

JOHN WAIHEE
GOVERNOR OF HAWAII



WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTES

KEITH W. AHUE
MANABU TAGOMORI
Dan T. Kochi

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 821
HONOLULU, HAWAII 96809

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OFC. OF
QUALITY

NOV 5 1991

FILE NO.: HA-10/4/91-2523
DOC. NO.: 1924E

MEMORANDUM

TO: The Honorable Brian J. J. Choy
Office of Environmental Quality Control

FROM: William W. Paty, Chairperson
Board of Land and Natural Resources

SUBJECT: Document for Publication in the OEQC Bulletin -
Environmental Assessment for Conservation District Use
Application HA-2523 for Radio Relay Station, Mauna Loa,
Hawaii
TMK: 3-9-009: 01

The above mentioned Chapter 343 Document was reviewed and a negative declaration was declared based upon the environmental assessment provided with the CDUA.

Please feel free to call me or Ed Henry of our Office of Conservation and Environmental Affairs, at 587-0377, if you have any questions.

Keith W. Ahue
WILLIAM W. PATY

700

1991-11-23-H1-FBA - Mauna Loa Radio Relay Station
CDUA

FILE COPY

Conservation District Use Application

CONSERVATION DISTRICT USE APPLICATION

CONE 7996

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

DEPARTMENT MASTER APPLICATION FORM

FOR DLNR USE ONLY

Reviewed by _____
Date _____
Accepted by _____
Date _____
Docket/File No. _____
180-Day Exp. _____
EIS Required _____
PH Required _____
Board Approved _____
Disapproved _____
Well No. _____

(Print or Type)

I. LANDOWNER/WATER SOURCE OWNER
(If State land, to be filled
in by Government Agency in
control of property)

Name Kamehameha Schools
Bernice Pauahi Bishop Estate

Address 78-6831 Alii Drive

Suite 232

Kailua-Kona, HI 96740

Telephone No. 322-6088

SIGNATURE *Royce J. Kelly*

Date 4/27, 1991

II. APPLICANT (Water Use, omit if applicant
is landowner)

Name University of Hawaii at Hilo

Address 523 W. Lanikaula Street

Hilo, HI 96720-4091

Telephone No. 933-3640

Interest in Property _____

(Indicate interest in property; submit
written evidence of this interest)

*SIGNATURE *[Signature]*

Date _____

*If for a Corporation, Partnership,
Agency or Organization, must be signed
by an authorized officer.

III. TYPE OF PERMIT(S) APPLYING FOR

() A. State Lands

(x) B. Conservation District Use

() C. Withdraw Water From A Ground
Water Control Area

() D. Supply Water From A Ground
Water Control Area

() E. Well Drilling/Modification

IV. WELL OR LAND PARCEL LOCATION REQUESTED

District Kau

Island Hawaii

County Hawaii

Tax Map Key 3-9-9-1

Area of Parcel _____

(Indicate in acres or
sq. ft.)

Term (if lease) _____

KEAUHOU SHOPPING VILLAGE

78 6831 Alii Drive

Suite 232

Kailua Kona, Hawaii 96740

Telephone (808) 322-6088

Fax (808) 322-9446

KAMEHAMEHA SCHOOLS / BERNICE PAUAI BISHOP ESTATE

September 17, 1991

University of Hawaii at Hilo
Center for the Study of Active Volcanoes
Hilo, Hawaii 96720

Attention: Dr. James L. Anderson
Director

Dear Dr. Anderson:

Right-of-Entry, Lease No. 27,792, TMK: 399-001-004, Keauhou, Kau,
Hawaii

This responds to your letter request to enter onto the above subject area to place a small radio relay station at the 7,996 foot elevation level for the purpose of transmitting seismic signals from the Hawaiian Volcano Observatory to the University of Hawaii at Hilo.

You are hereby granted a Right-of-Entry subject to the following terms and conditions:

- 1) TERM: October 1, 1991 to August 31, 1992 and to continue thereafter subject to termination upon 30 days written notice by either grantor or grantee.
- 2) PURPOSE: To establish a relay station consisting of two Condell radios, two Scala antennas, and Arco M-25 solar panels and permit authorized personnel access to the site.
- 3) INDEMNIFICATION: The University of Hawaii at Hilo (UHHC) agrees to the extent permitted by law, the Kamehameha Schools/Bishop Estate shall be held harmless from any liability for damages, injury, or death caused by or resulting from an activity of UHHC, its employees, agents, representatives or contractors under this right-of-entry.

