

U.S. NAVAL BASE, PEARL HARBOR, SHIPFITTERS, METAL
WORKERS & BOILER SHOP
(Pipe and Copper Shop)
(Special Projects Shop No. 55)
(U.S. Naval Base, Pearl Harbor, Naval Shipyard, Facility No. 4)
Lake Erie Street at Russell Avenue
Pearl Harbor
Honolulu County
Hawaii

HABS HI-359

HI-359

HABS

HI-359

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
PACIFIC GREAT BASIN SUPPORT OFFICE
National Park Service
U.S. Department of the Interior
1111 Jackson Street
Oakland, CA 94607

HISTORIC AMERICAN BUILDINGS SURVEY

U.S. NAVAL BASE, PEARL HARBOR, SHIPFITTERS, METAL WORKERS, AND BOILER SHOP
(U.S. Naval Base, Pearl Harbor, Naval Shipyard)
(U.S. Naval Base, Pearl Harbor, Pipe and Copper Shop)
(U.S. Naval Base, Pearl Harbor, Special Projects Shop 55)
(Facility No. 4)

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Location: Lake Erie Street at Russell Avenue
Naval Shipyard
Pearl Harbor
City and County of Honolulu

U.S.G.S. Pearl Harbor Quadrangle, Hawaii, 1999
7.5 Minute Series (Topographic) (Scale – 1:24,000)
Universal Transverse Mercator Coordinates 4.608140.2361400

Significance: Facility No. 4 was significant as one of the core buildings of the early naval base at Pearl Harbor. These primary industrial buildings at the base, including Facility Nos. 5 (forge shop), 8 (power house), and 9 (storehouse), were constructed in 1913 as part of the initial establishment of the naval installation. Facility No. 4 embodied the distinctive characteristics of a type and period of construction. Its most distinctive architectural features were its double roof form and its wood block flooring. This building was a contributing element to the Pearl Harbor National Historic Landmark.

Description: Facility No. 4 was located in the original core of Pearl Harbor Naval Base, to the west of Dry Dock No. 1. Facility No. 4A, a 1940s building, was built abutting its east side. Most of the other buildings within the block occupied by Facility No. 4 date before 1920. To the south, across Russell Avenue (originally Avenue E), the original setting has been changed, with a 1942 instrument shop (Facility No. 3A) and a 1983 repair shop (Facility No. 1456). This industrial area is relatively flat, approximately 10' above sea level, and without landscaping.

Although this building was demolished in the spring of 2001, it is described below as it appeared prior to demolition. Facility No. 4 is a large shop building with a footprint originally measuring about 300' x 100'. Its plan is no longer exactly rectangular, due to additions on both sides, and its width is listed in the Navy's database as 143'. The steel-frame building has a foundation of concrete piers resting on concrete piles. There are three rows of piers, with two rows of larger piers on the south and middle and smaller piers on the north row. The building is two bays in width (not counting the lean-tos and other additions) and 15 bays long. The original foundation grid is a rectangle measuring about 50' x 20'.

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The most notable features of this building are its paired gable roofs, each with matching tripartite form, but at two different heights. Each roof has a central gabled monitor above the flanking shed-roof sections. Each roof covers a 50' x 300' section of the building. The lower roof, on the north side, is about 37' tall at its peak. The roof on the south side is approximately 66' tall, and appears to cover a two-story section of the building, because there is a band of windows at the upper part of the walls. However, both of these roofs cover shop spaces which are unobstructed from the floor to the bottom of the trusses. There is a two-story part of the building in the northwest corner, where the slope of the northern side of the northern roof was altered to accommodate the extra level above the office space. There are also shed roofs on lean-to additions and a pent roof over most of the west gable end. Except for this pent roof, which connects the two parts of the building at a height above the main doors to the shop spaces, the west gable end of Facility No. 4 almost appears to be two buildings. This bit of roof at the western end is the only part remaining of the skirt roof that originally circled the building. Because of the double roofs and the double monitors, there is a complex pattern of wall and roof planes. The eaves of the shed roof portions on the taller half overhang their walls about 5'. The eaves on the monitor roofs have overhangs of about 2'. The original eaves and roof planes on the north side of the lower roof have mostly been extended into the roofs of the multiple additions or otherwise altered; on its south side the lower roof abuts the taller half of the building, so there are no eaves. Most of the roofing is corrugated metal, but there are skylights with corrugated translucent panels. Corrugated transite has also been used for both roofing and siding on the building. The building's siding is mostly corrugated metal but the walls of the two-story addition in the northwest corner appears to be built of concrete or stucco over concrete masonry units.

The south side of the building has three additions. Two of them cover the length of the south side and are about 15' wide, but with shed roofs of differing heights. The shed roof of the western addition on this side continues in the same slope as the original skirt roof and has a band of translucent panels. The eastern addition on this side has a shed roof about 3' higher, and is entirely of corrugated metal, with no skylights. A third addition, about 40' long, abuts the south side of the western addition, and has a reverse-slope shed roof, thus forming a valley at its intersection with the other shed-roof. Four additions on the north side of the building are evident, because each is unconnected to the others or has an obviously different roof. The east side of Facility No. 4 abuts Facility No. 4A.

