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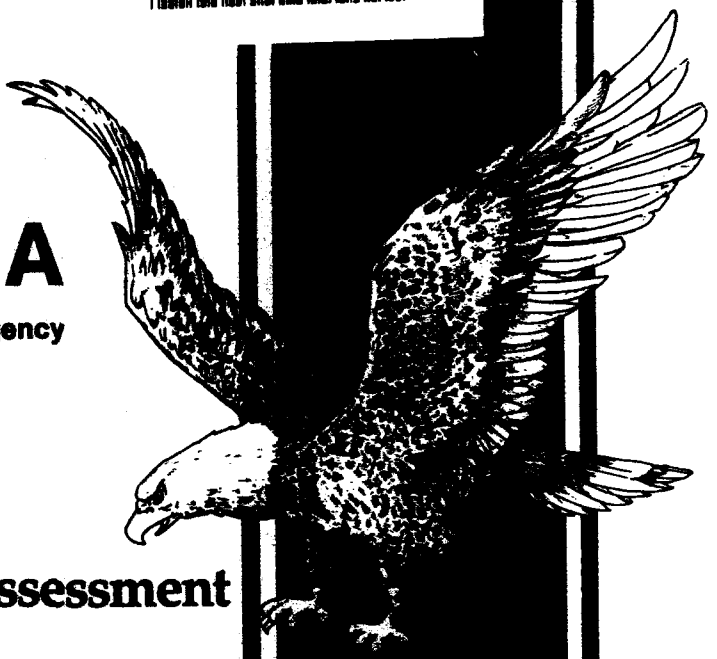

USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Task Order 2
Enhanced Preliminary Assessment

KAPALAMA MILITARY RESERVATION
HONOLULU, HAWAII

Contract Number DAAA15-88-D-0007

February 1990

Prepared for

U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

Prepared by

WESTON

Roy F. Weston, Inc.
West Chester,
Pennsylvania 19380

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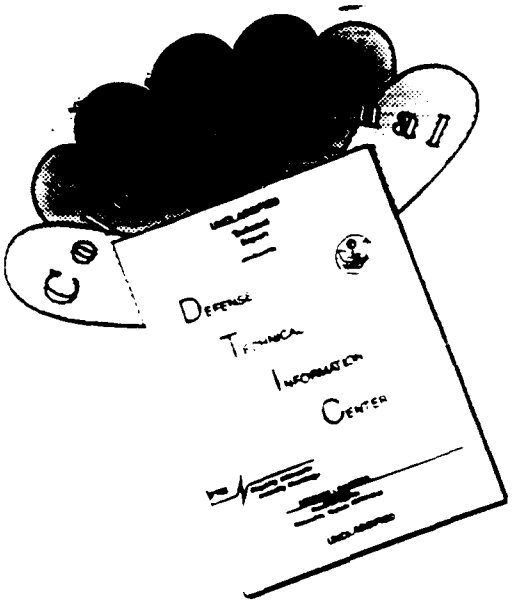

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USATHAMA Task Order 2

ENHANCED PRELIMINARY ASSESSMENT REPORT

Kapalama Military Reservation
Honolulu, Hawaii

Contract No. DAAA15-88-D-0007

William Freeman
Project Engineer

Lawrence J. Bove, P.E.
Project Manager

Glenn M. Johnson, P.E.
Program Manager

February 1990

Prepared By:

Roy F. Weston, Inc.
Weston Way
West Chester, Pennsylvania 19380

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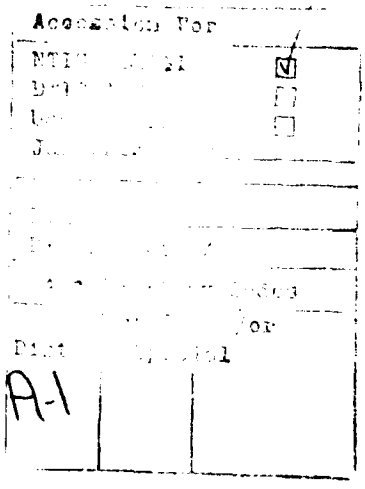

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18. Kapalama Military Reservation. Base Closure Program. Environmentally Significant Operations(ESOs). Logistical Support. Residual Contamination. Receptors. Sampling.

19. An Enhanced Preliminary Assessment was conducted at the Kapalama Military Reservation (KMR), which is planned for inclusion in the Base Closure Program. KMR was constructed during World War II, and has served as a logistical support center, receiving and distributin~ hardware, consumer items, dry goods, and chemicals in the Hawaiian Islands and throughout the Pacific area. Other activities have included maintenance-related painting, canvas repair/waterproofing, forklift maintenance, storage of low level radioactive waste, operation of a mortuary and identification laboratory (for decompose_ bodies), and fumigation. (Fumigation is conducted on all materials that are shipped off the island).

Almost the entire KMR property is paved, and infiltration is, therefore, minimal. Stormwater runoff flows to Honolulu Harbor of Keehi Lagoon. The surrounding area is industrial/commercial. Groundwater is tidal and brackish, and is not used for human consumption. The City of Honolulu supplies water for this area.

A previous asbestos survey for the facility has identified materials containing asbestos and recommended appropriate actions.

The conclusions and recommendations of this report are that a sampling program be developed to further assess possible contamination This includes samples of building materials, soils, and groundwater throughout the reservation. Petroleum hydrocarbons have been detected in the past in subsurface soils; the source of these could be either onsite or offsite (underground pipelines are located near the site and a petroleum tank farm is located across the street Due to the lack of human and environmental receptors, the impact of any existing contamination appears to be minimal.

DISCLAIMER

This Enhanced Preliminary Assessment Report is based primarily on the environmental conditions observed at the Kapalama Military Reservation, Honolulu, Hawaii, during the period 25 July through 28 July 1989. Past site conditions and management practices were evaluated, based on readily available records and the recollections of people interviewed. Every effort was made, within the scope of the task, to interview all identified site personnel, especially those personnel with a historical perspective of site operations.

No environmental sampling was conducted as part of the assessment. The findings and recommendations for further action are based on WESTON's experience and technical judgment, as well as current regulatory agency requirements. Future regulations, as well as any modifications to current statutes, may affect the compliance status of this site.

During the site visit, access was not gained to the former radioactive material storage building (929A) or the Hawaiian Telephone Company switching building (935). The scope of the site survey was initially restricted to the Phase III portion of KMR. Only selected buildings in Phase II were entered. Subsequent to the site inspection, WESTON was directed by USATHAMA to include all of the Phase II portion of the property in the preliminary assessment.

WESTON does not warrant or guarantee that the property is suitable for any particular purpose or certify any areas of the property as "clean." A more thorough investigation, including intrusive sampling and analysis for specific hazardous materials, is recommended prior to reporting this property as excess.

WESTON

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EXECUTIVE SUMMARY

BACKGROUND AND OBJECTIVES

This Enhanced Preliminary Assessment (PA) has been performed by Roy F. Weston, Inc. (WESTON) at the request of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) pursuant to Contract DAAA15-88-D-0007, Task Order 2. The purpose of the enhanced PA is to present WESTON's findings concerning the environmental conditions at the Kapalama Military Reservation (KMR) located in Honolulu, Hawaii, and to provide recommendations for possible further action. The objectives of this enhanced PA were to:

- Identify and characterize environmentally significant operations (ESOs) associated with the historical and current use of the KMR property.
- Identify and characterize possible impacts of the ESOs on the surrounding environment.
- Identify additional environmental actions, if any, that should be initiated for the ESOs identified.

Information contained in this enhanced PA was obtained through:

- Visual inspection of the facility.
- Review of available Army documentation.
- Review of related regulatory agency files at the state and federal levels.
- Interviews with current and former employees at KMR.

GENERAL PROPERTY DESCRIPTION

The Kapalama Military Reservation property was acquired by the U.S. Government through condemnation by the Secretary of War in 1941 and 1942. It was subsequently established as a logistics support and warehouse facility. Activities have consisted primarily of the receiving, storage, and distribution of goods and materials for U.S. military facilities in the Hawaiian Islands and throughout the Pacific area. These goods and materials include hardware items (office furniture, hospital beds, appliances, spare parts), consumer items (as sold in PXs), dry goods (tents, clothing), and chemicals (battery acid, cleansers, packing foam, paints, pesticides) in containers no larger than 55-gal capacity. In addition, mortuary and certain maintenance and repair activities (including painting and fumigation) have occurred on the site. It is possible that packaged ammunition has been received for distribution in the past; however, site personnel had no knowledge of any onsite use. One portion of KMR has been sold (Phase I) and another area is in the process of being sold (Phase II). This assessment focused on current active areas in Phase II and Phase III.

ESOs identified on the property include:

- Buildings 913/914 - Mortuary - chemicals used in the embalming process. The chemicals are used in small quantities and are well contained.

- Building 917 - Hazardous Material Storage - warehouse storage of a broad spectrum of chemicals. The chemicals are stored on pallets and racks. The concrete floor is marbled with cracks. A few minor spills were reported in the building.

- Building 923 - Solvent Cleaning Room and Spray Paint Booth - solvents used for cleaning/degreasing parts and vehicle maintenance; paints possibly containing lead and cadmium used in a spray booth; associated solvent storage areas outside.

- Building 924 - Canvas Repair Area & Packaging Area - waterproofing with polymer-type water repellents; packaging with isocyanate foam; "waste oil" drums (apparently empty) on pallet outside building.

- Building 925 - Maintenance & Repair of Forklifts - oils, greases, solvents, and hydraulic fluids used in the repair and maintenance of forklifts in an area adjacent to the building.

- Building 926 - General Storage and Sealed Source Radioactive Storage - sealed low-level radioactive sources such as compasses.

- Building 929 - General Storage and Former Pallet Fumigation Area - fumigation of wooden pallets in a large chamber (no longer used). Samples taken in the room by the Corps of Engineers indicated the presence of pentachlorophenol and 2,4-D.

- Building 929 - Former Sealed Source Radioactive Storage - sealed low-level radioactive sources such as compasses and watches (former storage area).

- Building 930 - General Purpose Storage - super tropical bleach (STB) used for decontamination of personnel and equipment. Several spills were reported.

- Building 931 - General Storage and Fumigation Area - current fumigation of wood and cardboard items; also former chemical storage area.

- Buildings 1027/1028 - The Central Identification Laboratory - darkroom chemicals used in x-ray and film activities for identification of bodies.

- Former Underground Storage Tank Across from Buildings 1027 and 1033 - fuel pump and underground tank removed. Located in locked area not included in primary focus of investigation.

- Underground Storage Tank - Adjacent to Building 935 - Fuel for emergency generator maintained by the Hawaiian Telephone Company.

- Aboveground Storage Tanks

  - approximately 300-gal kerosene tank adjacent to a grassy area.

  - 5,000-gal propane tank adjacent to Building 925.

  - 500-gal propane tank adjacent to Building 921 reported by personnel but not observed during site visit; 150-gal propane tank adjacent to Building 922.

- Asbestos - numerous onsite buildings constructed with 'Transite siding and other asbestos-containing material. Some siding material is broken along the lower side of buildings.

- Transformers - approximately 40 transformers, two pad mounted, the remainder pole mounted. Fluids have not been tested for polychlorinated biphenyls (PCBs) content. Two apparent minor leaks observed.

- Concrete Pad - possibly used either as a transformer staging area or for a dip tank for termite-proofing pallets.

- Former Railroad Track/Unloading Area - unloading of supplies from rail cars - possible spills in unloading activities.

- Possible Pre-Construction Disposal Site - A portion of KMR may have been used in the 1930s and 1940s as a municipal dump for the City and County of Honolulu.

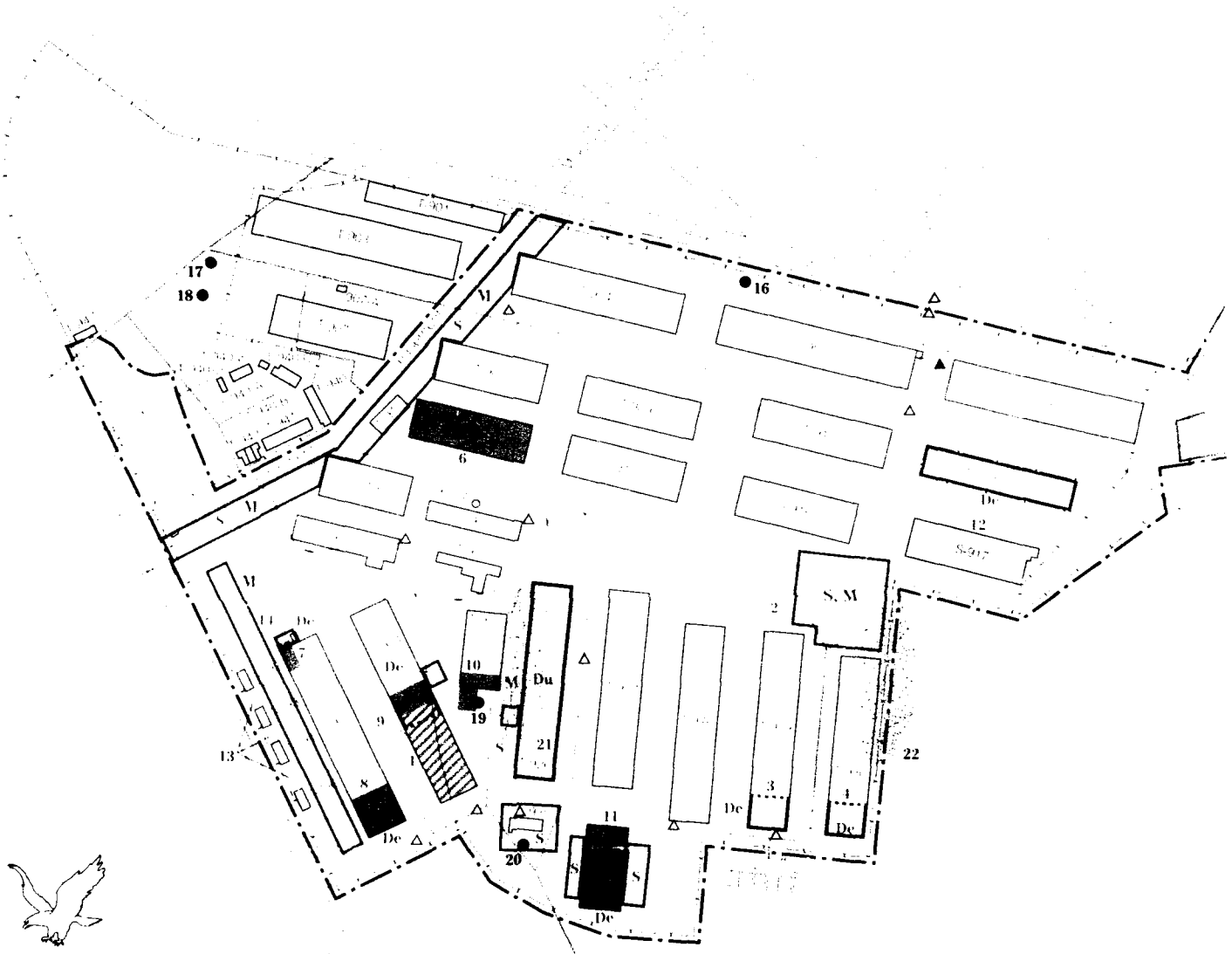
Figure ES-1 shows a site plan of the facility with the buildings and the ESOs marked.

HUMAN AND ENVIRONMENTAL RECEPTORS

KMR is located in the harbor district of the City of Honolulu, directly adjacent to Honolulu Harbor. The property was constructed on materials dredged from the harbor and placed over existing coral rocks and limestone deposits. KMR is almost entirely paved. Surface water runoff and the storm sewer system on KMR discharge directly into the harbor.

Groundwater in the area is hydraulically connected to the harbor. The shallow aquifer is brackish and is not used as a water supply. (The closest known well is approximately one mile north (inland) at the Oahu State Prison.)

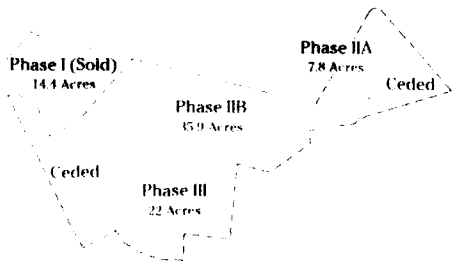
Land adjacent to the facility is used for commercial and industrial purposes. Adjacent properties include: a large fuel storage tank farm for aviation fuels that are piped underground; municipal piers with associated underground fuel oil and diesel lines; and the Phase I former KMR property, which contained three underground diesel and gasoline tanks (one of which was



U S A T H A M A

U.S. Army Toxic and Hazardous Materials Agency

PROPERTY SUBDIVISION



SAND ISLAND

Former Chemical

1. Canvas
2. Low-le
3. Fumiga
4. Bleach

Current Chemical

5. Central
6. Mortua
7. Parts c
8. Paint s
9. Foam p
10. Forklift
11. Fumiga

Current Chemical

12. Chemi
13. Solven petrol
14. Waste

U.S. Army
Base Closure Preliminary Assessment

Kapalama Military Reservation

Honolulu, Hawaii — November 1989

FIGURE ES-1

PROPERTY INFORMATION COMPOSITE

Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency.

Scale 1:4800
(1"-400')

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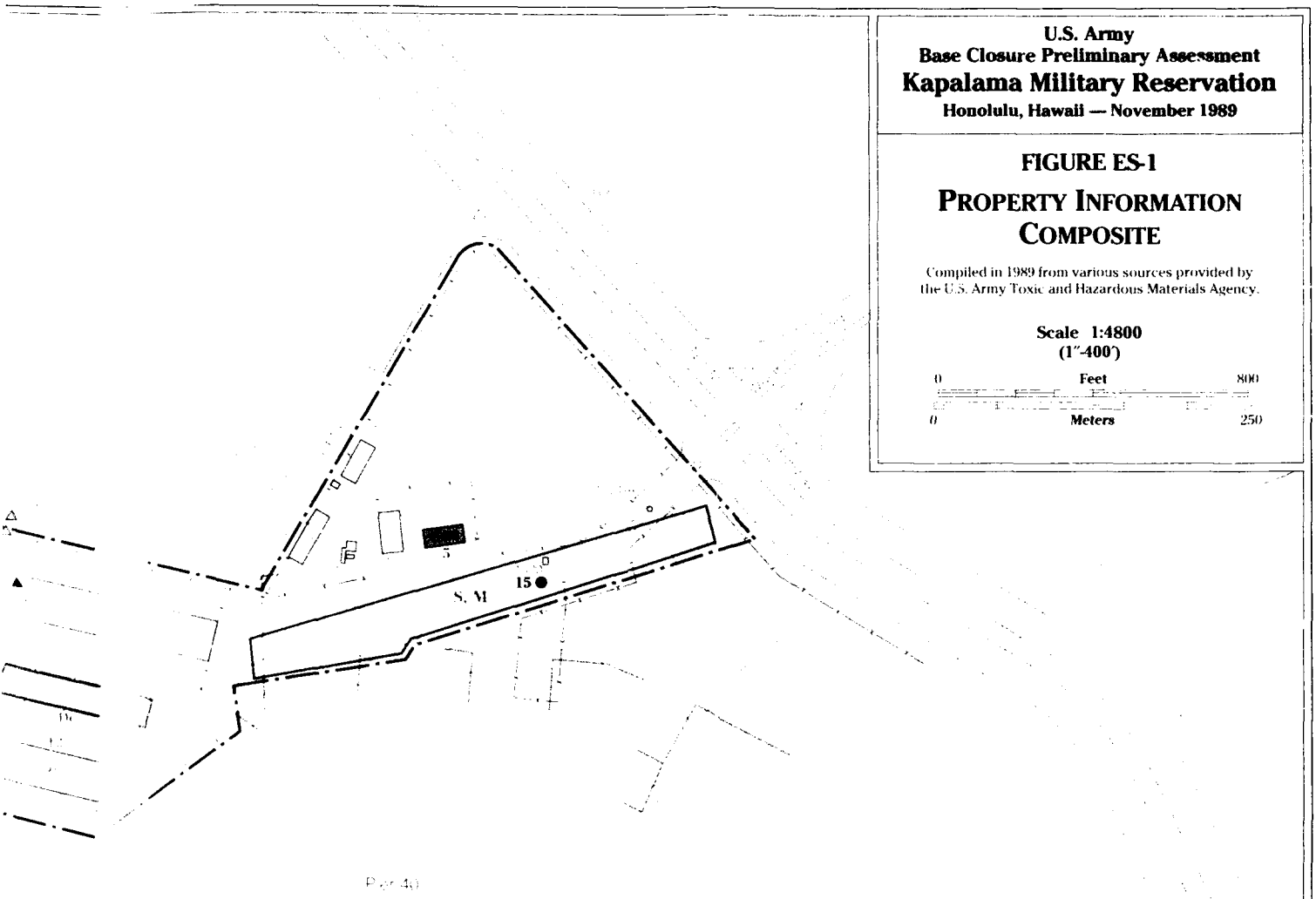
0 Meters 250



Former Chemical Use

1. Canvas repair area
2. Low-level radioactive storage
3. Fumigation area
4. Bleach storage

Current Chemical Use

5. Central I.D. Laboratory
6. Mortuary
7. Parts cleaner
8. Paint spray booth area
9. Foam packaging area
10. Forklift maintenance area
11. Fumigation area

Current Chemical Storage

12. Chemical storage warehouse
13. Solvent, waste solvent, and petroleum products
14. Waste solvent

Storage Tanks

- **15.** Former underground storage tank
- **16.** Above-ground kerosene storage tank
- **17.** Former underground storage tank
- **18.** Former underground storage tank
- **19.** Above-ground propane storage tank
- **20.** Underground storage tank

Waste Disposal

21-22. Possible pre-construction disposal sites

Transformers

- ▲ **High Voltage**
- △ **Other**

Storm Drain System

Storm Drain and Pipe Diameter

Recommended Sampling Locations

Locations are differentiated by the sampling methods indicated below. All locations are approximate. A detailed sampling plan would be developed prior to actual sampling acitvity.

S	Soil Boring	De	Destructive
Du	Dust	M	Monitoring Well

Note: Oil sample taken at all transformers.

Other Features

- **Reservation Boundary**
- **Building or Other Structure**
- **Property Subdivision**
- **Fence**

Elevation contour values are in feet.

N

removed prior to sale). Petroleum hydrocarbons have been found under the Phase I property during soil boring activities conducted by the current owner of the Phase I property.

No endangered or threatened species are recorded on KMR. No wetlands were identified within 2 miles of the facility. The variety of aquatic life in the harbor of this industrial/commercial area is expected to be limited and adapted to suboptimal environmental quality.

The groundwater will eventually discharge to the surrounding waters of Honolulu Harbor or Keehi Lagoon; however, the concentrations of a contaminant would be expected to be quite dilute. No ongoing discharges or surface contamination was apparent during the site inspection; therefore, no impact on human and environmental receptors from surface water is expected. The most significant risk on the property appears to be the contaminated building surfaces that may provide a direct contact hazard to personnel.

CONCLUSIONS AND RECOMMENDATIONS

No conditions were observed on the property that appear to represent an immediate substantial threat to human health or the environment. However, the ESOs listed above have the potential to affect human health or the environment. The ESOs, associated concerns, and recommendations are summarized in Table ES-1 and the following subsections.

The choice of analytes and locations of samples in the various buildings is based on the types of chemicals formerly used or stored in the building, the knowledge or likelihood of spills or releases, the persistence of the constituent in the media being sampled, and the ability to collect a sample representative of source contamination. For example, a soil sample collected directly under an area of asphalt paving would be contaminated by semivolatile compounds present in the asphalt. In regard to persistence, volatile organic compounds (VOCs) may be present in groundwater but not in surface soils after a number of years.

BUILDINGS

Wipe, destructive, and dust sampling of building interiors is recommended for most of the primary ESOs discussed in Section 3. The presence of asbestos materials in certain buildings in the Phase II area has been confirmed by previous sampling; therefore, sampling for asbestos is recommended only for Phase III buildings.

SUBSURFACE SOILS

With the discovery of subsurface petroleum hydrocarbons near Buildings 917 and 929 and on neighboring properties, as well as underground piping of aviation fuel and diesel fuel on neighboring properties (see Subsection 2.2), soil borings are recommended throughout the property. Boring samples

Table ES-1

ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action

ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Buildings 913/914 - Mortuary	Phase II	VOCs	No further investigation				
Building 917 - Hazardous Material Storage	Phase II	Pesticides RCRA Metals VOCs, TPH	Site investigation	4	Evenly distributed, one near entrance	Wipe	Pesticides/ Herbicides[a]
				4	In cracked areas, evenly distributed	Destructive	Pesticides/ Herbicides RCRA Metals[b]
				4	Under cracked areas	Surface soil under floor	Pesticides/ Herbicides RCRA Metals, TPH[c]
Building 923 - Solvent Cleaning Room and Spray Paint Booth	Western Ceded Area	Chlorinated Hydrocarbons Pb, Cd	Site investigation	1	Building floor	Dust	Pb, Cd
				1	Paint booth floor	Destructive	Pb, Cd
				3	Paint booth wall / ceiling	Destructive	Pb, Cd
Building 924 - Canvas Repair Area & Packaging Area	Phase III/ Western Ceded Area	Pesticides RCRA Metals	Site investigation	1	Floor near packaging area	Destructive	Pesticides/ Herbicides RCRA Metals
Building 924 - Former Solvent Dip Operation	Phase III/ Western Ceded Area	VOCs	No further investigation				
Buildings 923/924 - Yard Drainage	Western Ceded Area	Pesticides RCRA Metals	Site investigation	1	Storm sewer inlet	Sediment	Pesticides/ Herbicides RCRA Metals
Building 925 - Maintenance & Repair of Forklifts	Phase III	Chlorinated Organics, TPH	No further investigation				

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

Table ES-1

ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action
(continued)

ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Building 926 - General Storage and Sealed Source Radioactive Storage	Phase III	Radioactivity	Site investigation	NA	Building surfaces	Instrumentation sweep	Radioactivity
Building 929 - General Storage and Former Pallet Fumigation Area	Phase III	Pesticides	Site investigation	6-10	Floor, walls, ceiling	Destructive	Pentachloro-phenol; 2,4-D
Building 929A - Former Sealed Source Radioactive Storage	Phase III	Radioactivity	Site investigation	NA	Building surfaces	Instrumentation sweep	Radioactivity
Building 930 - General Purpose Storage	Phase III	Oxidizer	No further investigation				
Building 931 - General Storage and Fumigation Area	Phase III	Pesticides RCRA Metals	Site investigation	4	Walls, ceiling, floor	Destructive	Pentachloro-phenol
				1	Storm sewer	Sediment	Pentachloro-phenol
Buildings 1027/1028 - The Central Identification Laboratory	Phase II	Photographic Chemicals	No further investigation				
Former Underground Storage Tank (Near Buildings 1027 and 1033)	Phase II	TPH	Report review (soil sampling results)	NA		NA	NA
Underground Storage Tank (Adjacent to Building 935)	Phase III	TPH	No further investigation	NA	NA	NA	NA
Aboveground Storage Tank - Kerosene	Phase II	TPH	Site investigation	2	Adjacent to tank	Surface soil (0-6 in)	TPH

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

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Table ES-1

ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action
(continued)

ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Aboveground Storage Tank - Propane, Bldg 925	Phase III	Propane	No further investigation	NA	NA	NA	NA
Aboveground Storage Tanks - Propane, Bldgs 921, 922	Phase II/ Western Ceded Area	Propane	No further investigation	NA	NA	NA	NA
Asbestos	All Areas	Asbestos	Phase III buildings	As required	Suspect materials	Destructive	Asbestos
Transformers	All Areas	PCBs	Site investigation	40	All transformers	Dielectric fluid	PCBs
Concrete Pad	Western Ceded Area	PCBs Pesticides	Site investigation	2	Top of pad	Destructive	PCBs, Pesticides
Former Railroad Track/ Unloading Area	All Areas	Pesticides, VOCs, RCRA Metals, TPH	Site investigation	6	Adjacent to loading dock	Surface soil under asphalt	Pesticides, RCRA Metals
Petroleum Spill Areas (onsite)	All Areas	TPH	Site investigation	15-20	Plantwide	Soil boring	TPH
				5-10	Plantwide	Groundwater	TPH, VOCs[d]
Petroleum Pipelines (offsite)	NA	TPH	Site investigation	(Included in Petroleum Spill Areas)			TPH
Petroleum Storage Tank (offsite)	NA	TPH	Site investigation	(Included in Petroleum Spill Areas)			
Possible Pre-Construction Disposal Site	Phase II/ III	Undefined	Site investigation	2	1 in each disposal area	Soil boring (composite)	HSL[e]
				2	1 in each disposal area	Groundwater	HSL

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

1073M2-4

should be analyzed for total petroleum hydrocarbons (TPH) and VOCs. Soil samples should be collected at intervals of 2.5 ft from the surface to the top of the groundwater table at each boring. It is expected that groundwater will be reached less than 5 ft below the ground surface. Selected borings may be converted to monitoring wells, based on field operations.

GROUNDWATER

Groundwater quality has not been characterized throughout the site. The potential exists for contamination due to both site-related activities and to migration from offsite sources. Approximately 5 to 10 monitoring wells should be installed in selected subsurface soil borings. These wells should be strategically placed to characterize the groundwater at areas of concern. These samples should be analyzed for TPHs and VOCs. Additional analyses may be required based on proximity to specific ESOs.

SURFACE SOILS

Surface soil samples (0 to 6 in.) should be taken along the grass strip behind the aboveground kerosene tank near Building 905 and analyzed for TPH.

SEDIMENTS

Sediments in the bottom of the two storm drain systems near Buildings 923/924 and 929/930 should be sampled and analyzed for TPH, VOCs, metals, and pesticides. These storm drains would have been likely pathways for any spills in the primary chemicals storage areas.

DRUM LIQUIDS

Prior to disposal, the contents of the 55-gal drums stored outside Building 924 should be inspected to confirm that they no longer contain waste oil (as marked). Currently, the drums appear to contain rainwater.

CONCRETE PAD

Chip samples should be taken from three random locations on the concrete pad near Building 923 to check for potential contamination from PCBs or pesticides.

UNDERGROUND STORAGE TANKS

An underground storage tank (UST) near Buildings 1027 and 1033 has been removed. Reportedly, soil samples were collected during the removal activity, but analytical results are not yet available. The data should be reviewed when available and a decision made as to whether additional sampling is required. The existing UST adjacent to Building 935 was leak tested when installed in 1987, and no further investigation is required at this time.

TRANSFORMERS

All transformers on the property potentially contain PCBs and two of them appear to have leaked in the past. An inventory should be made of all transformers remaining on the property (except Phase I), and each transformer should be sampled for PCBs.

POSSIBLE PRE-CONSTRUCTION DISPOSAL SITE

Soil borings should be conducted and monitoring wells installed at the possible location of the City and County of Honolulu Municipal Dump. Because the material possibly received at this dump is undefined, the soil and groundwater samples should be analyzed for the entire Hazardous Substance List compounds. There will be one soil boring at each of the two possible disposal sites. A composite sample will be collected from each boring. Each composite will be comprised of grab samples collected every 2.5 feet of depth until groundwater is reached. Monitoring wells should be installed in each soil boring.

SECTION 1

INTRODUCTION

1.1 BACKGROUND

Roy F. Weston, Inc. (WESTON) has been retained by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) to conduct waste site characterizations of specific Department of Army properties under the authority of Contract DAAA15-88-D-0007, Task Order 2. This work is being performed within the scope of the U.S. Army Installation Restoration Program (IRP). As part of this contract, WESTON also has been asked to prepare enhanced preliminary assessments of selected properties destined to be included as part of the Base Closure Program. The purpose of the associated preliminary assessment reports is to present WESTON's findings concerning the environmental conditions of the properties and to provide recommendations for further action. These recommendations will serve as a guide to the U.S. Army in prioritizing the activities required to report these properties as excess.

This document discusses the enhanced preliminary assessment (PA) of Kapalama Military Reservation (KMR), Honolulu, Hawaii. A site visit was performed 24 July through 28 July 1989.

The KMR has been subdivided, pursuant to sale of the property, into "phases" (see Section 2). At the time of the site visits, one of the phases had already been sold.

1.2 OBJECTIVES

This enhanced PA report was prepared using existing information obtained from property records and from both current and former employees. No sampling activities were completed as part of this assessment. The objectives of this enhanced PA were to:

- Identify and characterize environmentally significant operations (ESOs) associated with the historical and current use of the KMR property.
- Identify and characterize possible impacts of the ESOs on the surrounding environment.
- Identify additional environmental actions, if any, that should be initiated for the ESOs identified.

Certain issues have been excluded from consideration as ESOs for the purposes of this report. First, painted surfaces will not be identified as ESOs solely because there is a potential for their containing lead. Second, drinking water will not be designated as an ESO solely because there is a potential for lead contamination due to piping solder or piping materials. Third, the presence of radon gas in buildings will not be considered as an ESO. A radon survey of all buildings will be performed utilizing the guidelines set forth in the Army Radon Program.

1.3 PROCEDURES

The information contained in this enhanced PA is based on the following data-gathering activities:

- Visual inspection of the facility.
- Review of available Army documentation.
- Review of U.S. Environmental Protection Agency (EPA) Region IX files.
- Contact with the Hawaii Department of Land and Natural Resources.
- Interviews with current and former employees at KMR.
- Evaluation of aerial photographs.