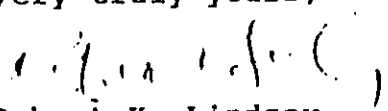
Dr. James L. Anderson
September 17, 1991
page Two

- 4) LESSEES RIGHTS: This right-of-entry will be subject to the approval of Lessees Mr. and Mrs. Kenneth H. Dillingham and UHHC shall take all steps necessary to insure that its actions in no way interfere or hinder ranch operations.

Should the above conditions be acceptable to you please sign in the space provided below and return an executed copy to our office prior to the commencement date shown above.

Please contact Bob Rosehill of our Hilo Office at 969-1256 if you have any questions regarding this matter or if you require further assistance.

Very truly yours,


Robert K. Lindsey
Manager
Hawaii Island Region

ACCEPTED:

UNIVERSITY OF HAWAII AT HILO

By James L. Anderson Date 9-30-91
Its

V. Environmental Assessment

1. Identification of applicant or proposing agency.

University of Hawaii at Hilo
Center for the Study of Active Volcanoes
523 W. Lanikaula Street
Hilo, Hawaii 96720-4091

2. Identification of approving agency, if applicable.

State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

3. Identification of agencies consulted in making assessment.

THE UNITED STATES GEOLOGICAL SURVEY, HAWAIIAN VOLCANO OBSERVATORY (HVO)
Jack Lockwood is the geologist responsible for studying Mauna Loa. He suggested that if we wanted to be above the forested area, the best location for our project would be the spatter cone, elevation 7996, on Mauna Loa's northeast rift. He explained that it had line-of-sight with both HVO and the University, was difficult of access for vandals, and would provide a stable base for our equipment.

HAWAII VOLCANOES NATIONAL PARK, RESOURCE MANAGEMENT

In an informal meeting, Dan Taylor indicated that he saw no problem with placing our radio equipment at Cone 7996. He said he thought it would have no adverse effects on the environment, and that there were few plants in the area.

STATE HISTORIC PRESERVATION DIVISION

According to this office, there are no known archaeological or historic sites at the spatter cone we are considering for our project site. There is a low probability that any exist out there, since the cone is surrounded on all sides by aa flows. The office was pleased to hear that we would be causing minimal ground disturbance, only drilling three small 1/2-inch diameter holes to bolt the guy wires in place, with the rest of the equipment resting on the existing ground surface.

DEPARTMENT OF LAND AND NATURAL RESOURCES, DIVISION OF FORESTRY AND WILDLIFE
Ronald Bachman explained that the only possible hazard he could see with the project would be that of certain birds, such as shearwaters, that fly at dusk at that elevation and might possibly crash into the antenna. He suggested two possibilities to mitigate this problem: first, to set a strobe light on top of the antenna mast to alert birds to the presence of the equipment; second, to set the antenna mast along the side of the spatter cone rather than on top of it so that it wouldn't possibly be in a bird flight path.

DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Jim Jacobi agreed that low-flying birds could pose a problem. The three species that pass through the area are the dark-rump petrol, the banded-rump petrol, and the shearwater. Paul Banko suggested that although the antenna mast would be extremely small and would hardly pose the kind of threat to birds that several miles of goat fence would, nevertheless, a bird could conceivably injure itself if it flew into the antenna at dusk. He agreed that placing the antennas and mast on the side of the cone, in a topographically sheltered area, would be the best way to prevent any possible harm to birds. Tom Telfer, the District Biologist on Kauai, doubted birds would run into such a short antenna mast. He said that when birds run into goat fences, it is because the fence wires are so very thin as to be virtually invisible; our mast will be 2" thick and have antennas a few inches across mounted to it and will thus be quite visible to these birds. Tom explained that the birds have very good night vision, and since they don't crash into trees, they won't likely crash into our antennas or mast. He said at the high elevation where we will be locating the equipment, the birds will be even less endangered, because there are much less clouds than at lower elevations so their vision will rarely be obscured. On Kauai, they have had problems with these birds crashing into streetlights, as though the light attracts them; therefore, he recommended that we not use a strobe light to warn the birds.