The windows in the upper part of the taller half of the building consist of paired 30-light metal-frame sash. Most, but not all, windows have nine-light pivoting sections surrounded by 21 fixed lights. All the lights are fixed where there is structural cross-bracing behind the windows. The windows form bands along the north and west sides, just under the roof eaves. The paired windows are in groups of four, with mullions between

the pairs. A narrow (approximately 1'-6") strip of wall separates the window groups in each 20' bay. The same windows are in the east and west end walls of the tall part of the building. A group of four windows (two pairs divided by a mullion) are in the center of the end walls, flanked by a pair of windows to each side, separated from the center four windows by about 4' of wall. Below the west-end windows, towards the north side of the tall section, are three added sliding sash windows. It is not clear why these windows are here, since there is no mezzanine level in this area. The monitor on the high section of Facility No. 4 has bands of expanded metal mesh screening under its eaves, above corrugated metal siding. The monitor in the lower section has bands of 27-light, metal-frame, awning-type windows along each side. Most of the building's original windows have lights with safety wire glass.

The office in the southeast corner has wood-frame, double-hung windows with six-over-six lights. The northwest corner of Facility No. 4, which was altered during World War II, has twelve-light and eight-light metal-frame windows. Two of the three eight-light windows at the upper level have four-light pivoting sections. Louvers and ventilation hoods have replaced lights in some of the windows. Ventilation openings in most of the additions are limited to screened bands under the eaves.

The interior of Facility No. 4 is primarily unobstructed space in both main sections, and a line of columns is all that separates the lower space from the taller half. The height of the clear space (floor to bottom of trusses) in the taller section is 42'-6", while the lower section has a clear height of 15'-8". Prefabricated units have been installed along the outer edge of each section as space for various office or shop functions. The building's riveted steel framework is exposed on the interior. This includes the columns, plus the trusses of the roofs and monitors. In the taller section, there is diagonal bracing about every third bay. Separate columns support the crane rails which run the length of the taller section, about 30' above the floor. Spanning the crane rails is a large-capacity bridge crane.

The shed-roof additions on both sides are partitioned into small offices, workspaces, and toilet facilities. The two-story section in the northwest corner of the building measures about 25' by 40', and has offices on the first floor and bathrooms on the level above.

A large portion of Facility No. 4 retains its original wood-block flooring. A 1938 drawing (no. I-N5-177) shows that the wood blocks are 3" thick. They are set in a ½" cushioning bed of sand on top of a 4" thick concrete slab reinforced with wire mesh.

Historical Context: For an overview of the Pearl Harbor Naval Base, especially its early history, see HABS No. HI-60. An overview history of the Shipyard can be found in HABS No. HI-483. For information on other early Shipyard buildings see the reports on the following facilities: forge shop (Facility No. 5, HABS No. HI-484), power house (Facility No. 8, HABS No.

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HI-446), storehouse (Facility No. 9, HABS No. HI-487), and steel storehouse (Facility No. 13, HABS No. HI-462). Even before these industrial facilities were designed, the plan was to make them as simple and inexpensive as possible. An early newspaper article about the planned base noted that the "workshops will probably be open steel structures covering large areas with all tools on one floor" (*Pacific Commercial Advertiser* 1904).

The initial construction contract for the industrial core at Pearl Harbor was simply to build the foundations. Work on these started in 1911, and meanwhile the "navy asked for bids for ... structural steel believing that it could make a better deal for the material than contractors. The buildings are to be erected on the unit plan, and this involves all the steel being fashioned so that the pieces can fit any building" (*Pacific Commercial Advertiser* 1911). In the original estimates, submitted to Congress by the Navy's Bureau of Yard and Docks, there were figures for separate Shipfitting and Boiler shops, but the Appropriation Act for 1912 combined the two shops into one building (Marine Barracks Hawaii: 14). Facility No. 4, along with the other shops, was completed in 1913. The other Pearl Harbor buildings of similar date, form, and materials were the pipe and plumbing shop (Facility No. 2), the machine shop (Facility No. 3), the forge shop (Facility No. 5), the woodworking shop (Facility No. 7), and the power house (Facility No. 8). Only the last three still stand as reminders of the early industrial history of Pearl Harbor. All of these industrial buildings were erected to support the work in the dry-dock (Facility No. S 779, HAER No. HI-65) which was also under construction, but not completed until 1919.

One of the earliest drawings (no. 0636) for Facility No. 4 is a plan of retaining walls and drainage for it and several other buildings in the area. This only shows the original concrete gutter, which was constructed just outside the east end and along a portion of the south side. Poor quality microfiche copies exist of the original 1911 set of manufacturer's drawings (between nos. 684 and 723) for the steel elements of these early shop buildings. These white-line drawings by the American Bridge Company of Elmira, New York are not reproducible. Another early drawing (no. 60028) of Facility No. 4, dated 1912, shows a floor plan and a cross section, but the microfiche copy is too faint to reproduce. This drawing does show the 25-ton-capacity electric crane spanning the width of the taller (south) half of the building, supported by an extra set of columns adjacent to the roof columns. The clearest early drawing is of a minor building change -- a November 1914 drawing (no. I-73) detailing the addition of reinforcement to two of the building's columns, designated "crane columns." A 1919 drawing (no. I-243), showing the addition of a small-capacity crane (one-ton maximum at end of boom), indicates these jib cranes mounted on columns were all of a similar design, consisting of a hinged I-beam, about 20' long with steel-rod supports. There are several 1918 drawings (nos. I-191, I-199, I-200, and I-203) showing plan, elevation, and details for a repositioned crane rail running most of the

length of the shipfitters' (north) half of the building, along the bottom of the roof trusses.