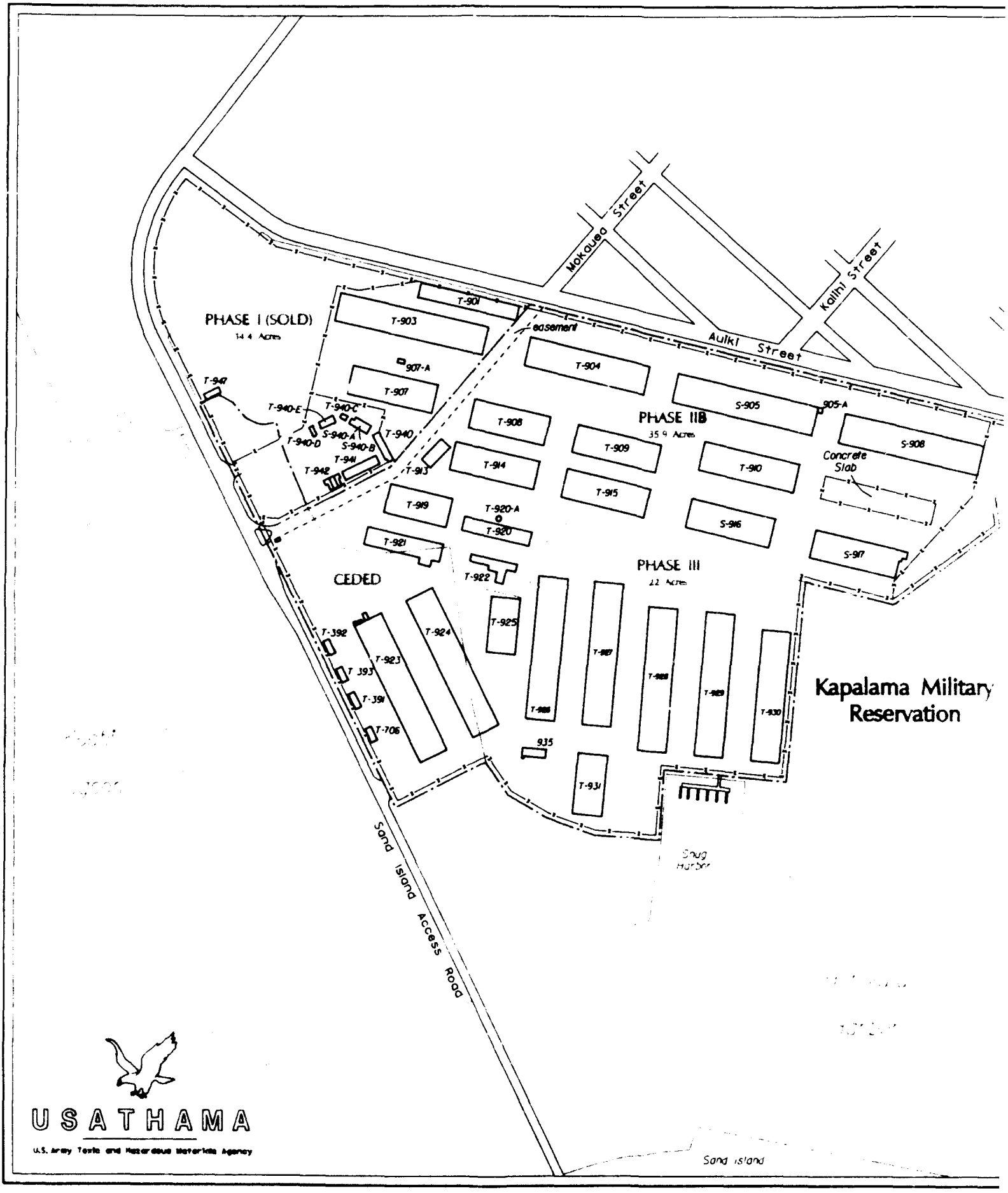
The scope of the site survey was initially restricted to the Phase III portion of the KMR property (Figure 1-1). Two other sections (Phases I and II) were to be treated as adjacent properties that may have environmental impacts on Phase III. In that regard, only selected buildings in Phase II were entered, based on the likelihood of their being possible sources of contamination. Subsequent to the site inspection, WESTON was directed by USATHAMA to include all of the Phase II portion of the property in the PA. Subsection 2.2 of this report specifies all buildings (Phase II and Phase III) that were entered as part of the site investigation.

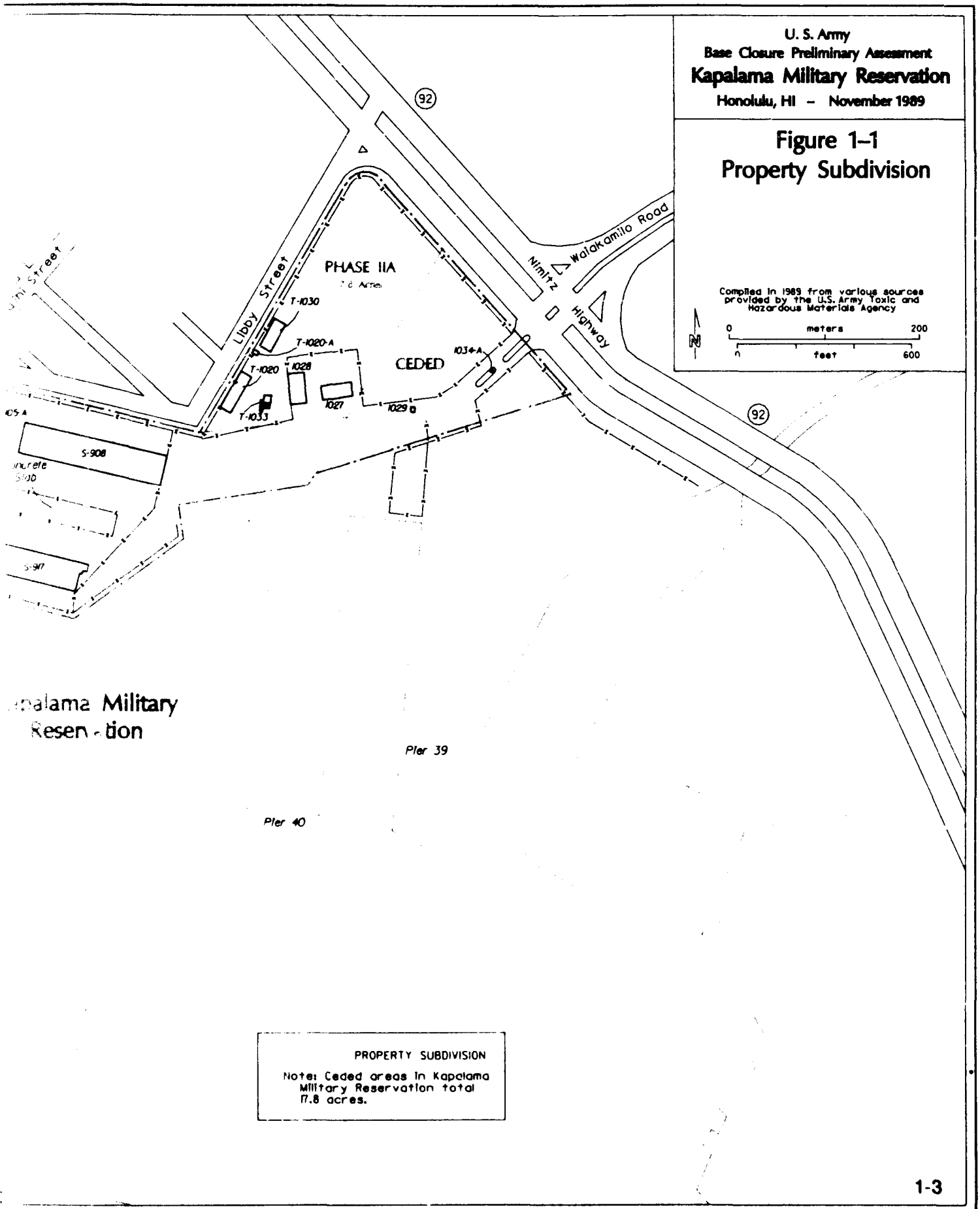
1.4 REPORT FORMAT

This enhanced PA report presents an evaluation of the relevant data for the Kapalama Military Reservation.

Section 2 describes the property and the surrounding environment and land uses. Section 3 identifies and characterizes all ESOs related to known and suspected releases to the environment. The potential impact of these operations on the local environment and human receptors is discussed in Section 4. Section 5 summarizes the findings and conclusions, discusses the quality and reliability of the supporting information, identifies areas requiring further action, and suggests how such actions may be accomplished. Section 6 lists the pertinent materials reviewed and the agencies that were contacted. Photographs taken during the site visit are provided in Section 7. Supporting documentation is provided in Appendices A and B.

References are presented throughout this report, where appropriate, by means of a letter and number designation in brackets, as follows: I refers to direct interviews; T refers to telephone conversations; and R refers to reports or other written documents. The number following the letter refers to the specific item in the respective lists provided in Section 6.


Mokauea Street
Kalihi Street
Auiki Street
easement
PHASE I (SOLD)
14 4 Acres
PHASE IIB
35 9 Acres
PHASE III
22 Acres
CEDED
T-901
T-903
907-A
T-907
T-904
S-905
905-A
T-908
S-908
T-909
T-914
T-910
T-915
T-919
T-920-A
T-920
S-916
T-921
S-917
T-922
T-947
T-940-E
T-940-C
T-940-D
S-940-A
S-940-B
T-940
T-941
T-942
T-913
Concrete Slab
T-392
T-923
T-924
T-925
T 393
T-391
T-706
935
T-931
Sand Island Access Road
Snug Harbor
Sand Island
Kapalama Military Reservation
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency


U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI – November 1989
Figure 1-1
Property Subdivision
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
0 meters 200
0 feet 600
N
92
PHASE IIA
7.6 Acres
CEDED
Libby Street
Nimitz
Waiakamilo Road
Highway
T-1030
T-1020-A
T-1020
1028
1027
1029
1034-A
T-1033
S-908
S-917
Pier 39
Pier 40
PROPERTY SUBDIVISION
Note: Ceded areas in Kapalama Military Reservation total 17.8 acres.

WESTON

SECTION 2

PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY DESCRIPTION AND HISTORY

The KMR property was acquired by the U.S. Government through condemnation by the Secretary of War in 1941. It was subsequently established as a logistics support and warehouse facility. Table 2-1 presents a property information summary. Figure 2-1 presents a site map of the area.

KMR was constructed partly on land that has been filled in with coral-lime dredge materials from the construction of the Keehi Lagoon Seaplane Runway [R-10]. There are approximately 30 buildings of various sizes that were built during the period 1942-1945. Almost all buildings consist of a wood frame, corrugated metal roof, and corrugated metal or Transite siding and are built on a concrete slab at or above grade (photos 1 to 4). It is unknown whether the wood used for construction was treated with pesticides for termite protection; however, this was a common practice. Table 2-2 lists the buildings at KMR. The site is almost entirely paved with asphalt (>99%), except for small grassy areas near the perimeter fence and a small area of ornamental shrubs and trees near the mortuary/chapel (Buildings 913/914) and base canteen (Building 920).

The use of the property prior to construction of KMR is not well documented. According to the Corps of Engineers Pacific Ocean Division (CEPOD), a portable asphalt batching plant was condemned when the Army purchased the property. Also, the City and County of Honolulu reportedly used the property as a site for municipal waste. A portion of the site also may have been used as a junk yard [R-8].

The reservation has been used primarily as a warehouse facility for the last 47 years. Activities have consisted of the receiving, storage, and distribution of goods and materials for U.S. military facilities in the Hawaiian Islands and throughout the Pacific areas. These goods and materials include hardware items (office furniture, hospital beds, appliances, spare parts), consumer items (as sold in PXs), dry goods (tents, clothing), and chemicals (battery acid, cleansers, packing foam, paints, pesticides, etc.). The chemicals do not include any bulk shipments; the largest containers are 55-gal drums. At the time of the site inspection, there were no munitions in the warehouses, and site personnel had no knowledge of any munitions having been stored at KMR. However, the facility was active during WWII, the Korean War, and the Vietnam War; therefore, it is possible that packaged ammunition was received for distribution in the past. There is no record of any onsite use of ammunition. A paint booth was installed at an unspecified date (at least 15 years ago) for maintenance-related activities only. Other site activities include a mortuary, an identification laboratory (for decomposed

Table 2-1

Property Information Summary

Name: Kapalama Military Reservation (KMR)

Property No.: 15265

FFIS: HI-214522214

Facility Address: Sand Island Access Road
Honolulu, Hawaii

Commanding Officer: None (Subinstallation of Fort Shafter)

Location: Just inland of the Kapalama Basin, in the Honolulu Harbor area, on the south coast of the island of Oahu, Hawaii.

Installation Coordinates: 19° 54' N; 155° 53' W

Size: Approximately 100 acres.

Mission: KMR is a subinstallation of Fort Shafter, part of the U.S. Army Support Command. It is a logistics and support facility and a general maintenance installation.

Operations: Current operations include warehouse and storage facilities, administration buildings, office machine and furniture repair, an Army mortuary, and the Pacific Area Central Identification Laboratory.

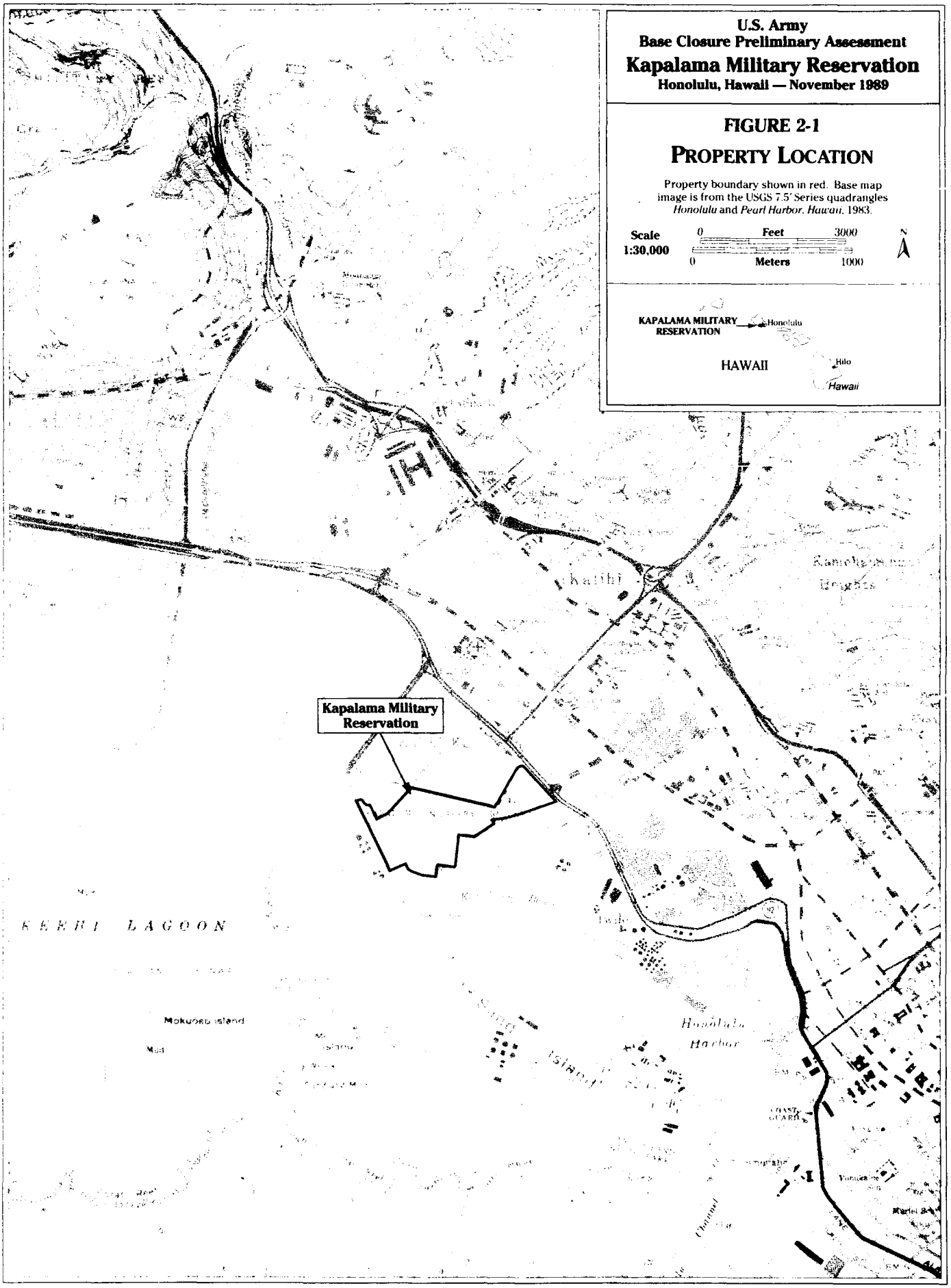

U.S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, Hawaii — November 1989
FIGURE 2-1
PROPERTY LOCATION
Property boundary shown in red. Base map image is from the USGS 7.5' Series quadrangles Honolulu and Pearl Harbor, Hawaii, 1983.
Scale 1:30,000
0 Feet 3000
0 Meters 1000
N
KAPALAMA MILITARY RESERVATION
Honolulu
HAWAII
Hilo
Hawaii
Kapalama Military Reservation
KEEHI LAGOON
Mokuoeo Island
Maui
Honolulu Harbor
Channel

Table 2-2

Description of Buildings
Kapalama Military Reservation

Property Subdivision	Building No.	Approx. Size (sq. ft)	Siding Type	Floor Type	Building Use	Building Entered
Phase II	904	43,000	CT	CA	Warehouse & Administration	No
Phase II	905	50,000	CT	CA	Warehouse & Cold Storage	No
Phase II	906	50,000	CT	CA	Tripler Med. Center Whse.	No
Phase II	908	27,000	CT/CM	CA	Gen'l. Storage (half vacant)	No
Phase II	909	30,000	CT/CM	CA	Tripler & AAFES (PX) Storage	No
Phase II	910	35,000	W	CA	Cold Storage	No
Phase II	913	5,000	W	W	Mortuary/Chapel	Yes
Phase II	914	29,000	CT/W	CA	Mortuary/General Storage	Yes
Phase II	915	30,000	W	CA	Gen'l. Storage, Logistics Dept.	No
Phase II	916	30,000	CT	CA	Gen'l. Storage, Logistics Dept.	No
Phase II	917	30,000	CT	CA	Chemical Warehouse (Haz.Mat.)	Yes
Phase II	919	22,000	CT	CG	Gen. Storage & Package Store	No
Phase II	920	25,000	W	W	Administration Building	No
Phase II	921	17,000	W/CM	CA	Administration Building	No
Phase II	922	7,000	W	W	Environmental Health Office	No

Siding Type:
CT = Corrugated Transite
CM = Corrugated Metal
W = Wood
C = Concrete Structure
B = Brick Structure

Floor Type:
CA = Concrete, above grade
CG = Concrete, on grade
W = Wood
Unk = Unknown (no access)

1073M2-5

Table 2-2

Description of Buildings
Kapalama Military Reservation
(continued)

Property Subdivision	Building No.	Approx. Size (sq. ft)	Siding Type	Floor Type	Building Use	Building Entered
Ceded	923	52,000	W	CA	Paint Booth; Solvent Cleaning	Yes
Phase III[a]	924	52,000	W	CA	Canvas Repair; Packaging Area	Yes
Phase III	925	20,000	CT	CG	Forklift/Vehicle Maintenance	Yes
Phase III	926	53,000	CM	CA	General Storage Warehouse	Yes
Phase III	927	51,000	CM	CA	General Storage Warehouse	Yes
Phase III	928	50,000	CT	CA	General Storage Warehouse	Yes
Phase III	929	50,000	CT	CA	General Storage Warehouse	Yes
Phase III	929-A	200	B	Unk	Radioactive Material Storage	No
Phase III	930	42,000	CT	CA	General Storage Warehouse	Yes
Phase III	931	18,000	CT	CA	Gen'l. Storage; Fumigation Area	Yes
Phase III	935	800	C	Unk	Telephone/Switching Cables	No
Phase II	1020[b]	5,500	CT/W	CA	General Storage Warehouse	No
Phase II	1027	10,000	C	CG	Central I.D./Forensic Lab	Yes
Phase II	1028	5,000	C	CG	Central I.D./Photo Lab	Yes
Phase II	1030[b]	4,000	CM	CG	Metal Quonset Hut; Gen. Storage	No

Siding Type:
CT = Corrugated Transite
CM = Corrugated Metal
W = Wood
C = Concrete Structure
B = Brick Structure

Floor Type:
CA = Concrete, above grade
CG = Concrete, on grade
W = Wood
Unk = Unknown (no access)

[a]Partly within ceded area.
[b]Building has been demolished.

1073M2-4

bodies), a forklift maintenance area, low-level radioactive material storage, pretransport fumigation of materials, and canvas repair and waterproofing. The fumigation process has been carried out in two separate buildings; it was moved to the current location in 1988, and is currently handled by a private contractor.

According to the Historic Section, Division of State Parks, Department of Land and Natural Resources, there are no sites on KMR listed in the national or state register of historic places. However, field work performed on the site reportedly resulted in archeological findings in the Phase IIA section of the property [R-6]. The extent or importance of these findings is unknown and will be monitored during subsequent field activities. Also, portions of Phase II and Phase III were apparently constructed over Loko (Fishpond) Ananoho [R-10]. Additional coordination with the State may be repaired prior to any excavation activities.

2.2 DESCRIPTION OF FACILITIES

For purposes of property disposal, KMR was divided into four parcels, as shown in Figure 1-1. They are:

- Phase I - 14.4 Acres
- Phase IIA - 7.8 Acres
- Phase IIB - 35.9 Acres
- Phase III - 22.0 Acres

The Phase I lot was sold to Servco Pacific, Inc., in 1987. It is currently used for the storage of new cars and light trucks. Phase II is subdivided into Phases IIA and IIB because the sale of Phase II is expected to be executed in stages. Also shown on Figure 1-1 are two "ceded" areas covering a total of 17.8 acres. These ceded areas are not included in the acreage figures shown above. Although the State is attempting to have this land ceded, this transaction has not yet been completed.

2.2.1 CONTENTS OF BUILDINGS - PHASE III AREA

Most buildings in the Phase III area are devoted to the storage of miscellaneous items such as office equipment and furniture, small mechanical parts, and appliances. These items range in size from small boxes of nuts and bolts to office desks and washing machines (photos 5 to 7). No current or potential ESOs were found in any of these general storage areas.

Some buildings in the Phase III area contain activities that are or may be of an environmentally significant nature. These locations are identified and discussed in Section 3 of this report. They include, for example, the paint spray booth in Building 923 and the termite fumigation area in Building 931.

2.2.2 CONTENTS OF BUILDINGS - PHASE II AREA

Because the original scope of this assessment was limited to the Phase III area of KMR, a less extensive review of buildings in Phase II was performed. General information concerning these buildings was gathered, as well as

specific information on a few selected buildings. These specific buildings, such as the hazardous material storage Building 917, were treated at the time of the assessment as "environmentally significant properties" adjacent to the Phase III area.

Examples of the general storage areas in Phase II include Building 905, which contains general items sold at the Army/Air Force stores (PXs) on the island, and Building 909, which houses surplus equipment (beds, etc.) from Tripler Army Medical Center.

2.2.3 GENERATION AND DISPOSAL OF WASTES

Solid wastes generated at KMR are collected in dumpsters and transported to a municipal landfill [I-2]. Reportedly, there has never been any onsite disposal (landfilling) of this material. These wastes consist mainly of general plant refuse, such as paper, cardboard, and empty containers, but also include dried paint residues from the spray booth and expanded polymer foam from the packaging area.

A few locations at the facility produce nonaqueous liquid wastes. These include a small parts degreasing area, a paint spray booth, and a forklift maintenance area. These wastes consist of used oils and solvents, with an approximate volume of less than 10 gal/week. Interviews with Maintenance Department Personnel [I-6] indicated that the past and current practice has been to accumulate a few drums of these wastes and then transport them by private contractor to the Schofield Barracks/Wheeler AFB waste disposal site on the island.

Small volume sources of chemical wastes exist in the Phase II area. These include the mortuary (e.g., formaldehyde) and the Central Identification Laboratory (darkroom/photographic solutions), but these areas discharge to the city sanitary sewer system. All sanitary wastewater is also discharged to this system. There are no current or former wastewater treatment or disposal facilities on the site.

2.3 PERMITTING STATUS

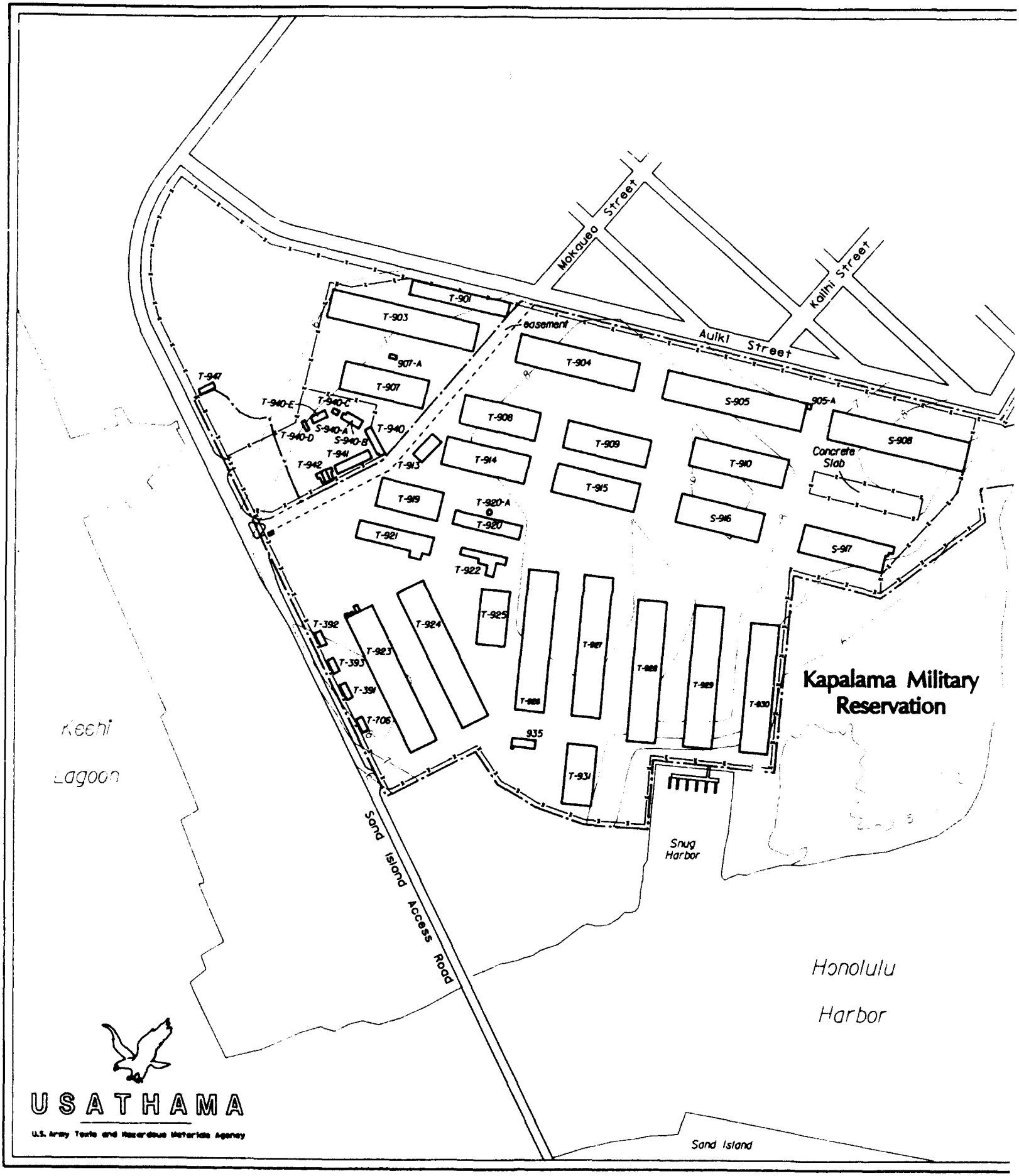
The KMR does not currently operate under any environmental permits. Contacts with the Hawaii Department of Land and Natural Resources and EPA Region IX showed no record of any permits issued. There have been no reported spills for at least the past 10 years.

2.4 SURROUNDING ENVIRONMENT AND LAND USE

The property is on the coastal area of the island of Oahu's southern shoreline. The land surface is flat and the surrounding area varies in elevation from sea level to 5 ft above sea level (Figure 2-2).

2.4.1. DEMOGRAPHICS AND ADJACENT LAND USE

KMR is located in the harbor district of the City of Honolulu. All surrounding land is used for commercial and industrial purposes. The city designates the area in which KMR is located as a Primary Urban Center, and the land is zoned as industrial/ commercial.


Mokauea Street
Kalihi Street
Auiki Street
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T-901
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S-905
905-A
T-908
S-908
T-909
T-914
T-910
Concrete Slab
T-915
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T-392
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T-706
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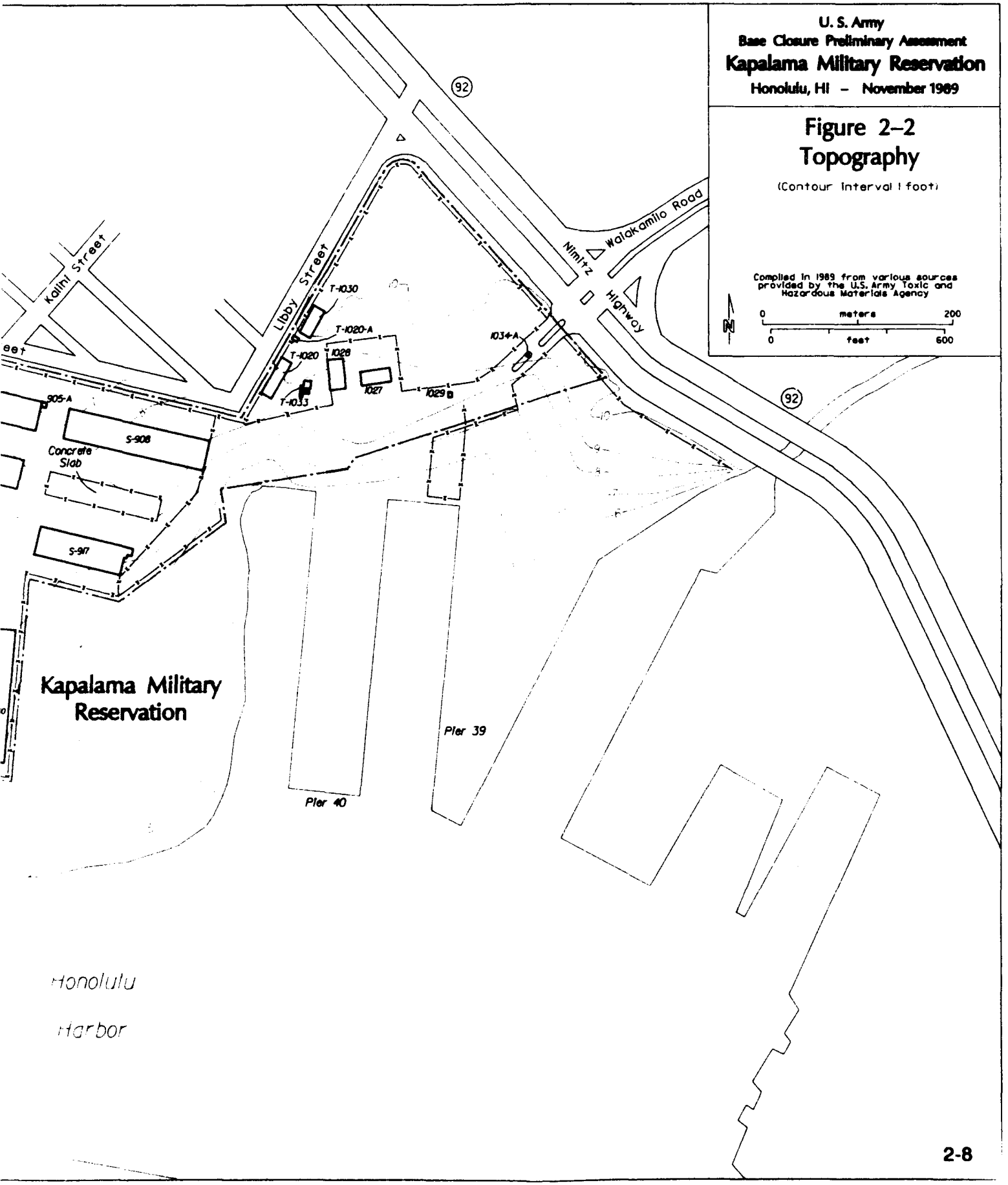
T-929
T-930
935
T-931
T-947
T-940-E
T-940-C
T-940-D
S-940-A
S-940-B
T-940
T-941
T-942
T-913
Kapalama Military Reservation
Kalihi Lagoon
Sand Island Access Road
Snug Harbor
Honolulu Harbor
Sand Island
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency


U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI - November 1989
Figure 2-2
Topography
(Contour Interval 1 foot)
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
N
0 meters 200
0 feet 600
92
Kalihi Street
Libby Street
Nimitz Highway
Waiakamilo Road
T-1030
T-1020-A
T-1020
1028
T-1033
1027
1029
1034-A
905-A
S-908
Concrete Slab
S-917
Kapalama Military Reservation
Pier 39
Pier 40
Honolulu Harbor

The Phase I portion of the property that is now owned by Servco Pacific, Inc., is currently used for the storage of automobiles and trucks.

This property reportedly contained three underground storage tanks, at least one of which was removed prior to sale of the property by the Army. The tanks contained diesel oil and g soline; their sizes and dates of installation are unknown. According to a 198/ report, a pressure test indicated one of these tanks was leaking [R-1]. Information recently received from the Department of Logistics at Kapalama indicated that subsurface hydrocarbons were found under the Phase I property [I-2]. Borings have been drilled by Dames & Moore and have revealed hydrocarbons in at least two borings to date [Appendix B]. Dames and Moore also conducted a soil gas survey and reported a "small area" as having measurable quantities of soil gas near the surface zone. A report by Woodward-Clyde Consultants also indicated the presence of subsurface hydrocarbons [R-7; Appendix B].

A large fuel storage tank farm is located just west of KMR, across Sand Island Road. This tank farm reportedly contains aviation fuels that are piped underground directly to Honolulu airport.