4. General description of the action's technical, economic, social, and environmental characteristics.

TECHNICAL CHARACTERISTICS

The equipment we will be placing on the proposed site will consist of the following items:

- a) one receiving Condell radio, 3" x 6" x 3" in size
- b) one transmitting Condell radio, 3" x 6" x 3" in size
- c) one receiving Scala antenna
- d) one transmitting Scala antenna
- e) two 6-volt batteries
- f) two Arco solar panels, each 18" x 30" x 2"
- g) one 5' antenna mast, consisting of 2" metal pipe sunk into the ground
- h) three guy wires to support the antenna mast, each wire 7' long
- i) three bolts, which will secure the guy wires into the adjacent rock
- j) connecting cables that run between the solar panels and batteries, between the batteries and the radios, and between the radios and the antennas
- k) a weatherproof box to store the electronic items in

Please see the attached drawing (Fig. 1).

ECONOMIC CHARACTERISTICS

The cost of the equipment listed above, which the University has bought, is \$1850.00. The cost of maintaining the equipment is estimated to be \$700.00 per year.

Because the project is educational, there should be no impact on the economy in general. No new jobs will be created in connection with the project. Individuals or organizations wishing to visit the seismic drum display at the University may do so free of charge; there they will be able to observe earthquakes being recorded whose signals pass through the telemetry project.

SOCIAL CHARACTERISTICS

Because the project will be situated in an area which is not populated, and rarely if ever visited, there will be minimal social impact. To get to the site from a trail or road, a person would have to walk over at least two miles of rugged aa. It is unlikely that anyone would undertake such a hike. Geologists occasionally might pass through the area when studying Mauna Loa lava flows; these scientists will be alerted to the presence of our antennas on the site.

ENVIRONMENTAL CHARACTERISTICS

The proposed project location is on a spatter cone, shown on the accompanying maps (Figs. 2 & 3). The cone is at an elevation of 7996 feet, and is located on Mauna Loa's northeast rift zone. On the cone, there are scattered pukeawe and ohelo bushes, kukaenene, a few grasses, and an occasional ohia tree. Because the vegetation is so sparse, the telemetry station can be set up without disturbing a single plant. The nearest ohia tree will be over 120 feet away from the proposed site. The cone is made of consolidated basaltic spatter. The surrounding ground is primarily aa, with a slope of about ten degrees; the cone lies in the midst of the Keamoku lava flows. Pahoehoe flows from the 1984 eruption of Mauna Loa wrap around the base of the cone 80 feet below. It is over two miles away from any trail or road.

5. Summary description of the affected environment, including suitable and adequate location and site maps.

The site is located within the Puu Ulaula quadrangle, and is a small spatter cone indicated by the elevation 7996 feet, located about two miles northeast of Puu Kulua (see attached maps, Figs. 2-5).

The environment is primarily basaltic lava flows of aa and pahoehoe. Vegetation consists of sparsely scattered pukeawe, ohelo, and grasses, with an occasional ohia tree on the side of the cone. The closest trail is the one to the summit of Mauna Loa which passes Puu Ulaula, and it is about two miles away. The closest road is for four-wheel drive vehicles, and it is about three miles away (Fig. 7).

The site is located on the northeast rift zone of Mauna Loa, allowing line-of-sight to both the Hawaiian Volcano Observatory and the University of Hawaii at Hilo. Adjacent lava flows include the Keamoku aa flows and pahoehoe from Mauna Loa's 1984 eruption.

6. Identification and summary of major impacts and alternatives considered, if any.

MAJOR IMPACTS

There will be no major impacts on the environment, because the amount of equipment is so small. The equipment will consist of, at most, two radios, two 6-volt batteries, two solar panels (18" x 30" x 2"), two Scala antennas (both mounted on a 5-foot tall, 2" diameter metal pipe supported by guy wires), connecting wires and terminals, and an environmentally protected box to house some of the equipment in. The ground surface to be covered by the equipment will be approximately eight square feet.

The Condel radios will be operating at milliwatts. This small amount of wattage will not pose any kind of health hazard; nor will it be strong enough to affect other existing radio frequencies which normally operate at higher power.

