

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



KŪKULU KE EA A KANALOA

KAHO'OLAWE ISLAND RESERVE COMMISSION

811 Kolu Street, Suite 201, Wailuku HI 96793
Telephone: (808) 243-5020 Fax (808) 243-5885

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R. KEONI FAIRBANKS
Executive Director

March 19, 2002

Ms Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania St., Suite 702
Honolulu, Hawai'i 96813

RECEIVED
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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

Dear Ms Salmonson:

Subject: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE RAINWATER
CATCHMENT AND WATER STORAGE FACILITY, KAHO'OLAWE, HAWAII

The Kaho'olawe Island Reserve Commission (KIRC) has reviewed the comments received during the 30-day public comment period, which began on February 8, 2002. The KIRC has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the April 8, 2002 OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, four copies of the final EA, and the project summary on a disk. Please call Mr. Deepak Neupane, P.E. at (808) 243-5025 if you have any questions.

Sincerely,

Deepak Neupane

FOR

R. Keoni Fairbanks
Executive Director

APR 8 2002

FILE COPY

2002-04-08-KAH-~~FEA~~-Kahoolawe

FINAL ENVIRONMENTAL ASSESSMENT

FINDING OF NO SIGNIFICANT IMPACT

FOR

(THE RAINWATER CATCHMENT AND

WATER STORAGE) FACILITY

ISLAND OF KAHO'OLAWE

Proposing Agency:



KŪKULU KE EA A KANALOA

Kaho'olawe Island Reserve Commission

Maui, Hawaii

Prepared by:

Marc M. Siah & Associates, Inc.

March 2002



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

FINAL ENVIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT
FOR
THE RAINWATER CATCHMENT AND
WATER STORAGE FACILITY
ISLAND OF KAHO'OLAWE

Proposing Agency:



KŪKULU KE EA A KANALOA

Kaho'olawe Island Reserve Commission
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March 2002

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EXECUTIVE SUMMARY



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

EXECUTIVE SUMMARY

This Final Environmental Assessment is prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Title 11, Chapter 200, Hawaii Administrative Rules, Department of Health, State of Hawaii. The Kaho'olawe Island Reserve Commission (KIRC) proposes to locate a rainwater catchment apron and water storage reservoirs on the eastern half of the Island of Kaho'olawe. The entire system will span approximately 3 acres of land surrounding the Luamakika crater.

The purpose of the water system is to allow for revegetation of the large barren area surrounding Luamakika in order to combat the severe problem of soil erosion that currently exists. The main components of the proposed project consist of a the catchment apron, a reservoir storage system, transmission pipes, a pump house, and an access road. Due to the island's sensitive and important cultural significance, each component of the catchment and storage system will have a modular design and a minimal profile above the existing grade.

The project is scheduled to begin in May, 2001. Once construction begins, it is expected to last approximately 6 months. The construction costs for this project are based on the analyses of two alternative means of transporting materials to the site. One way of transporting material to the island would be by barge. The material would then have to be trucked to the construction site. The second method of transporting the material would be by flying it in by helicopter, directly to the site. *Bringing the necessary materials by barge is estimated at \$1,240,000.* The option of flying the materials over via helicopter is the more expensive option, estimated at approximately \$1,590,000.

Based on the information presented in this report, prepared in accordance with the requirements of Chapter 343, HRS, the proposed action is assessed as having no significant impact on the environment so as to necessitate the preparation of an Environmental Impact Statement. The proposed project, therefore, is anticipated to merit a determination of a Finding of No Significant Impact (FONSI).

SUMMARY INFORMATION



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SUMMARY INFORMATION

Project Name: Rainwater Catchment and Water Storage Facility for the Island of Kaho'olawe.

Proposing Agency: Kaho'olawe Island Reserve Commission, State of Hawaii
811 Kolu Street, Suite 201
Wailuku, Hawaii 96793
Phone: (808) 243-5891
Fax: (808) 243-5885

EA Preparer: Marc M. Siah & Associates, Inc.
810 Richards Street, Suite 888
Honolulu, Hawaii 96813
Phone: (808) 538-7180
Fax: (808) 528-4352

Approving Agency: Kaho'olawe Island Reserve Commission, State of Hawaii
811 Kolu Street, Suite 201
Wailuku, Hawaii 96793
Contact: Deepak Neupane
Phone: (808) 243-5025
Fax: (808) 243-5885

Project Location: Luamakika, Island of Kaho'olawe

Landowner: State of Hawaii

Existing Use: Federal Reserve

Proposed Action: The State of Hawaii's Kaho'olawe Island Reserve Commission (KIRC) proposes to locate a rainwater catchment and water storage facility on the eastern half of the Island of Kaho'olawe. The entire system will span approximately 3 acres of land surrounding the crater at Luamakika. The purpose of the catchment and storage reservoirs are to allow for revegetation of the large barren area surrounding Luamakika in order to combat the severe problem of soil erosion that currently exists. The main components of the proposed project consist of a catchment apron, a reservoir storage system, transmission pipes, a pump house, and an access road.

Impacts: No significant adverse impacts are expected from the installation of the water system at Luamakika crater. Construction activities are anticipated to have minimal short-term noise and air quality impacts on the surrounding area. Special care was given during the design process of the proposed water system toward ensuring that the structures to be installed will have a minimal impact on the surrounding archaeological and cultural sites in the area. All applicable government rules and regulations will be followed during the construction phase of the project to minimize these impacts.

SECTION 1
INTRODUCTION AND PROJECT DESCRIPTION

SECTION 1

INTRODUCTION AND PROJECT DESCRIPTION

1.1 Project Location

The State of Hawaii's Kaho'olawe Island Reserve Commission (KIRC) proposes to locate a rainwater catchment and water storage reservoirs on the eastern half of the Island of Kaho'olawe. The entire system will span 20 grids, or 20 hectares (49.4 acres) surrounding the Luamakika crater. However, the total area directly impacted by construction is only 3 acres. Siting for the various components of the system was accomplished through close coordination and consultation with the KIRC restoration program, cultural education program staff, and consultation with project and State Historic Preservation Division (SHPD) staff, as well as consideration of predominant wind and rainfall directions. The general location of the proposed project is depicted in Figure 1-1.

1.2 Project Description

The purpose of the water system is to allow for revegetation of the large barren area surrounding Luamakika in order to combat the severe problem of soil erosion that currently exists. The main components of the proposed project consist of a the catchment apron, a reservoir storage system, transmission pipes, a pump house, and an access road. The proposed layout of the project is provided in Figure 1-2. Due to the island's sensitive and important cultural significance, each component of the catchment and storage system will have a modular design and a minimal profile above the existing grade.

1.2.1 Catchment Apron

The catchment apron will be a 224-foot by 200-foot corrugated metal surface, separated into two sections at an elevation of approximately 1444 feet above Mean Sea Level (msl). Each 100 foot section will be sloped to collect rain water in a 12-inch by 18-inch gutter at its lower edge. Each gutter will be sloped to drain into an underground piping system that feeds the reservoir storage system. The apron will have a 14-foot by 14-foot modular structure. Concrete footings and 4-inch by 6-inch wooden posts will be the primary structural support for the system. The catchment will slope at approximately 5% parallel to the corrugated metal grooves and 2% perpendicular to the corrugated metal grooves in order to deliver rain water into the collection gutters. A view of the site designated for the proposed catchment apron is provided in Figure 1-3.

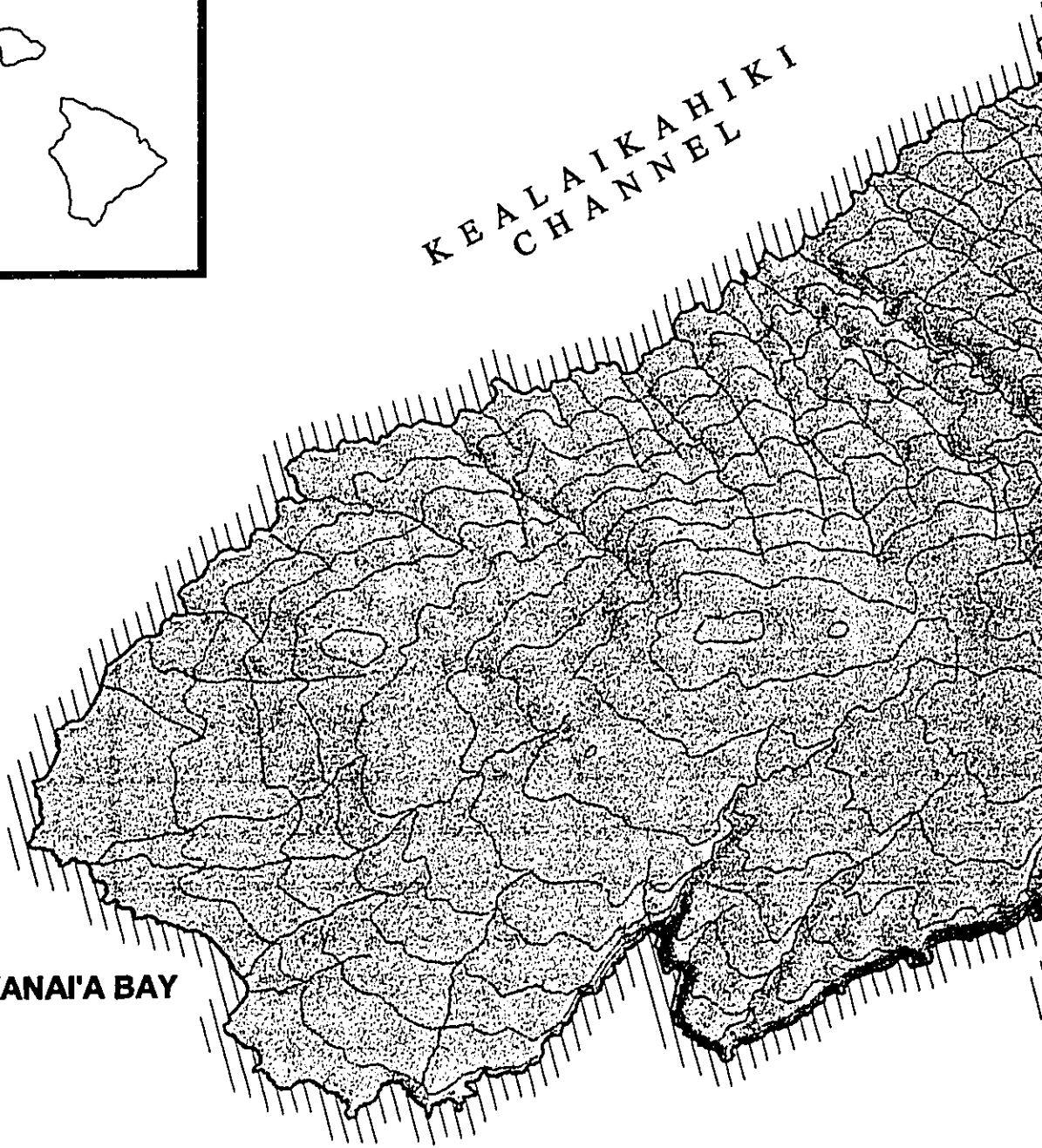
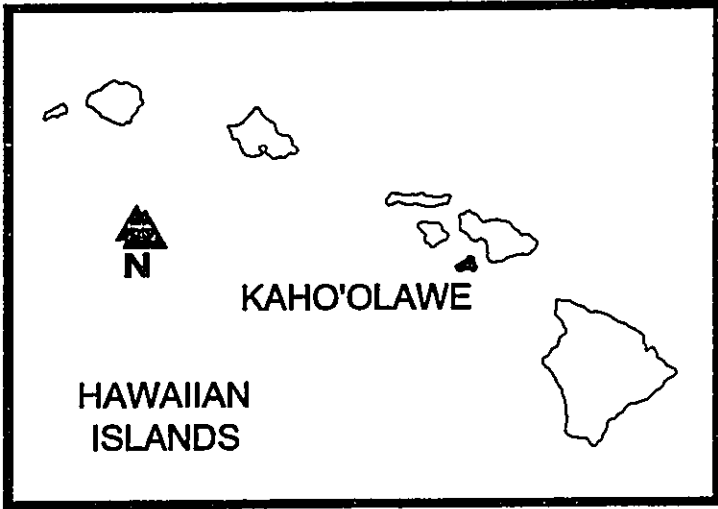
1.2.2 Reservoir Storage System

The rain water catchment system will consist of two storage reservoirs and a service tank. Two long term storage reservoirs of 150,000 gallon capacity each will be located below the catchment apron at an elevation of 1,436 feet above msl. The service tank will have a 100,000 gallon capacity and will be located at an elevation of 1,466 feet above msl. This tank will be tapped to fill water distribution vehicles during irrigation.

1.2.3 Transmission Pipes

The storage system will utilize about 485 lineal feet (lf) of 6-inch PVC pipe to transmit water from the catchment apron to the long term storage reservoirs. Approximately

Figure 1-1 General Location of the Project



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810 Richards Street, Suite 888, Honolulu, Hawaii 96813

PACIFIC OCEAN

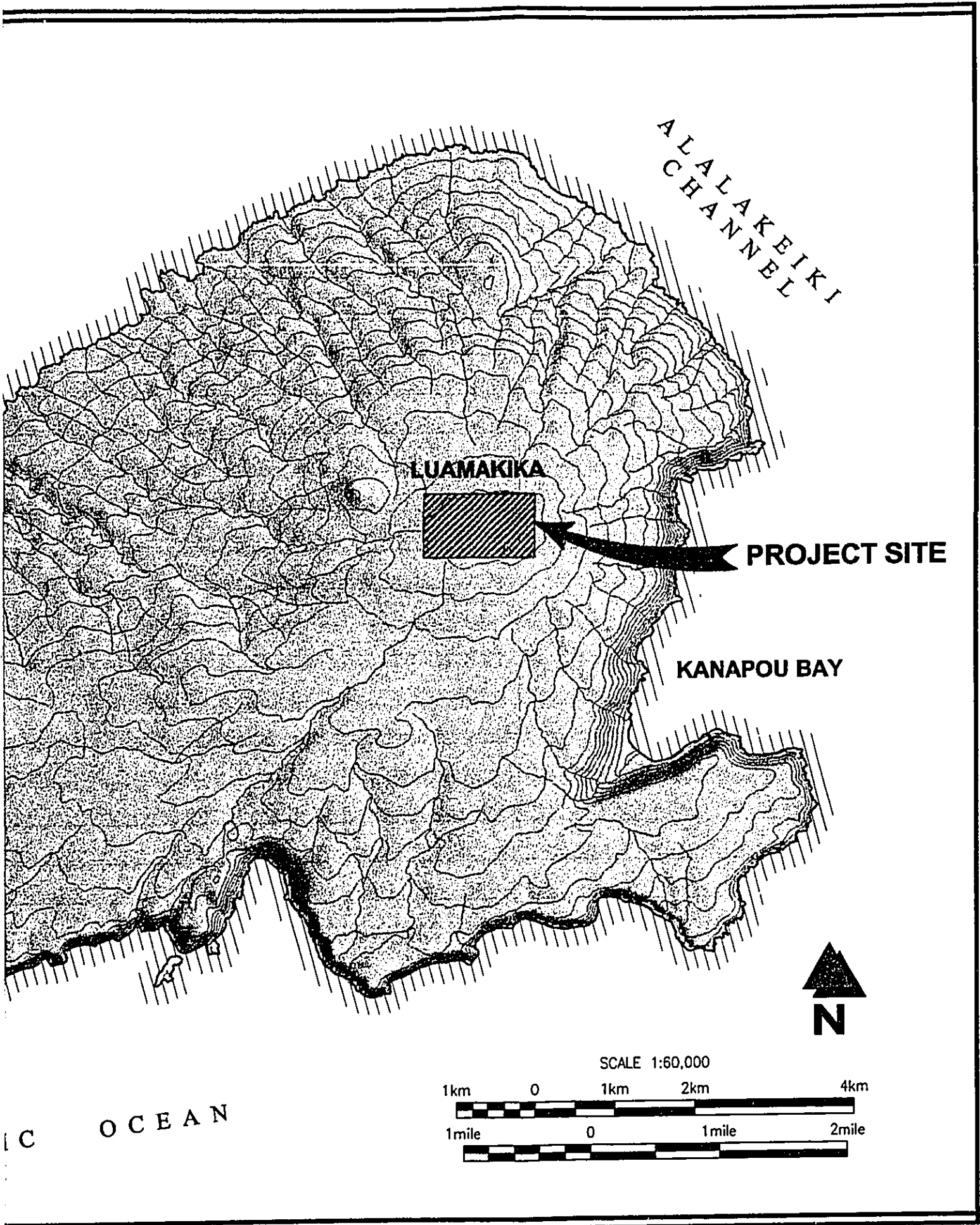
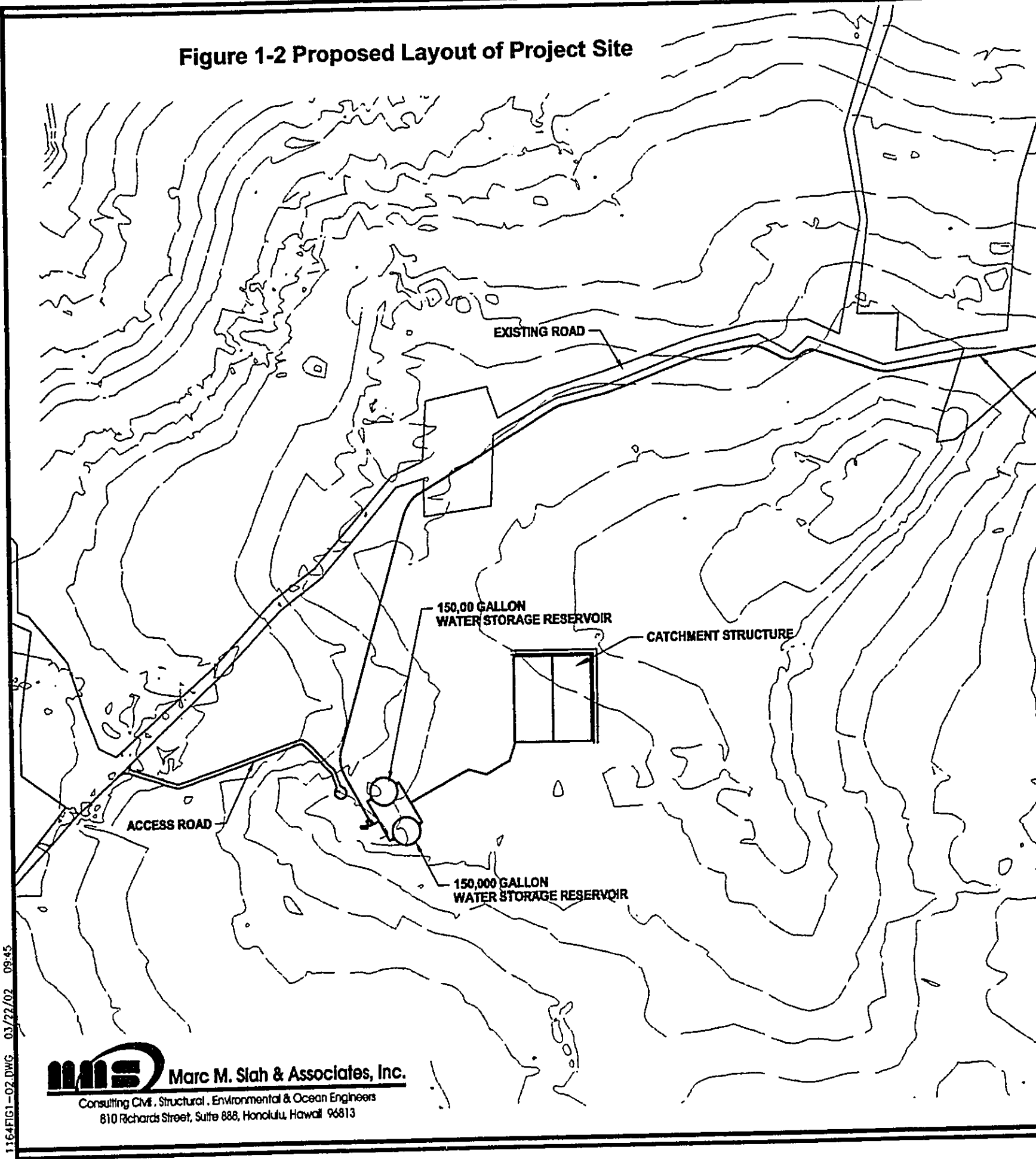
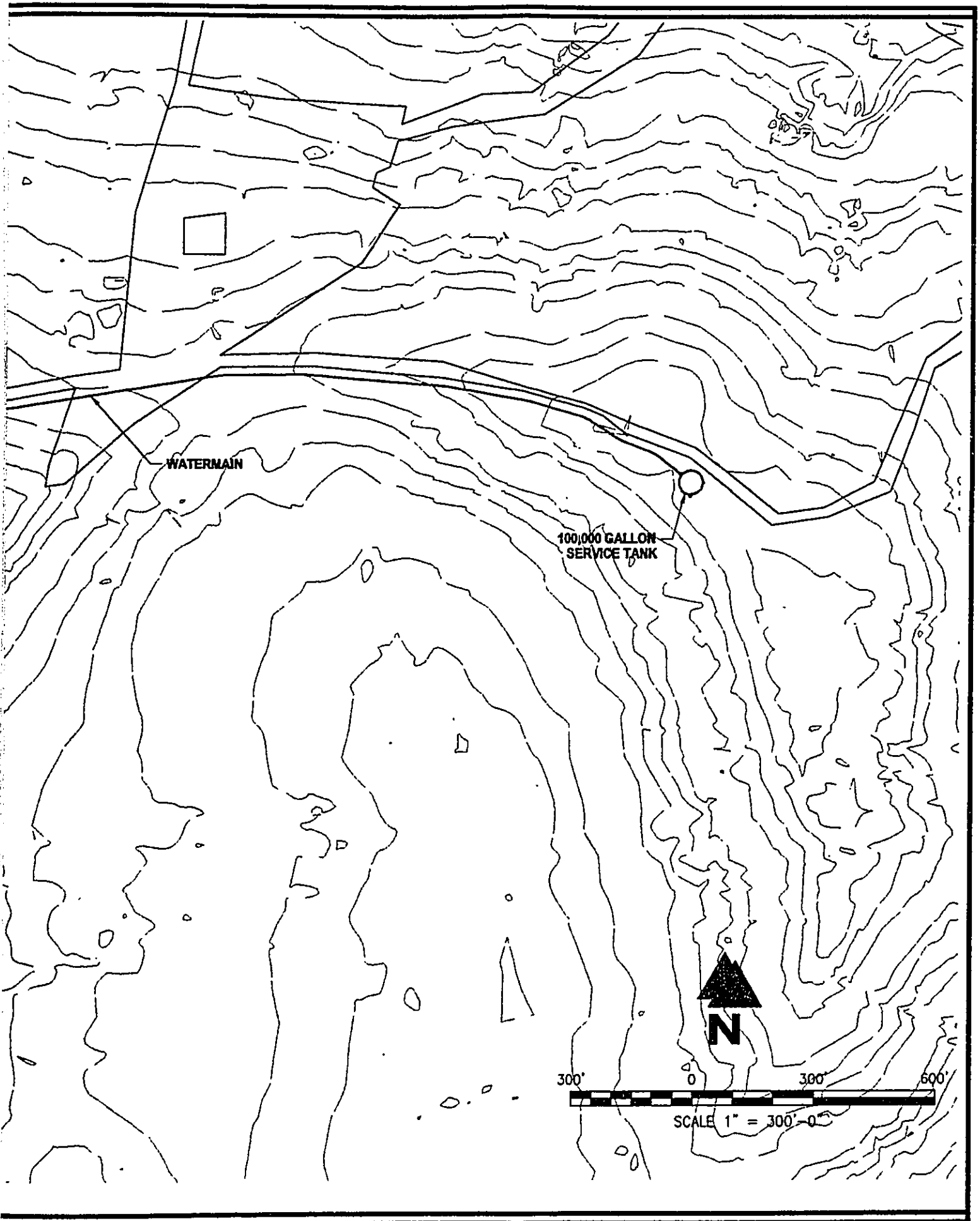


Figure 1-2 Proposed Layout of Project Site



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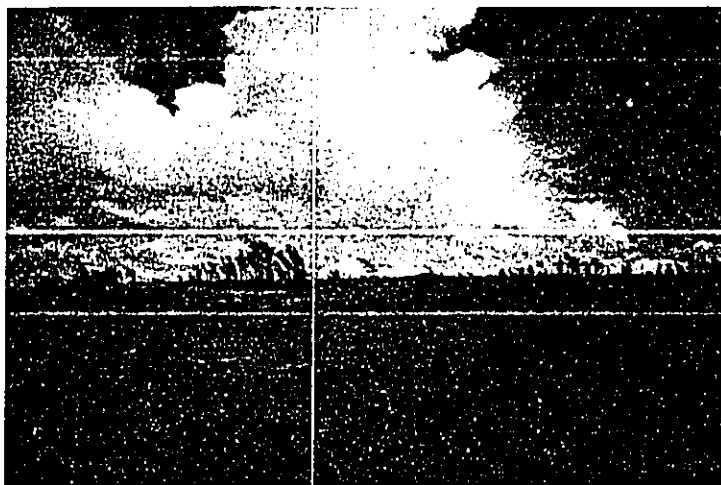


Figure 1-3 Designated Site for the Proposed Catchment Apron.

4,190 lf of 2-inch HDPE pipe will be used for transmitting water from the storage reservoirs to the 100,000 gallon service tank. The HDPE pipe will run parallel to the K-1 service road in a six-inch deep trench. A view of the location for the proposed transmission pipes along the K-1 service road is provided in Figure 1-4.



Figure 1-4 Proposed Location of the Transmission Pipe Along the K-1 Service Road.

1.2.4 Pump House

Due to the elevation differences between the two (2) 150,000 gallon storage reservoirs and the 100,000 gallon service tank, a pumping system will be utilized to lift the water from the storage reservoirs to the service tank. Two pumps will be used for redundancy in the system and each pump will be operating at a maximum of 60 feet of head and a flow rate of 17 gallons per minute with a base horse power of less than 1 hp.

1.2.5 Access Road

The access road will diverge off of the K-1 service road, near Luamakika, and run approximately 460 feet southeast toward the location of the catchment apron and the two 150,000 gallon storage reservoirs. The access road will be a compacted dirt road, 10 feet wide with two 2-foot wide drainage swales along either side for a total width of 14 feet.

1.3 Project Schedule and Cost

The project is scheduled to begin in April, 2002. Once construction begins it is expected to last approximately 6 months. The construction costs for this project are based on the analyses of two alternative means of transporting materials to the site. One way of transporting material to the island would be by barge. The material would then have to be trucked to the construction site. The second method of transporting the material would be by flying it in by helicopter, directly to the site. Bringing the necessary materials by barge is estimated at \$1,240,000. The option of flying the materials over via helicopter is the more expensive option, estimated at approximately \$1,590,000.

SECTION 2
DESCRIPTION OF THE EXISTING ENVIRONMENT



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SECTION 2

DESCRIPTION OF THE EXISTING ENVIRONMENT

2.1 Historical Land Use

Throughout its history, Kaho'olawe has been scarcely populated due to its lack of natural fresh water resources. The island was used as a penal colony for a short time during the mid 1800's. After the penal colony was shut down commercial interest in the land grew sharply. An inspection was conducted in 1857 to determine possible lease conditions of Kaho'olawe, which found "...about three thousand acres of good land, mauka in the mountain." The land was leased to Robert Wyllie and Elisha Allen in 1858 for the purpose of raising sheep. By the late 1890's there were approximately 900 cattle and 15,000 sheep on the island. These grazing animals, in addition to the large feral goat population that existed on the island, accelerated the loss of vegetation and helped lead the island to its present barren state.










Ranching activities continued on the island until 1941 when the United States military took control of Kaho'olawe for aerial bombing, naval gunnery and other related activities. Kaho'olawe was used for military training exercises and as a weapons range until 1990 when President George Bush ordered the Secretary of Defense to cease using the island for these purposes. Federal funds to be used toward the cleanup effort on Kaho'olawe were allocated to the Department of the Navy under the Department of Defense Appropriations Act. In November of 1993, the United States Congress directed the Department of the Navy to convey the island of Kaho'olawe to the State of Hawaii prior to beginning the cleanup of the former military training area and bombing target. This federal legislation required the Navy to enter into a Memorandum of Understanding (MOU) with the State regarding issues such as the cleanup of unexploded ordinance and the environmental restoration of the island. Also in 1993, the Kaho'olawe Island Reserve was established and the State-run Kaho'olawe Island Reserve Commission (KIRC) was created to oversee the management of the reserve and its surrounding waters. Chapter 6K of the Hawaii Revised Statutes (HRS) outlines the specific functions and responsibilities of KIRC. These duties limit the use of the reserve for the following: 1) preservation and practice of all rights customarily and traditionally exercised by Native Hawaiians for cultural, spiritual and subsistence purposes; 2) preservation and protection of its archaeological, historical and environmental resources; 3) rehabilitation, revegetation, habitat restoration and preservation; and 4) education. The proposed land use map for the island of Kaho'olawe, as developed by the KIRC, is depicted in Figure 2-1. Chapter 6K also stipulates that all commercial uses of the island of Kaho'olawe shall be strictly prohibited. Kaho'olawe is to be held as part of a public land trust for the eventual transfer of the island and its waters to the sovereign Native Hawaiian entity upon its recognition by the United States and the State of Hawaii.

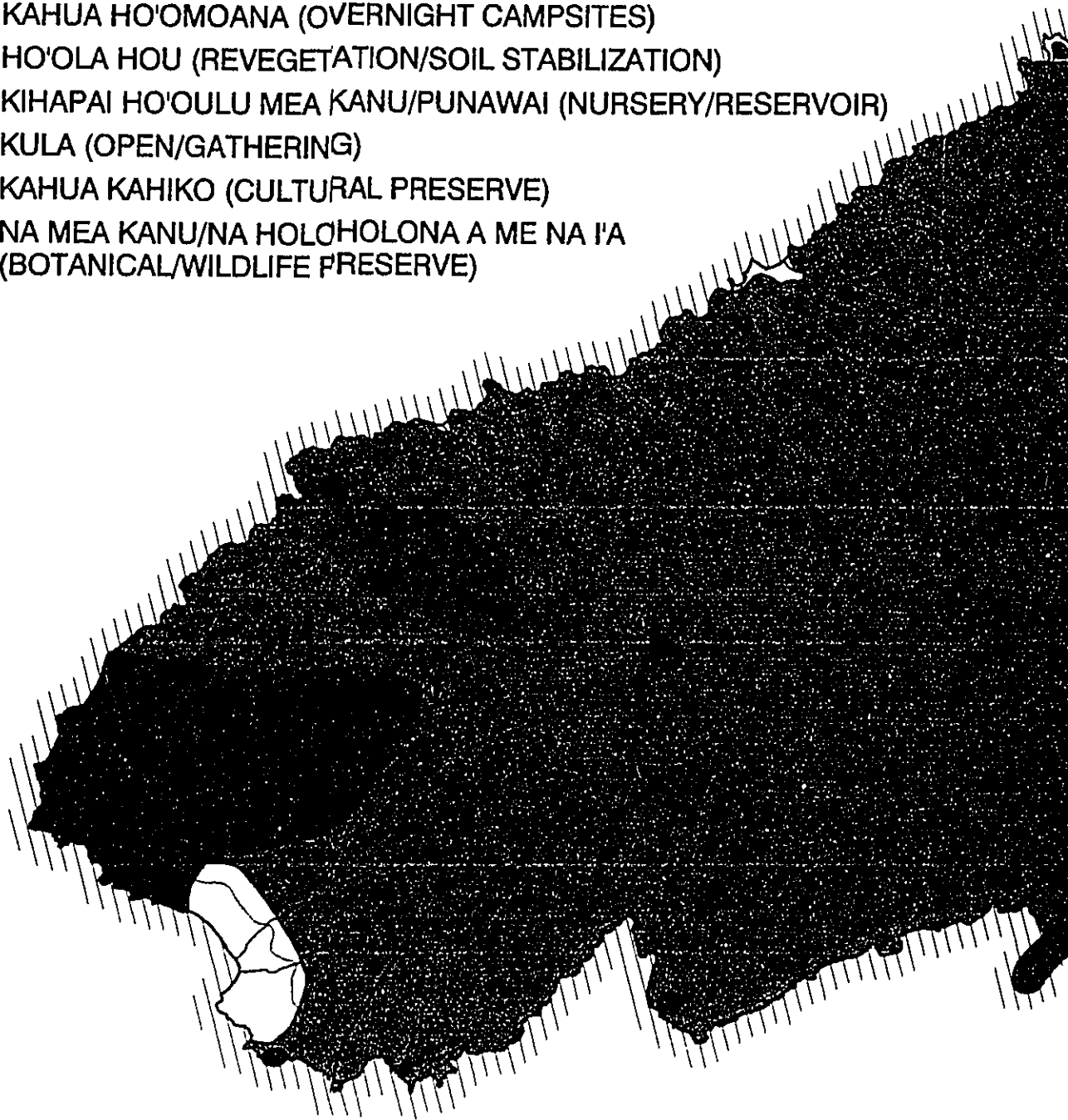
Based on the federal legislation, the Navy retains administrative control of Kaho'olawe until environmental restoration and unexploded ordinance removal is completed in accordance with the MOU or until November 11, 2003, whichever comes first.

2.2 Climate

The climate observed in the Hawaiian Islands is a function of the upper air circulation in the region. The dominant circulation pattern is that of an anticyclone which is generally located to the northeast of the islands. The result of this anticyclone is the production of trade winds that blow out of the northeast approximately 60 percent of the year. A trademark of the trade winds is that warm air masses passing over the ocean become moisture laden and are subjected to

Figure 2-1 Land Use Map for the Island of Kaho'olawe

-  'ILI BOUNDARY LINES ('ILI NAMES IN CAPITALS)
-  KAHUA KAUAHALE (EDUCATIONAL AND CULTURAL CENTERS)
-  KAHUA KAUAHALE (WORK CAMPS)
-  KAHUA HO'OMOANA (OVERNIGHT CAMPSITES)
-  HO'OLA HOU (REVEGETATION/SOIL STABILIZATION)
-  KIHAPAI HO'OULU MEA KANU/PUNAWAI (NURSERY/RESERVOIR)
-  KULA (OPEN/GATHERING)
-  KAHUA KAHIKO (CULTURAL PRESERVE)
-  NA MEA KANU/NA HOLOHOLONA A ME NA I'A (BOTANICAL/WILDLIFE PRESERVE)



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MMS Marc M. Siah & Associates, Inc.

Consulting Civil, Structural, Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813



DESCRIPTION OF THE EXISTING ENVIRONMENT
SECTION TWO

orographic uplift when they reach the islands and forced to move over the mountains. The result of this is that the air becomes cool and saturated as it rises producing rainfall. This effect is most pronounced on the windward side of the islands. It also accounts for the fact that rainfall amounts have a high spatial variability, with areas located up slope or towards the mountains on the windward side of the islands receiving more than areas along the coast.

The southern face of Haleakala Volcano, on the Island of Maui, deflects the north-east trade wind and funnels it in an easterly direction toward the Island of Kaho'olawe at an average speed between 18 and 21 miles per hour. This constant wind keeps the summit barren by preventing seeds from taking hold. Annual rainfall on the island is relatively low when compared to the rest of the Hawaiian islands. Due to its location on the leeward side of Haleakala's summit and its low elevations, Kaho'olawe is generally an arid island. According to Water Resources of the Island of Kaho'olawe Study (DLNR, 2001), Kaho'olawe has an average annual rainfall of 20 inches. Kaho'olawe experiences a majority of its rainfall during the winter months (approximately December through February) when Kona storms from the southwest occur, bringing moist, southerly wind and rain. Temperatures on Kaho'olawe range from a low of 74 F to a high of 95 F. Figure 2-2 depicts the isohyetal map of rainfall on the island of Kaho'olawe (source: Atlas of Hawaii, 1998).

2.3 Geology

Kaho'olawe, the smallest island in the State of Hawaii, covers an area of 44.6 square miles and is located 6.75 miles southwest of the island of Maui. The island is an extinct volcano whose eastern half slid away during a large landslide. The highest part of the island is Luamakika, which is the eroded remains of a lava shield that covers about 10 square miles. Luamakika reaches an elevation of 1,477 feet.

The most prominent geological feature of Kaho'olawe is its wind eroded surface. At one time, the island was covered with a thick layer of soil that supported grass, bushes and small trees. The introduction of goats in the early 1800's resulted in the devastation of plant cover and left the soil vulnerable to wind erosion. Further exacerbated by the use of the island as a bombing range by the military after World War II, soil loss has left the island with little remaining vegetation. Soil loss also increases during occasional heavy rains. Figure 2-3 shows the geological features of Kaho'olawe.

2.4 Topography

The existing topography for the proposed project site is defined by the rim of Luamakika crater with elevations ranging between 1,436 feet above msl to 1,466 feet above msl. Specifically, the rain water will first be collected using the catchment apron and allowed to drain into the two (2) 150,000 gallon reservoir both at an approximate elevation of 1,436 feet above msl. From here, the ground elevation gradually increases as the water is pumped up to the 100,000 gallon reservoir at an approximate elevation of 1,466 feet msl. Ground slopes throughout the proposed project site range from zero to ten percent. The project site will require grading to level the ground at the reservoir tanks and the pump house locations. The finished grade elevations of the remainder of the project site will be the same as the existing grade. Figure 2-4 depicts the general topographic conditions at the proposed project site.

Figure 2-2 Mean Annual Rainfall in Inches

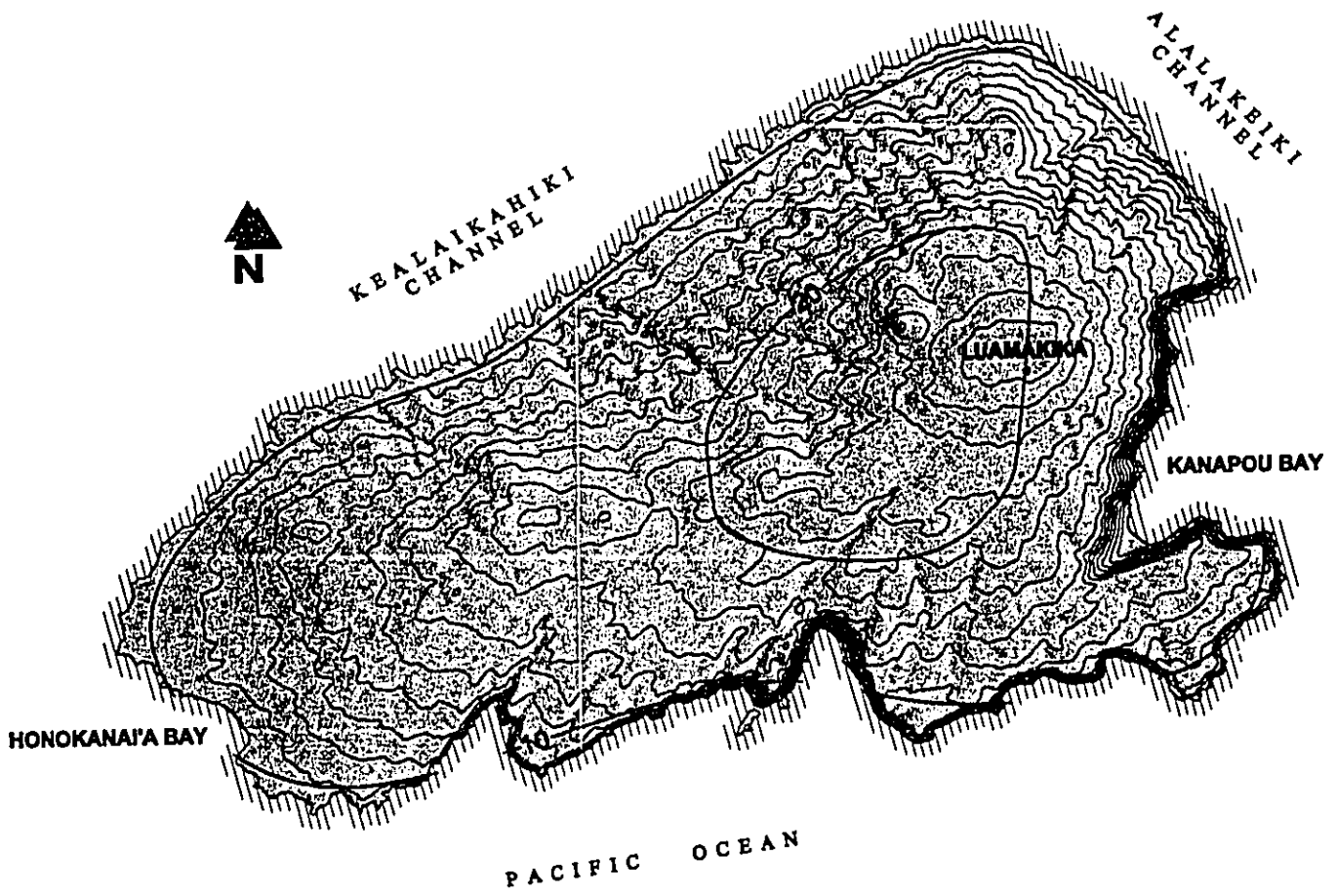


Figure 2-3 Geology of the Island of Kahoolawe

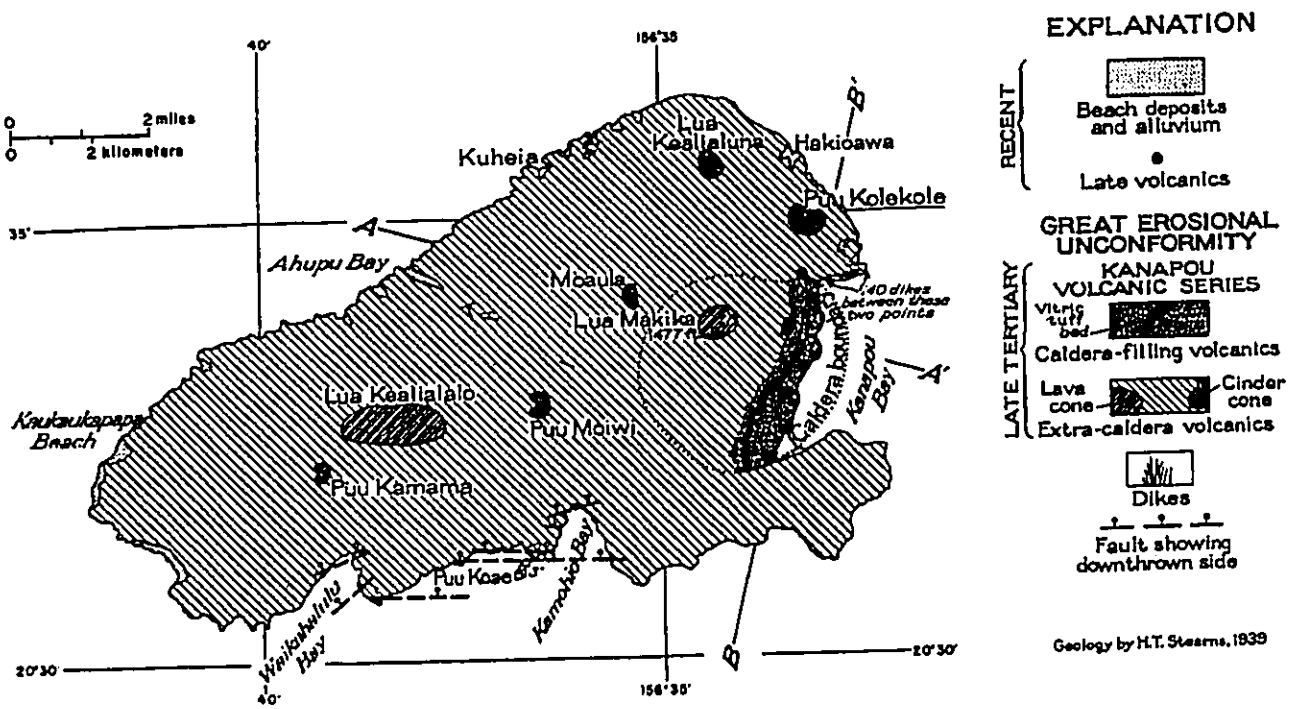


Figure 2-4 General Topography of Project Site



2.5 Aquatic Resources

Loss of vegetation and soil, surface winds, increased runoff and alien plant introduction have all significantly decreased the availability of water on the island of Kaho'olawe. The major source of fresh water on the island is rainfall. All of the potable water sources for the island of Kaho'olawe currently comes from man-made water catchment systems, desalinization plants or is brought onto the island. The rainfall on Kaho'olawe also feeds natural gully runoff, creates perched ground water sources and recharges ground water. Studies done by the State of Hawaii's Department of Land and Natural Resources and the U.S. Department of the Interior indicate a one acre catchment system could potentially develop 50,000 to 100,000 gallons of water on an annual basis on the island from rainfall alone.

2.5.1 Surface Water

Most watersheds/drainage on Kaho'olawe radiate from Luamakika as shown in Figure 2-5. The corrugated gulches of the island are 50 to 200 feet deep and only contain water a few days of each year. Approximately 81 % of the total land area of the island (23,314 acres) comprise readily definable watersheds. The remaining land occurs as "interbasin lands" accumulating surface water at headwaters, steep cliffs and within craters and cindercones. Information on the water quality of these surface supplies indicates a high turbidity, high chloride and sodium content, and bacterial contamination.

2.5.2 Ground Water

Kaho'olawe has a geologic framework similar to that of the other Hawaiian Islands. The mode of occurrence of ground water is also similar to that on the other islands. The size, development and permanency of the ground water bodies are all proportional to the size of the island and the amount of rain that falls on it. Due to the meager rainfall and relatively small size of Kaho'olawe, ground water bodies on the island are not extensive enough to support the restoration of the island. Previous surveys have indicated that the ground water which does exist on the island is mostly brackish and unfit for use as an irrigation or potable water source.