Piers 39 and 40 are owned by the State of Hawaii. Fuel oil and diesel fuel lines have been run to both piers, crossing Nimitz Highway to the northeast of KMR. Underground leaks from these pipe lines or from the tank farm could potentially migrate to KMR. The direction of potential leaks from any of these sources is not certain because this is an area of tidal groundwater fluctuation.

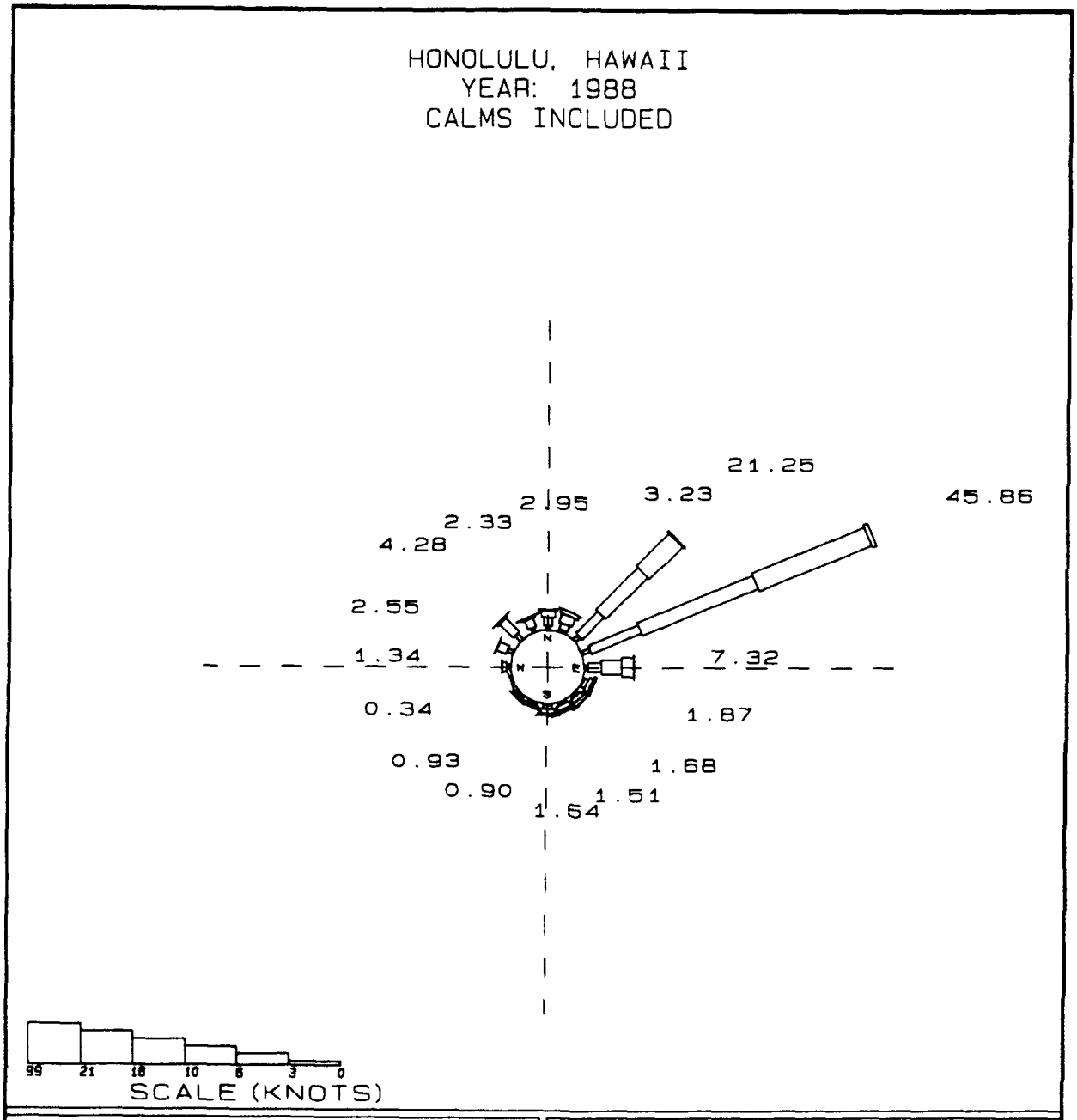
The paved area, including Snug Harbor south of Phase III, is owned by the State and used by the University of Hawaii. This site is used as a general storage yard for miscellaneous items such as buoys and mechanical equipment.

The neighbor southeast of KMR, adjacent to Pier 40, is the Hawaiian Dredging Company. General ship repair activities are performed here. At the northwest corner of KMR, just across the road, is a U.S. Postal Service vehicle maintenance and service facility. All other neighbors to the north consist of private commercial properties and a few truck terminals (photos 8 to 10).

2.4.2 CLIMATE

In general, the climate of Hawaii is affected by trade winds, variability of rainfall over short distances, and mountain ranges. Honolulu, where KMR is located, has a small seasonal variation in temperature during the year. The warmest months are August (80.7° F) and September (80.4° F), and the coldest months are January (72.3° F) and February (72.3° F). The yearly variation in temperature from summer to winter is approximately 7° F.

Figure 2-3 is a wind rose for Honolulu for the year 1988. The prevailing winds are from the northeast, commonly known as the northeasterly trade winds. The northeasterly trade winds occurred 67 percent of the time during



	WIND SPEED (KNOTS) PERCENT OCCURRENCE					
	0-3	3-6	6-10	10-16	16-21	>21
N	0.55	1.25	0.92	0.23	0.00	0.00
NNE	0.31	0.97	1.33	0.62	0.01	0.00
NE	1.00	4.58	8.75	5.71	0.22	0.00
ENE	1.27	7.94	18.36	17.60	0.69	0.00
E	0.51	1.99	2.97	1.75	0.09	0.00
ESE	0.24	0.55	0.64	0.44	0.00	0.00
SE	0.13	0.33	0.60	0.56	0.06	0.00
SSE	0.07	0.36	0.69	0.32	0.03	0.02

	WIND SPEED (KNOTS) PERCENT OCCURRENCE					
	0-3	3-6	6-10	10-16	16-21	>21
S	0.12	0.55	0.66	0.30	0.02	0.00
SSW	0.07	0.36	0.31	0.16	0.00	0.00
SW	0.09	0.38	0.41	0.06	0.00	0.00
WSW	0.08	0.18	0.07	0.01	0.00	0.00
W	0.58	0.64	0.13	0.00	0.00	0.00
WNW	0.90	1.53	0.11	0.01	0.00	0.00
NW	1.14	2.81	0.27	0.05	0.01	0.00
NNW	0.64	1.39	0.25	0.02	0.03	0.00

FIGURE 2-3 WIND ROSE

1988. On an annual basis, the northeasterly trade winds vary from about 90 percent of the time during the summer to about 50 percent of the time during the winter.

Rainfall distribution varies greatly from the coast to the inland mountains. Rainfall in the Honolulu area averages 23 in. per year, but increases to about 35 in. per year one mile inland and to 60 to 70 in. per year 2 miles inland. Parts of the inland mountains average 300 in. of rainfall or more per year. Rainfall varies from month to month and year to year. For example, March rainfall in Honolulu has varied from 0.01 in. (1957) to 20.79 inches (1951).

Severe weather in Honolulu is infrequent. Thunderstorms are mild and seldom occur. Few tropical cyclones have directly struck Hawaii; however, there have been some tropical storms that have come close enough to Hawaii to cause high winds and rain. Tornadoes and waterspouts occur infrequently, but some have moved onshore and caused minor damage.

2.4.3 SURFACE WATER AND HYDROLOGY

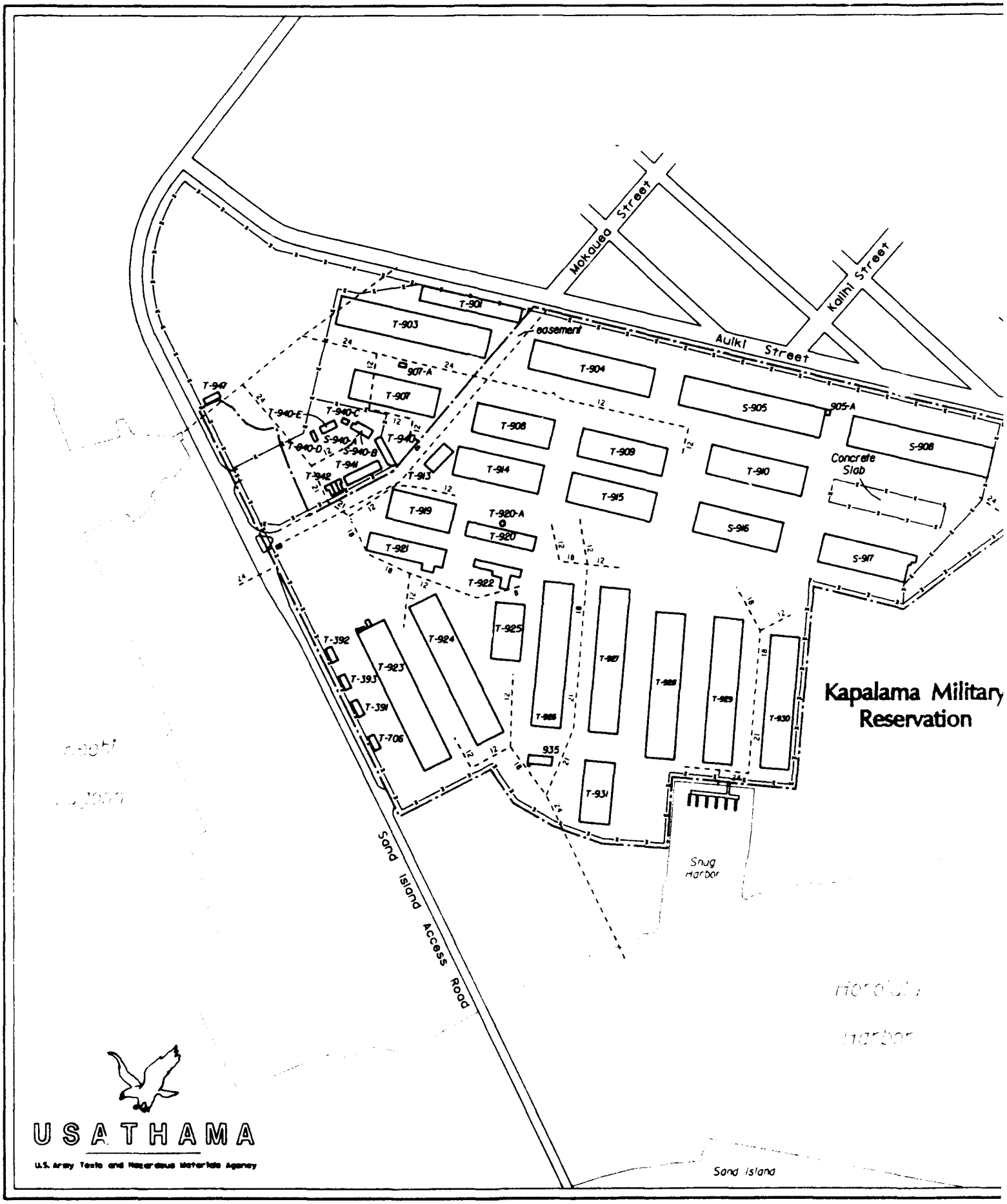
The KMR facility is located adjacent to the Honolulu Harbor. The storm sewer system and any surface runoff discharge directly into the Harbor (Figure 2-4). The primary use of the Honolulu Harbor is for commercial and industrial activities. No surface water bodies are present within the facility boundaries. Although adjacent to the harbor, the site is not subject to flooding; it is located within a flood insurance rate map zone X area, which means it is outside the 500-year flood zone.

2.4.4 SOILS

The area on which KMR was built consists primarily of dredgings from Kapalama Basin/Honolulu Harbor that were placed over the existing coral rocks and limestone deposits. However, a portion of the original shore line remains [R-8]. The U.S. Soil Conservation Service describes the land as "fill land of a mixed nature, characteristic of fill lands in the Honolulu area, dredged from the Kapalama Basin and Reserve Channel" [I-9]. The limited amount of exposed soil in the area (almost all surrounding areas are paved) is sandy.

Soil maps of the area classify KMR as "Fill Land, Mixed," which consists of areas filled by ocean dredging operations or by dumping of garbage or other material. This land type is described as being used for urban development [R-9].

In the Phase I area, some soil borings have been made. A Woodward-Clyde report references a 1989 report by Geolabs, which states that KMR is underlain predominantly by man-made fill that has been placed over a coral-algal formation [R-7]. The fill is described as consisting of "...clay to sandy gravel mixtures and an intermediate mix of silty sand soils, with consistencies that range from soft or loose to hard or very dense." The depth of this fill material is said to range from 12 to 20 feet.


Mokauea Street
Kalihi Street
Auiki Street
easement
T-901
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T-904
T-907
907-A
S-905
905-A
T-908
T-909
T-910
S-908
T-914
T-915
Concrete Slab
T-919
T-920-A
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T-392
T-393
T-391
T-706
T-927
T-928
T-929
T-930
935
T-931
T-947
T-940-E
T-940-C
S-940-A
T-940-D
S-940-B
T-940
T-941
T-942
T-913
Kapalama Military Reservation
Snug Harbor
Sand Island Access Road
Sand Island
USATHAMA
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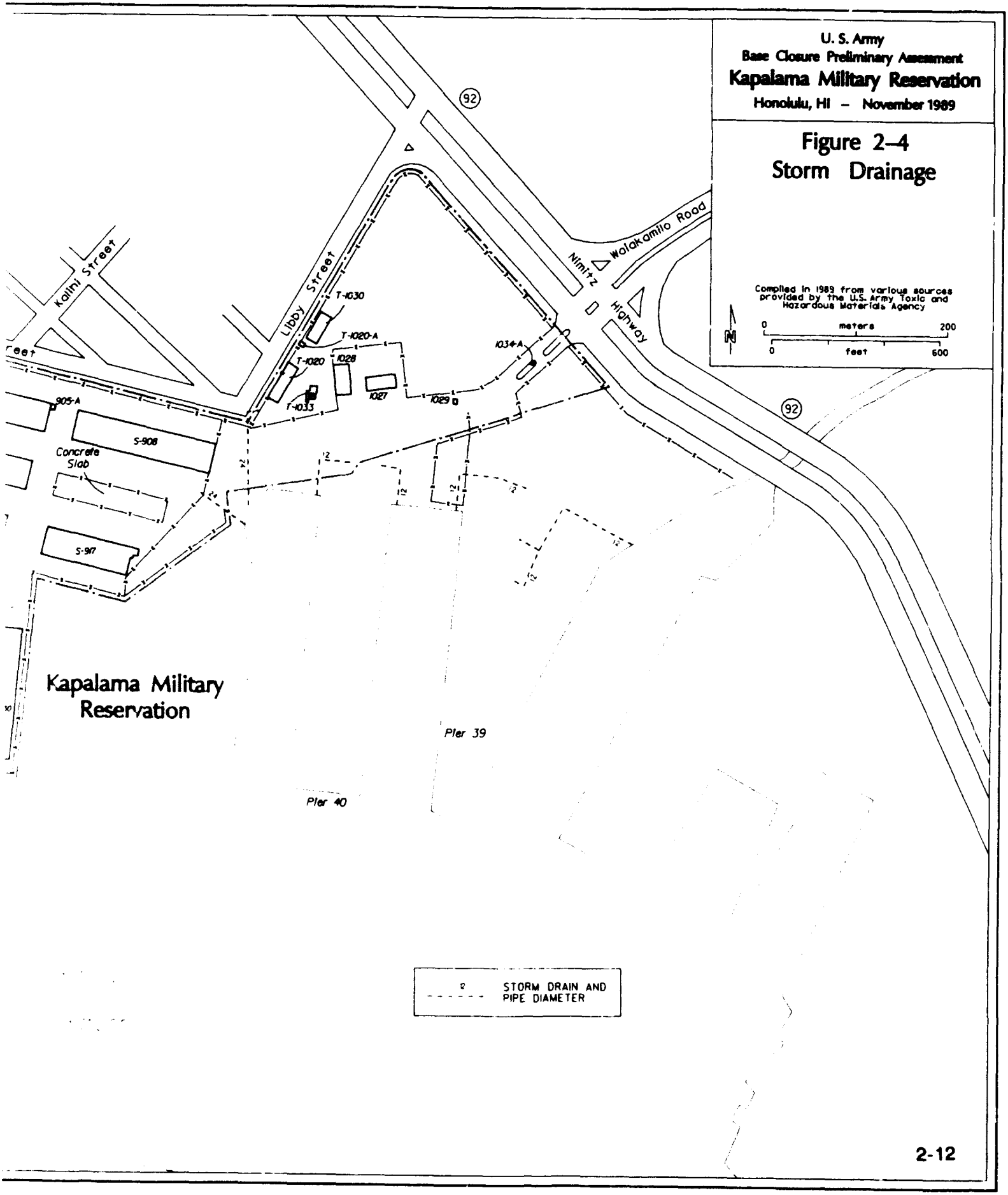

U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI – November 1989
Figure 2–4
Storm Drainage
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
N
0 meters 200
0 feet 600
92
Kalihi Street
Libby Street
Nimitz
Waiakamilo Road
Highway
T-1030
T-1020-A
T-1020
1028
1027
1029
1034-A
T-1033
905-A
S-908
Concrete Slab
S-917
Kapalama Military Reservation
Pier 39
Pier 40
STORM DRAIN AND PIPE DIAMETER

2.4.5 GROUNDWATER AND HYDROGEOLOGY

The coral reef and limestone under the facility are highly permeable. The water table is 3 to 5 ft below the surface. The groundwater is hydraulically connected to the harbor, and depth to water varies with the tidal action in the harbor. The water in this shallow aquifer is brackish and is not used as a water supply. The KMR facility is served by the City of Honolulu water and sewer system. There are no wells on the property. The closest known groundwater well is approximately one mile north (inland) at the Oahu State Prison.

2.4.6 FLORA AND FAUNA

KMR and the surrounding properties consist primarily of paved surfaces for industrial and commercial uses, plus adjacent streets and highways. A limited number of ornamental trees and shrubs exist in this urban area. It is, therefore, a very poor habitat for any wildlife. A few rodents, geckos, finches, and sparrows were observed during this site visit. Stray cats are reported to occasionally inhabit some areas of the facility.

2.4.7 SENSITIVE ENVIRONMENT

No endangered or threatened species are recorded on KMR nor would any be expected in this environment. (No wetlands were identified within 2 miles of the facility.)

SECTION 3

ENVIRONMENTALLY SIGNIFICANT OPERATIONS

The objectives of this section are to document areas where hazardous materials are managed and to identify known or potential releases of these materials into the environment and their likely migration pathways. The locations of all identified ESOs are shown in Figures 3-1, 3-2, and 3-3.

3.1 BUILDINGS 913/914 - THE MORTUARY (PHASE II)

3.1.1 DESCRIPTION

Building 913 is a small annex of Building 914 connected by a walkway. Building 913 houses a chapel and a small receiving area; the rest of the mortuary operations are carried out in Building 914. Coffins and other equipment associated with the mortuary are also stored in Building 914.

A few chemicals are stored in Building 914 in containers of 5-gal capacity or less placed in metal cabinets and in solvent lockers. These lockers are designed with a spill containment well at the bottom, which has sufficient capacity to retain spills of the largest container. There are no floor drains in this building. The chemicals stored here are associated with the examination and embalming procedures performed at the mortuary and include arterial fluids (formaldehyde), desiccate (dry inorganic powders such as calcium and aluminum sulfates) and liquid soaps containing small amounts of phenol and hexachlorophene. Drum quantities of these chemicals are stored in Building 917 and transferred to the mortuary as needed.

The area is very clean. A few large sinks and prep tables are used to examine and prepare bodies for burial. All drains from these fixtures discharge directly to the sanitary sewer system. No autopsies are performed here, and no biological wastes are stored in the building. Any blood removed during the embalming process is discharged to the sanitary sewer.

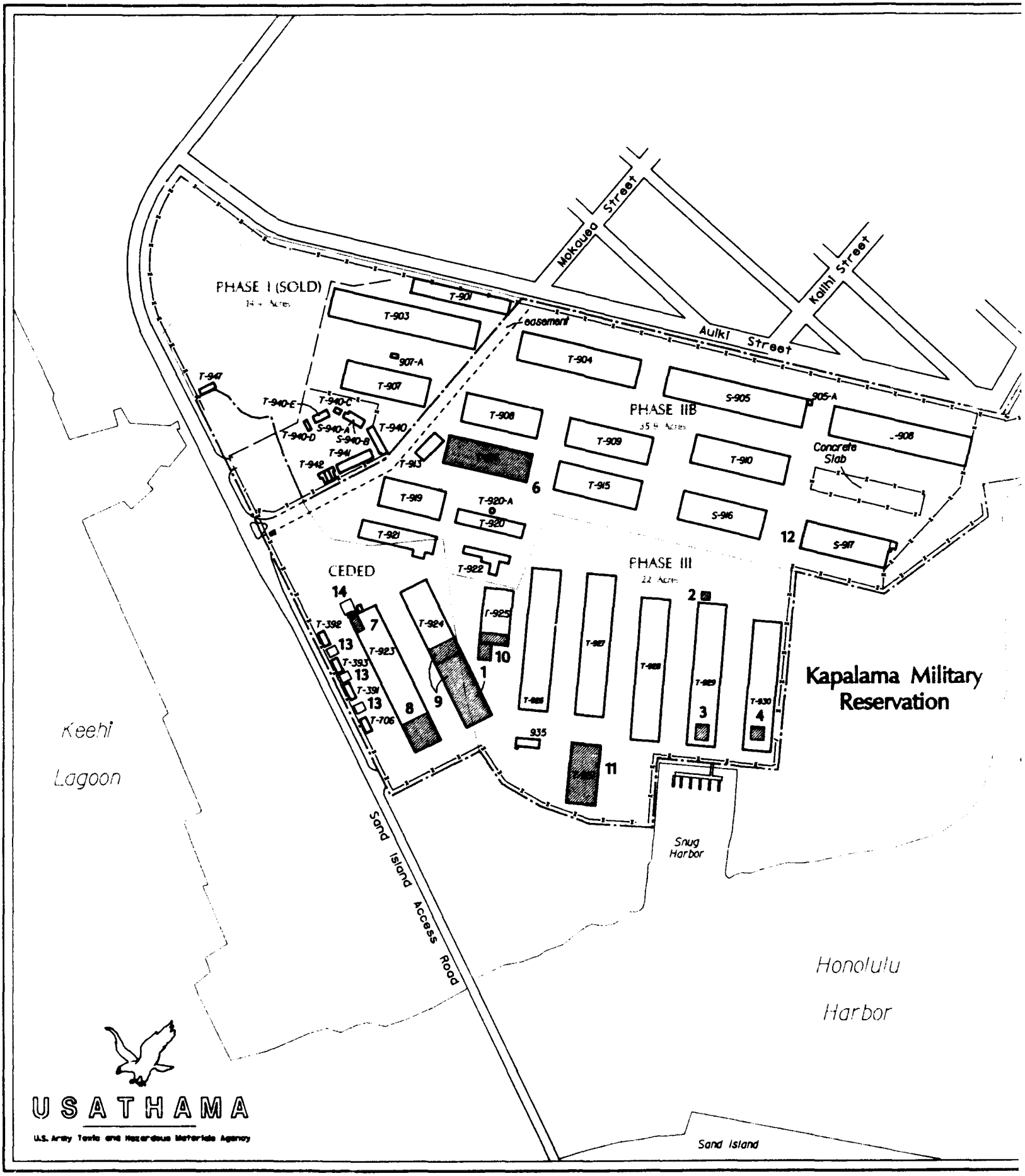
3.1.2 KNOWN AND SUSPECTED RELEASES

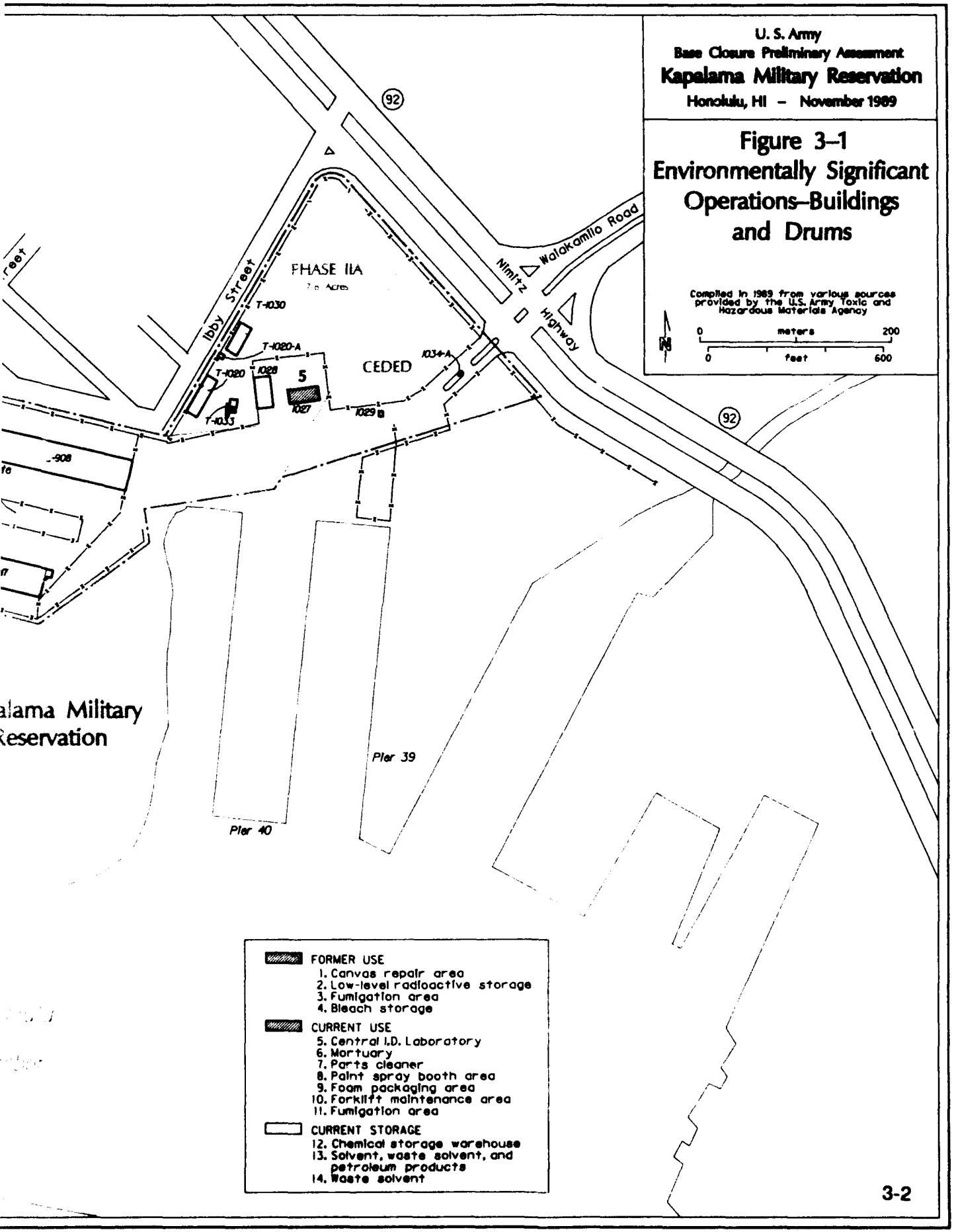
There is no evidence of spills in this area.

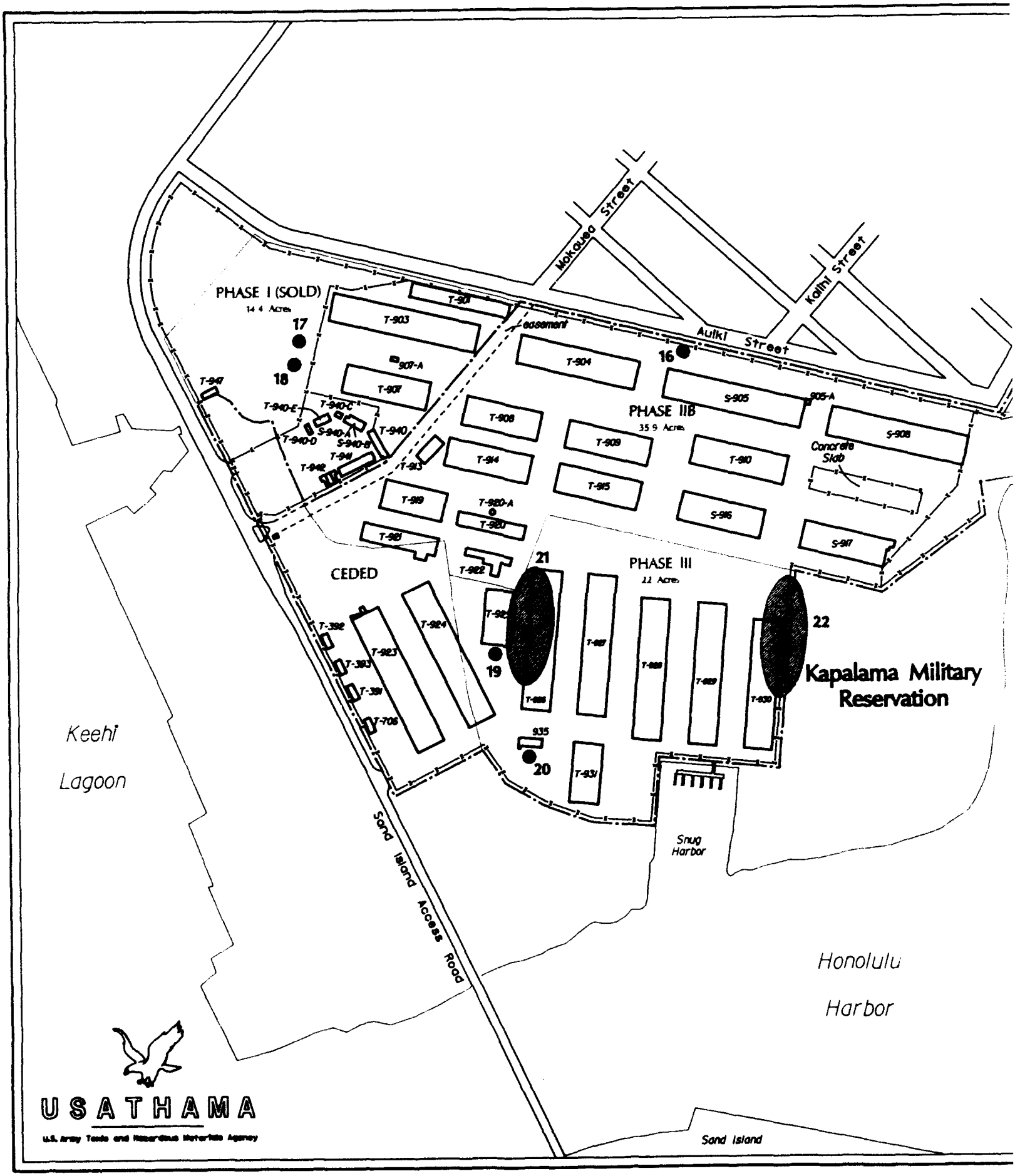
3.2 BUILDING 917 - HAZARDOUS MATERIAL STORAGE (PHASE II)

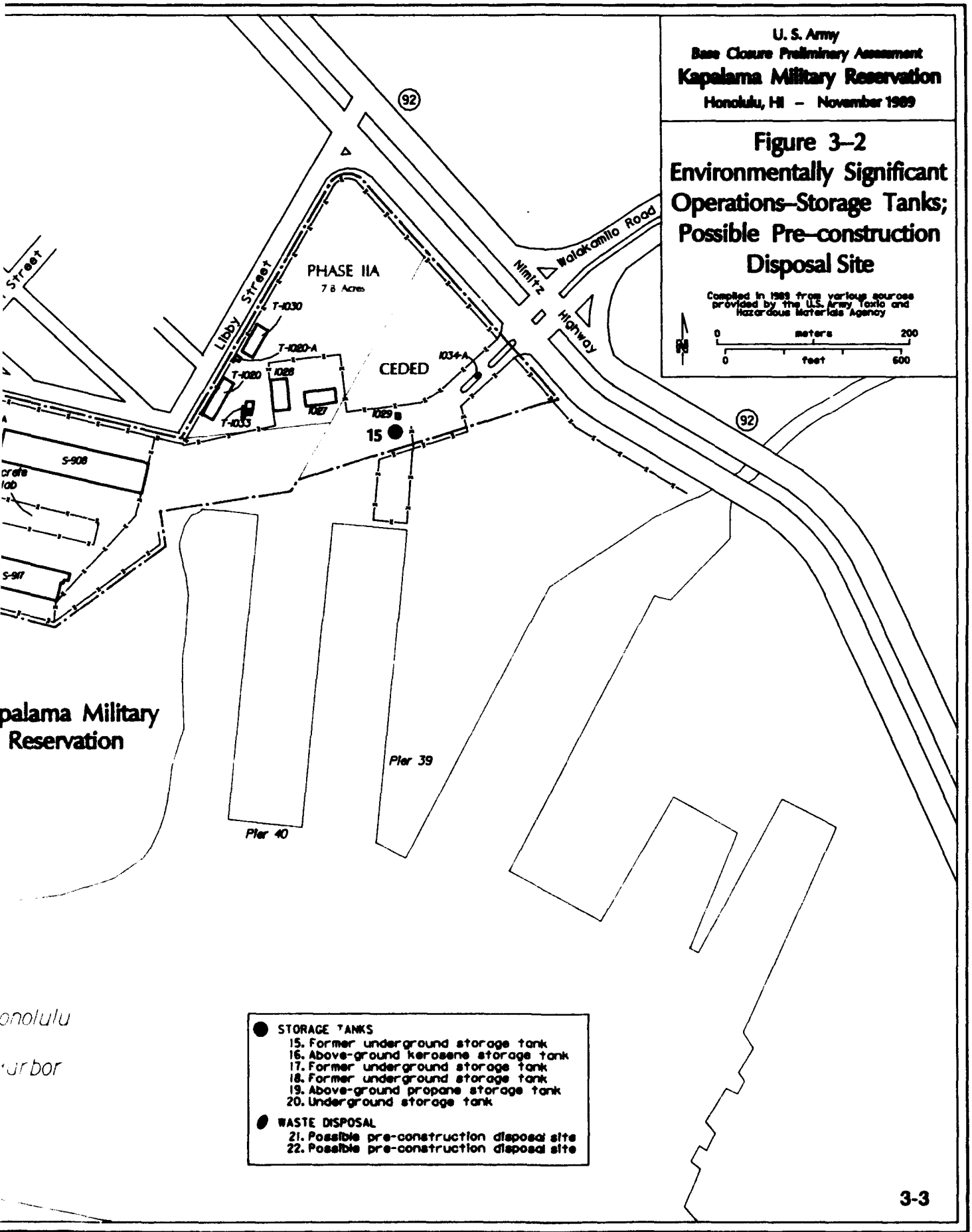
3.2.1 DESCRIPTION

KMR serves as a supply and warehouse facility for other U.S. Army installations in Hawaii. Building 917 warehouses a large variety of chemical compounds. These materials include a broad spectrum of hazard classifications, ranging from common cleaners and lubricants to oxidizers, corrosives, and pesticides. Quantities of these materials range from pint/pound-sized containers to 55-gal drums.