A historic photograph dated February 1913 shows the almost completed building, still without machinery inside. Not all windows were yet installed in the taller monitor, and both monitors had the same multi-light windows (National Archives II). A Navy inventory form lists the builder of this shop as W. N. Concannon Co. of San Francisco, under Contract #1835 (Fogel 1980). A 1916 interior photo of the boiler shop (southern half of the building) shows several large pieces of equipment and the wood block flooring (National Archives II).

This was the only shop building which historic maps show with a rail line running across its width, at the middle bay. Most of the shops had rail lines running to their entrance doors, and in a few buildings tracks ran through them, lengthwise. Historic maps from the 1920s and 1930s also show several tracks running east from Facility No. 4 to Facility No. 13, the steel storehouse. According to a 1945 map, the tracks through and to Facility No. 4 had been removed, although some rail lines in the shipyard are still shown on 1950s maps. The rails, labeled "industrial tracks" on a 1939 topography drawing (no. I-N5-218), to the east of Facility No. 4 were removed when Facility No. 4A was built about 1940. A 1929 map of Pearl Harbor shows that an extension of Facility No. 4 had been planned as early as that year.

Historic photos and/or drawings show some of the changes made to the building over the decades of the twentieth century, but some alterations are not well documented. Between 1917 and 1918, photos (National Archives II) and drawings (nos. I-168 and I-180) show that the originally open sides of this shop building were enclosed with wire mesh, plus offices and locker area and tool room (in three of the building's corners) were created, using corrugated metal siding and wood-frame, double-hung windows.

In 1938 a lean-to addition for storage was built along the western half of the south side. This addition was about 16' wide and approximately 120' (six bays) in length. Its roof line was an extension of the existing skirt roof which circled the building. At the southwest corner, the existing office was expanded to incorporate the width of the addition, matching the materials and details of the 1918 office. Photos from 1938 (National Archives II) and a drawing (no. I-N5-177) show that the remainder of this shed-roof addition was enclosed with wire mesh, and it had a wood block floor. Another drawing (no. I-N5-183) shows the enclosed office area at the northwest corner of Facility No. 4 was also enlarged in 1938. The north exterior wall was moved out about 10', plus a toilet room was planned (but perhaps not built until the 1940s) on the second floor (mezzanine level) of this office area.

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A historic photo shows another lean-to addition was extended along the rest of the building's south side by September 1939 (National Archives II). This photo and later drawings suggest that this was done in two stages. A 1940 drawing (no. I-N5-439) shows that the three center bays along the south-side additions have a wood block floor like the 1938 addition, while the remaining bays have concrete flooring. The 1939 photo also shows the center bays were enclosed by expanded wire mesh, while the six eastern bays on the south side were enclosed by corrugated siding. The roofline of the whole addition on this side was then an extension of the existing skirt roof. However, in the eastern portion there were six bays with skylight panels in the corrugated roofing. A later drawing (no. I-N5-441) labels these panels as "existing corr. wire glass." Another feature shown in the 1939 photo was a gable-roof dormer at the center bay; this was apparently built over the railway tracks that maps show running through the building (the tracks are not visible due to angle of photo).

A 1939 topography drawing (no. I-N5-218) of the area to the east of Facility No. 4, shows a small acetylene gas storage shed had been built abutting that end of the building. A drawing (no. I-N5-229) of Facility No. 4, which is undated but ca. 1940 based on comparisons with drawings for other buildings, shows a 40' by 75' addition for material and tool storage along the remainder of its east end. It appears that this planned addition was never built. Everything to the east of Facility No. 4 was demolished when Facility No. 4A was built in 1941, and the drawings for that building only note the removal of the acetylene shed. After Facility No. 155 (HABS No. HI-496) was constructed, also in 1941, the heavy metal trades (shipfitters and boiler shops) moved into that new structure, and Facility No. 4 became the Pipe and Copper Shop. An undated drawing (no. I-N5-229) shows the layout of the equipment in the building for this new function. The equipment, some of which is labeled "new" and the rest presumably used, included work benches, bending slabs, metal band saws, jig saw, pipe cutters, pipe machines, pipe expanders, die rack, grinders, pipe bending machines, various pumps, draw bench, small forges, tinning tank, solder table, annealing table, lathe, radial drills, welding booth, punch machine, various shears, and flange facers. "Jib booms" (jib cranes) are shown projecting from about 14 of the columns in the taller (south) half of the building.