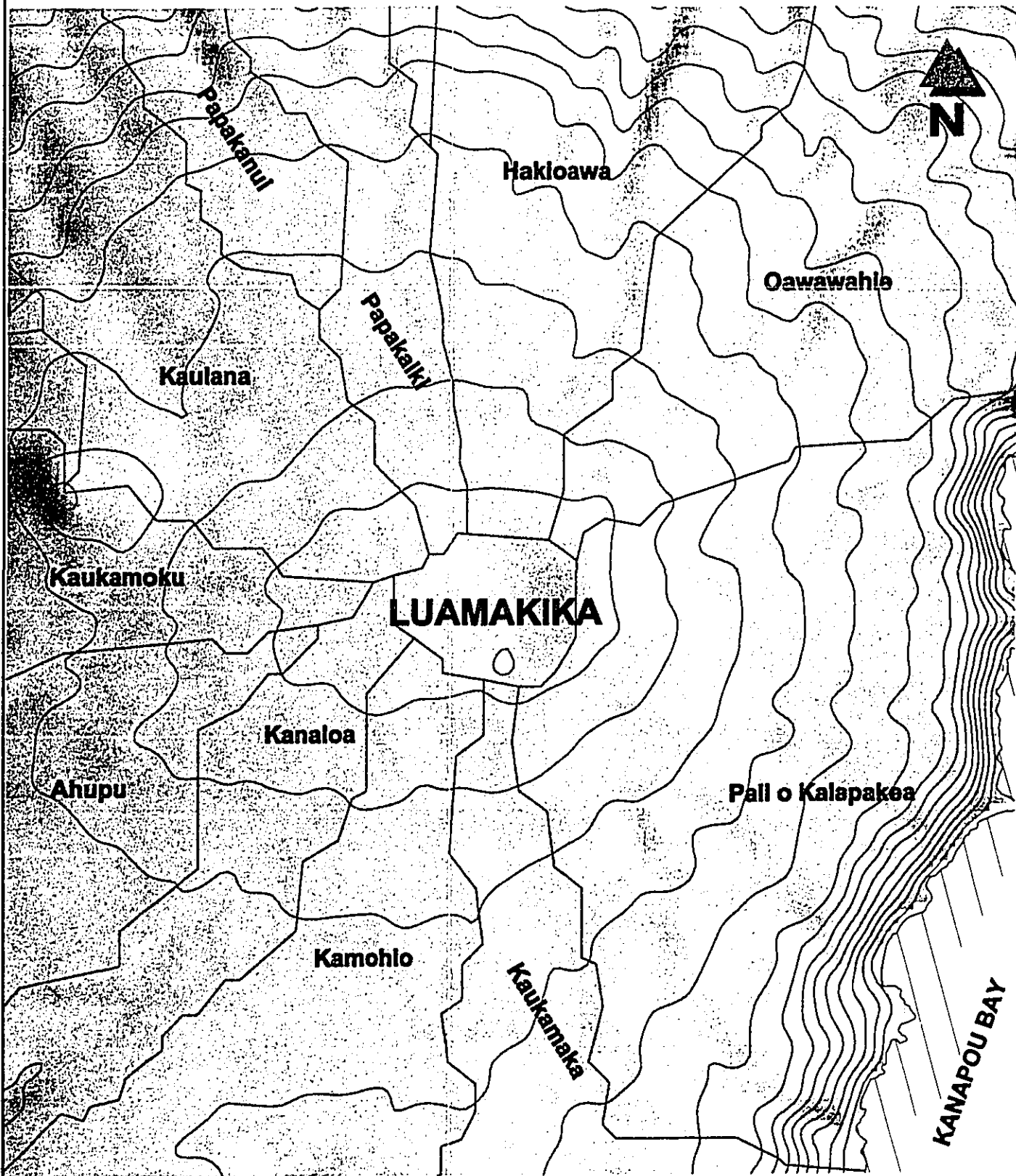
2.6 Soils

The proposed project site is situated in an area consisting of three (3) soil series which the U.S. Natural Resource Conservation Service (NRCS) categorizes as Kaho'olawe silty clay loam, Kaneloa silty clay loam, and Badlands, steep.

The Kaho'olawe soil series is described as a reddish brown, very fine granular and very friable silty clay loam 12 inches thick. The soil has slopes of 8-15 percent, a moderate permeability and a severe erosion hazard. This soil is underlain by a reddish brown, stratified silty clay loam and silty loam to 60 inches thick.

The Kaneloa soil series surface layer has been removed by erosion exposing the subsurface layer which is a strong brown silty clay loam 8 inches thick with fine subangular blocky structure. The soil has many pores, but the pores on the surface are sealed by surface

Figure 2-5 Watershed Map of Luamakika



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polishing. The soil is moderately well drained, has a moderate permeability and has slopes of 3-15 percent. The subsoil here is a strong brown over dark yellowish brown silty clay loam to a depth of 32 inches.

The Badland, steep soil series is described as eroded to highly weathered rock consisting of dark reddish brown, yellowish brown, and very pale brown fine blocky material that crushes to silty clay loam. Other areas have remnants of dark reddish brown and dark brown subsoils isolated by gullies. The soil has a moderate permeability. The slopes generally range from 15 to 30 percent with rock outcrop occupying about 15 percent of the area. Depth to the hard bedrock is more than 60 inches. Figure 2-6 depicts the soil map of the area in the immediate vicinity of the proposed project site.

2.7 Flood Considerations

Currently, there are no Flood Insurance Rate Maps available for the island of Kaho'olawe. However, due to the topography surrounding the proposed project site, the well defined watershed regions radiating from Luamakika, and lack of rainfall to the island, any flooding problems in the immediate area is highly unlikely.

2.8 Earth Quake Hazards

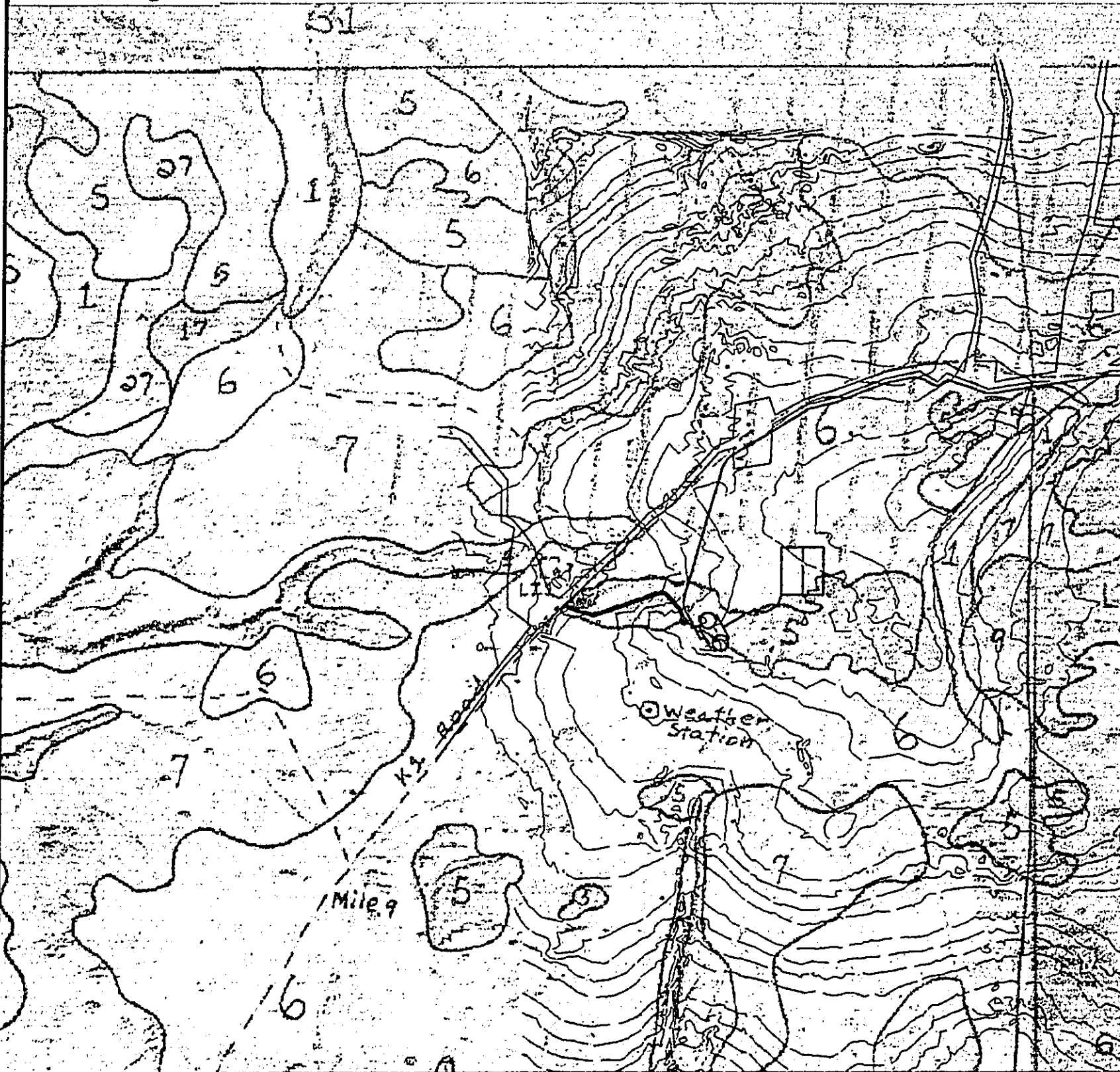
The Hawaiian Islands are divided into three (3) seismic zones as specified by the Uniform Building Code (UBC) for the purpose of structural design. The entire island of Kaho'olawe is classified as Zone 2B as per UBC (1997), which is a seismically active area of the state. Given that the least active zone is Zone 0, and the most active zone is Zone 4, the possibility of an earthquake occurring on the island of Kaho'olawe is moderate. All new structures will be designed and constructed to resist stresses produced by lateral forces, as associated with Seismic Zone 2B.

2.9 Flora and Fauna

At one time, the island of Kaho'olawe was covered with vegetation including grass, shrubs and trees representative of dryland/mesic plant communities. However, with the introduction of goats to the island in the late 18th century, nearly all of the plant life was decimated. Following this destruction of the vegetation, the wind blew away the upper 2 to 8 feet of red soil from the entire summit and left nearly 15 square miles of land stripped down in most places to a buff to reddish-tan hardpan consisting of partly decomposed basalt. The vegetation found in the area surrounding Luamakika consists of exposed hardpan, 'ilima coastal dry shrubland, kiawe scrub forest and grasslands as shown in Figure 2-7. Figures 2-8 and 2-9 show views of the various vegetation, plant types and general character of the area surrounding the proposed project site.

The endangered *Manduca blackburni* (Blackburn's Sphinx moth) was observed in the area of the proposed project during a survey conducted two years ago of the plants and animals living in the region. However, no recent sightings of the sphinx moth have been made. Tree tobacco, an introduced species that serves as a food source for the endangered *Manduca blackburni* (Blackburn's Sphinx moth), grows in the crater and is found on nine grids (75272752,

Figure 2-6 Soil Map With Proposed Layout of Structures



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Figure 2-7 Map of Vegetation on the Island of Kaho'olawe




LEGEND

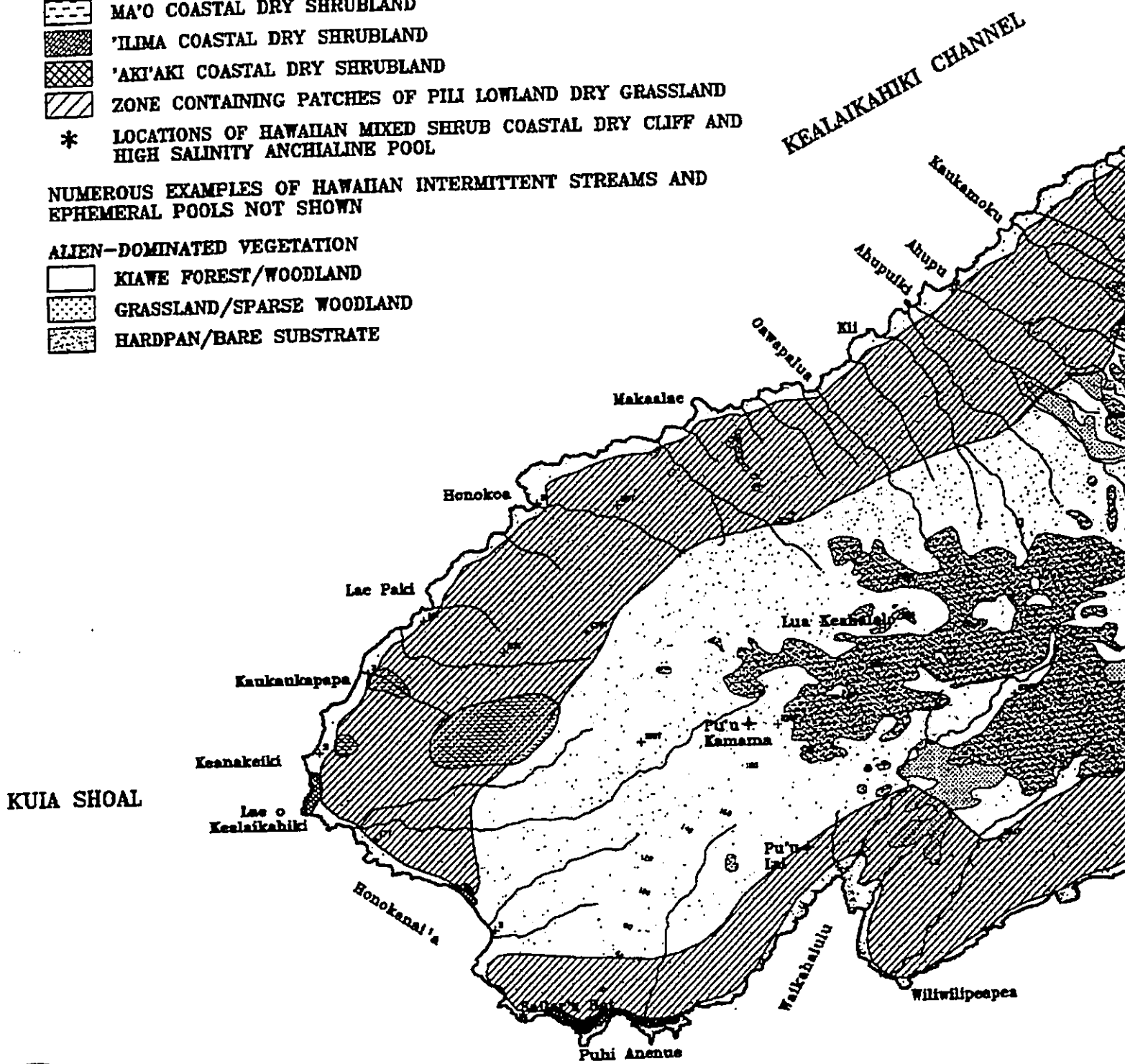
NATIVE-DOMINATED VEGETATION

-  MA'O COASTAL DRY SHRUBLAND
-  'ILIMA COASTAL DRY SHRUBLAND
-  'AKI'AKI COASTAL DRY SHRUBLAND
-  ZONE CONTAINING PATCHES OF PILI LOWLAND DRY GRASSLAND
- * LOCATIONS OF HAWAIIAN MIXED SHRUB COASTAL DRY CLIFF AND HIGH SALINITY ANCHIALINE POOL

NUMEROUS EXAMPLES OF HAWAIIAN INTERMITTENT STREAMS AND EPHEMERAL POOLS NOT SHOWN

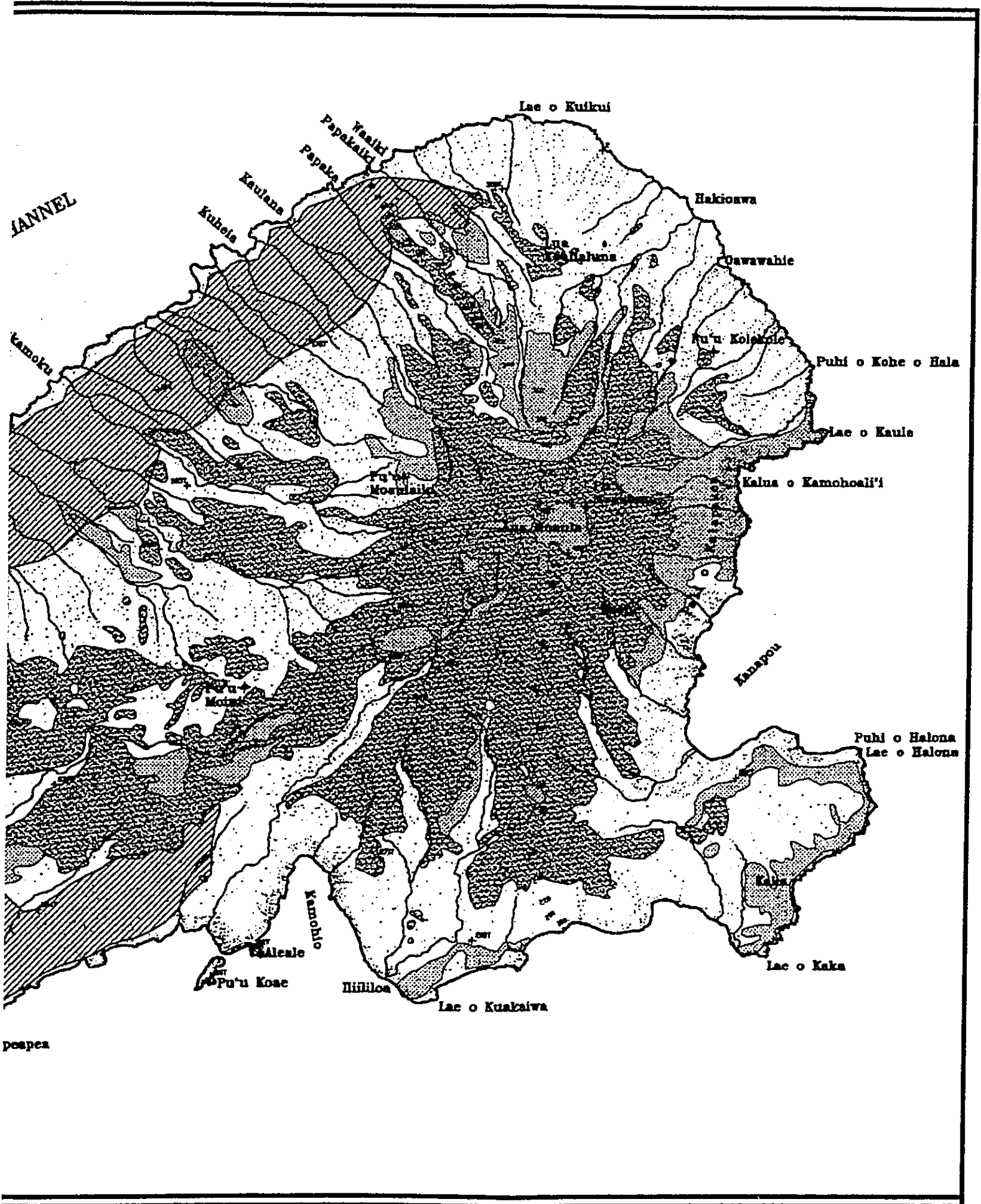
ALIEN-DOMINATED VEGETATION

-  KIAWE FOREST/WOODLAND
-  GRASSLAND/SPARSE WOODLAND
-  HARDPAN/BARE SUBSTRATE



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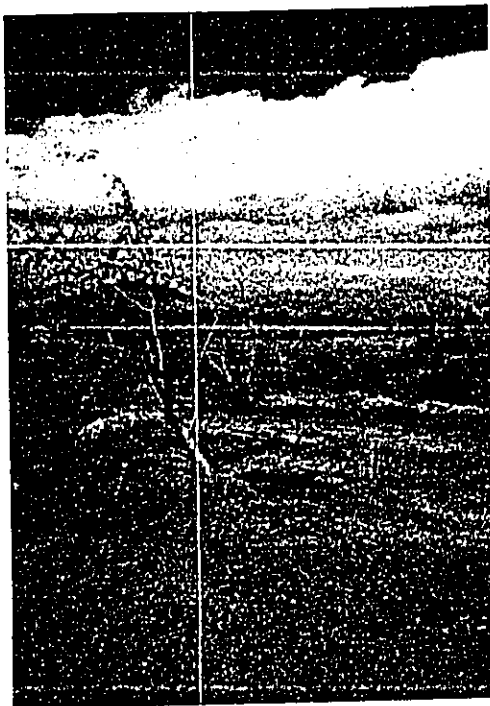


Figure 2-8 Vegetation and General View of the Proposed Catchment Site.

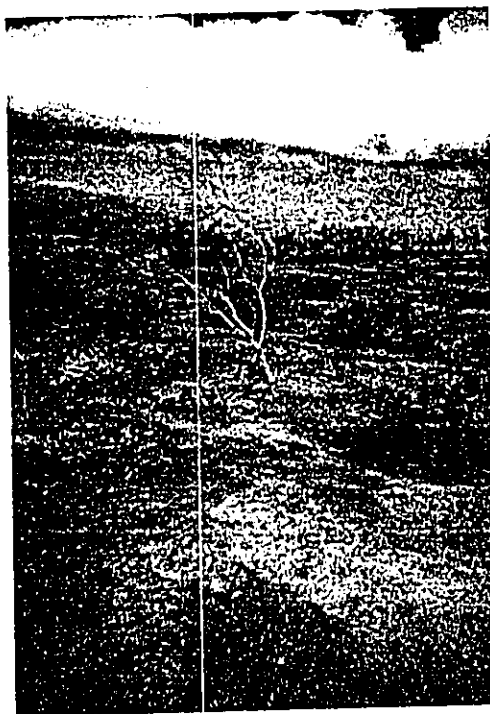


Figure 2-9 Existing Flora Found at the Proposed Catchment Site.

75262753, 75272753, 75282753, 75292754, 75322756, 75362756, 75362755, and 75372755). Manduca moths (eggs and caterpillars) were observed in four grids (75272752, 75272753, 75282753, and 75292753) impacted by the catchment structure. There are only about five or six trees spread across the project site. A map depicting the location of these grids in respect to the layout of the proposed project is provided in Appendix A.

There are no other known rare, endangered or threatened species of fauna existing in the immediate area of the project site. The species that are known to exist around Luamakika are either introduced or migratory. Table 2-1 list the species of fauna which are found near the site and the relative abundance of each.

2.10 Wetlands

The State of Hawaii Geographical Information System (GIS) map shows no wetlands in the project area as presented in Figure 2-10 (Table 2-2 provides a map legend). The nearest wetland and/or sensitive riparian habitat is located approximately 3,300 feet to the north of the project site near Lua Kealialuna. The GIS identifies the area as a PFO3C habitat or *Palustrine, Forrested (Needle - leaved Evergreen), Seasonal*. The proposed project does not impact the existing wetland ecosystem.

2.11 Scenic and Aesthetic Resources

The site where the catchment structure and two 150,000-gallon storage tanks are located does not offer any special view plane of the island itself. However, the 100,000-gallon tank is located close to the point of highest elevation on the rim of the crater. This area is adjacent to the trail on the southeastern face of Luamakika crater, which is at times used as the route for the Makahiki procession. This location provides a good view of the Luamikika crater and the entire rim, including both rain ko'a. The highest elevation of the tank is kept approximately one meter lower than the elevation of the Ulupalakua rain ko'a in order to preserve its cultural significance. Native species of flora will be employed to improve the visual impact of the tank, wherever possible, without impeding access to the water system.

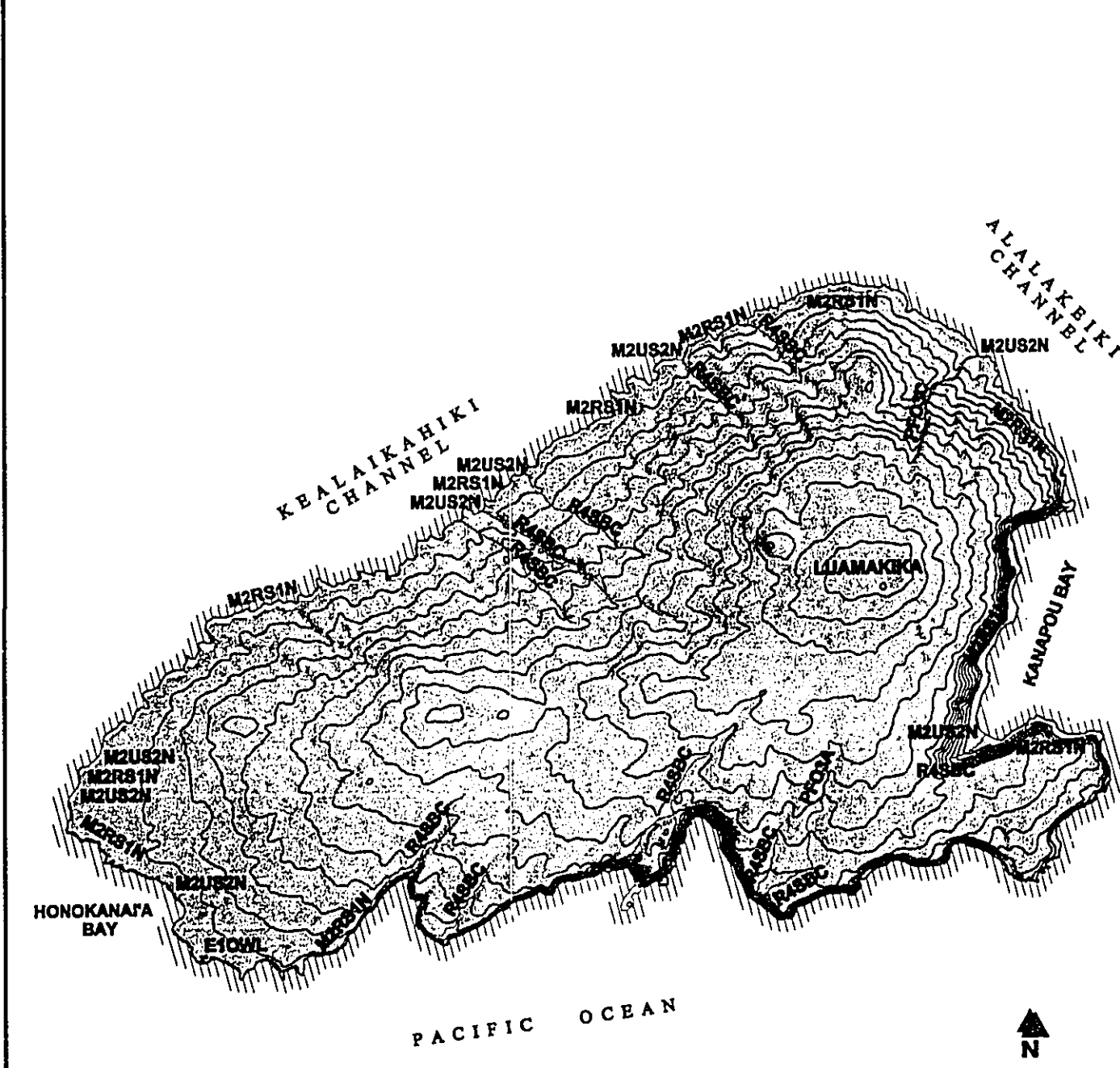
2.12 Cultural and Archaeological Resources

The layout of the proposed water system will overlap and pass near several areas deemed archaeologically significant found around the Luamakika crater region. These areas hold a cultural importance for the Native Hawaiian Community as well as a historical importance for archaeologist. Taking this into consideration, special care was given during the design phase of the project to minimize all potential adverse impacts to these sites. A more detailed description of the sites and the mitigation measures to be followed, both during and after construction, is provided in Section 4.

Table 2-1 Species of Fauna in the Vicinity of the Proposed Project Site

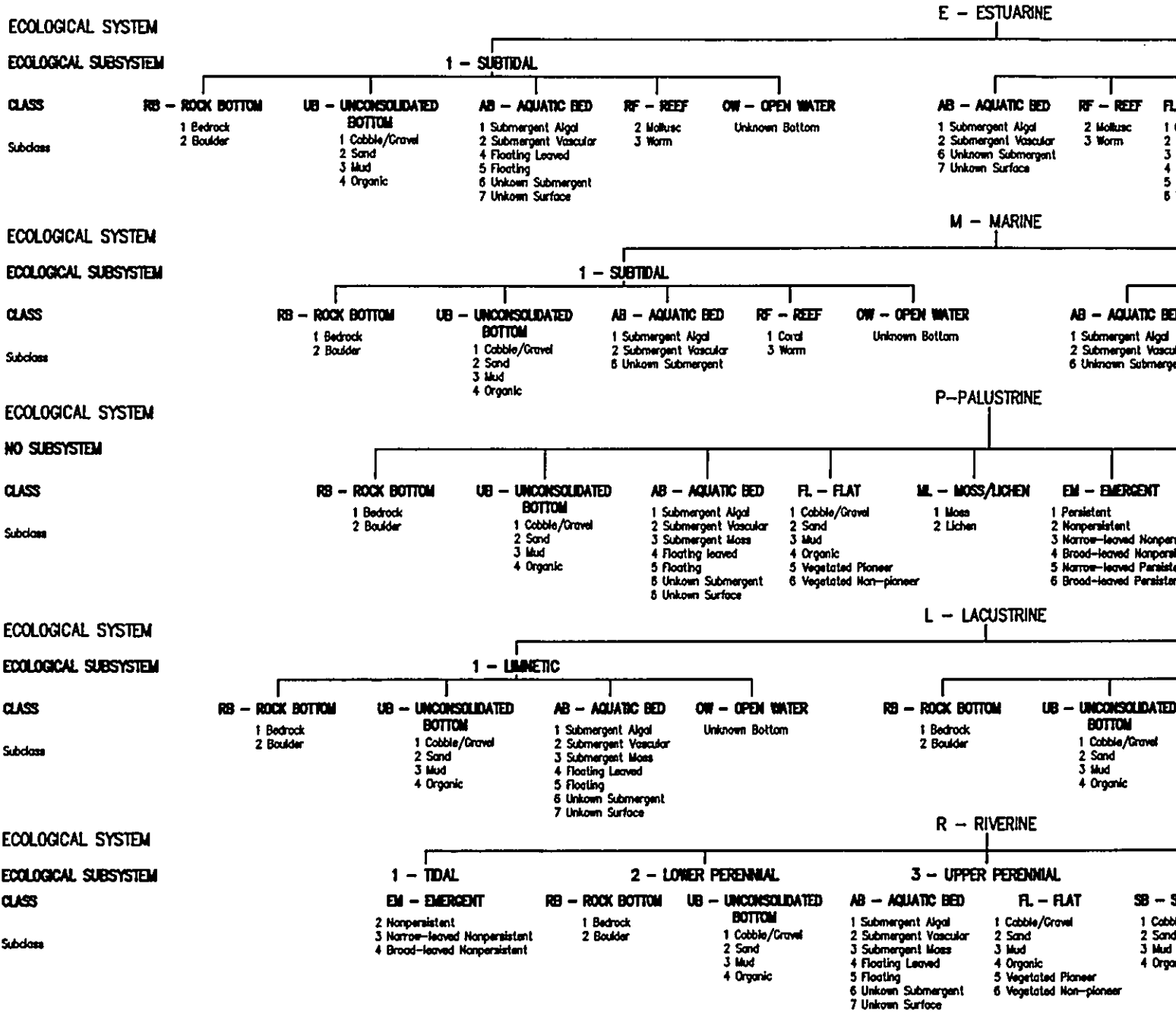
Scientific Name	Common Name	Status	Habitat Areas			
			Impact Area Hardpan	Grasslands	Kiawe Savanah	Kiawe Scrub
Aves						
<i>Pluvialis dominica</i>	Golden Plover	Regular migrant to Hawaii.	uncommon	common	common	rare
<i>Alaudia arvensis</i>	Skylark	Regular migrant to Hawaii.	uncommon	common	abundant	n/a
<i>Mimus polyglottos</i>	Mocking Bird	Regular migrant to Hawaii.	n/a	n/a	rare	n/a
<i>Aostreops japonicus</i>	White Eye Mejiro	Regular migrant to Hawaii.	n/a	n/a	common	n/a
<i>Passes domesticus</i>	House Sparrow	Regular migrant to Hawaii.	rare	n/a	n/a	n/a
<i>Cardinalis cardinalis</i>	Cardinal	Regular migrant to Hawaii.	uncommon	n/a	uncommon	rare
<i>Carpodacus mexicanus</i>	House Finch	Regular migrant to Hawaii.	uncommon	n/a	common	uncommon
Mamalia						
<i>Felius catus</i>	Domestic Cat	Regular migrant to Hawaii.	present	rare	common	present
<i>Mus musculus</i>	House Mouse	Regular migrant to Hawaii.	rare	uncommon	uncommon	present
<i>Rattus exulans hawaiiensis</i>	Polynesian Rat	Regular migrant to Hawaii.	present	present	present	present
Reptilia						
<i>Hemidactylus fernatus</i>	House Gecko	Foreign, long established	n/a	n/a	uncommon	rare

Figure 2-10 Wetland Map



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Table 2-2 National Wetlands Inventory Map Legend



In order to more adequately describe wetland may be applied at the class or lower

WATER REGIMEN

Non-Tidal		Tidal	
A Temporary	H Permanent	K Artificial	R Seasonal Tidal
B Saturated	J Intermittently Flooded	L Subtidal	S Temporary Tidal
C Seasonal	K Artificial	M Irregularly Exposed	T Semipermanent
D Seasonal Well-drained	Z Intermittently Exposed/Permanent	N Regular	V Permanent Tidal
E Seasonal Saturated	W Intermittently Flooded/Temporary	P Irregular	U Unknown
F Semipermanent	Y Saturated/Semipermanent/Seasonal		
G Intermittently Exposed	U Unknown		

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E

2 - INTERTIDAL

	RF - REEF	FL - FLAT	SB - STREAM BED	RS - ROCKY SHORE	BB - BEACH/BAR	EM - EMERGENT	SS - SCRUB/SHRUB	FO - FORESTED
1	Mollusc	Cobble/Gravel	Cobble/Gravel	Bedrock	Cobble/Gravel	Persistent	Broad-leaved Deciduous	Broad-leaved Deciduous
2	Worm	Sand	Sand	Boulder	Sand	Nonpersistent	Broad-leaved Evergreen	Broad-leaved Evergreen
3		Mud	Mud	Vegetated Non-pioneer		Narrow-leaved Nonpersistent	Needle-leaved Evergreen	Needle-leaved Evergreen
4		Organic	Organic			Broad-leaved Nonpersistent	Dead	Dead
5		Vegetated Pioneer				Narrow-leaved Persistent	Deciduous	Deciduous
6		Vegetated Non-pioneer				Broad-leaved Persistent	Evergreen	Evergreen

2 - INTERTIDAL

AB - AQUATIC BED	RF - REEF	FL - FLAT	RS - ROCKY SHORE	BB - BEACH/BAR
1 Submergent Algal	1 Coral	1 Cobble/Gravel	1 Bedrock	1 Cobble/Gravel
2 Submergent Vascular	3 Worm	2 Sand	2 Boulder	2 Sand
6 Unknown Submergent		3 Mud	6 Vegetated Non-pioneer	
		6 Vegetated Non-pioneer		

EM - EMERGENT	SS - SCRUB/SHRUB	FO - FORESTED	OW - OPEN WATER
1 Persistent	1 Broad-leaved Deciduous	1 Broad-leaved Deciduous	Unknown Bottom
2 Nonpersistent	3 Broad-leaved Evergreen	3 Broad-leaved Evergreen	
3 Narrow-leaved Nonpersistent	4 Needle-leaved Evergreen	4 Needle-leaved Evergreen	
4 Broad-leaved Nonpersistent	5 Dead	5 Dead	
5 Narrow-leaved Persistent	6 Deciduous	6 Deciduous	
6 Broad-leaved Persistent	7 Evergreen	7 Evergreen	

E

2 - LITTORAL

UB - UNCONSOLIDATED BOTTOM	AB - AQUATIC BED	FL - FLAT	RS - ROCKY SHORE	BB - BEACH/BAR	EM - EMERGENT	OW - OPEN WATER
1 Cobble/Gravel	1 Submergent Algal	1 Cobble/Gravel	1 Bedrock	1 Cobble/Gravel	2 Nonpersistent	Unknown Bottom
2 Sand	2 Submergent Vascular	2 Sand	2 Boulder	2 Sand	3 Narrow-leaved Nonpersistent	
3 Mud	3 Submergent Moss	3 Mud			4 Broad-leaved Nonpersistent	
4 Organic	4 Floating Leaved	4 Organic				
	5 Floating	5 Vegetated Pioneer				
	6 Unknown Submergent	6 Vegetated Non-pioneer				
	7 Unknown Surface					

HAL

4 - INTERMITTENT

5 - UNKNOWN PERENNIAL

FL - FLAT	SB - STREAM BED	RS - ROCKY SHORE	BB - BEACH/BAR	OW - OPEN WATER
Cobble/Gravel	1 Cobble/Gravel	1 Bedrock	1 Cobble/Gravel	Unknown Bottom
	2 Sand	2 Boulder	2 Sand	
	3 Mud			
	4 Organic			

Vegetated Pioneer
Vegetated Non-pioneer

MODIFYING TERMS

Use the following terms to modify wetland and aquatic habitats one or more of the water regime, water chemistry, soil or special modifiers at the class or lower level in the hierarchy. The formed modifier may also be applied to the ecological system.

	WATER CHEMISTRY			SOIL	SPECIAL MODIFIERS
Tidal	Coastal Salinity	Inland Salinity	pH Modifiers for all Fresh Water	g Organic n Mineral	b Beaver d Partially Drained/Ditch f Farmed
Speed	1 Hyperhaline	7 Hyperhaline	a Acid		h Diked/Impounded
	2 Euhaline	8 Eusaline	l Circumneutral		r Artificial
	3 Mixohaline (Brackish)	9 Mixosaline	l Alkaline		s Spoil
	4 Polyhaline	0 Fresh			x Excavated
	5 Mesohaline				
	6 Oligohaline				
	0 Fresh				

SECTION 3
PROJECT IMPACTS AND MITIGATION MEASURES



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810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SECTION 3

PROJECT IMPACTS AND MITIGATION MEASURES

In general, construction of the proposed rainwater catchment and water storage facility will include grading of the site to accommodate the reservoir structures, access road, and drainage needs, construction of the reservoir structures and service tank, and digging a six-inch deep trench along the K-1 service road in which to lay the two-inch HDPE pipe between the storage reservoirs and the service tank. Clearly, construction activities at the proposed site will alter existing conditions and will have an impact on the topography, drainage and flora and fauna. In the following paragraphs, potential impacts to the physical environment are discussed. During construction, utmost efforts will be made to minimize the potential impacts.

3.1 Grading, Drainage and Erosion Control

The proposed project site will be graded at the locations of the three water storage reservoirs and along the site access road. A grading plan for the proposed project is shown in Figure 3-1. These locations will be excavated to provide level surfaces with floor elevations of 1,436 ft above msl for the two 150,000 gallon storage reservoirs and 1,466 feet above msl for the 100,000 gallon service tank. The access road will be graded to provide a smooth riding surface capable of accommodating traffic flow to the site during the construction phase of the project as well as during facility maintenance.

Storm water flow, running across the proposed project area, will be horizontally dispersed as much as possible away from downhill slopes to minimize erosion to these areas. The grading plan includes the addition of a drainage swale between the service road and the water storage reservoirs to prevent runoff across the road. Swales will also be placed on either side of the access road in order to divert runoff toward the existing downhill slopes of the area. Two diversion swales will be situated uphill of the rainwater catchment apron in order to prevent soil erosion around its footings. All impermeable surfaces constructed at the proposed project site are designed to divert rainwater toward drain inlets feeding into the water storage reservoirs in order to prevent future runoff problems.

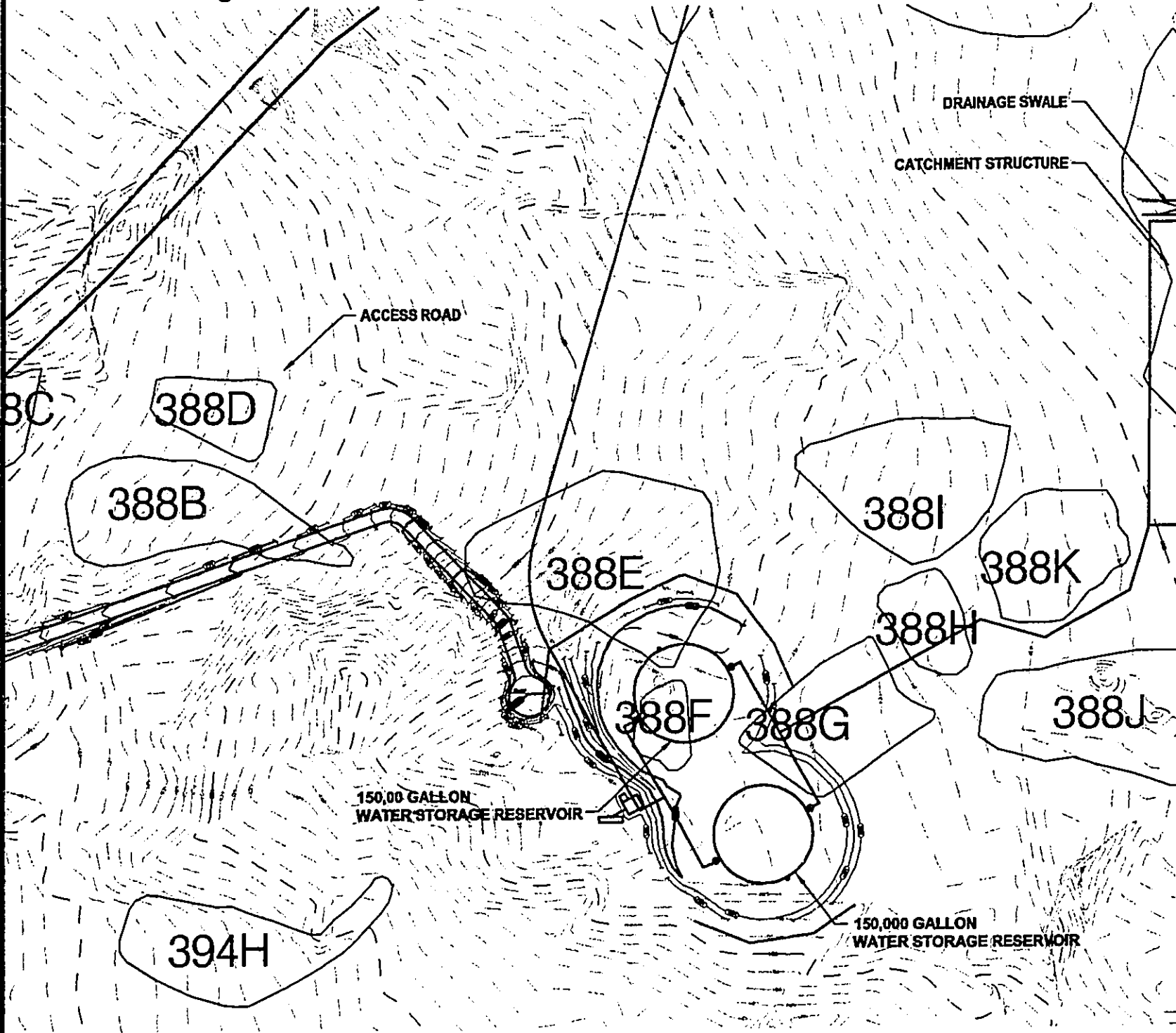
Also included in the grading plan is the installation of temporary silt fences in order to minimize any possible erosion which may result during grading activities. The silt fences will be carefully located during grading so as not to adversely impact surrounding historical sites or natural resources.

The focus of the project is to provide irrigation water for vegetation in order to alleviate current erosion rates of the surrounding area. During construction of the project, proper mitigation measures, including the use of silt fences (see Figure 3-2), will be taken to combat possible erosion.

3.2 Construction Noise

Construction activity will unavoidably increase the ambient noise levels. Construction equipment such as trenchers, backhoes, and trailers will be the dominant noise producers during the construction period. Impact tools, such as hammers used for soil compaction, may also be a major source of noise. Despite the fact that the island of Kaho'olawe is uninhabited, the Contractor will still be required to comply with the State Department of Health's noise level requirements.