Mokauea Street
Kalihi Street
Auiki Street
easement
PHASE I (SOLD)
PHASE IIB
PHASE III
CEDED
T-901
T-903
907-A
T-907
T-904
S-905
905-A
T-908
T-909
T-910
-908
Concrete Slab
T-915
T-919
T-920-A
T-920
S-916
T-921
T-922
S-917
T-947
T-940-E
T-940-C
T-940-D
S-940-A
S-940-B
T-940
T-941
T-942
T-943
T-924
T-925
T-927
T-928
T-929
T-930
T-392
T-923
T-393
T-391
T-706
935
Kapalama Military Reservation
Keehi Lagoon
Sand Island Access Road
Snug Harbor
Honolulu Harbor
Sand Island
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency


U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI – November 1989
Figure 3–1
Environmentally Significant Operations–Buildings and Drums
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
0 meters 200
0 feet 600
92
Nimitz Highway
Waiakamilo Road
Ibby Street
PHASE IIA
7.6 Acres
CEDED
T-1030
T-1020-A
T-1020
1028
5
1027
1029
T-1033
1034-A
908
Pier 39
Pier 40
alama Military
Reservation
FORMER USE
1. Canvas repair area
2. Low-level radioactive storage
3. Fumigation area
4. Bleach storage
CURRENT USE
5. Central I.D. Laboratory
6. Mortuary
7. Parts cleaner
8. Paint spray booth area
9. Foam packaging area
10. Forklift maintenance area
11. Fumigation area
CURRENT STORAGE
12. Chemical storage warehouse
13. Solvent, waste solvent, and petroleum products
14. Waste solvent

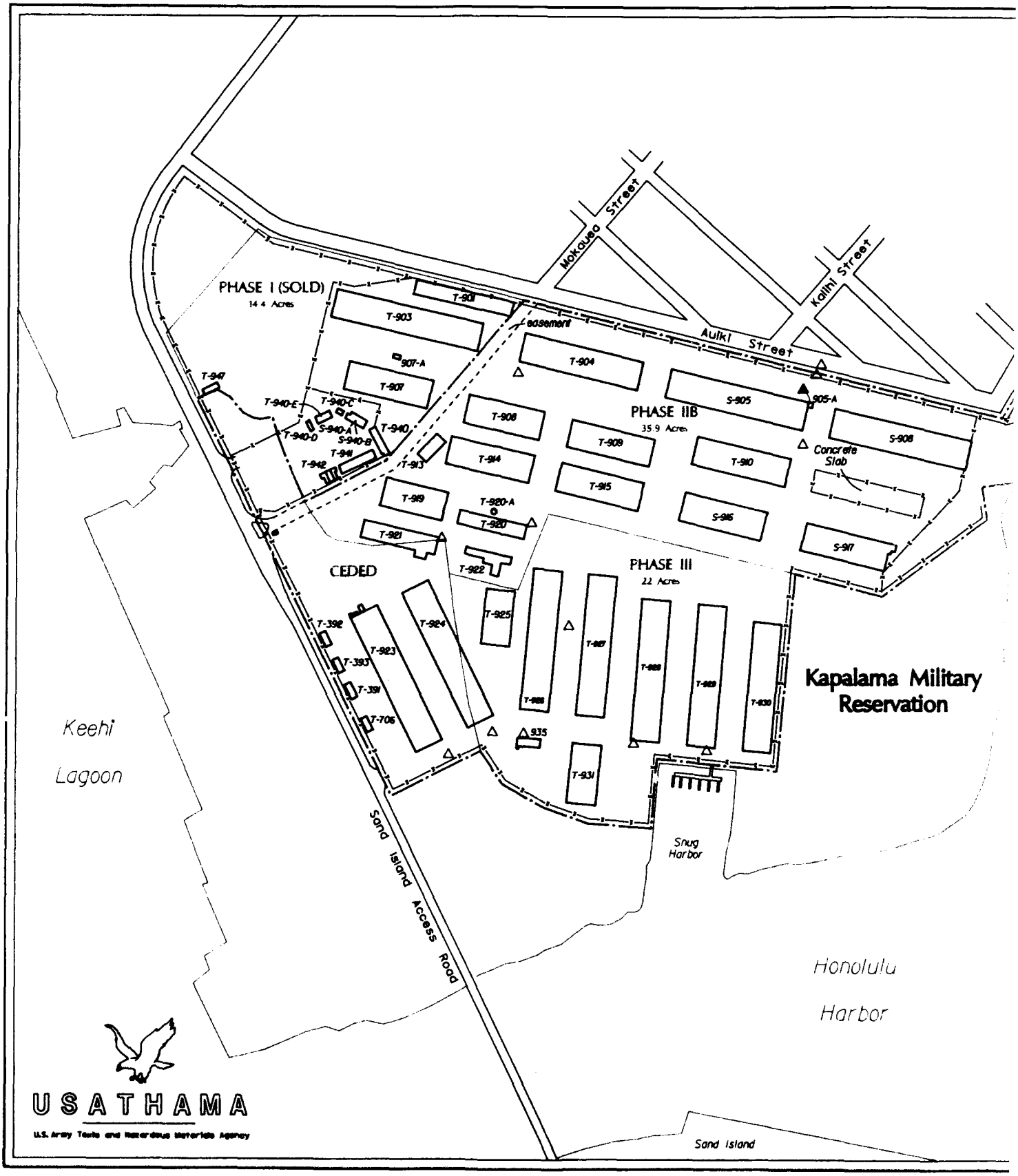

Makaleo Street
Kalihi Street
Auiki Street
easement
PHASE I (SOLD)
14 4 Acres
PHASE IIB
35 9 Acres
PHASE III
2.1 Acres
CEDED
Concrete Slab
Kapalama Military Reservation
Keehi Lagoon
Sand Island Access Road
Snug Harbor
Honolulu Harbor
Sand Island
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency

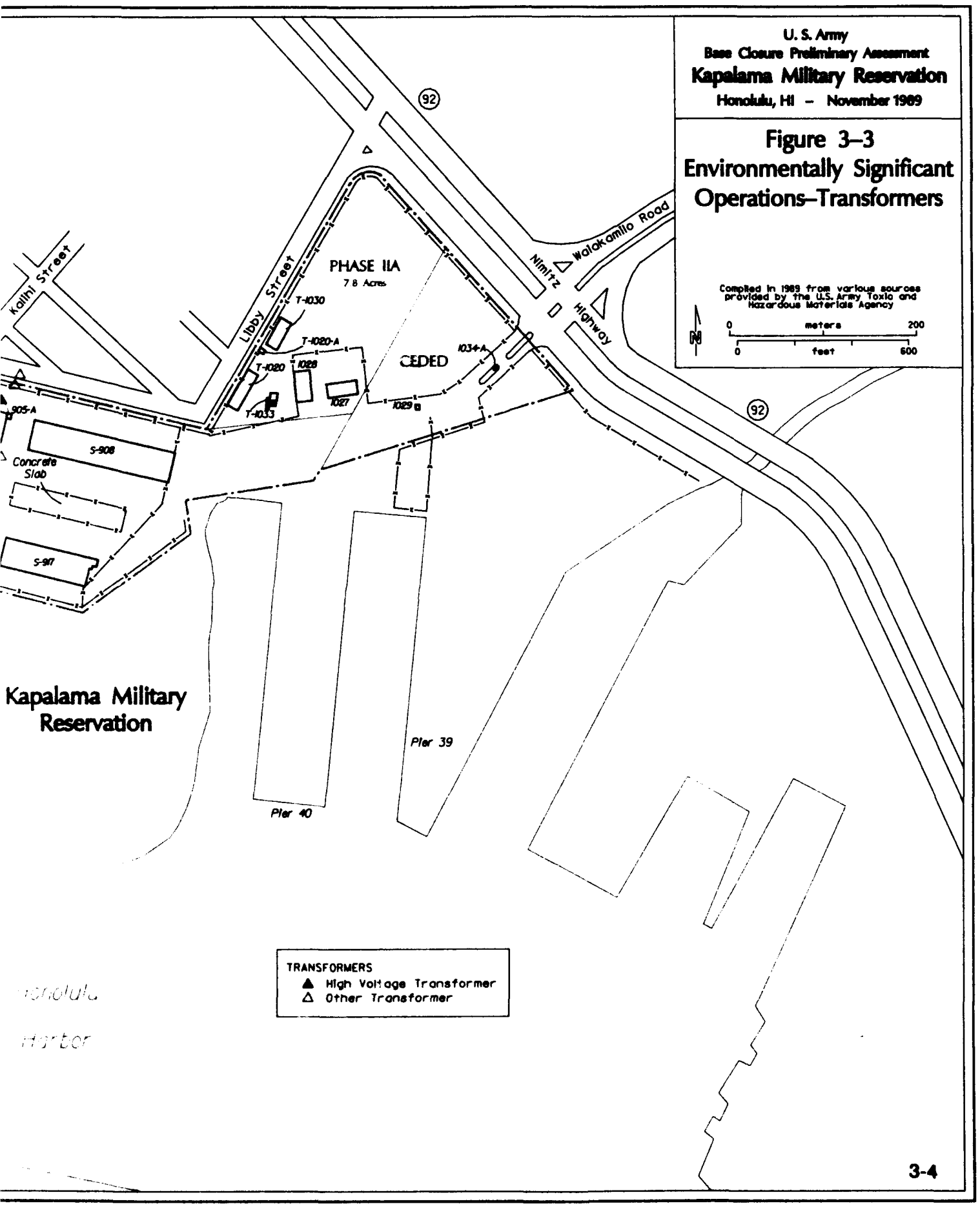


palama Military Reservation

onolulu

urbor


PHASE I (SOLD)
14.4 Acres
PHASE IIB
35.9 Acres
PHASE III
22 Acres
CEDED
Kapalama Military Reservation
Mokauea Street
Kalihi Street
Auiki Street
easement
Concrete Slab
Keehi Lagoon
Sand Island Access Road
Snug Harbor
Honolulu Harbor
Sand Island
T-903
T-904
T-905
T-905-A
T-906
T-907
T-907-A
T-908
T-909
T-910
T-913
T-914
T-915
T-916
T-917
T-919
T-920
T-920-A
T-921
T-922
T-923
T-924
T-925
T-927
T-928
T-929
T-930
T-931
T-935
T-940
T-940-A
T-940-B
T-940-C
T-940-D
T-940-E
T-941
T-942
T-947
S-905
S-908
T-391
T-392
T-393
T-706
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency


U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI – November 1989
Figure 3–3
Environmentally Significant Operations–Transformers
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
0 meters 200
0 feet 600
N
92
Kalihi Street
Libby Street
Nimitz
Walakamilo Road
Highway
PHASE IIA
7.8 Acres
CEDED
T-1030
T-1020-A
T-1020
1028
1027
1029
T-1033
1034-A
905-A
S-908
Concrete Slab
S-917
Kapalama Military Reservation
Pier 39
Pier 40
TRANSFORMERS
High Voltage Transformer
Other Transformer
Honolulu Harbor

Examples of some of the materials stored in Building 917 are listed below. A more comprehensive list of materials is provided in the computerized inventory database presented in Appendix A.

- Battery acid (concentrated sulfuric) in 5-gal containers.
- Caustic cleaning compound (sodium hydroxide) of various sizes.
- Aromatic organic solvents such as toluene and xylene in 5 to 55-gal quantities.
- Low flash point solvents such as acetone and methyl ethyl ketone.
- Lindane (organochlorine pesticide).
- Paints, both aqueous and oil based, possibly containing lead and/or cadmium.

Examples of the contents of Building 917 are shown in photos 11 to 17.

The chemicals are stored on wooden pallets and/or metal shelves and racks, and no secondary containment is provided. The warehouse floor is concrete and marbled with cracks, some as large as 1/4 in. Any spills that may have occurred were washed out of the building into the storm drain in the parking area between the buildings. There are no floor drains in the building.

3.2.2 KNOWN AND SUSPECTED RELEASES

At the time of this inspection, the warehouse was clean and there was no evidence of any current or previous spills. A shop steward who had worked at KMR for 20 years stated that there have been "...only a few minor spills over the years, never anything big [I-8]."

Any hazardous chemicals that were spilled could have entered cracks in the floor and remained there after surface cleanup was complete. It is not known how far into the slab these cracks penetrate or if any subsurface contamination has occurred.

The Corps of Engineers issued a 1988 report stating that subsurface samples collected around Building 917 were analyzed for the RCRA hazardous characteristics of ignitability, corrosivity, reactivity, and EP Toxicity [R-4]. All test results indicated the samples were not hazardous. Samples were also tested for total petroleum hydrocarbons (TPH). The report stated that TPHs were detected, but did not identify the number of samples or concentrations. The report further stated that the TPH levels were below those set by the U.S. Environmental Protection Agency. WESTON is unaware of any EPA TPH limitations for soils; therefore, this reference to a regulatory limit is unclear.

3.3 BUILDING 923 - SOLVENT CLEANING ROOM AND PAINT SPRAY BOOTH (WESTERN CEDED AREA)

3.3.1 DESCRIPTION

Most of Building 923 is used for general storage, including office furniture and file cabinets. There are, however, two areas of concern regarding hazardous materials and the generation of small quantities of wastes.

At the west end of the building, a paint spray booth area (two booths) is used to paint items such as metal office desks and cabinets and small pieces of military hardware such as camouflage-painted vehicle parts. Both aqueous and oil-based paints as well as paint thinners and solvents are used in this area (photo 18).

The spray booths are the typical water-curtain type, with a trough at the bottom to collect the residues. The water is recirculated; there is no wastewater discharge. The current method for disposing of the paint residues is to manually remove the paint waste, allow it to air dry outdoors, and to place it in the trash dumpster. At this time, the water in the trough is hand bailed and dumped into an adjacent sink, which is connected to the sanitary sewer system. Less than 10 percent of the painting performed at this location involves camouflage paint, but some camouflage paints are known to contain lead or cadmium pigments. The exact chemical composition of the paints used is not known.

At the east end of the building is a small room used for solvent cleaning/degreasing of small equipment parts (mainly electronic) and vehicle maintenance. Chlorinated solvents, including trichloroethylene TCE, are used in this room on a limited basis (<10 gal/week). All degreasing operations are performed in a metal sink inside a fume hood, with exhaust directed outside of the building. The sink drain runs directly into a 55-gal drum in a small wooden shed outside the building (photos 19 and 21). The shed has a wooden floor resting on asphalt. There are no floor drains in the building and the floor itself is intact.

Two storage areas that contain hazardous materials and waste liquids are adjacent to Building 923. One area consists of racks containing 55-gal drums filled with fresh solvents such as paint thinners and chlorinated degreasing solvents. The other site is a wire-fenced area in which 55-gal drums of waste solvents from the paint booth and degreasing areas are stored on wooden pallets. Both of these drum storage areas are on the asphalt-paved area near the property perimeter fence along Sand Island Road (photos 22 and 24). Waste solvents and oil are transported by private contractor to Schoefield Barracks for disposal. There are no containment dikes of any type at either storage area. Both storage areas drain to the storm sewer system.

3.3.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any spills in these storage areas. A spill from one of the outside drum storage areas could have resulted in contamination of the surrounding pavement and ground, and a release could have reached one of the storm drains in the area.

3.4 BUILDING 924 - CANVAS REPAIR AREA AND PACKAGING AREA (PHASE III - PARTLY WITHIN WESTERN CEDED AREA)

3.4.1 DESCRIPTION

Two different operations are carried out in this building, and there is some general warehouse use. The "canvas repair area" operations include the repair of large tents used in military field operations and chemical-resistant suits used by emergency response personnel as well as a small upholstery shop for furniture repair.

One area of this building, approximately 500 sq ft at the east end, is the former "waterproofing area." These operations, which ceased in 1970, consisted of treating various fabric materials with a polymer-type water repellent agent. This area has a sloped floor, which would have channeled any spills directly to the sanitary sewer system (photos 25 and 26).

No chemicals were observed in the building. The interior of the building was clean. Some small rusted tanks (approximate size of 50 to 100 gal) are present in the building; these were reportedly used in a previous dip-type solvent degreasing operation. This operation occurred at least 15 years ago. The floor is cracked around the tanks. The tanks are now occasionally used for washing small parts with household-type cleaners.

The packaging area is a section of the building devoted to packing small to medium-sized containers in crates, using a two-part isocyanate foam. The items are usually chemical products, such as cleansers, solvents, and pesticides from Building 917, packaged in containers ranging in size from one pint to 5 gal. The items to be packaged are placed in the crates, the two components of the foam are mixed in a separate container, and then the blended liquid is poured around the items in the crate and allowed to expand. At the time of the site visit, some of the items packaged in this manner included corrosive alkaline cleaners and methyl ethyl ketone.

The polymeric isocyanate foam components are stored in separate containers and mixed only as needed. Any excess or spilled blended material is disposed of as a solid waste in one of the plant dumpsters once it has expanded and solidified (photos 27 and 28).

There are a few old rusted drums on pallets just outside Building 924. The pallets are located on asphalt, and the only drains in the area are connected to the storm sewer. These are labelled as containing "waste oil" and are now empty, except for 1 to 2 in. of what appears to be rainwater in two of the open drums (photo 29).

3.4.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of past or present spills in this area. The packaging operation could have caused contamination of the floor surface by the material being shipped. A potential spill from the outside drum storage area would likely enter the storm sewer system.

3.5 BUILDING 925 - MAINTENANCE AND REPAIR OF FORKLIFTS (PHASE III)

3.5.1 DESCRIPTION

This smaller building (20,000 sq ft) is centrally located in the Phase III area and is used for some small parts storage. The activity with potential for environmental impact is the forklift maintenance activity, which is performed adjacent to Building 925.

Numerous propane forklifts are used throughout the KMR warehouse facility. Repair and maintenance of these vehicles, including the changing of fluids, is performed in and around Building 925. A variety of lube oils, greases, and hydraulic fluids are required for these activities. These materials are stored outside on the paved asphalt area southwest of the building. At the time of the site visit, the storage area appeared to be well maintained. Drums are mounted horizontally on metal racks. Drip pans and trays filled with absorbents are used with all drums that are in service. The asphalt shows a few small stains from what appear to have been service-related drips or spills (*photos* 30 and 31).

This maintenance area generates an average of 2 gal/week of waste oil and solvent. Waste oils and lubricants are stored in drums, and outside in the service yard area. Some drums are of the bung-type, while others are open top with weighted covers on them (photo 32). This area has no design containment (other than drip pans as noted above) and drains to the storm sewer system in the parking lot. Waste oil is delivered by a private contractor to Schoefield Barracks.

3.5.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of a significant spill in or around Building 925. Small stains were noted, but appear to be the result of only minor quantities that were spilled during transfer operations. Potential spills from the storage area, if more than minor quantities, would drain into the storm sewer system and eventually discharge into the harbor.

3.6 BUILDING 926 - GENERAL STORAGE AND SEALED SOURCE RADIOACTIVE STORAGE (PHASE III)

3.6.1. DESCRIPTION

This building is used predominantly for the general storage of furniture and small parts. A few boxes containing sealed low-level radioactive sources such as compasses are also kept here. The building, in general, appears to be well maintained.

3.6.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of leaks or spills of any type.

3.7 BUILDING 929 - GENERAL STORAGE AND FORMER PALLET FUMIGATION AREA (PHASE III)

3.7.1 DESCRIPTION

The building is now used for the general storage of office equipment and small parts. However, a small part of the building was formerly used for the fumigation of wooden pallets. The purpose of this treatment was termite control, and it was used on all wooden and cardboard material transported from the island. The fumigation step was performed in Building 929 up until 1988 [I-11]. It is now handled in Building 931 by a private contractor, as described in Subsection 3.10.

The fumigation process in Building 929 took place in a large chamber (approximately 20 ft x 40 ft) that is still intact. It has wooden walls and a fibrous insulation-type material on the ceiling. A portion of this ceiling material has become partly detached and is hanging in the chamber. A strong organic chemical-type odor is still evident in the chamber, which has remained closed since the fumigation activities ceased (photos 33 to 35). The name of the insecticide used was not available.

3.7.2 KNOWN AND SUSPECTED RELEASES

Pursuant to the National Environmental Policy Act, an Environmental Assessment prepared by the Army Corps of Engineers in November 1988 indicated that samples taken from the former fumigation room in Building 929 contained 40 mg/kg of PCP (pentachlorophenol) and 0.45 mg/kg of 2,4-D (2,4-dichlorophenoxyacetic acid) [R-4]. The report further stated that the current allowed EPA limit of 10 mg/kg of 2,4-D was not exceeded; however, the PCP-contaminated material must be disposed of as a hazardous waste [R-4]. The 10 mg/kg limit of reference is for the RCRA hazardous characteristics of extraction procedure (EP) toxicity testing. It is unclear whether the results cited refer to direct analysis of the samples or to EP toxicity. In any case, the results indicate the material is not a hazardous waste due to 2,4-D. In regard to PCP, the current RCRA regulations list discarded, unused portions of this substance as a hazardous waste (F027). Contaminated surfaces would not be included under this designation. No containers of discarded, unused PCP (or any other insecticide) were observed in the fumigation room. There is no EPA hazardous waste code for materials contaminated with PCP.

In the same report, TPHs were detected near the west end of Building 929; however, these levels were described as "not above the allowable limits established by the Environmental Protection Agency." The sample media are unclear, but appear to be subsurface soils. Current EPA regulations do not specify TPH limits for soils, and the report's reference to a regulatory limit is unclear.

3.8 BUILDING 929-A - FORMER SEALED SOURCE RADIOACTIVE STORAGE (PHASE III)

3.8.1 DESCRIPTION

This small one-story brick structure, approximately 200 sq ft in area, is the former "sealed source radioactive storage building." According to KMR personnel, items such as compasses and watches with low levels of radioactivity were stored in Building 929-A until approximately March 1989. The building was locked and inaccessible at the time of the site visit. It is reported to be empty and no longer in use (photo 36).

3.8.2 KNOWN AND SUSPECTED RELEASES

There have been no reports of any radioactive releases in or around this building. However, there is a potential for radioactive contamination of building surfaces.

3.9 BUILDING 930 - GENERAL PURPOSE STORAGE (PHASE III)

3.9.1 DESCRIPTION

This building is currently used to store general supplies such as office equipment and miscellaneous small mechanical parts.

Until approximately 10 years ago, large quantities (palletized containers) of super tropical bleach (STB) were stored in this building. STB is a solid (granular) inorganic chlorinated compound used for decontamination purposes for personnel and equipment. There are no floor drains in the building, although the concrete floor is cracked in several places.

There are approximately one dozen used automobile radiators stored on pallets outside of Building 930, near the main door (photo 37). These radiators do not contain any antifreeze, which was reportedly drained into the storm sewers [I-11].

3.9.2 KNOWN AND SUSPECTED RELEASES

It was reported that several spills occurred during the years that STB was stored there. These were reportedly swept up and any residue was flushed with hoses to the paved area outside the building. The drainage from this paved area empties into the storm sewers.

3.10 BUILDING 931 - GENERAL STORAGE AND FUMIGATION AREA (PHASE III)

3.10.1 DESCRIPTION

The ESO in Building 931 involves the fumigation of wooden and cardboard materials. This operation has replaced the fumigation process that was formerly performed in Building 929, as discussed in Subsection 3.7. Building 931 has been used for this purpose for approximately one year. Any

items made of wood or cardboard that are transported from the island must first be fumigated for termites and other insects. A commercial insecticide, Vikane (sulfuryl fluorides), produced by Dow Chemical Co. is used.

The fumigation procedure was described as follows. Items, such as pallets, wooden crates, cardboard packages, etc., are placed in the fumigation area at the end of the building and a "tent" is placed over them. The building is closed for 24 hours while the Vikane vapor is applied in the tent and allowed to dissipate [I-11]. Currently, fumigation of wood or cardboard products usually occurs once every two to three weeks. This activity is performed by a private contractor.

The building is set on a concrete pad; the walls are Transite. Exposed wooden areas include sliding doors as well as beams and supports (photos 38 and 39).

Building 931 was also identified during interviews as the primary area for chemical storage prior to 1978 [I-2]. As noted in Subsection 3.2, Building 917 now serves as the chemical warehouse. Currently, Building 931 is used for general storage. Gallon cans of the paint and lithium dry batteries, along with office equipment items, were observed during the site visit. The paint and batteries were wrapped in cardboard packaging and stored on pallets and may only have been staged there prior to fumigation and shipment.

3.10.2 KNOWN AND SUSPECTED RELEASES

The fumigation operation is likely to contaminate the interior surfaces of this building. The tent does not provide an absolute seal during the fumigation process, and, in any case, the Vikane vapors are allowed to dissipate within the building after each application.

3.11 BUILDINGS 1027/1028 - THE CENTRAL IDENTIFICATION LABORATORY (PHASE II)

3.11.1 DESCRIPTION

These two small adjacent buildings contain the Pacific Area Central Identification Laboratory. They are located in the Phase II-A area in the northeast corner of KMR. Unidentified remains of bodies (bones, dental work, clothing) throughout the Pacific/Asia area are brought here for identification. The chemicals typically used and stored in the building are x-ray and photographic film fixatives and developing agents. In addition, small quantities of radioactive sources are contained in the x-ray equipment used in these buildings. These dark room chemicals are stored in metal lockers in quantities ranging from one pint to one gal. There are no floor drains, and all sinks drain directly to the city sanitary sewer system.

3.11.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any spill or release from the identification operation. All chemical wastes from the x-ray and film activities are flushed down the sinks and into the sanitary sewer system.

3.12 FORMER UNDERGROUND STORAGE TANK (PHASE II)

3.12.1 DESCRIPTION

No underground storage tanks (UST), either in service or abandoned, were reported to be present in the Phase II area [I-2]. No vents, fill caps, or other indications of USTs were observed. It was reported by Unitek Environmental Consultants, Inc., in a 1988 report, that there had been an abandoned fuel pump station (i.e., dispensing pump) in the far northeast corner of the property (Phase II-A) [R-2]. This area was fenced and locked during WESTON's visit and access was not pursued because Phase II was not within the primary scope of our investigation at that time. According to the Corps of Engineers Pacific Ocean Division (CEPOD), this tank, plus an oil/water separator, an oil sump, and a hydraulic lift were removed in October 1989 [R-8]. Reportedly, soil samples were collected during this removal activity. However, a report documenting the results of the soil analyses has not yet been issued.

3.12.2 KNOWN AND SUSPECTED RELEASES

There are no reports of any spills or releases in this area. As noted, the area was not inspected during the site visit.

3.13 UNDERGROUND STORAGE TANK (PHASE III)

3.13.1 DESCRIPTION

The only identified underground storage tank in either the Phase II or Phase III area is adjacent to Building 935. This small building is used by the Hawaiian Telephone Company and contains telephone cables and switching equipment. The tank contains diesel fuel for an emergency electrical generator; its capacity is 550 gal. The tank is constructed of fiberglass, and was leak tested when installed in March 1987 [T-2]. Neither the building nor tank were accessible. The fill line was visible; it protruded through the asphalted paving outside the building. This tank is owned by the U.S. Army and maintained by the Hawaiian Telephone Company.

3.13.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any spill or release from this tank. There was no visible staining of the asphalt in the vicinity of the fill line.

3.14 ABOVEGROUND STORAGE TANK - KEROSENE (PHASE II)

3.14.1 DESCRIPTION

An approximately 300-gal capacity tank is used to store kerosene (photo 40). The tank is set on asphalt pavement, adjacent to a grassy area. No form of secondary containment for the kerosene tank is provided. There are no drains nearby.

3.14.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any spills around the tank. The asphalt around the tank is not stained. Any spills or overflows from the tank would drain to either the storm sewer or the grassy area.

3.15 ABOVEGROUND STORAGE TANK - PROPANE, BUILDING 925 (PHASE III)

3.15.1 DESCRIPTION

A 5,000-gal capacity liquid propane tank is located next to Building 925 (photo 41). The primary purpose of this tank is to fuel the forklifts.

3.15.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any releases attributed to this tank. In any case, no residual contamination would result from a propane release, which would be gaseous.

3.16 ABOVEGROUND STORAGE TANKS - PROPANE, BUILDINGS 921 AND 922 (PHASE II - PARTLY WITHIN WESTERN CEDED AREA)

3.16.1 DESCRIPTION

Interviews with KMR personnel [I-2] and review of facility site plans indicated that there were two propane tanks adjacent to Buildings 921 and 922 in the Phase II area, but these were not observed during the site visit, which concentrated on Phase III. The reported capacities of these tanks are 500 gal and 150 gal, respectively.

3.16.2 KNOWN AND SUSPECTED RELEASES

There are no reports of any releases from either tank. As noted previously, any releases would be gaseous.

3.17 ASBESTOS (ALL AREAS)

3.17.1 DESCRIPTION

This assessment included all of the buildings in Phase III at KMR, as well as selected buildings in the Phase II area. Many of the buildings at KMR are constructed with Transite siding, a material known to contain asbestos

fibers. The presence of asbestos in various materials was confirmed in a 1988 report by Unitek Environmental Consultants, Inc. [R-3]. The siding is cracked and broken in many locations along the lower sides of the buildings; this appears to be a result of vehicular impacts (photos 42 to 44).

Interior areas of several of the buildings inspected appear to contain asbestos in some ceiling tiles, wallboard, and floor tiles. Some sections of roofing panels and awnings also appear to be made of asbestos-containing materials, but this was not confirmed by close observation.

In a 1988 Army COE report, numerous buildings were identified as containing asbestos materials [R-4]. Table 2 from that report is included in this report as Table 3-1. In their report, the COE recommended that "All buildings with one percent or greater amounts of asbestos containing materials should be removed prior to sale of the property." The one percent figure is apparently based on the Toxic Substances Control Act (TSCA) asbestos abatement regulations, which define friable asbestos material as containing more than one percent asbestos.

3.17.2 KNOWN AND SUSPECTED RELEASES

There is no documentation of asbestos released. The potential exists for exposure to asbestos from damaged materials. If such a problem exists, it is of primary concern inside the buildings as no asbestos would be expected to accumulate outdoors.

3.18 TRANSFORMERS (ALL AREAS)

3.18.1 DESCRIPTION

There are approximately 40 oil-filled transformers on the KMR facility. All 16 transformers in the Phase III area are located on poles. Most of those in the Phase II area are also on poles, except for two that are pad mounted. A ground level inspection of the pole-mounted units was conducted, but name plate information could not be distinguished at that distance. A map (Figure 3-3) shows the location of the transformers. Each location shown on Figure 3-3 may represent from one to three transformers, depending on how many are mounted on a pole.

All transformers in the Phase III area and most in the Phase II area were observed. They appeared to be of various ages; some were rusted, while others appeared to be in good condition (photos 45 and 46).

An Army COE report states that "A name-plate survey ... in 1983 indicated that no transformers containing PCBs were identified at KMR." [R-4]. It should be noted that no transformer fluids were tested for PCBs, and the name plate data are not specific in this regard. Therefore, it should be assumed that all transformers potentially contain PCBs. The only other possible PCB source observed during this visit was the numerous fluorescent light fixtures throughout the buildings. These could contain small amounts of PCBs in their ballast units.

Table 3-1

Buildings Containing Asbestos
Kapalama Military Reservation

Building	Area Sampled	Results
Phase IIA		
1020[a]	Corrugated Transite siding	Chrysotile, 5%[b]
1027	Roofing material awning	Chrysotile, 5%[b]
1028	Roofing material awning	Chrysotile, 5%
Phase IIB		
904	Corrugated Transite siding	Chrysotile, 60%[b]
905	Office floor tile	Chrysotile, 1%
905	Roofing material awning	Chrysotile, 5%[b]
906	Corrugated Transite siding	Chrysotile, 60%[b]
906	Office floor tile	Chrysotile, 1%
908	Corrugated Transite siding	Chrysotile, 60%[b]
909	Corrugated Transite siding	Chrysotile, 60%[b]
914	Roofing material awning	Chrysotile, 5%[b]
916	Roofing material awning	Chrysotile, 5%[b]
917	Roofing material awning	Chrysotile, 5%[b]
919	Corrugated Transite siding	Chrysotile, 60%[b]
920	Front office floor tile	Chrysotile, 5%
921	Office floor tile	Chrysotile, 2%
921	Roofing material awning	Chrysotile, 5%[b]
923	Women's restroom, floor tile	Chrysotile, 1%
923[c]	Clean room, particle wallboard	Chrysotile, 45%
925	Corrugated Transite siding	Chrysotile, 60%

[a]Building has been demolished.
[b]Although the building was not sampled, it contains materials similar to those in buildings that were confirmed to have asbestos.
[c]Within Western Ceded Area.