There will be only three minor impacts. The first will be drilling small holes into the rock to bolt guy wires. The second will be the helicopter landing on the ground nearby for assembly and maintenance visits. The third will be the potential for birds flying at dusk to crash into the antenna.

ALTERNATIVES CONSIDERED

1. Puu Kulua. This hill is in an ideal location, but it is unstable because it is a cone of loose cinders. In the event of an earthquake, our equipment could become damaged.

2. Puu Kipu. This hill is covered with large trees. To put an antenna up, it would be necessary to cut down some of the trees, and the antenna would have to be higher than the trees, which would necessitate a thirty-foot mast.

3. Higher along the rift zone. An antenna placed in this area would be far more visible to hikers along the Mauna Loa trail, and thus more susceptible to vandalism, as well as detracting from the wilderness nature of the hike.

7. Proposed mitigation measures, if any.

Drilling holes:

It is essential that we drill three small holes, about 1/2 inch in diameter, so that we can bolt the guy wires which support the antenna mast into the solid rock. To mitigate this effect, we will choose carefully where we drill, selecting the most aesthetically appropriate area, and making sure we drill no more than three holes.

Helicopter landing:

The helicopter will land on the spatter cone in such a manner as to not harm vegetation. The landing spot will be chosen so as to create the least possible disturbance to the ground.

Bird safety:

Our main concern is the safety of birds flying near the area at dusk. To prevent these birds from crashing into the antenna, we plan to use a short antenna mast, only 5 feet in height, constructed of a pole thick enough to be visible to birds. On a recent reconnaissance trip, no birds, feathers, nor other evidence of bird activity was seen on the cone. The antenna mast will be located in an area of the cone where the topography is rough and undulating, so that birds would naturally tend to fly several feet above the ground surface anyway to avoid crashing into the cinder hummocks.

8. Determination.

It has been determined that the impacts on the proposed project site will be very small. The small impacts on the environment will be placing the equipment on the ground surface and drilling three small holes; landing with a helicopter to service the equipment annually; and placing a small antenna in the potential path of birds. Actions will be taken to mitigate all of these effects (see Section 7). We therefore request a Negative Declaration.

9. Findings and reasons supporting determination.

The Department of the Interior, U.S. Geological Survey, has indicated that the site would be appropriate for our project because of the stability of the spatter cone and its difficult access for vandals. Resource Management has provided assurance that there are few plants in the area, and these will not be adversely affected. The State Historic Preservation Division has made it clear that there are no known archaeological or historic sites at the spatter cone we are considering for our project site. DLNR, Forestry and Wildlife, have suggested an appropriate placement of a short antenna mast to protect low-flying birds.

All impacts which are negative will be mitigated (see Section 7).

10. Agencies to be consulted in the preparation of the EIS, if applicable.

Not applicable.

VI. Summary of Proposed Use

The University of Hawaii at Hilo (UHH) would like to place a small radio relay station on the spatter cone described earlier. The relay station would consist of two Condel radios (5" x 3" x 3" in size), one for receiving signals from the Hawaiian Volcano Observatory and one for transmitting them to UHH; two Scala directional antennas which would be mounted on a metal pole about five feet high (supported by three guy wires bolted into the nearby rock); two Arco solar panels (about 18" x 30" x 2" in size); two 6-volt batteries (about the size of a regular car battery); and wires connecting the various pieces of equipment. The electronic equipment will be placed in a weatherproof box to protect it from the elements.

The purpose of the relay station is to transmit seismic signals from the Hawaiian Volcano Observatory (HVO), located on the rim of Kilauea Caldera, down to the University of Hawaii at Hilo. At present, HVO has over 50 seismic stations located at various places on the island, and radio signals from these stations are sent to the observatory building, where they are then recorded on seismic drums and the scientists are able to analyze the earthquakes. The University plans to have signals from five of these stations sent from HVO down to the University's Geology building, to be recorded on seismic drums there. The University has a program for teaching volcano monitoring methods to students, and the seismic drums play an important part in this program.

INFORMATION REQUIRED FOR ALL USES

I. Description of Parcel. A. EXISTING STRUCTURES/USE.

There are no existing structures of any kind on the proposed site, nor within two miles of it. There is minimal use of the site by humans; occasionally a geologist passes through the area when studying rocks. The nearest used land is the trail to the summit of Mauna Loa, which is a little over two miles away; day hikers and back packers frequently use this trail, but it will not be affected by the proposed project.