Figure 3-1 Grading Plan for Proposed Project



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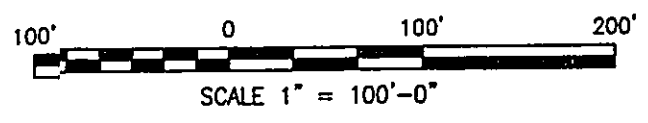
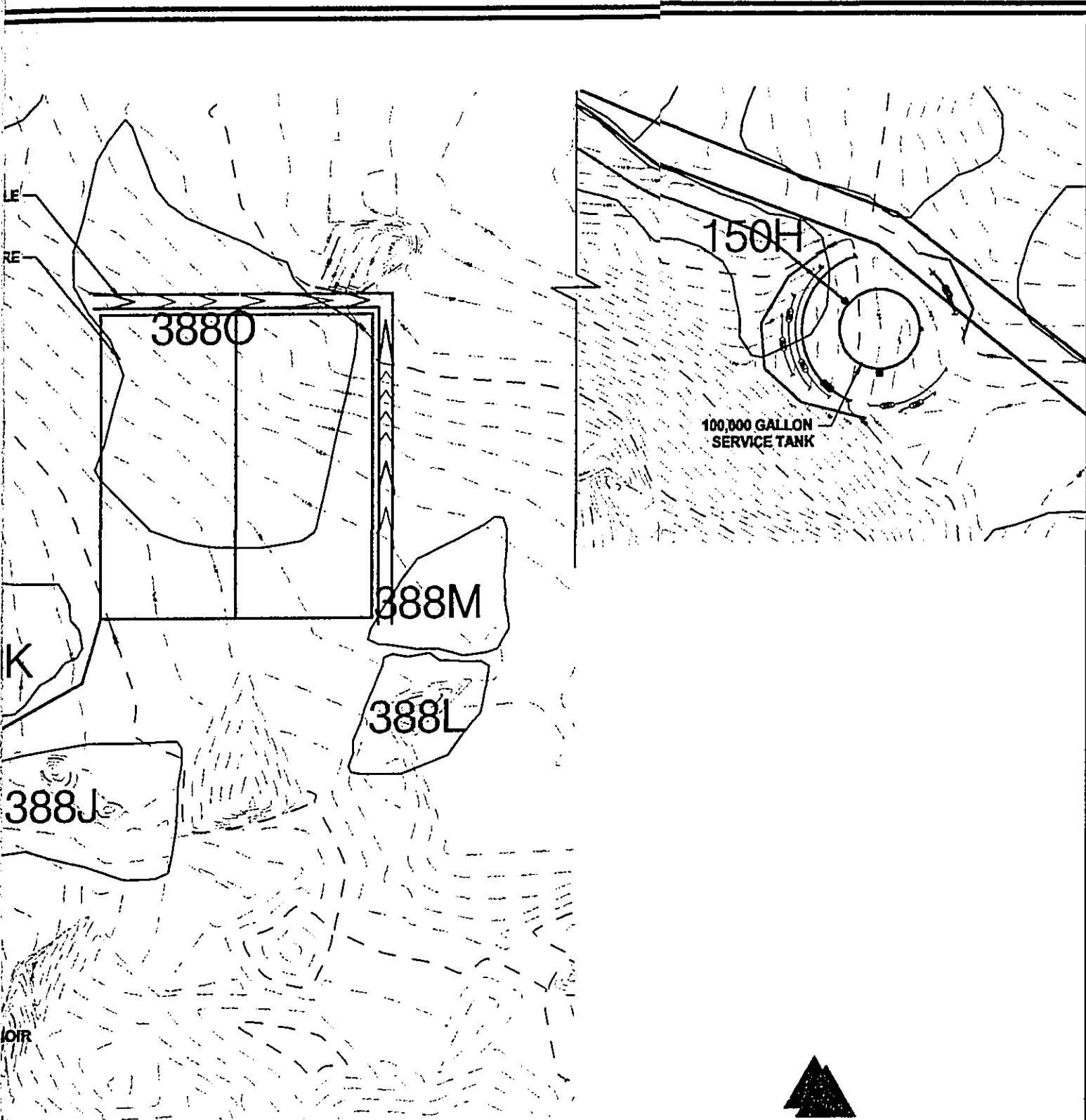
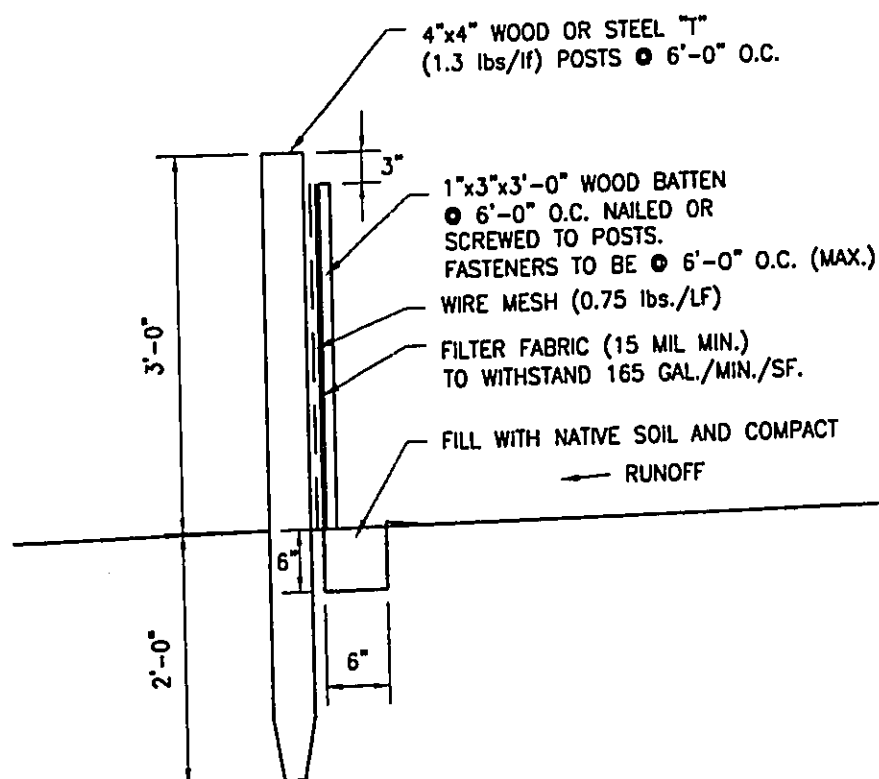


Figure 3-2 Typical Section - Silt Fence

BEST MANAGEMENT PRACTICES NOTES:

1. THE CONTRACTOR SHALL PROVIDE SEDIMENT BARRIERS OR TRAPS AND OTHER MITIGATIVE MEASURES FOR SEDIMENT TRANSPORT DURING CONSTRUCTION IN ACCORDANCE WITH THE CITY AND COUNTY OF HONOLULU'S RULES RELATING TO SOIL EROSION STANDARDS AND GUIDELINES.
2. SILT FENCES SHALL BE IMMEDIATELY REPAIRED WHEN DAMAGED DURING CLEARING AND GRUBBING OR GRADING OPERATIONS.
3. FILTER FABRIC SHALL BE PLACED OVER THE ENTRANCES TO STORM DRAIN INTAKE STRUCTURES.



TYPICAL SECTION-SILT FENCE
SCALE: NONE

3.3 Air Quality

Ambient air quality is expected to be affected due to the dust generated by short-term construction related activities. Grading activities will generate air borne particulates. Construction activities will be required to comply with the provisions of Hawaii Administrative Rules, Chapter 11-60.I, "Air Pollution Control," regarding fugitive dust. The contractor will be responsible for utilizing dust control measures such as regular watering and sprinkling to minimize wind-blown particulates. Graded areas will be seeded as soon as feasible to establish long-term dust abatement. The seeded areas will be blanketed with a protective covering (i.e. matting, hay or hydromulch - to be determined during the design phase of the project) until sprouting begins. Ambient air quality may also be adversely affected by emissions from construction equipment and other motor vehicles. The contractor will be required to minimize emissions through proper vehicle maintenance.

3.4 Flora and Fauna

The proposed project site is located on vacant land with minimal vegetation. No known threatened or endangered species are found at the site. Thus it is anticipated that the proposed action will have no short-term impact on sensitive and endangered species or their environment.

Once the proposed water system is constructed, native flora species will be planted in the surrounding area. The plant species used for the initial restoration and erosion control of the island should have ideal characteristics. These characteristics include:

- controls erosion
- tolerates heat, drought, wind, fire and nutrient-starved soils
- contributes to soil rebuilding
- survives among alien species populations
- propagates easily
- is readily available
- pollinates and disperses seeds successfully
- has a long life
- has food, medicinal or cultural importance
- contributes to faunal habitat restoration

As found in the Kahoolawe Island Environmental Restoration Plan, Tables 3-1 through 3-6 list the recommended species of trees, shrubs, herbs, vines, ferns and grasses for use throughout the restoration of the area.

Table 3-1 Recommended Trees for Initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
'ahakea	<i>Bobea sandwicensis</i> ; <i>B. timonioides</i>
a'ia'i	<i>Streblus pendulinus</i>
'aiea	<i>Norhocestrum latifolium</i>

PROJECT IMPACTS AND MITIGATION MEASURES
SECTION THREE

Table 3-1 Recommended Trees for Initial Restoration and Erosion Control (Cont'd)

COMMON NAME	SCIENTIFIC NAME(S)
'akoko	<i>Chamaesyce stokesii</i>
'ala'a	<i>Pouteria sandwicensis</i>
alahe'e	<i>Canthium odorantum</i>
'anapanapa	<i>Colubrina asitica</i>
hala	<i>Pandanus odoratissimus</i>
halapepe	<i>Pleomele auwahiensis</i>
kulu'i	<i>Nototrichium sandwicense</i>
lama	<i>Diaspyros sandwicensis</i>
mal'a	<i>Musaxparadisiaca</i>
mamane	<i>Sophora chrysophylla</i>
maua	<i>Xylosma hawaiiense</i>
'ohi'a	<i>Metrosideros polymorpha</i>
ololpua	<i>Nesigia sandwicensis</i>
ulu	<i>Artocarpus altilis</i>
wiliwili	<i>Erthrina sandwicensis</i>
hao	<i>Rauvolfia sandwicensis</i>
hau	<i>Hibiscus tiliaceus</i>
mehame	<i>Antidesma pulvinatum</i>
milo	<i>Thespesia populnea</i>
nanu	<i>Gardenia bighamii</i>
niu	<i>Cocos nucifera</i>
'ohe makai	<i>Reynoldsia sandwicensis</i>
'iliahi	<i>Santalum freycinetianum</i>
keahi	<i>Nesoluma polunescicum</i>
koai'a	<i>Acacia koaia</i>
kolea	<i>Myrsine lanaiensis</i> ; <i>M. Lessertiana</i>

PROJECT IMPACTS AND MITIGATION MEASURES
SECTION THREE

Table 3-1 Recommended Trees for Initial Restoration and Erosion Control (Cont'd)

COMMON NAME	SCIENTIFIC NAME(S)
kou	<i>Cordia subcordata</i>
kukui	<i>Aleurites moluccana</i>

Table 3-2 Recommended Shrubs for Initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
'a'ali'i	<i>Dodonaea viscosa</i>
'akai	<i>Wikstroemia uva-ursi</i> ; <i>W. oahuensis</i>
'akoko	<i>Chamaesyce celastroides</i>
'awa	<i>Piper methysticum</i>
'iliahi alu'e	<i>Santalum ellipticum</i>
'ilie'e	<i>Plumbago zeylanica</i>
'ilima	<i>Sida fallax</i>
'aweoweo	<i>Chenopodium oahuense</i>
ki	<i>Cordyline terminalis</i>
kokio	<i>Hibiscus kokio</i>
kolokolo kahakai	<i>Vitex retundifolia</i>
kolomona	<i>Senna gaudichaudii</i>
ko'oko'olau	<i>Bidens menziesii</i> , <i>B. molokaiensis</i>
ko'ola kea	<i>Abutilon incanum</i>
ko'ola 'ula	<i>Abutilon menziesii</i>
kupaoa	<i>Dubautia linearis</i>
maiapilo	<i>Capparis sandwicensis</i>
ma'o	<i>Gossypium tomentosum</i>
ma'o hau hele	<i>Hibiscus brakenridgei</i>
naio	<i>Myporum sandwicensis</i>
naupaka kahakai	<i>Scanvola sericea</i>

Table 3-2 Recommended Shrubs for Initial Restoration and Erosion Control (Cont'd)

COMMON NAME	SCIENTIFIC NAME(S)
naupaka kuahiwi	<i>Scaevola gaudichaudii</i>
nehe	<i>Lipochaeta intergrifolia</i>
ohai	<i>Sesbania tomentosa</i>
pukiawe	<i>Styphelia tameiameia</i>
'ulei	<i>Osteomeles anthyllidifolia</i>
wauke	<i>Broussonetia papyrifera</i>

Table 3-3 Recommended Vines for Initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
anunu	<i>Sicyos</i> spp.
Awikiwiki	<i>Cnavaia pubescens</i> ; <i>C. hawaiiensis</i>
huehue	<i>Cocculus trilobus</i>
hunakai	<i>Ipomoea imperati</i> ; <i>I. Tuboides</i>
kauna oa	<i>Cuscuta sandwichiana</i>
koali	<i>Ipomoea indica</i>
kali'ali	<i>Ipomoea carica</i>
kupala	<i>Sicyos pachycarpus</i>
pa'u o hi'laka	<i>Jaquemontia ovalifolia</i>
pohuehue	<i>Ipomoea pes-caprae</i>
'uala	<i>Ipomoea batatas</i>
none available	<i>Bonamia menziesii</i>

PROJECT IMPACTS AND MITIGATION MEASURES
SECTION THREE

Table 3-4 Recommended Herbs for Initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
'akulikuli	<i>Sesuvium portulacastrum</i>
'ala'ala wainui	<i>Plectranthus</i>
hinahina	<i>Heliotropium anomalum</i>
'ihi	<i>Portulaca lutea</i> ; <i>P. molokiniensis</i> ; <i>P. villosa</i>
kalo	<i>Colocasia esculenta</i>
'ohelo kai	<i>Lucuim sandwicensis</i>
pawale	<i>Rumex giganteus</i> ; <i>R. skottsbergii</i>
paukala	<i>Argemone glauca</i>
'uhaioa	<i>Waltheria indica</i>

Table 3-5 Recommended Grasses and Sedges for Initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
'aki'aki	<i>Sporobolus virginicus</i>
kakonakona	<i>Panicum spp.</i>
Kaweju	<i>Eragrostis variabilis</i>
makaloa	<i>Cyperus laevigatus</i>
pili	<i>Heteropogon contortus</i>
none available	<i>Carex oahuensis</i>
none available	<i>Eragrostis atropioides</i>
none available	<i>Fimbristylis spp.</i>
none available	<i>Guhnia spp.</i>
none available	<i>Mariscus hillebrandii</i>

Table 3-6 Recommended Ferns for initial Restoration and Erosion Control

COMMON NAME	SCIENTIFIC NAME(S)
kalamoho	Pellaea ternifolia
kilau	Pteridium aquilinum
kumuniu	Doryopteris spp.
kupukupu	Nephrolepis exaltata
moa	Psilotum nudum
pala'a	Sphenomeris chinensis
uluhe	Dicranopteris linearis

3.4.1 Blackburn's Sphinx Moth

The construction of the water catchment and water storage facilities at Luamakika will impact the habitat of the Blackburn's sphinx moth (*Manduca blackburnii*). The sphinx moth was observed in the area of the proposed project during a survey conducted two years ago of the plants and animals living in the region. However, no recent sightings of the moth have been made. There are about five or six tree tobacco trees, which serve as a food source for the endangered moth, found within the project site.

As part of the KIRC's ongoing environmental restoration program the following measures will be taken to minimize the adverse impacts on the Blackburn's sphinx moth:

Preconstruction activities:

- Educate and familiarize the contractor about minimizing the impacts on *Manduca*.
- Survey the construction site for tree tobacco (*Nicotiana glauca*).
- Determine the number of tobacco trees in the area including the actual construction site and within a distance of 100 meters around the site.
- Determine presence or absence of *Manduca* on all tobacco trees in and around the construction site
- Identify a holding site with tobacco trees to which *Manduca* eggs/larvae could be moved. This may involve several sites that will be sheltered from the wind.
- Relocate eggs/larvae from tree tobacco plants in and around the construction site to the holding area.
- Monitor/evaluate the survival of eggs/larvae at the holding site. Modify procedures if necessary.
- Remove tree tobacco plants within the construction area to prevent additional laying of eggs at the site. The total number of trees to be removed within the site is limited. A healthy, alternative tree tobacco population is currently available in Luamakika crater which was not present during the original survey for tree tobacco and *Manduca*.

Tree removal will occur at least 30 days prior to the start of construction so that any *Manduca* pupae in the ground will have adequate time to emerge in moth stage and leave the area.

- For every tree tobacco removed, 5 additional tree tobacco plants, or 3 aiea (*Nothocestrum longifolium*) plants will be planted in nearby areas. The newly planted trees will be watered and maintained for one year to ensure survival. If initial plantings occur at the end of the rainy season (April-May) or into the dry season, ground cover (eg. Mulch, organic matter, chip, piligrass hay) will be applied to reduce soil temperatures during the summer months.

Construction Period:

- Plant out aiea or tree tobacco and water and maintain plants to ensure maximum survival in an alternate area, away from construction activity.
- Install ground cover if necessary.

Post Construction:

- Water and maintain aiea or tree tobacco plantings.
- Monitor/document establishment of *Manduca* on planted aiea or tree tobacco.

All construction equipment, tools, and other accessories will be cleaned and inspected prior to mobilization to the construction site to prevent the inadvertent introduction of alien species to the island. All construction crews will be briefed on protocols to follow in preventing any unintentional introduction of alien species to the island.

3.5 Water Quality

The proposed water system construction project is not anticipated to adversely affect water quality in the area. Construction of the project will incorporate methods used to minimize erosion into the watershed areas radiating from Luamakika. Appropriate best management practices will be used during construction to impede transport of silt and debris. These erosion controls put in place during construction should improve the groundwater in the area because they are designed to assist water percolation rather than sheet flow promotion. Additionally, the potential impacts of the proposed catchment system on the volume of groundwater in the area is expected to be insignificant given the relatively small amount of rainwater which will be collected by the catchment apron.

3.6 Scenic and Aesthetic Resources

The short-term affects on the visual resources in the vicinity of the project site will be slight. The various structures erected for the proposed water system will also have minimal visual impacts. In order to achieve this, screening trees and bushes will be planted adjacent to each above ground structure. The long-term impacts the water system will have on the surrounding view plain are very positive. Once the proposed system has collected enough water to begin irrigation, the scenic and aesthetic qualities of the area will be greatly enhanced through the introduction of various native plant species, thus, attracting new wildlife and serving to beautify the area.

3.7 Traffic

The proposed water system will be constructed to the south of the K-1 service road. An additional roadway, running southeast for approximately 685 feet off of the K-1 service road, will be used to access the proposed location of the catchment apron and storage reservoirs. Currently, very little traffic runs along K-1 near Luamakika, thus, the increase in traffic volume from vehicles transporting equipment and supplies during construction is not expected to adversely impact traffic flow in the area.

3.8 Public Health and Safety

The island of Kaho'olawe is currently inhabited only by workers removing unexploded ordinance and those involved in the restoration efforts; therefore, construction of the proposed project would have minimal impact on public health conditions. The Contractor will be responsible for delineating and properly marking the construction area to provide adequate safety and restrict access to the site. The Contractor will also abide by all rules and regulations as set forth by the Occupational Health and Safety Administration (OSHA).

3.9 Socioeconomic Conditions and Cultural Environment

All equipment, supplies, materials and workers needed for construction will be secured by the contractor prior to arriving at the proposed project site. For this reason, the proposed project is expected to have no short-term impacts on the local economy. Title X and Hawaii Revised Statutes, Chapter 6K strictly forbid any commercial use of the island, and as such there are no concerns regarding the future economic development of Kaho'olawe.

Construction of the catchment at the proposed location is consistent with the Kaho'olawe Use Plan and Kaho'olawe Environmental Restoration Plan. These plans were prepared in close consultation with cultural practitioners as well as the Protect Kaho'olawe Ohana (PKO). Consideration was given to the potential impact of any construction in the Luamakika Traditional Cultural Property area in developing the plans. Furthermore, the KIRC cultural education coordinator as well as members of PKO were consulted and have visited the project location to ascertain that the proposed construction will not have an adverse impact on cultural practices, such as the Makahiki procession, in this area. Adjustments were made to the catchment layout based on these consultations.

SECTION 4
CULTURAL RESOURCES AND
ARCHAEOLOGICAL IMPACTS



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SECTION 4

CULTURAL RESOURCES AND ARCHAEOLOGICAL IMPACTS

An extensive archaeological survey conducted on the island of Kaho'olawe between the years 1976 and 1980 revealed the existence of at least 544 archaeologically significant sites. A large number of these sites were found to date from a period of Hawaiian history prior to the first contact with western civilizations. Based on the findings of this survey the entire island of Kaho'olawe was designated as an Archaeological District and placed on the National Register of Historic Places. The following section discusses the cultural and archaeological resources of the area surrounding Luamakika and the impacts and mitigation measures which will take place during construction.

4.1 Cultural Resources

Kaho'olawe serves as an important cultural resource for Native Hawaiians as an area rich in tradition and local legend. The island provides both a link to the past and a place to perform contemporary cultural practices. For the past twenty years, the Protect Kaho'olawe 'Ohana has utilized the island for several cultural ceremonies. Maintaining the cultural foundation for activities on Kaho'olawe for present and future generations is a high priority with the Native Hawaiian Community and the Kaho'olawe Island Reserve Commission (KIRC).

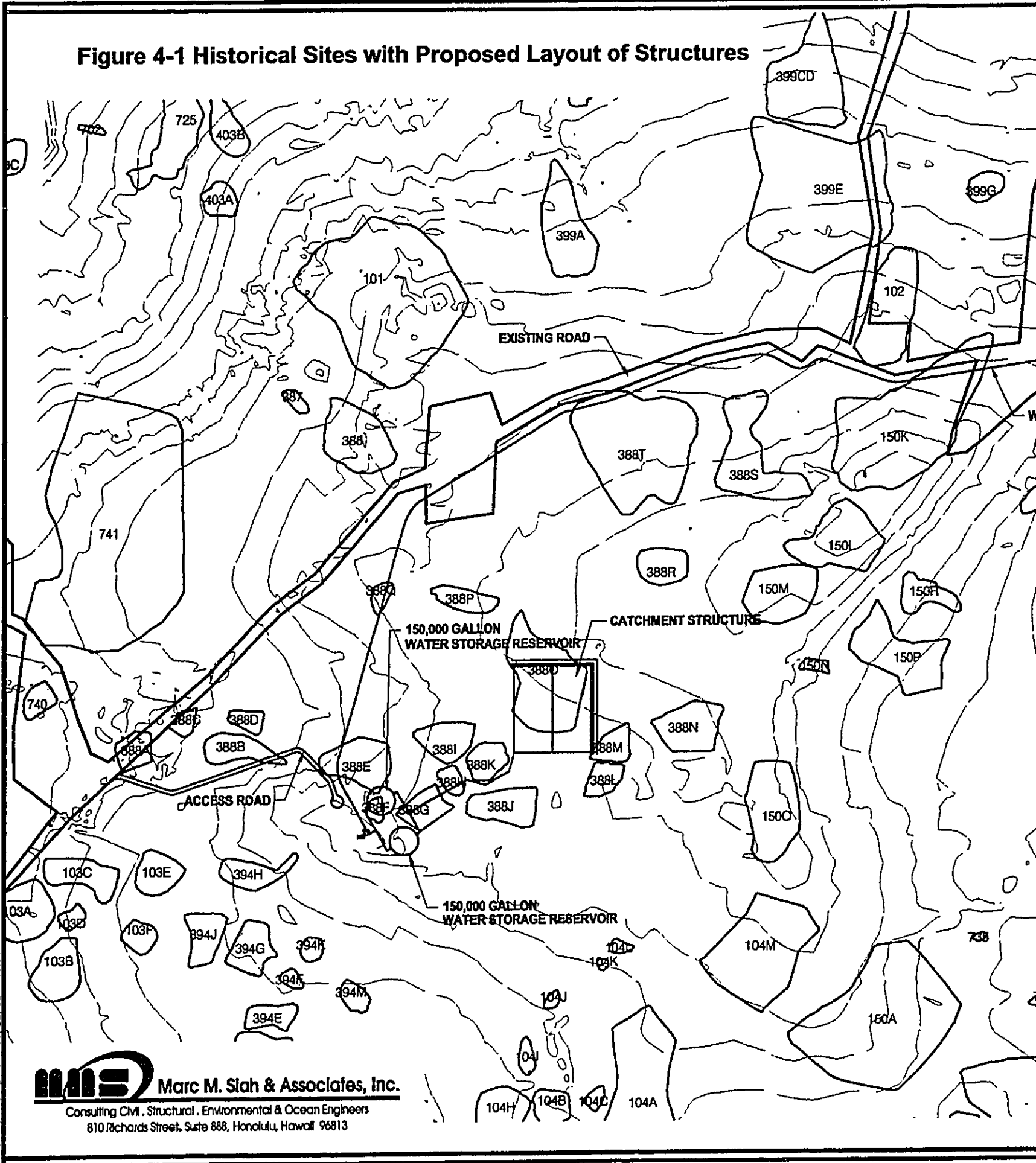
During construction of the proposed project, access to the area surrounding the project site will be restricted for safety reasons. The long-term impacts of the proposed water system toward the cultural environment of Luamakika will be extremely favorable. The future revegetation efforts will help to stabilize the soil in the area, drastically reducing the high erosion rates, thus, helping to preserve the culturally significant sites as well as the island's heritage. Further, the selection of primarily native Hawaiian plant species to be planted in the area will provide an added sense of cultural value.

4.2 Archaeological Impacts

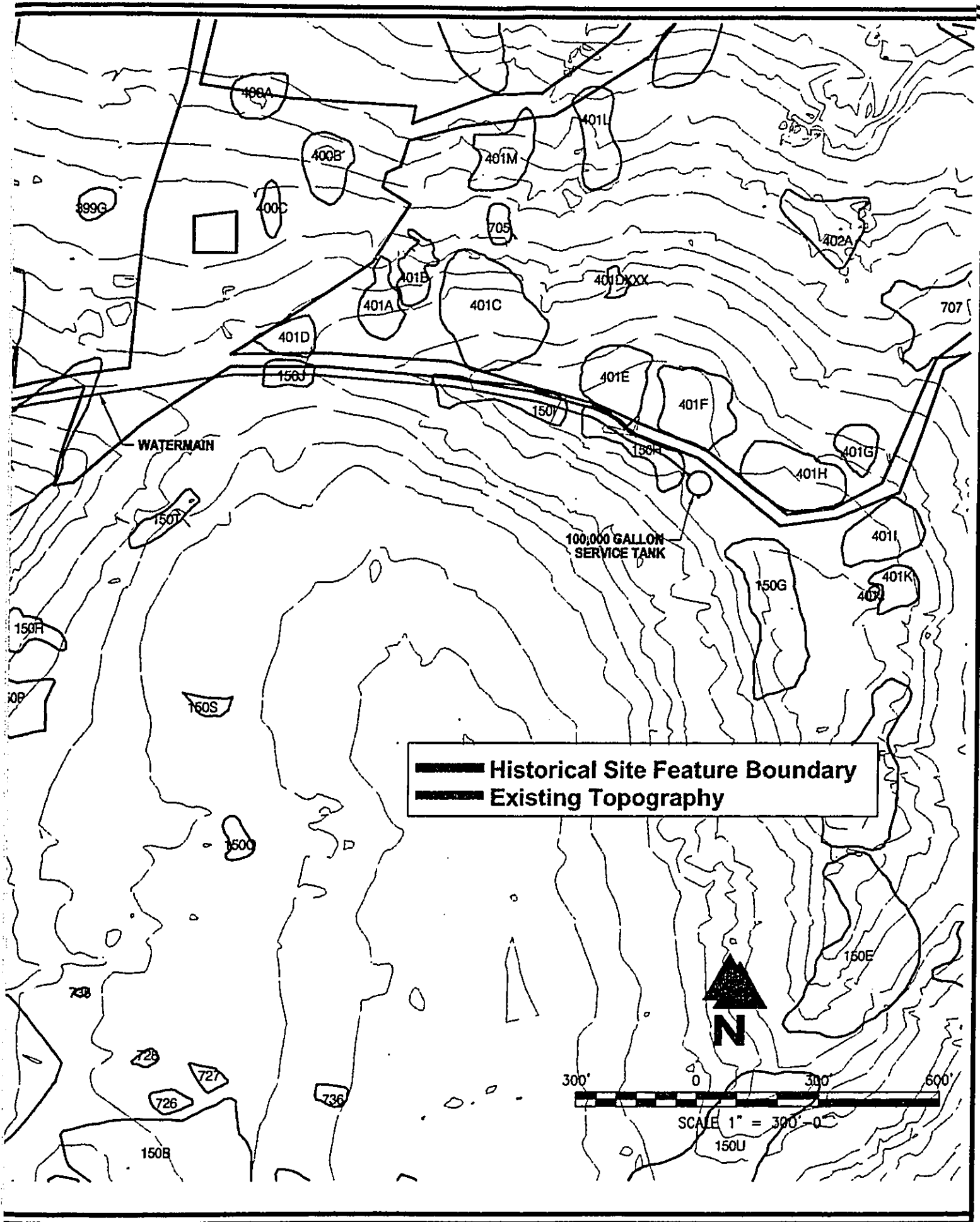
Luamakika crater, and the surrounding area as a whole, is considered the Moa'ulanui Traditional Cultural Property (TCP) (SHIP 50-20-97-771). There are numerous individual archaeological sites within the Moa'ulanui TCP.

The proposed water system at Luamakika will overlap two known archaeological sites as shown in Figure 4-1. These sites are listed on the National Register of Historic Places as sites 50-20-97-150 and 50-20-97-388. Both of the sites consist of a cluster of individual features which have been identified by a survey team as "activity areas" and are found on the outer slopes of the crater. Like most of the archaeological sites found on the island of Kaho'olawe, the sites commonly referred to as 150 and 388 have suffered severe degradation due to the heavy erosion rates which exist on the surrounding upland slopes. This pattern of erosion in the area has resulted in cultural material found at these sites to be scattered and washed down slope. The cultural material which remains at these sites consists mostly of fire cracked rocks, marine mollusc shells and flakes of basalt and volcanic glass. The following subsections provide a more detailed description of the activity areas of sites 150 and 388 which will be impacted by construction of the water system. A complete description of the archaeological features found at sites 150 and 388 is given in Appendix B.

Figure 4-1 Historical Sites with Proposed Layout of Structures



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4.2.1 Site 150

Site 150 is comprised of 21 features located around the crater rim at Luamakika. The features are situated in mostly bare areas among eroding hummocks and scattered patches of vegetated shallow soils. The installation of approximately 4,190 linear feet of 2-inch HDPE pipe transmitting the water from the storage reservoirs to the 100,000 gallon service tank will have a direct impact on four of these features, namely: 150H, 150I, 150J, and 150K. A six-inch deep trench will run through each feature in order to house the transmission pipe. A table summarizing the artifacts found at these features is given below in Table 4-1.

Table 4-1 Summary of Archaeological Features of Site 50-20-97-150 Impacted by Construction

Feature	Site Type	Cultural Material Quantity	Cultural Material Density	Material Characteristics
150H	Scatter	>100 Items	High	Fractured Basalt, Sinkers, Adz, Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden
150I	Scatter	>100 Items	Low	Fractured Basalt, Adz Preforms/Rejects, Basalt Artifacts, Basalt Flakes, Marine Midden.
150J	Scatter	>100 Items	Low	Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden
150K	Scatter	>100 Items	Low	Fractured Basalt, Finished Adz, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden, Cypraea Shell Lure.

4.2.2 Site 388

Site 388 consists of 20 features bordering the eastern side of the crater rim at Luamakika. The proposed storage system will utilize about 485 linear feet of 6-inch PVC pipe, buried one foot below grade, to transmit water from the catchment apron to the long term storage reservoirs, which will have a direct impact on seven of these features, namely: 388E, 388F, 388G, 388H, 388O, 388Q and 388T. The proposed access road will also be constructed across the boundaries of feature 388E and in addition feature 388B. A table summarizing the artifacts found at these features is given

in Table 4-2. The piping was originally designed to run through feature 388K; however, due to the presence of a permanent impact structure located at this feature, the pipe alignment was diverted to avoid crossing into this area.

**Table 4-2 Summary of Archaeological Features of Site 50-20-97-388
Impacted by Construction**

Feature	Site Type	Cultural Material Quantity	Cultural Material Density	Material Characteristics
388B	Scatter	>100 Items	Low	Fractured Basalt, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden.
388E	Scatter	>100 items	Medium	Fractured Basalt, adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes.
388F	Scatter	11-100 Items	Low	Fractured Basalt, Other Artifacts, Marine Midden.
388G	Scatter	>100 Items	Medium	Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden.
388H	Scatter	>100 Items	Medium	Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden.
388O	Scatter	>100 Items	High	Abrader, Fractured Basalt, Finished adz, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden.
388Q	Scatter	11-100 Items	Low	Fractured Basalt, Polished Flakes from Finished Adzes, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden.
388T	Scatter	>100 Items	Medium	Abrader, Fractured Basalt, Finished Adz, Fireplace, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts & Flakes, Other Artifacts, Marine

4.2.3 Pipeline Alignment

During the initial design phase for the irrigation system, various alternatives for water distribution were considered. One option of irrigating this area is to use a water truck to haul water from the main storage tanks near the catchment apron to the various regions around Luamakika crater. This option was considered infeasible because there are no roads within the crater and constructing a new road would be economically infeasible and culturally inappropriate. Furthermore, indiscriminate driving within the crater will increase erosion in the area and subsequent environmental degradation. An alternate route for the pipeline directly through the middle of the crater was also considered. This route would avoid most of the archaeological sites but would lead to a greater environmental impact because the route will not be easily accessible for maintenance crews and vehicles. To maintain the pipeline, the maintenance crew would have to drive through areas that are culturally sensitive and prone to severe erosion due to driving.

The proposed route runs along the existing K1 road and is easily accessible for maintenance. No added erosion or other adverse environmental impacts are anticipated from this option. The 2" pipeline will be on grade and anchoring blocks for the pipeline will be placed outside the archeological areas to minimize the impact. Further mitigation measures for impacted archaeological sites are discussed in section 4.3 below.

4.3 Mitigation Measures

In order to minimize the impacts the proposed construction will have on the existing archaeological and cultural sites in the area, the KIRC has established various mitigation measures. An archaeological monitoring plan approved by the State Historic Preservation Division will be implemented during construction. It will require close consultation with the cultural program staff to ensure respectful and appropriate measures are taken during construction through sensitive areas. Archaeologically significant features have been previously marked by survey teams and all human foot and vehicular traffic will be restricted in these areas during the construction phase of the project.

All of the identified historic properties within the project area can be classified as surface scatter features that represent completely or partially denuded locations of artifacts, structural remains, midden, and other cultural material. Due to long term soil erosion, not all of these features actually represent locations of past human activity. All of the surface scatters were listed as contributing elements of the Kaho'olawe National Register District, based on the initial inventory survey of the island between 1976 and 1980. However, more detailed examination of the surface scatters indicates that there is considerable range in the integrity of the surface scatter features and their corresponding contributory significance. As the surface scatters continue to erode, their integrity as both individually discrete features and as definable elements of a composite settlement pattern continues to decrease. It is evident that the surface scatters that have been fully transformed by natural processes provide less interpretive and scientific value than the scatters that are still relatively close to their site of original deposition. It is the latter patterns that also exhibit greater cultural and educational potential.

Available site location maps for the Luamakika area (1980,1998) do not provide the important distinction between secondary scatters that have been transported by runoff and the more

significant scatters that are still at or near their primary locations. A more detailed method of mapping the surface scatter by category has been developed (Donham 2000, personal communication with KIRC) and applied to selected areas around the crater. This approach distinguishes four types of scatter:

- A) Cultural material located in and around the base of a soil hummock, observed in the active process of becoming exposed by wind action;
- B) Discrete concentrations of cultural material at or very near its primary location;
- C) Generally linear pattern of cultural material dispersed in a surface runoff channel, or concentrated in an erosion delta or similar area along the channel;
- D) Sparse, regular dispersion of cultural material over relatively large areas as a result of sheet wash erosion, or as a result of dispersion prior to the removal of the soil layers.

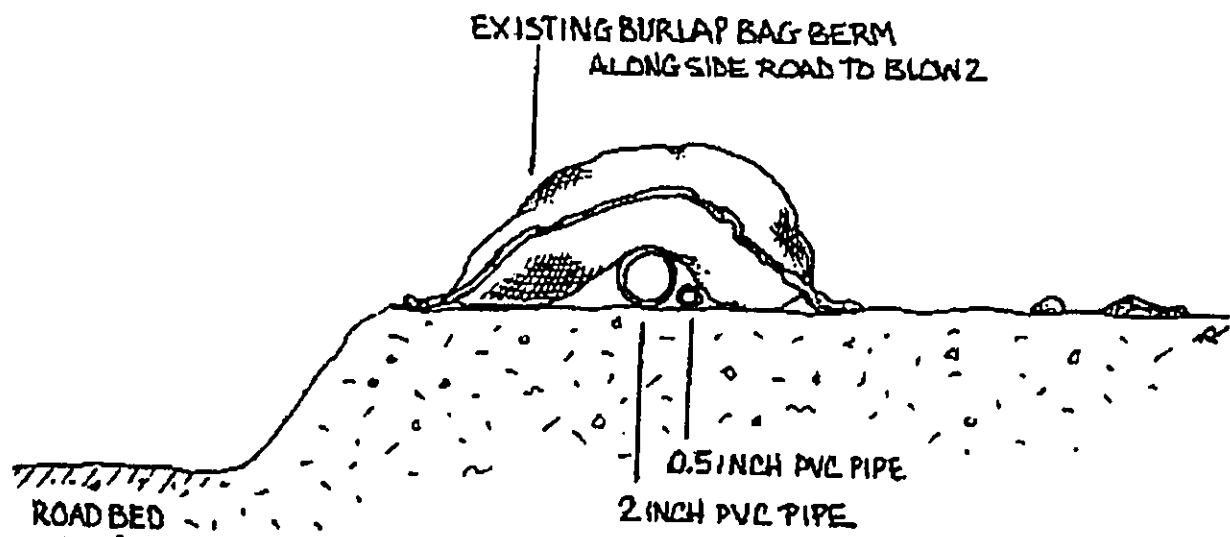
Each of these four categories of scatter is readily identifiable based on visual inspection. Application of these categories has been found to be relatively straightforward and easily documented with the use of GPS by walking the perimeter of the surface scatter area while recording a polygon feature coded for the appropriate scatter category.

Determination of the exact location of the 2" pipeline as well as laying of the pipeline will be coordinated and integrated with erosion control measures that KIRC is already undertaking in the area. The erosion control method selected for Luamakika is the placement of aligned burlap bags filled with kiawe chips, such as those shown in Figure 4-2. For historic property sites 150J, 150I, and 150H the 2" pipeline will be located on the surface close to the existing K1 road and covered with burlap bags filled with kiawe chips, making it an integral part of the erosion control measures (see Figure 4-3). These alignments are single bags set end to end along a contour of the hill side, creating a low berm or terrace-like structure. The location of berm lines will be carefully determined by KIRC restoration professionals, using consideration of existing slope degree, dissection, vegetation patterns, and so on. The berm lines will also be determined in consultation with a Navy archaeologist and the KIRC historic property coordinator. This approach will help the positioning of the pipeline and the berms to avoid in situ deposits or primary scatter features, and to retard runoff around relatively intact surface scatter features. After the pipeline and the berms are set out along a contour, the uphill side is filled with loose kiawe chips to provide an organic stabilization matrix. It is anticipated that soil will accumulate in these areas and mix with the wood chips to provide a bedding matrix for seeds. Since the pipeline and the berm alignments would avoid Type A and B surface scatters, this would preclude the need to relocate any artifacts that are at or near their primary locations. The KIRC has already implemented this approach for erosion control in some areas on Luamakika and, to date, this planning approach has been successful in avoiding impacts to significant surface scatters and artifacts. This is due in part to the fact that areas where the berms are most needed are severely eroded and do not contain primary features. The exceptions are hummock faces, which can contain in situ features. Finer adjustments to the alignment of the pipeline will be made during construction to avoid these types of features. The pipeline alignment and the locations of berm lines will be mapped using GPS after they are established.



Figure 4-2 Existing Erosion Control Along K-1 Service Road

Figure 4-3 Erosion Control at 2-inch Pipeline



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810 Richards Street, Suite 888, Honolulu, Hawaii 96813

CULTURAL RESOURCES AND ARCHAEOLOGICAL IMPACTS
SECTION FOUR

In order to mitigate the adverse effects this project may have on areas of archaeological significance, the following archaeological data recovery scope will be implemented:

1. Prior to the project beginning, a professional archaeologist (minimally with a M.A. in Archaeology and experience in Hawaiian archaeology) shall conduct or oversee the identification and temporary fencing-off of any features of sites 150 and 388 that are hummocks or type A and B scatters that are near the project area. This work shall be coordinated with KIRC staff. The archaeologist shall notify the State Historic Preservation Division (SHPD) and KIRC that the fences are in place.
2. Prior to the project beginning or concurrent with the project, a professional archaeologist (minimally with a M.A. in Archaeology and experience in Hawaiian archaeology) shall be shown the project impact areas in features of sites 150 and 388 that are Type C and D scatters. Current descriptions indicate that relatively few archaeological remains will be present in the impact areas. Prior to project work in those impact areas, the archaeologist shall map the locations of the archaeological remains (artifacts, food remains, and debitage) from a site datum and recover them.
3. During the project, a professional archaeologist shall be available in case the project impact areas *alter during construction* and more features of sites 150 and 388 are impacted. If this is the case, prior to construction in these new areas, the procedures of Item 2 above will be followed.
4. An acceptable data recovery report shall be prepared by the professional archaeologist, following SHPD minimal standards. This report will not be research focused, rather it will address basic site and object documentation. A draft copy of the report will be submitted to SHPD and KIRC for review. If revisions are requested to meet minimal SHPD reporting standards and concerns of KIRC, these revisions shall be made (or a meeting shall be held to discuss and resolve concerns). The report shall include, but not be restricted to:
 - a. A location map(s) showing the locations of the objects recovered;
 - b. The description of the objects following standard archaeological descriptive approaches;
 - c. Illustrations of a representative sample of the objects.
5. The objects recovered shall be curated in a facility acceptable to SHPD and KIRC, preferably on the island of Kaho'olawe. As objects being removed from portions of sites undergoing destruction by development, it is important that they be curated acceptably to protect the historic resources of the island for future generations.
6. All activities by the archaeologists while on Kaho'olawe will be done in close consultation with KIRC's cultural programs staff.

SECTION 5
ALTERNATIVES TO THE PROPOSED ACTION

SECTION 5

ALTERNATIVES TO THE PROPOSED ACTION

The alternatives for the proposed rainwater catchment and water storage facility include "No Action", "Delayed Action" and "Alternative Sources".

5.1 No Action

The objective of the project is to provide irrigation water to the island of Kaho'olawe in order to increase the amount of vegetation that can be supported on Luamakika, thus reducing further erosion of the area. "No Action" means that no rain water catchment or storage facilities will be installed. This alternative would result in a lack of vegetation at the proposed site and continued erosion of the area surrounding Luamakika. As such the "No Action" alternative is not a desirable option.

5.2 Delayed Action

The "Delayed Action" alternative means that installation of the rain water catchment and water storage facility takes place at some time in the future. This alternative will postpone the resolution of irrigation water supply concerns in the area. Furthermore the delay in the installation of the irrigation system will result in continued erosion to the proposed project area. The alternative of "Delayed Action" will have the same negative ramifications as those of the "No Action" alternative and therefore is also considered to be an undesirable option.

5.3 Alternative Sources

The "Alternative Sources" alternative refers to all other sources of water, other than the rain catchment system, which can be utilized for irrigation purposes. Possible alternative sources include: ground water, desalinization of sea water, and importing water from the island of Maui. The calculated demand for the proposed irrigation system is approximately 6,400 gallons per week based on the rate of demand of future vegetation, thus, any alternative source of water must be able to accommodate for this demand.

5.3.1 Ground Water

Currently there is very little information concerning the volume and quality of the groundwater on Kaho'olawe. Previous wells have provided water acceptable to grazing animals; however, the salt content of these waters was high. All existing water resource studies for the island of Kaho'olawe indicate that the groundwater is brackish and not suitable for human consumption or irrigation. Furthermore, the cost for developing the groundwater on Kaho'olawe would be prohibitive.

5.3.2 Desalinization

The operating expense and small capacity of desalinization units make them an impractical alternative for providing an adequate source of irrigation water. In addition, construction and maintenance of a desalinization facility would be considerably more expensive than the proposed rainwater catchment system.

5.3.3 Off-island Water Source

Bringing water over to Kaho'olawe from the island of Maui is also a very costly alternative. In addition to depleting the water resources of Maui, this alternative would induce heavy costs for the transport and storage of the volume of water required to meet the weekly demands of irrigation.

Based on the negative aspects associated with the alternate sources evaluated, the most appropriate means of attaining irrigation water would be the proposed catchment system. This conclusion is supported by the KIRC Environmental Restoration Plan and the Kaho'olawe Water Resources Study prepared by the Protect Kaho'olawe Ohana both of which recommend a rainwater catchment as the most viable source of water on the island.

SECTION 6
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT
OF RESOURCES AND UNRESOLVED ISSUES



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SECTION 6

**IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS
OF RESOURCES AND UNRESOLVED ISSUES**

The proposed rainwater catchment and water storage facility project involves the uses of energy, labor, materials and capital funds by the Kaho'olawe Island Reserve Commission.

There are no unresolved issues for the proposed project at the present time.

SECTION 7
LIST OF NECESSARY PERMITS AND APPROVALS

SECTION 7

LIST OF NECESSARY PERMITS AND APPROVALS

The Kaho'olawe Island Reserve Commission (KIRC) will follow all relevant Federal, State, and Local laws and regulations pertaining to a project of this nature. However, due to the semi autonomous status afforded to the Kaho'olawe Island Reserve Commission (KIRC) under the Hawaii Revised Statutes (HRS), Chapter 6K, KIRC has the authority to review and approve all construction projects which take place on the island of Kaho'olawe. As such, it is not required to obtain any additional permits or approvals for the construction of the proposed project other than those imposed by KIRC. A copy of HRS, chapter 6K is provided in Appendix C.

SECTION 8
FINDINGS, DETERMINATION,
AND REASONS SUPPORTING DETERMINATION



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SECTION 8

FINDINGS, DETERMINATION, AND REASONS SUPPORTING DETERMINATION

8.1 Significance Criteria

This Draft Environmental Assessment (DEA) is prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Title 11, Chapter 200, Hawaii Administrative Rules, Department of Health, State of Hawaii. The Kaho'olawe Island Reserve Commission (KIRC) proposes to locate a rainwater catchment and water storage facility on the eastern half of the Island of Kaho'olawe. The purpose of the catchment system is to allow for revegetation of the area surrounding the crater at Luamakika with native plant species.

The proposed installation of the rainwater catchment and water storage facility will have no significant adverse impact on the environment. Therefore, an Environmental Impact Statement is not required for the project. Based on the "Significant Criteria" listed in Section 12 of HRS Title 11, Chapter 200, an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences (both primary and secondary), its cumulative impact with other projects, and its short and long-term impacts. In making the determination, the "Significant Criteria" Rules established are employed as the basis for identifying whether the proposed project has significant environmental impacts. Based on these rules the following conclusions are reached:

1. ***The Rainwater Catchment and Water Storage Facility for the Island of Kaho'olawe would not result in irrevocable commitment to loss or destruction of any natural or cultural resources.*** The proposed structures will be constructed on vacant land. Special care was taken during the design phase of the proposed water system so as not to adversely impact any archaeologically significant areas. Construction is expected to have no adverse impacts on any known cultural resources.
2. ***The proposed project would not curtail the range of beneficial uses of the environment.*** The proposed project will not curtail beneficial uses of the site and the surrounding area. The area used for the catchment apron and storage reservoirs is very small in proportion to the entire area of the site. Installation of the structures for the proposed project by no means curtails the use of the remaining portion of the property from any beneficial use. Additionally, the rainwater collected will be a small fraction of the rainfall which falls each year at the project site.
3. ***The proposed action does not conflict with the State's long-term environmental policies or goals and guidelines.*** The State policies as set forth in Chapter 344, Hawaii Revised Statutes espouse conservation of natural resources and enhancement of the quality of life. The project is in line with the objective of the Kaho'olawe Use Plan of the State Kaho'olawe Island Reserve Commission which was established to preserve the current archaeological integrity, preserve Native Hawaiian cultural access and rehabilitate and restore the environmental quality of the island of Kaho'olawe.
4. ***The economic and social welfare of the community or State would not be affected.*** All equipment, supplies, materials and workers needed for construction will be secured by the contractor prior to arriving at the proposed project site. For this reason, the proposed project is expected to have no short-term impacts on the local economy. The

proposed system would have a long-term impact on the social welfare of the island of Kaho'olawe and the State in a positive way. The project will provide a reliable, low cost source of water for irrigation of current and future vegetation in the area. Title X and the Hawaii Revised Statutes, Chapter 6K, strictly forbid any commercial use of the island, and as such there are no concerns regarding the future economic development of Kaho'olawe.