Several changes to the building were made when it was converted to a Pipe and Copper Shop about 1941. The office area at the northwest corner of the building was rebuilt with new framing and roof truss at this time, and its length was extended another bay along the north side. Thus, the total area of the two-story section of the building at the northwest corner was then approximately 40' x 25'. The drawing for this office area (no. I-N5-438) shows it was covered with a new shed roof which had a lower slope than the rest of the north-side roof. Another 1941 drawing (no. I-N5-439) shows that a wire-mesh enclosed storage space about 15' wide was also added on the north side, along the two bays (40') just east of the office area. That same drawing also indicates which areas of the wood block floor in Facility No. 4 were replaced with

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other types of flooring in 1941. In the east end of the building, an area corresponding approximately to two bays (40' x 50') along the north side plus four bays (80' x 50') along the south side, floor blocks were removed and the existing 6" concrete slab was topped with 3½" of concrete fill. Similarly, concrete also replaced wood blocks within an area measuring 80' x 11'-4" wide, located along the south side of the center columns, towards the western end of the building. Another area labeled "Template Floor," located near the center of the north side of the building, replaced the wood blocks with 2" tongue and groove flooring. These boards were placed on 2x4 sleepers which were set on the existing 6" concrete slab. The drawing (no. I-N5-439) specified that "Before laying floor / spread 5 lbs. of paris green to 100 sq. ft. / over entire area including sleepers." That material is an extremely poisonous bright green powder, chemically known as copper acetoarsenite, which was used as an insecticide and fungicide (Columbia Encyclopedia 2005).

In 1942 a tinning shop was created by enclosing the area in the northeast corner of the building. A drawing (no. I-N5-504) shows that the existing floor here (3½" concrete topping from 1941) was removed and replaced with 3" wood blocks that were dipped in hot asphalt before setting in place with the joints staggered. Hot asphalt was then mopped on the surface and covered with silica sand. Also an exhaust blower and 25¼" diameter duct, running up through the roof of the monitor, were installed.

The 1941 lean-to addition on the north side, plus adjacent space in the northern half of the building, was converted to work space for Progressmen in 1945. This job title is for staff responsible for coordinating work among the different production shops on ship repair projects (U.S. Office of Personnel Management 1993: 18). A drawing (no. I-N5-1368) shows that existing walls were removed; the new exterior wall was built with corrugated metal siding on 2x6 studs and double-hung windows. New interior walls were constructed with canec and double-hung windows that allowed views of the shop space. Photos from 1944 (National Park Service, USS *Arizona* Memorial) show other World War II additions along the north side of Facility No. 4, but a drawing (no. I-N5-670) for one of them (toilet facilities addition) does not appear to correspond with the photos.

The taller roof monitor of Facility No. 4 originally had awning windows like those on the lower monitor. Historic photos show that sometime between September 1939 and January 1944 they were removed and replaced with solid panels (National Archives II and National Park Service, U.S.S. *Arizona* Memorial). This could have been done as part of the post-attack blackout response. One proposed project that was delayed after the attack was the installation of skylight bands of corrugated glass panels in the roofs of Facilities Nos. 3, 4, and 5. The drawing (no. I-N5-441) for this project was approved December 4, 1941, but it was apparently not implemented until after the war. The bands of skylights are not seen in the 1944 photos, but show up as existing elements on a 1956 reroofing plan (no. 764961). However, compared to the 1941 drawing the bands

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are slightly shorter, and appear only on the north side (lower) roof sections. The 1944 photos also show the building painted in camouflage pattern after the attack. Facility No. 4 was not damaged in the December 7, 1941 attack, but, like all the other shops, it performed a crucial role in the ship repairs and other recovery efforts.

There is a March 1947 drawing (no. I-N5-1616) detailing the alteration of the taller monitor to add a band of screening for ventilation, just under the eaves. The drawing shows that the panels of corrugated metal were to be taken down and cut to about half their height, and reinstalled with expanded metal mesh to fill in the upper opening. This drawing is initialed "V.O." as the "Architect or Engineer." These initials could refer to noted Honolulu architect Vladimir Ossipoff, who worked as a Project Engineer for Contractors Pacific Naval Air Bases during World War II and also did work for the Navy after the war (American Institute of Architects, Hawaii State Council 1998).

After WWII there are relatively few drawings for this building and most are for minor alteration projects. For example, there are three drawings (nos. I-N5-1724, -1725 and -1726) for a 1949 renewal of the roof structure in three northern bays. In 1951 there were two drawings (nos. SK 2243 and I-N5-1785) for a new ladies lounge on the mezzanine level at the northwest corner. In 1953 there was a drawing (no. I-N5-1935) for a 20' x 20' lean-to addition at the northeast corner of Facility No. 4, adjacent to Facility No. 4A. Plans were made in 1955 to reroof areas of Facility No. 4 with new corrugated iron and with corrugated transite; the latter material was to be used on an area at the east end of the building, while the whole south side of the taller monitor and a few other areas were to receive the corrugated iron (drawing no. 708872). About one year later, in 1956, another reroofing project (drawing no. 764961) covered most of the remainder of the building, including lean-to additions, with corrugated aluminum roofing and translucent panels. A 1985 photo of the interior of the tall half of Facility No. 4 showed that additional translucent panels had been installed by that date, but no reroofing drawing for this work was found.

In 1962 a 32' by 52' area of Facility No. 4, near the northeast corner, was altered to function as a "clean room for the repair & assembly of nuclear vessel parts." Five drawings were prepared for this project (nos. 923409-923413), which included a locker room, clean welding room, plus an inspection test & assembly room. The biggest alteration to the building's interior was a rearranged floor plan and equipment layout; this was done about 1971, as part of a larger project also involving Facility Nos. 3 and 4A. The 1971 changes to Facility No. 4 are documented in several drawings (between nos. 1230239 and 1230279).