2. EXISTING UTILITIES.

There are no existing utilities within several miles of the site.

3. EXISTING ACCESS.

There is no existing access to the project site. The nearest road, which is for four-wheel drive vehicles only, is over two miles away. The nearest trail, which is the one leading to the summit of Mauna Loa, is over two miles away. These are shown on an accompanying map (Fig. 7).

To get to the project site to set up the equipment, we plan to fly in by helicopter.

Access will be required initially to set up the equipment; after that, a visit annually for maintenance should be all that is required, unless some unforeseen problem such as a lightning strike requires an additional trip to the site.

D. VEGETATION.

The site was specifically and carefully chosen to be away from plants so as not to disturb them, and so as not to have them interfere with the equipment. The only plants nearby are pukeawe bushes, ohelo bushes, kukaenene, and small grasses. There is an occasional ohia tree along the lower slopes of the cone.

E. TOPOGRAPHY.

The project location is on a small spatter cone, elevation 7996 feet. The surrounding topography displays the typical gentle shield volcano shape of a young volcano, with a slope of about ten percent. The accompanying map shows contour lines (Fig. 3).

F. IF SHORELINE AREA, DESCRIBE SHORELINE.

Area is not a shoreline area.

G. EXISTING COVENANTS, EASEMENTS, RESTRICTIONS.

According to Bill Rosehill, Land Manager at Bishop Estate, we will be allowed to use the site gratis, since the project is educational and will be open to visits by Kamehameha Schools. The arrangement will be subject to periodic review by the Board of Directors of Bishop Estate.

H. HISTORIC SITES AFFECTED.

According to the State Historic Preservation Division, there do not appear to be any known archaeological or historic sites at the spatter cone we are considering for our project site. There is a low probability that any exist out there, since the cone is surrounded on all sides by aa flows. We will be causing minimal ground disturbance, only drilling three small holes to bolt the guy wires in place, with the rest of the equipment resting on the existing ground surface.

II. Description: Describe the activity proposed, its purpose and all operations to be conducted.

The University of Hawaii at Hilo (UHH) would like to place a small radio relay station on the spatter cone described earlier. The relay station would consist of two Condal radios (5" x 3" x 3" in size), one for receiving signals from the Hawaiian Volcano Observatory and one for transmitting them to UHH; two Scala directional antennas which would be mounted on a metal pole about five feet high (supported by three guy wires bolted into the nearby rock); two Arco solar panels (about 18" x 30" x 2" in size); two 6-volt batteries (about the size of a regular car battery); and wires connecting the various pieces of equipment. The electronic equipment will be placed in a weatherproof box to protect it from the elements.

The purpose of the relay station is to transmit seismic signals from the Hawaiian Volcano Observatory (HVO), located on the rim of Kilauea Caldera, down to the University of Hawaii at Hilo. At present, HVO has over 50 seismic stations located at various places on the island, and radio signals from these stations are sent to the observatory building, where they are then recorded on seismic drums and the scientists are able to analyze the earthquakes. The University plans to have signals from five of these stations sent from HVO down to the University's geology building, to be recorded on seismic drums there. The University has a program for teaching volcano monitoring methods to students, and the seismic drums play an important part in this program.

Once a year, it will be necessary for an electronics technician to visit the site to repair and maintain the equipment. This will most likely be done by means of helicopter.

III. Commencement Date: January 1, 1992.
Completion Date: Indefinite.

IV. Type of Use Requested.
Conditional.

Information from Page 4, Master Application Form.

Name and distance of nearest town or landmark.

The nearest landmark is Kulani Hill, which is 6 1/2 miles away. The nearest town is Volcano Village, which is 9 1/2 miles away.

Boundary Interpretation.

The area is over 3000 feet from the boundary of any other Conservation District.

Conservation District Subzone: Protective (green).
County General Plan Designation: Conservation District.

INFORMATION REQUIRED FOR CONDITIONAL USE ONLY

I. Plans, including north arrow and graphic scale.

A. Area Plan.

Show the relationship of the proposed project to existing and future uses in abutting parcels.

