and World War I. The experience of the

⁴³ Committee on Naval Affairs, *Report*, H. Doc. 41, 64:1 (1916).

⁴⁴ Herbert M. Neuhaus, "Fifty Years of Naval Engineering In Retrospect," Part II: 1898 to 1908 and Part III: 1908-1921; Plan of U.S. Navy Yard, Mare Island, 1918 and 1925; Captain L. S. Howeth, USN, *History of Communications-Electronic in the United States Navy* (Washington D.C., 1963), 60-115.

⁴⁵ Rear Admiral Eugene J. Peltier, USN, *The Bureau of Yards and Docks of the Navy and the Civil Engineer Corps* (1961), 16-17.

⁴⁶ BuDocks, WWI, 19.

Navy during the Spanish-American War argued in favor of increased use of smokeless powder; smoke from Navy guns had hindered visibility during battle. Smokeless powder, however, was considered more volatile than black powder. A 1901 explosion in Building A1 was attributed to problems associated with handling smokeless powder. That explosion prompted the Navy to build newer, more dispersed magazines to the north of Building A1. In addition, the Navy adopted newer, far larger shells to penetrate the thicker skins on the ships of potential enemies. Larger magazines were needed to store and handle these shells. Finally, there simply was more ordnance to store because more ships were using the shipyard for repairs. Initially, the Navy built new magazines to the north of the older Ammunition Depot buildings. By the end of this period, however, the Navy had begun to construct reinforced concrete buildings dug into the hillside on the southern and southwestern end of the island, a trend that would continue until Mare Island Naval Shipyard closed in the 1990s.

The increasing pace of activity in the Ammunition Depot resulted in construction of a small neighborhood of houses in the area. This construction dated to 1860, when the first home was built in the area. In 1908, the Navy built a home for the commander of the Ammunition Depot (Building A43) as well as an office building (A25). The office building was later converted to a residence.

The years 1898 to 1918 may be seen as the beginning of the modernization process at Mare Island, a process that would continue uninterrupted until the base was closed in the 1990s. The earthquake of 1898, occurring the same year as the Spanish-American War, was a powerful event at Mare Island because it destroyed so much of the physical plant left over from the mid-19th century. The war taught the Navy a great deal about where and how it needed to modernize its fleet. Recognizing the need for new ways of doing things to support a new fleet, Mare Island rebuilt itself to accommodate new technologies to deal with changes in ship design and propulsion.

The best symbols of the drive to modernize the base are: Building 271, the huge (for the time) Steam Engineering building, the first to use a curtain wall design; Dry Dock 2, which was large enough to accommodate any ship then under design; and Building 121, the new centralized power plant. Other rebuilt facilities, such as the new hospital, were designed to take advantage of emerging methods and technologies.

It would be a mistake, however, to regard this drive toward modernization as the only consideration taken into account in designing the buildings of this period. The new power plant, for example, included a Beaux Arts brick shell over its steel frame and modern equipment. The officers housing – Captains' Row – constructed during this period is nearly as elegant as any housing ever built by the Navy. The new hospital (Building H1) was a handsome Beaux Arts building in addition to being a newer and more efficient facility. The buildings from this period, then, are transitional, forward-looking in their operations but generally traditional in their design. The Navy's commitment to these design traditions

would begin to fade in the interwar years of the 1920s and 1930s and would disappear altogether during World War II.

4. 1919-1938 – The Interwar Years

Nationally and internationally, the interwar period was one of disarmament during the 1920s, followed by a dramatic increase in armed hostilities in Europe and Asia during the 1930s, leading to international warfare. The level of activity at Mare Island roughly paralleled this international trend, although the level of work did not decrease as dramatically at Mare Island during the 1920s as at some shipyards. Building activity on Navy yards virtually ceased after the reduction of arms conference of 1922, as a result the Navy lost many skilled shipworkers. Employment at the Mare Island Naval Shipyard fell from 10,500 at war's end to a low of 2804 in 1925. Nevertheless, under a 1918 wartime appropriation, Mare Island secured funding to modernize its shipbuilding plant. In the 1920s, Mare Island also obtained a submarine repair base, developed a radio communications center, almost doubled its effective size through reclamation of tidelands, and dramatically expanded and improved its facilities for assembling ordnance and storing high explosives. In the early 1930s, and increasingly after 1933, shipbuilding activities escalated at Mare Island and the other Navy yards as the nation struggled to recover from the Great Depression and braced for war.

West Coast cities and their political allies had long pressed for a more equitable distribution of the Navy bases between the Atlantic and the Pacific coasts. Beginning with the 1916 debates over naval preparedness, West Coast communities contended ever more strenuously that their protection demanded a greater proportion of the Navy's assets to be based in the Pacific. The enlargement of the fleet during the war gave the West Coast the leverage it needed when peace returned. During World War I, the bulk of the fleet was logically dispatched to European waters. War losses and the Armistice which required scuttling of the German fleet all but removed the foremost danger in the Atlantic. In the Pacific, however, the Japanese and American rivalry intensified. A larger Navy and a reduced threat in the Atlantic made it more feasible to divide the fleet, and to assign a greater number of ships to the West Coast.⁴⁷ When the war had ended in the Atlantic, naval planners turned as never before to the upgrading of shore facilities in the Pacific to support the westward movement of the fleet to the Far East. The Navy Department and many others directed an increasing amount of attention to Pacific naval base strategy. By this time, the Navy had definitely settled on a mid-Pacific route to Asia with the Panama Canal, the Hawaiian Islands, Guam, and the Philippines serving as the major stepping stones. Protective shore facilities for the fleet were required at these points, as well as at naval yards and stations on the West Coast of the United States.

⁴⁷ *Annual Report of the Navy Department for the Year 1919*, 7-10.

In July 1919, the Navy transferred half of the American armada to the Pacific – 185 ships, including seven destroyers, nine battleships, along with battle cruisers, submarines and a host of scout ships, fuel ships, and auxiliary vessels. The new Pacific fleet was placed under the command of Admiral Hugh Rodman. To accommodate the fleet, the Navy planned the construction of new shore facilities and the enlargement of existing ones. The locations for these facilities were to be distributed near West Coast metropolitan areas at Puget Sound, Portland, the San Francisco Bay Area, Los Angeles and San Diego. By 1923 Congress approved an impressive array of facilities for San Diego, including a Marine Base, a Naval Training Center, and a Naval Air Station. Los Angeles won a submarine base and the West Coast fleet anchorage of the Pacific Squadron. Mare Island obtained waterfront improvements and a dramatic expansion of its shipbuilding capabilities.

As recommended by the Helm Investigating Commission of 1916, the San Francisco Bay Area won the most sought after prize: the main home base for the Pacific Fleet. Unfortunately for Mare Island, however, the commission favored a mid-bay site and de-emphasized the importance of the island as a site for the base. The reason for not using Mare Island was the impracticality of bringing carrier and larger battleships into the shallow and narrow Mare Island Strait. Additionally, nearby San Pablo Bay and the Straits of Carquinez contained a limited amount of deep water for anchorage of the fleet. Furthermore, the Mare Island site was as limited in its land base as it was of a deep navigable channel. As the debate unfolded, the Navy Department clearly favored a mid-bay site for expansion in northern California. Alameda, on the East Bay, seemed the most logical choice because it possessed an enormous anchorage, open land for shore facilities, easy access to the Golden Gate, a good port facility nearby, and a large labor force, adequate housing, as well as a mature urban transportation infrastructure.

In addition to not being selected as the site for the home base for the Pacific Fleet by the Helm Commission, as early as 1910 various Navy spokesmen began casting doubt on the utility of Mare Island as the principal shipyard and supply depot on the West Coast. Some had even suggested abandonment of the facility. In response to critics, the Vallejo Chamber of Commerce, local newspapers, citizens of the town, and their representative in Congress, Charles F. Curry, rallied to the defense of Mare Island Shipyard. Curry argued that closing Mare Island would be a waste of a \$25 million naval investment. Furthermore, the waste was unnecessary because Mare Island, with its vast shipbuilding and repair expertise, was perfectly capable, if modernized, of serving as the Navy's home base. In 1919, however, a Naval board chaired by Admiral W. Parks and J. S. McKean reaffirmed the Helm Commission's recommendation for a mid-bay home base. Two years later a Special Joint Committee of Congress on Pacific Naval Bases chose Alameda as its preferred site.⁴⁸

⁴⁸ The competition between and among California cities for Navy expansion has been documented and analyzed by Roger W. Lotchin in a series of articles and in the book *Fortress California: 1910-1961: From Warfare to Welfare* (New York: Oxford University Press, 1992). The competition was intense and produced complex alliances. One battle was between northern and southern California. The Bay Area, however, was unable to agree on a single site for Navy expansion, as Vallejo, San Francisco, Alameda, and Oakland vied with one another. Lotchin's conclusion is that San Diego ultimately prevailed over the Bay Area because of

The Naval disarmament treaty of 1922, however, gave Mare Island proponents a boost as the core of the debate over military expenditures shifted to economic and pacifist arguments. Public sentiment for a larger Navy weakened before the outcry for arms reduction. Congressman Curry convinced President Calvin Coolidge to oppose proposals for a new naval base at Alameda as an unwarranted expenditure in light of the arms limitation treaty of 1922 and the existing facilities at the Mare Island base. The mid-bay home base idea sputtered out in the mid-1920s, and lay dormant for years thereafter. The Navy, in turn, was left with half of its main battle fleet in the Pacific but without an adequate base on the West Coast to home port those ships. As a result, the Navy had to expand its scattered facilities in San Diego, Los Angeles, Vallejo, and elsewhere. Mare Island supporters successfully warded off Secretary of the Navy George Meyer's attempt to downgrade it to a second-class naval yard, the shipyard retained its designation as the principal West Coast supply depot, and its dry dock facilities remained open for ship repair and refitting. Thus, Mare Island was spared from the second major effort to close it.