5. ***The proposed action does not substantially affect public health.*** The island of Kaho'olawe is currently uninhabited; thus, any construction conducted in the area will have no impact on human health. The Contractor will be responsible for delineating and properly marking the construction area to provide adequate safety and restrict access to the site. The Contractor will also abide by all rules and regulations as set forth by the Occupational Health and Safety Administration (OSHA). There are no anticipated negative impacts to public health and safety foreseen to be caused by the proposed water system at any time in the future.
6. ***No substantial secondary impacts, such as population changes, or effects on public facilities are anticipated.*** The proposed project is intended to provide water solely for irrigation purposes near Luamakika. The catchment system will not have any impacts on public facilities and/or population in the area.
7. ***No substantial degradation of environmental quality is anticipated.*** The project site is located on vacant land with no significant environmental features. It will not adversely impact any of the surrounding cultural sites or the overall environmental quality of the area. Once the proposed system has collected enough water to begin irrigation, the scenic and aesthetic qualities of the area will be greatly enhanced through the introduction of various native plant species, thus, attracting new wildlife and serving to beautify the area.
8. ***The proposed action does not involve a commitment to larger actions, nor would cumulative impacts result in considerable adverse effects on the environment.*** The proposed project is self contained. The catchment system will provide a reliable water supply for irrigation of the area surrounding Luamakika.
9. ***No rare or threatened species or their habitats would be affected.*** The proposed project site is located on vacant land relatively clear of any vegetation. No known rare, threatened or candidate flora or fauna species are present at the site or may be affected by the proposed action. There is the possibility of having very minimal effects on the endangered Blackburn's sphinx moth. A Mitigation plan for the listed Blackburn's Sphinx Moth (*Manduca blackburni*) has been developed and is presented in Section 3.4.1.
10. ***Air quality, water quality or ambient noise levels would not be detrimentally affected.*** There are no significant air or water quality impacts anticipated for this project. Short-term impacts from construction activity include increased noise levels, dust and exhaust from construction machinery. The Contractor will be required to properly maintain all equipment used for construction to ensure no excessive noise at the site. Implementation of Best Management Practices (BMP's) will be used to ensure all compliance requirements.

11. **The project would not adversely affect environmentally sensitive areas, such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, fresh waters or coastal waters.** No environmentally sensitive areas would be affected by the project. The proposed project site is located well inland of the coast and outside of tsunami inundation zones, flood plains and geologically hazardous lands. Seismic risks and volcanic hazards are also minimal.

The focus of the project is to provide irrigation water for vegetation in order to alleviate current erosion rates of the surrounding area. During construction of the project, proper mitigation measures, including the use of silt fences, will be taken to combat possible erosion.

12. **The project does not substantially affect scenic vistas and view plains identified in County or State plans or studies.** The various structures erected for the proposed water system will have minimal visual impacts. The rainwater catchment apron and water storage reservoir were designed to have a low profile to minimize visual impacts to the area. Screening trees and bushes will also be planted adjacent to each above ground structure. The vegetation to be planted is intended to improve the aesthetic qualities of the environment surrounding Luamakika.

13. **The proposed project does not require substantial energy consumption.** During construction, energy needed to power any equipment will be derived from on-site generators provided by the contractor. Upon completion of the project the only power requirements of the water system will be for the 1 hp pump, which will lift water from the two storage reservoirs to the service tank. Power for this pump will be supplied via a photovoltaic panel system.

8.2 Notice of Determination

On the basis of the foregoing information, this EA has determined that the proposed rainwater catchment and water storage facility would not have significant impacts on the environment. As such, an anticipated notice of determination of *Finding of No Significant Impact (FONSI)* for the proposed project is appropriate.

8.3 Reasons Supporting the Anticipated Determination

The nature and scale of the proposed project are such that no significant environmental affects are anticipated. A few negative impacts, which have been identified in this Environmental Assessment, can be mitigated or minimized through sensitive site planning and engineering design, implementation of careful construction methods and compliance with all governmental requirements including those of the Kaho'olawe Island Reserve Commission and the State Department of Health.

SECTION 9
RESPONSES AND COMMENTS
TO DRAFT ENVIRONMENTAL ASSESSMENT



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813



RECEIVED MAR

1164/01
GILBERT COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
DEPUTY
ERIC T. HIRANO
LUNEL NISHIOKA

1.1

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BLVD., ROOM 666
KAPOLEI, HAWAII 96707

ACQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES CONSERVATION AND ENVIRONMENTAL AFFAIRS CONSERVATION AND RESOURCES ENFORCEMENT CONVEYANCES FORESTRY AND WILDLIFE HISTORIC PRESERVATION DIVISION LAND MANAGEMENT STATE PARKS WATER AND LAND DEVELOPMENT

February 28, 2002

Kelly J. Chuck, P.E.
Project Manager
Marc M. Siah & Associates, Inc.
810 Richards Street
City Center Building, Suite 888
Honolulu, Hawaii 96813

LOG NO: 29258 ✓
DOC NO: 0202RC36

Dear Mr. Chuck:

**SUBJECT: Chapter 6E-8 Review – Rainwater Catchment & Water Storage Facility
Kaho'olawe**

Thank you for the copy of the Draft EA for this project, which we received February 15, 2002. This is the first opportunity that we have had to review this proposed undertaking. We asked Mr. Neupane of KIRC not to proceed with the plans as they are given in this Draft EA until we have commented.

We thoroughly support the proposed catchment and water storage project, as an element to help reforest the island. However, our review of the EA clearly shows that historic sites will be impacted. Section 4 of this document makes this clear also.

Two significant historic sites are being impacted – 380 and 150, both remnants of former inland activity or habitation areas. As the EA points out, some features of these sites are severely eroded remnants of the sites which have been washed downslope across the hardpan. Other features of these sites include hummocks – intact remnants of the sites left behind in raised vegetated areas (hummocks) of soil and deposits. We agree with Donham's typing of eroding sites (noted in the EA, p. 4-6). Types A and B are closer to the hummocks (the original place of deposition) and their material is more intact, while Types C and D are dispersed downslope by erosion. The EA indicates that it is unclear if the features or portions of features of these sites that are being impacted include any hummocks or Type A and B scatters. (The site records in Appendix B indicate hummocks are part of these sites or adjacent; see 388, Feature E, on page B-201.)

We believe that the project, as planned, will have an adverse effect on these two sites – although a very limited adverse effect. We disagree with the assumption that for Type C and D scatters "relocation of artifacts in order to protect them from breakage or permanent loss is not considered an adverse effect when the artifact is in a secondary context with no integrity of location". The location of the artifacts and remains even in Type C and D scatters is important information on the past. It may be that such scatters can be keyed back into different parts of sites. Also, sometimes the scatters are all that remain of former temporary habitations or activity areas. These scatters, as unimpressive as they are, contain significant information. (Artifacts – even flakes – can be of different functional types, can undergo residue analysis to see what material

they were used on, can be chemically analyzed to determine their geological source, and can potentially be dated. Food remains can similarly be dated.) So, mapping the objects' location by a professional archaeologist is an important part of mitigation. We also do not believe that relocation of the objects is appropriate mitigation (even into nearby areas). This can damage the context of a historic site. It moves an archaeological site's materials to another part of the site and alters the archaeological record.

We recommend the following archaeological data recovery scope of work to acceptably mitigate the adverse effects of this project. This is a simple scope, given the nature of the sites. The scope does not greatly deviate from what the EA proposes, but it deviates in key elements. It is vital that a professional archaeologist must oversee and document the work, to ensure that the historic information is acceptably documented and not lost. We are not sure what the qualifications of KIRC's historic property coordinator is. That person could potentially be qualified if they have a M.A. degree in Archaeology and experience in Hawaiian archaeology. Another difference is that we believe that the objects must be collected and curated, to properly protect the historic resources. The scope follows:

1. Prior to the project beginning, a professional archaeologist (minimally with a M.A. in Archaeology and experience in Hawaiian archaeology) shall conduct or oversee the *identification and temporary fencing-off* of any features of sites 150 and 388 that are hummocks or Type A and B scatters that are near the project area. This work shall be coordinated with KIRC staff. That archaeologist shall notify the State Historic Preservation Division (SHPD) and KIRC that the fences are in place.
2. Prior to the project beginning or concurrent with the project, a professional archaeologist (minimally with a M.A. in Archaeology and experience in Hawaiian archaeology) shall be shown the project impact areas in features of sites 150 and 388 that are Type C and D scatters. Current descriptions indicate that relatively few archaeological remains will be present in the impact areas. Prior to project work in those impact areas, the archaeologist shall map the locations of the archaeological remains (artifacts, food remains, and debitage) from a site datum and recover them.
3. During the project, a professional archaeologist shall be available in case the project impact areas alter during construction and more features of sites 150 and 388 are impacted. If this is the case, prior to construction in these new areas the procedures of Item 2 above will be followed.
4. An acceptable data recovery report shall be prepared by the professional archaeologist, following SHPD minimal standards. This report will not be research focused, rather it will address basic site and object documentation. A draft copy of the report will be submitted to SHPD and KIRC for review. If revisions are requested to meet minimal SHPD reporting standards and concerns of KIRC, these revisions shall be made (or a meeting shall be held to discuss and resolve concerns). The report shall include, but not be restricted to:
 - a. a location map(s) showing the locations of the objects recovered.
 - b. the description of the objects following standard archaeological descriptive approaches
 - c. illustrations of a representative sample of the objects,

Kelly J. Chuck, P.E.
Page 3

5. The objects recovered shall be curated in a facility acceptable to SHPD and KIRC, preferably on the island of Kaho'olawe. As objects being removed from portions of sites undergoing destruction by development, it is important that they be curated acceptably to protect the historic resources of the island for future generations.
6. All activities by the archaeologists while on Kaho'olawe will be done in close consultation with KIRC's cultural programs staff.

We believe that this mitigation approach will acceptably treat (mitigate) the adverse effects to the sites.

If you have questions, please contact our review staff for this project, Ross Cordy (our Branch Chief for Archaeology) at 692-8025.

Aloha,



Don Hibbard, Administrator
State Historic Preservation Division

RC:jen

c: Deepak Neupane, KIRC

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



KŪKULU KE EA A KANALOA

KAHO'OLAWE ISLAND RESERVE COMMISSION

811 Kolu Street, Suite 201, Wailuku HI 96793
Telephone: (808) 243-5020 Fax (808) 243-5885

COMMISSION MEMBERS

COLETTE Y. MACHADO
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ROBERT J. LU'UWAI
CRAIG NEFF
BURT SAKATA

R. KEONI FAIRBANKS
Executive Director

March 25, 2002

Mr. Don Hibbard, Administrator
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

Dear Mr. Hibbard:

Subject: CHAPTER 6E-8 REVIEW – RAINWATER CATCHMENT AND WATER STORAGE
FACILITY, KAHO'OLAWE, HAWAII

Thank you for reviewing the environmental document for our proposed project. We will append your letter to the Final Environmental Assessment.

In response to your comments, we offer the following:

1. The paragraph on Page 4-6 in Section 4.3 regarding the relocation of secondary scatters has been omitted. All features that are Type C and D scatters will be mapped from a site datum and recovered by a professional archaeologist.
2. All six points in your archaeological data recovery scope will be incorporated within the mitigation measures detailed in Section 4.3.

If you have any questions, please contact Deepak Neupane, P.E. at (808) 243-5025.

Sincerely,

Deepak Neupane

FOR R. Keoni Fairbanks
Executive Director

cc: Kelly Chuck, Marc M. Siah & Associates, Inc.



University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Krauss Annex 19 • 2500 Dole Street • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

March 11, 2002
EA: 0280

Mr. Deepak Neupane
Kaho'olawe Island Reserve Commission
811 Kolu Street, Suite 201
Wailuku, Hawaii 96783

Dear Mr. Neupane:

Draft Environmental Assessment
Kaho'olawe Rainwater Catchment and Water Storage Facility
Kaho'olawe, Hawaii

The Kaho'olawe Island Reserve Commission proposes to locate a rainwater catchment and water storage facility on the eastern region of the Island of Kaho'olawe. The entire system will cover approximately 3 acres of land surrounding the crater at Luamakika. The purpose of the catchment and storage reservoir system is to provide an irrigation water source allowing for re-vegetation of the barren area surrounding Luamakika in order to alleviate the severe soil erosion that currently exists. The main components of the proposed project consist of a catchment apron, a reservoir storage system, transmission pipes, a pump house, and an access road. The project is scheduled to begin in April 2002 and is expected to last approximately 6 months. The estimated cost of the project is \$ 1,590,000.

Thomas Giambelluca of the Geography Department and Kevin Polloi of the Environmental Center participated in the review of this document.

General Comments

The Environmental Center recognizes the need to augment re-vegetation efforts on Kaho'olawe. This initial step in restoring the island's vegetative cover will help retain the soils therefore alleviating the erosion problem. Also the use of native plants is a very good idea in order to keep the area in a natural state as much as possible.

Although we do have concerns regarding this document, this is not to say that we oppose the effort. In fact, we would very much like to see the project succeed. Our concerns are intended to provide another voice in the process to ensure that all necessary factors have been taken into consideration to result in the successful implementation of the project.

Specific Comments

Section 2.2 Climate (pp.2-1 & 2-3)

In this section, it mentions the average annual rainfall of the island of 20 inches per year, but fails to include any references to this claim. Figure 2-2: Mean Annual Rainfall in Inches also does not include a source. Although a list of references is provided in the document, please provide in-text citations.

In addition, we note that the area surrounding the proposed system is largely devoid of vegetation, and we have concerns that exposed terrain will be a source for significant amounts of windblown soils, which may accumulate and interfere with the catchment and storage system. Periodic maintenance will be required to address this concern, which will add to the operational costs of the system.

Figure 2-4 (p. 2-6)

There is no legend in this figure to explain the areas that are highlighted in green.

Section 2.5 Aquatic Resources (p. 2-7)

The last sentence of this section states, "water supply studies indicate a potential 50,000 to 100,000 gallons could be developed on an annual basis on the island from rainfall alone." There is no citation as to the source data for these calculations. It is unclear whether the amount of water that could be "developed" is collected over the whole surface area of the island, from the project catchment system or all the other mentioned man-made rainwater systems currently on the island.

Section 5.3 Alternative Sources

It would be helpful if cost estimate analyses were done on each of the alternative sources of water in this section. Short-term as well as long-term projections should be considered. It is obvious that annual rainfall is highly variable from year to year. Large variations in rainfall imply that the storage capacity may be exceeded in some years and collected water may be less than expected during other years. This should be included in the assessment.

In cases where there is overflow or pipeline clogging, there will be concentrated water flows that may accelerate soil erosion. This should be addressed as well as including mitigation measures such as diverting overflow water onto low-slope areas with erosion control measures in place.


In periods where there is an insufficient amount of rainwater, the alternatives of temporary shipping of water and/or leasing of desalination equipment might be the only possible options. These were not discussed in this document and should be addressed, including cost analyses.

Section 8.1 Significance Criteria (pp. 8-1 - 8-3)

Item (9) in the section, which discusses if there are affected rare, threatened or endangered species of their habitats seems contradictory. The first sentence states that there is no effect to endangered species, yet subsequently, the document notes that the endangered Blackburn's Sphinx Moth, *Manduca blackburni*, is found in the area. The sentence or paragraph should be revised.

Thank you for the opportunity to review this Draft Environmental Assessment.

Sincerely,



John T. Harrison, Ph.D.
Environmental Coordinator

Cc: OBQC
Marc M. Siah & Associates
Thomas Giambelluca
James Moncur
Kevin Polloi

BENJAMIN J. AYETANO
GOVERNOR OF HAWAII



KŪKULU KE EA A KANALOA

KAHO'OLAWE ISLAND RESERVE COMMISSION

811 Kolu Street, Suite 201, Wailuku HI 96793
Telephone: (808) 243-5020 Fax (808) 243-5885

COMMISSION MEMBERS

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CRAIG NEFF
BURT SAKATA

R. KEONI FAIRBANKS
Executive Director

March 25, 2002

Mr. John T. Harrison, Ph.D., Environmental Coordinator
University of Hawai'i at Manoa
Environmental Center
2500 Dole Street, Krauss Annex 19
Honolulu, Hawai'i 96822

Dear Dr. Harrison:

Subject: DRAFT ENVIRONMENTAL ASSESSMENT – RAINWATER CATCHMENT AND WATER STORAGE FACILITY, KAHO'OLAWE, HAWAII

Thank you for reviewing the environmental document for our proposed project. We will append your letter to the Final Environmental Assessment.

In response to your comments, we offer the following:

Section 2.2 Climate (pp. 2-1 & 2-3)

1. The information regarding the average annual rainfall on Kaho'olawe was derived from the Water Resources of the Island of Kaho'olawe study done by the State of Hawai'i's Department of Land and Natural Resources Division of Water and Land Development in conjunction with the Protect Kaho'olawe 'Ohana. This source will be cited in the text. The source of Figure 2-2 is the Atlas of Hawai'i (1998). This source will also be cited in the text.
2. Cleanouts and access hatches will be provided for each tank in order to remove any accumulated debris. Periodic maintenance will be supplied by the Kaho'olawe Island Reserve Commission's field staff.

Figure 2.4 (p. 2-6)

1. The varying colors in this figure are software generated and have no significance thus no legend is provided. If possible, the image generating program will be edited to remove any misleading discoloration.

Section 2.5 Aquatic Resources (p. 2-7)

1. The source of this data also comes from the DLNR Water Resources report. This potential water development is based on the project catchment system and takes draught conditions into account.

Section 5.3 Alternative Sources

1. The choice of a rainwater catchment system for supplying irrigation water to Kaho'olawe was made primarily based on the Water Resources Study as done by the DLNR. This study provides an in depth analysis of alternate methods of water supply and includes cost estimates for each. Within DLNR's report, Table 8.10: Estimate of Long Term Development Costs Water Development & Soil Conservation (in 1990 dollars) summarizes the costs for various water supply alternatives.
2. Overflow of the storage tanks will be accommodated via a piping system from the top of the storage tank to outlet areas several feet away. The outlet areas will be concrete lined to prevent erosion.
3. The catchment system has been designed to supply sufficient quantities of irrigation water through up to two years of drought conditions. Each storage tank has been oversized to handle these conditions.

Section 8.1 Significance Criteria (pp. 8-1 – 8-3)

1. The paragraph at Item 9 will be revised to indicate the impact to the endangered Blackburn's Sphinx Moth.

If you have any questions, please contact Deepak Neupane, P.E. at (808) 243-5025.

Sincerely,

Deepak Neupane

For R. Keoni Fairbanks
Executive Director

cc: Kelly Chuck, Marc M. Siah & Associates, Inc.

BENJAMIN J. CAYETANO
GOVERNOR



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①.1
GENEVIEVE SALMONSON
DIRECTOR

RECEIVED MAR 13 2002

STATE OF HAWAII
OFFICE OF ENVIRONMENT QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

March 11, 2002

Mr. Deepak Neupane, P.E.
Kaho'olawe Island Reserve Commission
811 Kolu Street, Suite 201
Wailuku, Hawai'i 96793

Mr. Kelly Chuck
Marc M. Siah & Associates, Inc.
810 Richards Street, Suite 888
Honolulu, Hawai'i 96813

Dear Messrs. Neupane and Chuck:

The Office of Environmental Quality Control has reviewed the draft environmental impact statement for the Kaho'olawe Rainwater Catchment and Water Storage Facility on the Island of Kaho'olawe and offers the following comments for your consideration and response.

1. **PLANTING PLAN:** In order to fully assess all impacts (direct, indirect and cumulative) of the proposed school to the environment, please include your plan for revegetating the areas to be served by the proposed water storage facility in the environmental assessment.
2. **CUMULATIVE IMPACTS:** Please briefly describe past, present and reasonably foreseeable future projects on Kaho'olawe. Describe the cumulative environmental impacts of the project on the natural and human environment, as well as the cumulative environmental impacts of the proposed action on other related projects in the region.
3. **USE OF NATIVE PLANTS IN LANDSCAPING.** Consonant with the goal of rehabilitating Kaho'olawe, and with the goal of eradicating alien species, we recommend that the project make use of native plants in landscaping.

Thank you for taking the time to prepare a concise yet comprehensive environmental assessment. Thank you also for the opportunity to comment. If there are any questions, please call Leslie Segundo at (808) 586-4185.

Sincerely,

A handwritten signature in cursive script, appearing to read "Genevieve Salmonson".

GENEVIEVE SALMONSON
Director

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



KŪKULU KE EA A KANALOA

KAHO'OLAWE ISLAND RESERVE COMMISSION

811 Kolu Street, Suite 201, Wailuku HI 96793
Telephone: (808) 243-5020 Fax (808) 243-5885

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GILBERT S. COLOMA-AGARAN
ROBERT J. LU'UWAI
CRAIG NEFF
BURT SAKATA
R. KEONI FAIRBANKS
Executive Director

March 25, 2002

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

Dear Ms. Salmonson:

Subject: DRAFT ENVIRONMENTAL ASSESSMENT REVIEW – RAINWATER CATCHMENT AND
WATER STORAGE FACILITY, KAHO'OLAWE, HAWAII

Thank you for reviewing the environmental document for our proposed project. We will append your letter to the Final Environmental Assessment.

In response to your comments, we offer the following:

1. There is no proposed school planned for the island of Kaho'olawe in the near or distant future. However, a plan for revegetating various areas of the island after the rainwater catchment and water storage facility is complete is given in Section 3.4 of the report.
2. There are no past or foreseeable future projects planned for the island of Kaho'olawe. The only project that is presently underway is the unexploded ordnance clean up as administered by the U.S. Navy.
3. We agree that the project should make use of native plants in landscaping. Section 3.4 of the Draft Environmental Assessment indicates this intent and provides lists of recommended native flora to be used for revegetation.

If you have any questions, please contact Deepak Neupane, P.E. at (808) 243-5025.

Sincerely,

Deepak Neupane

For R. Keoni Fairbanks
Executive Director

cc: Kelly Chuck, Marc M. Siah & Associates, Inc.

REFERENCES

REFERENCES

1. U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey of the Island of Kaho'olawe, State of Hawaii, 1994.
2. University of Hawaii, Department of Geography, Atlas of Hawaii (3rd Ed.), University of Hawaii Press, Honolulu, Hawaii, 1998.
3. Macdonald, Gordon A.; Abbott, Agatin T.; and Peterson, Frank L., Volcanoes in the Sea, University of Hawaii Press, Honolulu, Hawaii, 1990.
4. Kaho'olawe Island Conveyance Commission, Final Report to the Congress of the United States, Kaho'olawe Island: Restoring a Cultural Treasure, Wailuku, Maui, 1993.
5. University of Hawaii, Department of Geography, Environmental Assessment, Kaho'olawe Restoration Project, Honolulu, Hawaii, 1991.
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9. U.S. Department of the Interior, Geological Survey, Geology and Groundwater Resources of the Island of Lanai and Kaho'olawe, Advertiser Publishing Co., Ltd., Honolulu, Hawaii, 1941.
10. State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development in conjunction with the Protect Kaho'olawe 'Ohana, Water Resources of the Island of Kaho'olawe, Hawaii, 89-4209, 2001.
11. State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development, Strategies for the Management of Land and Water Resources of Kaho'olawe, Contract No. 24516, 1989.
12. U.S. Department of Navy, Environmental Impact Statement, Kaho'olawe Training Area, Hawaiian Archipelago, 1977.
13. Marc M. Siah & Associates, Inc. *Engineering Study and Basis of Design for the Rainwater Catchment, Water Storage Facility, and Irrigation Network for the Island of Kaho'olawe.* Marc M. Siah & Associates, Inc. December 2000.

APPENDICES

 **Marc M. Siah & Associates, Inc.**

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

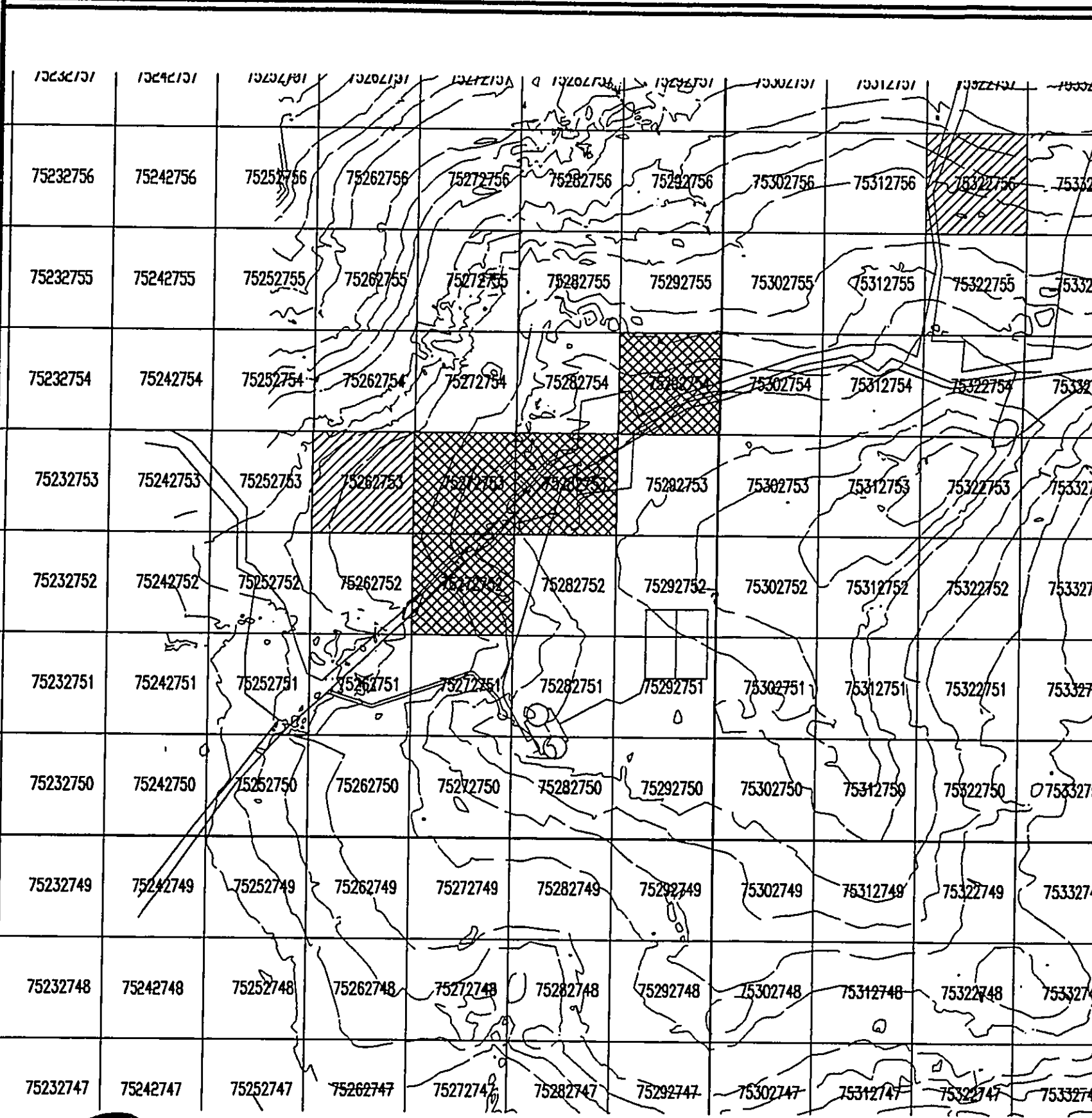
Appendix A
Grid Map of Luamakika,
Island of Kaho'olawe



Marc M. Siah & Associates, Inc.

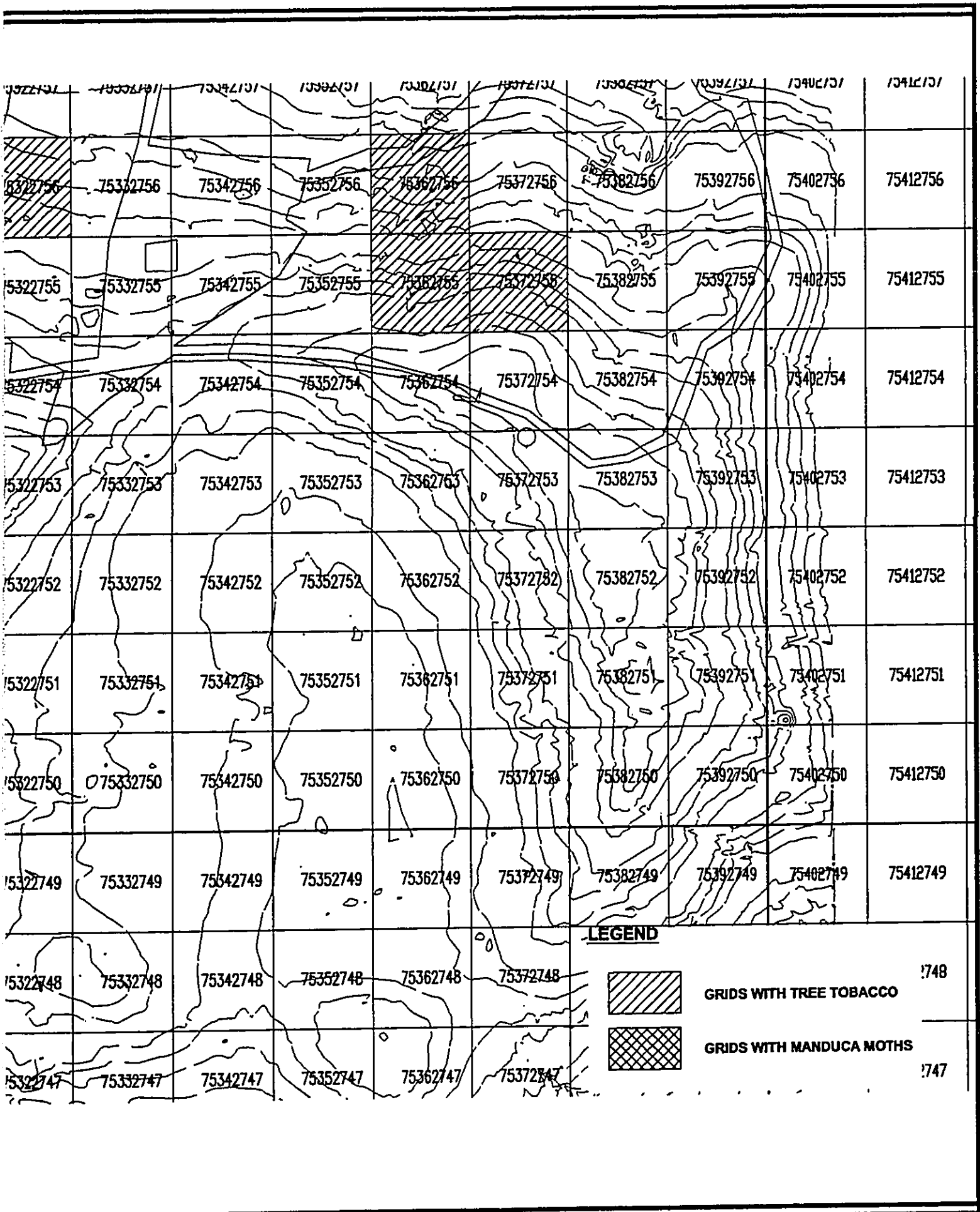
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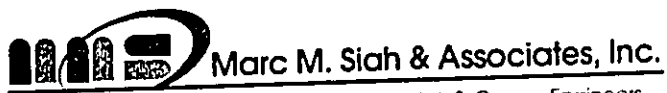
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Consulting Civil, Structural, Environmental & Ocean Engineers
 810 Richards Street, Suite 888, Honolulu, Hawaii 96813



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75322750	75332750	75342750	75352750	75362750	75372750	75382750	75392750	75402750	75412750
75322749	75332749	75342749	75352749	75362749	75372749	75382749	75392749	75402749	75412749
75322748	75332748	75342748	75352748	75362748	75372748				748
75322747	75332747	75342747	75352747	75362747	75372747				747

Appendix B
Description of Archaeological Features
Located at Proposed Construction Site



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

SITE 388

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: A
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden

FIELD NO.: 75252753-1
GMU: 75252753
WORK AREA: K-1 Road
CULTURAL MATERIAL QUANTITY: 11-100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 27 m (L) x 23 m (W)
SITE AREA: Approx. 621 sq. m

Site Description

Site 388 consists of a group of 20 lagged or deflating features of the type referred to as activity areas in the NRHP Nomination forms. The southern features are adjacent to a long hummock that extends easterly from the helicopter landing pad (LZ-1) to the rim of the Moa'ulanui crater (Figure 3-7). All 20 features were reidentified by means of the photogrammetric maps provided by the Navy. The constituent features (A through T) are discussed below.

Feature A Description

This feature of Site 388 consists of a small scatter of fractured basalt, volcanic glass and basalt debitage, and a few fragments of marine shell (*Thaididae spp.*). The scatter is mostly low-density, though there are a couple of areas of medium-density concentrations. The feature is located adjacent to (to the northwest) a large and long hummock, with which many of the features of Site 388 are associated (Figure B-131). The ground surface at the feature is completely eroded and 95% devoid of vegetation.

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: B
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75262753-1
GMU: 75262753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 65 m (L) x 25 m (W)
SITE AREA: Approx. 1625 sq. m

Site Description

Feature B of Site 388 consists of a generally low-density scatter of cultural materials, including fractured basalt, manufacturing debris flakes of fine-grained basalt and volcanic glass, marine shell, coral fragments, and a few small waterworn basalt cobbles. Scatter density is generally low, but there are a few places where materials are more concentrated. Cultural materials are visible in the hardpan areas between dispersed clumps of grass and lantana growing on shallow soils. The feature is situated adjacent to a large hummock to the south, from which part of this site may still be eroding (Figure B-132). Many of the features of Site 388 are associated with this hummock.

Figure B-131. Site 388, Feature A, Plan Map

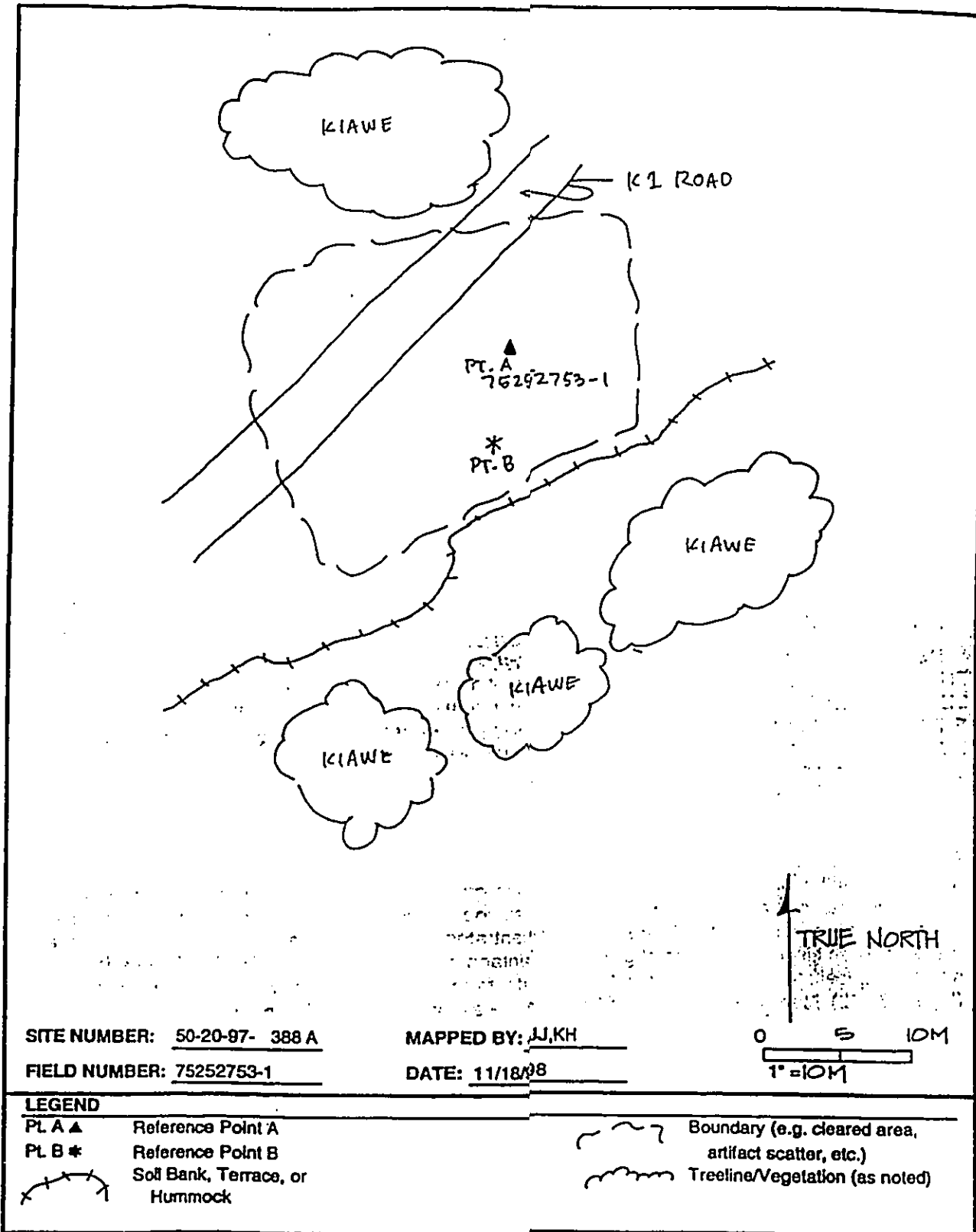
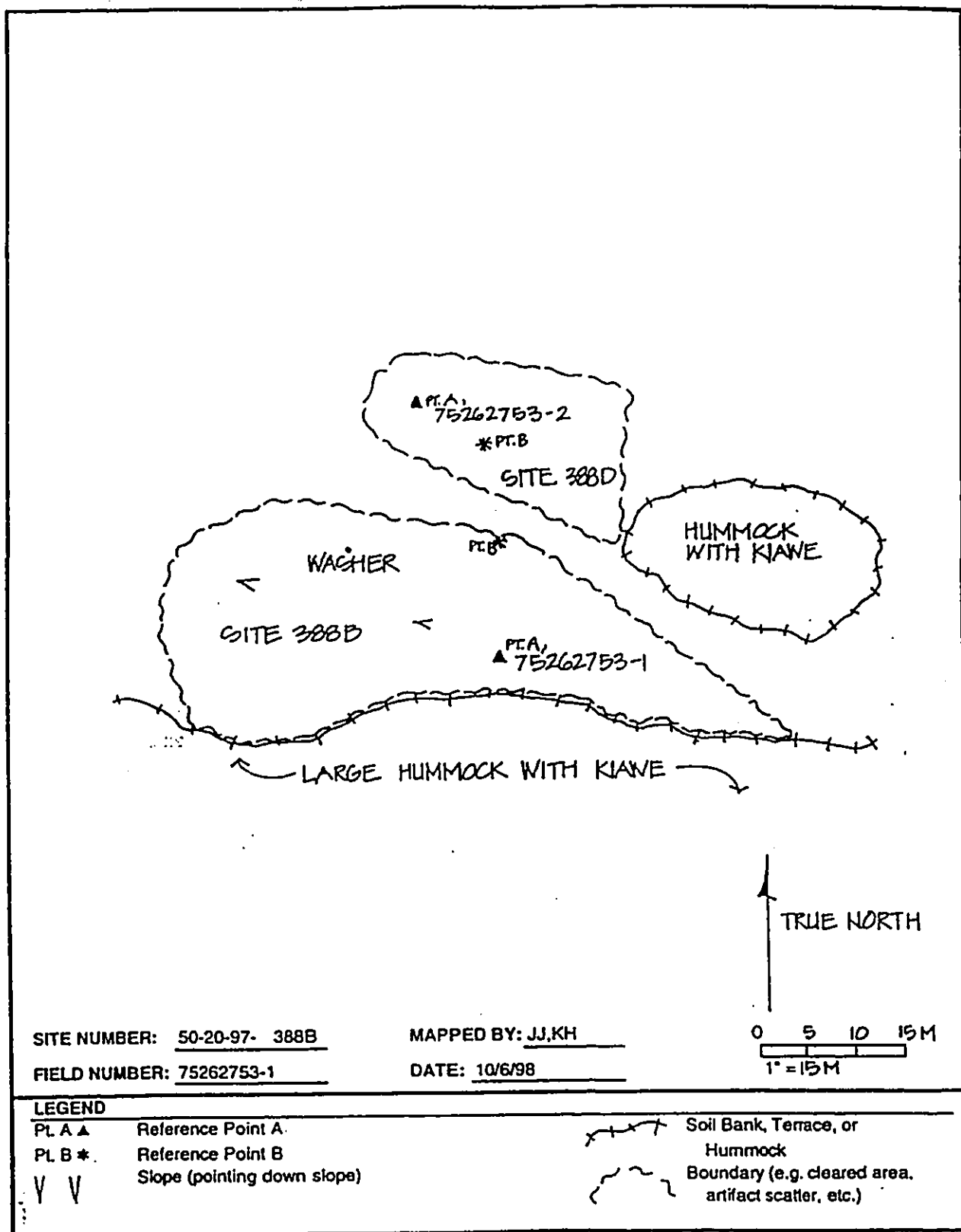


Figure B-132. Site 388, Feature B, Plan Map



SITE NUMBER (SIHP): 50-20-97-388
FEATURE: C
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75262753-3
GMU: 75262753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 20 m (L) x 17 m (W)
SITE AREA: Approx. 340 sq. m

Site Description

This feature of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP description. There are concentrations of volcanic glass flakes and expended cores that are in high-density concentrations. The ground surface is primarily hardpan, with approximately 20 to 25% covered with grass and *koa haole* growing on shallow soils. The feature is situated adjacent to and on the south side of K-1 Road, and it is also about 25 m north of the long hummock that is associated with many of the features of Site 388 (Figure B-133). There is a shallow erosional channel that bisects the site in a northwest-southeast direction.

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: D
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75262753-2
GMU: 75262753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 30 m (L) x 15 m (W)
SITE AREA: Approx. 450 sq. m

Site Description

Feature D of Site 388 consists of a mostly low-density scatter of cultural materials listed in the NRHP description, with the addition of manufacturing flakes of fine-grained basalt, one basalt biface (recorded), coral fragments, and a few small waterworn cobbles. The density of the cultural material scatter is mostly low, but there are a few areas where materials are more concentrated. This is most evident in the area around Reference Point A, where there is a high-density concentration of volcanic glass flakes and core fragments (Figure B-134). The site is situated adjacent to and north of Site 388-B. Cultural materials are visible in the hardpan areas between dispersed clumps of grass, *koa haole*, and lantana growing on shallow soils.