There are two abutting parcels. One is the Hawaii Volcanoes National Park, located two miles from the site. Its existing and future uses are for people to hike along existing trails and enjoy nature. The part of the Park within three miles of the site is designated a wilderness area. The other abutting parcel, located half a mile from the site, is owned by the State, and is the Mauna Loa Forest and Game Reserve. This area has been designated a conservation district (Fig. 6).

Identify major existing facilities.

There are no major existing facilities within four miles of the site. The nearest facility of any kind is the National Park Cabin adjacent to Puu Ulaula, which is about four-and-a-half miles away; the Mauna Loa Boys' School building (not used since the 1950s) is just under five miles away; and Kulani Hill, which is about six miles away, has numerous radio antennas on it.

Provide names and addresses of adjacent property owners.

Hawaii Volcanoes National Park
Hawaii 96718

State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

B. Site Plan.

Show the dimensions and shape of the lot.

This is not a lot. The dimensions and shape of the parcel can be seen on TMK 9-9-01 (Fig. 5).

Show existing features, including vegetation, water area, roads, and utilities.

The site plan shows everything within a quarter-mile radius of the project location. There is no water, no roads, and no utilities. Vegetation consists of sparsely scattered ohelo, pukeawe, kukaenene, and grasses, with an occasional ohia tree over 120 feet from the project site (Fig. 8).

C. Construction Plan.

Existing and proposed changes in contours.

The existing contours are of a spatter cone. As the accompanying drawing shows, a small area of about eight square feet will be used for the equipment to rest on. The contours will not need to be changed for the small area used (Fig. 9).

Buildings and structures, open space and recreation areas.
Not applicable.

Landscaping, including buffers.

A few rocks from the area will be piled up around the equipment to protect it, as shown in the accompanying drawing (Fig. 9).

Roadways, offstreet parking area, existing and proposed drainage, proposed utilities and other improvements, revegetation plans, drainage plans, grading, trenching, filling, dredging, soil disposal.
Not applicable.

D. Maintenance Plans.

The proposed project is an unmanned communications facility. Once a year, an electronics/telemetry technician will visit the site to inspect the equipment, replace worn parts, and make sure everything is in top shape.

Should a part of the equipment become damaged and/or inoperable between the annual maintenance visits, the technician would need to visit the site at such time as well. An example of this would be a lightning strike, which could harm the radios.

E. Management Plans.

No animal, plant, or mineral resources will be used.

F. Historic or Archaeological Site Plan.

There do not appear to be any historic nor archaeological sites. (See pages 2, 12.)

II. Subzone Objective.

Demonstrate that the intended use is consistent with the objective of the subject Conservation District Subzone.

"The objective of the Conservation District Subzone is to protect valuable resources in designated areas as restricted watersheds; marine, plant, and wildlife sanctuaries, significant historic, archaeological, geological, and volcanological features and sites, and other designated unique areas."

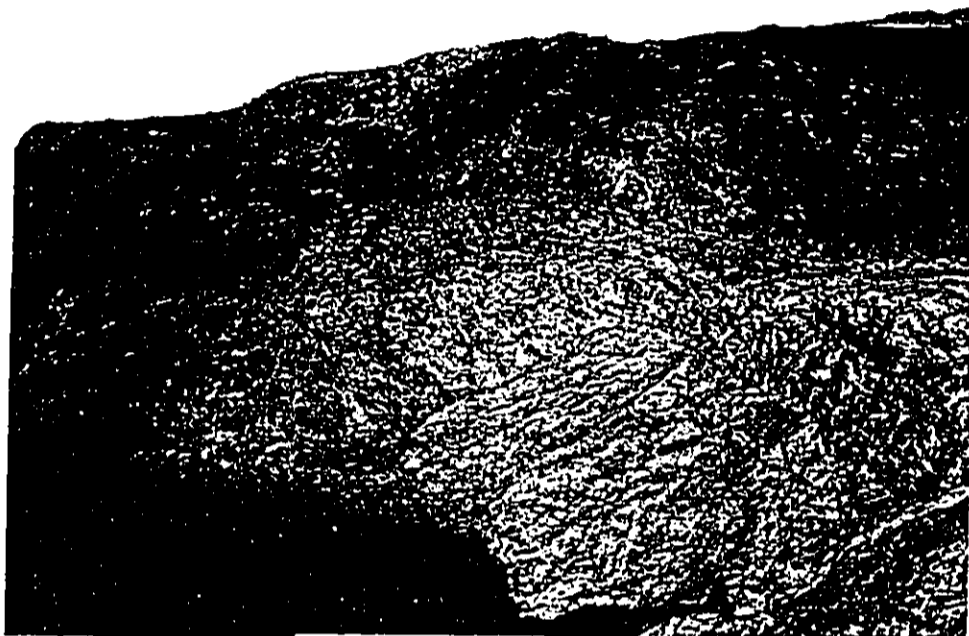
The intended use of the proposed project is consistent with this objective. The project is small in scale and will have virtually no damaging effects on the environment. It is educational, and the telemetry site will serve a non-profit, public purpose.