Reference: [R-4]

3.18.2 KNOWN AND SUSPECTED RELEASES

None of the transformers in the Phase III area, either the units themselves, the poles, or the ground below, showed any sign of leakage.

Two apparent minor leaks were observed in the Phase II area. A large pad-mounted, high voltage transformer between Buildings 905 and 906 had a small leak near its top; the name plate did not indicate the type of dielectric fluid used (photo 47). Two pole-mounted transformers are located just inside the perimeter fence, near Building 905 (pole 54). One of these appears to have a small leak (photo 48). In both cases, no free liquids were observed on or around the transformers. The term "leak" refers to staining on the outside of the transformer.

3.19 CONCRETE PAD (WESTERN CEDED AREA)

3.19.1 DESCRIPTION

A small concrete pad, approximately 10 ft x 20 ft, is located near the east end of Building 923 in the asphalt-paved parking lot (photo 49). Interviews with KMR personnel revealed two conflicting possible former uses that may have had potential environmental impacts.

One report indicated that the pad was used as a staging area for both new and used transformers as they were transferred on and off of the facility [I-6]. The other version was that a dip tank for termite-proofing pallets was formerly located on the pad. All parties reported that the pad has been unused for the last 5 to 6 years. No spill containment is provided around the pad.

3.19.2 KNOWN AND SUSPECTED RELEASES

There is no evidence of any past or present spills at this site. Any spills could potentially have been washed to the storm sewer system.

3.20 FORMER RAILROAD TRACK/UNLOADING AREA (ALL AREAS)

3.20.1 DESCRIPTION

Railroad tracks formerly ran from offsite locations, including the adjacent piers, onto KRM and between the various warehouse buildings. Supplies were then unloaded directly into the warehouses from the rail cars. These tracks were removed about 20 years ago (1968-70), and the track bed area was covered with asphalt. Building 931 was the only chemical warehouse identified as being present before 1970.

3.20.2 KNOWN AND SUSPECTED RELEASES

There is no record of any spills from unloading or railroad operations. Given that the tracks were removed 20 years ago, no such records would be expected, except for catastrophic events. However, spills due to unloading operations are not uncommon, and it is prudent to assume that some chemical releases could have occurred.

3.21 POSSIBLE PRE-CONSTRUCTION DISPOSAL SITE (PHASES II & III)

3.21.1 DESCRIPTION

In the 1930s and early 1940s, the City and County of Honolulu may have operated a municipal dump on land that now comprises Phases II and III of KMR. A reference to this activity has been supplied by the Corps of Engineers Pacific Ocean Division (CEPOD) [R-8], which in turn references a 1946 real estate appraisal prepared for the U.S. Department of Justice [R-10]. A topographical map supplied by CEPOD shows two areas (as shown on Figure 3-2) that are designated as "C&C Dump." No other information is known as to the extent or type of materials that may have been placed in this dump.

3.21.2 KNOWN AND SUSPECTED RELEASES

There are no known releases from the possible dump areas. However, the site is unlined and the water table is close to the surface; therefore, any waste present in the site would likely have migrated to the groundwater. The identity of any possible contaminants is unknown because the sources and nature of the wastes that may have been received are not documented.

SECTION 4

HUMAN AND ENVIRONMENTAL RECEPTORS

In this section, the pathways by which human and environmental receptors may be exposed to site-related chemicals are discussed.

4.1 GROUNDWATER

Because almost all of the KMR property is paved, infiltration and percolation to the groundwater is minimal. Furthermore, the groundwater in this tidal area is brackish. The City of Honolulu supplies water to this area for human use. If any contaminants were to penetrate the asphalt or concrete floors of the buildings through cracks, they would reach the groundwater 3 to 5 ft below. The groundwater would eventually discharge to the Honolulu Harbor; however, the concentrations would be expected to be quite dilute. The variety of aquatic life in the harbor of this industrial/commercial area is expected to be limited and adapted to suboptimal environmental quality. Therefore, the effects on human and environmental receptors exposed to groundwater will be negligible or non-existent.

4.2 SURFACE WATER

There are no surface water bodies (streams, ponds, etc.) onsite. Storm water runoff is collected by storm water sewers and is discharged to Honolulu Harbor. Any past spills would eventually have been washed to the harbor or to the storm sewer. No ongoing discharges or surface contamination was apparent during the site inspection; therefore, no impact on human and environmental receptors from surface water is expected.

4.3 SOIL

Most of the KMR site is paved with asphalt. What soil exists is primarily on a strip of land along the perimeter fence and a small strip of land in front of the mortuary. The soil is not known to be contaminated. If an aboveground kerosene tank near Building 905 leaked, soil near the tank may have been contaminated. Depending on the contaminant levels, this soil could pose an inhalation or direct contact exposure risk to personnel working in the area.

4.4 AIR

No permanent sources of air contaminants are known to be present onsite; therefore, no human or environmental receptors would be impacted by air contaminants at the site. However, the potential exists for exposure to asbestos from the ceiling tiles or siding in some of the buildings if they are removed or damaged.

4.5 OTHER HAZARDS

4.5.1 FIRE AND EXPLOSIONS

Transformers represent a certain, but small risk of fire and explosion. However, this risk does not appear to be any greater at KMR than at other industrial sites. No other fire and explosion hazards will exist at the site once chemicals stored at the site are removed prior to property transfer and the propane storage tanks are emptied.

4.5.2 DIRECT CONTACT

Building surfaces, if contaminated, may provide a direct contact hazard to site personnel. The walls and floors of buildings that housed hazardous materials may have absorbed contaminants that could be contacted by personnel at a later time. Such buildings include Buildings 917, 923, 924, 929, 929-A, 930, 931, and the concrete pad near Building 923.

WESTON

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The Kapalama Military Reservation is a large urban warehouse facility in the Honolulu, Hawaii, harbor area. The 30 buildings on the property are approximately 45 years old and are constructed of various materials such as wood siding, Transite (asbestos) siding, and corrugated metal. Most buildings are built on a concrete pad and contain warehouse items such as furniture, documents, foodstuffs, and spare equipment parts. At the time of this site visit, all areas that were checked were maintained in a clean and orderly manner. This includes active work areas such as the forklift maintenance area and the foam packaging department.

This facility is located in a commercial/industrial area. Drinking water in the area is supplied by the City of Honolulu. Groundwater is brackish and tidal in nature. All surface runoff discharges to the Honolulu Harbor. The facility is largely paved and well maintained. There are few operations that would adversely impact local human and environmental receptors. These operations are summarized in the following subsections.

5.1.1 BUILDINGS

Some of the buildings pose a potential hazard because they contain materials of asbestos construction. In addition, certain indoor operations could have resulted in contamination of building surfaces. Buildings 929 and 931 each house a pesticide fumigation area. The operation in Building 931 is still active, while the one in Building 929 was discontinued in 1988. Both operations could have resulted in contamination of floors, ceilings, and walls.

Ongoing operations in other buildings may have in the past potentially posed contamination hazards to various surfaces. These include the chemical warehouse in Building 917, the parts cleaning and painting operations in Building 923, the Building 924 packaging area, and the two radioactive storage areas in Buildings 926 and 929-A.

5.1.2 SUBSURFACE SOILS AND GROUNDWATER

Contamination of subsurface soil by petroleum hydrocarbons was detected in and around Buildings 917 and 929. Petroleum hydrocarbons were also detected offsite on the former Phase I property. The presence of underground fuel pipelines on adjacent property was also confirmed. These activities indicate the potential for significant subsurface contamination of the property. The depth to groundwater is only a few feet; therefore, any significant soil contamination will impact the groundwater. However, due to the proximity of the site to Honolulu Harbor and Keehi Lagoon, effects of groundwater contamination on human health and the environment are minimum. This is an industrial/commercial area, and groundwater is not used as a drinking water source.

5.1.3 SURFACE SOILS AND SEDIMENTS

With the exception of the aboveground kerosene tank near Building 905, almost the entire site is asphalt paved, and any past spills would likely have entered Honolulu Harbor, either as direct runoff or through the storm sewer system. Due to the impervious nature of the asphalt, it is unlikely that surface soils would be contaminated by a spill unless the pavement was cracked where the spill occurred. Any past spills that entered the storm sewers could have resulted in contamination of sediments in the sewers.

5.1.4 DRUM LIQUIDS

Drum liquids of unidentified contents are located outside Building 924. These are labeled as waste oil, but may contain only rainwater.

5.1.5 CONCRETE PAD

A concrete pad near Building 923 was reportedly used either to stage transformers or to support a dip tank as part of a termite-proofing operation.

5.1.6 UNDERGROUND STORAGE TANKS

An underground storage tank in the Phase II-A area was removed in October 1989. Results of soil analyses to determine whether contamination exists are not yet available. An underground storage tank of unknown capacity does exist adjacent to Building 935; it has not been leak tested.

5.1.7 TRANSFORMERS

All transformers on the site potentially contain PCBs, although this has not been confirmed. Two transformers appeared to have leaked in the past, as evidenced by stains on the casings.

5.1.8 POSSIBLE PRE-CONSTRUCTION DISPOSAL SITE

The City and County of Honolulu may have operated a municipal dump on the site before KMR was constructed.

5.2 RECOMMENDATIONS FOR FURTHER ACTION

No conditions were observed on the property that appear to represent an immediate substantial threat to human health or the environment. However, the ESOs discussed in Section 3 have the potential to affect human health or the environment. These recommendations are summarized in Table 5-1 and shown in Figure 5-1. Accordingly, the recommended sampling of the property is presented in the following subsections.

5.2.1 BUILDINGS

Wipe, destructive, and dust sampling of building interiors is recommended for most of the primary ESOs discussed in Section 3. Specific sampling recommendations are set forth in Table 5-1. The presence of asbestos

Table 5-1

ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action

ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Buildings 913/914 - Mortuary	Phase II	VOCs	No further investigation				
Building 917 - Hazardous Material Storage	Phase II	Pesticides RCRA Metals VOCs, TPH	Site investigation	4	Evenly distributed, one near entrance	Wipe	Pesticides/ Herbicides[a]
				4	In cracked areas, evenly distributed	Destructive	Pesticides/ Herbicides RCRA Metals[b]
				4	Under cracked areas	Surface soil under floor	Pesticides/ Herbicides RCRA Metals, TPH[c]
Building 923 - Solvent Cleaning Room and Spray Paint Booth	Western Ceded Area	Chlorinated Hydrocarbons Pb, Cd	Site investigation	1	Building floor	Dust	Pb, Cd
				1	Paint booth floor	Destructive	Pb, Cd
				3	Paint booth walls/ ceiling	Destructive	Pb, Cd
Building 924 - Canvas Repair Area & Packaging Area	Phase III/ Western Ceded Area	Pesticides RCRA Metals	Site investigation	1	Floor near packaging area	Destructive	Pesticides/ Herbicides RCRA Metals
Building 924 - Former Solvent Dip Operation	Phase III/ Western Ceded Area	VOCs	No further investigation				
Buildings 923/924 - Yard Drainage	Western Ceded Area	Pesticides RCRA Metals	Site investigation	1	Storm sewer inlet	Sediment	Pesticides/ Herbicides RCRA Metals
Building 925 - Maintenance & Repair of Forklifts	Phase III	Chlorinated Organics, TPH	No further investigation				

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

Table 5-1

ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action
(continued)

ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Building 926 - General Storage and Sealed Source Radioactive Storage	Phase III	Radioactivity	Site investigation	NA	Building surfaces	Instrumentation sweep	Radioactivity
Building 929 - General Storage and Former Pallet Fumigation Area	Phase III	Pesticides	Site investigation	6-10	Floor, walls, ceiling	Destructive	Pentachloro-phenol; 2,4-D
Building 929A - Former Sealed Source Radioactive Storage	Phase III	Radioactivity	Site investigation	NA	Building surfaces	Instrumentation sweep	Radioactivity
Building 930 - General Purpose Storage	Phase III	Oxidizer	No further investigation				
Building 931 - General Storage and Fumigation Area	Phase III	Pesticides RCRA Metals	Site investigation	4	Walls, ceiling, floor	Destructive	Pentachloro-phenol
				1	Storm sewer	Sediment	Pentachloro-phenol
Buildings 1027/1028 - The Central Identification Laboratory	Phase II	Photographic Chemicals	No further investigation				
Former Underground Storage Tank (Near Buildings 1027 and 1033)	Phase II	TPH	Report review (soil sampling results)	NA		NA	NA
Underground Storage Tank (Adjacent to Building 935)	Phase III	TPH	No further investigation	NA	NA	NA	NA
Aboveground Storage Tank - Kerosene	Phase II	TPH	Site investigation	2	Adjacent to tank	Surface soil (0-6 in)	TPH

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

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Table 5-1

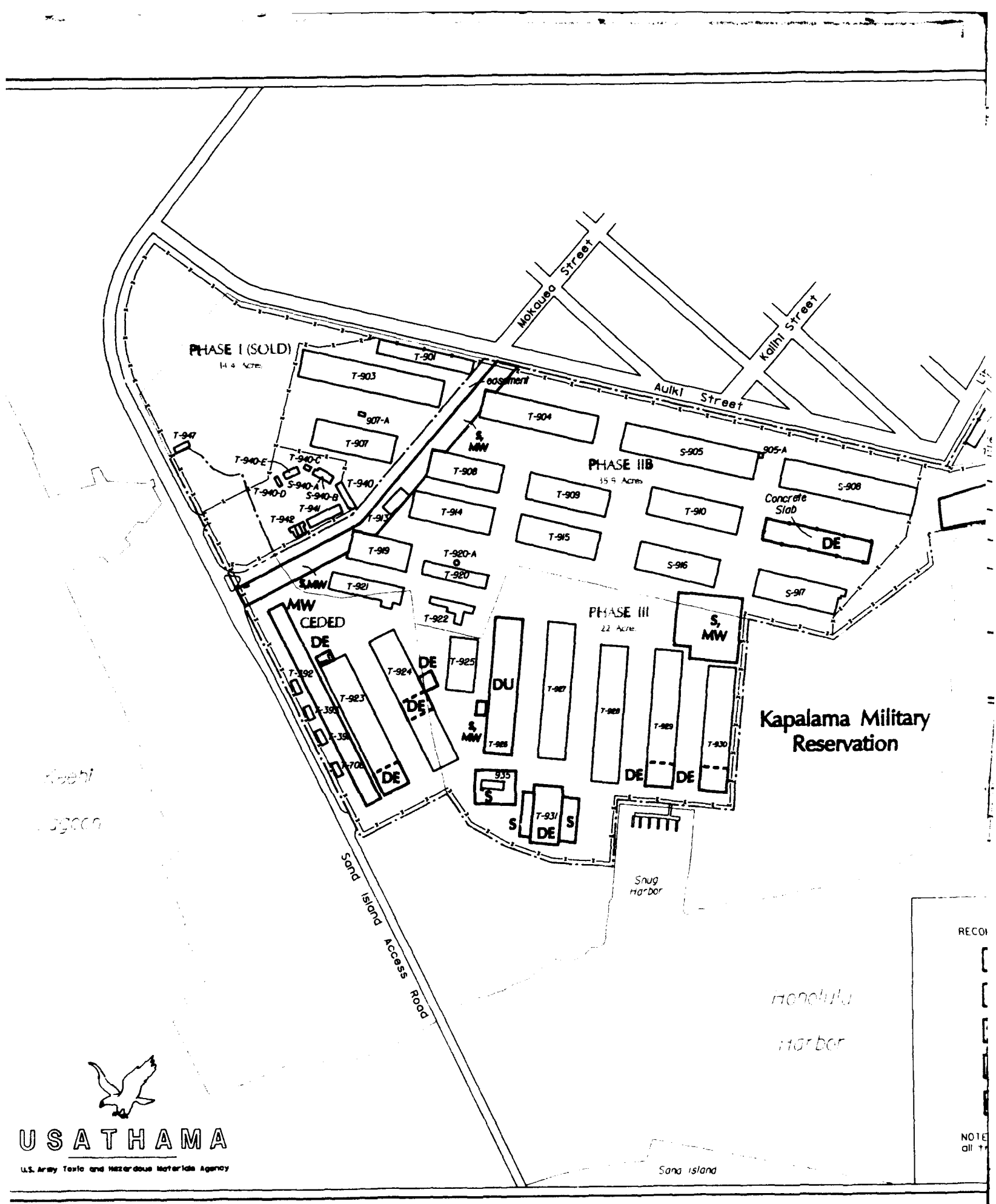
ESOs Identified at Kapalama Military Reservation and Recommendations for Further Action
(Continued)

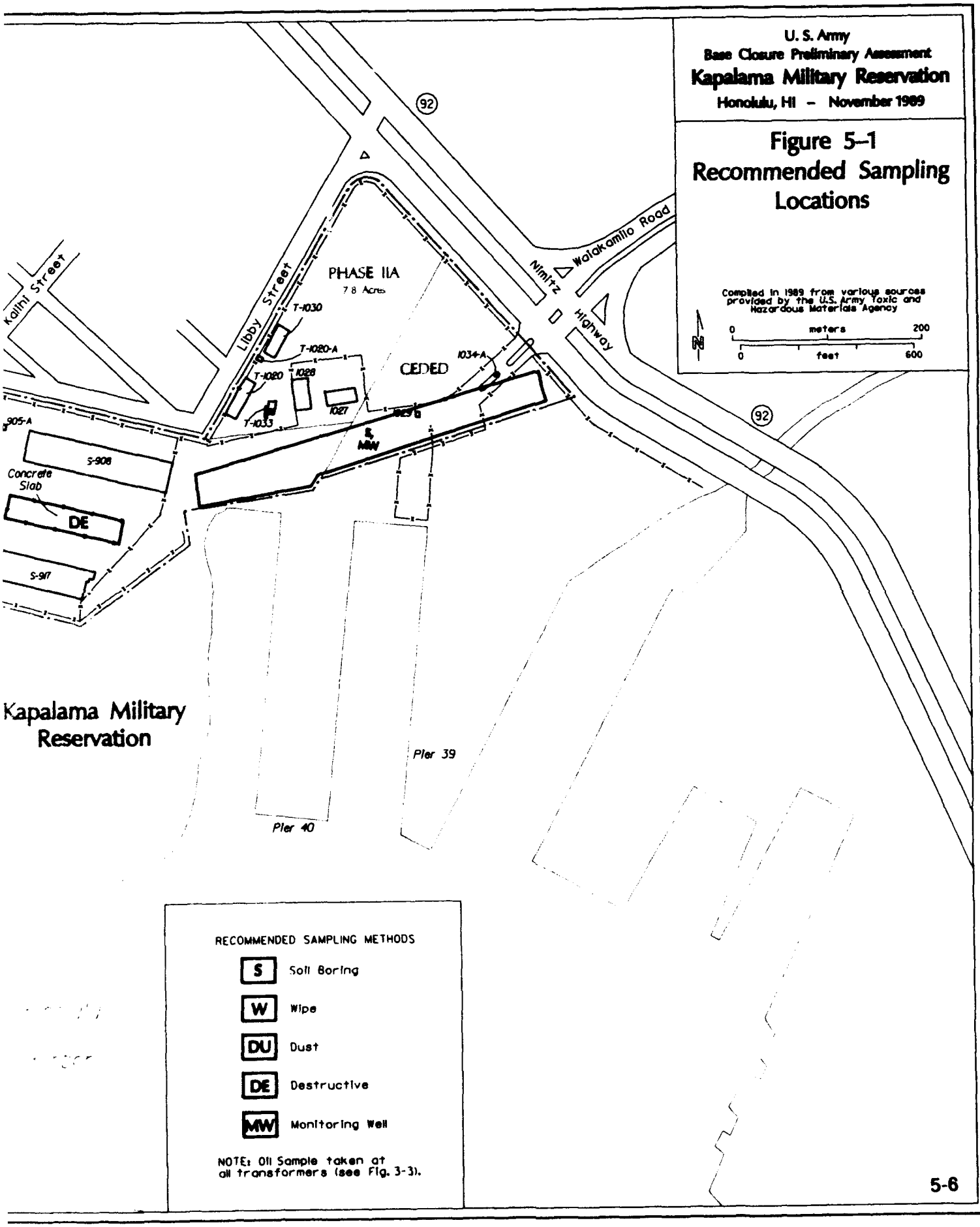
ESOs	Location	Concern	Recommended Activity	Number of Samples Recommended	Location	Sample Type	Analysis
Aboveground Storage Tank - Propane, Bldg 925	Phase III	Propane	No further investigation	NA	NA	NA	NA
Aboveground Storage Tanks - Propane, Bldgs 921, 922	Phase II/ Western Ceded Area	Propane	No further investigation	NA	NA	NA	NA
Asbestos	All Areas	Asbestos	Phase III buildings	As required	Suspect materials	Destructive	Asbestos
Transformers	All Areas	PCBs	Site investigation	40	All transformers	Dielectric fluid	PCBs
Concrete Pad	Western Ceded Area	PCBs Pesticides	Site investigation	2	Top of pad	Destructive	PCBs, Pesticides
Former Railroad Track/ Unloading Area	All Areas	Pesticides, VOCs, RCRA Metals, TPH	Site investigation	6	Adjacent to loading dock	Surface soil under asphalt	Pesticides, RCRA Metals
Petroleum Spill Areas (onsite)	All Areas	TPH	Site investigation	15-20	Plantwide	Soil boring	TPH
				5-10	Plantwide	Groundwater	TPH, VOCs[d]
Petroleum Pipelines (offsite)	NA	TPH	Site investigation	(Included in Petroleum Spill Areas)			TPH
Petroleum Storage Tank (offsite)	NA	TPH	Site investigation	(Included in Petroleum Spill Areas)			
Possible Pre-Construction Disposal Site	Phase II/ III	Undefined	Site investigation	2	1 in each disposal area	Soil boring (composite)	HSL[e]
				2	1 in each disposal area	Groundwater	HSL

[a]Hazardous Substance List (HSL) pesticides and herbicides, plus phenoxy acid herbicides.
[b]Eight metals defined in 40 CFR 261 pursuant to the Resource Conservation and Recovery Act (RCRA).
[c]Total petroleum hydrocarbons.
[d]Volatile organic compounds.
[e]Hazardous Substance List Compounds.

NA = Not applicable.

1073M2-4


Mokauea Street
Kalihi Street
Auiki Street
PHASE I (SOLD)
14.4 Acres
T-901
T-903
907-A
T-907
T-947
T-940-E
T-940-C
T-940-D
S-940-A
S-940-B
T-940
T-941
T-942
T-913
easement
T-904
S, MW
PHASE IIB
35.9 Acres
T-908
T-914
T-909
T-915
T-919
T-920-A
T-920
T-921
S, MW
MW CEDED
DE
T-922
PHASE III
22 Acre
S, MW
T-924
DE
T-925
DU
T-927
T-928
T-929
T-930
T-923
T-931
S
935
S-905
905-A
S-908
T-910
Concrete Slab
DE
S-916
S-917
Kapalama Military Reservation
Sand Island Access Road
Snug Harbor
Honolulu Harbor
Sand Island
USATHAMA
U.S. Army Toxic and Hazardous Materials Agency


U. S. Army
Base Closure Preliminary Assessment
Kapalama Military Reservation
Honolulu, HI - November 1989
Figure 5-1
Recommended Sampling Locations
Compiled in 1989 from various sources provided by the U.S. Army Toxic and Hazardous Materials Agency
0 meters 200
0 feet 600
92
Waiakamilo Road
Nimitz
Highway
Kalihi Street
Libby Street
PHASE IIA
7.8 Acres
CEDED
T-1030
T-1080-A
T-1080
1088
1027
T-1033
1034-A
905-A
S-908
Concrete Slab
DE
S-917
MW
Pier 39
Pier 40
Kapalama Military Reservation
RECOMMENDED SAMPLING METHODS
S Soil Boring
W Wipe
DU Dust
DE Destructive
MW Monitoring Well
NOTE: Oil Sample taken at all transformers (see Fig. 3-3).

materials in certain buildings in the Phase II area has been confirmed by sampling; therefore, sampling for asbestos is recommended only for Phase III buildings.

5.2.2 SUBSURFACE SOILS

With the discovery of subsurface petroleum hydrocarbons near Buildings 917 and 929 and on neighboring properties, as well as underground piping of aviation fuel and diesel fuel on neighboring properties (see Subsection 2.2), soil borings are recommended throughout the property. Boring samples should be analyzed for TPH and VOCs. Soil samples should be collected at intervals of 2.5 feet from the surface to the top of the groundwater table at each boring. It is expected that groundwater will be reached less than 5 ft below the ground surface. Selected borings may be converted to monitoring wells, based on field operations.

5.2.3 GROUNDWATER

Groundwater quality has not been characterized throughout the site. The potential exists for contamination due to both site-related activities and to migration from offsite sources. Approximately 5 to 10 monitoring wells should be installed in selected subsurface soil borings. These wells should be strategically placed to characterize the groundwater at areas of concern. These sample should be analyzed for TPH and VOCs. Additional analyses may be required based on proximity to specific ESOs.

5.2.4 SURFACE SOILS

Surface soil samples (0 to 6 in) should be taken along the grass strip behind the aboveground kerosene tank near Building 905 and analyzed for total petroleum hydrocarbons.

5.2.5 SEDIMENTS

Sediments in the bottom of the two storm drain systems near Buildings 923/924 and 929/930 should be sampled and analyzed for TPH, VOCs, metals, and pesticides. These storm drains would have been likely pathways for any spills in the primary chemicals storage areas.

5.2.6 DRUM LIQUIDS

The contents of the 55-gal drums stored outside Building 924 should be inspected to confirm that they no longer contain waste oil (as marked) prior to disposal. Currently, the drums appear to contain rainwater.

5.2.7 CONCRETE PAD

Chip samples should be taken from three random locations on the concrete pad near Building 923 to check for potential contamination from PCBs or pesticides.

5.2.8 UNDERGROUND STORAGE TANKS

An underground storage tank (UST) in Phase II-A, near Buildings 1027 and 1033, has been removed. Reportedly, soil samples were collected during the removal activity but a report documenting the results has not yet been issued. The report should be reviewed when issued; if the soil is not contaminated, no further action is required. If contamination is present, remedial measures may be necessary.

An underground storage tank next to Building 935 was leak tested when installed in 1987, and no further investigation is required at this time.

A potential underground storage tank was reported, but unconfirmed, in area II-A. The presence of this tank needs to be confirmed. If the tank exists, both it and the tank near Building 935 should be leak tested.

5.2.9 TRANSFORMERS

All transformers on the property potentially contain PCBs and two of them appear to have leaked in the past. An inventory should be made of all transformers remaining on all phases (except Phase I), and each transformer should be sampled for PCBs.

5.2.10 POSSIBLE PRE-CONSTRUCTION DISPOSAL SITE

The nature of the material that may have been placed in the municipal dump operated by the City and County of Honolulu is undefined. Although designated as a municipal dump, the possibility exists that industrial wastes were received. Soil borings and monitoring wells are recommended with analyses for the constituents included on the Hazardous Substance List (HSL). There will be one soil boring at each of the two possible disposal sites. A composite sample will be collected from each boring. Each composite will be comprised of grab samples collected every 2.5 feet of depth until groundwater is reached. Monitoring wells should be installed in each soil boring.

WESTON

SECTION 6

REFERENCES

6.1 DIRECT INTERVIEWS

I-1 Management Analyst (WESTCOM BRACO), Deputy Chief of Staff for Resource Management

I-2 Chief of Storage Branch, D.O.L. (Kapalama)

I-3 Central Identification Lab, Bldg. #1027 (Kapalama)

I-4 Planning Division Chief (Wheeler AFB)

I-5 Chief Real Estate, C.O.E. (Federal Building, Honolulu)

I-6 Maintenance Shop Foreman, Bldg. #923 (Kapalama)

I-7 Mortuary Building Supervisor (Kapalama)

I-8 Supervisor/Shop Steward, Bldg. #917 (Kapalama)

I-9 Geologist, Hawaii Dept. of Land and Natural Resources (Honolulu)

I-10 Mortuary Attendant, Bldg. #913/914 (Kapalama)

I-11 Supervisor, Storage Branch, D.O.L. (Kapalama)

I-12 Environmental Specialist, Master Planning Division (Wheeler AFB)

6.2 TELEPHONE INTERVIEWS

T-1 Branch Chief, Hawaii Dept. of Land and Natural Resources (Honolulu)

T-2 Supervisor for Military Services Office, Hawaiian Telephone Company (Honolulu)

6.3 REPORTS AND OTHER DOCUMENT SOURCES

R-1 Precision Leak Test Report, Unitek Environmental Services, Inc., pp. 23-28, April 1987.

R-2 Environmental Assessment, Preliminary Site Survey, Unitek Environmental Consultants, Inc., 27 June 1988.

R-3 Environmental Assessment, Hazard Verification and Action Plan, Unitek Environmental Consultants, Inc., 30 September 1988.

R-4 Environmental Assessment for Sale and Replacement, Phase II, Kapalama Military Reservation, Corps of Engineers, U.S. Army Engineer District, Honolulu, 1 November 1988.

R-5 Progress Letter to Servco Pacific, Inc., Dames and Moore, 5 July 1989.*

R-6 Memorandum for Commander, Honolulu Engineer District, from Chief, Environmental Master Plans and Programs Unit, 3 October 1989.

R-7 Report, Subsurface Investigation of Kapalama, Phase I, Woodward-Clyde Consultants, 1989.*

R-8 CEPOD Comments on USATHAMA - Task Order 2 Draft Preliminary Assessment, Kapalama Military Reservation (November 1989), Corps of Engineers Pacific Ocean Division, Prepared by Roy F. Weston, Inc., December 1989.

R-9 Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, USDA Soil Conservation Service and University of Hawaii, Agricultural Experiment Station, 1972.

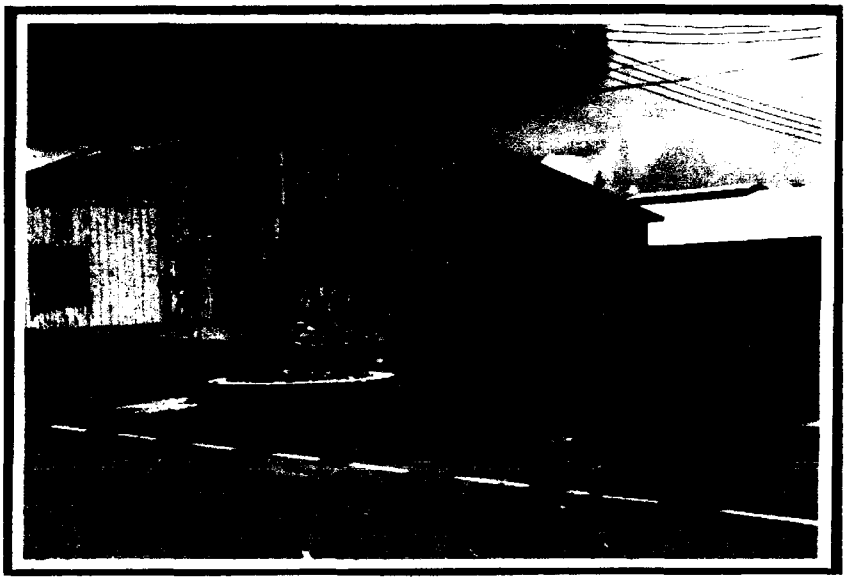
R-10 Appraisal Report - Appraisal of Lands at Kalihi-Kai, Honolulu, T.H., 82.534 Acres, More or Less, John F. Child Jr. (Appraiser) for U.S. Department of Justice, 1946.

*Included in Appendix B.

SECTION 7

PHOTOGRAPHS

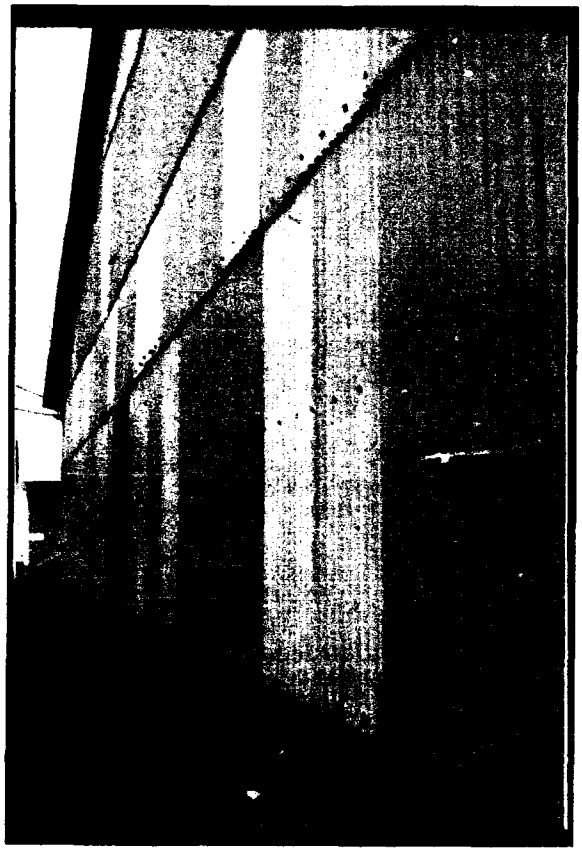
Photographs of ESOs taken during WESTON's site visit are included in this section.



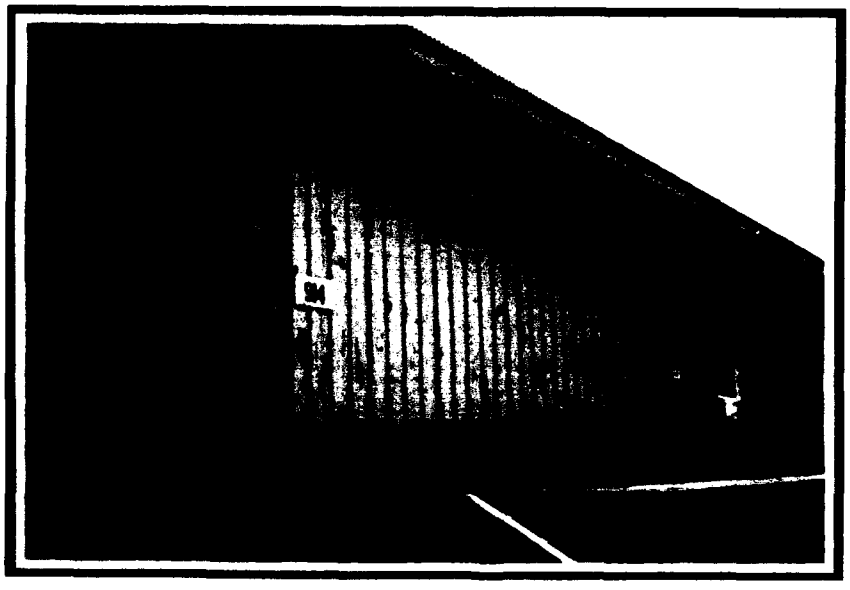
1.