Figure B-133. Site 388, Feature C, Plan Map

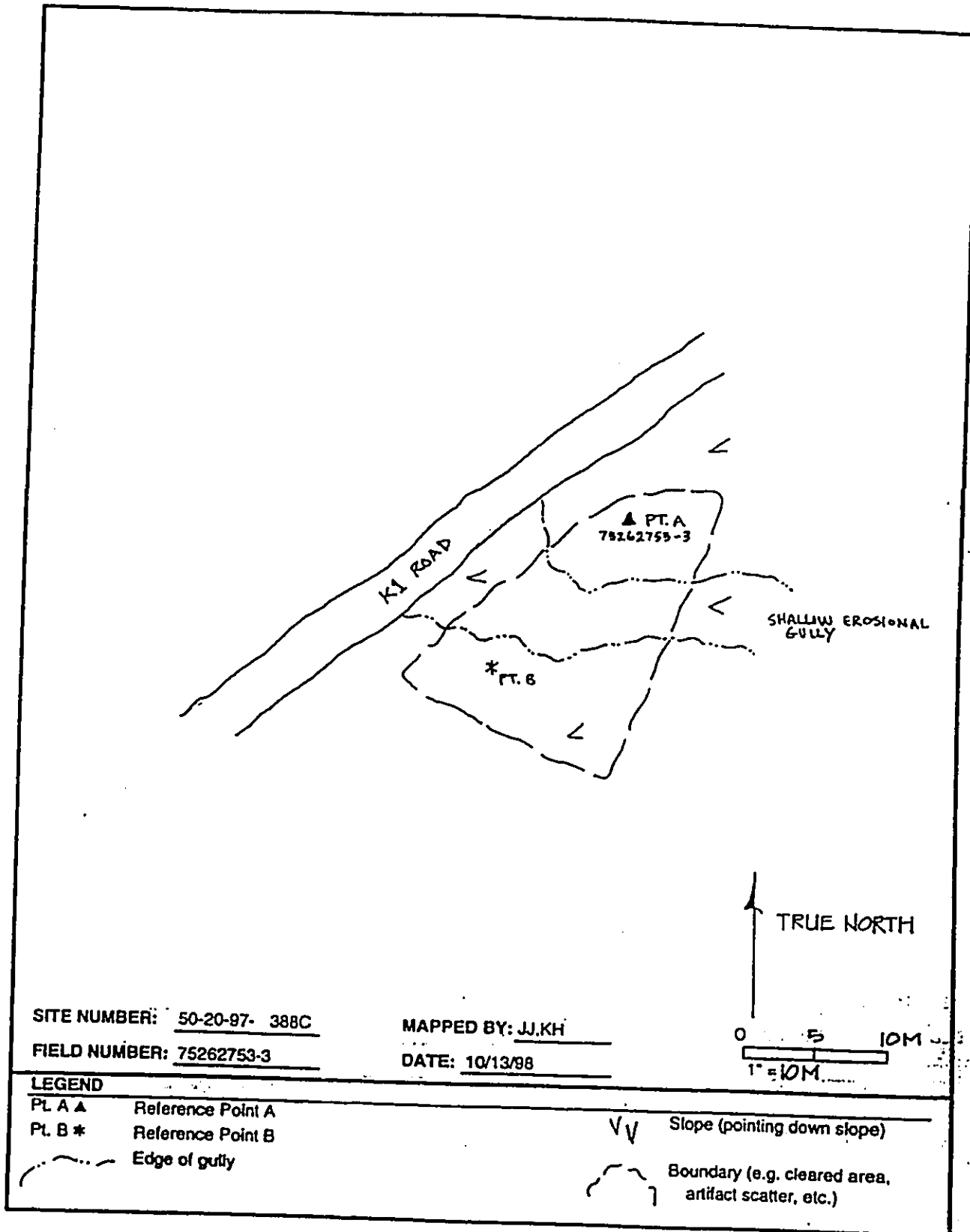
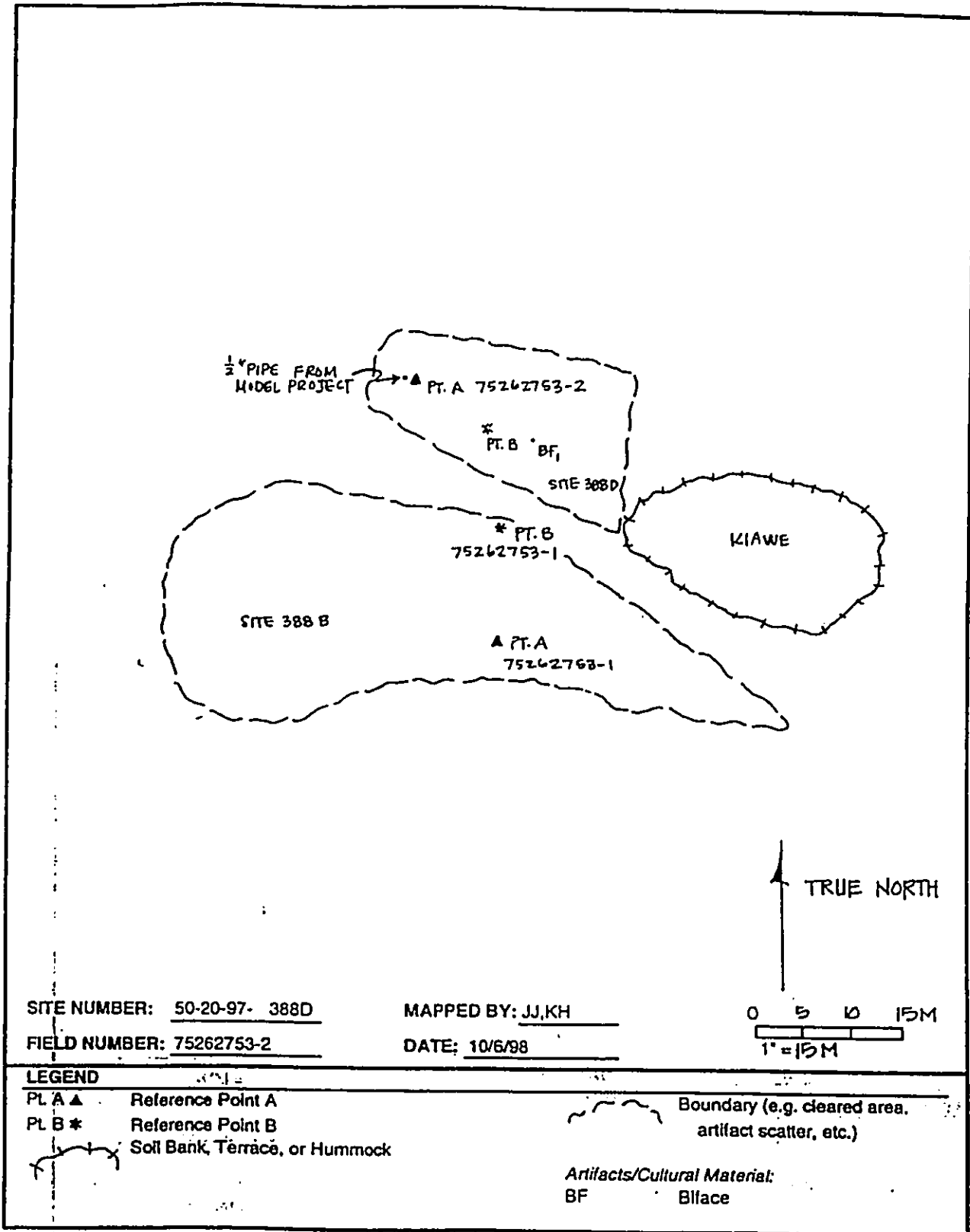


Figure B-134. Site 388, Feature D, Plan Map



SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75272753-1
FEATURE: E **GMU:** 75272753
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** > 100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Medium
SITE TYPE: Scatter **SITE DIMENSIONS:** 56 m (L) x 45 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 2520 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes

Site Description

This feature of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP description, with the addition of a few small waterworn cobbles, one piece of green bottle glass, and recorded artifacts, consisting of a basalt biface and an adz preform/reject. The site is situated adjacent to (north of) the large hummock with which many of the features of Site 388 are associated (Figure B-135). Near the hummock, volcanic glass flakes, chips, and core fragments, along with basalt flakes and fractured basalt are highly concentrated. In other areas of the feature, the density of the cultural material scatter is low. Cultural materials are visible on denuded hardpan, which comprises approximately 60 to 70% of the feature surface area; the remainder is composed of remnant patches of soil covered by grass, lantana, and *koa haole*. There are also four wild tobacco plants in the site vicinity.

SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75272752-1
FEATURE: F **GMU:** 75272752
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** 11-100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Low
SITE TYPE: Scatter **SITE DIMENSIONS:** 20 m (L) x 11 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 220 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

Feature F of Site 388 consists of a small, low- to medium-density scatter of cultural materials listed in the NRHP description, with the addition of one small adz preform/reject that was recorded. The site is situated immediately north of the large hummock with which many of the features of Site 388 are associated (Figure B-136). Cultural materials are visible on eroded hardpan that comprises most of the feature surface area. There are, however, a few small patches of vegetated remnant soils within the feature boundary.

Figure B-135. Site 388, Feature E, Plan Map

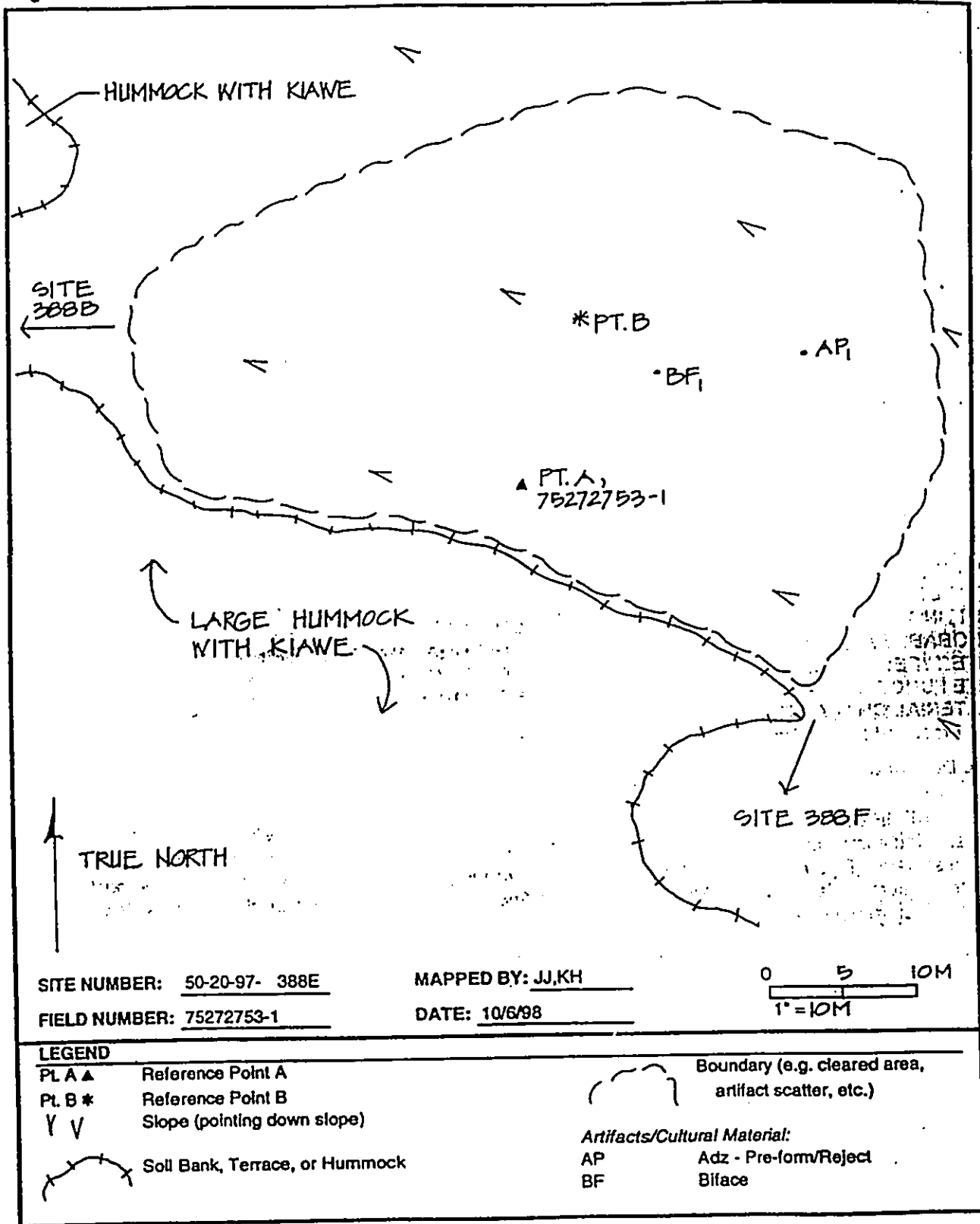
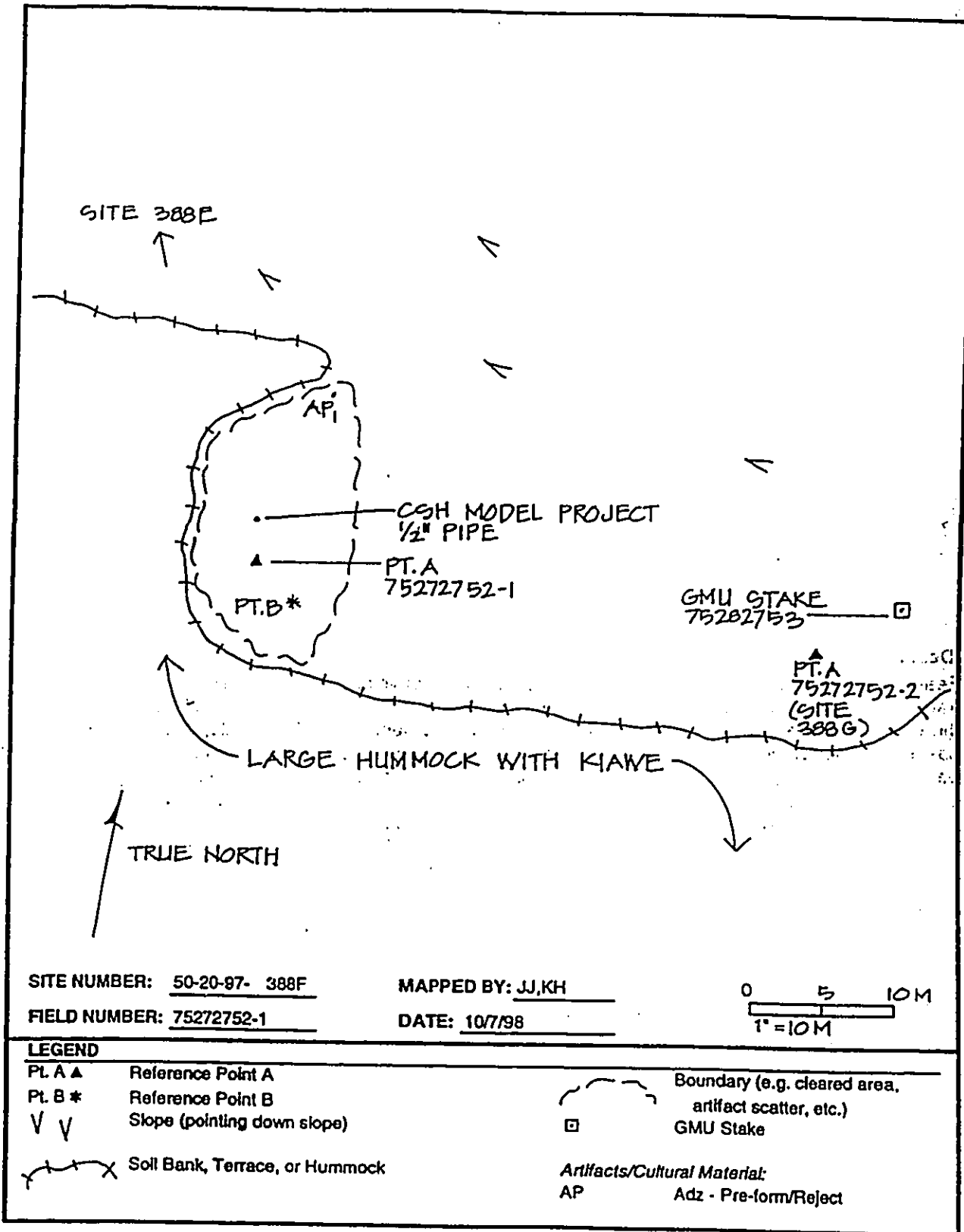


Figure B-136. Site 388, Feature F, Plan Map



SITE NUMBER: 50-20-97- 388F

MAPPED BY: JJ,KH

FIELD NUMBER: 75272752-1

DATE: 10/7/98

0 5 10 M
1" = 10 M

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: G
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden

FIELD NO.: 75272752-2
GMU: 75272752
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Medium
SITE DIMENSIONS: 45 m (L) x 38 m (W)
SITE AREA: Approx. 1710 sq. m

Site Description

This feature of Site 388 consists of a relatively small scatter of cultural materials listed in the NRHP description, with the addition of a small quantity of coral fragments. Scatter density ranges from low to high, but is, on average, medium. The site is situated immediately northwest of a large hummock with which many of the features of Site 388 are associated (Figure B-137). The cultural materials are visible on the eroded hardpan surface of which the majority of the feature surface area is composed. There are very few patches of remnant soil with grass in the feature.

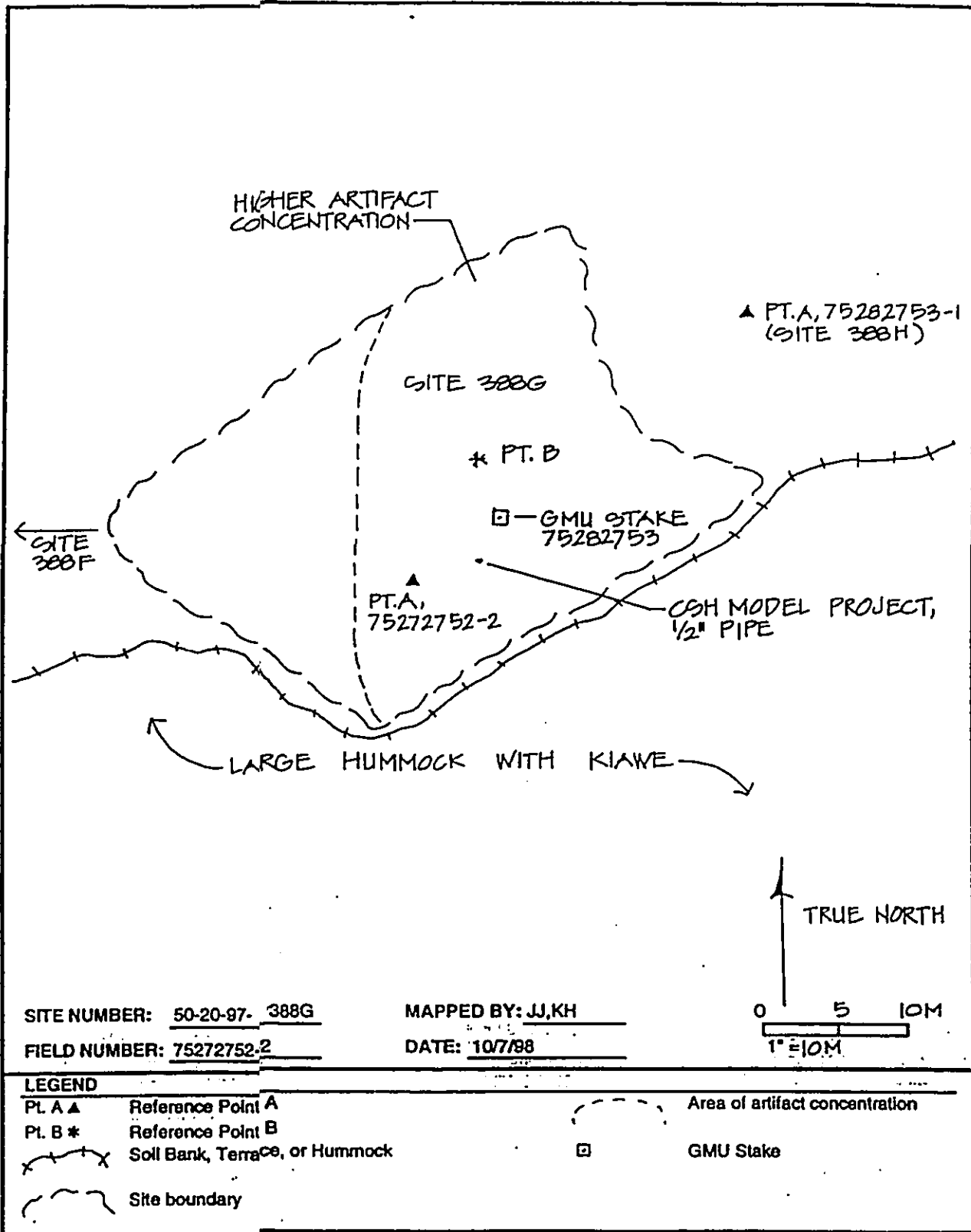
SITE NUMBER (SIHP): 50-20-97-388
FEATURE: H
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden

FIELD NO.: 75282753-1
GMU: 75282753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Medium
SITE DIMENSIONS: 22 m (L) x 17 m (W)
SITE AREA: Approx. 374 sq. m

Site Description

Feature H of Site 388 consists primarily of a dense scatter of volcanic glass flakes, chips, and core fragments, as described on the NRHP Nomination form. In addition to the volcanic glass materials, there are a few fine-grained basalt flakes, marine shell fragments, coral fragments, and fractured basalt. The size of the volcanic glass scatter is about the same as originally recorded, but the feature boundaries were expanded to include the cultural materials surrounding it. The feature surface consists primarily of eroded hardpan, with patches of remnant soils vegetated with grass, saltbush, wild tobacco, *koa haole*, and lantana. The concentration of volcanic glass is located north of a moderately-sized remnant soil patch or low hummock (Figure B-138).

Figure B-137. Site 388, Feature G, Plan Map



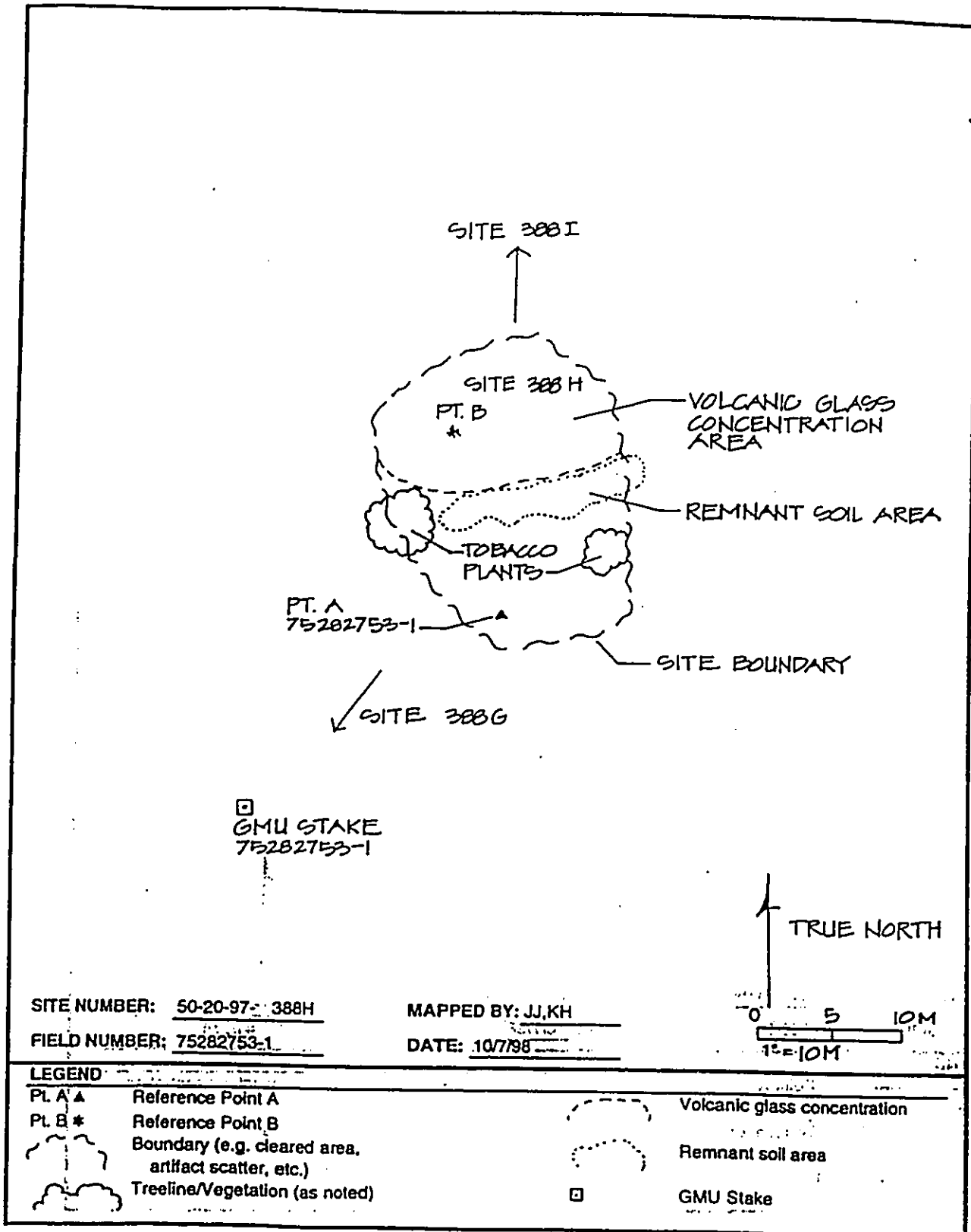
SITE NUMBER: 50-20-97-388G

MAPPED BY: JJ,KH

FIELD NUMBER: 75272752-2

DATE: 10/7/98

Figure B-138. Site 388, Feature H, Plan Map



SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75282753-2
FEATURE: I **GMU:** 75282753
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** > 100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Medium
SITE TYPE: Scatter **SITE DIMENSIONS:** 50 m (L) x 31 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 1550 sq. m

MATERIAL CHARACTERISTICS:

Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP Nomination form description, with the addition of the recorded artifacts and a few small waterworn cobbles. Artifacts recorded include two adz preform/rejects, three hammerstones, and one biface. Cultural materials are visible on the eroded hardpan surface that comprises most of the feature surface area. There are a few patches of remnant soil with grass and lantana within the feature boundaries (Figure B-139). The ground slopes gently to the west, and there are a few shallow erosion channels. For the size of this site, and compared to other 388 sites to the south and west, this site has a moderately high quantity of hammerstones and broken and/or unfinished lithic tools.

SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75282752-1
FEATURE: J **GMU:** 75282752
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** > 100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Low
SITE TYPE: Scatter **SITE DIMENSIONS:** 65 m (L) x 32 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 2080 sq. m

MATERIAL CHARACTERISTICS:

Fractured Basalt, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

Feature J of Site 388 consists of a low-density scatter of mostly fractured basalt, a few basalt flakes, marine shell fragments, and coral fragments. Cultural materials are sparse and are visible on the eroded hardpan areas of the feature. Approximately 40% of the feature area consists of four small hummocks, while the southern boundary of the site is up against the large hummock associated with many other features of Site 388 (Figure B-140). The north boundary is abutted to a fenced area of planted eucalyptus and agave. The boundaries of the feature have been extended beyond the original NRHP definition to include the low-density scatter of cultural materials around the central portion of the feature.

Figure B-139. Site 388, Feature I, Plan Map

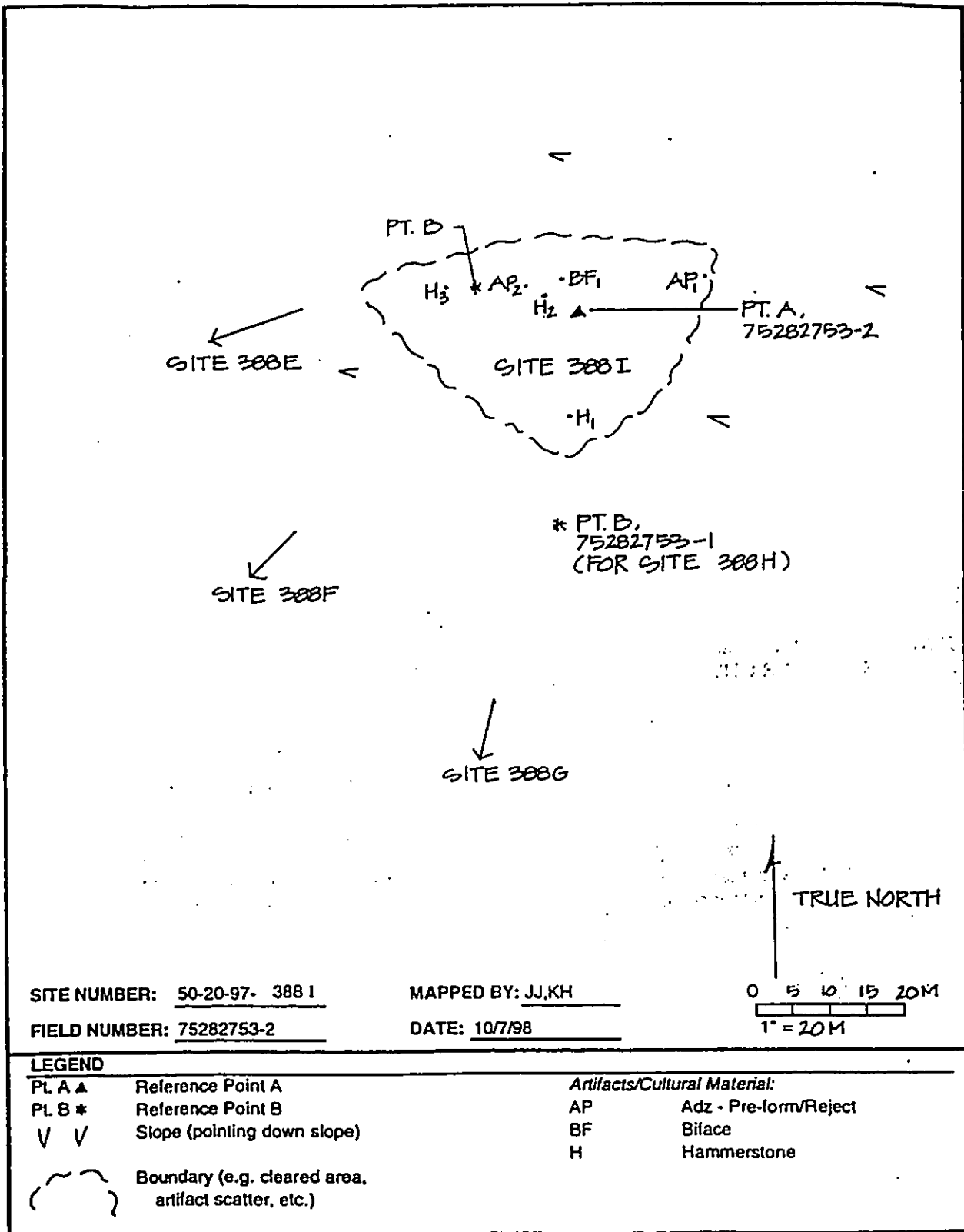
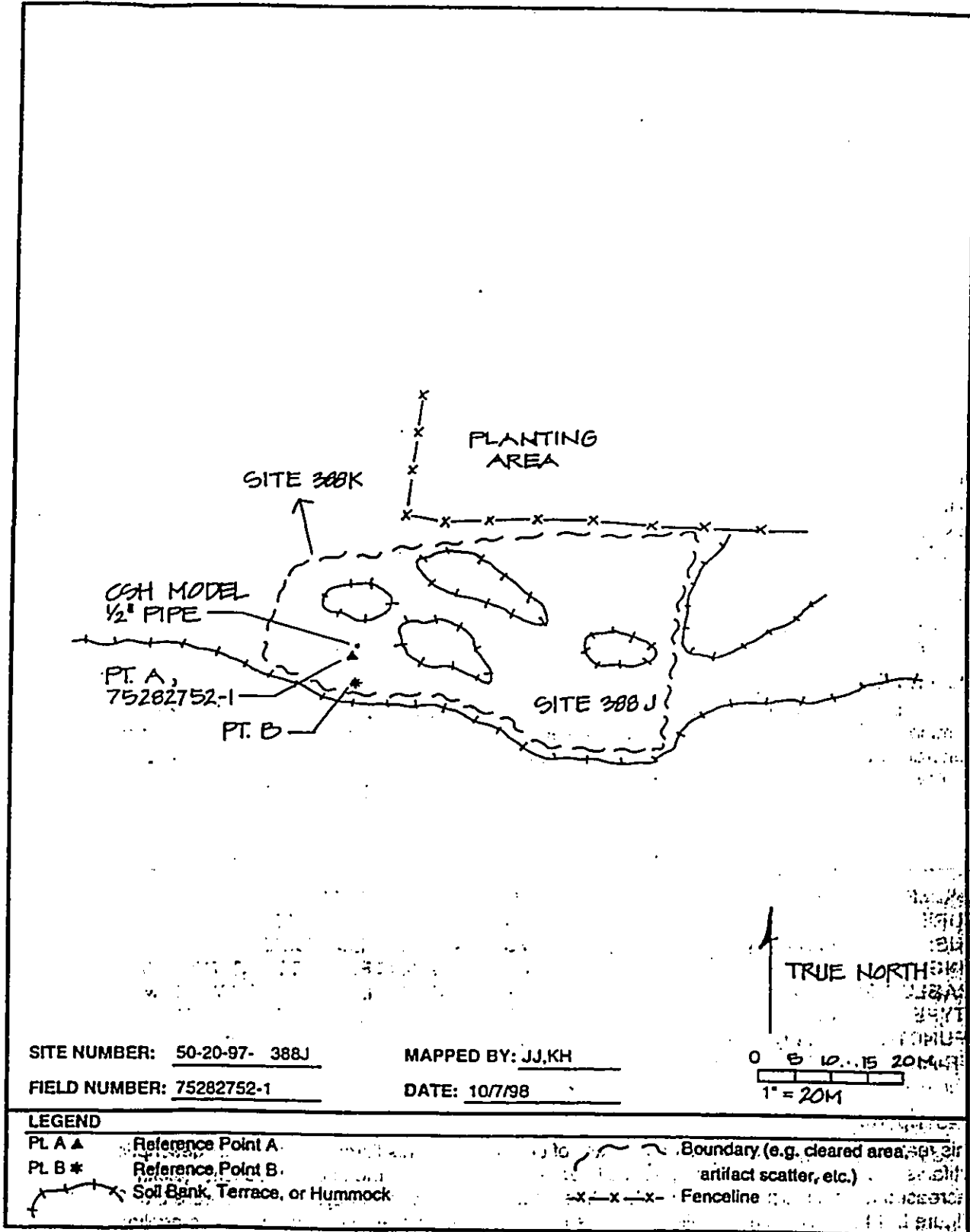


Figure B-140. Site 388, Feature J, Plan Map



SITE NUMBER (SIHP): 50-20-97-388
FEATURE: K
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75282753-3
GMU: 75282753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 32 m (L) x 29 m (W)
SITE AREA: Approx. 928 sq. m

Site Description

This feature of Site 388 consists of a medium- to high-density scatter of cultural materials listed in the NRHP description, except the two hammerstones were not relocated. However, several additional artifacts were recorded, including three adz preforms, one possible chisel fragment, and one fragment of a coral abrader (Figure B-141). Fractured basalt and manufacturing debris flakes of basalt and volcanic glass are relatively highly concentrated at this feature. The ground surface of the feature is approximately 70 to 75% eroded hardpan (where cultural materials are visible), with the remainder consisting of remnant soil patches vegetated with grass, vines, and lantana.

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: L
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75292753-1
GMU: 75292753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 32 m (L) x 30 m (W)
SITE AREA: Approx. 960 sq. m

Site Description

Feature L of Site 388 consists of a scatter of cultural materials previously listed in the NRHP Nomination form description. The cultural material scatter is generally a low-density concentration. Cultural materials are visible on the eroded hardpan and non-vegetated surfaces, among patches of shallow soils, with grass, lantana, and *koa haole*. This site is situated immediately adjacent (north) of the large hummock that is associated with many features of Site 388 (Figure B-142).

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: M
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Flakes, Marine Midden

FIELD NO.: 75292753-2
GMU: 75292753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 32 m (L) x 25 m (W)
SITE AREA: Approx. 800 sq. m

Site Description

This feature of Site 388 consists of a scatter of cultural materials listed in the NRHP description. Artifacts are concentrated in a high-density area in the middle of the site, but density quickly decreases toward the perimeter. Feature M is situated north of and adjacent to Feature L of Site 388 (Figure B-142). Cultural materials are visible on the non-vegetated hardpan and loose aeolian-deposited soil areas of the site. There are patches of shallow soils or low hummocks that are covered

with grass, lantana, and *koa haole*.

Figure B-141. Site 388, Feature K, Plan Map

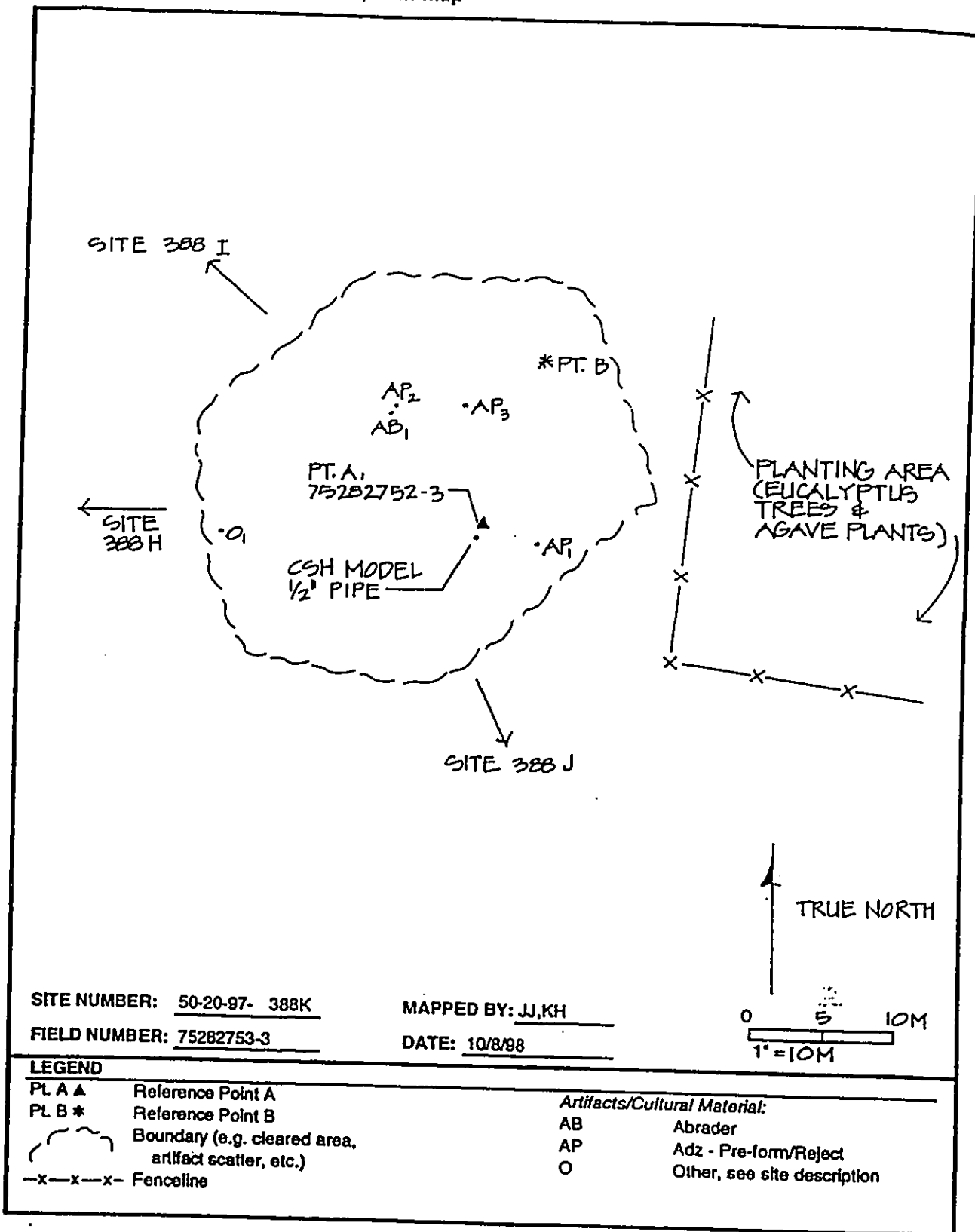
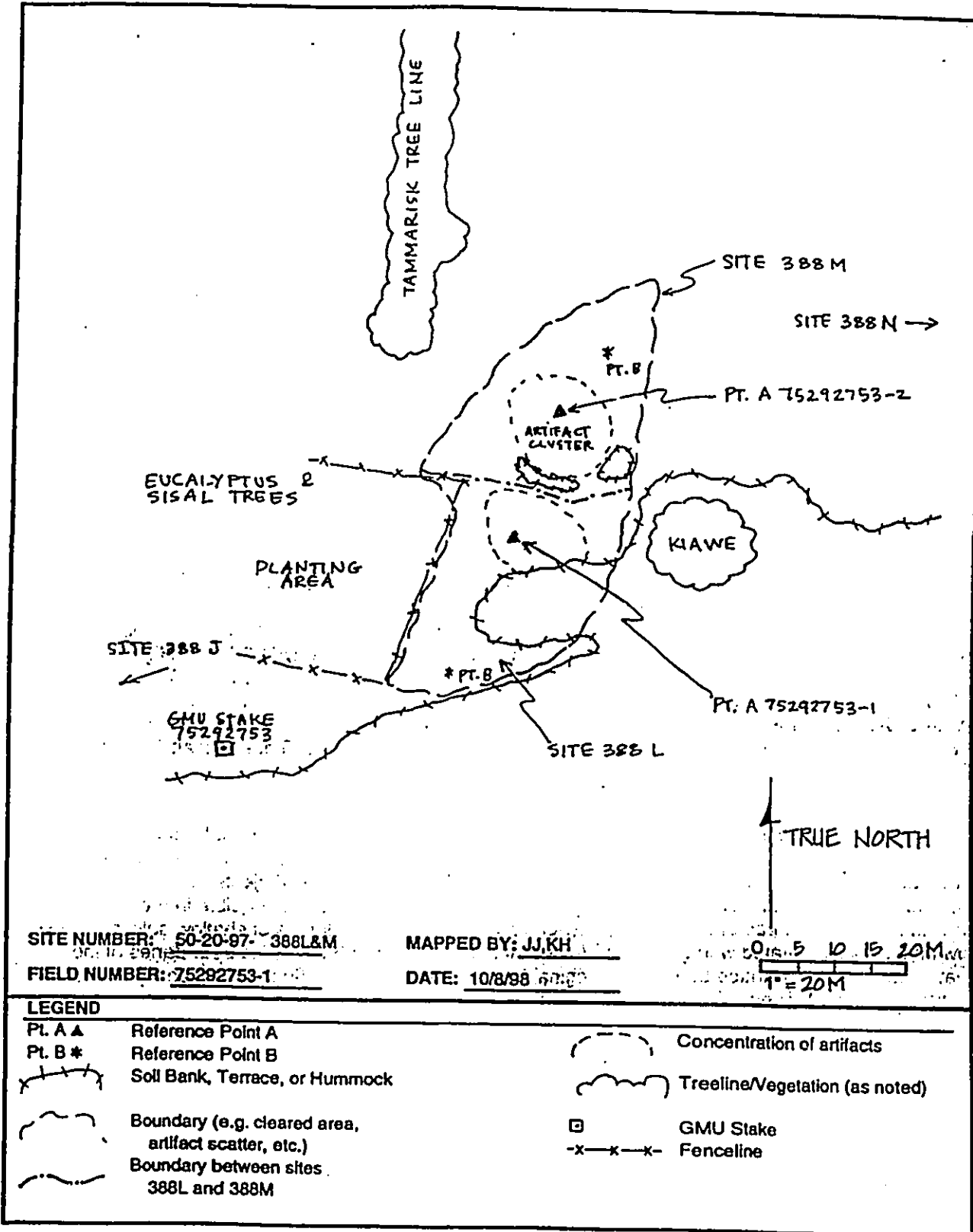


Figure B-142. Site 388, Features L and M, Plan Map



LEGEND

Pt. A ▲	Reference Point A	(Dashed circle)	Concentration of artifacts
Pt. B *	Reference Point B	(Wavy line)	Treeline/Vegetation (as noted)
(Line with 'x' markers)	Soil Bank, Terrace, or Hummock	(Square)	GMU Stake
(Dashed line)	Boundary (e.g. cleared area, artifact scatter, etc.)	(Line with 'x' markers)	Fence line
(Dotted line)	Boundary between sites 388L and 388M		

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: N
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75302753-1
GMU: 75302753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 62 m (L) x 42 m (W)
SITE AREA: Approx. 2604 sq. m

Site Description

Feature N of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP Nomination form description, with the addition of recorded artifacts, including two basalt awls and one more adz preform/reject fragment (two were recorded). Also, there is a greater quantity of coral fragments (mostly branch) than is implied by the NRHP description. The feature is situated to the north of (immediately adjacent to) the large hummock that is associated with many other features of Site 388 (Figure B-143). Feature N is situated at the eastern end of the hummock, where it terminates at the top of the western rim of Moa'ulanui crater. Cultural materials are visible in the hardpan and non-vegetated areas of the feature, between small patches of vegetated shallow soils. The boundaries of the feature have been extended beyond the original NRHP definition to include the low-density scatter of cultural materials around the central portion of the feature.

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: O
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Finished adz, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75282753-4
GMU: 75282753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 103 m (L) x 71 m (W)
SITE AREA: Approx. 7313 sq. m

Site Description

This feature of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP Nomination form description, with the addition of the recorded artifacts. Artifacts recorded at this feature include two basalt awls, a small complete adz, two adz preform/rejects, one basalt core, one hammerstone, and a coral abrader (Figure B-144). Cultural materials are visible in the hardpan and non-vegetated areas of the feature, between the grass-covered clumps of shallow soils and a few low hummocks vegetated with grass, *koa haole*, *Jantana*, and wild tobacco. The boundaries of the feature have been extended beyond the original NRHP definition to include the low-density scatter of cultural materials around the central portion of the feature.