Despite its physical disadvantages, Mare Island continued to fulfil its mission by improving the channel in San Pablo Bay and the Mare Island Strait, making waterfront improvements, modernizing its repair plants, enlarging the supply depot, and upgrading other facilities for the maintenance and operation of naval forces in the Pacific. Larger Navy vessels that Mare Island could not handle were sent to leased dry docks at Bethlehem Steel Company's shipyard at Hunters Point.⁴⁹

During World War I, the United States Navy had expanded rapidly and by 1921 was arguably the strongest Navy in the world. At the time of the United States' entry into the war, the Navy had about 350 vessels of all classes. By Armistice this number had increased over 700 percent. At the war's end, the Navy was faced with the tremendous task of maintaining the machinery and apparatus of more than 2600 vessels in service. Furthermore, in the years immediately after the war, Mare Island and the other shipyards were busy completing shipbuilding work commissioned during the Great War. In 1919, Mare Island launched four new destroyers, followed by two in 1920, and another pair in 1921. These were the last ships constructed at Mare Island for nearly a decade.⁵⁰

the lack of unity among Bay Area cities. He further concludes that the Bay Area was ultimately rewarded with a series of smaller bases approved in the years just before American involvement in World War II, including an air station at Alameda, a training station and shipyards in San Francisco, and a supply depot in Oakland. Vallejo was rewarded with a major expansion program during the interwar years as well as during World War II. The expansion of Mare Island, however, must be appreciated in the larger context. In the long view, Mare Island and the Bay Area generally were gradually losing out to San Diego and the Seattle area in the competition to be the hub of Navy activities on the West Coast.

⁴⁹ Braisted, *The United States Navy in the Pacific, 1902-1922*, 2:225-230 and 475-490; Roger W. Lotchin, *Fortress California, 1910-1961*, 42-63; In 1940 the Navy finally bought that private shipbuilding plant and began development of the Naval Shipyard, Hunters Point.

⁵⁰ "Building Ways," Historical Files, Mare Island Historian's Office; The next large ship built at Mare Island was the submarine *Nautilus*, completed in 1930.

In accordance with the Washington Limitation of Arms Treaty in 1922, the Navy sank, scrapped, or demilitarized more than a million tons of combatant vessels, and from 1923 to 1932 naval shipbuilding was virtually a non-existent industry. Nevertheless, operation of the fleet required shore establishments for service of the fleet; their efficient operation was essential in insuring readiness during peace.

One of the lessons of World War I was that submarines were destined to become an even more critical component of naval warfare strategy in the future. Mare Island had become the major West Coast submarine repair facility during the Great War and subsequently benefited from the growing importance of submarines in naval strategy. Submarine repair bases were maintained as essential to national security. Although the special facilities at Mare Island were not capable of servicing the entire fleet, its ability to provide quarters for personnel, special supplies, and some special repair facilities, made it a significant submarine base. In 1921, a second submarine repair base was opened in California in San Diego harbor. Nevertheless, Mare Island continued to expand its submarine repair base throughout this period and was even awarded a contract to build its first submarine in 1925. This submarine work was especially suited to Mare Island as the vessels could easily maneuver the relatively shallow waters of the Mare Island Strait and San Pablo Bay.

A vigorous testing, research, and development program accompanied the expansion of the Navy's submarine fleet in the interwar years. The Navy debated the strategic role of the submarine and various related issues essential to design and construction. Submarine design ranged from 800-ton coastal boats to 2000-ton fleet boats. Naval representatives traveled to Germany to study German submarine technology and strategy, and by the end of the early 1930s a consensus was beginning to emerge. Throughout the 1920s, the Bureau of Construction and Repair and the Bureau of Engineering proceeded to explore a 990- to 1400-ton design based on the World War I vintage U-135 as a prototype. By the end of the decade, Rear Admiral Thomas Winters of the Navy War College began articulating an imaginative change in submarine warfare strategy: allow the boats to operate independent of a battle fleet in combined reconnaissance and attack missions. As a result, the submarine was redefined as a weapon of stealth and opportunity too valuable to risk in surface encounters with warships.⁵¹

As a result, the Navy became deeply involved in submarine construction during the interwar years and by the eve of Pearl Harbor, the Bureau of Construction and Repair and the Bureau of Engineering had reached a level of design and construction expertise equal to that of any private submarine builder. The long production run of the S-class submarine provided the Navy for the first time with experience in the naval architecture and engineering of submarines. The fifty-one S-class submarines for many years served as the backbone of the U.S. fleet. The Navy also constructed nine V-type submarines during the 1920s. These submarines were a major improvement over the S-class; however they also represented the

⁵¹ Gary E. Weir, *Building American Submarines, 1914-1940* (Washington, DC: Naval History Center, 1991), 23-46.

final attempt to build a classic fleet submarine on the U-boat design. The *Nautilus* (V-6), the largest V-class submarine constructed, was built at Mare Island in the late 1920s. It was a classic fleet submarine. The final two V boats, the *Cachalott* (V-8) and the *Cuttlefish* (V-9), were fundamentally different from the previous seven and represented a transition to the new lighter submarine designs of World War II that employed use of alloys, high tensile steel, lighter engines, and higher machinery speeds.⁵²

The increasing appreciation of the strategic and commercial importance of the Pacific in the interwar years was reflected in the continued growth of the Yard. Shops were rearranged and modernized, transportation and docking facilities extended, and the shipbuilding ways improved. The hospital, ammunition depot, and submarine repair base areas were developed further with modern, Bureau of Yards and Docks-designed fire-proof buildings. In 1919, the island was finally connected to the mainland by a causeway. Built on wooden piers, the causeway contained a bascule bridge to allow for movement of ships up the channel and provided direct access for movement of goods and people across the channel by automobile, bicycle, on foot, or by railway. An improved causeway was constructed some distance to the north in 1935.⁵³

Changes in the organizational structure of the Navy, specifically the Bureau of Yards and Docks, are reflected in the changing building styles of the interwar period. By an act of Congress passed on March 4, 1911, the Bureau of Yards and Docks gained the exclusive responsibility for design and construction of all public works for the Navy. During World War I, this centralized responsibility manifested itself most clearly in the planning and building of training camps, hospitals, aviation facilities, submarine stations, and permanent storage facilities to meet wartime emergencies. Many of the buildings designed for this wartime period were temporary in nature. After the war, the elimination of the employment of outside architects and the centralization of design work under the civil engineers of the Bureau led to the further standardization of permanent building types by building function. In the past, the base civil engineer requested authority to carry out work under an appropriation, which when endorsed by the commandant, was then authorized by the Bureau. The local base civil engineer had wide latitude in building design, selection of building materials, and architectural styles. After 1911 those same base civil engineers simply filled out a card on which all technical requirements were noted; this card was then passed on to civil engineers and architects at the central office of the Bureau of Yards and Docks where the design work was performed. On Mare Island, the fruits of this new system of building design are best illustrated in the massive structural group buildings (Buildings 386, 388, and 390).⁵⁴

⁵² Herbert M. Neuhaus, "Fifty Years of Naval Engineering In Retrospect: Part IV, 1921-1938," *Journal of the Society of Naval Engineering*, November 1938, 540-557.

⁵³ "Causeway," Historical Files, Mare Island Historian's Office.

⁵⁴ This tradition of the Bureau designing all public works appears to have extended only through the interwar period. When emergency mobilization began for World War II, private architects were heavily relied upon to design buildings on military bases throughout the United States. Bureau of Yards & Docks, *150 Years of Doing it Right: The Bureau of Yards and Docks, The Naval Facilities Engineering Command, 1842-1992*

The 1930s brought fundamental physical changes to Mare Island. One was the removal of Dublin Hill, a tract of high land near 5th and Walnut Streets; the other was the reclamation of tule land through the construction of dikes and levees to capture the spoils of channel dredging. As early as 1910, excavators gnawed away at the margins of Dublin Hill to make way for an expansion of the shipyard. Additional material was removed for fill under the submarine base wharf in 1925. Six years later removal of fill for a 1000-foot expansion of the quay wall and for the extension of the submarine base north into tule lands, and excavation for a supply building and dispensary, took more of the hill. Additional fill requirements in the mid-1930s led to razing or relocating some 20 buildings from Dublin Hill, among them old civilian and junior officers' quarters.⁵⁵ In the 1930s, land reclamation roughly doubled the usable acreage on the island. The low-lying tule lands on the north end of the island were raised above the high tide line and for the first time became available for construction of housing, shops, storehouses, shipbuilding, and a proposed aviation field. Areas along the western, southern, and southeastern shoreline were also leveed and diked to reclaim additional acreage for expansion.

The modernization of Mare Island during these years reflects in part the need to keep pace with changes in technology. Several notable technological achievements were made during this period in machinery for propelling ships, including reduction in weight per horsepower ratios in engines, the development of water tube boilers, improvement of shipboard fuel oil and fuel oil heating systems, and use of turbo-electric propulsion systems. The use of alternating current, as opposed to direct current, in the electrical systems onboard destroyers after 1932 proved to be a major improvement in the field of electric design as applied to naval ships. Technological breakthroughs in electric motors, diesel-electric drive engines, shipboard evaporators, and high-pressure centrifugal feed pumps also came during the twenties. In the area of shipboard electronic systems, the Sperry gyro-controlled fin stabilizer was introduced to more effectively sense and moderate the ships roll. The development of radar, television, underwater acoustics, and mobile radio communications had a major impact on the operation of ships and the new technologies were adapted for a host of shipboard uses. New advances in metallurgy (austenitic stainless steels) and welding (as opposed to riveting) strengthened and lightened shipboard structures and permitted the use of higher operating pressures and temperatures. All of these breakthroughs of technology kept Navy shipyard repair and refitting facilities busy and were applied to new Navy shipbuilding when construction restarted in the 1930s.⁵⁶

After 1930, naval building programs in Japan, and later in Italy and Germany, led the United States to reconsider its fleet requirements. In 1929 and 1930 the Navy ordered five heavy 10,000 ton, eight-inch gun cruisers of slightly varying designs. Mare Island built

(1992), 5; Rear Admiral Eugene J. Peltier, USN, *The Bureau of Yards and Docks of the Navy and the Civil Engineer Corps* (New York: The Newcomen Society, 1961), 15-17; *Annual Report of the Secretary of the Navy for the Year 1911*, 16-17.