2.

GENERAL CONDITIONS OUTSIDE OF BUILDINGS

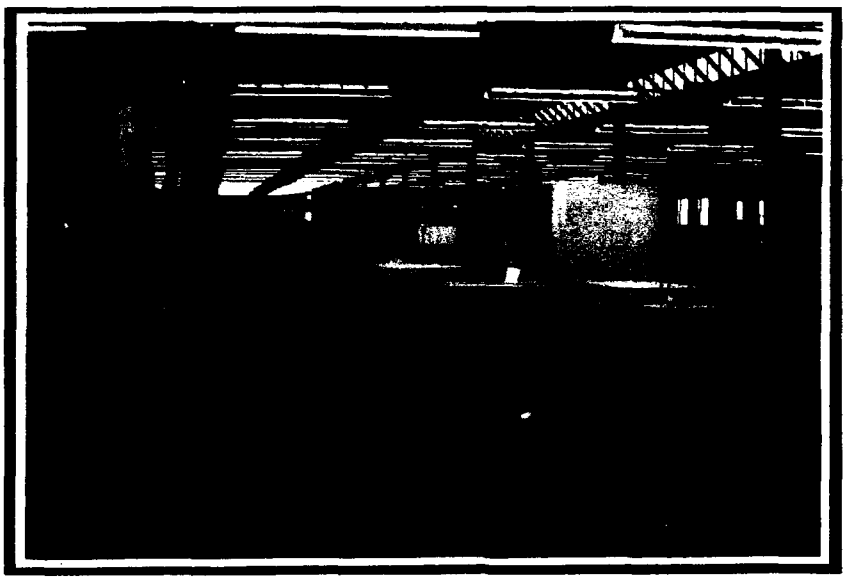


3.



4.

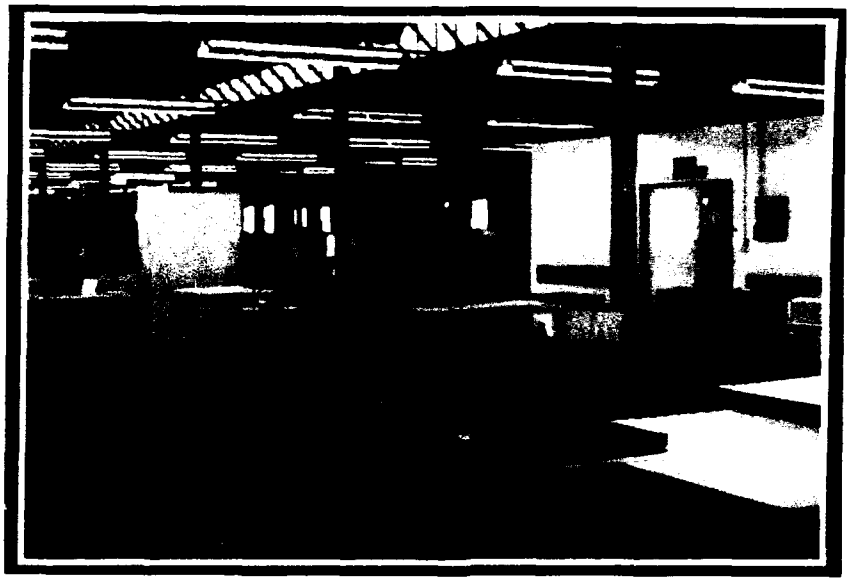
GENERAL CONDITIONS OUTSIDE OF BUILDINGS (CONTINUED)



5.

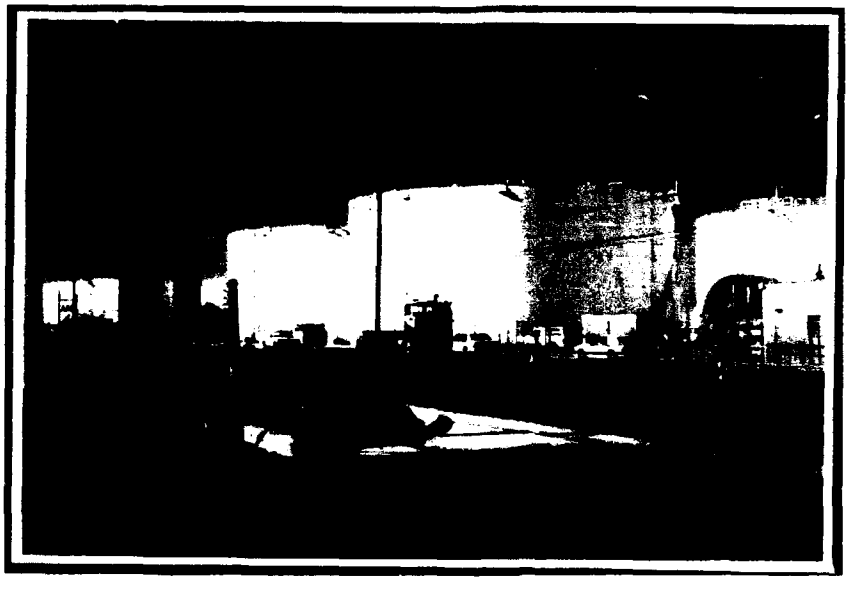
5.

GENERAL CONDITIONS INSIDE WAREHOUSE



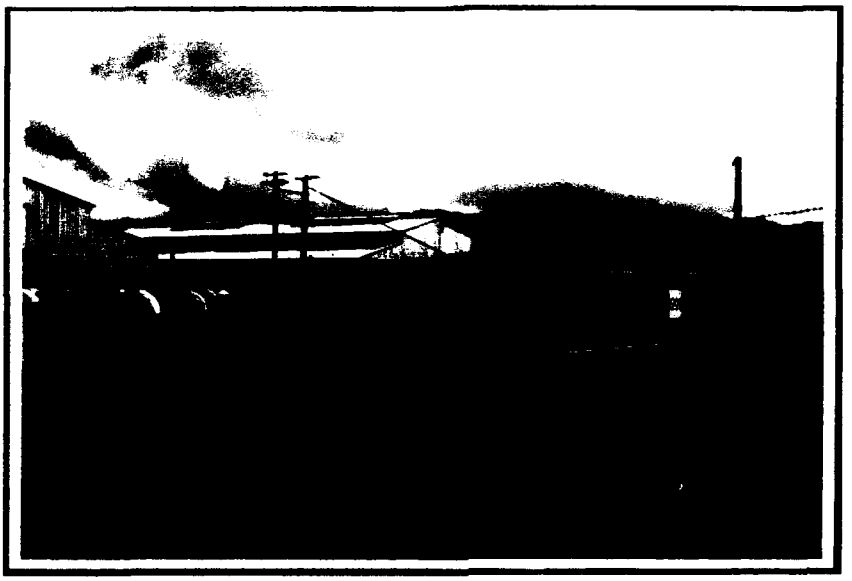
7.

GENERAL CONDITIONS INSIDE WAREHOUSE (CONTINUED)

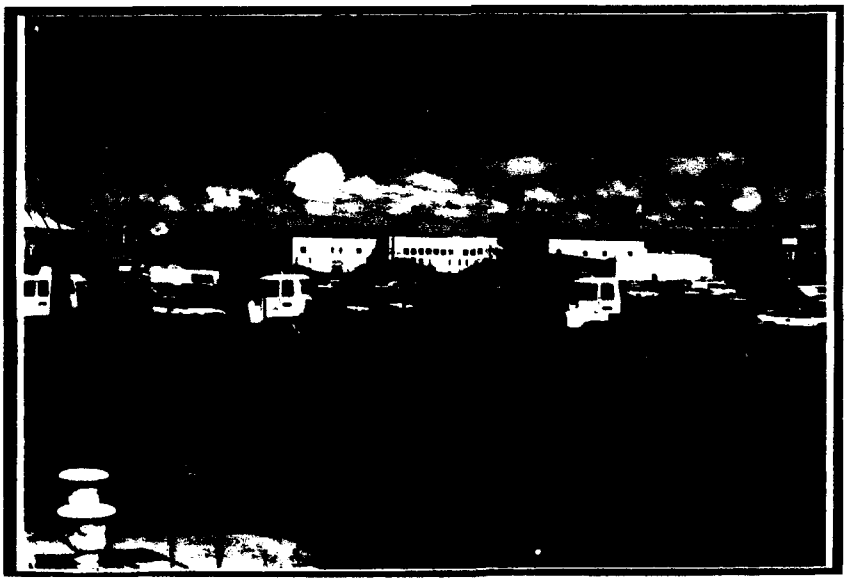


8. Chevron Tank Farm

NEIGHBORS



9. N.O.A.A. Storage Yard



10. Car/Truck Storage Area

NEIGHBORS (CONTINUED)

E

Building 92
Storage and
Radioactive

Building 92
Storage and
Fumigation

Building 92
Source Radi

Building 93
Purpose Sto

Building 93
Storage and

Buildings 1
Central Ide
Laboratory

Former Unde
Tank (Near
and 1033)

Underground
(Adjacent t

Aboveground
Kerosene

[a]Hazardous
[b]Eight metal
[c]Total petr
[d]Volatile o
[e]Hazardous

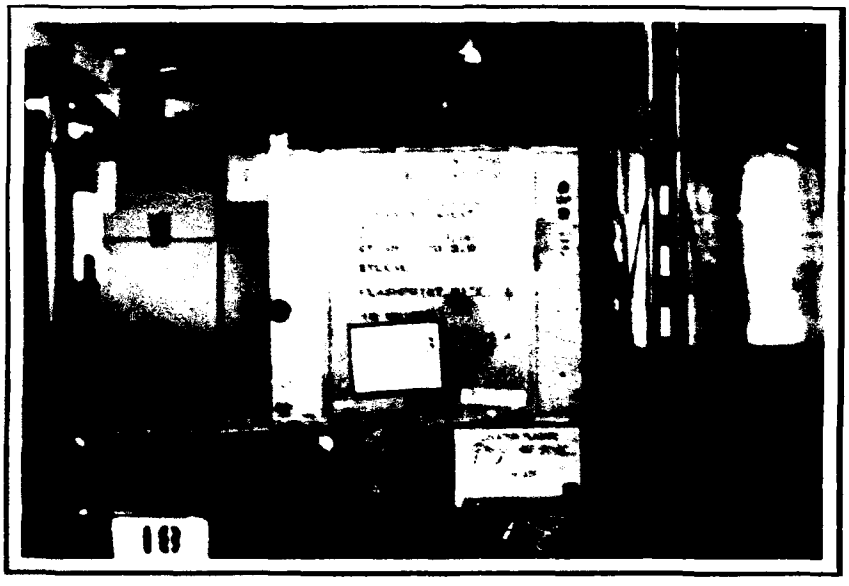
NA = Not ap

1073M2-4

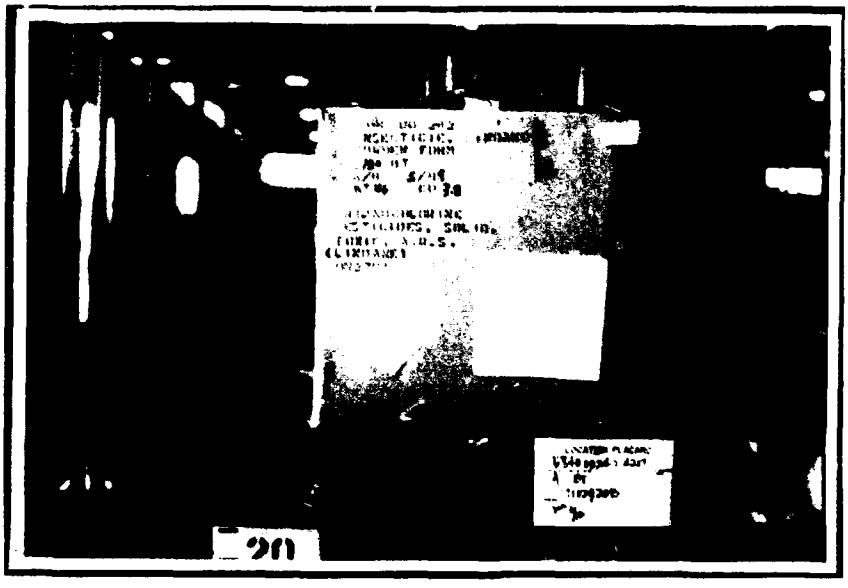
11. Battery Acid

12. Caustic Cleaner

CONTENTS OF BUILDING 917

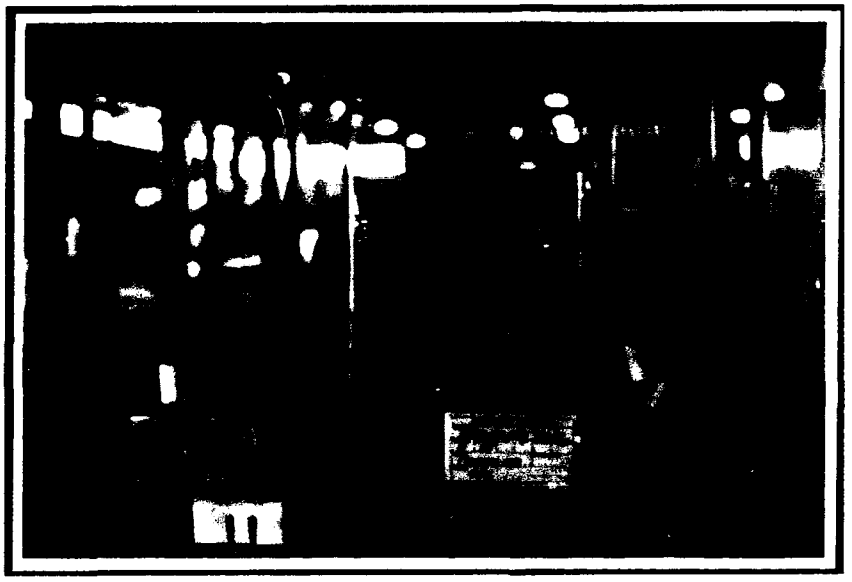


13. Aromatic Solvents



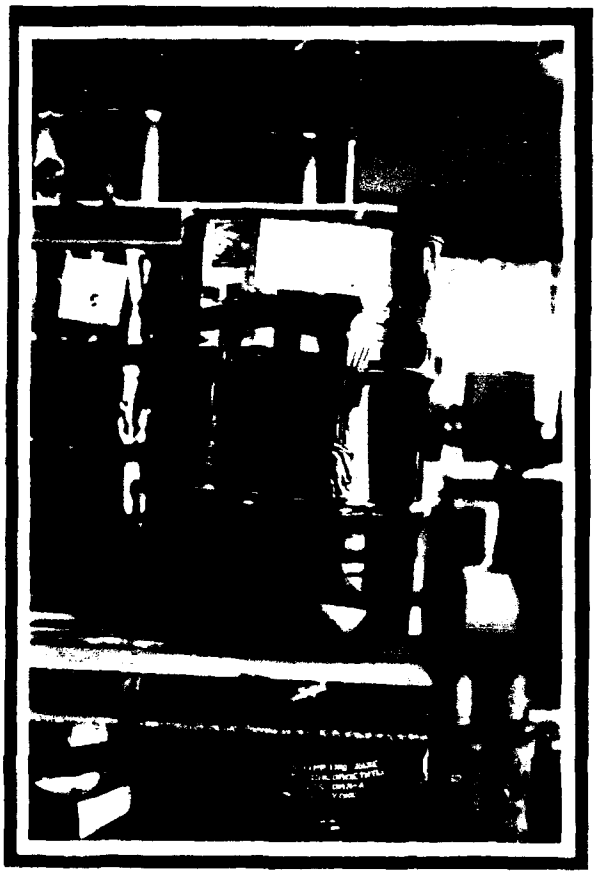
14. Pesticides

CONTENTS OF BUILDING 917 (CONTINUED)



15. Solvents

CONTENTS OF BUILDING 917 (CONTINUED)

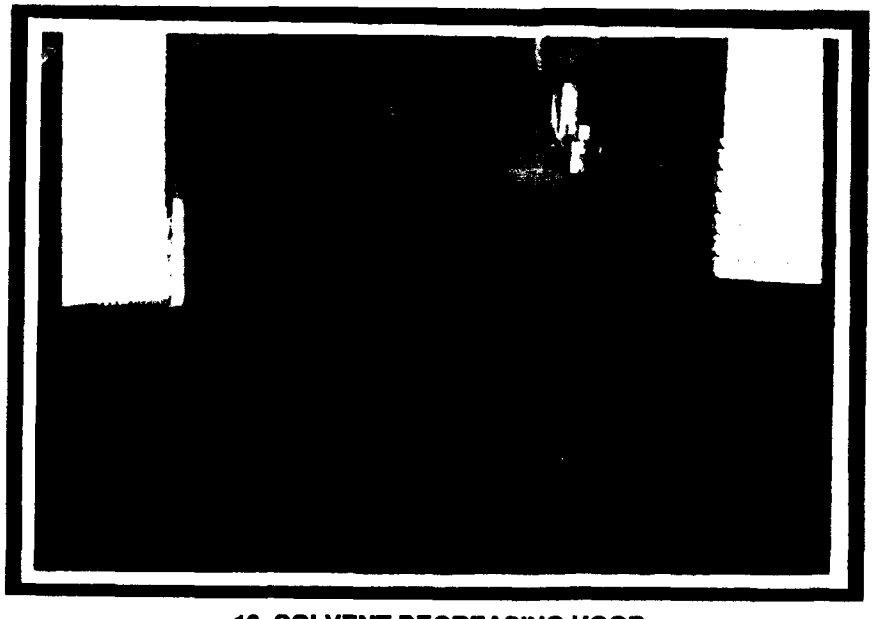


16. Chlorinated Solvents

17. Flammable Liquids

CONTENTS OF BUILDING 917 (CONTINUED)

18. PAINT SPRAY BOOTH

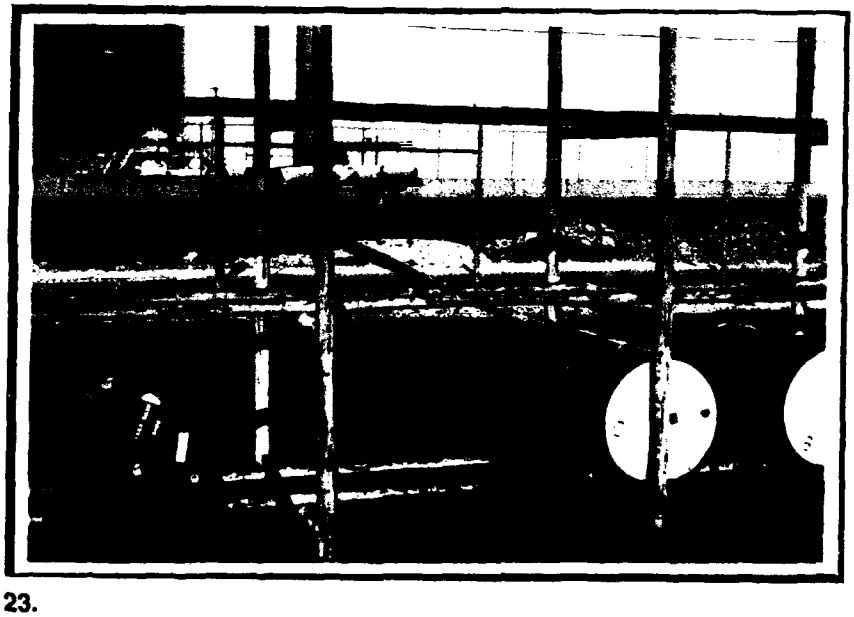


19. SOLVENT DEGREASING HOOD

20. DRAIN LEADING TO DRUM IN SHED

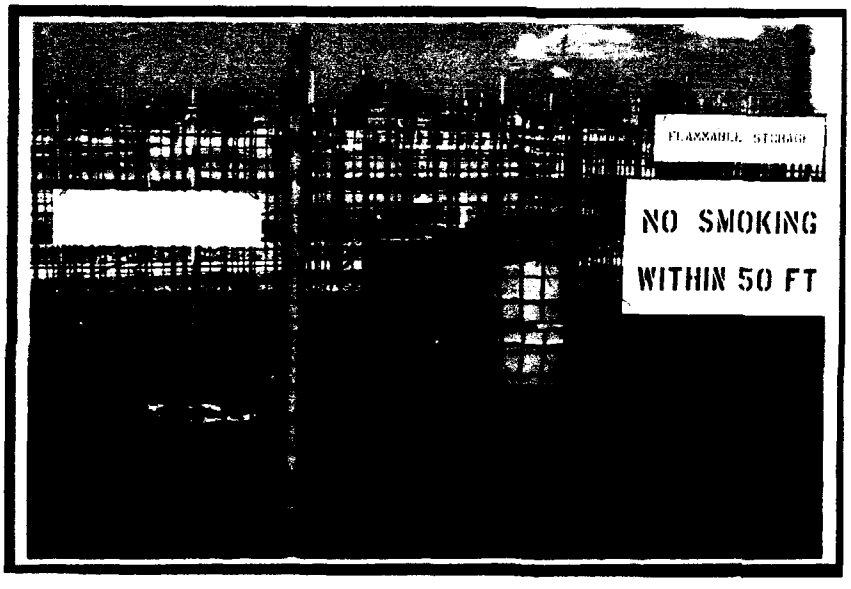
21. VIEW OF EXHAUST VENT AND SHED

22.



23.

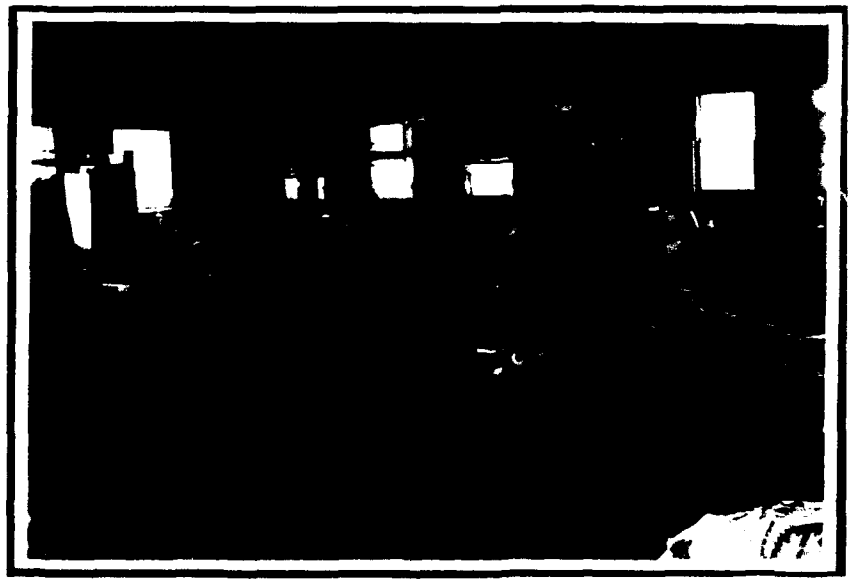
DRUM STORAGE AREAS NEAR SAND ISLAND ROAD



24.

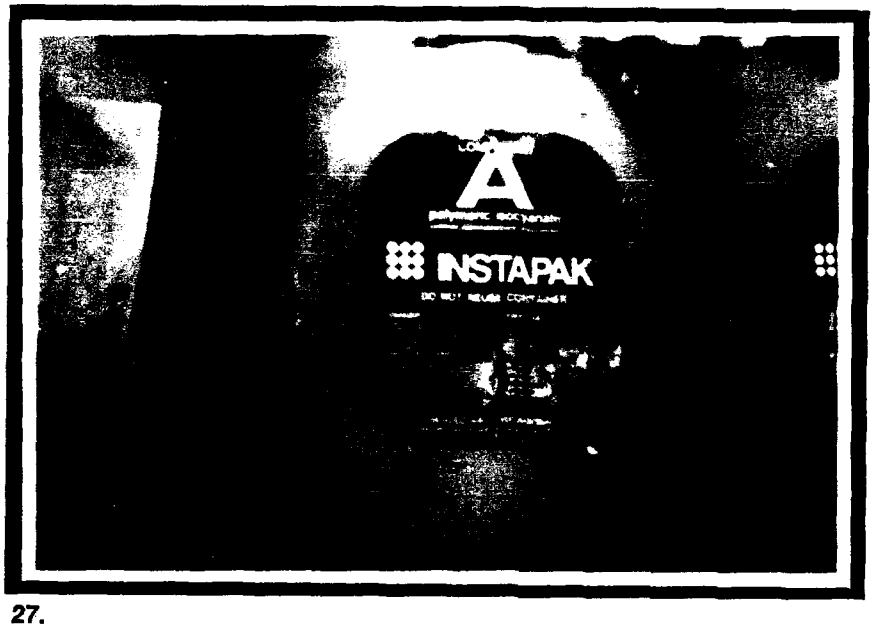
DRUM STORAGE AREAS NEAR SAND ISLAND ROAD

25.

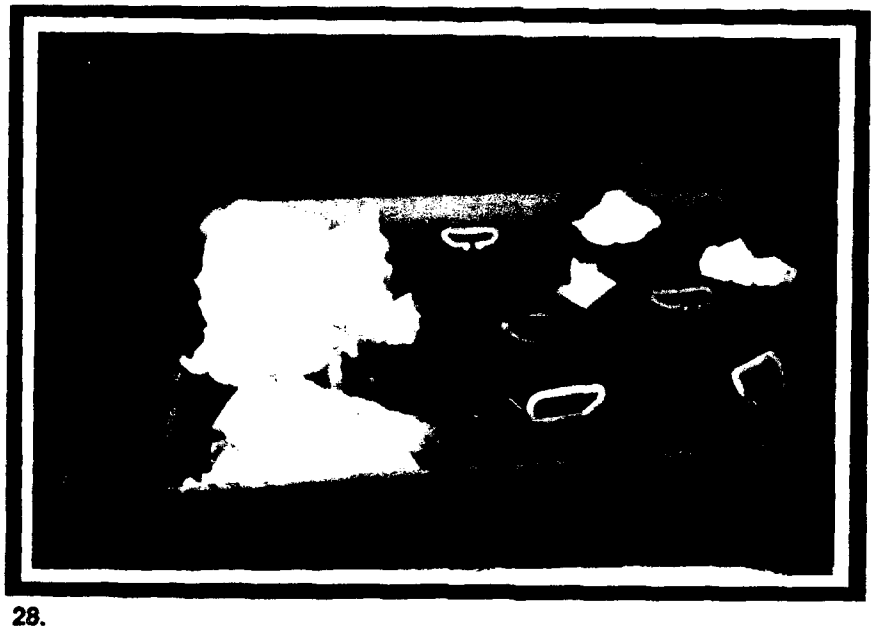


26.

CANVAS REPAIR AREA, BUILDING 924



27.

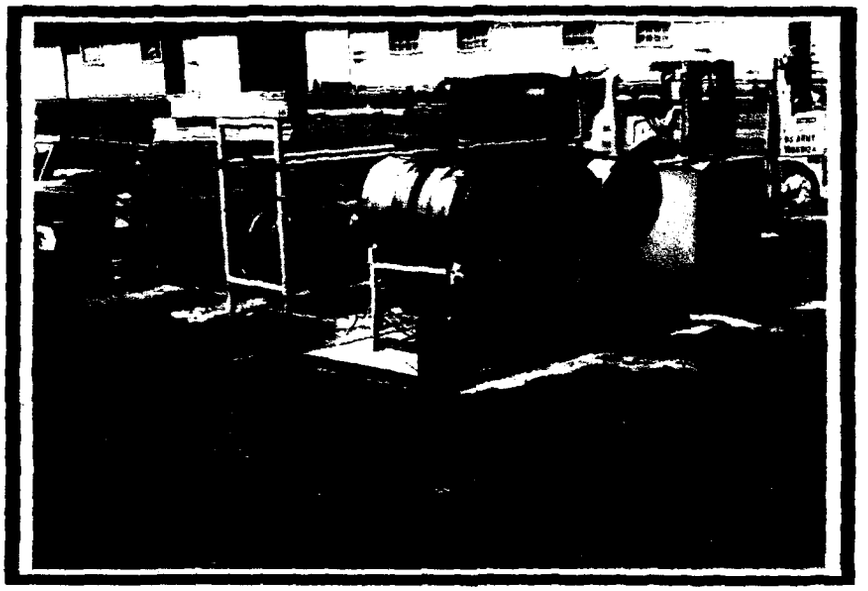


28.

FOAM PACKAGING AREA, BUILDING 924

29. RUSTED DRUMS OUTSIDE BUILDING 924

30. FORK LIFT MAINTENANCE AREA, BUILDING 925



31.

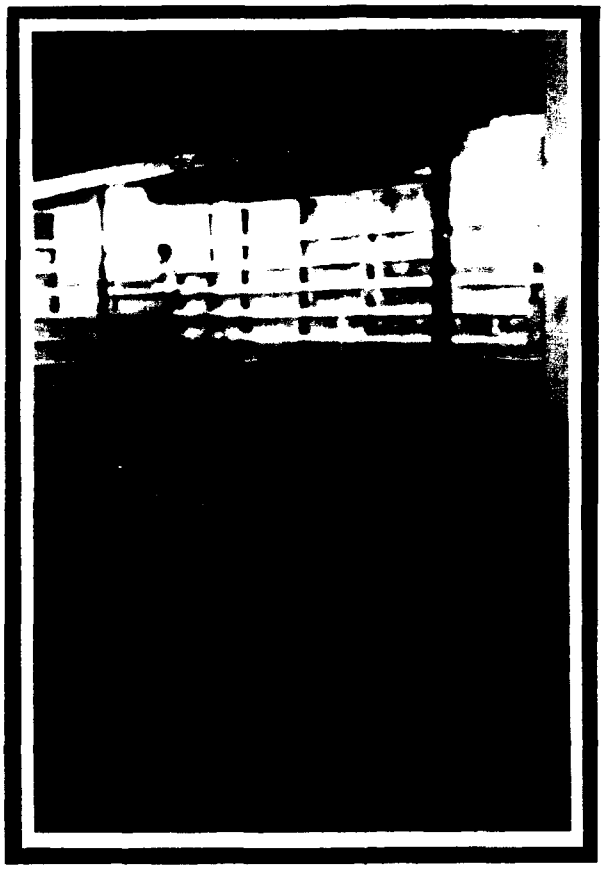
32.

FORK LIFT MAINTENANCE AREA, BUILDING 925

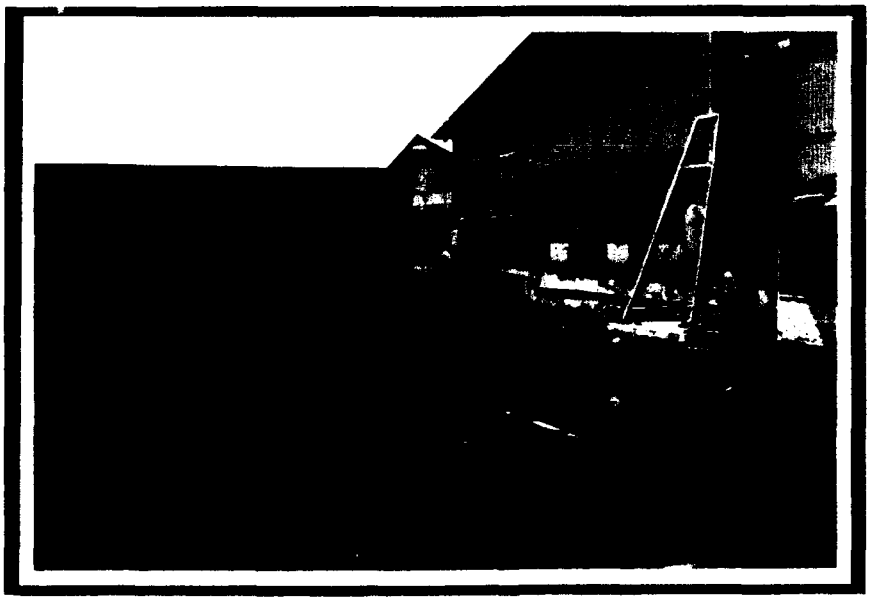
33.

34.