Photographs

DOCUMENT CAPTURED AS RECEIVED



DOCUMENT CAPTURED AS RECEIVED



Aerial view of Cone 7996. Lava flows
from Mauna Loa's 1984 eruption (black)
surround the cone.



view from Cone 7996 looking
downslope towards Hilo.

DOCUMENT CAPTURED AS RECEIVED



Vegetation on the cone is sparse and scattered.
The telemetry equipment is small enough that it
can be set up without disturbing the plants.



Typical vegetation on the cone includes kukaenene.
The rock hammer provides scale.

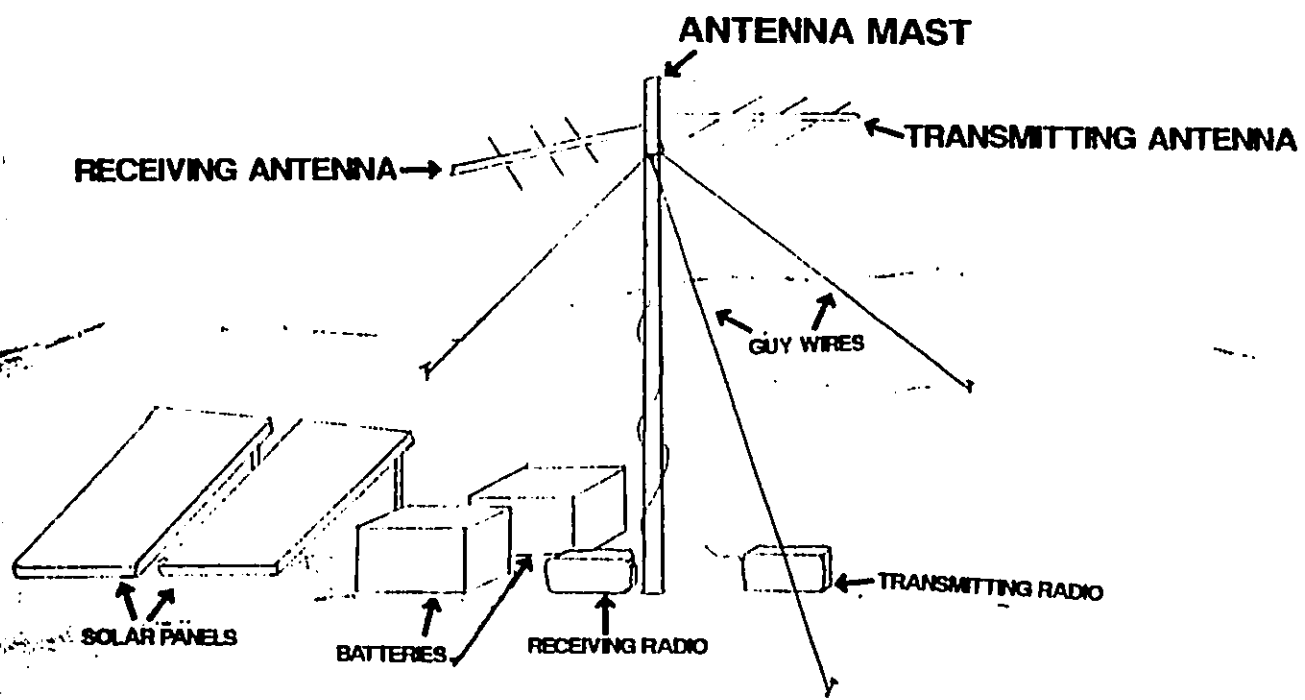
DOCUMENT CAPTURED AS RECEIVED



There are a few ohia trees on Cone 7996.