Figure B-143. Site 388, Feature N, Plan Map

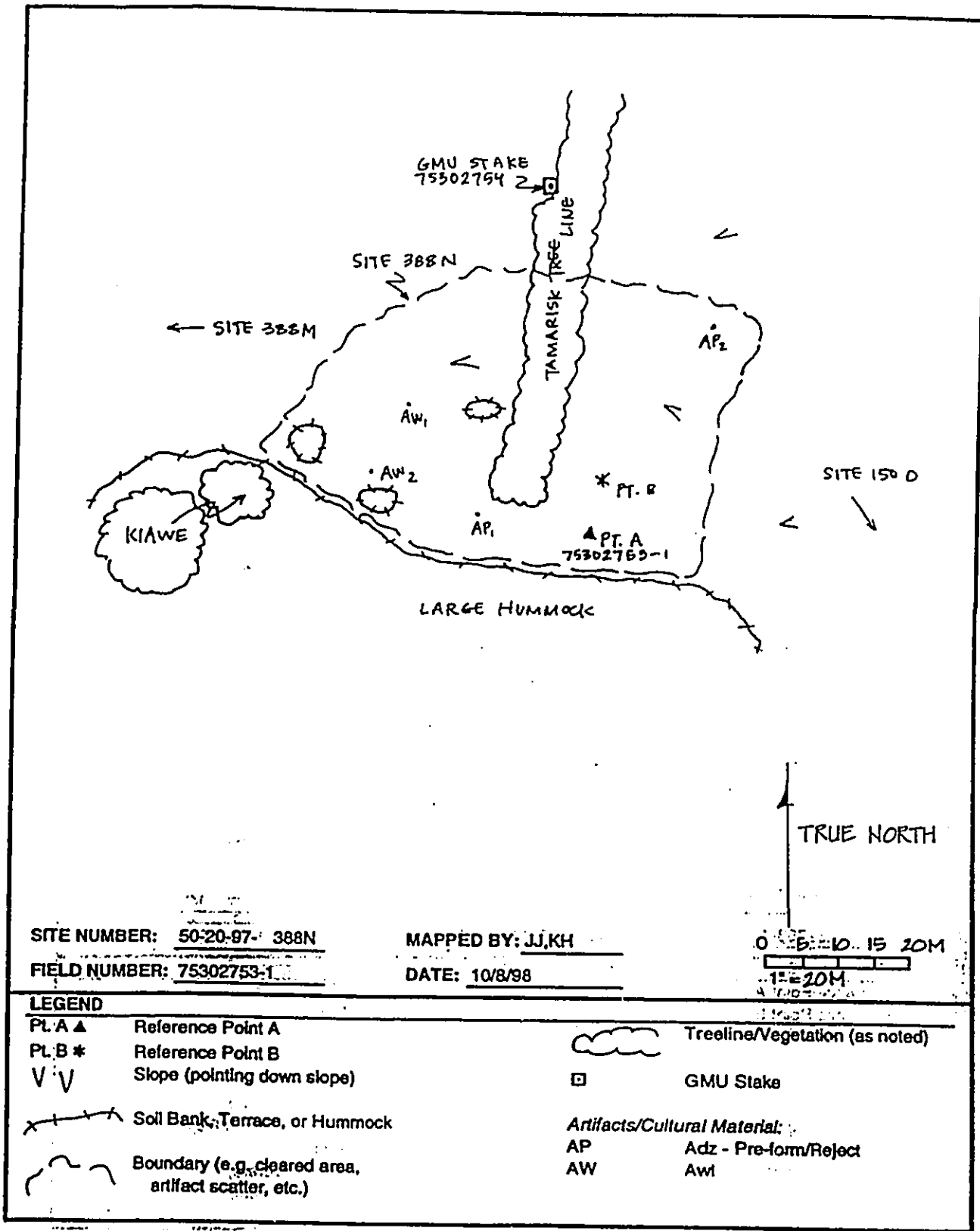
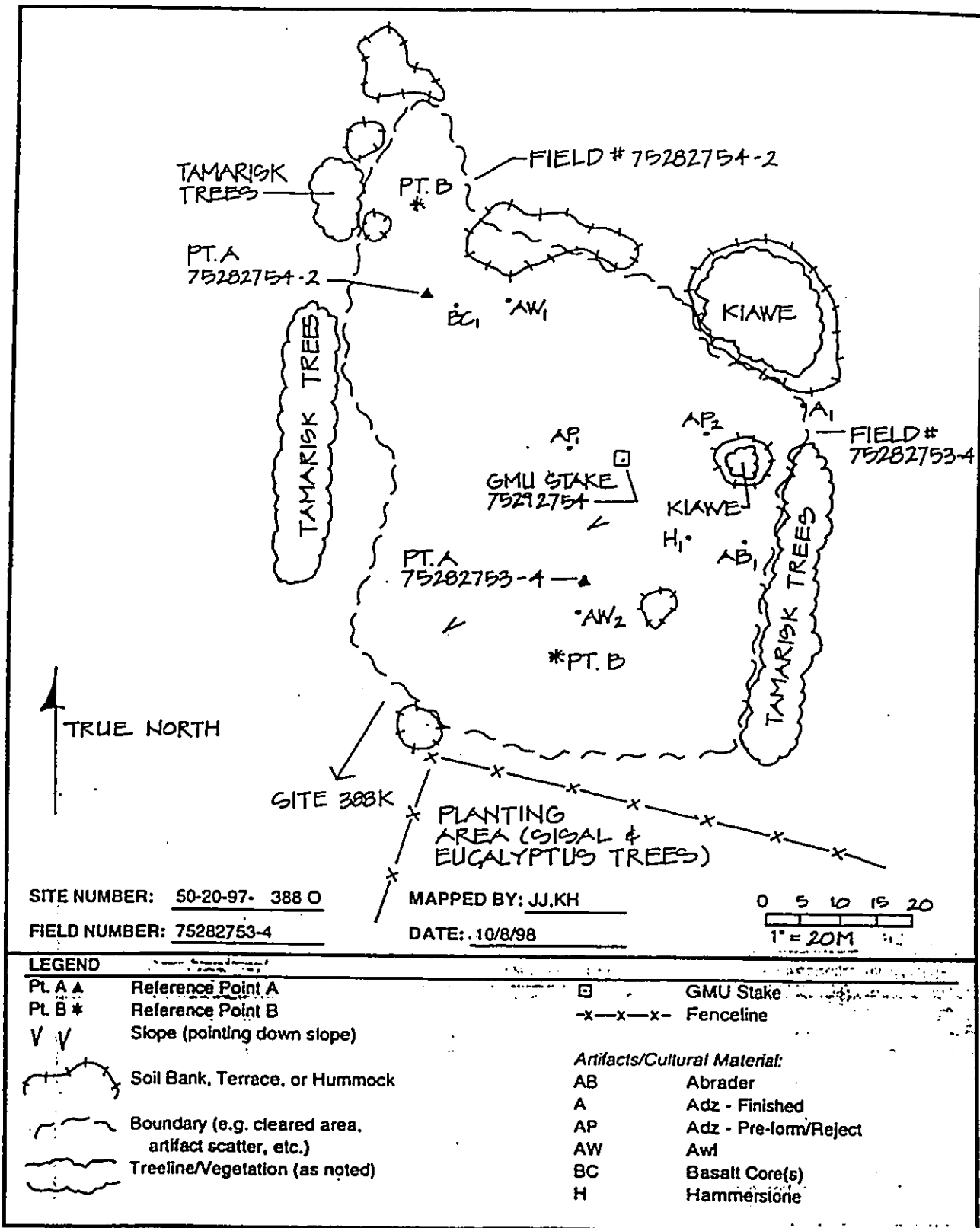


Figure B-144. Site 388, Feature O, Plan Map



SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75282754-1
FEATURE: P **GMU:** 75282754
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** 11-100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Low
SITE TYPE: Scatter **SITE DIMENSIONS:** 53 m (L) x 18 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 954 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

Feature P of Site 388 consists of a mostly low-density scatter of cultural materials listed in the NRHP Nomination form description, including the helmet (*Cassis spp.*) shell fragment that was specifically mentioned. Additional adz preform/rejects (a total of three), one basalt core, and one basalt biface were recorded (Figure B-145). The site is situated on a hardpan surface that is interspersed with small hummocks and shallow soils vegetated with grass, lantana, and *koa haole*. It is situated between two tamarisk tree-line windbreaks, and the ground slopes gently to the west. There is a shallow erosive channel where much of the cultural material can be found.

SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75272754-1
FEATURE: Q **GMU:** 75272754
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** 11-100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Low
SITE TYPE: Scatter **SITE DIMENSIONS:** 27 m (L) x 17 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 459 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Polished Flakes from Finished Adzes, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 388 consists of a low-density scatter of cultural materials, as described in the NRHP Nomination form description. No additional cultural materials were observed. The ground surface is primarily hardpan, though about 20% of the feature area is covered with grass growing on shallow soils (Figure B-146).

SITE NUMBER (SIHP): 50-20-97-388 **FIELD NO.:** 75292754-1
FEATURE: R **GMU:** 75292754
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Hardpan **CULTURAL MATERIAL QUANTITY:** 11-100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Low
SITE TYPE: Scatter **SITE DIMENSIONS:** 39 m (L) x 27 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 1053 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

Feature R of Site 388 consists of a low- to high-density scatter of cultural materials listed in the NRHP description. Cultural materials are visible on the hardpan surface surrounding a low hummock in the center of the site (Figure B-147). The density of the cultural material scatter is mostly low, but there are a few areas where materials are more concentrated. The ground surface of the feature consists of approximately 50% hardpan. Approximately 20% of the surface is covered by hummocks, and about 30% of the surface is covered by grass growing on shallow soil. The area is generally flat, though about 50 m north of the feature the ground begins to slope to the north.

Figure B-145. Site 388, Feature P, Plan Map

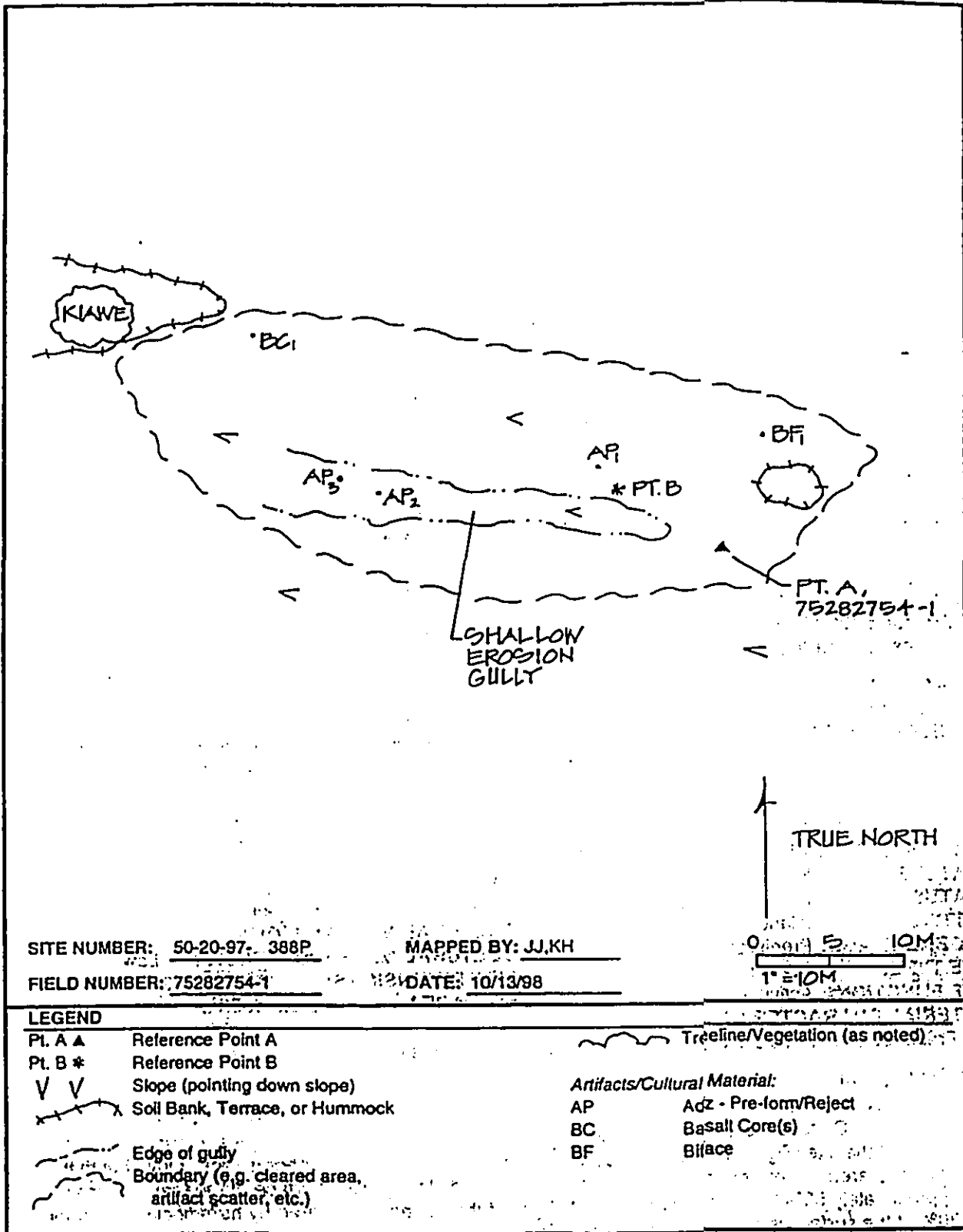


Figure B-146. Site 388, Feature Q, Plan Map

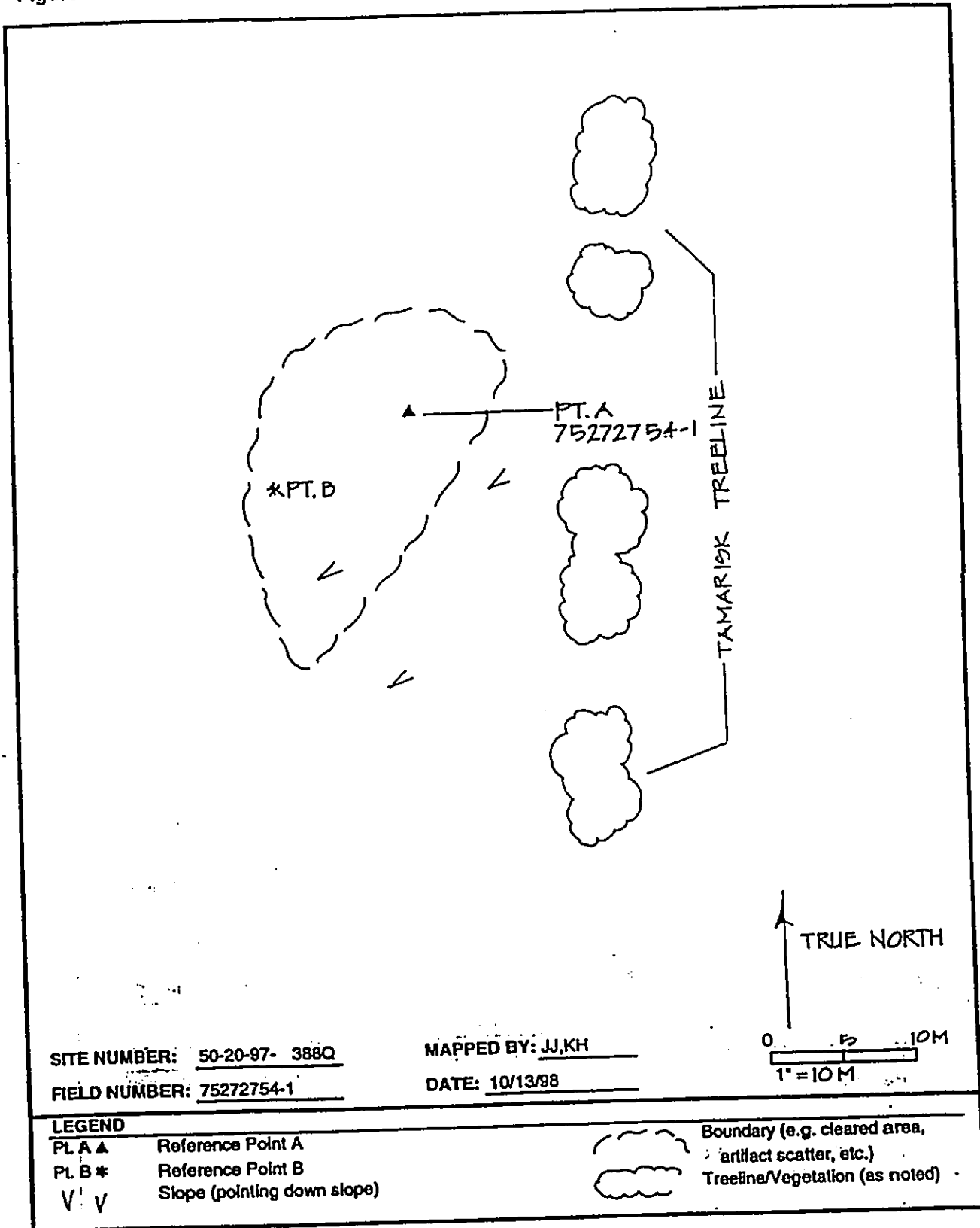
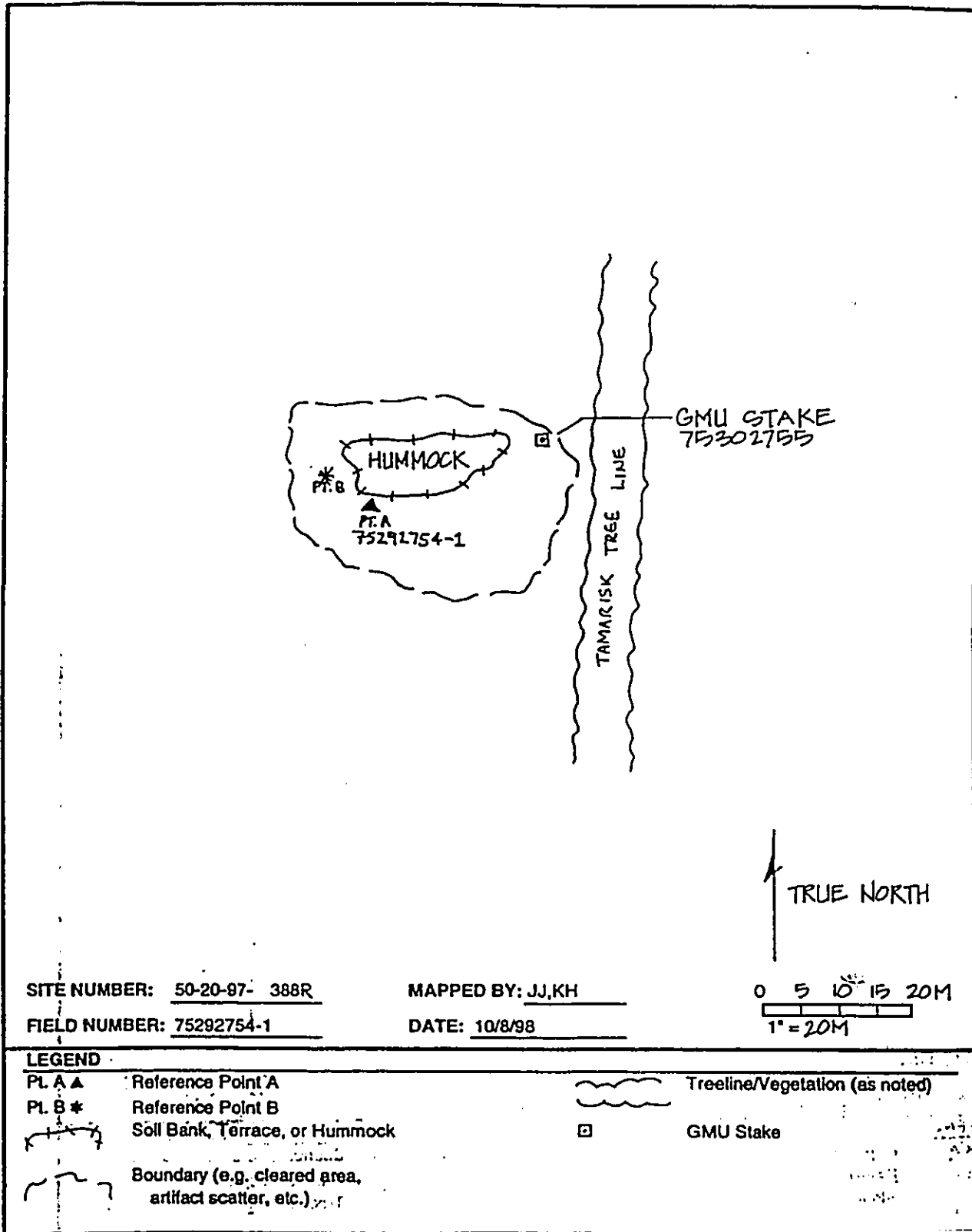


Figure B-147. Site 388, Feature R, Plan Map



SITE NUMBER (SIHP): 50-20-97-388
FEATURE: S
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75302755-1
GMU: 75302756
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 86 m (L) x 75 m (W)
SITE AREA: Approx. 6450 sq. m

Site Description

This feature of Site 388 is located downslope and northwest of Site 150-L. It is a sparse scatter of mostly fractured basalt, with some basalt flakes, a few marine shells, and shell fragments. Recorded artifacts include two adz preform/rejects, one hammerstone, and one biface (Figure B-148). This site is also near (southeast) to Site 388-T. Most of the feature as identified is on eroded hardpan, though there are some large hummocks that surround the site.

SITE NUMBER (SIHP): 50-20-97-388
FEATURE: T
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric, Historic
SITE TYPE: Scatter
SITE FUNCTION: Habitation, Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Finished Adz, Fireplace, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75292755-1
GMU: 75292755
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Medium
SITE DIMENSIONS: 105 m (L) x 93 m (W)
SITE AREA: Approx. 9765 sq. m

Site Description

Feature T of Site 388 consists of a low- to high-density scatter of cultural materials surrounding two hummocks, as described on the NRHP Nomination form. The site contains two hummocks from which three firepits are eroding out of the leeward sides (Figure B-149). Two of the firepits appear to be still in the intact soil, but the third appears to have mostly eroded. The other two have fire-cracked rock (basalt) and a charcoal-ash layer still intact, with a cascaded scatter of fire-cracked rock down the face of the hummock. There are two distinct clusters of volcanic glass flakes and debris. One is between the two hummocks, and the other is to the south of the westernmost hummock. The fragment of what was originally identified as "chalcedony" is very distinct and still present at this site. Two types of bottle glass are present: dark green and clear/translucent. Also, two types of porcelain fragments are present – both from plates or shallow bowls. Cultural materials near the lee side of the hummocks are very dense, and gradually thin out toward the perimeters of the site to low-density. Artifacts recorded at this feature include one adz, two adz preform/rejects, two hammerstones, one basalt core, five coral abraders, one basalt abrader, one biface, and one volcanic glass core.

Figure B-148. Site 388, Feature S, Plan Map

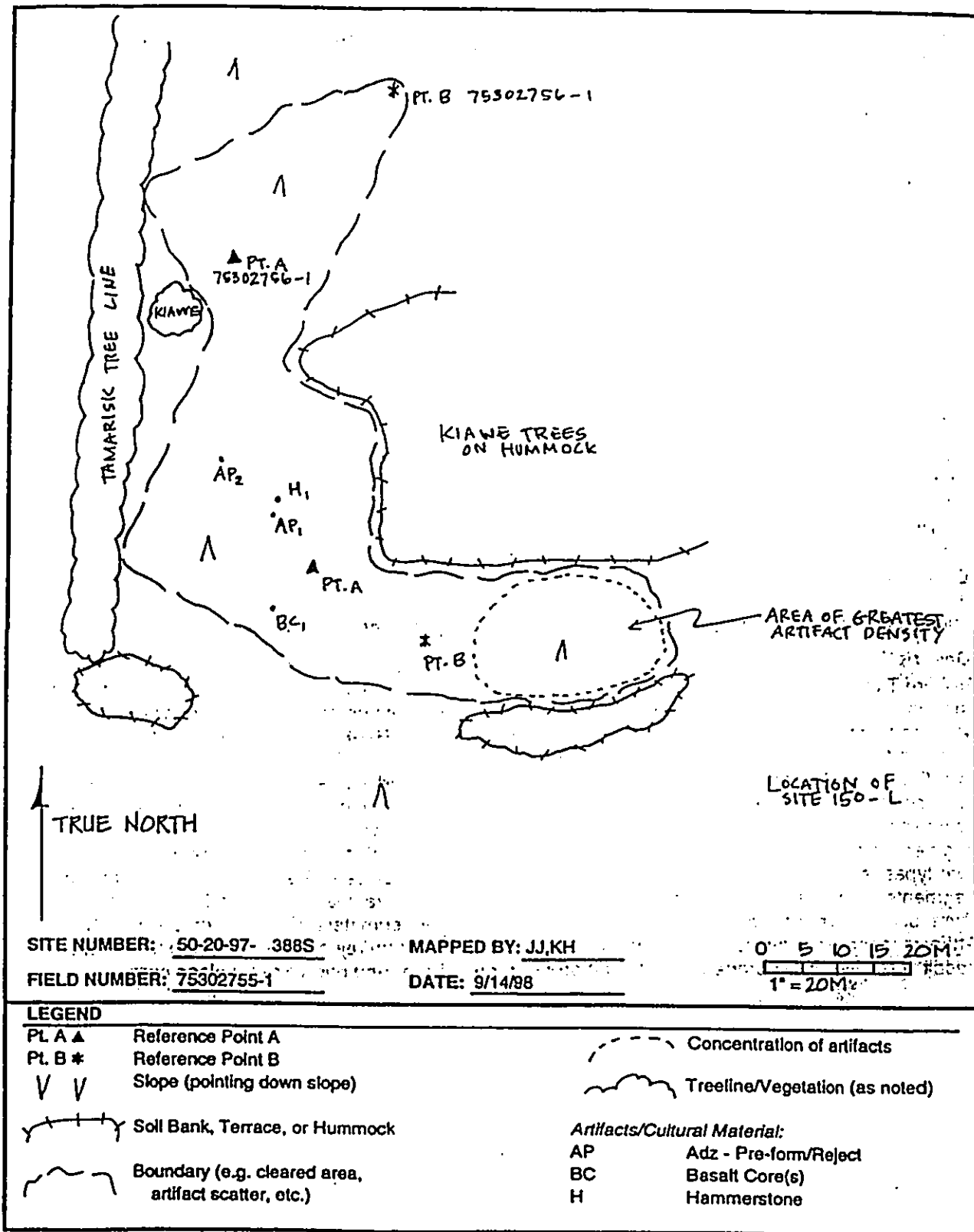
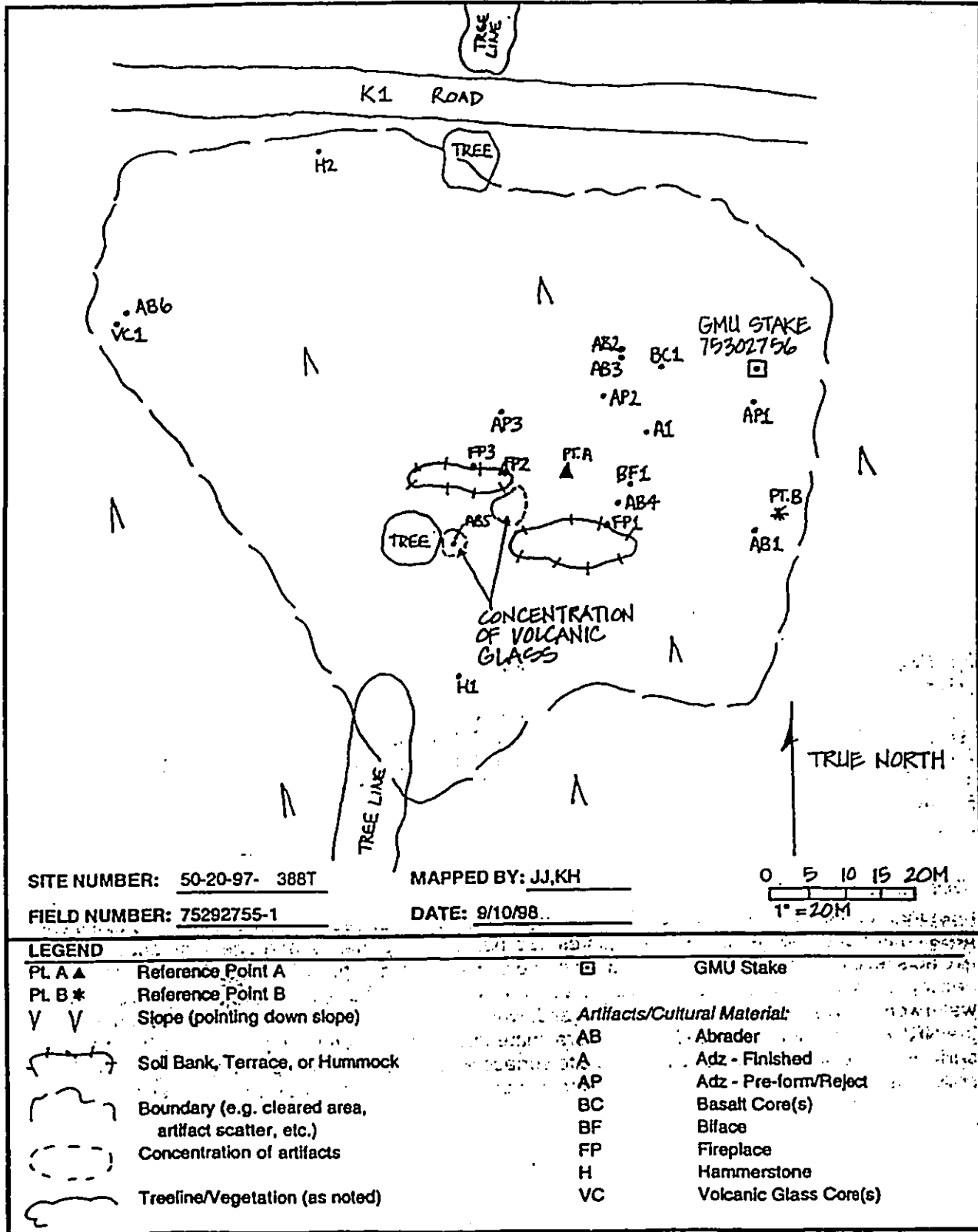


Figure B-149. Site 388, Feature T, Plan Map



SITE NUMBER: 50-20-97- 388T

MAPPED BY: JJ,KH

FIELD NUMBER: 75292755-1

DATE: 9/10/98

0 5 10 15 20M
 1" = 20M

SITE NUMBER (SIHP): 50-20-97-389
FEATURE: A
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75242749-1
GMU: 75242749
WORK AREA: K-1 Road
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 108 m (L) x 58 m (W)
SITE AREA: Approx. 6264 sq. m

Site Description

Site 389 is a complex of three activity area features located on the southwest slope of Moa'ulanui. The site is situated in a mostly denuded area, with sparse hummocks and vegetation. The site sits at an elevation of approximately 435 m and is within Hommon's Inland Settlement Zone (1980:48). All three features of the site were reidentified within the K-1 Road work area with the use of the photogrammetric maps provided by the Navy (Figure 3-7). The constituent features (A, B, and C) are discussed below.

Feature A Description

This feature of Site 389 consists of a high- to low-density scatter of cultural materials listed in the NRHP description, with the addition of the recorded unfinished and finished tools. Artifacts recorded include one adz preform/reject, one hammerstone, two basalt awls, one basalt core, and one coral abrader. The feature is located on the southwestern slope of Moa'ulanui in an area that is highly eroded. Within the feature there are two hummocks and patches of grass, lantana, and *koa haole* growing on shallow soils. Cultural materials are more concentrated in the western end of the feature, where most of the volcanic glass flakes are located. The rest of the site is a low- to very low-density scatter (Figure B-150).

SITE NUMBER (SIHP): 50-20-97-389
FEATURE: B
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes

FIELD NO.: 75242749-2
GMU: 75242749
WORK AREA: K-1 Road
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 21 m (L) x 20 m (W)
SITE AREA: Approx. 420 sq. m

Site Description

Feature B of Site 389 consists of a high- to low-density scatter of fractured basalt, volcanic glass and basalt manufacturing debris flakes and cores, two basalt tool fragments, and one fragment of coral. Artifacts recorded include one basalt awl and one sinker preform. The NRHP Nomination form description is generally accurate, though the mentioned marine shell was not located. A fragment of a waterworn cobble that has a groove on the end, which may be a fragment of a sinker mentioned in the NRHP description was found. The cultural materials are visible on the highly eroded hardpan surface. Approximately 5% to 10% of the site surface area is covered with grass growing on shallow soils. The feature is located next to a hummock, but the materials do not extend to the edge of it (Figure B-151).

SITE 150

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: A
STATUS: Previously Recorded
SETTING: Inland, Hardpan
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75312751-1
GMU: 75312751
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 120 m (L) x 95 m (W)
SITE AREA: Approx. 11400 sq. m

Site Description

Site 150 is comprised 21 features situated around the rim and within the crater of Moa'ulanui (Figure 3-7). The features are situated in mostly denuded areas interspersed with eroding hummocks and scattered patches of vegetated shallow soils. The features of the site sit at elevations between 420 and 450 m and are within Hommon's Inland Settlement Zone (1980:48). All 21 features of the site were reidentified within the Lua Makika work area with the use of the photogrammetric maps provided by the Navy. The constituent features (A through U) are discussed below.

Feature A Description

This feature of Site 150 consists of a large scatter of cultural materials listed in the NRHP form description. It is situated on the rim of the Moa'ulanui crater and extends down the inner slope of the crater (Figure B-36). The feature encompasses several small hummocks on the inner slope of the crater, with eroding shallow soil areas with grass on the crater rim. Overall cultural material is quite sparse in comparison to other features of Site 150 on the southern slope of Moa'ulanui, although there are some areas of high density. There are quite a few large boulders in the southeastern portion of the site, but they do not appear to be in any recognizable pattern. There is not much coral at this site, but there is some branch coral. Artifacts recorded at this feature include two adz preform/rejects, one hammerstone, one basalt core, and one biface.

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: B
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75332750-1
GMU: 75332750
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 144 m (L) x 78 m (W)
SITE AREA: Approx. 11232 sq. m

Site Description

This feature of Site 150 is situated on the inner slope of the southwestern portion of Moa'ulanui crater. The gentle slope of the site is mostly to the north-northeast. The feature encompasses several small hummocks, and some areas of shallow soil with grass. The cultural material at this feature is quite dense in places and decreases toward the perimeter. Some areas have very dense scatters of volcanic glass flakes. There are also a lot of flakes of high quality basalt, some of which are relatively flat thinning flakes (small and large). Artifacts recorded at this feature include three adz preform/rejects, two hammerstones, two coral abraders, one scoria abradar, one basalt awl, two bifaces, and one miscellaneous artifact (Figure B-37). There are also some small waterworn pebbles and small cobbles, but not many. Most coral appears to be brain-coral fragments, except for one big chunk of branch coral, with some fragments dispersed around it. One large basalt flake was observed eroding out of the edge of a low hummock.

Figure B-36. Site 150, Feature A, Plan Map

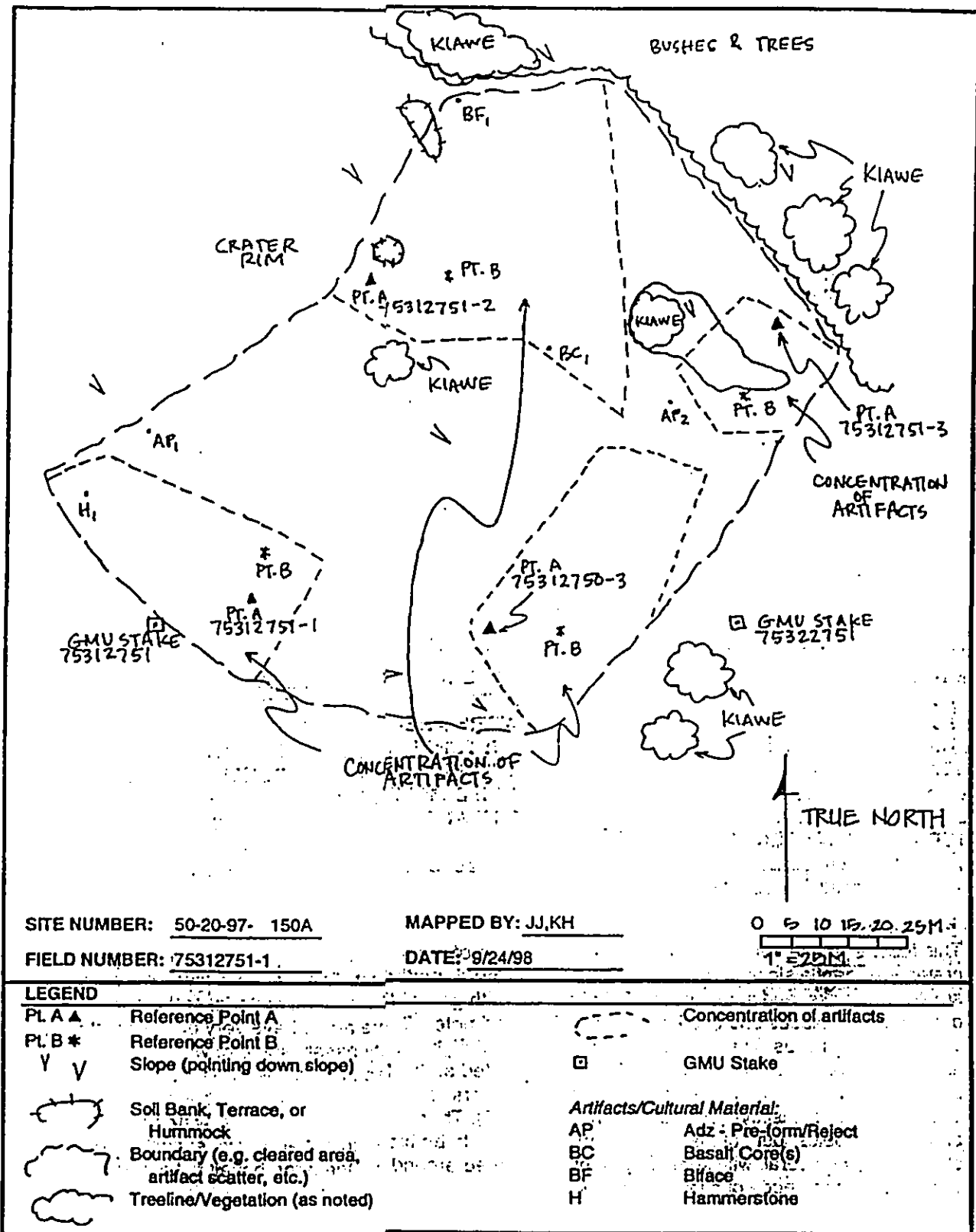
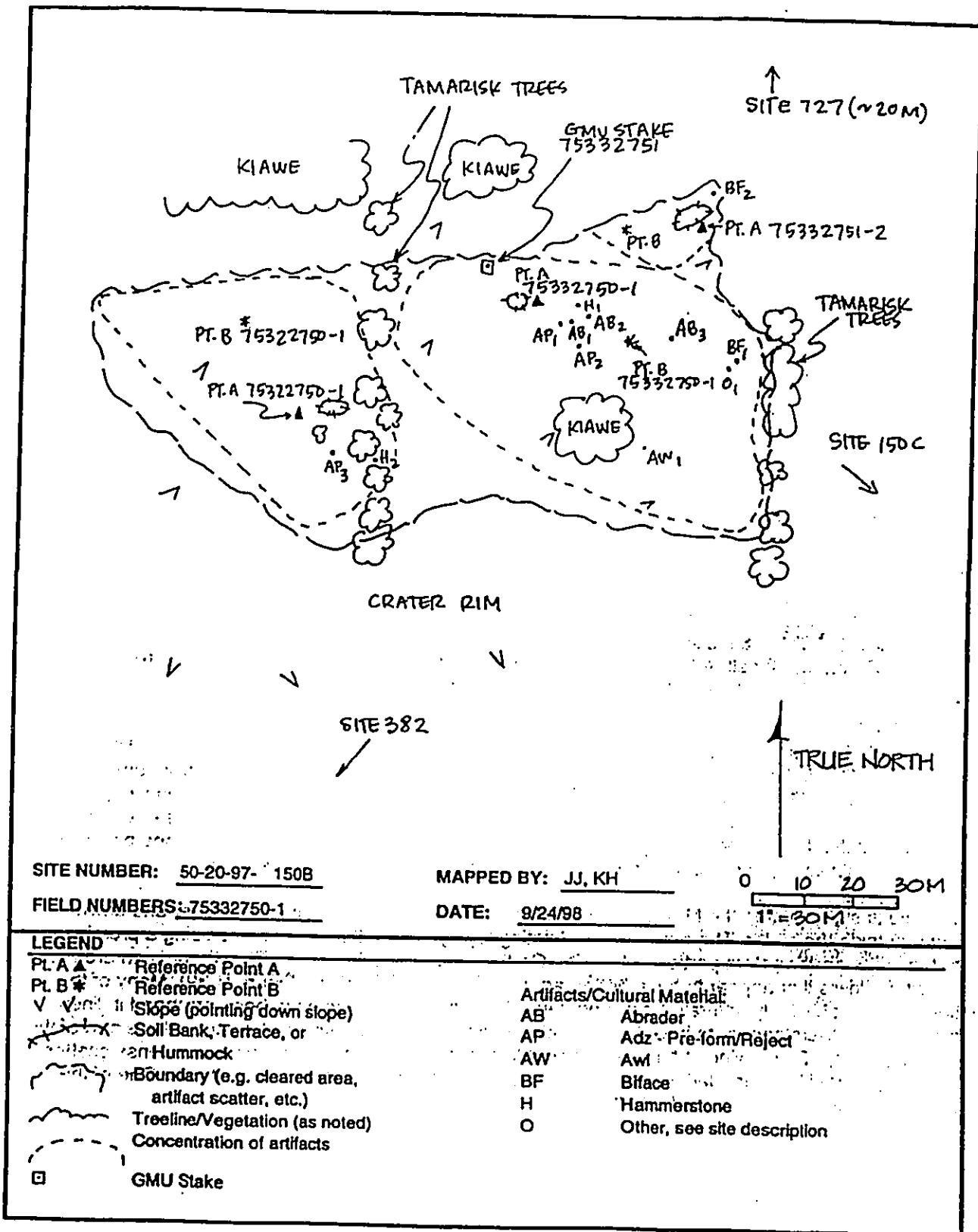


Figure B-37. Site 150, Feature B, Plan Map



SITE NUMBER (SIHP): 50-20-97-150
FEATURE: C
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75332750-2
GMU: 75332750
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 82 m (L) x 50 m (W)
SITE AREA: Approx. 4100 sq. m

Site Description

This feature of Site 150 is situated in a low area or swale of the Moa'ulanui crater rim. Site 150-D rises to the southeast and 150-B rises somewhat to the northwest. This feature slopes gently to the southeast. The feature consists of a scatter of basalt and volcanic glass flakes, fractured basalt, and marine shell midden. Some of the areas of the site have dense concentrations of basalt and volcanic glass flakes, while other areas have low-density cultural material concentration. There is very little coral at this site, in comparison to Feature D. There are a lot of volcanic glass flakes, expended cores, and shatter - similar to the western portion of Feature D of Site 150. Artifacts recorded at this feature include two adz preform/rejects, one basalt awl, and one utilized flake (Figure B-38).

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: D
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Complex
SITE FUNCTION: Habitation, Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden, *Cypraea* Shell Lure

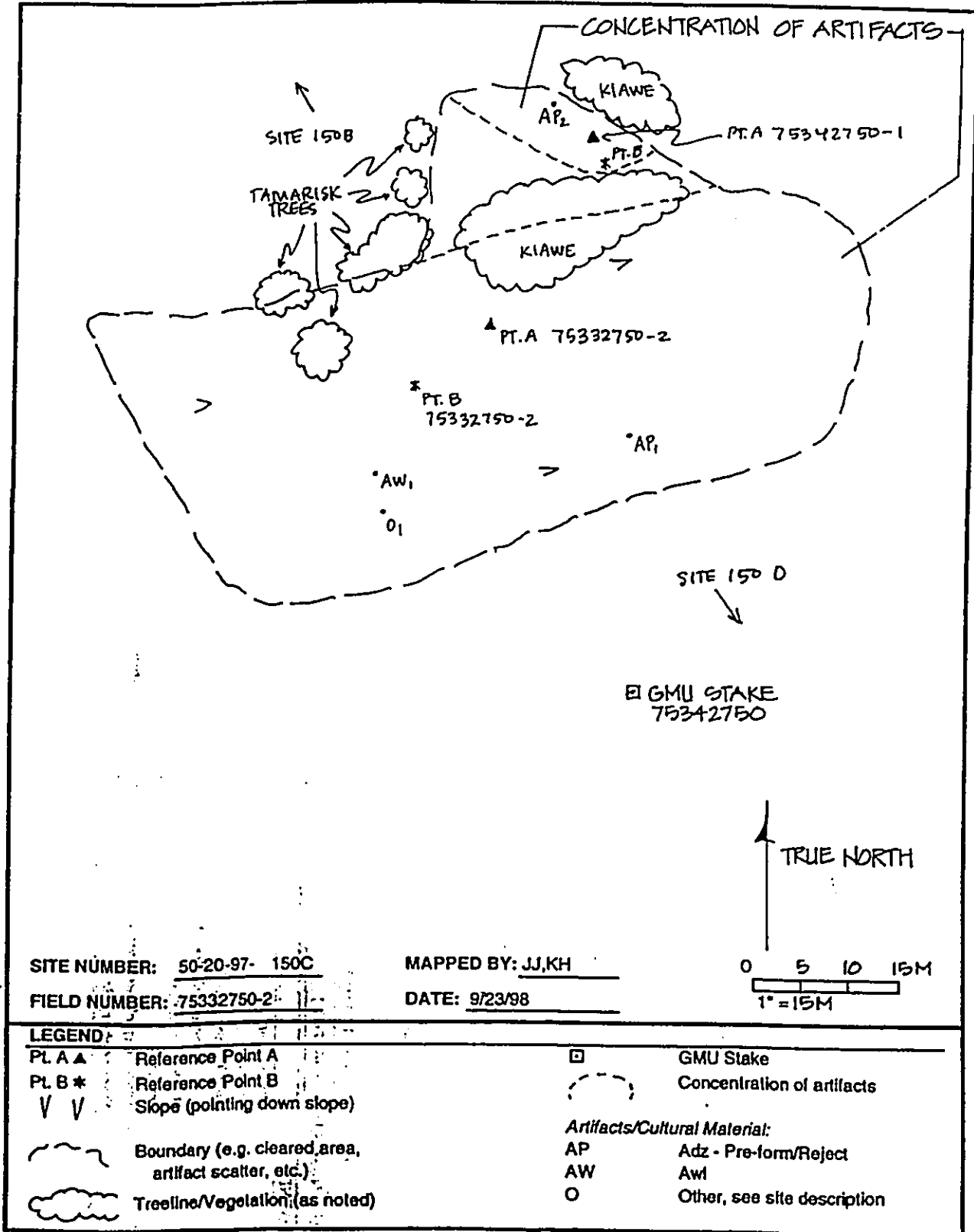
FIELD NO.: 75342749-1
GMU: 75342749
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 230 m (L) x 150 m (W)
SITE AREA: Approx. 34500 sq. m

Site Description

This very large feature of Site 150 consists of several areas of relatively dense scatters of lithic artifacts, shell midden, and features that look like deflated firepits. Feature D differs from other features of Site 150 in that it contains a scatter of *Nerita spp.* shell and an area with relatively abundant volcanic glass flakes, and small poor quality volcanic glass cores and nodules. Artifacts recorded at this feature include one adz, 13 adz preform/rejects, two hammerstones, one basalt core, three coral abraders, one scoria abrader, one basalt awl, and one cowry shell lure.

The site is situated atop the Moa'ulanui crater and extends down-slope into the crater and down-slope outside the crater. There is some undulating topography within the site, including a prominent hilltop in the northwestern portion of the site. On the windward side of this hilltop, there is an area of basalt boulders that appear to have been part of some sort of structure (Figure B-39). Many of the boulders are obviously naturally occurring there, but others appear to have been arranged in linear alignments, others appear to have been used to support or prop up some of those that are part of the natural outcrop. Down-wind of this area of boulders, there is an area where there are dense scatters of fractured basalt in very dark gray soil that may be the remains of the firepit features. One of these also has a concentration of *opihi* shells.

Figure B-38. Site 150, Feature C, Plan Map



SITE NUMBER (SIHP): 50-20-97-150 **FIELD NO.:** 75382751-1
FEATURE: E **GMU:** 75382751
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Crater **CULTURAL MATERIAL QUANTITY:** > 100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** Medium
SITE TYPE: Scatter **SITE DIMENSIONS:** 140 m (L) x 92 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 12880 sq. m
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of two discrete artifact concentrations that are separated by a relatively deep erosional gully. The site is situated on the top of Moa'ulanui crater rim on completely eroded and deflated ground surface, with artifacts spread down the outside slope of the crater. The artifact density is medium near the centers of the concentrations, then decreases to low toward the perimeters. In addition to the cultural materials listed above, there are also some small waterworn pebbles and cobbles present. Artifact density is greater in the northern portion of the site. Artifacts recorded at this feature include three adz preform/rejects, seven hammerstones, one coral abrader, one basalt awl, two bifaces, and one grinding stone (Figure B-40).

SITE NUMBER (SIHP): 50-20-97-150 **FIELD NO.:** 75382753-1
FEATURE: F **GMU:** 75382753
STATUS: Previously Recorded **WORK AREA:** Lua Makika
SETTING: Inland, Crater **CULTURAL MATERIAL QUANTITY:** > 100 Items
PROBABLE AGE: Prehistoric **CULTURAL MATERIAL DENSITY:** High
SITE TYPE: Scatter **SITE DIMENSIONS:** 130 m (L) x 56 m (W)
SITE FUNCTION: Activity Area **SITE AREA:** Approx. 7280 sq. m
MATERIAL CHARACTERISTICS:
Fractured Basalt, Polished Flakes from Finished Adzes, Sinkers, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of three relatively discrete concentrations of cultural materials listed in the NRHP Nomination form. Artifacts recorded at this feature include one adz, eight adz preform/rejects, one hammerstone, one basalt core, four bifaces, one volcanic glass core, and one sinker. The distribution of cultural material between the concentrations is fairly continuous. All three are concentrations of cultural material of high- to low-density. The site is situated atop the rim of Moa'ulanui crater, with some cultural materials extending down the slopes of the crater interior and exterior. The site is completely eroded and lies on hardpan. There are some small, yet marked, erosive gullies in the feature, and there are exposed outcrops of extremely weathered basalt and a (Figure B-41).