Other changes to the building were made as a result of maintenance and repair projects, or as less formal alterations which are not documented in drawings stored at the Plan Files of the Naval Facilities Engineering Command, Pacific. One recent project was documented in a letter to the

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State Historic Preservation Division. About 1,350 square feet of wood-block flooring at the west end, just inside the overhead door of the taller section, was replaced with concrete after a storm (Yuen 1997).

Sources:

There are 138 drawings for this building on microfiche cards at the Plan Files of Naval Facilities Engineering Command, Pacific. The important drawing numbers were cited in the history section above, in the discussion of the building's evolution; the poor reproduction quality of many of the earliest drawings was also noted there. In addition, there are drawings for specific equipment and utility installations.

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U.S. Office of Personnel Management

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Yuen, Stanford B. C.

1997 Letter dated 21 Jan 97 (ref 11010, SER N40/4225) to Michael Wilson, State Historic Preservation Officer, by direction of Commander, Naval Base Pearl Harbor.

Project Information: In 2001, Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility (PHNSY&IMF) demolished this building. Consultation on the demolition was carried out in accordance with the 1979 Memorandum of Agreement (MOA), which was in effect at the time of consultation in 1996. [The 1979 MOA was terminated in 1999.] This report was prepared under a Historic Preservation Services contract (N62742-97-D-3502) awarded to AMEC Earth and Environmental, the prime contractor, by the U.S. Navy, Naval Facilities Engineering Command. The addition to the contract covering this report was funded through the Cultural Resources Program of the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility. The photographic documentation was undertaken by David Franzen, of Franzen Photography. Location maps were made by Nestor Beltran of NAB Graphics. Between 1999 and 2000, the field work was done and the draft of this report was written by Dot Dye, of AMEC Earth & Environmental, Inc. The report was rewritten in 2005 by Mason Architects, Inc.

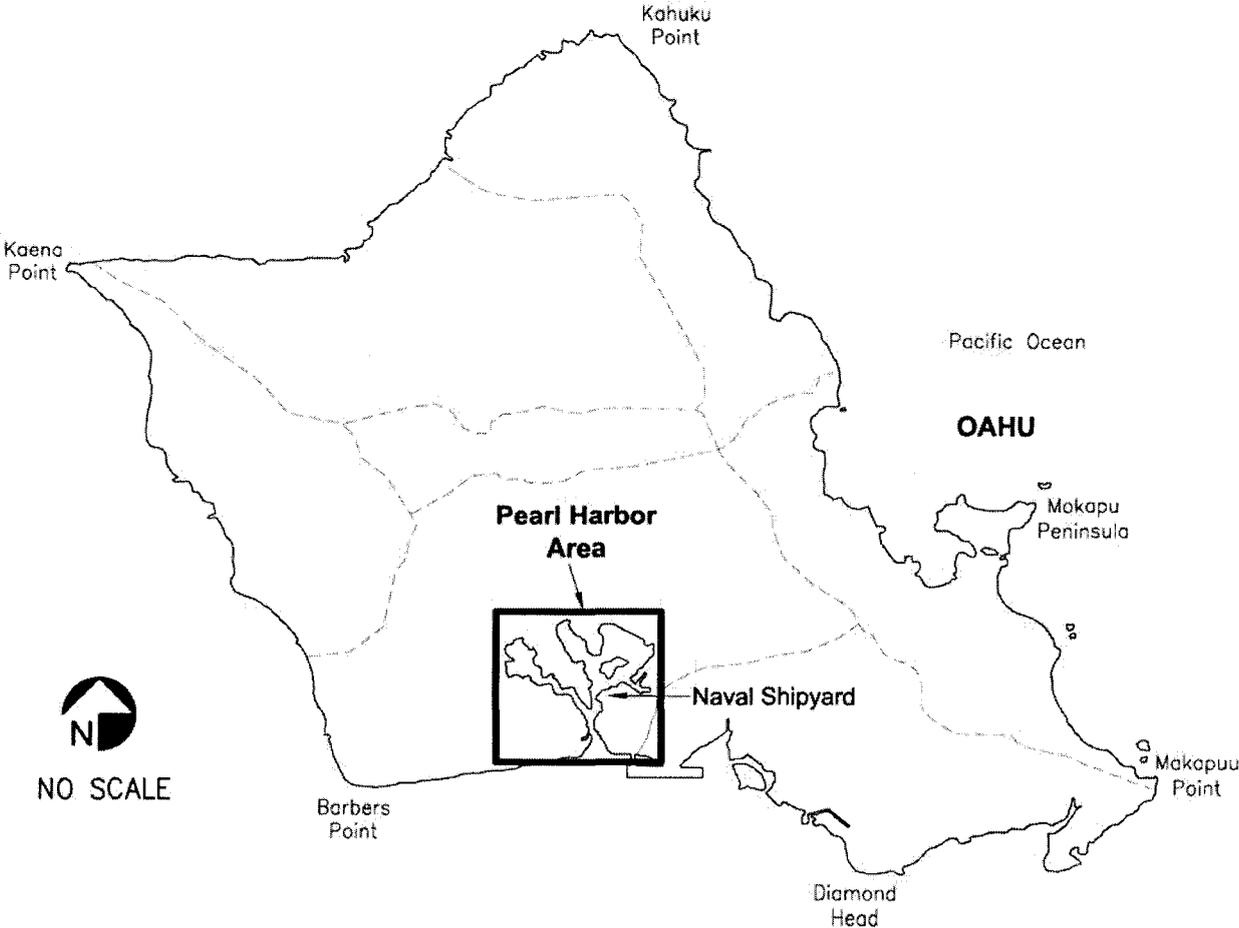
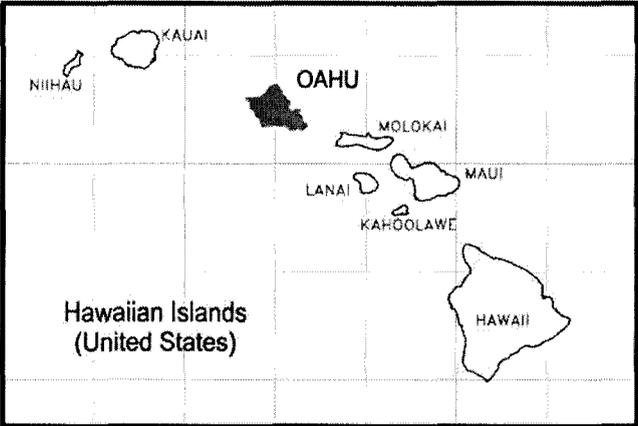
Prepared by:

Mason Architects, Inc.
119 Merchant St., Suite 501
Honolulu, HI 96813

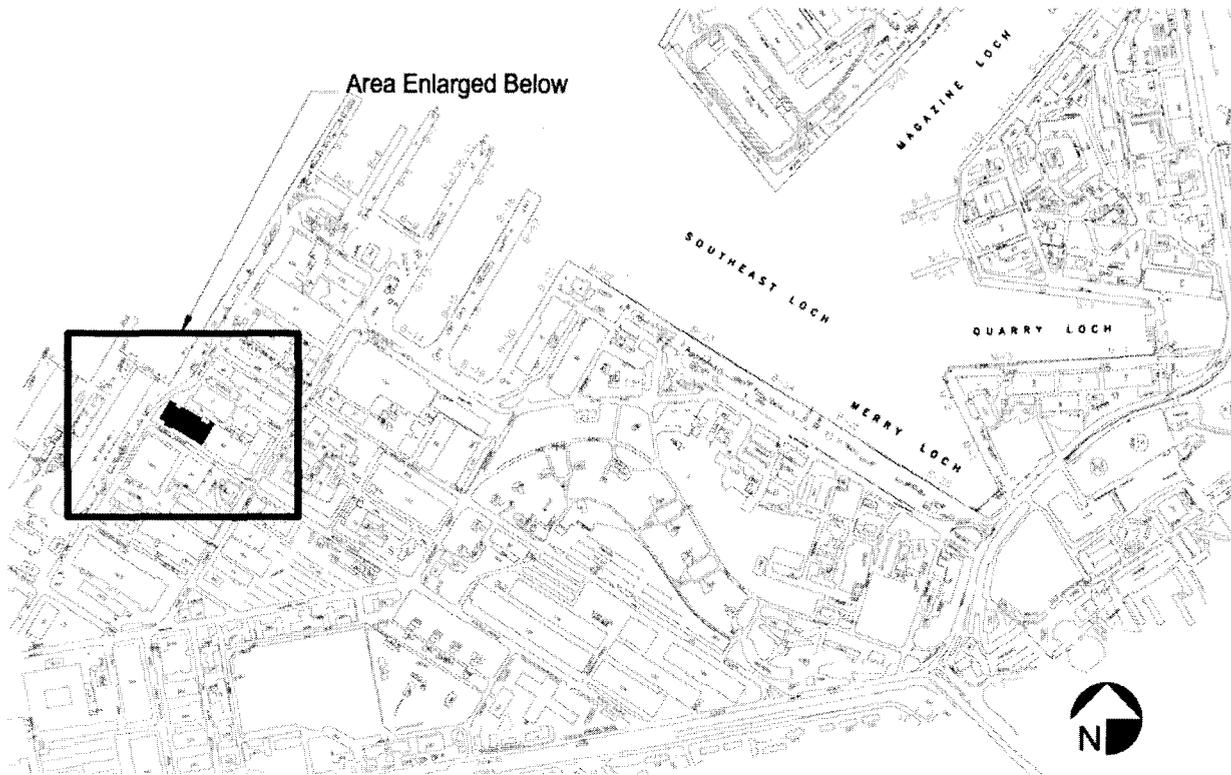
AMEC Earth & Environmental, Inc.
3375 Koapaka Street, Suite F251
Honolulu, HI 96819