⁵⁵ "Dublin Hill," Historical Files, Mare Island Historian's Office.

⁵⁶ Rear Admiral R. W. King, USN, *Naval Engineering and American Sea Power* (Baltimore: The Nautical & Aviation Publishing Company, 1989), 142-157.

two: the *Chicago* and the *San Francisco*. The latter was christened with a bottle of water from the recently completed Hetch Hetchy Dam. President Franklin D. Roosevelt (a former Secretary of the Navy) gave a new impetus to naval shipbuilding in 1933 when he took office. The National Industrial Recovery Act provided for building cruisers and smaller vessels to treaty-permitted strengths. In March 1934, the Vinson-Trammell bill provided for the construction of 102 ships of all types, extending over eight years. During the period 1933 to 1941, the Navy replaced over 200 obsolete, flush-deck, World War I-style destroyers. Three destroyers, *Smith*, *Preston*, and *Hendley* were built and launched at Mare Island in 1936-1937. These vessels were designed and built for torpedo attack on the enemy fleet and defense of the battle fleet against similar enemy attack.⁵⁷

The United States entered the 1930s with a submarine fleet of some 120 boats, mostly of the World War I R-class and the postwar S-class. By 1934, a submarine design of approximately 1500-tons emerged as the overwhelming preference of submarine officers, the technical bureaus, and the General Board. The success of the *Salmon* and *Sargo* design, reliable and habitable submarines with 17-knot surface speed and a minimum radius of 7500 miles, testified to the final consensus achieved by the Navy bureaus during the interwar period. The General Board's final recommendation to the Secretary of the Navy for the 1937 construction program recommended 1450-ton submarines of the *Salmon-Sargo* type. In recognition of the Navy's expertise in submarine technology and its substantial design and construction capabilities, the Navy Department assigned a portion of the newly authorized class to the naval shipyards at Portsmouth and Mare Island. The Mare Island shipyard constructed three submarines between 1936 and 1939 – the *Pompano*, *Sturgeon*, and *Swordfish*.⁵⁸

Beginning in 1937, the Navy received authority to administer an accelerated construction program funded by New Deal recovery legislation and congressional budget appropriations. Navy yards at Portsmouth and Mare Island competed with private naval vendors for construction contracts. Shortly after the *Sturgeon* was launched from Building Ways No. 1 in 1938, the Navy Department announced an award to Mare Island for construction of the first vessel designed as a submarine tender, the *Fulton*, and a ten-year construction program at the Navy Yard to build one submarine each year and a tender every other year. The success and popularity of the new *Salmon-Sargo* submarine design set the stage for the mass production of submarines at the Portsmouth Naval Shipyard and Mare Island Naval Shipyard that commenced in 1940.

Beyond the shipyard, the major construction at Mare Island during this period occurred at the hospital. The main hospital building was built in 1901 and had been overcrowded ever since, especially in the years following World War I as the hospital continued to receive and care for the sick and wounded. Until the U.S. Naval Hospital at San Diego was opened in

⁵⁷ E. B. Potter, *The United States and World Seapower* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955).

⁵⁸ Weir, *Submarines*, 42-43 and 103-109.

1922, the Mare Island hospital accommodated a greater number of patients than any other naval hospital in the post-war period. In the early 1920s, some 20 medical officers, a dentist, two pharmacists, 48 female nurses, and 174 hospital corpsmen were on duty at the hospital caring for an average of over 600 patients at any one time. During 1921, a total of 7335 patients were admitted to the hospital. Accommodation of these patients was achieved by continued use and additions to the temporary buildings erected at the hospital during the recent war.⁵⁹ At a cost in excess of \$366,000, the U. S. Naval Hospital began a program to modernize its facilities in 1926, including construction of a contagious and general hospital ward (Buildings H70 and H72), quarters for sick officers (Building H73), and a medical corps barracks (Building H71). The main hospital building was also expanded in 1928 with construction of a five-story, L-shaped, reinforced concrete wing, extending to the northwest. Expansion of these hospital facilities required installation of a separate heating plant near the hospital (Building H74) and an electrical substation (Building H75) to service the enlarged hospital complex. On the eve of World War II, construction began on a second major hospital wing on the southeast side of the old hospital that essentially duplicated the 1928 addition.⁶⁰

The interwar period was one of accelerated modernization at Mare Island, despite the national and international trends toward disarmament during the 1920s and economic austerity during the 1930s. The process of modernization was driven chiefly by changes in shipbuilding techniques which necessitated new thinking about building design. The physical symbol of that modernization was the appearance of the curtain wall industrial building, the building type preferred by private manufacturers during this period and the emerging building of choice for the Navy's shipyards. Building 271, built in 1918, was the first example of this building type at Mare Island. It was followed a few years later by the huge structural metal shops, Building 386/388/390. These frankly modern and pragmatic buildings ended forever the neoclassical character of the shipyards.

Accelerated construction beyond the shipyards also emphasized modernization at the expense of the 19th century neoclassical character of the base. Major additions to the hospital were executed in reinforced concrete, as was the large Marine Corps barracks, built just on the eve of World War I. Even in the Ammunition Depot, new building types began to emerge, specifically reinforced concrete subterranean magazines.

The functional modernization of the base is reflected in the buildings that survive from this period. The buildings from the interwar years are transitional in character, built with practicality and efficiency in mind. They were also often designed in the Mission Revival Style, an up-to-date stylistic expression for the period. While emphasizing practicality and modernity, the buildings from this period, except for the strictly utilitarian curtain wall industrial buildings, were designed around historic revival themes. The Mission Revival buildings of the 1920s and 1930s were simply a different type of historic revival from the

⁵⁹ *Annual Report of the Navy Department for the Year 1921*, 104-105.

⁶⁰ *Annual Report of the Navy Department for the Year 1925*, 9.

buildings of the 1850s. This commitment to historicist design, so long a part of the design tradition of the Navy, would disappear altogether during World War II.

5. 1939-1945 – World War II

World War II left an indelible mark on the economy of the American West. Between Pearl Harbor and V-J Day, the economy of California and much of the region underwent a transformation as profound as any since the discovery of gold nearly a century earlier. The U.S. Navy was a central catalyst to this transformation. Heavily dependent upon raw materials production before 1941, the economy of the western states became increasingly diversified and self-sufficient during and after the war. As a region, the West benefited from the nation's demand for raw materials, but the war also accelerated industrial development and reshaped the region's economic life. Military demands stimulated the establishment and expansion of manufacturing and industrial assembly plants. The war crisis also stimulated the new aerospace, electronics, atomic energy, and other "high-tech" industries in California, and in the wake of these wartime developments, the state emerged as an economic pace-setter for the nation.

The major influence in this transformation of the state's economy was the federal government, which poured at least \$40 billion into the West during wartime. Federal spending in California ballooned from \$1.3 billion in 1940 to \$8.5 billion in 1945. The value of California's manufacturing production tripled during the same period, increasing three times as fast as the national average. Federal money flowed into the state primarily through expansion of military bases, the establishment of new factories, and awards of vast contracts for war materiel. A significant portion of that investment went directly into the aircraft and shipbuilding industries.⁶¹ Mare Island Naval Shipyard underwent considerable expansion during the war. The number of buildings in the Industrial Department, for example, increased from 323 buildings with a floor space of 1.6 million square feet to 525 buildings with square footage in excess of 2.8 million.⁶² The reshaping of the economy in California by war industries spurred other changes. The federal presence sparked the creation of hundreds of thousands of new jobs, which attracted men and women from all over the nation to California. The presence of more than a million military personnel did much to boost the state's economy.⁶³

The initial expansion of Navy yards to meet the requirements of World War II began in 1938 when Congress voted to increase the size of the American fleet by 20 percent. At that time there were eight Navy Yards in the continental United States, all but one of which had

⁶¹ James C. Fahey, *The Ships and Aircraft of the United States Fleet* (New York: Ships and Aircraft, 1942); Clinton H. Whitehurst, *The United States Shipbuilding Industry* (Annapolis: Naval Institute Press, 1986).

⁶² Commander, MINSY, "Wartime History," September 3, 1946.

⁶³ Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Bloomington: Indiana University Press, 1985), 17-37; Sterling J. Brubaker, "The Impact of Federal Government Activities on California's Economic Growth," Ph.D. diss. University of California, Berkeley (1959), 47-51, 155-168.

been founded in the 19th century. These yards had been expanded in a piecemeal manner in an attempt to keep pace with the modern requirements of shipbuilding, but the arrangement of the yards, their equipment, and their building stock were not optimal to meet the production goals set by the Navy during World War II. Major funding for the construction and improvement of Navy yards was initiated by a congressional approval of \$20 million for public works in 1938 in support of the fleet expansion bill. The following year, Congress appropriated an additional \$116 million for projects to improve existing yards. The need for more ships was impressed upon the American people after the fall of France. Beginning in June 1940, the United States inaugurated a national defense preparedness program, a major part of which included base expansion of the Navy. The "Two-Ocean Navy" bill passed in July 1940 authorizing a 75 percent expansion in tonnage of the Navy. This naval expansion program authorized building of 1,325,000 tons of combatant vessels. The defense program also increased many times the number of auxiliary, patrol, scout, and miscellaneous craft. Money to build the ships was released to the Bureau of Ships which in turn allotted funds to the Bureau of Yards and Docks to build the facilities to construct and repair the additional vessels.⁶⁴

Most of the shipbuilding and repair work funded in the months before the attack on Pearl Harbor concentrated on expansion of facilities at Navy yards. Captain Ben Moreell guided all Navy construction programs throughout the war. Previously the Commander of the Civil Engineer Corps at Pearl Harbor, Moreell was appointed chief of the Bureau of Yards and Docks in December, 1937 and he continued to oversee the Bureau until December, 1945. Within the Bureau, the Department of Planning and Design prepared the basic drawings of most onshore projects. The officers of that department and others within the Bureau were drawn from the Civil Engineers Corps. From a close-knit group of 150 in 1940, the Corps grew to more than 10,000 by 1945, mostly civilian architects, engineers, and planners. But the Bureau of Planning and Design could only provide a small part of the design services for the program.