Figure B-40. Site 150, Feature E, Plan Map

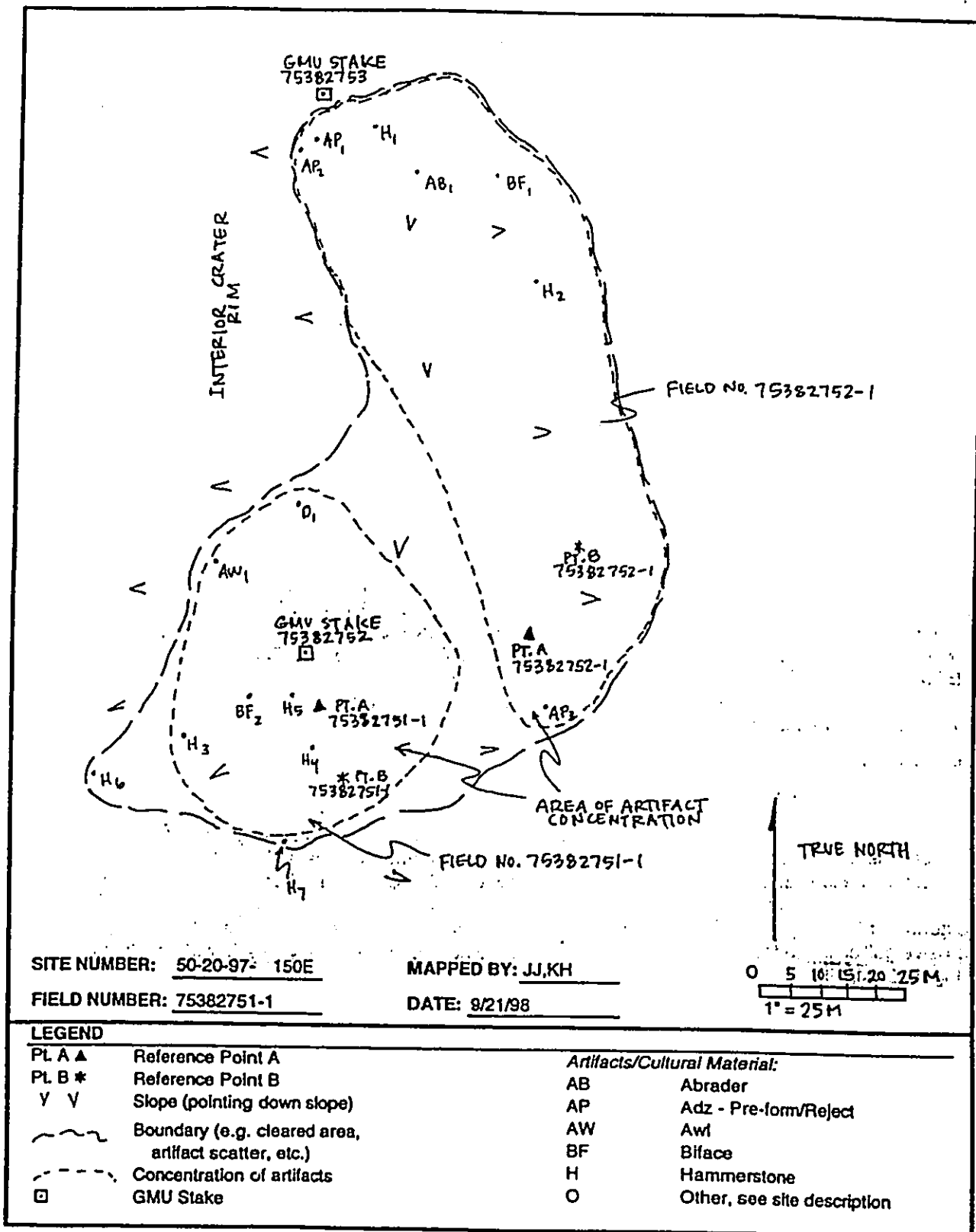
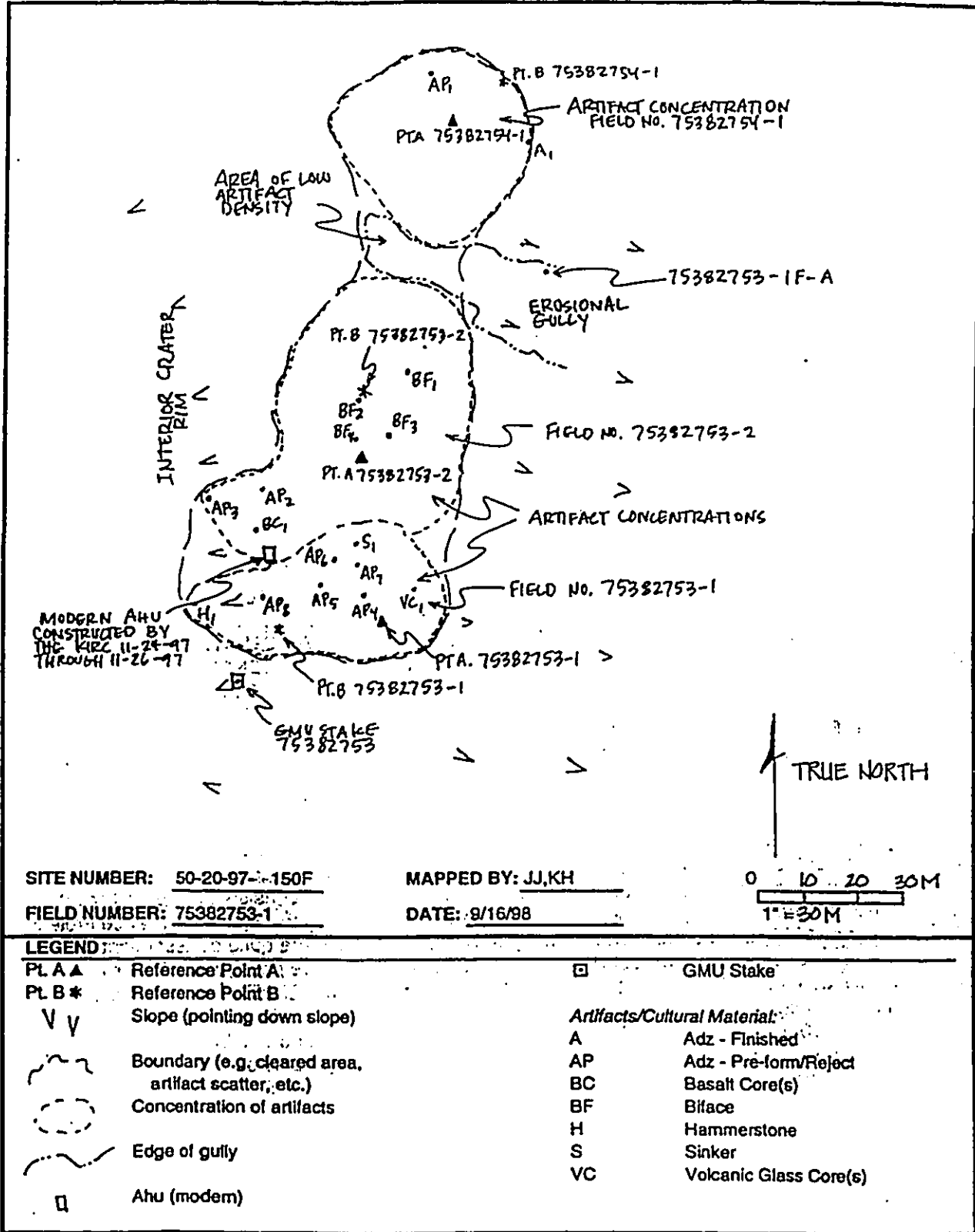


Figure B-41. Site 150, Feature F, Plan Map

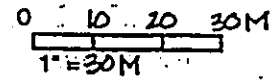


SITE NUMBER: 50-20-97-150F

MAPPED BY: JJ,KH

FIELD NUMBER: 75382753-1

DATE: 8/16/98



LEGEND

Pt. A ▲	Reference Point A	□	GMU Stake
Pt. B *	Reference Point B	Artifacts/Cultural Material:	
V V	Slope (pointing down slope)	A	Adz - Finished
~~~~~	Boundary (e.g. cleared area, artifact scatter, etc.)	AP	Adz - Pre-form/Reject
⊖	Concentration of artifacts	BC	Basalt Core(s)
~~~~~	Edge of gully	BF	Biface
□	Ahu (modern)	H	Hammerstone
		S	Sinker
		VC	Volcanic Glass Core(s)

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: G
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
FIELD NO.: 75372754-1
GMU: 75372754
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 100 m (L) x 50 m (W)
SITE AREA: Approx. 5000 sq. m

Abrader, Fractured Basalt, Polished Flakes from Finished Adzes, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of one large, relatively dense, artifact scatter and several smaller scatters in close proximity to each other (Figure B-42). Much of the cultural material consists of large, medium, and small flakes of fine-grained basalt. There are also many volcanic glass flakes and fragments of tools in production. Artifacts recorded at this feature include one adz, eight adz preform/rejects, two hammerstones, two coral abraders, one basalt awl, one biface, one *ulu maika*, and three miscellaneous artifacts. Density of cultural materials in the scatters ranges from high (near the center) to low (near the concentration perimeters). The site is situated atop the rim of Moa'ulanui crater on the *mauka* side of K-1 Road. Some cultural materials spill over the rim toward the inside of the crater. Cultural materials are lying on eroded hardpan with some erosion gullies and bomb craters. There are a few small patches of grass-covered soil within the site boundaries

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: H
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
FIELD NO.: 75362756-3
GMU: 75362756
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 90 m (L) x 32 m (W)
SITE AREA: Approx. 2880 sq. m

Fractured Basalt, Sinkers, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 is situated on top of Moa'ulanui crater rim and defined as Site 150-H on the crater rim side of the road only. The cultural material scatter is continuous across the road, but has been defined as part of Site 401 on the north side of the road. This site consists of three adjacent dense concentrations of cultural materials, which were recorded during the Model Clearance Project (Hammatt *et al.*, 1996) as Features H1, H2, and H3. Cultural materials are quite densely scattered near the centers of each of the concentrations, and decrease toward the perimeters. Cultural materials include fractured basalt, large and small flakes of fine-grained basalt of various types, some flakes of poor quality volcanic glass, and a few pieces of marine shell. Artifacts recorded at this feature include 10 adz preform/rejects, one biface, one hammerstone and one basalt bread-loaf sinker. There are also some small waterworn cobbles, and some fragments of clear plate glass. Some materials have spilled over the crater edge, but not very far (Figure B-43).

Figure B-42. Site 150, Feature G, Plan Map

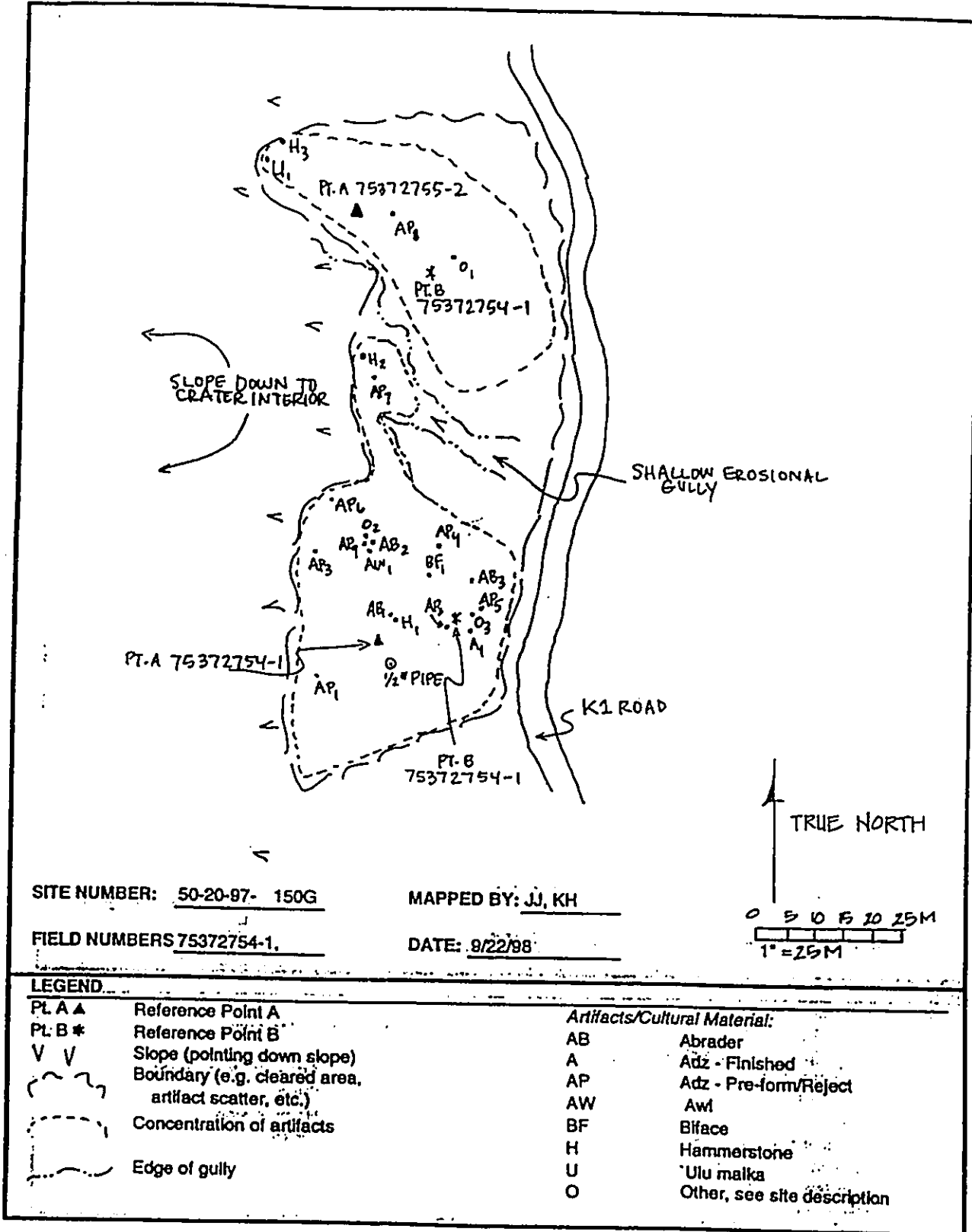
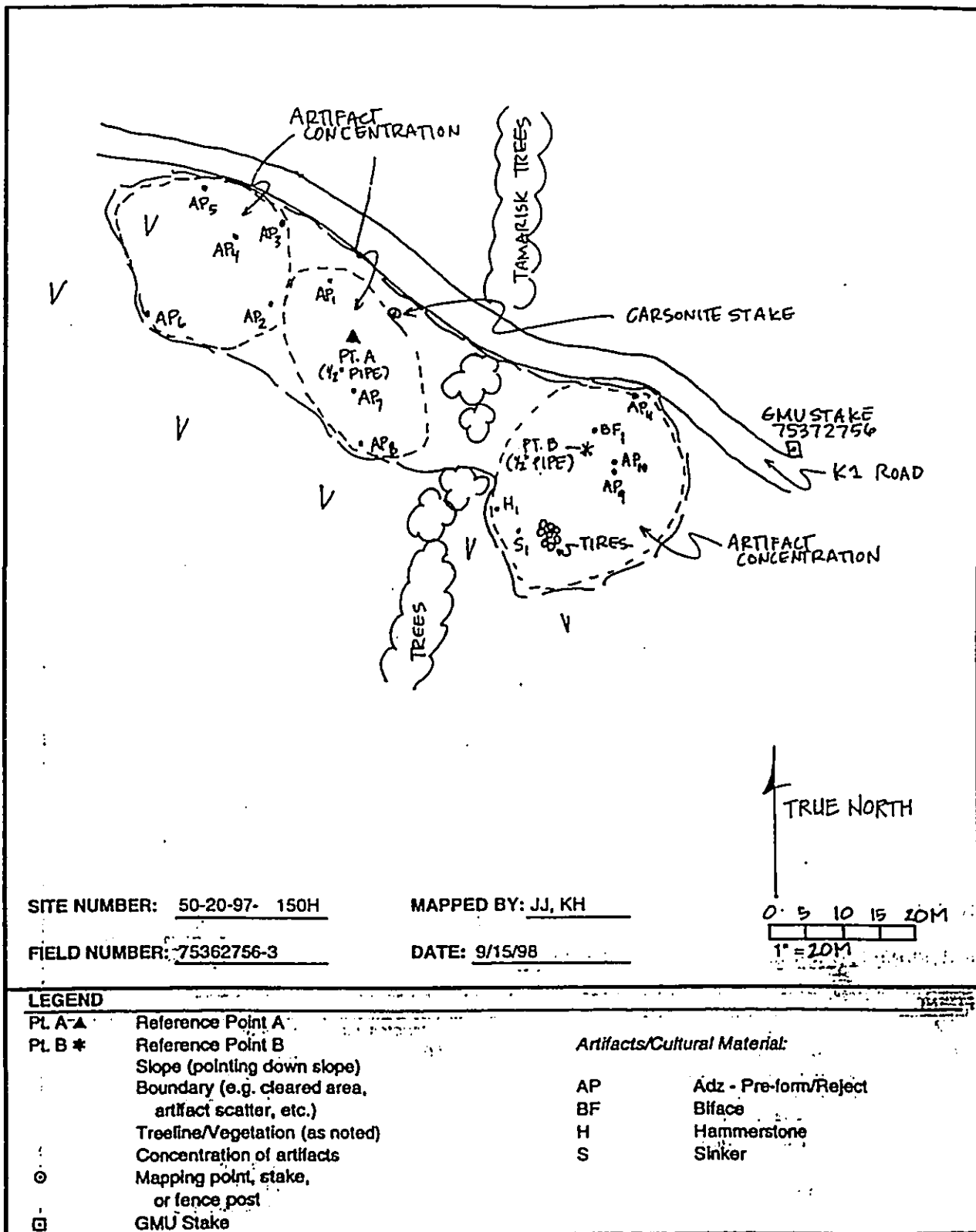


Figure B-43. Site 150, Feature H, Plan Map



SITE NUMBER (SIHP): 50-20-97-150
FEATURE: I
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75352756-1
GMU: 75352756
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 95 m (L) x 23 m (W)
SITE AREA: Approx. 2185 sq. m

Site Description

This feature of Site 150 consists of a generally low-density scatter of cultural materials listed in the NRHP description. The *in situ* fireplace mentioned in the NRHP description was not relocated. However, in the western end of the site, there is a concentration of fractured basalt, flaked basalt, and shell that may be the remains of the previously identified fireplace that has eroded out of a small remnant hummock. There is a large fine-grained basalt core (BC-1), from which one large flake, broken into two pieces, was found. The two pieces of the broken flake were found approximately 10 m apart. Artifacts recorded at this feature include one adz preform/reject, one hammerstone, three basalt cores, and one basalt awl. Cultural materials are visible on the eroded hardpan surface, though at the edge of the rim there are small hummocks around clusters of very large boulders. Cultural materials were observed within some of these small hummocks. The site is situated at the top of Moa'ulanui crater, with some material falling downslope toward the interior of the crater. The northern boundary of the site is K-1 Road (Figure B-44).

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: J
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75332756-2
GMU: 75332756
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 33 m (L) x 21 m (W)
SITE AREA: Approx. 693 sq. m

Site Description

This feature of Site 150 consists of a low-density scatter of cultural materials listed in the NRHP description, although the fireplaces, the flaked chopper, and the adz blank were not relocated. One flaked basalt artifact recorded as a scraper might be the adz blank, but it would have to be an unusual adz blank. The feature is situated on the northern rim of Moa'ulanui crater, where the rim is low. The site slopes a bit to the south toward the interior of the crater. Cultural materials are visible on the eroded hardpan surface which has almost no vegetation. The feature is adjacent to K-1 Road that forms the northern boundary of the feature (Figure B-45).

Figure B-44. Site 150, Feature I, Plan Map

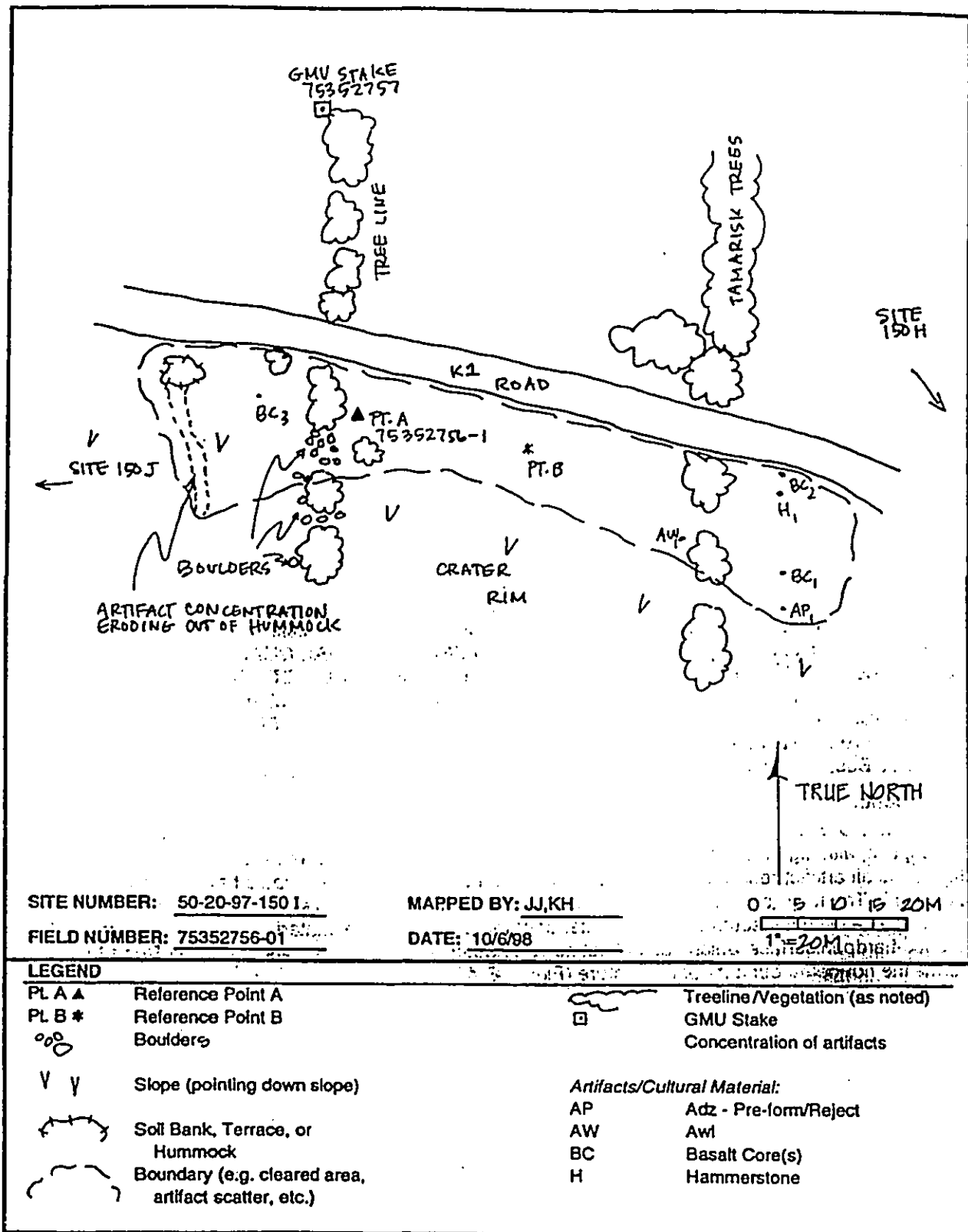
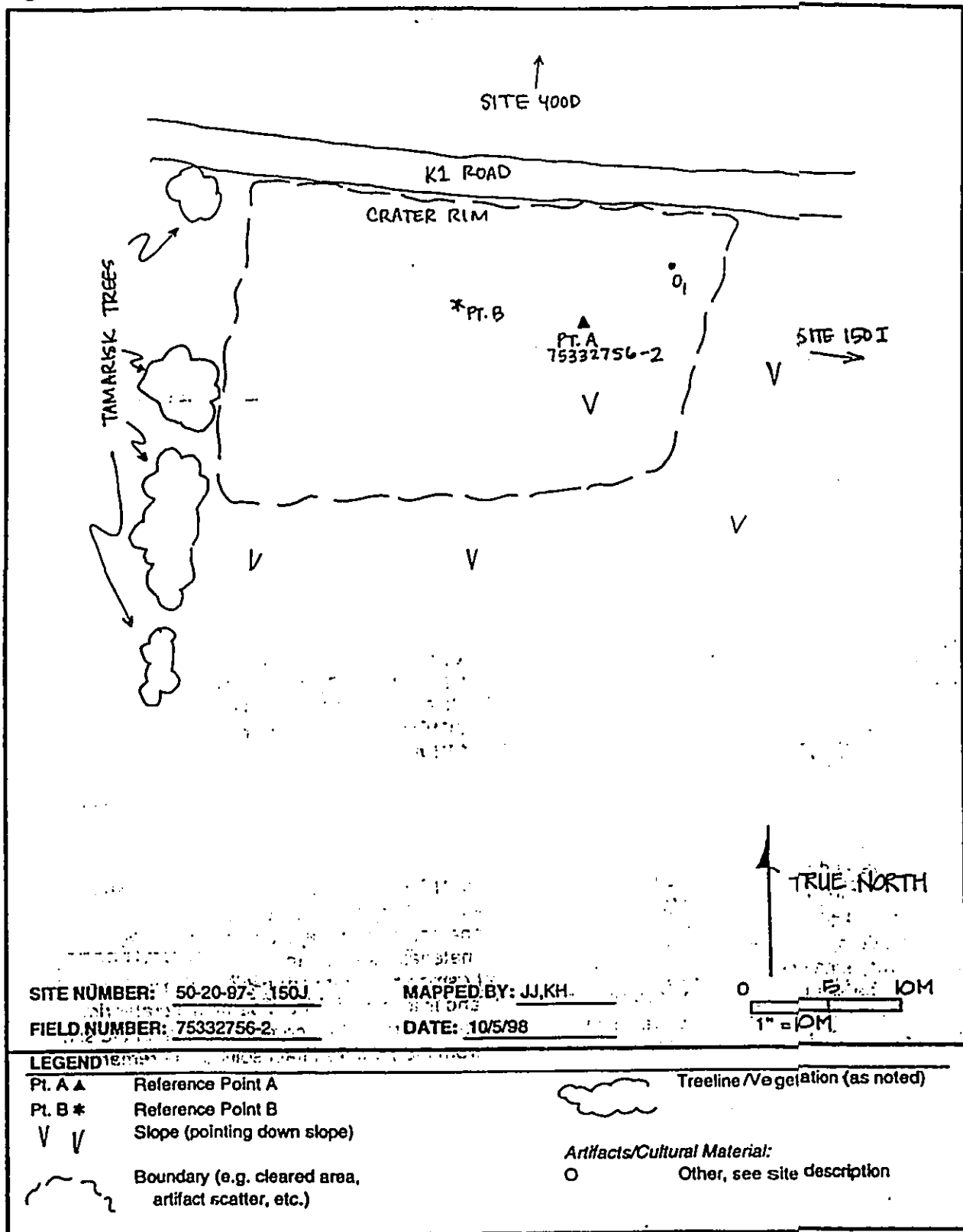


Figure B-45. Site 150, Feature J, Plan Map



SITE NUMBER: 50-20-97-150J

MAPPED BY: JJ, KH.

FIELD NUMBER: 75332756-2

DATE: 10/5/98

0 5 10M
 1" = 10M

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: K
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Finished Adz, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden, *Cypraea* Shell Lure

FIELD NO.: 75312755-2
GMU: 75312755
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 142 m (L) x 90 m (W)
SITE AREA: Approx. 12780 sq. m

Site Description

This feature of Site 150 consists of a scatter of cultural materials listed in the NRHP description, though the fireplaces noted on the NRHP Nomination form were not relocated. Artifacts recorded at this feature include four adz preform/rejects, one finished adz, and one basalt awl. There are areas of the feature where cultural materials are in medium-density concentrations, whereas the overall density is low. Some partially intact areas of grass-covered soil were observed to contain cultural materials, and they may contain the firepits (Figure B-46). A modern four-sided *ahu* has been constructed at the top of the crater rim in the south-central portion of the site. It measures 90 cm high, 105 cm long, and 90 cm wide at the base, and the top measures 68 by 42 cm. It is constructed of basalt cobbles and boulders neatly stacked, with a few basalt artifacts incorporated into the top portion. The top surface has pieces of coral and one very weathered *Cypraea* shell lure. A curvilinear one- to two-course high rock alignment has also been constructed to the northwest of the *ahu*. Because it is built on deflated hardpan, it is likely modern as well.

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: L
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75312755-1
GMU: 75312755
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 63 m (L) x 46 m (W)
SITE AREA: Approx. 2898 sq. m

Site Description

This feature of Site 150 is generally as described by the NRHP form. The fireplace noted in the NRHP Nomination form was not relocated, possibly due to poor visibility of the grassy edges of the hummocks. Artifacts recorded at this feature include one adz preform/reject, one basalt core, two coral abraders, and one basalt awl. In addition to the materials listed on the NRHP Nomination form, several very small (approximately 1 cm diameter), very smooth, waterworn pebbles were observed at this site. The site is very close to Site 150, feature K, and is located on the Moa'ulanui crater rim (Figure B-47). Cultural materials are visible on the hardpan surface that comprises most of the site's surface area. Cultural materials can be seen eroding from the partially intact soils of the remaining hummocks.

Figure B-46. Site 150, Feature K, Plan Map

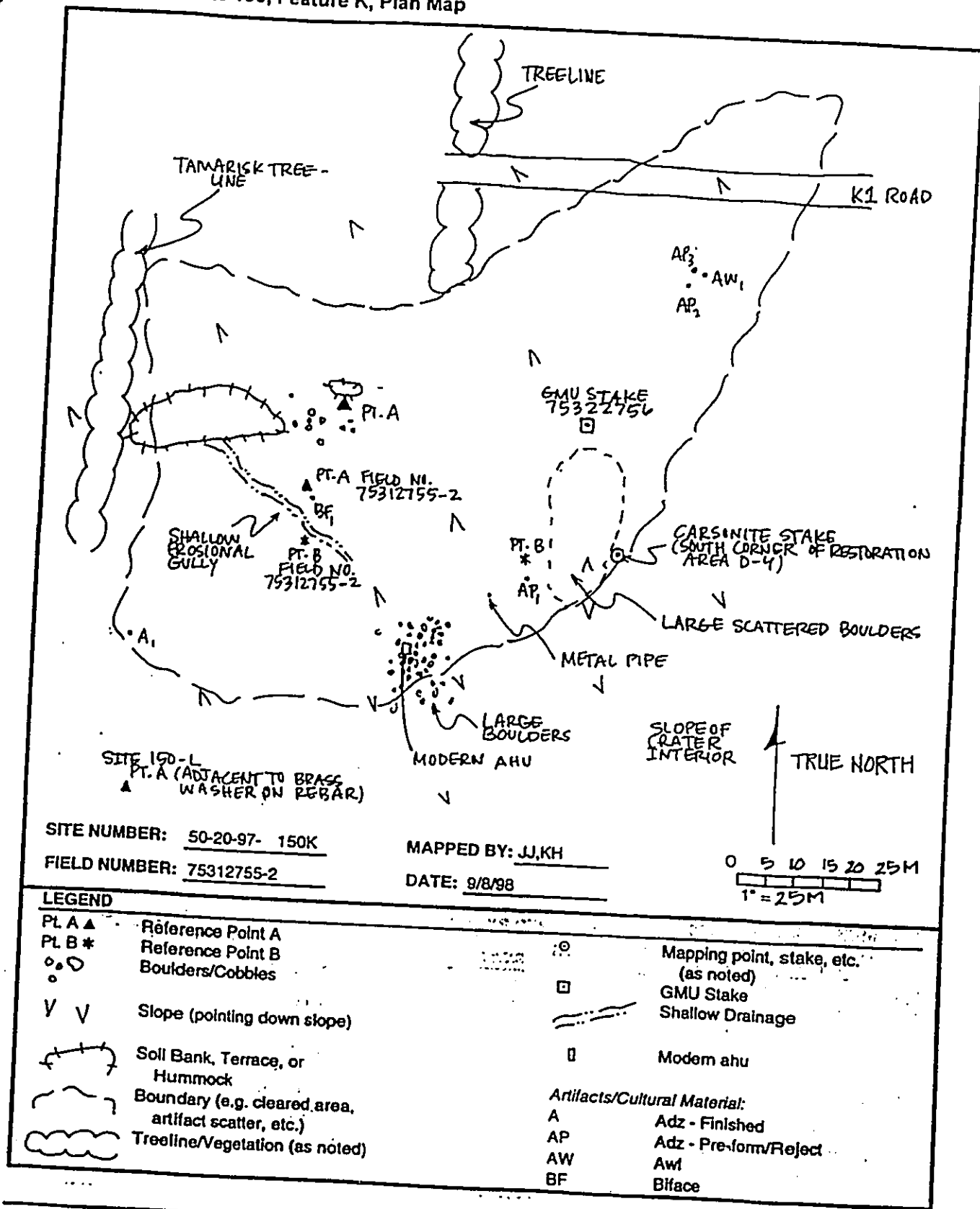
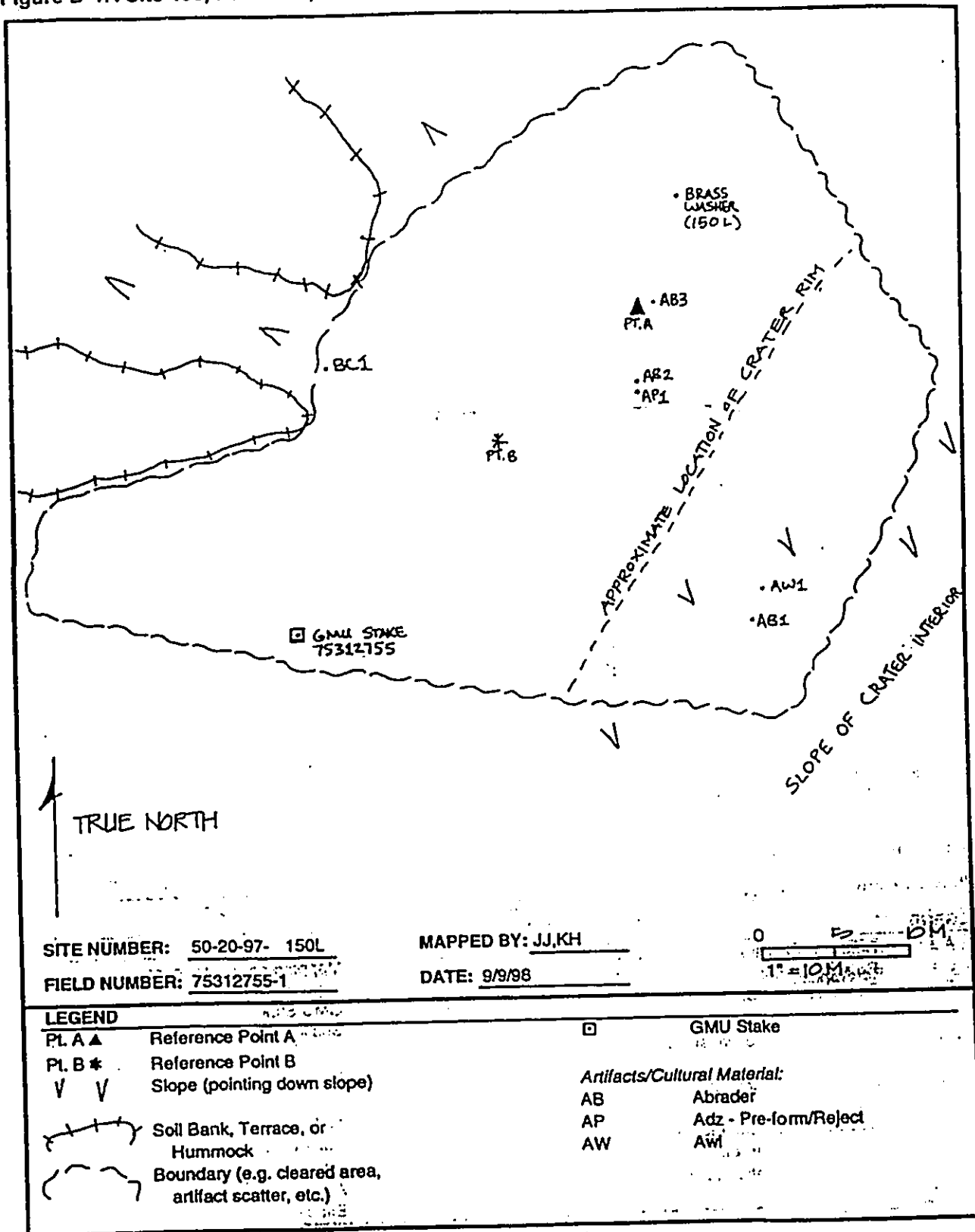


Figure B-47. Site 150, Feature L, Plan Map



SITE NUMBER (SIHP): 50-20-97-150	FIELD NO.: 75302754-1
FEATURE: M	GMU: 75302754
STATUS: Previously Recorded	WORK AREA: Lua Makika
SETTING: Inland, Crater	CULTURAL MATERIAL QUANTITY: > 100 Items
PROBABLE AGE: Prehistoric	CULTURAL MATERIAL DENSITY: Medium
SITE TYPE: Scatter	SITE DIMENSIONS: 62 m (L) x 42 m (W)
SITE FUNCTION: Activity Area	SITE AREA: Approx. 2604 sq. m

MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of a scatter of cultural materials listed in the NRHP Nomination form description, with the addition of one basalt core and a few small waterworn basalt cobbles. The NRHP Nomination form description is generally accurate, except the site as defined is significantly larger than the NRHP definition. The site is situated on the rim of Moa'ulanui crater, in an area that is mostly non-vegetated, except for sparse clumps of grass (Figure B-48).

SITE NUMBER (SIHP): 50-20-97-150	FIELD NO.: 75312754-1
FEATURE: N	GMU: 75312754
STATUS: Previously Recorded	WORK AREA: Lua Makika
SETTING: Inland, Crater	CULTURAL MATERIAL QUANTITY: > 100 Items
PROBABLE AGE: Prehistoric	CULTURAL MATERIAL DENSITY: Medium
SITE TYPE: Scatter	SITE DIMENSIONS: 26 m (L) x 10 m (W)
SITE FUNCTION: Activity Area	SITE AREA: Approx. 260 sq. m

MATERIAL CHARACTERISTICS:

Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of a low- to medium-density scatter of fractured basalt, manufacturing debris flakes of fine-grained basalt and volcanic glass, marine shell fragments, and small amounts of coral. Artifacts recorded at this feature include one adz preform/reject, one basalt awl, and one biface. The site is on an eroded hardpan and gravel surface, situated on the inner slope of the western portion of the Moa'ulanui crater (Figure B-49).

SITE NUMBER (SIHP): 50-20-97-150	FIELD NO.: 75302753-2
FEATURE: O	GMU: 75302753
STATUS: Previously Recorded	WORK AREA: Lua Makika
SETTING: Inland, Crater	CULTURAL MATERIAL QUANTITY: > 100 Items
PROBABLE AGE: Prehistoric	CULTURAL MATERIAL DENSITY: Low
SITE TYPE: Scatter	SITE DIMENSIONS: 80 m (L) x 42 m (W)
SITE FUNCTION: Activity Area	SITE AREA: Approx. 3360 sq. m

MATERIAL CHARACTERISTICS:

Fractured Basalt, Adz-Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

Site Description

This feature of Site 150 consists of a scatter of cultural materials listed in the NRHP description, with the addition of the recorded artifacts, including two adz preform/rejects, one hammerstone, and one biface. This site is situated atop the western rim of Moa'ulanui crater and does appear to be eroding from intact deposits. In the southern portion of the site, materials were observed eroding from what appear to be intact deposits. A small portion of the site is on eroded hardpan, where materials appear to have shifted down the inner slope of the crater. The density of the material scatter is low, on average, but some areas have high-density concentrations (Figure B-50).