Date of Final Report: August 2005

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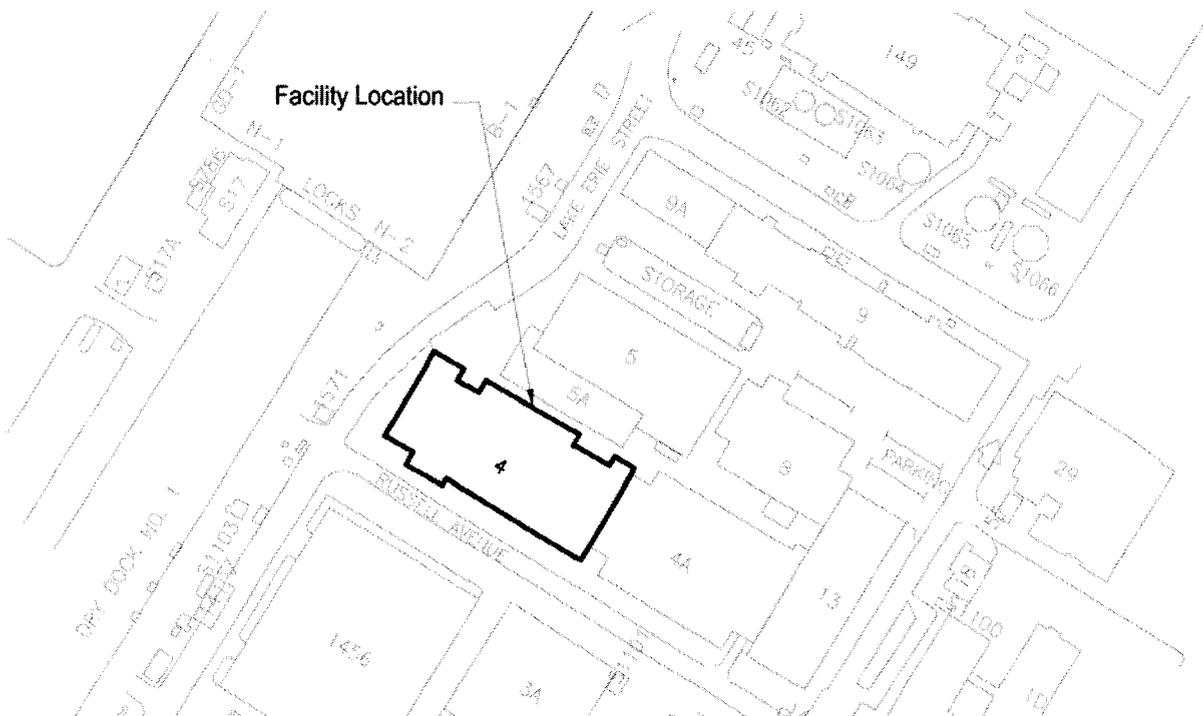


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Vicinity Map

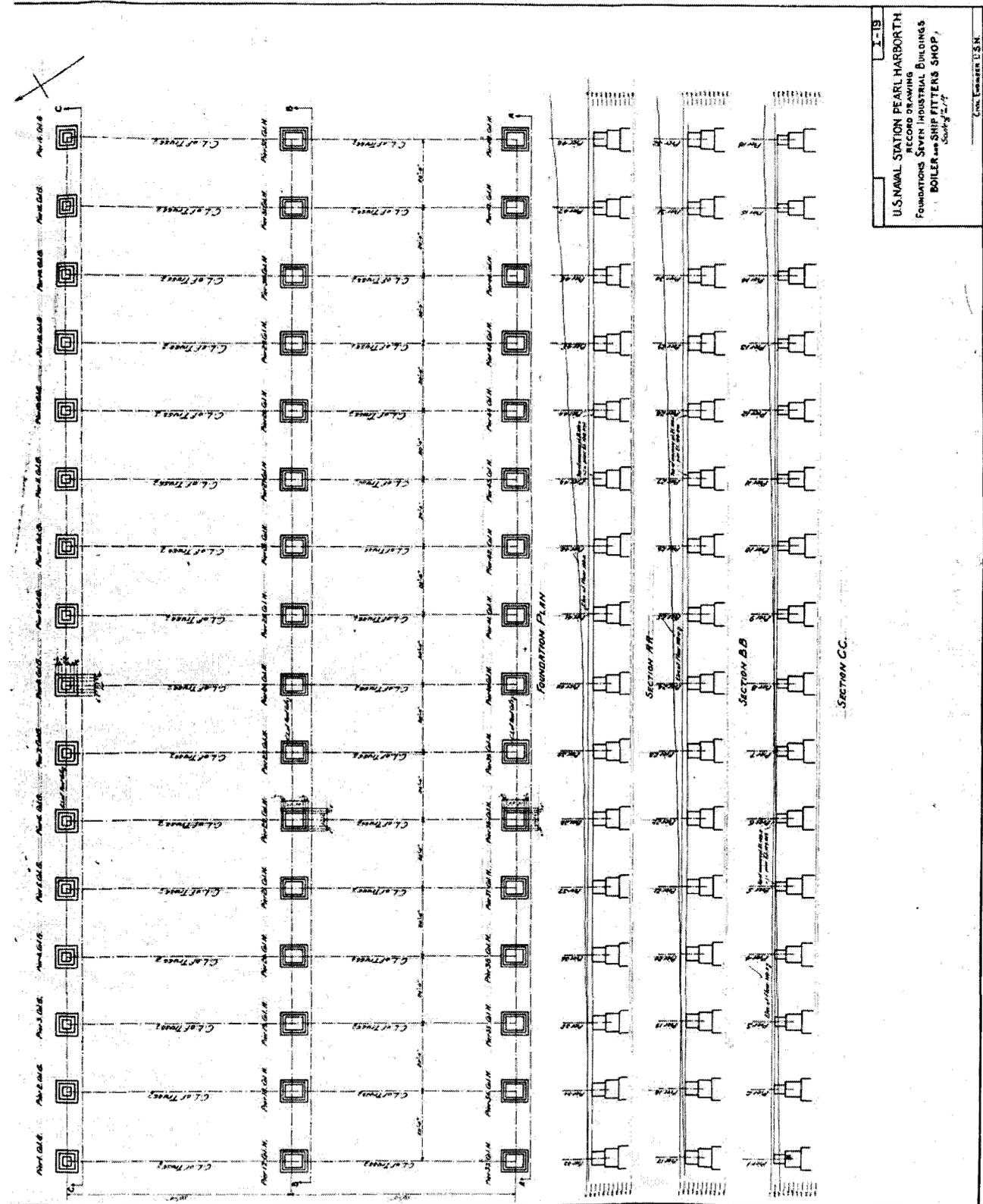
NO SCALE



Site Map

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Drawing No. I-19, undated (ca 1912). Foundation Plan and Sections.