Many of the buildings erected on Mare Island during World War II, as with military bases throughout the United States, were constructed as light woodframe temporary buildings. Their construction methods and their vast numbers reflect the emergency expansion of naval activities associated with the war. The highest concentration was near the north gate where ships barracks and housing for enlisted personnel were erected, and north of Cedar Avenue at the site of Quonset hut housing villages and the Naval Retraining Command. None of these remain intact. The only World War II temporary building inventoried for this HABS documentation is a WAVES officers' barracks (Building 733).

A substantial number of permanent buildings were constructed at Mare Island between 1938 and 1945, although the bulk of these were built between 1938 and 1941, before wartime demand restricted the availability of structural concrete and steel. Major groupings

⁶⁴ *Building the Navy's Bases in World War II* (Washington: GPO, 1947), 169-172; Frederic C. Lane, *Ships for Victory* (Baltimore, The Johns Hopkins Press, 1951), 36-40.

of World War II-era permanent buildings exist in all parts of the base but are concentrated in the North End, Shipyard South, and the Ammunition Depot. The North End was transformed into a major ship assembly plant with huge warehouses, barracks, vast storage yards, shops, and building ways. The Shipyard South underwent a similar change with several of the major shops from the old shipyard relocating to this area into modern industrial shops, offices, and storehouses. These buildings are closely associated with repair of battle damaged vessels and construction of the larger warships and submarines built at Mare Island during and after the war. The waterfront in the Shipyard South region was also completely redesigned, adding significantly to the docking and berthing capabilities of the shipyard. Finally, the Ammunition Depot continued to expand both its productive and storage capacities to handle the huge quantities required by the war effort.

During World War II, much of the design and construction of Navy yards and stations was undertaken by private contractors operating under the direction of the Bureau. Seven times as many Navy contracts were awarded to private contractors in World War II as in the previous war. The commandant of each naval base had wide discretion in making recommendations for new construction and in the selection of outside architects and engineers. A selection could be made from an architect-engineer list compiled by the Bureau in cooperation with the American Society of Civil Engineers, the American Institute of Architects, and the Association of General Contractors. Austin Wilmott Earl, a San Francisco consulting civil engineer who had designed waterfront and harbor improvements at Mare Island after World War I, designed many of the major industrial buildings and waterfront improvements at the yard between 1939 and 1945.⁶⁵

During the interwar period, the Navy Department had converted its Portsmouth Naval Shipyard into a state-of-the-art facility for submarine design and construction. The decision gave the Navy an alternative to a near private sector monopoly enjoyed by the Electric Boat Company. In 1938 Charles Edison, Assistant Secretary of the Navy, began laying plans to enhance the submarine building services at Mare Island in order to supplement the production capabilities of the Portsmouth shipyard and to develop a similar proficiency on the West Coast. Many of the key production and industrial shops in the Shipyard South area were completed before December 7, 1941, such as the waterfront production shop buildings (Buildings 670, 672, and 674), the pattern shop (Building 676), the foundry (Building 678), the machine shop (Building 680) and the electric shop (Building 686). These buildings contributed materially to the rapid mobilization of the fleet, reactivating World War I destroyers and repairing foreign battle-damaged ships.

Actual war demanded ships in numbers far greater than the Navy could supply from its eight shipbuilding facilities. The Navy opened shipbuilding annexes and purchased some private yards, such as the one at Hunters Point to expand its capacity, but private

⁶⁵ Ben Moreell, "The Bureau of Yards and Docks," *The Military Engineer* 35 (July 1943); Chief of the Bureau of Yards and Docks to Commandant, 12th Naval District, December 13, 1941, RG 181, Letters Received, FARC, San Bruno.

shipbuilders of the nation also contributed to the build-up of naval forces. Shipbuilding had previously taken place in a craft-industry environment where corporate or naval officers and skilled workers prided themselves on product knowledge, quality, and individualized production. The result was a handcrafted vessel. The new shipbuilders of World War II came from the great building contractors of the era – road, bridge and dam builders. In assembly-line mass production, construction engineers and managers used their organizational skills and their knowledge of production factors to turn out a product at record speed. The Pacific Coast shipbuilding industry was at the forefront of this revolution in shipbuilding. This change in style is well reflected in Mare Island's World War II-era shipbuilding facilities.⁶⁶

Mass production of destroyer escorts and landing craft was possible because they were relatively simple, unsophisticated machines. Skilled craftsmen and mechanics knowledgeable in the old procedures and high-tech equipment repair were still vital to the new order, but their numbers were far outreached by young unskilled workers, male and female, who came to the shipyard without any industrial work experience. Throughout Mare Island's shops, unskilled or semi-skilled civilian employees became the backbone of wartime shipbuilding as a new industrial order was crafted onto the existing Mare Island Shipyard. Much of the work was not really shipbuilding, but was the manufacture of a standard-type ship. Mass produced ships were coming out of yards with revolutionary new designs. One plant engineer noted the yards were, "all laid out on the principle that the material flows through the structural shops, and from the structural shops flows to the assembly plants, and from there on down to the shipways." Pacific Coast shipbuilders, private and naval, produced 52 percent of the vessels built for the war effort. Mass production was their legacy to the American shipbuilding industry.⁶⁷

Management of the Mare Island Shipyard was a complex matter, made even more so by the variety of military functions unrelated to shipbuilding that were located on the island. As with any manufacturing operation, materials procurement, storage, and issuance were major concerns, especially with the scarcity of strategic materials in wartime. To meet the shipbuilding schedule, there was a need to accelerate the building rates on the shipways and improve dry dock management. For shops to be used to full capacity, larger portions of submarines, for example, were prefabricated by welding together parts in a sub-assembly shop before being carried to the building ways. In turn, there was an increasing urgency to launch vessels in a lesser state of completion. Balancing the launching of new ships, outfitting of new vessels in the post-launch time of their lives, overhauling operating units, and repairing battle-damaged ships required a careful reexamination of operational concepts. The shipbuilding part of the yard and the repair part of the yard were in constant competition for dry dock time. Expansion of waterfront docking, berthing, building ways,

⁶⁶ James R. Chiles, "The Ships that Broke Hitler's Blockade," *Invention and Technology*, Winter 1988; Lott, *A Long Line of Ships*, 212-214; Lane, *Ships for Victory*, 138-172, 202-235; House Committee on Merchant Marine and Fisheries, *Hearings on Dry Dock Facilities on the West Coast*, 76:1 (1939), 19-23.

⁶⁷ House Sub-Committee on Production in Shipbuilding Plants, *Hearings*, Pt 3, 691-708.

and mooring capabilities allowed the shipyard to operate at maximum capacity and to fulfill its shipbuilding and repair missions during the national emergency.

Prior to the wartime expansion, Mare Island Navy Yard had a usable area of approximately 635 acres. Waterfront repair and construction facilities included two dry docks, a third nearing completion, and two building ways at the center of the shipyard. By 1945, the yard covered an area of approximately 1500 acres, including a substantial tract of reclaimed land at the north end of the island, and contained four dry docks and eight shipbuilding ways. Dry Dock 3, completed in 1940, was the second largest at Mare Island. Dry Dock 4 was a smaller dock primarily used for submarines and destroyers. The new building ways were located in two areas. Ways No. 3 was at the south end of the shipyard; it was equipped with a marine railway and used primarily to dry dock tugs, barges, and other small craft. Ways Nos. 4, 5, 6, 7, and 8 were built at the north end of the yard and used primarily in construction of destroyer escorts and landing craft. The yard also increased its number of berths from 15 in 1939 to 30 by the end of the war. The berthing areas, including the quay walls at the finger piers on the south end of the shipyard, were capable of berthing and working on 100 ships at one time.⁶⁸

Before the war, ships came to Mare Island for routine overhaul or alterations. As the war progressed, the work load increased and increasingly included repair of battle-damaged vessels. During World War II, Mare Island was one of the busiest shipyard repair facilities in the Navy. Two of the ships damaged at Pearl Harbor, the *Cassin* and *Downs*, were towed there for rebuilding. Over the course of the war, Mare Island developed a team of specialists who traveled out to sea to assess battle damages aboard ships and relay information to the shipyard where parts were prefabricated for installation before the damaged vessel was ever towed into the shipyard. During the war, Mare Island repaired some 31 cruisers, 43 destroyer escorts, 84 submarines, 117 auxiliaries, 165 destroyers, nine aircraft carriers, 63 LSTs, and five LCTs.

Although the highest priority was given to repairing battle-damaged vessels, a tremendous amount of new construction was undertaken at Mare Island during the war. At this time, refined submarines, crude escort vessels, and landing craft were the specialties of the shipyard. The quality of its submarines is evident; they won the greatest number of citations of any group of submarines constructed by any shipyard. The Mare Island Naval Shipyard constructed five submarine tenders, 19 submarines, two fuel oil barges, four seaplane wrecking derricks, seven floating workshops, 31 escort destroyers, three tank landing crafts, six water barges, 301 landing craft, and a 500-ton covered lighter during the war. The great majority of these ships were built between 1942 and 1944. At peak performance the yard produced one destroyer escort every ten days and one LCT each day.