FORMER FUMIGATION CHAMBER, BUILDING 929

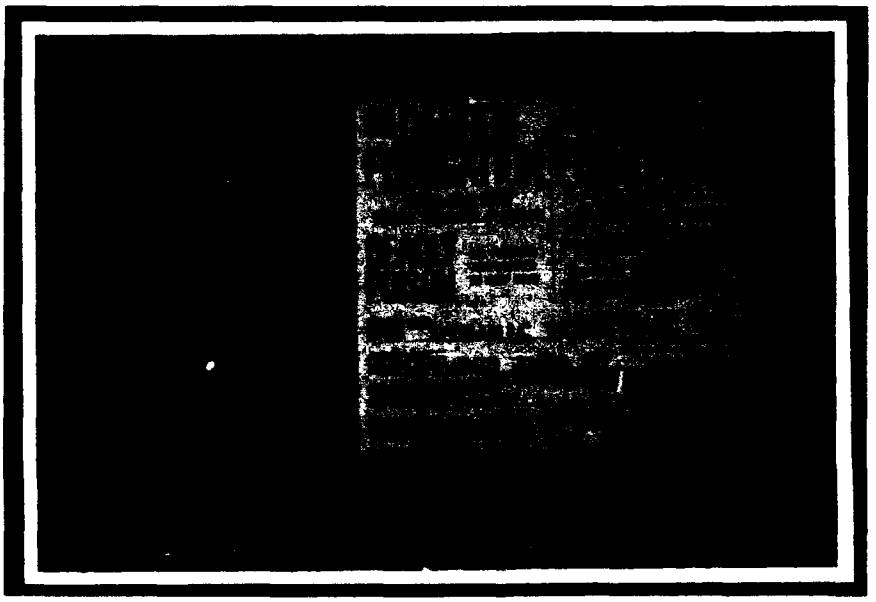


35. FORMER FUMIGATION CHAMBER, BUILDING 929

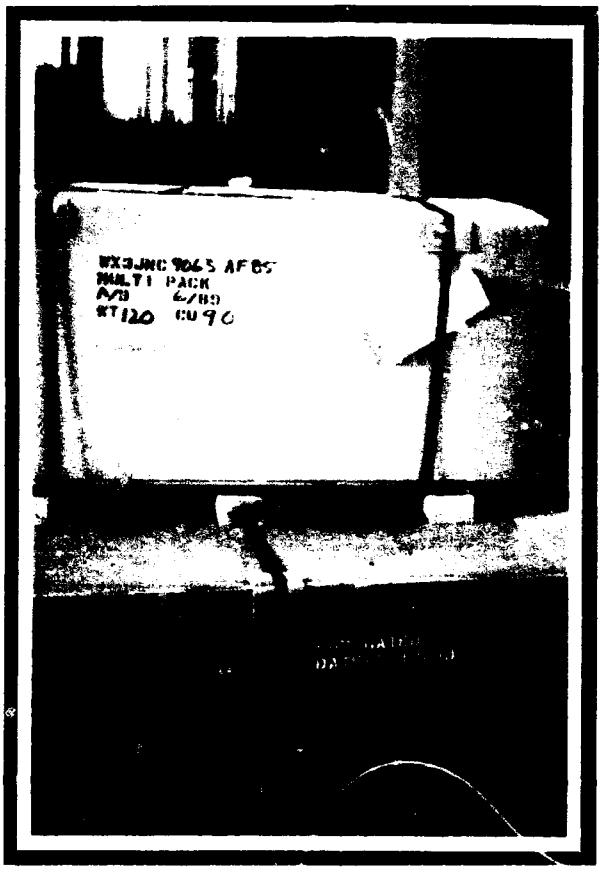


36. FORMER RADIOACTIVE MATERIAL STORAGE AREA, BUILDING 929-A

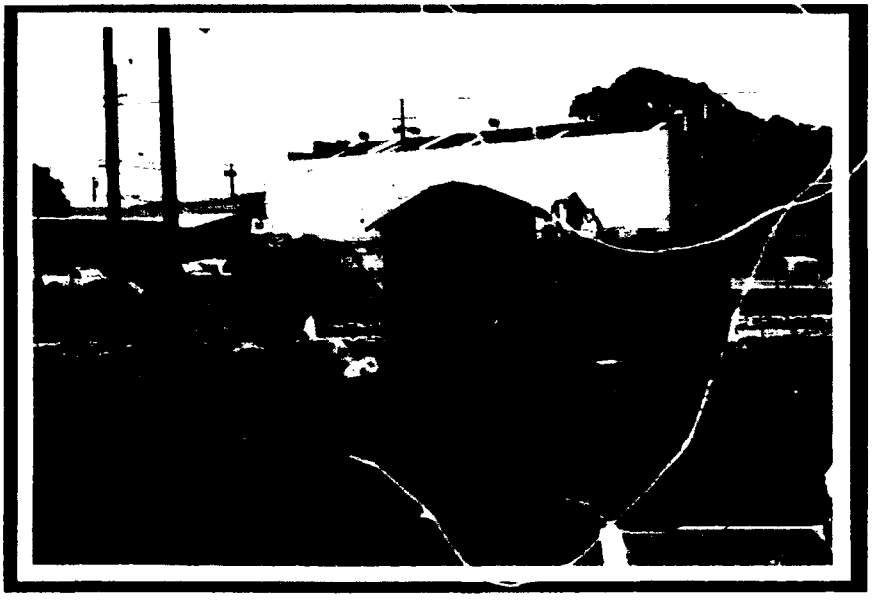
37. USED RADIATORS FROM VEHICLES



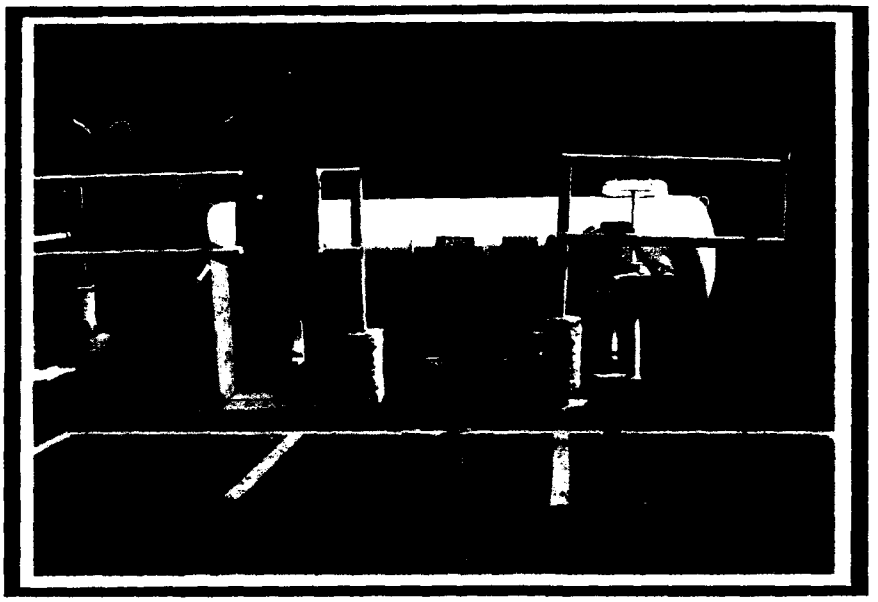
38. CURRENT FUMIGATION AREA, BUILDING 931



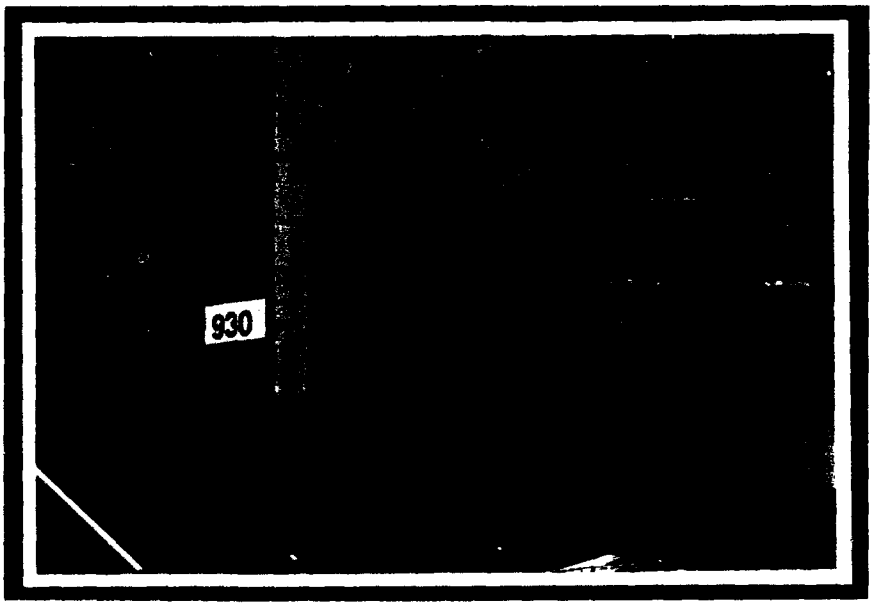
39. CURRENT FUMIGATION AREA, BUILDING 931



4C. KEROSENE STORAGE TANK

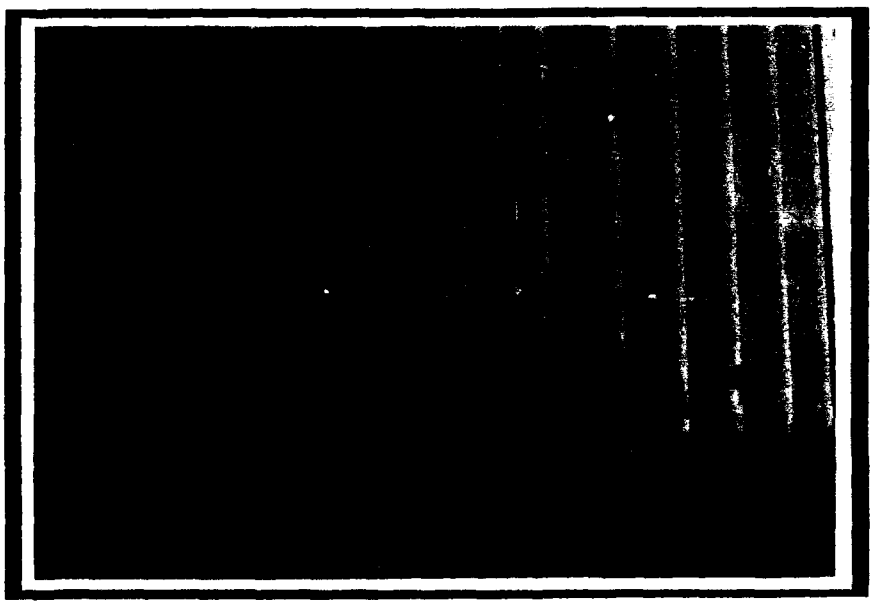


41. PROPANE STORAGE TANK NEAR BUILDING 925



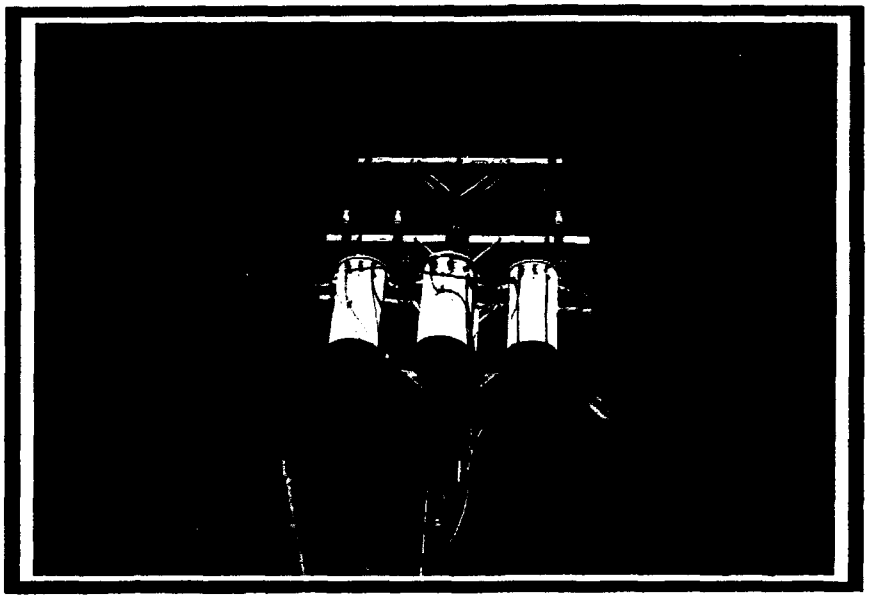
42. GENERAL CONDITION OF TRANSITE SIDING

43.



44.

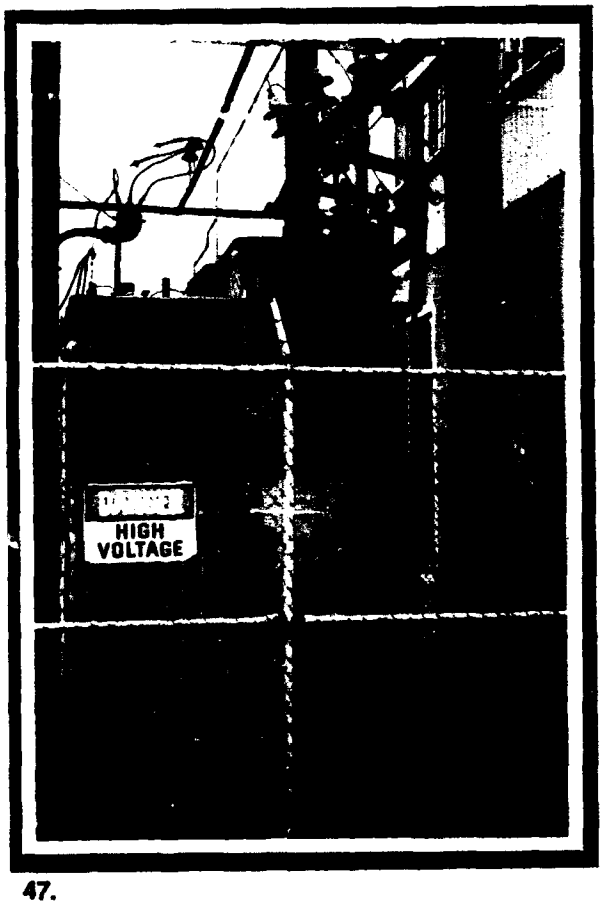
GENERAL CONDITION OF TRANSITE SIDING



45.

46.

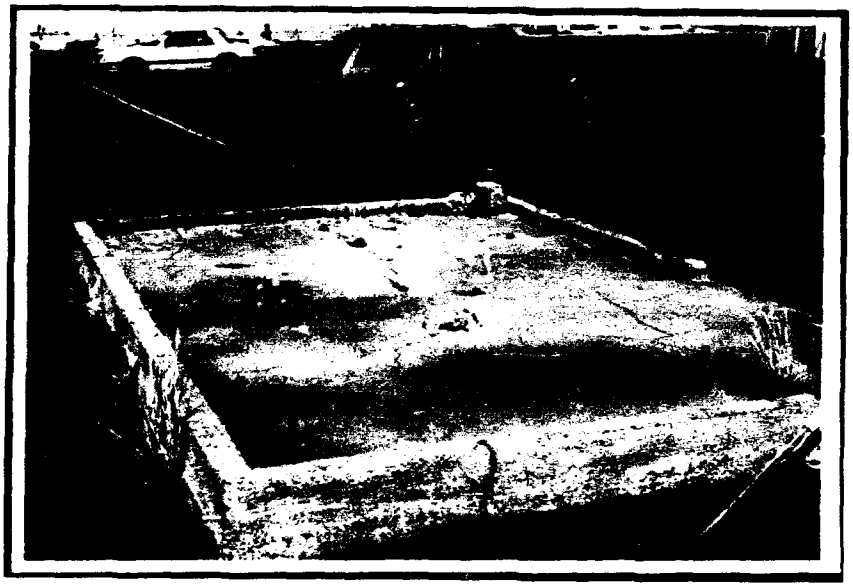
TRANSFORMERS



47.

48.

TRANSFORMERS



49. CONCRETE PAD NEAR BUILDING 923

WESTEN

APPENDIX A

BUILDING 917 - INVENTORY AS OF 9 AUGUST 1989
(As Received)

08/09/89
07:31:06

NSN	LOC	NOUN	UI	CCD	SCIC
1615012444970	17A02220A	TRANSMISSION,ROTOR	EA	A	8
2540010331831	26099196G1	PARTS KIT,MIRROR MO	EA	A	7
4931010485834	JNM07335J	ALIGNMENT DEVICE,OP	EA	M	8
5355006169659	2605115B1	KNOB	EA	A	8
5835009339049	17102918B	CLEANING AGENT HEAD	EA	A	7
5855009413037	17102909B	EYEPIECE ASSEMBLY,O	EA	A	8
5855009413037	17102909B	EYEPIECE ASSEMBLY,O	EA	A	8
5855010677772	2605115B2	WINDOW,OPTICAL INST	EA	A	8
5855011096433		COLLIMATOR BORESIGH	EA		8
5930006159376	2608619J2	SWITCH,TOGGLE	EA	A	8
5930006551514		SWITCH	EA		8
5960000824139	2605115C4	ELECTRON TUBE	EA	A	8
5960001345994	2605115C4	ELECTRON TUBE	EA	A	8
5960006886706	2605115D1	ELECT TUBE	EA	A	8
5965008762375	2608525A1	LOUDSPEAKER LS-454/U	EA	A	7
5965008762375	2608223E1	LOUDSPEAKER LS-454/U	EA	A	7
6135002996918	2607821E3	BATTERY, NONRECHARG	EA	A	7
6135004503528	17100508A	BATTERY, NONRECHARG	EA	H	7
6135004503528	17106206A	BATTERY, NONRECHARG	EA	A	7
6135004613590	261180101	BATTERY, NONRECHARG	EA	A	7
6135004857402	17100715A	BATTERY,PRIMARY	EA	H	7
6135008013493	2611904D1	BATTERY, NONRECHARG	EA	A	7
6135009260827	261180112	BATTERY, NONRECHARG	EA	A	7
6135009268322	17100704A	BATTERY,DRY	EA	H	7
6135009268322	17100704A	BATTERY,DRY	EA	H	7
6135009300030	17106206A	BATTERY, NONRECHARG	PG	A	7
6135009300030	17106206A	BATTERY, NONRECHARG	PG	A	7
6135009352532	2607814D3	BATTERY, NONRECHARG	EA	A	7
6135009352532	2607814D3	BATTERY, NONRECHARG	EA	A	7
6135009352533	2611904B2	BATTERY, NONRECHARG	EA	A	7
6135009352533	2611904B2	BATTERY, NONRECHARG	EA	A	7
6135009352587		BATTERY, NONRECHARG	PG		7
6135009355301	261190104	BATTERY, NONRECHARG	PG	A	7
6135009355301	261190104	BATTERY, NONRECHARG	PG	A	7
6135009355301	261190104	BATTERY, NONRECHARG	PG	A	7
6135009613603	2611804D1	BATTERY, NONRECHARG	EA	A	7
6135009613603	2611804D1	BATTERY, NONRECHARG	EA	A	7
6135009613603	2611804D1	BATTERY, NONRECHARG	EA	A	7
6135010342239	17100713A	BATTERY, NONRECHARG	EA	H	7
6135010342239	17100713A	BATTERY, NONRECHARG	EA	H	7
6135010342239	17100105A	BATTERY, NONRECHARG	EA	A	7
6135010342239	17100713A	BATTERY, NONRECHARG	EA	H	7
6135010342239	17100105A	BATTERY, NONRECHARG	EA	A	7
6135010342239	17100105A	BATTERY, NONRECHARG	EA	A	7
6135010363495	17100107A	BATTERY,PRIMARY,LIT	EA	A	7
6135010363495	17100706A	BATTERY,PRIMARY,LIT	EA	H	7
6135010363495	17100706A	BATTERY,PRIMARY,LIT	EA	H	7
6135010363495	17100107A	BATTERY,PRIMARY,LIT	EA	A	7
6135010363495	17100708A	BATTERY,PRIMARY,LIT	EA	H	7

08/09/89
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NSN	LOC	NOUN	UI	CCD	SCIC
6135010363495	17100706A	BATTERY,PRIMARY,LIT	EA	H	7
6135010363495	17100708A	BATTERY,PRIMARY,LIT	EA	H	7
6135010363495	17100708A	BATTERY,PRIMARY,LIT	EA	H	7
6135010363495	17100107A	BATTERY,PRIMARY,LIT	EA	A	7
6135010631978	17103210A	BATTERY, NONRECHARG	PG	A	7
6135010882708	17102617B	BATTERY,DRY	EA	A	7
6135010882708	17102617B	BATTERY,DRY	EA	A	7
6135010882708	17100715A	BATTERY,DRY	EA	H	7
6135010882708	17100715A	BATTERY,DRY	EA	H	7
6135010882708	17102617B	BATTERY,DRY	EA	A	7
6135010882708	17100715A	BATTERY,DRY	EA	H	7
6135010946536	17100706A	BATTERY (1) NONRECH	EA	H	7
6140001226110	17106207A	BATTERY,STORAGE	EA	A	7
6140001843415	17106409B	BATTERY,STORAGE	EA	A	7
6140001909831	17106207C	BATTERY,STORAGE	EA	A	7
6140008816887		BATTERY,STORAGE	PG		7
6140010321326	30101726A	BATTERY,STORAGE	EA	H	7
6140010321326	17106209A	BATTERY,STORAGE	EA	A	7
6140010321326	17106209A	BATTERY,STORAGE	EA	A	7
6140010321326	30101726A	BATTERY,STORAGE	EA	H	7
6140010461116	17103112A	BATTERY,STORAGE	EA	F	7
6140010461116	17101120A	BATTERY,STORAGE	EA	H	7
6140010461116		BATTERY,STORAGE	EA		7
6140010461116		BATTERY,STORAGE	EA		7
6140010461116		BATTERY,STORAGE	EA		7
6140010461116	17103112A	BATTERY,STORAGE	EA	F	7
6140010461116	-	BATTERY,STORAGE	EA		7
6140010461116	17103112A	BATTERY,STORAGE	EA	F	7
6140010461116	17101120A	BATTERY,STORAGE	EA	H	7
6140010461116	17103112A	BATTERY,STORAGE	EA	F	7
6140010461116	17101120A	BATTERY,STORAGE	EA	H	7
6140010461116	17101120A	BATTERY,STORAGE	EA	H	7
6140010461116	2606925B2	BATTERY,STORAGE	EA	F	7
6140010461116	2606925B2	BATTERY,STORAGE	EA	F	7
6140010461116	2606925B2	BATTERY,STORAGE	EA	F	7
6140010461116	2606925B2	BATTERY,STORAGE	EA	F	7
6140010612818	17101120A	BATTERY,STORAGE	EA	H	7
6140010612818	17106208A	BATTERY,STORAGE	EA	A	7
6140010612818	2601634B1	BATTERY,STORAGE	EA	A	7
6140010612818	17106208A	BATTERY,STORAGE	EA	A	7
6140010612818	17101120A	BATTERY,STORAGE	EA	H	7
6140010612818	2601634B1	BATTERY,STORAGE	EA	A	7
6140010688572	2601619B3	BATTERY,STORAGE	EA	A	7
6140010715070	2607824H3	BATTERY,STORAGE	EA	A	7
6140010718560	17102618A	BATTERY,STORAGE	EA	A	7
6140010718560		BATTERY,STORAGE	EA		7
6140010723123	17106211B	BATTERY,STORAGE	EA	A	7
6140010723123	2606620B2	BATTERY,STORAGE	EA	F	7
6140010723123	2606620B2	BATTERY,STORAGE	EA	F	7

08/09/89
07:31:06

NSN	LOC	NOUN	UI	CCD	SCIC
6140010723123	17102T11B	BATTERY,STORAGE	EA	A	7
6140010723124	17102616A	BATTERY,STORAGE	EA	A	7
6140010723125	17101120A	BATTERY,STORAGE	EA	H	7
6220001591762	2607819C3	LIGHT,NAVIGATIONAL,	EA	A	7
6220001591762	2606012B1	LIGHT,NAVIGATIONAL,	EA	H	7
6220001591762	2606012B1	LIGHT,NAVIGATIONAL,	EA	H	7
6220001591762	2606012B1	LIGHT,NAVIGATIONAL,	EA	H	7
6220001591762	2606020B3	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2606020B3	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2606020B3	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2605109B1	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2605109B1	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2607819C3	LIGHT,NAVIGATIONAL,	EA	A	7
6220001591762	2605109B1	LIGHT,NAVIGATIONAL,	EA	F	7
6220001591762	2607819C3	LIGHT,NAVIGATIONAL,	EA	A	7
6240006171746	2605116H1	LAMP,FLUORESCENT	EA	A	7
6240009651370	2605115E3	LAMP,MERCURY VAPOR	EA	A	7
6260001067478	29100782A	LIGHT,CHEMILUMINESC	BX	A	7
6260001700430	28101473A	LANTERN,GASOLINE	EA	A	8
6260001700430	29100719C	LANTERN,GASOLINE	EA	A	8
6260002704060	2605116D2	MANTLE,GASOLINE LAN	CO	A	8
6605001515337	2605108A1	COMPASS MAG UNMTD LEN	EA	H	8
6605001515337	2605108A1	COMPASS MAG UNMTD LEN	EA	H	8
6605001515337	2607819J1	COMPASS MAG UNMTD LEN	EA	A	8
6605001515337	2607819J1	COMPASS MAG UNMTD LEN	EA	A	8
6605001515337	2607819D5	COMPASS MAG UNMTD LEN	EA	A	8
6605001515337	2607819D5	COMPASS MAG UNMTD LEN	EA	A	8
6605001515337	2605108A1	COMPASS MAG UNMTD LEN	EA	H	8
6605001515337	2607819D5	COMPASS MAG UNMTD LEN	EA	A	8
6605001515337	2607819J1	COMPASS MAG UNMTD LEN	EA	A	8
6605005518187	2605116B2	COMPASS,MAGNETIC,MOUNTED WET TYPE,	EA	A	8
6605005518187	26RADAREA	COMPASS,MAGNETIC,MOUNTED WET TYPE,	EA	H	8
6605011966971	2607819J1	COMPAS MAGNETIC UNMTD	EA	A	8
6605011966971	2607819F3	COMPAS MAGNETIC UNMTD	EA	A	8
6605011966971	29RADAREA	COMPAS MAGNETIC UNMTD	EA	H	8
6605011966971	29RADAREA	COMPAS MAGNETIC UNMTD	EA	H	8
6605011966971	2607819F3	COMPAS MAGNETIC UNMTD	EA	A	8
6605011966971	2607819J1	COMPAS MAGNETIC UNMTD	EA	A	8
6605011966971	2605107D2	COMPAS MAGNETIC UNMTD	EA	H	8
6605011966971	2605107D2	COMPAS MAGNETIC UNMTD	EA	H	8
6620005145492	2605116A2	INDICATOR,PRESSURE	EA	A	8
6625006431670	16102205B	VOLTMETER EL ME-30A/U	EA	F	8
6675006413610	29100784C	DRAFT SET 346COMP	SE	A	7
6675006413610	29100784C	DRAFT SET 346COMP	SE	A	7
6675006413610	260MI300A	DRAFT SET 346COMP	SE	A	7
6675006413610	260MI300A	DRAFT SET 346COMP	SE	A	7
6685005570370	2605109F3	INDICATOR, TEMPERATURE, ELECTRICAL	EA	F	8
6685005570370	2605109F3	INDICATOR, TEMPERATURE, ELECTRICAL	EA	F	8
6685005575316	2605109F2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	F	8

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NSN	LOC	NOUN	UI	CCD	SCIC
6685005575316	2605107D1	THERMOMETER,SELF&INDICATING,BIMETAL	EA	H	8
6685005575316	2605107D1	THERMOMETER,SELF&INDICATING,BIMETAL	EA	H	8
6685005575316	2605109F2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	F	8
6685005575316	2605116C2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	A	8
6685005575316	2605116C2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	A	8
6685005575316	2605109F2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	F	8
6685005575316	2605107D1	THERMOMETER,SELF&INDICATING,BIMETAL	EA	H	8
6685005575316	2605116C2	THERMOMETER,SELF&INDICATING,BIMETAL	EA	A	8
6810001237047	17102912B	N-AMYL ACETATE REAGENT 1 PT PER BT	PT	A	7
6810001237047	17102911B	N-AMYL ACETATE REAGENT 1 PT PER BT	PT	A	7
6810001844798	17101809A	ACETONE TECH 5 GL CN	CN	A	7
6810001844800	17102914B	TRICHLOROETHYLENE TECH 55 GAL DR	DR	A	7
6810001844800	17102205A	TRICHLOROETHYLENE TECH 55 GAL DR	DR	A	7
6810002010906	17102620B	ALCOHOL,DENATURED	PT	A	7
6810002010907	17101710A	ALCOHOL DENATURED GR 111 5 GL CN	CN	A	7
6810002232739	17100118B	ACETONE TECH LIQ FORM 1 PT CN	PT	A	7
6810002388115	17103808C	CALCIUM HYPOCHLORIT	BT	A	7
6810002388119	17100518C	NAPHTHA ALIPHATIC TT-N-95 1 GL CN	GL	A	7
6810002388119	17100518C	NAPHTHA ALIPHATIC TT-N-95 1 GL CN	GL	A	7
6810002414709	17102609A	BUTYL ALCOHOL ACS LIQ FORM 1 GL BT	GL	A	7
6810002499354	17106410A	SULFURIC ACID ELECTROLYTE 1 GAL BT	GL	A	7
6810002550471	17103807C	CALCIUM HYPOCHLORIT	BT	A	7
6810002550472	17103808C	CALCIUM HYPOCHLORIT	DR	A	7
6810002646610		SODIUM BICARBONATE TECH 1 LB CN	LB		7
6810002646715	17102912B	MOLYBDENUM DISULFIDE 1 LB CN	LB	A	7
6810002646715	17102612B	MOLYBDENUM DISULFIDE 1 LB CN	LB	A	7
6810002756019	17101711A	METHANOL TECHNICAL 5 GL DR	CN	A	7
6810002812762	17101713A	METHYL ETHYL KEYTONE 5 GL CN	CN	A	7
6810002812785	17100106A	METHYL ETHYL KEYTONE 1 GL CN	GL	A	7
6810002904166	17102207A	XYLENE,TECHNICAL	DR	A	7
6810002905574	17103208C	SODIUM BICARBONATE 100 LB DR	BG	A	7
6810002929676	17100503A	METHANOL TECH FED O-M 232 1 QT CN	QT	A	7
6810002979540	17106214A	BATTERY WATER	BT	A	7
6810003564936	17106415A	DISTILLED-DEIONIZED	BT	A	7
6810005437415	17101818A	ALCOHOL DENATURED GR III 1 GL CN	GL	A	7
6810005790431	17102619B	TOLUENE TECHNICAL 1 QT CN	QT	A	7
6810005852017	28101035A	LIMESTONE,PULVERIZE	BG	A	7
6810005973608	17100117C	METHANOL TECHNICAL 1 GL CN	GL	A	7
6810005973608	17100117A	METHANOL TECHNICAL 1 GL CN	GL	A	7
6810006640387	17102604B	1,1,1-TRICHLOROETHANE 1 GAL CN	GL	A	7
6810006826867	17106211B	DISTILLED-DEIONIZED	BX	A	7
6810006878056	17100116B	METHANOL ACS 1 GAL CN	GL	A	7
6810007534993	17100118B	ISOPROPYL ALCOHOL TECH 8 OZ CN	CN	A	7
6810007634397	17102606B	CAMPHOR TECHNICAL 1 LB CN	LB	A	7
6810009049372	17106704A	SULFURIC ACID ELECT 5 GL DR	DR	A	7
6810009954804	17102916A	DIETHYLENETRIAMINE 1 PT BT	PT	A	7
6810011157792	17100108B	ISOAMYL ACETATE;REA	BX	A	7
6830001690800	17B00111A	OXYGEN,TECHNICAL	CF	A	7
6830001690800	17B00111A	OXYGEN,TECHNICAL	CF	A	7

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NSN	LOC	NOUN	UI	CCD	SCIC
6830002450199	17104020A	CARBON DIOXIDE,TECH	LB	A	7
6830002450199	17104019A	CARBON DIOXIDE,TECH	LB	A	7
6830002646755		ACETYLENE,TECHNICAL	CF		7
6830002646755		ACETYLENE,TECHNICAL	CF		7
6830002646755	18B00101A	ACETYLENE,TECHNICAL	CF	A	7
6830002646755	18B00101A	ACETYLENE,TECHNICAL	CF	A	7
6830005774623		NITROGEN,TECHNICAL	CF		7
6830005774623		NITROGEN,TECHNICAL	CF		7
6830005774623	17B00102A	NITROGEN,TECHNICAL	CF	A	7
6830005774623	17B00102A	NITROGEN,TECHNICAL	CF	A	7
6830006600027		HELIUM,TECHNICAL	CF		7
6830006600027		HELIUM,TECHNICAL	CF		7
6830006600027	17C00101A	HELIUM,TECHNICAL	CF	A	7
6830006600027	17C00101A	HELIUM,TECHNICAL	CF	A	7
6830009359876	17102910A	MONOCHLORODIFLUOROM	CY	A	7
6840002424217	17102920B	INSECTICIDE LINDANE 3 OZ BT	BT	A	7
6840002424217	17102920B	INSECTICIDE LINDANE 3 OZ BT	BT	A	7
6840002866018	2605115D4	INSECTICIDE,NAPHTHA	LB	A	7
6840005843129	17102914B	DISINFECTANT DETERG	GL	A	7
6840005987326	17106414B	DISINFECTANT-DETERG	GL	A	7
6840006877904	17102608C	DISINFECTANT DETERG	QT	A	7
6840006877904	17102608C	DISINFECTANT DETERG	QT	A	7
6840007534973	17102914B	RODENTICIDAL BAIT ANTICOAGUL 5LB CN	CN	A	7
6840008106396		DISINFECTANT FOOD SVC 4.77 OZ PO	BX		7
6840008447355	17102611A	INSECTICIDE DIAZINON LQDFM 1 GL CN	GL	A	7
6840010842104	17102605B	REFILL,DEODORIZER	BX	A	7
6840012103392	17102605B	INSECTICIDE,DURSBAN	BX	A	7
6850000014194	17102908B	WATER INDICATING PA	TU	A	7
6850000014194	17102908B	WATER INDICATING PA	TU	A	7
6850000035295	17102617B	CLEANING AND LUBRIC	CN	A	7
6850001053084	17102911A	CLEANING COMPOUND 16 OZ CN	CN	A	7
6850001104498	17100103B	DRY CLEANING SOLVEN	PT	A	7
6850001277193	2605115E1	ANTIFOGGING KIT 1 CN	KT	A	7
6850001487161	17102617A	CLEANING COMPOUND,A	CN	A	7
6850001657447	2605116D1	DEVELOPER,INDIRECT	PG	A	7
6850001775094	17102615B	SILICONE COMPOUND 2 OZ TU	TU	A	7
6850001817929	17106701A	ANTIFREEZE	GL	A	7
6850001817933	17106411A	ANTI-FREEZE PERM MIL-A-46153 5 GL	CN	A	7
6850001817933	17106411A	ANTI-FREEZE PERM MIL-A-46153 5 GL	CN	A	7
6850001817940	17106707A	ANTIFREEZE	DR	A	7
6850002246656	17100503B	CLEANING COMP RIFLE BORE 2 OZ CN	BT	A	7
6850002246657	17102618B	CLEANING COMP RIFLE BORE 8 OZ CN	CN	A	7
6850002246663	17102607A	CLEANING COMP RIFLE BORE 1 GL CN	GL	A	7
6850002271887	17102916A	CLEANING COMPOUND 1 QT A A PKG	QT	A	7
6850002456232	2810007661	TONER,INDIRECT ELEC	BX	A	7
6850002498029	17101715A	CLEANING COMPOUND,R	CN	A	7
6850002646568	17102604A	DESICCANT ACTIV 450-1/2UN BG 5GLCN	CN	A	7
6850002649039	171018I9A	DRY CLEANING SOLVENT TYPE I BULK-GL	GL	A	7
6850002649039	171018I9A	DRY CLEANING SOLVENT TYPE I BULK-GL	GL	A	7