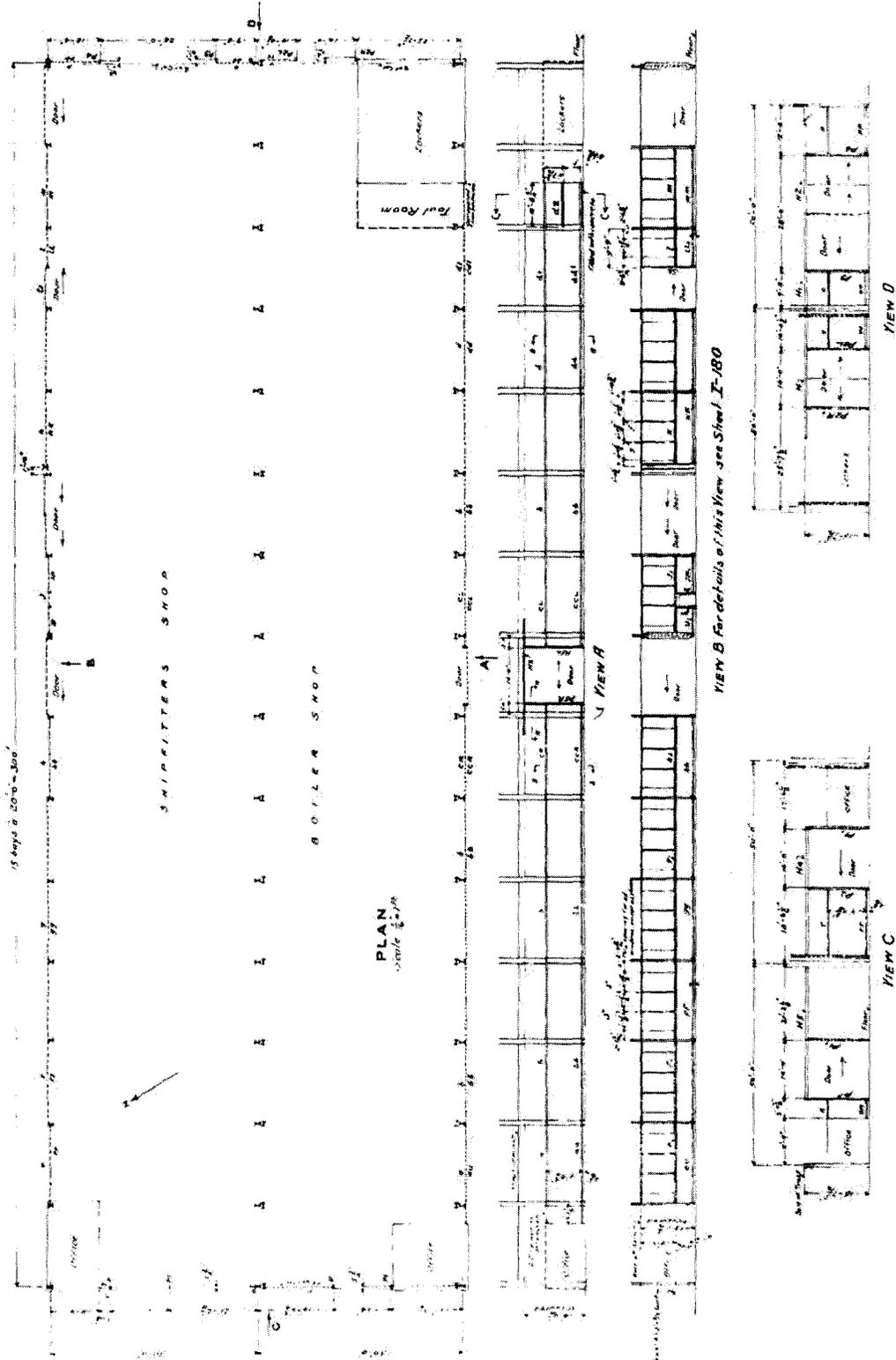
I-19

U.S. NAVAL STATION PEARL HARBOR
 SECOND DRAWING
 FOUNDATIONS SEVEN INDUSTRIAL BUILDINGS
 BOILER SHOP SHIP FITTERS SHOP
 Scale 1/4" = 1'-0"

C. W. F. 1912

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Portion of Drawing No. I-168, dated May 27, 1918. Plan and elevations



U.S. NAVAL BASE, PEARL HARBOR, SHIPFITTERS, METAL WORKERS, AND BOILER SHOP
(Facility No. 4)
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Portion of Drawing No. I-N5-229, undated (ca. 1940). Cross section.