In addition to repairing and building ships, Mare Island supported forces at sea and in advance bases, and gave assistance to other shipyards. In normal times, all construction,

⁶⁸ Commander, MINSY, "Wartime History," 1946

prefabrication, and manufacturing was accomplished at Mare Island by its yard workers. During the war many commercial shops supplemented the Mare Island workforce to increase productive capacity, with Mare Island assigning specialized work directly to these shops. However, Mare Island did manufacture many items required to outfit vessels, such as minesweeping gear, small wooden boats, wood and metal rigging blocks, rescue and safety equipment such as gas masks, clothing, oxygen tanks, and even hundreds of thousands of five-gallon paint buckets.⁶⁹

During World War I, employment at Mare Island had peaked at 9000. From a low of 2250 workers in 1925, the yard employed 6000 workers in early 1939 before the preparedness campaign hit full throttle. The yard's force steadily grew as the preparedness campaign got underway. The workload increased constantly and some 30,000 men and women were employed at Mare Island by the time the Japanese struck at Pearl Harbor. The figures climbed steeply from that point on, peaking at 41,053 in October, 1945.⁷⁰ The problems of securing manpower to carry out its operations led Mare Island to conduct extensive recruiting activities across the entire nation. With the unprecedented development of private shipbuilding around San Francisco Bay, the surplus of workers was rapidly depleted. After the attack on Pearl Harbor, the manpower shortages became acute and were accentuated by the increasing demands of the Selective Service and by a severe housing shortage near the shipyards. By the end of 1942, Mare Island had broadened its scope of recruiting to Denver, St. Louis, and New Orleans, providing bus transportation to anyone willing to accept employment. In May, 1943 the Civil Service Commission was charged with recruiting on a national basis for West Coast naval establishments. The influx of population to California by migration from other states during World War II was far in excess of that during World War I. Government policies prohibiting discrimination against employees because of race, creed, or color led to a mass migration of minorities, particularly blacks, to California during the war years.

As a result of the Civil Service Commission's efforts, many shipyard recruits came to Mare Island from Texas, Louisiana, and Colorado in the last half of 1943, once again swamping the local housing market. In late 1943 and 1944, a new recruit and transportation program, providing travel by rail and free meals enroute, was initiated in four Midwestern and six Southern states. Before the end of the war, recruiters had traveled as far as Ohio, Pennsylvania, New Jersey, and New York in their efforts to shore up manpower shortages in the California shipbuilding industry. During the war a total of 110,000 new employees were processed through the Mare Island Labor Board. In January 1946, some 9000 of Mare Island's 28,000 employees were recruits. As elsewhere in the West, many elected to stay in their adopted state.

During the war years, Mare Island tried to utilize the employment of as many women as possible. Many worked in non-traditional roles as woodworkers, welders, and mechanics in

⁶⁹ Commander MINSY, "Wartime History," 1946.

⁷⁰ *Mare Island Grapevine*, November 25, 1941 and February 20, 1942.

the various industrial shops. At the conclusion of hostilities, some 21 percent of the Mare Island workers were women. Because they were not subject to the Selective Service Act, the turnover among women was less than among men and their integration into the shipyard workforce was a major factor in the ultimate success in meeting wartime production goals. By 1942, the Navy was plundering its shore establishments of their most capable petty officers and other able-bodied servicemen. To replace them the Navy recruited and trained a corps of enlisted women, known as WAVES (Women Accepted for Volunteer Emergency Service). WAVES served in a variety of capacities and were especially visible in the Hospital Corps.⁷¹

In many respects, Mare Island made its greatest contribution to American history during World War II. Never before or since did the Mare Island Naval Shipyard contribute in so many ways to the American military effort. The all-out nature of the war dictated that every acre of Mare Island and all buildings there were called on to support the Navy. The Shipyard South, which had the newest and best-built industrial buildings, was the major focus, particularly in the critical areas of submarine construction and repair of battle-damaged vessels. The center of the submarine construction and ship repair effort was the huge machine shop (Building 680), built just before the war, and the foundry (Building 386/388/390) built during the 1920s. The North End (north of the edges of the Mare Island Historic District) was arguably the second most important area, with the open lands there used to assemble destroyers from prefabricated pieces. No area at Mare Island, however, was spared from the call to duty. The hospital, for example, was filled with injured sailors; it was never busier than it was during World War II. It was able to handle the influx chiefly by relying upon buildings that had been constructed during the 1920s. The Ammunition Depot was assigned new missions that went far beyond the traditional function of storing ordnance from ships that were in dry dock. The Ammunition Depot became an annex to the major Naval Weapons Station at Concord and was assigned the duty of manufacturing weapons as well as storing ordnance. Most of this work took place in buildings constructed during the war. The Ammunition Depot was the site of major new, permanent construction during the war, a necessary development, given the nature of the work there.

Although World War II was arguably Mare Island's finest hour, wartime buildings account for a relatively small number of the major buildings within the Mare Island Historic District. It is true that World War II-era buildings constitute more than half of the contributing buildings and structures within the Mare Island Historic District. These buildings, however, are generally small and played a peripheral or support function within the shipyard operations. A large percentage of the wartime buildings, for example, are scattered concrete magazines that dot the hillside at the south end of the island. Another large category of

⁷¹ Kathleen C. Doyle, *Californians: Who, Whence, Whither* (Los Angeles, 1956); Mel Scott, *The San Francisco Bay Area: A Metropolis in Perspective* (Berkeley, 1965); Command File World War II, "History of Mare Island Navy Yard in World War II, Part V: Labor and Management," 1-3.

wartime buildings are small support buildings in the Shipyard North and Shipyard South area that were used for miscellaneous purposes, such as restrooms, tool sheds, and so forth.

There is a limited number of large, permanent buildings from this period. The greatest of these is Building 680, a huge machine shop built in 1940. Several other large shops were built in the Shipyard South just before the war, including a large foundry that was also built in 1940. Beyond the shipyard, the most important World War II-era buildings are Building 521, the administrative annex, and Building A266, a large and structurally complex munitions handling building. A group of ten officers' duplexes were built during the war. While not large individually, this group collectively was a substantial housing complex that was built to permanent standards.

The small number of substantial buildings from World War II speaks to the quality of design and construction at Mare Island for almost a century before the attack on Pearl Harbor. Every building, from the 1850s shops and ammunition depot buildings to the hospital buildings from the 1920s, was drafted into service. To the tens of thousands of employees at Mare Island during the war, the sturdy historic buildings were likely favored locations, more so than the hastily-built temporary buildings in which much of the work was accomplished.

The adaptability of these old buildings during World War II helps explain how the buildings and the base generally managed to survive for as long as it did. As early as the 1870s, political and military leaders began to question the wisdom of investing any more funds into a base built on an island in the shallow waters of San Pablo Bay. On a regular basis, Mare Island was threatened with closure due to the antiquity of its building stock and natural shortcomings. The axe finally fell in the late 1980s; Mare Island was on the first list of bases closed under the Base Realignment and Closure process. Little by little, however, those buildings are being put back into service for a variety of civilian uses, from motion picture sets to metal fabricating shops. The ease with which these buildings can be modified, which served them well over the years as a Navy base, may prove to be important to their future as well.

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Maps

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Plan of U.S. Navy Yard, Mare Island, 1874.

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Plan of U.S. Navy Yard, Mare Island, 1936.

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Map of Existing Conditions: U.S. Naval Shipyard, Mare Island, June 30, 1946.

U.S. Navy Yard Mare Island, Index Map, 1940.

Interviews

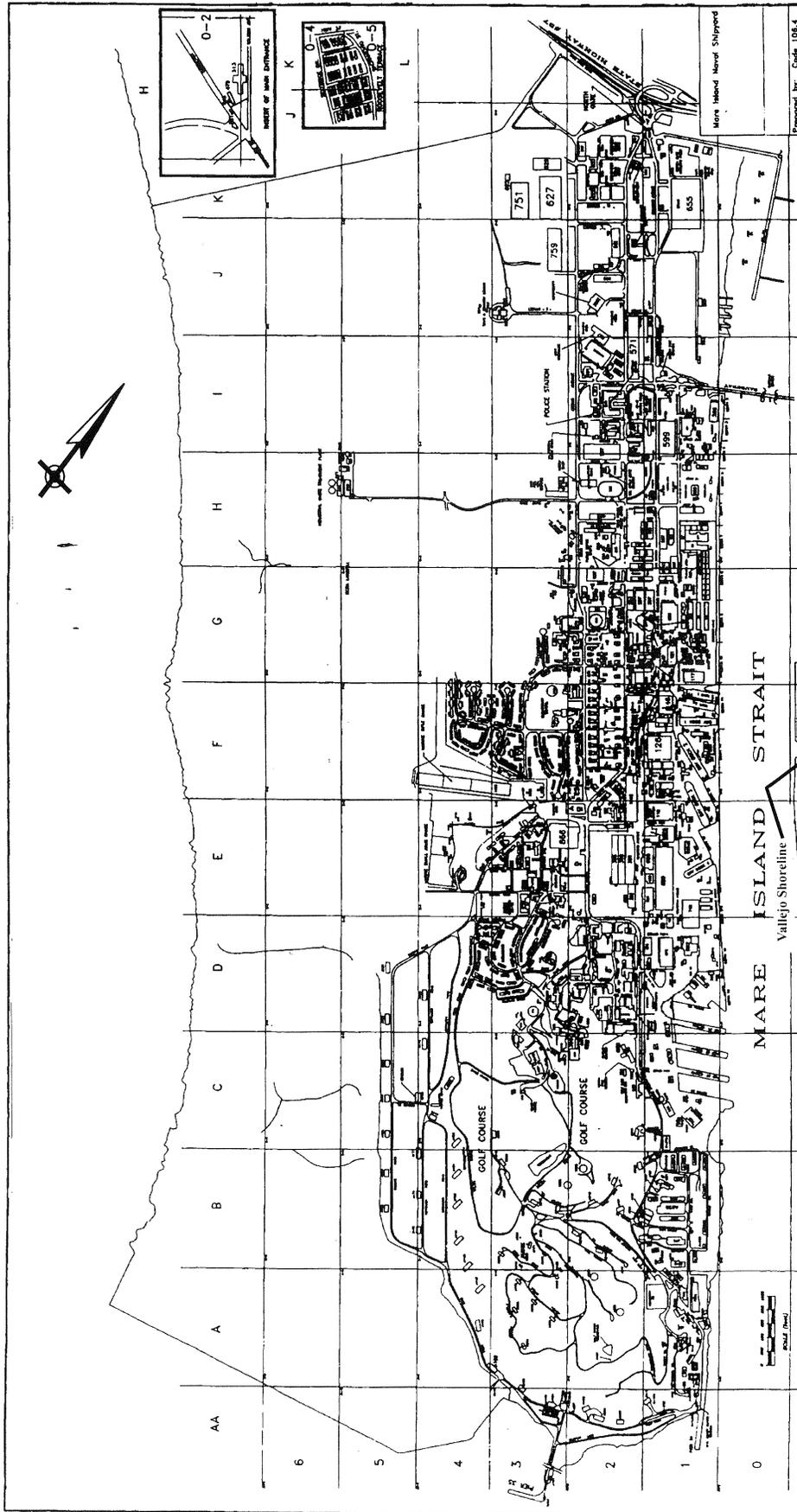
Sue Lemmon. Base Historian, Mare Island. Phone interview, May 22, 1995.