NSN	LOC	NOUN	UI	CCD	SCIC
6850002705526	2605116A1	GASOLINE INDICATING PASTE 2 1/2 TU	JR	A	7
6850002705526	17102610B	GASOLINE INDICATING PASTE 2 1/2 TU	JR	A	7
6850002706225	17103808B	CHLORINATION KIT FED O-C-287TYPEIBX	KT	A	7
6850002745421	17101703A	DRY CLEANING SOLVENT TYPE II 5 GLCN	CN	A	7
6850002811785	17100509A	DRY CLEANING SOLVEN	GL	A	7
6850002858011	17102203A	DRY CLEANING SOLVENT TYPEII 55GLDR	DR	A	7
6850002858012	17102209A	DRY CLEANING SOLVENT TYPE I 55GLDR	DR	A	7
6850002976653	17106416A	DECON AGENT STB	DR	A	7
6850003685233	17102914A	INHIBITOR CORROSION CRYSTAL 1LTCN	LB	A	7
6850003685233	17102914A	INHIBITOR CORROSION CRYSTAL 1LTCN	LB	A	7
6850003929751	17102604B	CLEANING COMP OPTICAL LENS 2 OZ BT	BT	A	7
6850004372076	2609526A1	DEVELOPER.INDIRECT	PG	A	7
6850004372076	2605115E2	DEVELOPER.INDIRECT	PG	A	7
6850004571521	17102613A	TONER.DIRECT ELECTR	BZ	A	7
6850005923283	17102913A	CLEANING COMPOUND.O	DZ	A	7
6850005979765	17100120A	CLEANING COMPOUND SOLVENT 1 GL CN	GL	A	7
6850005979765	17100120A	CLEANING COMPOUND SOLVENT 1 GL CN	GL	A	7
6850005979765	17100 20A	CLEANING COMPOUND SOLVENT 1 GL CN	GL	A	7
6850005979765	17100120A	CLEANING COMPOUND SOLVENT 1 GL CN	GL	A	7
6850006645685	17102620A	DRY CLEAN SOLVENT	BT	A	7
6850006824763	17106213B	CLEANING COMPOUND.A	CN	A	7
6850007534967	17102613B	INHIBITOR CORROSION PWDR FM 6 OZ CN	CN	A	7
6850007535061	17101810A	INHIBITOR.ICING.FUE	CN	A	7
6850007822740	17102616B	INSPECTION PENETRANT KIT	KT	A	7
6850008652916	17102911B	INHIBITOR CORROS 2 OZ JR	CN	A	7
6850008807616	17100104A	SILICONE COMPOUND	TU	A	7
6850009262275	17100120C	CLEANING COMPOUND WIND 16 OZ CN	PT	A	7
6850009652332	17101705A	CARBON REMOV 5 GL CN	CN	A	7
6850009739091	17102916A	PENETRATING FLUID	CN	A	7
6850009750712	17102605B	SILICONE COMPOUND	TU	A	7
6850009830282		CLEANING COMPOUND SOLVENT 55 GL DR	DR		7
6850009845853	17102615A	CLEANING COMP SOLV 5 GL CN	CN	A	7
6850010114937	17102719A	TONER.DIRECT ELECTR	BT	A	7
6850011632139	2605115D3	DEVELOPER.INDIRECT	BX	H	7
6850011655408	17102611B	FUSING FLUID	BT	A	7
6850012100770	17102920A	DRY INK CARTRIDGE	EA	A	7
8010008998835	17100101C	PRIMER COATING	PT	H	7
8030000870630	17102909B	ANTISEIZE COMPOUND	LB	A	7
8030005241770	17100520A	CORROSION PREVENTIV	CN	A	7
8030002812726	17100101C	COATING COMPOUND.ME	KT	H	7
8030006169191	17106104C	SEALING COMPOUND	KT	H	7
8030006647105	17105206A	COATING COMPOUND.CO	GL	A	7
8030006700553	17100104C	SEALING COMPOUND	KT	H	7
8030007232746	17100104C	SEALING COMPOUND	KT	H	7
8030007235345	17100101C	SEALING COMPOUND	KT	H	7
8030007534598	17100104C	SEALING COMPOUND	KT	H	7
8030008693535	2601628C1	TAPE.ANTISEIZING	EA	A	7
8040001450019	17100101C	ADHESIVE	KT	H	7
9110002639665	17100703A	FUEL COMPRESSED TRIOX RATN HTNG NR	BX	A	7

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NSN	LOC	NOUN	UI	CCD	SCIC
9110008093553	17100520B	FUEL,COMPRESSED TRI	BR	A	7
9150001113199	17104817A	LUB OIL EE 10 MIL-L-21260A 5GL CN	CN	A	7
9150001178791	17105205A	LUBRICATING OIL,TWO	PT	A	7
9150001414481	17105209B	GREASE,GENERAL PURPOSE	CA	A	7
9150001450268	17105214C	GREASE AIRCRAFT GP WD TEMP R 5LB CN	CN	A	7
9150001497431	17105606A	HYDRAULIC FLUID,FIR	QT	A	7
9150001866668	17104403A	LUBOIL MIL-L-2104 OE/HDO-10 5 GL CN	CN	A	7
9150001866699	17105611A	LUBOIL MIL-L-46152 GR 10W-30 1 QTCN	QT	A	7
9150001889858	17104408A	LUBOIL MIL-L-2104 OE/HDO-30 5 GL CN	CN	A	7
9150001889867	31010000A	LUBOIL MIL-L-2104 OE/HDO-50 55/18DR	DR	A	7
9150001896727	17105809A	LUBOIL MIL-L-2104 OE/HDO-10 1 QT CN	QT	A	7
9150001896729		LUBOIL MIL-L-2104 OE/HDO-30 55/18DR	DR		7
9150001896729		LUBOIL MIL-L-2104 OE/HDO-30 55/18DR	DR		7
9150001896729	31010000A	LUBOIL MIL-L-2104 OE/HDO-30 55/18DR	DR	A	7
9150001896729	31010000A	LUBOIL MIL-L-2104 OE/HDO-30 55/18DR	DR	A	7
9150001896730	17105814A	LUBOIL MIL-L-2104 OE/HDO-40 1 QT CN	QT	A	7
9150001900904	17105218C	GREASE,AUTOMOTIVE A	CN	A	7
9150001900905	17105812A	GREASE AUTOMOTIVE & ARTY 5 LB CN	CN	A	7
9150001900907	17104413A	GREASE,AUTOMOTIVE A	CN	A	7
9150001900917	17105218B	GREASE GRAPHITE GRADE 3 HARD 1LB CN	CN	A	7
9150001912772	31010000A	LUBOIL MIL-L-2104 OE/HDO-10 55/18DR	DR	A	7
9150001912772	31010000A	LUBOIL MIL-L-2104 OE/HDO-10 55/18DR	DR	A	7
9150002312361	17105210A	LUB OIL MIL-L-3150 MS PL-M 1 QT	QT	A	7
9150002316689	17105219C	LUBRICATING OIL,GEN	QT	A	7
9150002319062	17104816A	LUBRICATING OIL,GEN	CN	A	7
9150002345197	17105215A	LUB OIL VV-L-751 MS CWIIA 5 LB	CN	A	7
9150002500926	17105203B	PETROLATUM TECHNICAL 1 LB CN	CN	A	7
9150002500926	17105203B	PETROLATUM TECHNICAL 1 LB CN	CN	A	7
9150002500926	17105203B	PETROLATUM TECHNICAL 1 LB CN	CN	A	7
9150002575370	17105207A	GREASE GRAPHITE 1 LB CN	CN	A	7
9150002617899	17105216A	PENETRATING OIL VV-P-216 1 PT	PT	A	7
9150002732388	17105219A	LUB OIL JET ENG MS 1010 1 QT	QT	A	7
9150002732389	17105205B	LUB OIL GP VV-L-800 MS PL-S 4 OZ CN	CN	H	7
9150002732389	17105205B	LUB OIL GP VV-L-800 MS PL-S 4 OZ CN	CN	H	7
9150002929689	17105204A	LUB OIL WEP MIL-L-14107 MS LAW 1 QT	QT	A	7
9150005306614	17105218A	GREASE WIRE-ROPE EXPOS GEAR 35LB CN	CN	A	7
9150006574959	17104815A	HYDRAULIC FLUID,AUT	CN	A	7
9150006982382	17105607A	HYDRAULIC FLUID AUTO-TRANS 10T CN	QT	A	7
9150007534667	17105208B	LUBOIL ENG BNS3-7A 1 QT CN	QT	A	7
9150007540664	17100505B	LUBRICANT SOLID FILM AIR DR 120S CN	CN	A	7
9150007822627	17105610A	LUBOIL ATE MIL-L-7808 1 QT CN	QT	A	7
9150008237660	17105215C	LUBRICATING COMPOUND FN HUSH 1LB CN	CN	A	7
9150008933522	17105207B	LUB OIL WEA LSA MIL-L-46000A 4 OZBT	BT	A	7
9150009351017	17105214A	GREASE AUTOMOTIVE & ARTY 1407 CA	CA	A	7
9150009356577	17105215B	LUB OIL WEA LSA MIL-L-46000A 2 OZBT	BT	A	7
9150009359807	17105619A	HYDRAULIC FLUID PB PRES/TEST 1QT CN	QT	A	7
9150009359808	17105618A	HYDRAULIC FLUID PB PRES/TEST 1GL CN	GL	A	7
9150009359809	17104812A	HYDRAULIC FLUID PB PRES/TEST 5GL CN	CN	A	7
9150009448953	17105219B	GREASE AIRCRAFT GP WD TEMP 1LB CN	LB	A	7

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NSN	LOC	NOUN	UI	CCD	SCIC
9150009490323	17105209A	LUB OIL SEM RIAPD-68 8 8 OZ TU	TU	A	7
9150009857245	17105204B	GREASE,AIRCRAFT AND	TU	A	7
9150009997548	17105213B	LUBRICANT INTERLOCKING SLIDE FAS BX	BX	A	7
9150010355392	17105205A	LUBRICATING OIL,GEA	QT	A	7
9150010355393	17104415A	LUBRICATING OIL,GEA	CN	A	7
9150010355394	31010000A	LUBRICATING OIL,GEA	DR	A	7
9150010355394	31010000A	LUBRICATING OIL,GEA	DR	A	7
9150010536688	17105620A	CLEANER,LUBRICANT A	GL	A	7
9150010546453	17105213C	CLEANER,LUBRICANT A	PT	A	7
9150010796124	17105216A	CLEANER,LUBRICANT A	BT	A	7
9150011021473	17105211C	CLEANER,LUBRICANT A	BT	A	7
9150011029455	17105203C	BRAKE FLUID,AUTOMOT	GL	H	7
9150011029455	17105203C	BRAKE FLUID,AUTOMOT	GL	H	7
9150011029455	17105617A	BRAKE FLUID,AUTOMOT	GL	A	7
9150011029455	17105617A	BRAKE FLUID,AUTOMOT	GL	A	7
9150011029455		BRAKE FLUID,AUTOMOT	GL		7
9150011029455		BRAKE FLUID,AUTOMOT	GL		7
9150011045227	17105203A	LUBRICATING OIL,WEA	QT	A	7
9150011129412	17105205B	LUBRICANT,INTERLOCK	TU	A	7
9150011129412	17105205B	LUBRICANT,INTERLOCK	TU	A	7
9150011524118	17104814A	LUBRICATING OIL,ENG	CN	A	7
9150011524119		LUBRICATING OIL,ENG	DR		7
9150011524119	31010000A	LUBRICATING OIL,ENG	DR	A	7
9150011772762	17105616A	LUBRICATING OIL,ENG	QT	A	7
9150011772763	17105609A	LUBRICATING OIL,ENG	QT	A	7
9150011784726	17105603A	LUBRICATING OIL,ENG	QT	A	7
9150011983829	2601240B1	GEAR LUBRICANT ADDI	BT	A	7
9150012602534	17100506B	LUBRICANT,SOLID FIL	CN	A	7
9160002531173	2601623C3	BEESWAX TECHNICAL 2 OZ	CK	A	7
9930009353638	17101719A	EMBALMING FLUID,ART	DR	A	7
9930009353639	17101717A	EMBALMING FLUID	DR	A	7

WESTON

APPENDIX B

DAMES & MOORE REPORT

WOODWARD-CLYDE CONSULTANTS REPORT

(As Received)

WESTON

DAMES & MOORE REPORT

DAMES & MOORE

July 5, 1989
19038-001-11

Servco Pacific Inc.
900 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813 Fax: 533-1369

Attention: Mr. Glenn H. Takeuchi
Senior Division Manager
Property Development

Subject: Progress Letter
Engineering Services and Consultation
Subsurface Hydrocarbon at
Proposed Servco Commercial Center - Phase I
Sand Island, Oahu, Hawaii

Following our discussion today, this letter provides our progress to date on the subject project.

Soil Gas Survey - The results of our soil gas survey are presented on the attached Plot Plan. The plot plan indicates that only a small area has measureable quantities of soil gas in the near surface zones. This finding, however, was not consistent with previous findings (hydrocarbon in borings), so we drilled borings in areas outside the indicated plume.

Borings - To date we have completed three of the five borings originally proposed. We have encountered hydrocarbon in two of the borings, which are outside the area indicated by the soil gas survey. Soil gas measurements taken during drilling did not indicate hydrocarbon until a clayey silt layer, approximately at the water table, was penetrated by the drilling. In Boring 1, the hydrocarbon was not detected in significant amounts until a clayey silt layer at approximately 6 feet in depth was penetrated. In Boring 3, hydrocarbon was detected when a clay layer from 8 to 10 feet was penetrated. Hydrocarbon in significant quantities was not detected in Boring 2, which appears to lie outside the hydrocarbon plume.

It appears that the hydrocarbon is more extensive than indicated by the soil gas survey, but hydrocarbon vapors are being prevented from moving up by the clay layer. Field boring logs for the three borings drilled to date are attached. We anticipate completing two more borings by the end of this week.

Recommendation - Based on the results, we anticipate that borings will need to be the primary means of investigation, as the soil gas survey does not extend deep enough to penetrate the apparently confining clayey silt layer. We therefore recommend that additional borings (beyond the five currently authorized) be drilled.

Budget - A review of our budget indicates that we are within the original estimates of our proposal of May 2, 1989. For the soil gas survey, approximately $4,000 in charges were generated. For the drilling, we anticipate that we will be within the budget.

For the additional borings recommended, we anticipate that drilling, sampling, and logging costs would be approximately $1,000 per boring and chemical testing would be approximately $500 to $1,000 per boring.

An additional six borings would cost approximately $6,000 plus $3,000 to $6,000 for chemical testing.

Planned Construction - We understand that a sewer line may soon be constructed to an approximate invert elevation of +2 in the area just mauka of the existing plume. We recommend that available information, particularly the soil gas survey results, be supplied to the contractor. Because of the confining clay layer, it may be possible to proceed with excavation work for the sewer without encountering hydrocarbons, if the excavation does not penetrate the clay layer. The contractor, however, should be aware of the presence of hydrocarbons so that proper safety precautions can be taken, such as periodic checks for vapors.

- o 0 o -

It has been a pleasure to prepare this progress letter for you. Please let us know as soon as possible if the additional borings are authorized, so that we can proceed without demobilizing. We believe that we require some assistance in moving automobiles temporarily out of areas to be investigated.

I will be out of town from 7/7/89 through 7/14/89. In the meantime, Ken Fan or Glen Lau will be available to coordinate the field investigation with you.

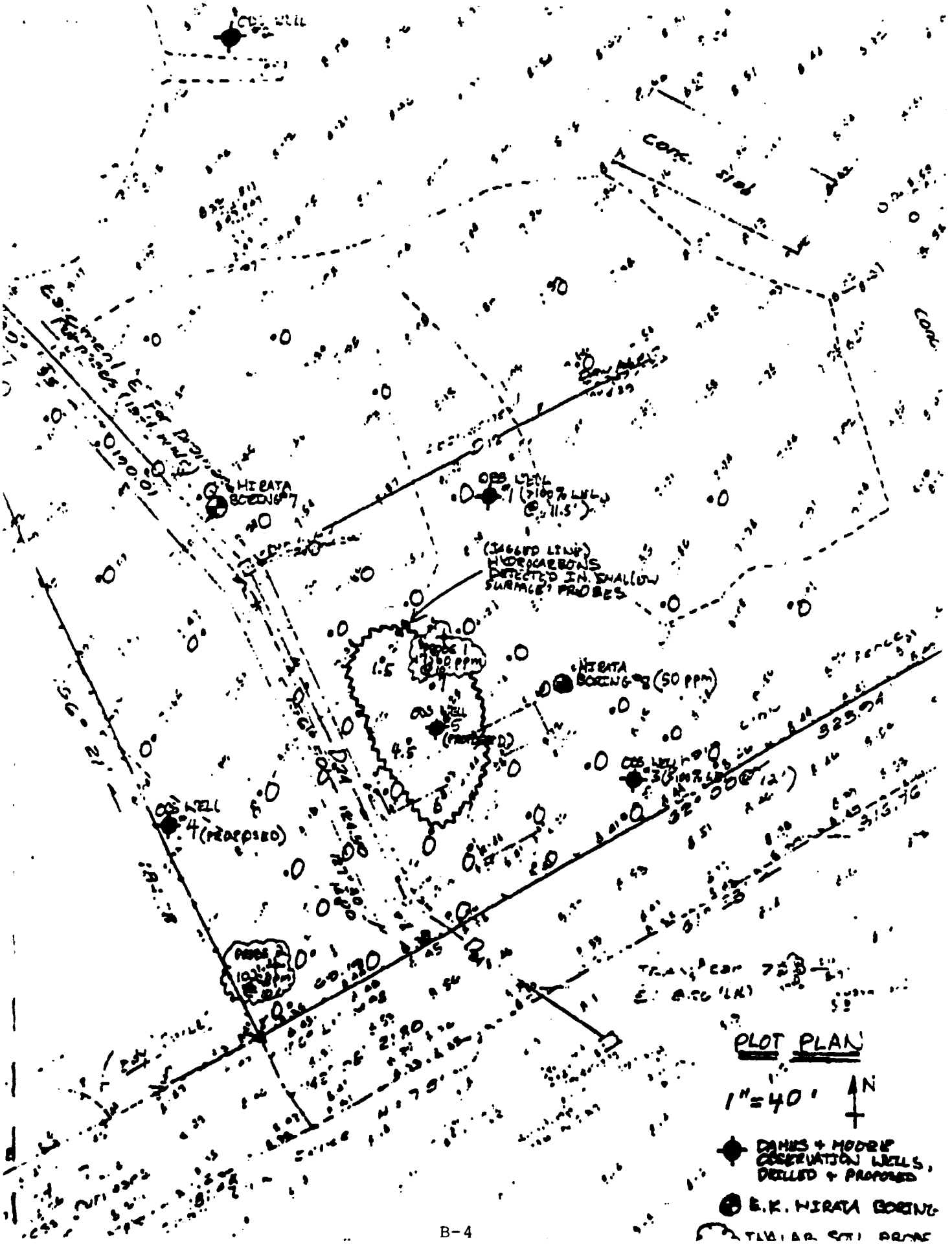
Respectfully submitted,

DAMES & MOORE
A Professional Limited Partnership

Kenneth Fan
for
Masanobu R. Fujioka, P.E.
Consultant

MRF(4547B/2008:19038-001-11)
(two copies submitted)

Attachments: Plot Plan
Field Logs


OBS WELL 1 (>100% LEL @ 11.5')
HIRATA BORING 7
(JAGGED LINE) HYDROCARBONS DETECTED IN SHALLOW SURFACE PROBES
HIRATA BORING 8 (50 ppm)
OBS WELL 5 (PROPOSED)
OBS WELL 4 (PROPOSED)
PLOT PLAN
1"=40'
N
DAMES & MOORE OBSERVATION WELLS, DRILLED & PROPOSED
E.K. HIRATA BORING

WESTERN

WOODWARD-CLYDE CONSULTANTS REPORT

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REPORT
SUBSURFACE INVESTIGATION OF KAPALAMA, PHASE I
KAPALAMA MILITARY RESERVATION
HONOLULU, HAWAII

I GENERAL

This report presents the results of Woodward-Clyde Consultants (WCC) Phase I subsurface investigation of the United States Army Engineer Division's (Army Corps) Kapalama Military Reservation in Honolulu, Hawaii. The work was authorized under Delivery Order No. 0007 to Architect-Engineer Contract No. DACA83-88-D-0127. The site location is shown on Figure 1.

II OBJECT AND SCOPE

The object of the work was to assess the quality of groundwater at the Kapalama Military Reservation - Phase I Property. The Phase I Property is one of five parcels of land at the Kapalama Military Reservation being sold (or that have been sold) by the Army. To complete this work, WCC evaluated existing reports, prepared a work plan, obtained well permits, advanced four soil borings and installed monitoring wells in these borings, developed and sampled the wells, evaluated the results of chemical analyses, measured ground water level elevations and free product thickness; prepared subsurface cross sections, water level and contaminant distribution maps; and prepared this report summarizing the results of our findings.

III SITE DESCRIPTION

The Kapalama Military Reservation is situated along Sand Island Access Road, in Honolulu, Hawaii at the location shown on Figure 1. The site is presently used by Servco Corporation as a vehicle storage parking lot. The

site is generally flat and partially covered with asphalt. Buildings and an underground storage tank, once present at the site, have been removed. A site plan map is shown on Figure 2.

IV REPORT REVIEW

To assist in the evaluation of the subsurface conditions at the Kapalama Military Reservation, WCC evaluated the following records and reports:

1. Unitec (1987) Underground Storage Tank Removal Reports,

2. Geolabs (1987) Preliminary Geological and Geotechnical Engineering Reconnaissance Report of the Honolulu Waterfront Master Plan Technical Report Series,

3. Jason Lembeck and Associates (1989) Petroleum Facilities Report for the Honolulu Waterfront Master Plan Technical Report Series,
4. Dames and Moore (1989a and b) reports concerning groundwater quality on the Kapalama Phase I Military Reservation,

5. Goodsill, Anderson, Quinns and Stifel's August 15, 1989 letter to the U.S. Army Engineer Division, and

6. Interviews with U.S. Army Engineer Division personnel familiar with either the removal or use of the underground storage tank.

A brief discussion of each of these is described below:

In 1987, Unitec removed an underground storage tank at the Kapalama Military Reservation Phase I property at the location shown on Figure 2. At the time of removal, Unitec's records show that the underground storage tank contained both gasoline and water. Thus, it is reasonable to conclude that holes existed in the underground storage tank, and that product may

have migrated from the tank into the native soils and groundwater. Unitec did not test the groundwater at the time of tank removal for hydrocarbons. Thus no conclusions can be drawn concerning the concentration or amount of gasoline dispersed.

Geolabs (1989) prepared a report describing the general geologic and geotechnical conditions of the Honolulu waterfront which included the Kapalama Military Reservation area. They report that the Kapalama Military Reservation is underlain predominantly by man made fill (designated Rf1) overlying more competent coral-algal formation. The fill consists of clay to sandy gravel mixtures and an intermediate mix of silty sand soils, with consistencies that range from soft or loose to hard or very dense.

Jason Lembeck and Associates (1989) describe the current petroleum distribution system within Honolulu Harbor. Their report shows that several oil pipelines, which belong to the Hawaiian Independent Refinery (HIRI), Chevron, and the Hawaiian Fuel Facilities Corporation (HFFC), cross the Kapalama Military Reservation Phase 1 property (Figure 3). The petroleum pipeline distribution system is presented in more detail by Helber et al. and R.M. Towill Corporation on sheet 2 of their Honolulu Waterfront project report. Their map shows that the pipelines that cross or are located immediately adjacent to the Kapalama Phase I property includes two Chevron 8-inch pipelines which transport black and white oil, respectively; three Chevron 4-inch pipelines which transport jet-A fuel, one HFFC 10-inch pipeline, and one 10-inch HIRI pipeline. The HIRI and HFFC pipelines reportedly transport numerous petroleum products to other refiners and the Honolulu airport.

Dames and Moore (1989a and b) prepared two reports concerning groundwater quality at the Kapalama Phase I property. Their July 5, 1989 report describes the results of a soil gas survey and observations of subsurface conditions from soil borings. Although they do not describe their soil gas procedures, Dames and Moore indicated that hydrocarbon product is present in the shallow subsurface.

Dames and Moore's August 17, 1989 progress letter reports the results of a more extensive subsurface investigation. In addition to detecting hydrocarbon vapors in shallow soils, Dames and Moore presented the results of their ground water monitoring. These results show a free floating hydrocarbon product plume centered around the location of the former underground storage tank.

Dames and Moore's findings are summarized in Goodsill, Anderson, Quinns and Stifel's August 15, 1989 letter to the U.S. Army Engineer Division. It is concluded in this letter that, based upon the location of floating gasoline product, the source of contamination is onsite rather than offsite. Thus the source of the leak is the underground storage tank. This conclusion is drawn, however, without mention of an investigation of external sources of subsurface petroleum product--such as that transported by one of the many underground pipelines that traverse or are located adjacent to the property.

Personal interviews with U.S. Army Corps of Engineers personnel in September of 1989 revealed that both diesel fuel and gasoline products were stored in the underground tank. At the time of tank removal, personnel at the site did not, however, observe gasoline or diesel fuel product in either the soils or groundwater.

V FIELD ACTIVITIES

To assess the quality of subsurface groundwater adjacent to the location of the former underground storage tank at the Kapalama Military Reservation Phase I Property, WCC completed a subsurface field investigation. The activities required to complete this task are described below. WCC's findings are presented in subsequent report sections.

A. Drilling

On August 30 and 31, 1989, WCC subscontracted PR Drilling to advance four soil borings and install monitoring wells (MW-1, 2, 3 and 4) in the borings at the subject site. The borehole locations were selected by WCC after a field consultation with the Engineers Division representative. The location of the boreholes are shown on Figure 2. The borings were advanced to depths of approximately 12 to 20 feet with a Mobile B-80 truck mounted drill rig equipped with hollow stem augers. While drilling, soils were obtained using a split spoon sampler placed through the hollow stem of the auger. The augers and sampler were steam cleaned between sampling locations. The soils were logged by a WCC geologist according to the Uniform Soils Classification System. Logs of the materials encountered are provided in Appendix A.

B. Monitoring Well Construction

Groundwater Monitoring wells were constructed in each of the borings after their completion. The wells were designed to monitor the top of the shallow groundwater. The wells were constructed with 2-inch schedule 40 ASTM grade PVC casing placed inside the hollow stem of the auger. The casing consists of an upper blank section and a lower screened (.020 inch slots) section positioned across the top of the shallow ground water. Grade A12 silica sand filter pack was placed in the annular space of the well bore to approximately 1 foot above the top of the well screen section. A 1/2 to 1 foot thick bentonite pellet seal was placed above the filter pack, followed by a cement slurry to surface grade. Well No. MW-4 was completed with a locking Cristy cap, the remaining wells were completed with removeable steel caps.

C. Well Development and Groundwater Sampling

After their construction, the wells were developed using the bailer method. Approximately 18 to 25 gallons of water were removed from each well during this process. Well development was terminated when the well water appeared clear a short time after bailing. A clean acrylic bailer was then used to identify wells which contained free floating product. This included wells installed both by Dames and Moore and WCC. Once identified, these wells were not sampled because of their obvious contamination. The depth to free product and top of groundwater were then determined in all the wells using an electronic sounder. WCC then purged all the wells to be sampled of approximately 4 to 5 well volumes using a clean teflon™ bailer. A sample was then obtained from each of these wells using the same bailer. The teflon bailer was cleaned between well locations using a laboratory grade acetone rinse, followed by an alconox soap rinse and finally a distilled water rinse. The samples were placed in laboratory prepared finger vials for benzene, toluene, ethylbenzene, and total xylenes (BTEX) analyses; and 1 liter glass containers for total petroleum hydrocarbon (TPH) as gasoline and diesel fuel analyses. The sample containers were immediately placed in refrigerated storage for transport to Brewer Analytical Laboratories in Papaikou, Hawaii. The samples were delivered following EPA chain of custody procedures. A copy of WCC's chain of custody is included in Appendix B.

D. Laboratory Analyses

On September 5 and 13, 1989, the groundwater samples were analyzed for TPH, both as gasoline and diesel fuel; and BTEX using California LUFT Manual Procedures. The results of these analyses are discussed below. The analytical laboratories report is included in Appendix B of this report.

E. Well Survey

On September 7, 1989 R. M. Towill Corporation surveyed in the elevations of the wells installed both by WCC and Dames and Moore. Their survey elevations are summarized in Table 1. The elevation datum was mean sea level (MSL). Their reference benchmark is 10.255 feet MSL.

VI RESULTS

A. Subsurface Conditions

As shown on the logs of borings in Appendix A and in cross section A-A' Figure 5, (see Figure 4 for the cross section location) the subsurface materials encountered consist of interbedded sand, underlain by clays, silty clays, and clayey and sandy gravels to depths that vary from 12 to 20 feet. These units comprise Geolabs (1989) Rf1 unit described as fill. They are all, in turn, underlain by coral.

B. Groundwater

Shallow groundwater beneath the site occurs at a depth of about 6 feet. Groundwater level and free product thickness measurements obtained on September 5, 1989 are summarized in Table 1. The data is plotted as a water level elevation map on Figure 6. As shown, the groundwater gradient is generally flat, with a slight depression located near wells B-8 and OB-3 and local groundwater highs around wells MW-2 and MW-3.

C. Free Product Thickness

The location and thickness of floating hydrocarbons beneath the site is shown on Figure 7. As shown, the thickest accumulation of free product surrounds wells OB-3 and OB-5. Up to 1.55 feet of free floating hydro-

carbons were detected in well OB-3, 0.59 feet in well OB-5, 0.29 feet in well OB-1, 0.12 feet in well MW-3, and 0.12 feet in well OB-13. Free product was not observed in any other wells at the site.

D. Groundwater Analyses

Groundwater samples were obtained from monitoring wells that did not contain free floating product. These samples were submitted to Brewer Analytical Laboratories for TPH as gasoline, diesel fuel and BTEX analyses. The results of these analyses are summarized in Table 2. As shown, TPH as gasoline was detected in monitoring wells MW-1, 2, 4, OB-4, and OB-12 at concentrations of 40, 2.9, 46, 1.7 and 7.9 mg/l, respectively. Diesel fuel was also detected in groundwater from these same wells. The reported concentrations were 24, 2.9, 10, 1.3 and 5.7 mg/l, respectively. The analytical laboratory also reported that benzene, toluene, ethylbenzene and total xylenes were present either singularly or in combination in wells MW-1, MW-2, MW-4, OB-4 and OB-12. The water sample obtained from well MW-1 showed the highest concentration of benzene (0.36 mg/l), toluene (0.097 mg/l), ethylbenzene (2.6 mg/l) and total xylenes (0.35 mg/l) relative to all other samples from the site.

E. Distribution of Groundwater Contaminants

The distribution of TPH as gasoline, diesel fuel, and BTEX constituents in groundwater is shown on Figures 8, 9 and 10, respectively. As shown, these constituents are present in groundwater around the edges of the free floating product plume. The distribution of these contaminants to the northeast appears limited to the west side of wells OB-11 and OB-9, but is unknown in all other directions. The vertical extent of contamination is also unknown.

VII DISCUSSION

Both the analytical laboratory's report and our own field observations indicate that both dissolved and floating phase hydrocarbons are present in the shallow groundwater at the Kapalama Military Reservation Phase I property in Honolulu, Hawaii. The laboratory's report shows that both gasoline and diesel fuel products are present in water samples obtained from the site. These products were also reportedly stored in the underground storage tank removed by Unitec in 1987. The free product thickness map shows that floating hydrocarbon product is also thickest adjacent to the former underground storage tank location. TPH as gasoline, diesel fuel, and BTEX constituents are distributed adjacent to this free product plume, with the highest concentrations of diesel fuel and BTEX found in well MW-1, the well closest to the former underground tank location. Concentrations of these constituents generally decrease radially away from well MW-1, with the exception of TPH as gasoline, which is also found in high concentration in well MW-4. These spatial relations suggest that the underground storage tank formerly located at the Kapalama Military reservation leaked both gasoline and diesel fuel into the shallow groundwater. The distribution of TPH, diesel and BTEX beyond the limits of this investigation, however, does not preclude the possiblity of additional or other sources of both dissolved and floating phase contaminants.

VIII CONCLUSIONS

Based upon the results of our records and report review, the analytical laboratories report, and our own field observations, the underground storage tank formerly located at the Kapalama Military Reservation Phase I property probably leaked hydrocarbon product into the shallow groundwater. Other sources of dissolved phase hydrocarbons may be one of the several pipelines adjacent to or that cross the Kapalama Military Reservation Phase I property, or underground storage tanks reported on the Phase II property. Product transfer and hydrostatic test records of these tanks and/or pipelines should be reviewed to assess their contribution of hydrocarbon products to the shallow soil and groundwater.