Figure B-48. Site 150, Feature M, Plan Map

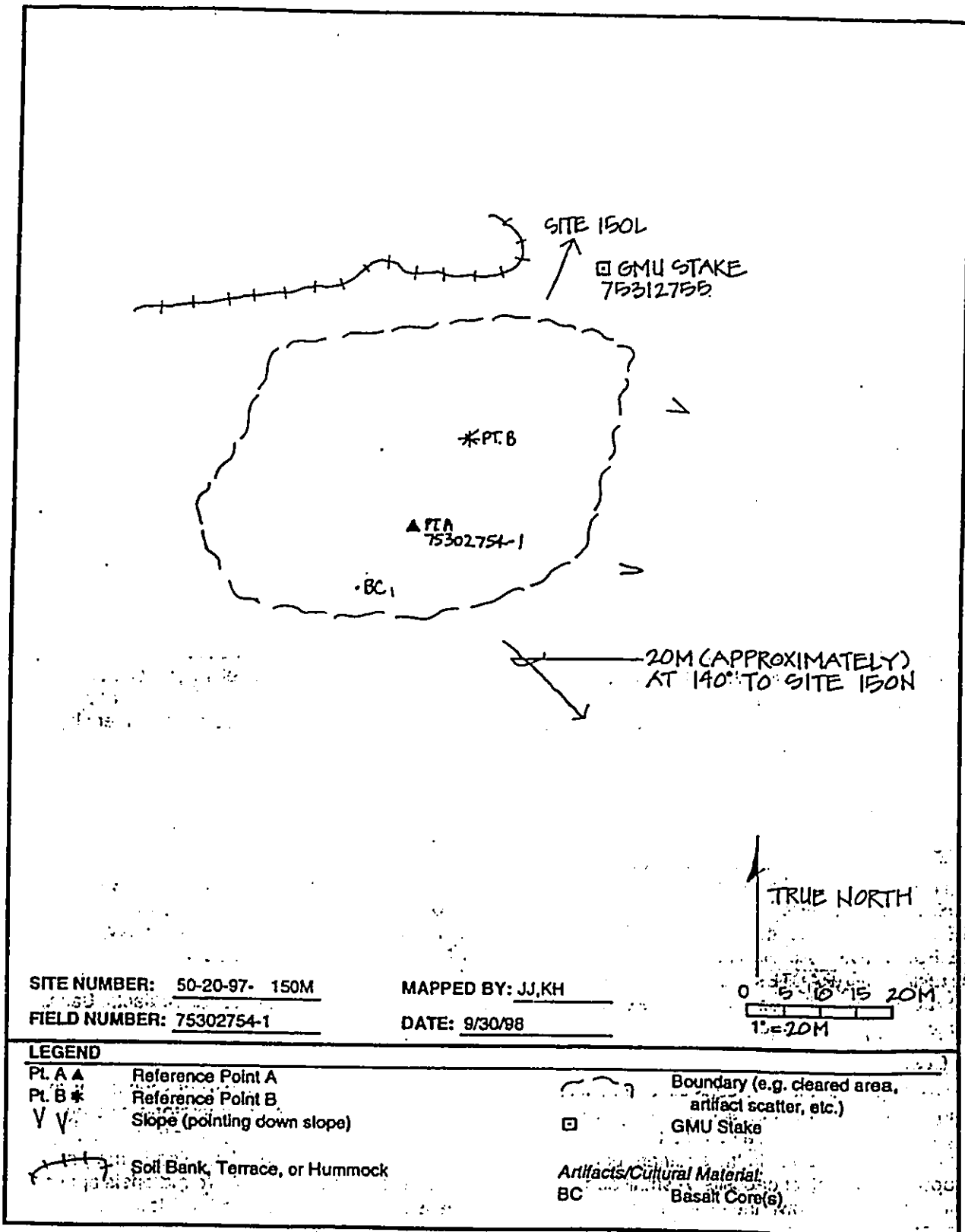


Figure B-49. Site 150, Feature N, Plan Map

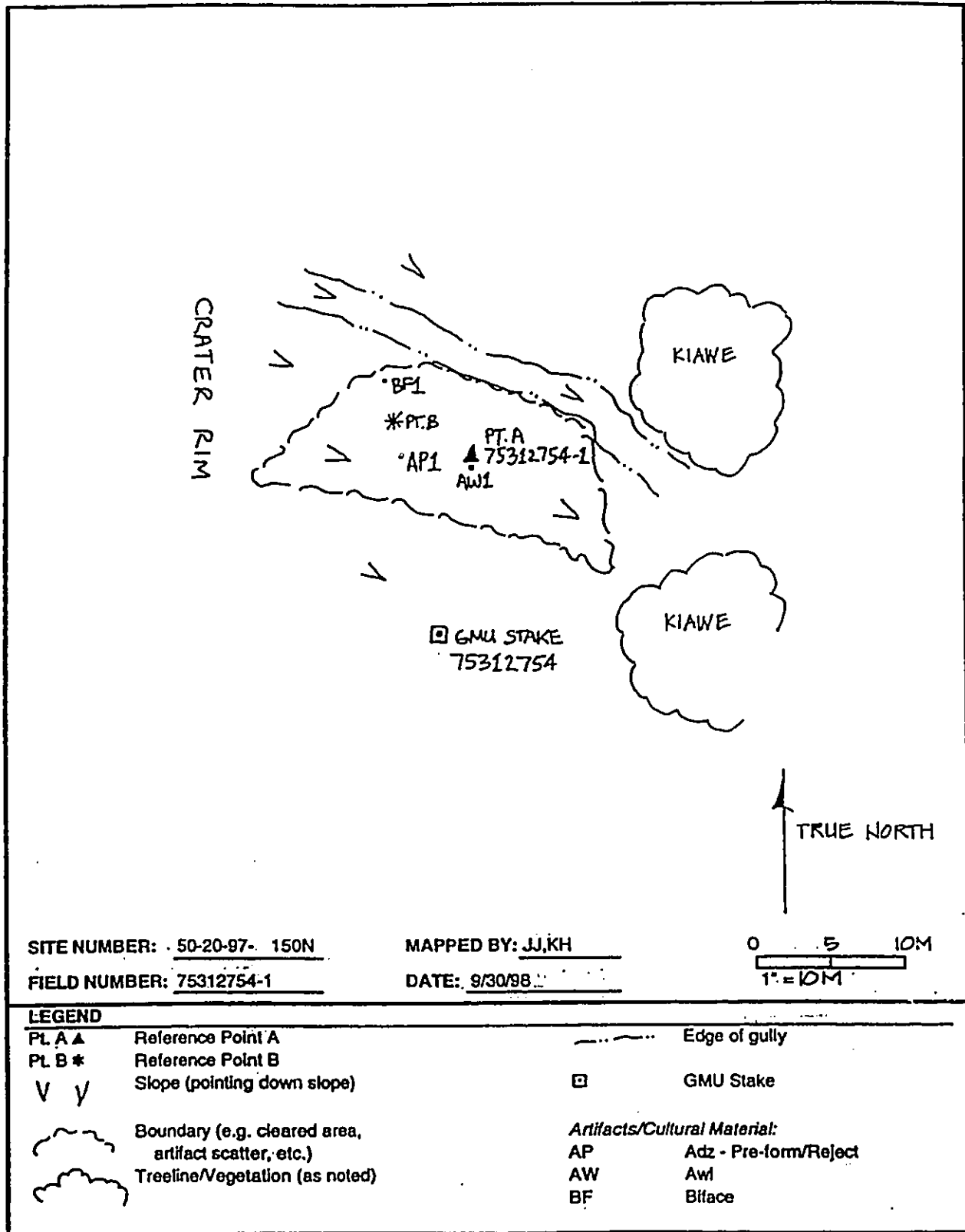
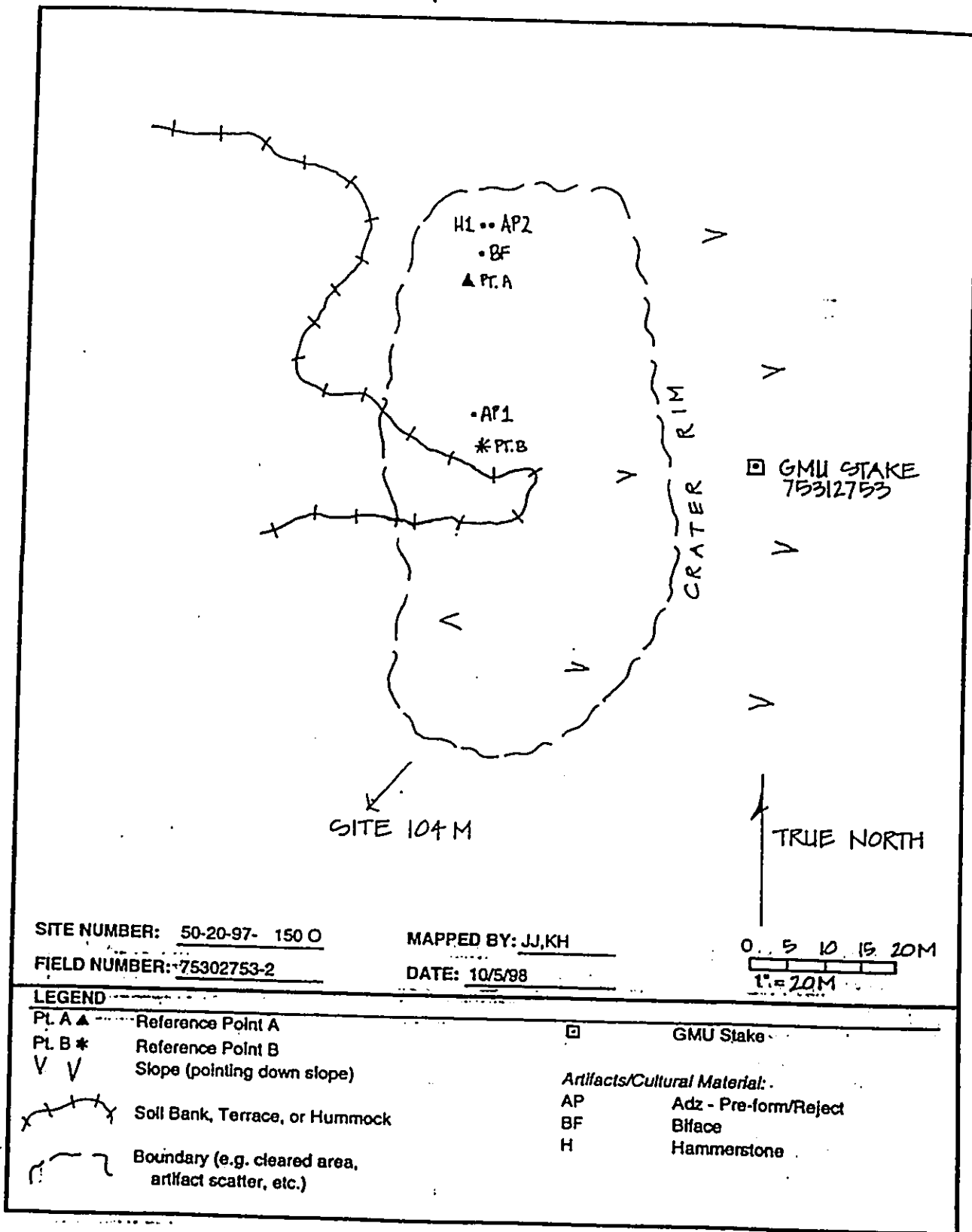


Figure B-50. Site 150, Feature O, Plan Map



SITE NUMBER (SIHP): 50-20-97-150
FEATURE: P
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75312754-2
GMU: 75312754
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 79 m (L) x 69 m (W)
SITE AREA: Approx. 5451 sq. m

Site Description

This feature of Site 150 consists of a generally low-density scatter of fractured basalt, manufacturing debris flakes of fine-grained basalt and volcanic glass, and basalt artifacts. There are also a few marine shell fragments and small waterworn cobbles. Artifacts recorded at this feature include two adz preform/rejects, one hammerstone, and one biface. The scatter is mostly low-density, but a few locations have materials in high-density concentrations. There are also a few fragments of coral. The site is situated on the inner slope of the northwestern portion of Moa'ulanui crater. Cultural materials are visible on the non-vegetated eroded hardpan surface, between the areas of soil that are covered with thick grass and *koa haole* trees. The site as identified today is somewhat smaller than previously defined, which may be due to increased vegetation cover of the southern portion of the previous site area (Figure B-51).

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: Q
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75332753-1
GMU: 75332753
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: 11-100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 34 m (L) x 21 m (W)
SITE AREA: Approx. 714 sq. m

Site Description

This feature of Site 150 consists of a low-density scatter of cultural materials listed in the NRHP Nomination form description, with the addition of a few pieces of coral and one hammerstone. The site is situated in the Moa'ulanui crater interior, where there is dense vegetation cover (grass, lantana, *koa haole*, and sparse *kiawe*). Cultural materials are visible in eroded areas on the north and south sides of a hummock. The site as observed now is quite a bit smaller than originally recorded. This possibly due to increased vegetation cover after the removal of the goats (Figure B-52).

Figure B-51. Site 150, Feature P, Plan Map

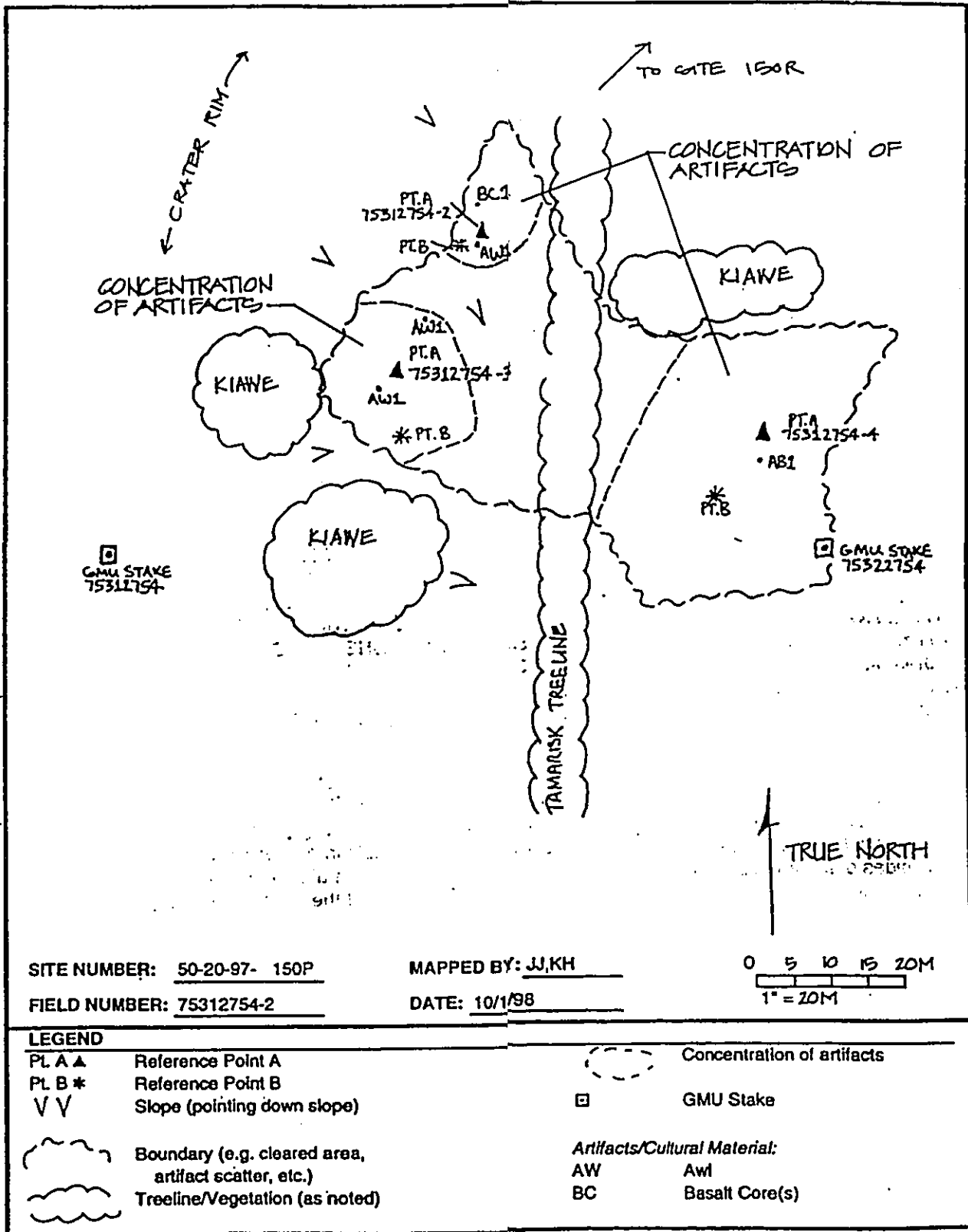
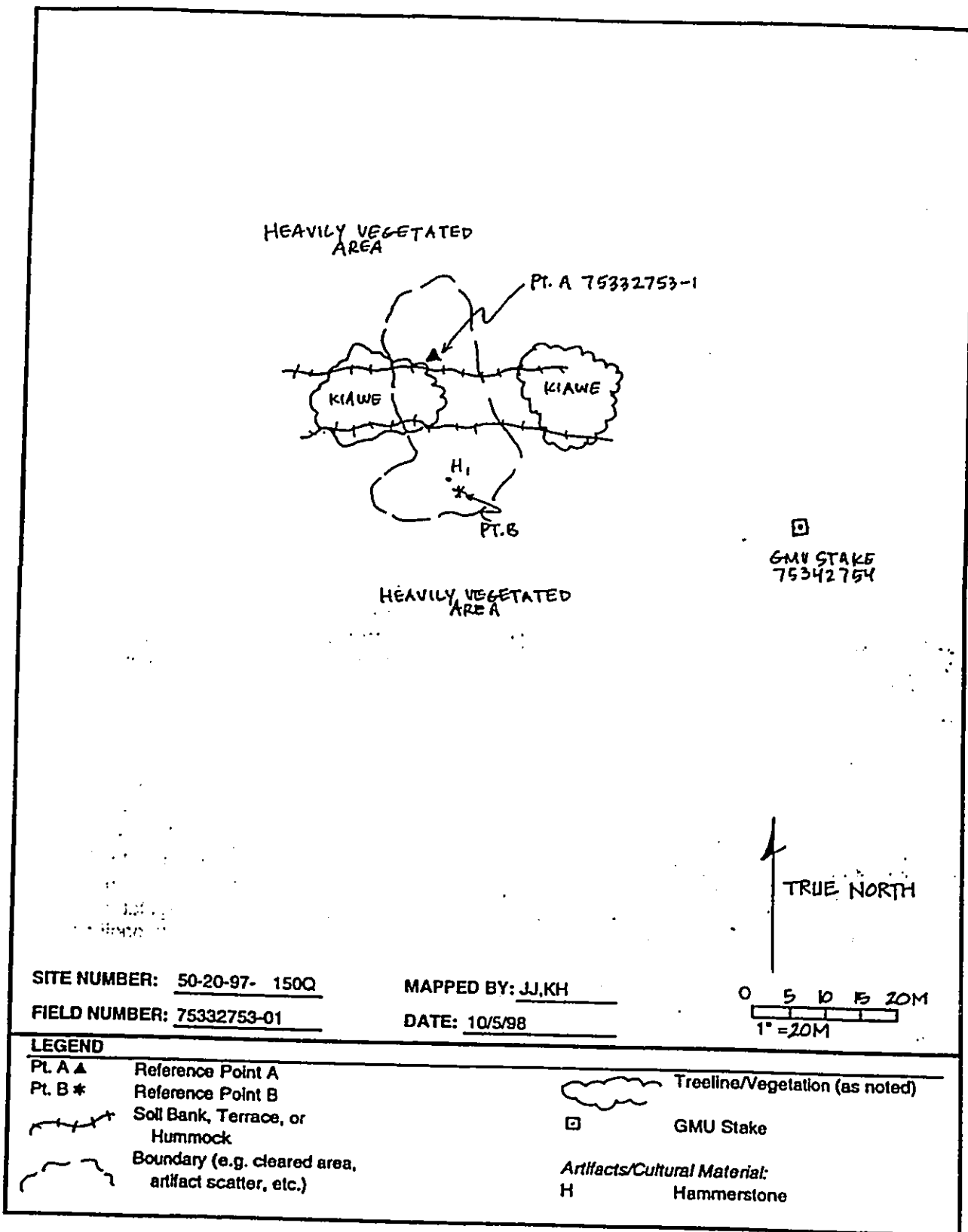


Figure B-52. Site 150, Feature Q, Plan Map



SITE NUMBER: 50-20-97- 150Q

MAPPED BY: JJ,KH

FIELD NUMBER: 75332753-01

DATE: 10/5/98

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: R
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75312754-5
GMU: 75312754
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: 11-100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 48 m (L) x 34 m (W)
SITE AREA: Approx. 1632 sq. m

Site Description

This feature of Site 150 consists of a low-density scatter of fractured basalt, fine-grained basalt flakes, volcanic glass flakes, a few marine shell fragments, coral fragments, flaked basalt artifacts, and a volcanic glass core. Artifacts recorded include one adz preform/reject, one basalt awl, and one miscellaneous artifact. The site is situated on the lower inner slope of the northwestern portion of the Moa'ulanui crater, and is adjacent to Site 150-P (Figure B-53). Cultural materials are visible on the non-vegetated soil and hardpan areas between the patches of soil that are covered with grass, lantana, *koa haole*, and *kiawe*. There are also a few small waterworn cobbles. This site also has one large (6 x 6 cm) piece of banded chalcedony with cortex on both sides. Feature 150-K, just up the crater slope from this site, also has one fragment of this type of rock, and the *lei palaoa* at Site 104-M is constructed of a similar material.

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: S
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Basalt Flakes, Marine Midden

FIELD NO.: 75332754-1
GMU: 75332754
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: < 10 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 22 m (L) x 6 m (W)
SITE AREA: Approx. 132 sq. m

Site Description

This feature of Site 150 consists of a very low-density scatter of materials listed in the NRHP Nomination form description. As presently observed, there is only one fragment of marine shell, one volcanic glass flake, a few basalt flakes, a few pieces of fractured basalt, and one adz preform that was mentioned in the NRHP description. The site is situated in the northwest interior of Lua Makika crater. The few cultural remains are visible in non-vegetated hardpan areas, and the site is much smaller than originally defined. Within and surrounding the site, the ground is heavily vegetated with grass, *koa haole*, lantana, and *kiawe*. This site has probably been overgrown since it was originally identified (Figure B-54).

Figure B-53. Site 150, Feature R, Plan Map

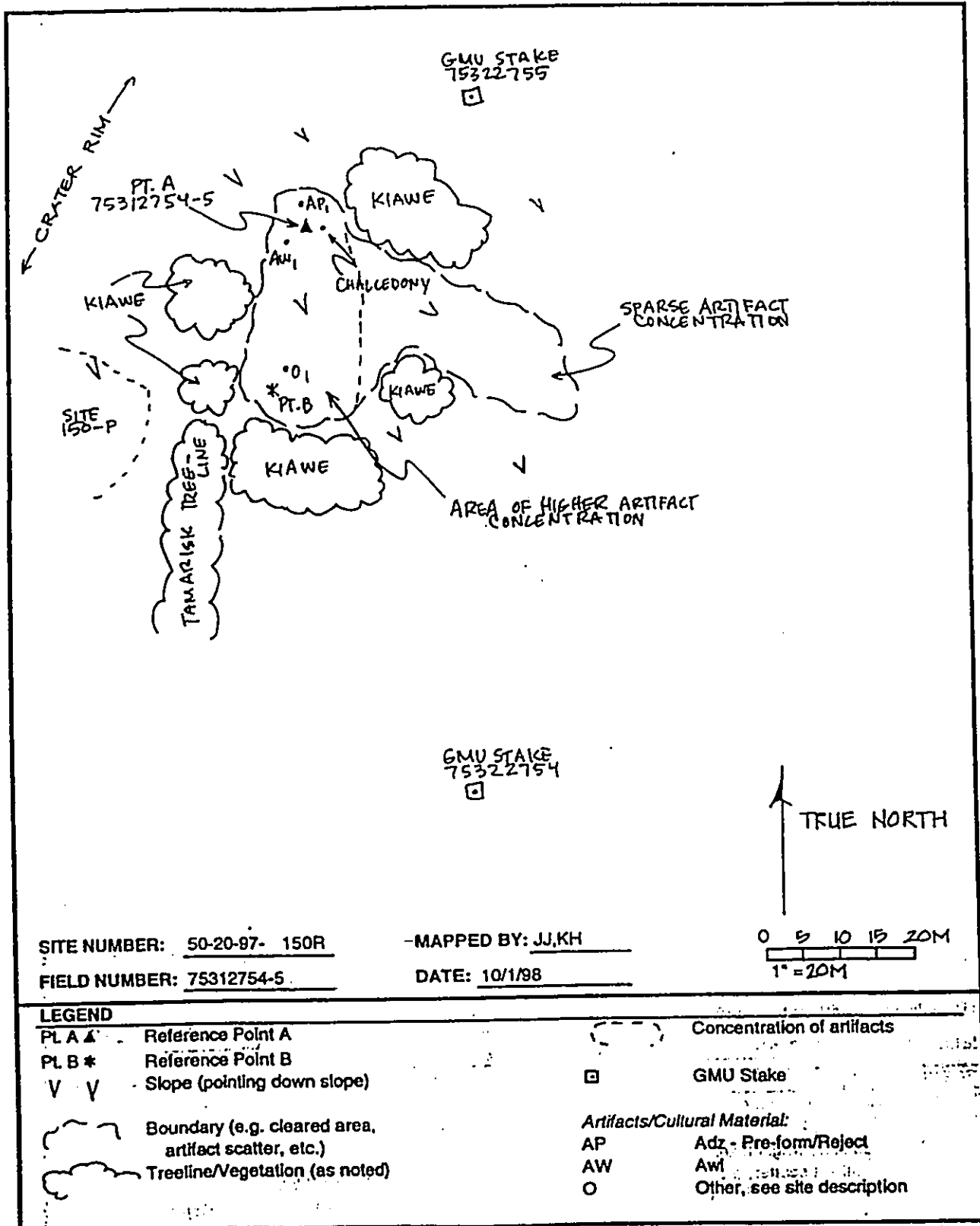
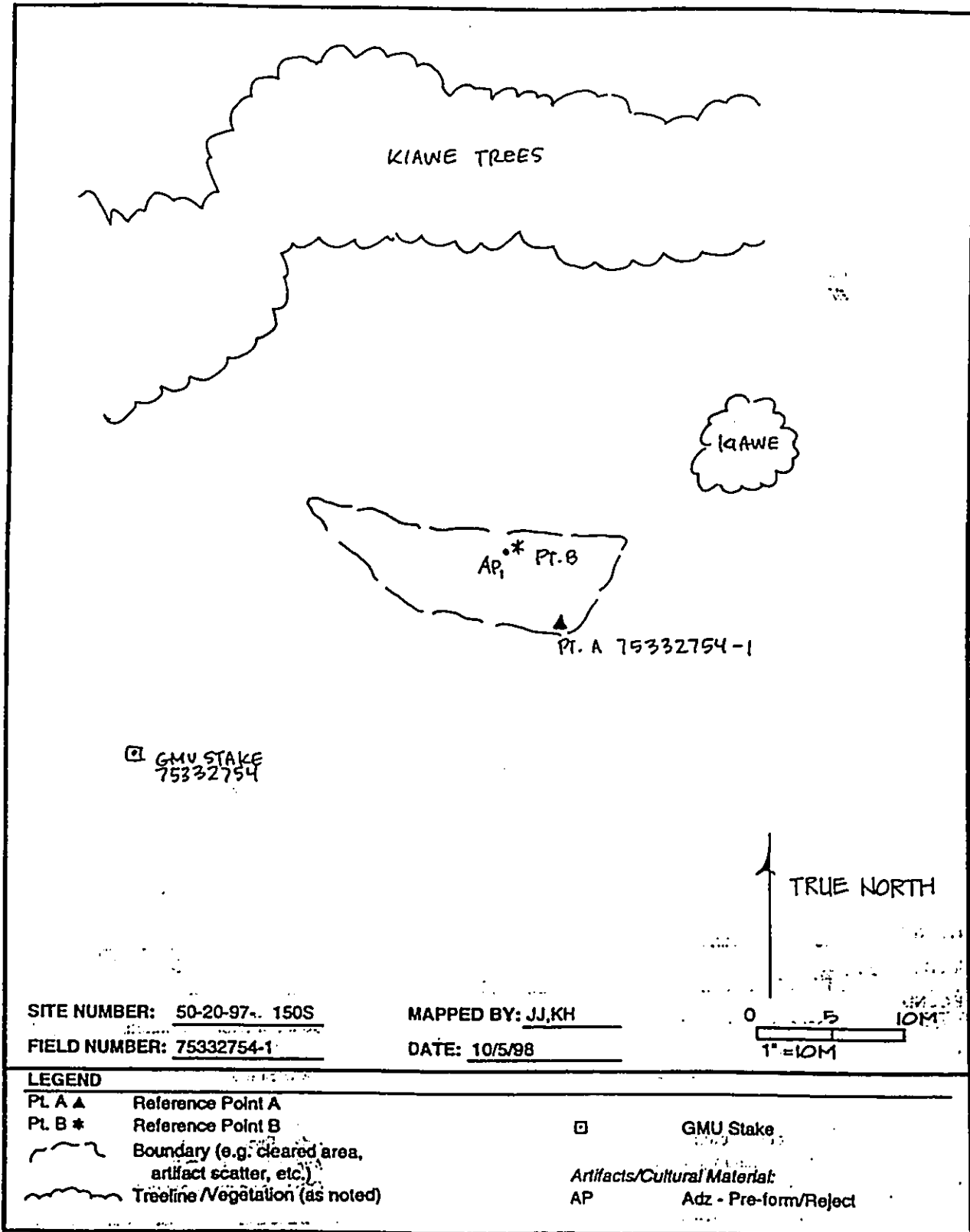


Figure B-54. Site 150, Feature S, Plan Map



SITE NUMBER (SIHP): 50-20-97-150
FEATURE: T
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75322755-1
GMU: 75322755
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: 11-100 Items
CULTURAL MATERIAL DENSITY: Low
SITE DIMENSIONS: 60 m (L) x 17 m (W)
SITE AREA: Approx. 1020 sq. m

Site Description

This feature of Site 150 is situated on the inner slope (SSE) of the Moa'ulanui crater, about midway between the top of the rim and the base of the interior. The feature consists of a scatter of cultural materials listed in the NRHP Nomination form description. The chipped basalt awl that was mentioned in the 150-T NRHP description was relocated and recorded along with one adz preform/reject. The density of cultural materials is generally low, though in a couple of places it is medium to high. The visible portion of the site is on eroded hardpan, downslope from two high hummocks (Figure B-55).

SITE NUMBER (SIHP): 50-20-97-150
FEATURE: U
STATUS: Previously Recorded
SETTING: Inland, Crater
PROBABLE AGE: Prehistoric
SITE TYPE: Scatter
SITE FUNCTION: Activity Area
MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Adz Preforms/Rejects, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

FIELD NO.: 75372750-1
GMU: 75372750
WORK AREA: Lua Makika
CULTURAL MATERIAL QUANTITY: > 100 Items
CULTURAL MATERIAL DENSITY: High
SITE DIMENSIONS: 160 m (L) x 48 m (W)
SITE AREA: Approx. 7680 sq. m

Site Description

This feature of site 150 feature consists of a scatter of cultural materials listed in the NRHP Nomination Form description. Much of the material on the surface is fractured basalt, with basalt debitage being the next most frequent item. There is a greater quantity of volcanic glass flakes, shatter, nodules, and core rejects, than at all other features of Site 150, except feature D to the southwest. Artifacts recorded at this feature include three adz preform/rejects, three basalt awls, one biface, one scoria abrader, three *ulu maika*, and three miscellaneous artifacts. Of the three *ulu maika* at this site, two are not finished pieces, but are clearly *ulu maika* in production. All three *ulu maika* are made of the same vesicular basalt (the same color and pore size). The site is situated atop the Moa'ulanui crater rim, with portions of the site on the interior and exterior crater slopes. Cultural material at this site is most concentrated on the crater rim and decreases toward the perimeter (Figure B-56).

Figure B-55. Site 150, Feature T, Plan Map

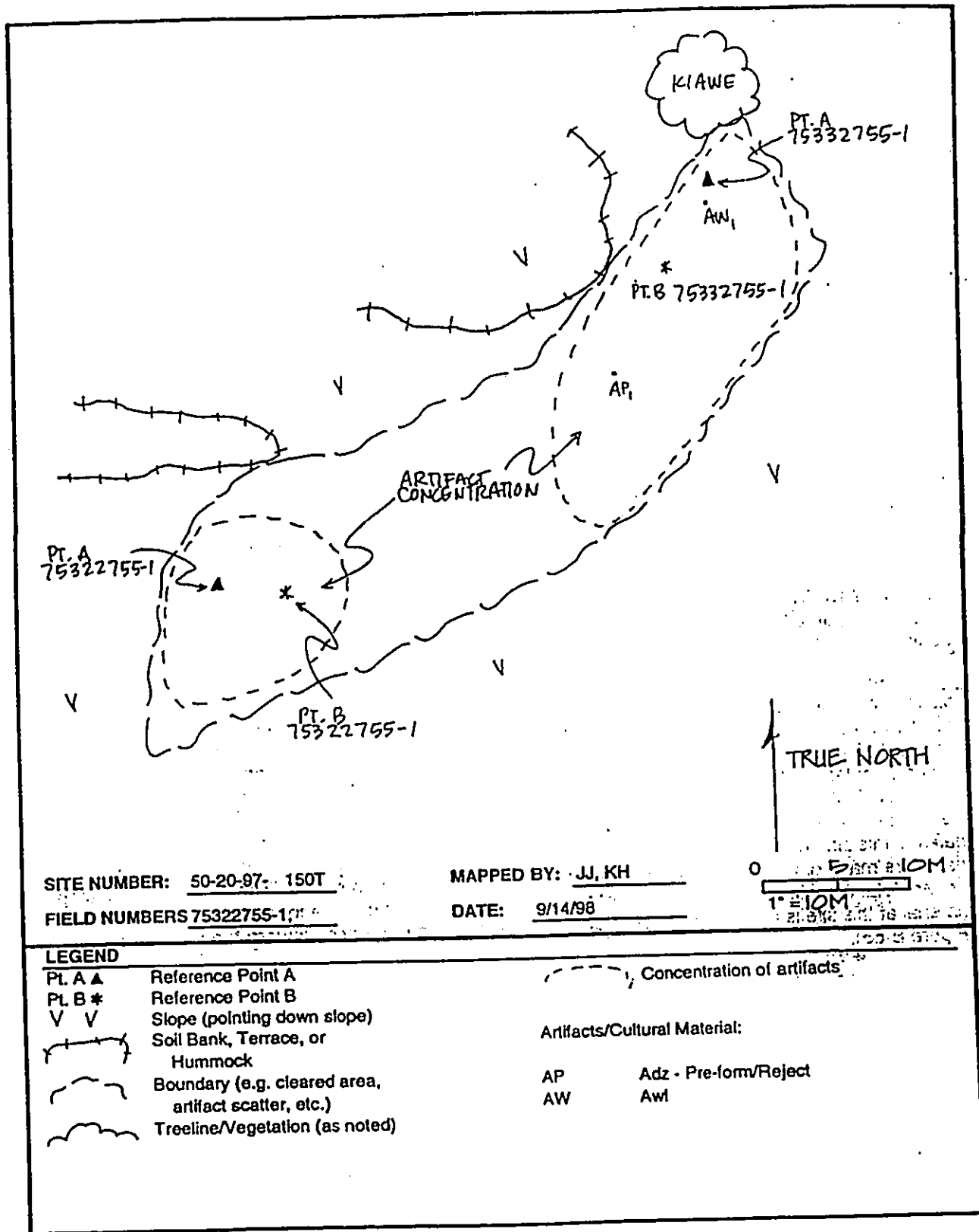
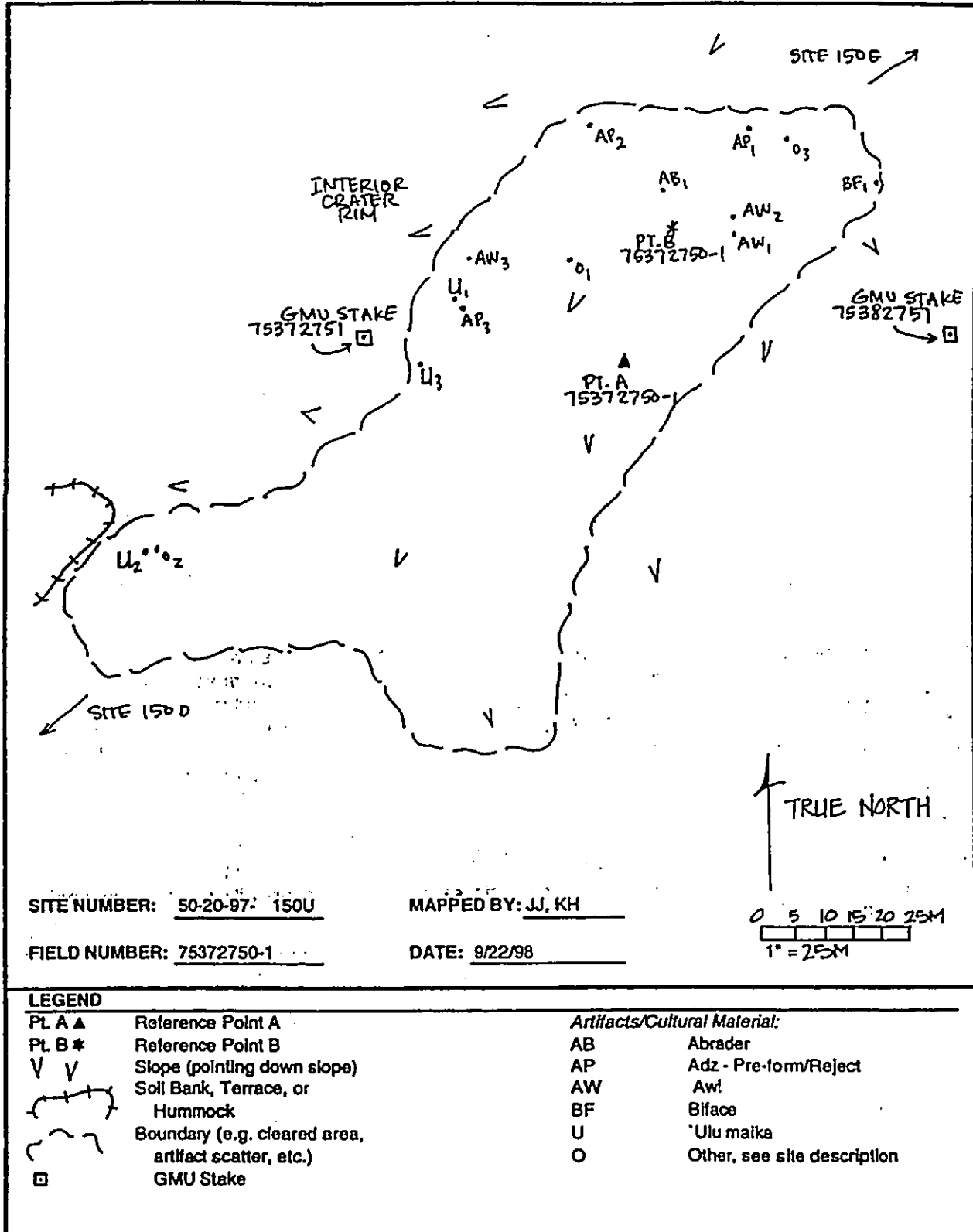


Figure B-56. Site 150, Feature U, Plan Map



SITE NUMBER (SIHP): 161	FIELD NO.:	75322746-1
FEATURE: None	GMU:	75322746
STATUS: Previously Recorded	WORK AREA:	Lua Makika
SETTING: Inland, Hardpan	CULTURAL MATERIAL QUANTITY:	> 100 Items
PROBABLE AGE: Prehistoric	CULTURAL MATERIAL DENSITY:	Low
SITE TYPE: Scatter	SITE DIMENSIONS:	245 m (L) x 120 m (W)
SITE FUNCTION: Habitation, Activity Area	SITE AREA:	Approx. 29400 sq. m

MATERIAL CHARACTERISTICS:
Abrader, Fractured Basalt, Finished adz, Fireplace, Adz Preforms/Rejects, Intact Cultural Layer, Volcanic Glass, Basalt Artifacts, Other Artifacts, Basalt Flakes, Marine Midden

Site Description

Site 161 is situated in a mostly denuded area, interspersed with eroding hummocks and scattered patches of vegetated shallow soils (Figure 3-7). The site sits at an elevation of approximately 400 m and is within Hommon's Inland Settlement Zone (1980:48).

The site consists of a large low- to high-density scatter of cultural materials, as listed in the NRHP Nomination form description, with the addition of the many finished and unfinished tools. Artifacts recorded at this feature include eight adz preform/rejects, 13 hammerstones, seven basalt cores, eight coral abraders and one made of scoria, 13 basalt awls, two bifaces, one adz, two *ulu maika*, one basalt scraper, and two miscellaneous artifacts.

The density of the scatter is low to medium over the entire site, with discrete areas of high-density scatters of cultural material. There are three areas with high-density concentrations of volcanic glass flakes, nodules, and cores. The area to the south of the large hummock has the highest-density concentration of artifacts and cultural materials, including volcanic glass. The area with the high-density volcanic glass concentration in the southwest portion of the site also contains several small waterworn pebble hammerstones, which are the right size for use on small volcanic glass cores and nodules (Figure B-57). Cultural materials noted but not listed in the NRHP description include many branch coral fragments, waterworn cobbles, and some vesicular waterworn cobbles (oval-shaped). Specimens of helmet (*Cassis spp.*) and augur shell were also observed. The one large hummock in the northern portion of the site appears to have eroded since the initial feature description, as the fireplace appears to have fallen out of the hummock face, leaving only the scattered cultural materials in the face. The variety of tool types recorded at this site is quite extensive, which generally implies that a wide range of activities was performed there. This wide range of activities, combined with the generally high density of the material remains and the presence of firepit remains in the face of the hummock, suggest that this site functioned as some sort of habitation of an indefinite duration.

Materials are visible mostly on the eroded, non-vegetated surfaces of the site that comprise approximately 50% of the site surface area. The remainder of the feature consists of a large hummock, small low hummocks, and shallow soil patches, covered primarily with grasses, *koa haole*, and saltbush.

Appendix C
Hawaii Revised Statutes, Chapter 6K



Marc M. Siah & Associates, Inc.

Consulting Civil • Structural • Environmental & Ocean Engineers
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

DOCUMENT CAPTURED AS RECEIVED

THE CURRENT VERSION OF CHAPTER 6-K IN HAWAII REVISIED STATUTES.
Copied from the 1997 Cumulative Supplement, pages 52-55.

Includes language passed during the 1997 session:
Re-wording of 6K-6 with two new sub-sections (8) & (10);
re-wording of 6K-8 and a new section 6K-8.5.

CHAPTER 6-K
KAHO'OLAWI ISLAND RESERVE

SECTION	
6K-1	ADMINISTRATION OF CHAPTER
6K-2	DEFINITIONS
6K-3	RESERVATION OF USES
6K-4	POWERS AND DUTIES
6K-5	COMMISSION
6K-6	RESPONSIBILITIES AND DUTIES OF THE COMMISSION
6K-7	FISHING
6K-8	PENALTY
6K-8.5	GENERAL ADMINISTRATIVE PENALTIES
6K-9	TRANSFER
6K-9.5	REHABILITATION TRUST FUND
6K-10	SEVERABILITY

[§6K-1] Administration of chapter. The Kaho'olawe Island reserve commission and the department of land and natural resources shall administer this chapter. [L 1993, c 340, pt of §2]

[§6K-2] Definitions. As used in this chapter, unless the context otherwise requires:

"Commission" means the Kaho'olawe island reserve commission.

"Department" means the department of land and natural resources.

"Island reserve" means the area designated as the island of Kaho'olawe and the submerged lands and waters extending seaward two miles from its shoreline.

"Waters" means the area extending seaward two miles from the shoreline. [L 1993, c 340, pt of §2]

[§6K-3] Reservation of uses. (a) The Kaho'olawe island reserve shall be used solely and exclusively for the following purposes:

- (1) Preservation and practice of all rights customarily and traditionally exercised by native Hawaiians for cultural, spiritual, and subsistence purposes;
- (2) Preservation and protection of its archaeological, historical, and environmental resources;
- (3) Rehabilitation, revegetation, habitat restoration, and preservation; and
- (4) Education.

(b) The island shall be reserved in perpetuity for the uses enumerated in subsection (a). Commercial uses shall be strictly prohibited. [L 1993, c 340, pt of §2]

§6K-4 Powers and duties. The department and other departments and agencies of the State shall be subject to the oversight of the commission with regard to the control and management of the island reserve. Subject to section 6K-6, the department shall:

- (1) Implement controls and permitted uses for the island reserve;
- (2) Enforce this chapter;
- (3) Provide administrative support to the commission; and
- (4) Authorize those of its employees as it deems reasonable and necessary to serve and execute warrants and arrest offenders or issue citations in all matters relating to enforcement of the laws and rules applicable to the island reserve. [L 1993, c 340, pt of §2; am L 1994, c 161, §3]

§6K-5 Commission. (a) There is established the Kaho'olawe island reserve commission to be placed within the department of land and natural resources for administrative purposes as provided in section 26-35. The commission shall consist of seven members to be appointed in the manner and to serve for the terms provided in section 26-34; provided that:

- (1) One member shall be a member of the Protect Kaho'olawe Ohana;
- (2) Two members shall be appointed by the governor from a list provided by the Protect Kaho'olawe Ohana;
- (3) One member shall be a trustee or representative of the office of Hawaiian affairs;
- (4) One member shall be a county official appointed by the governor from a list provided by the mayor of the county of Maui;
- (5) One member shall be the chairperson of the board of land and natural resources; and
- (6) One member shall be appointed by the governor from a list provided by native Hawaiian organizations.

(b) The governor shall appoint the chairperson from among the members of the commission.

(c) The members of the commission shall serve without pay but shall be reimbursed for their actual and necessary expenses, including travel expenses, incurred in carrying out their duties.

(d) Any action taken by the commission shall be approved by a simple majority of its members. Four members shall constitute a quorum to do business.

(e) The commission, without regard to the requirements of chapters 76 and 77, may hire employees necessary to perform its duties. [L 1993, c 340, pt of §2; am L 1994, c 161, §4]

§6K-6 Responsibilities and duties of the commission. The general administration of the island reserve shall rest with the commission. In carrying out its duties and responsibilities, the commission:

- (1) Shall establish criteria, policies, and controls for permissible uses within the island reserve;
- (2) Shall approve all contracts for services and rules pertaining to the island reserve;
- (3) Shall provide advice to the governor, the department, and other departments and agencies on any matter relating to the island reserve;
- (4) Shall provide advice to the office of planning and the department of the attorney general on any matter relating to the federal conveyance of Kaho'olawe;

- (5) May enter into curator or stewardship agreements with appropriate Hawaiian cultural and spiritual community organizations for the perpetuation of native Hawaiian cultural, religious, and subsistence customs, beliefs, and practices for the purposes stated in section 6K-3;
- (6) Shall carry out those powers and duties otherwise conferred upon the board of land and natural resources and the land use commission with regard to dispositions and approvals pertaining to the island reserve. All powers and duties of the board of land and natural resources and the land use commission concerning dispositions and approvals pertaining to the island reserve are transferred to the commission;
- (7) Shall carry out those powers and duties concerning the island reserve otherwise conferred upon the county of Maui by chapter 205A. The powers and duties of the county of Maui and its agencies concerning coastal zone dispositions and approvals pertaining to the island reserve are transferred to the commission;
- (8) Shall carry out those powers and duties concerning the island reserve otherwise conferred upon the island burial councils and the department with regard to proper treatment of burial sites and human skeletal remains found in the island reserve;
- (9) Shall adopt rules in accordance with chapter 91 that are necessary for the purposes of this chapter and shall maintain a record of its proceedings and actions; and
- (10) May delegate to the executive director or employees of the commission, by formal commission action, such power and authority vested in the commission by this chapter as the commission deems reasonable and proper for the effective administration of this chapter. [L 1993, c 340, pt of §2; am L 1994, c 161, §5; am L 1996, c 299, §3; am L 1997, c 205, §1]

[§6K-7] Fishing. Section 6K-3 notwithstanding, the commission shall adopt rules pursuant to chapter 91 to permit fishing in the waters around Kaho'olawe that are consistent with the purpose of this chapter and that take into consideration the health and safety of the general public. [L 1993, c 340, pt of §2]

§6K-8 Penalty. Any person who violates any of the laws or rules applicable to the island reserve shall be guilty of a petty misdemeanor and shall be fined not more than \$1,000 or imprisoned not more than thirty days, or both, for each offense. Each day of each violation shall be deemed a separate offense. [L 1993, c 340, pt of §2; am L 1997, c 66, §2]

[§6K-8.5] General administrative penalties. (a) Except as otherwise provided by law, the commission is authorized to set, charge, and collect administrative fines, or bring legal action to recover administrative costs of the commission or the department, or payment for damages, or for the cost to correct damages resulting from a violation of chapter 6K or any rule adopted thereunder. The administrative fines shall be as follows:

- (1) For a first violation, by a fine of not more than \$10,000;
- (2) For a second violation within five years of a previous violation, by a fine of not more than \$15,000; and
- (3) For a third or subsequent violation within five years of the last violation, by a fine of not more than \$25,000.

(b) In addition, an administrative fine of up to \$5,000 may be levied for each specimen of natural resource or any historic property taken, killed, injured, broken, or damaged in violation of any rule adopted under this chapter. For purposes of this section, "natural resource" includes any archaeological artifacts, minerals, any aquatic life or wildlife or parts thereof, including their eggs, and any land plants or parts thereof, including seeds. Also for purposes of this section, "historic property" means any building, structure, object, districts, area, or site, including heiau and underwater site, which is over fifty years old.

(c) Any criminal penalty for any violation of this chapter or any rule adopted under this chapter shall not be deemed to preclude the commission from bringing a civil legal action to recover additional administrative fines and costs. Any civil legal action against a person to recover administrative fines and costs for any violation of this chapter or any rule adopted under this chapter shall not be deemed to preclude the State from pursuing any criminal action against that person.

(d) In any judicial proceeding to recover an administrative penalty imposed, the commission need only show that notice was given, that a hearing was held or the time granted for requesting a hearing has run without such a request, that an administrative penalty was imposed, and that the administrative penalty remains unpaid. [L 1997, c 66, §1]

[§6K-9] Transfer. Upon its return to the State, the resources and waters of Kaho'olawe shall be held in trust as part of the public land trust; provided that the State shall transfer management and control of the island and its waters to the sovereign native Hawaiian entity upon its recognition by the United States and the State of Hawaii.

All terms, conditions, agreements, and laws affecting the island, including any ongoing obligations relating to the clean-up of the island and its waters, shall remain in effect unless expressly terminated. [L 1993, c 340, pt of §2]

[§6K-9.5] Rehabilitation trust fund. (a) There is created in the state treasury a trust fund to be designated as the rehabilitation trust fund to be administered by the department with the prior approval of the commission. Subject to Public Law 103-139, and this chapter, all moneys received from the federal government for the rehabilitation and environmental restoration of the island of Kaho'olawe, any moneys appropriated by the legislature to the trust fund, and the interest or return on investments earned from moneys in the trust fund, shall be deposited in the trust fund and shall be used to fulfill the purposes of this chapter.

(b) The commission may use moneys in the trust fund to carry out the purposes of this chapter, including hiring employees, specialists, and consultants necessary to complete projects related to the purposes of this chapter.

(c) Moneys deposited into or appropriated to the trust fund shall remain available until they are obligated or until the trust fund is repealed.

(d) The trust fund shall be repealed on July 1, 2005. The commission shall transfer to the credit of the state general fund, all unexpended or unencumbered balances remaining in the trust fund prior to June 30, 2005; provided that all unexpended or unencumbered balances of federal moneys shall be disbursed in accordance with applicable federal law. [L 1994, c 161, §2]

[§6K-10] Severability. If any provision of this chapter or the application thereof to any person or circumstance is held invalid, the invalidity shall not affect other provisions or applications of this chapter that can be given effect without the invalid provision or application, and to this end the provisions of this chapter are severable. [L 1993, c 340, pt of §2]