Joe W. Vann, III. Unexploded Ordnance Specialist, Mare Island. Interview in his office at Mare Island, February 7, 1995.

**MARE ISLAND BUILDINGS
PREVIOUSLY INITIATED HABS DOCUMENTATION**

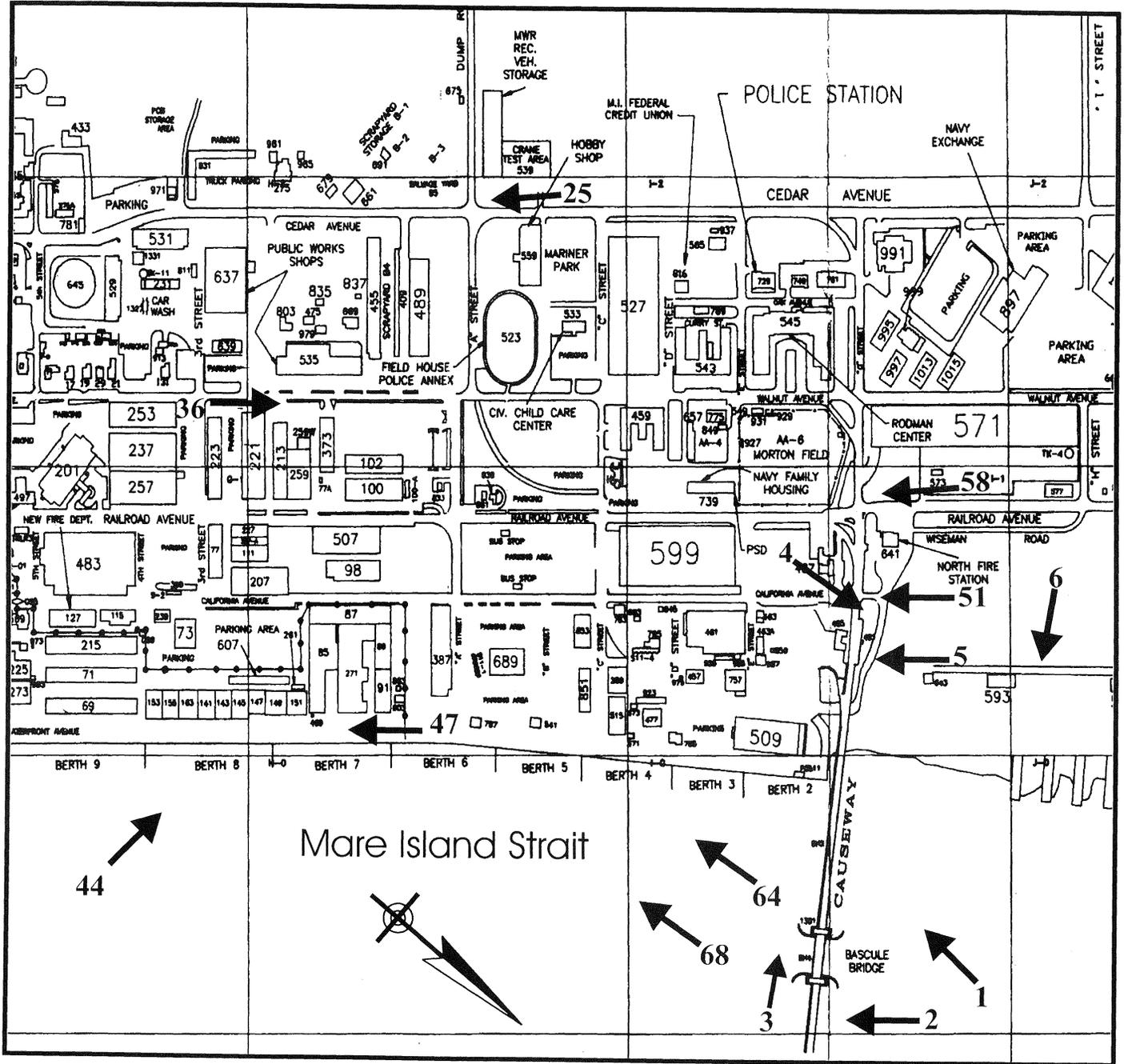
HABS Addendum	Building #	Building Name
A		Commandment Office & Administration
B		addendum to Commandment Office & Administration
C		St. Peter's Chapel
D	46	Smithery
E	47	Administration Headquarters
F	814	Chemical Cleaning Building
G	463	Acid Mixing Building
H	463A	Battery Testing Building
I	99	Firehouse
J	99A	Firehouse Annex
K	685	Electric Shop
L	73	Oil House
M	141-153	Coal Sheds
N	206	Artificier Building
O	208	Administration & Cafeteria
P	417	Medical Supply
Q	521	Administration
R	686	Welding School
S	926	Wilderman Hall
T	A-6	Shell House
U	A-11	Gun Cotton Magazine
V	A-16	Filling House
W	A-75	Magazine
X	A-76	Magazine
Y	A-80	Magazine
Z	A-130	Magazine
AA	A-139	Magazine
AB	A-147	Magazine
AC	A-156	Magazine
AD	A-159	Bag Change & Filling House
AE	A-187	Explosive Loading Plant
AF	S33-18	Bomb Shelters
AG	S33-26	Bomb Shelters

MARE ISLAND NAVAL SHIPYARD
HABS No. CA-1543 (Page 76)

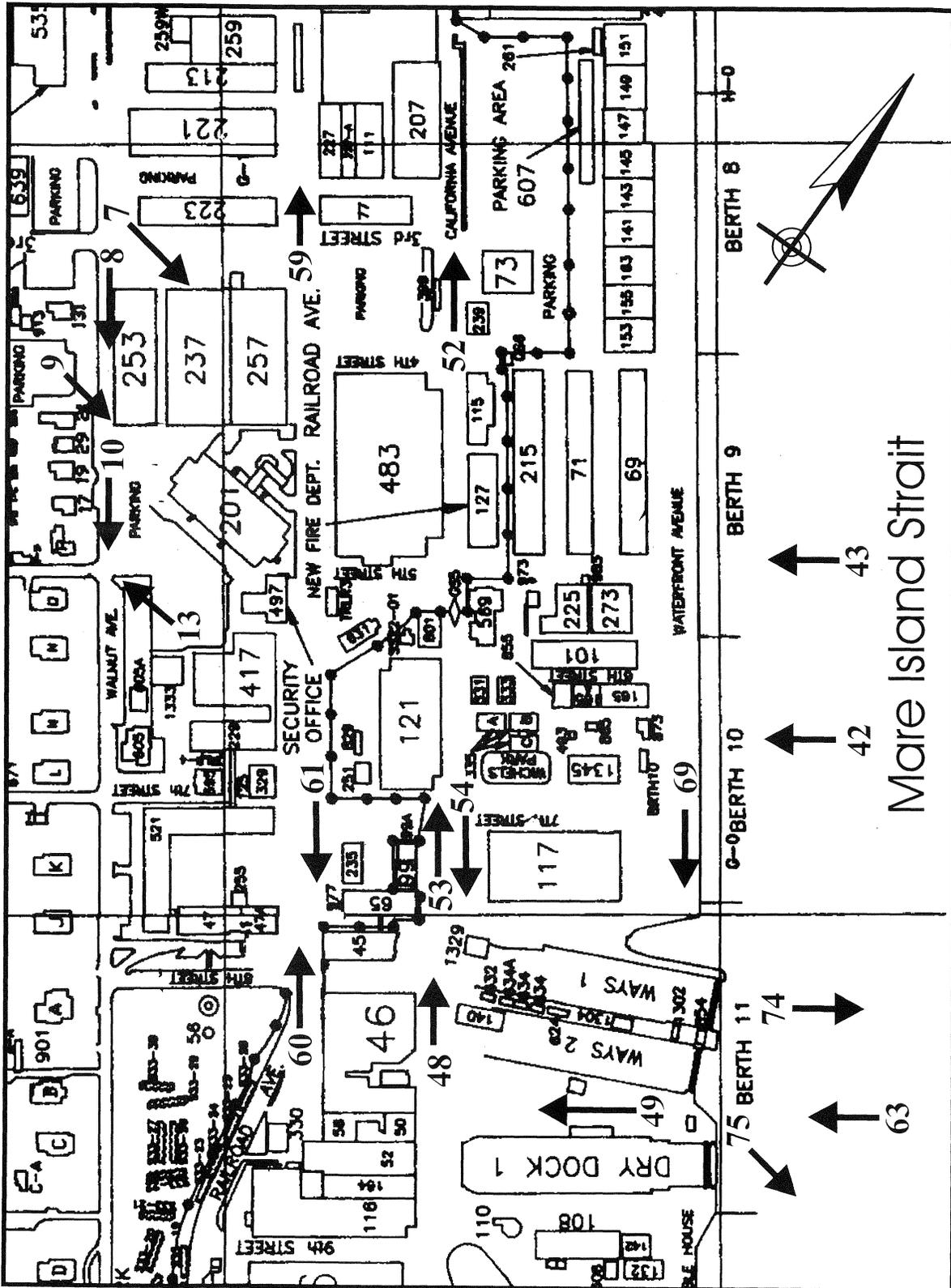


Mare Island

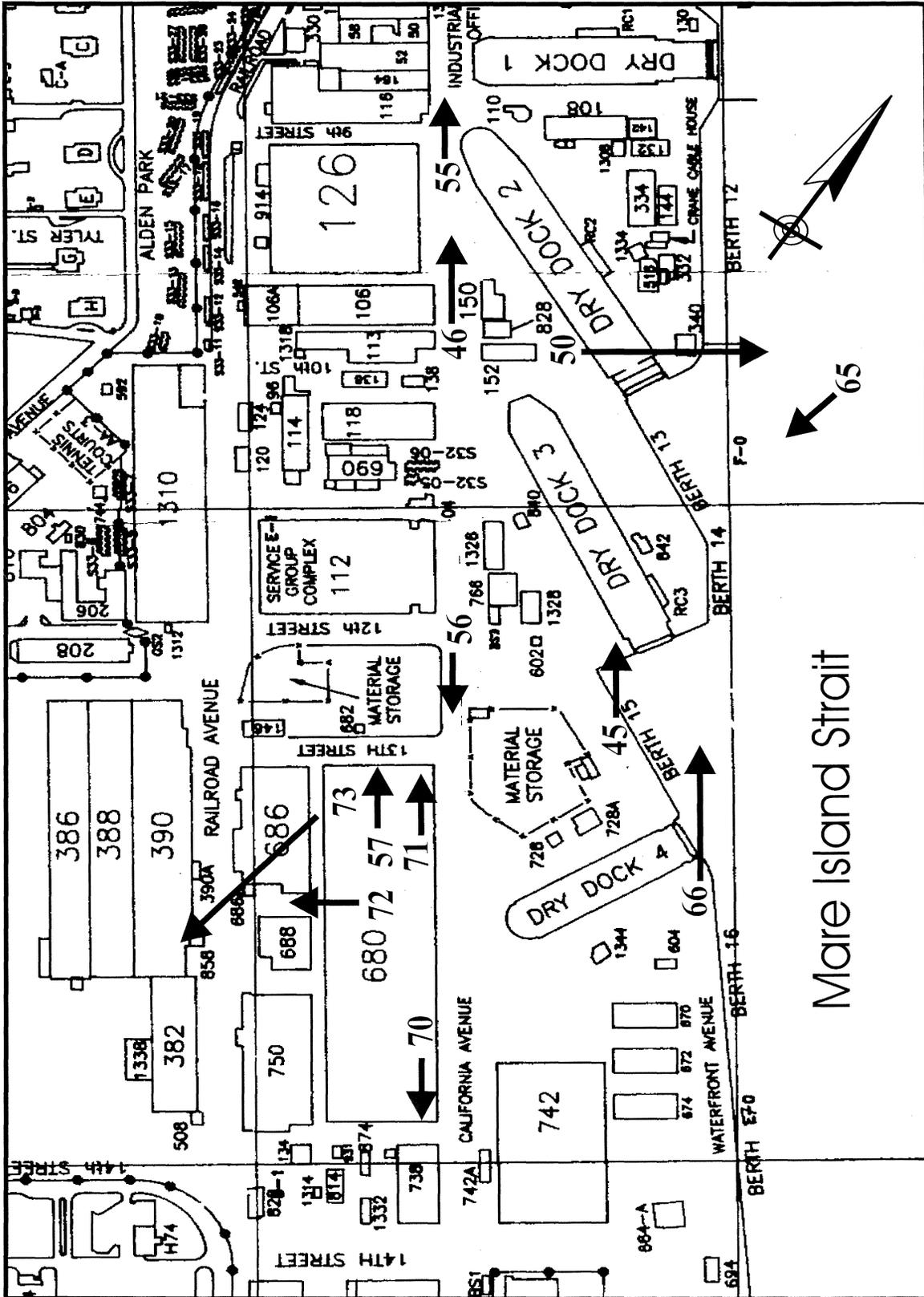
CONTEXTUAL MAP 1



CONTEXTUAL MAP 2

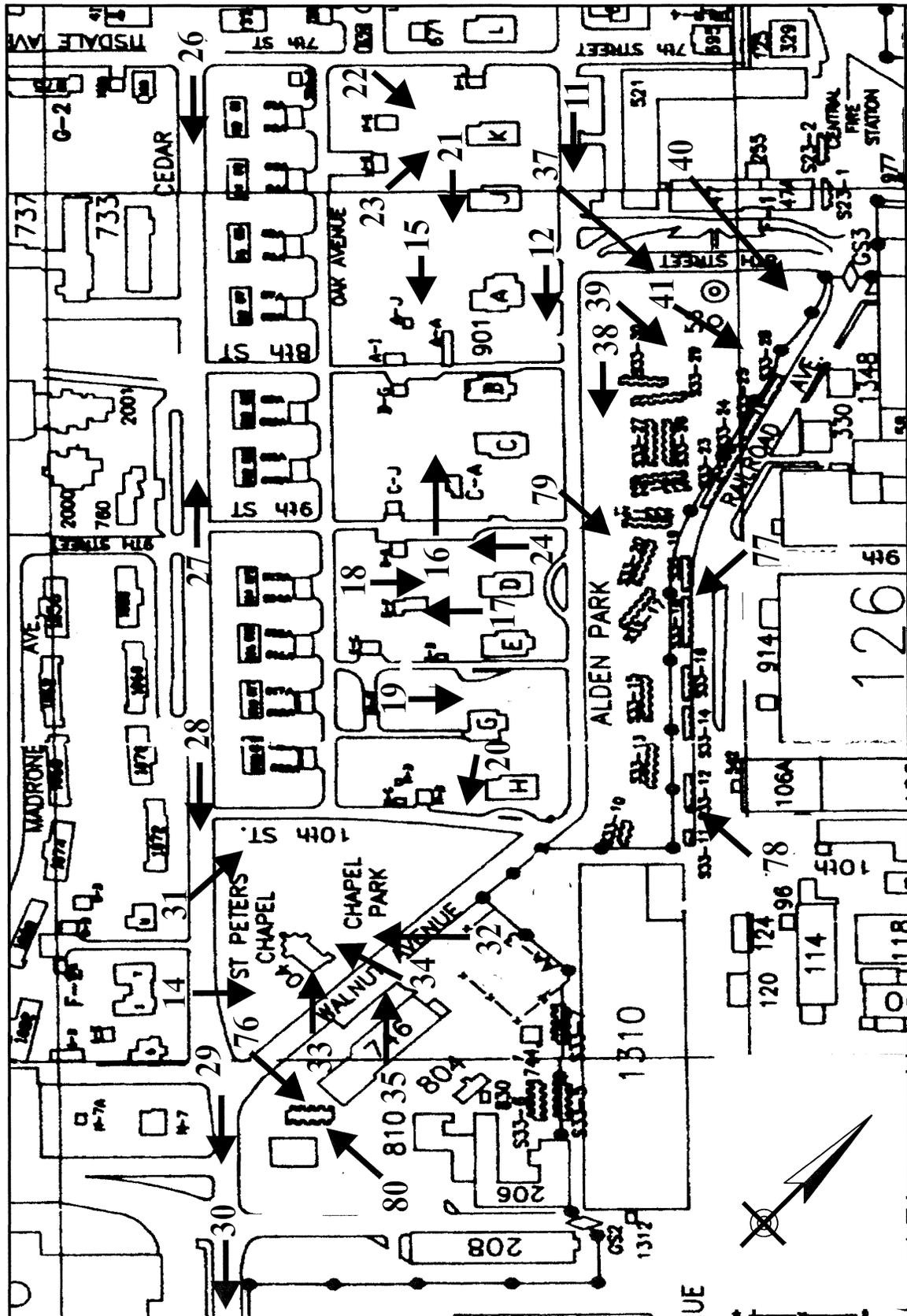


CONTEXTUAL MAP 3

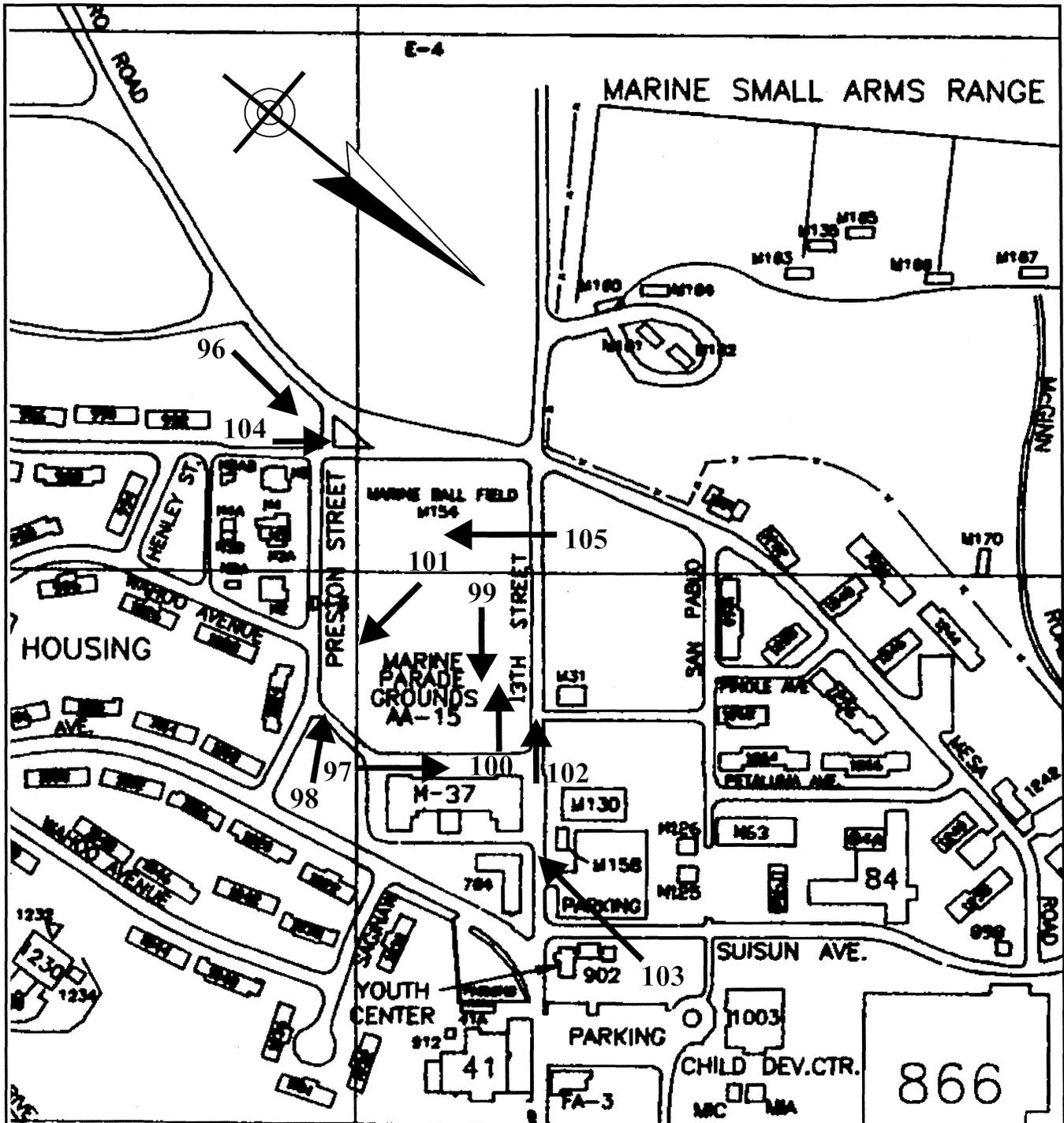


Mare Island Strait

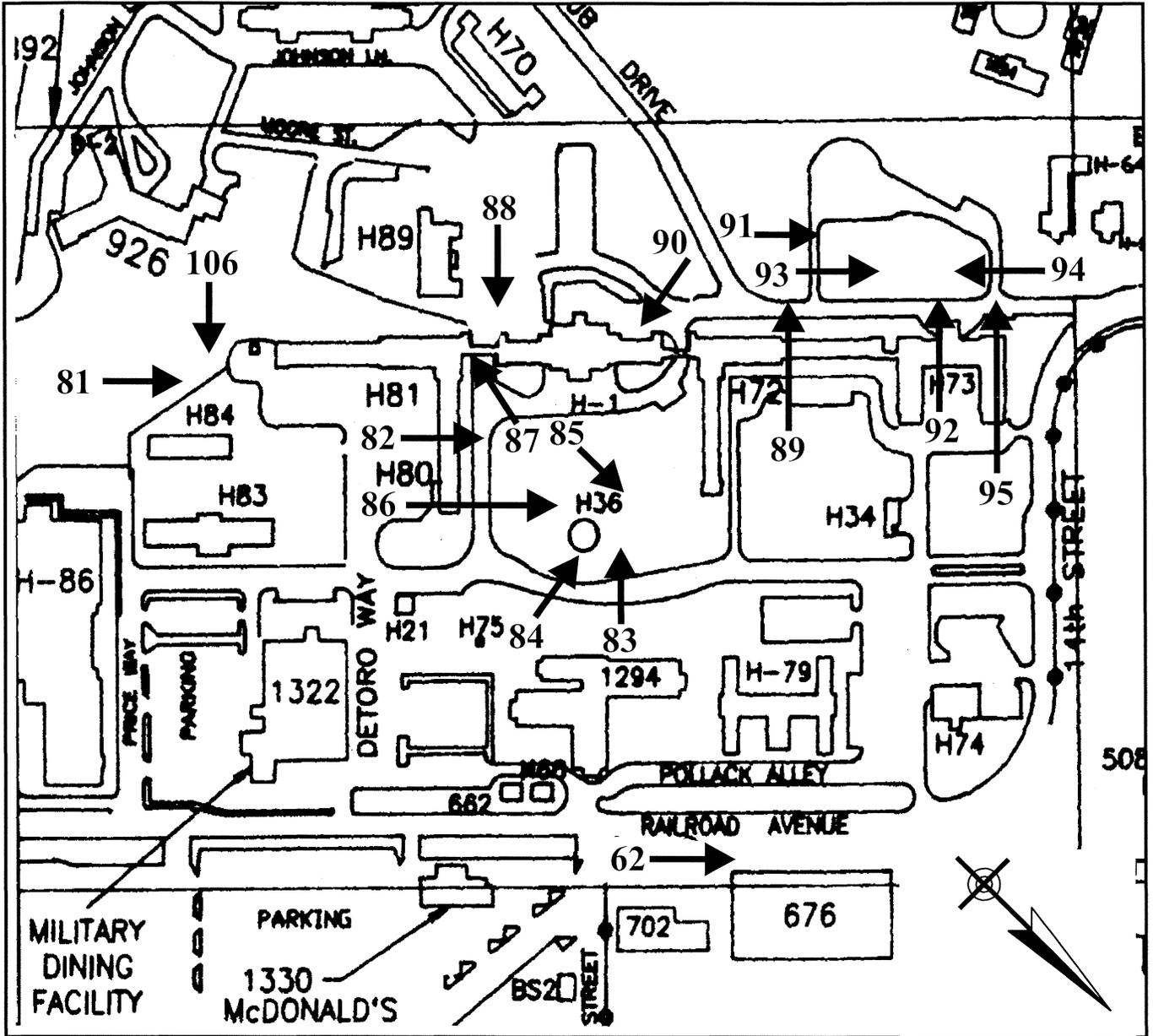
CONTEXTUAL MAP 4



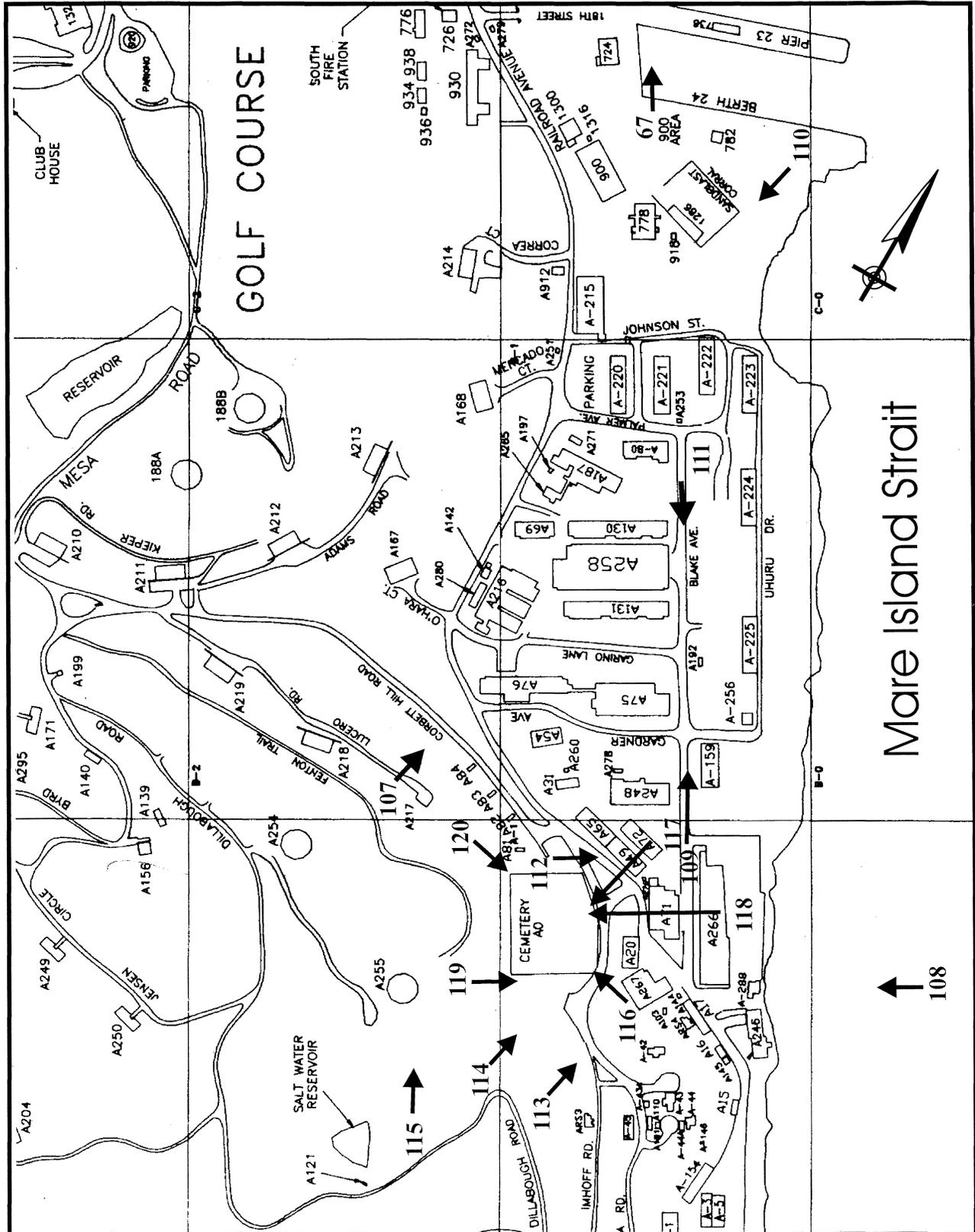
CONTEXTUAL MAP 5



CONTEXTUAL MAP 6



CONTEXTUAL MAP 7



Mare Island Strait

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