DOCUMENT CAPTURED AS RECEIVED

Illustrations



SCALE

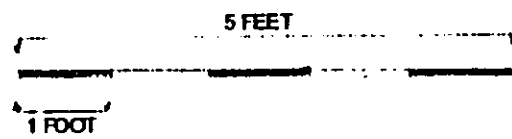
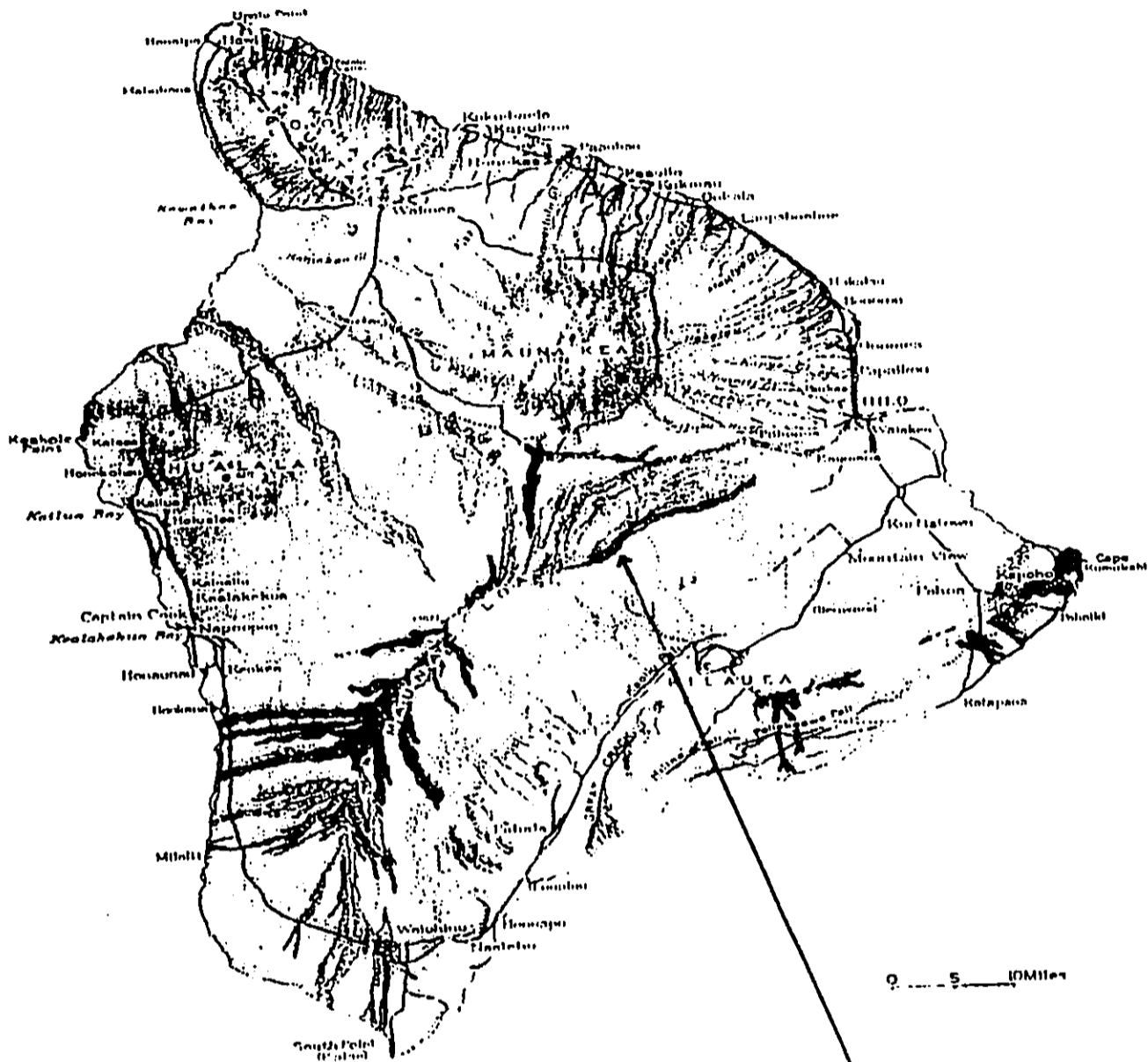
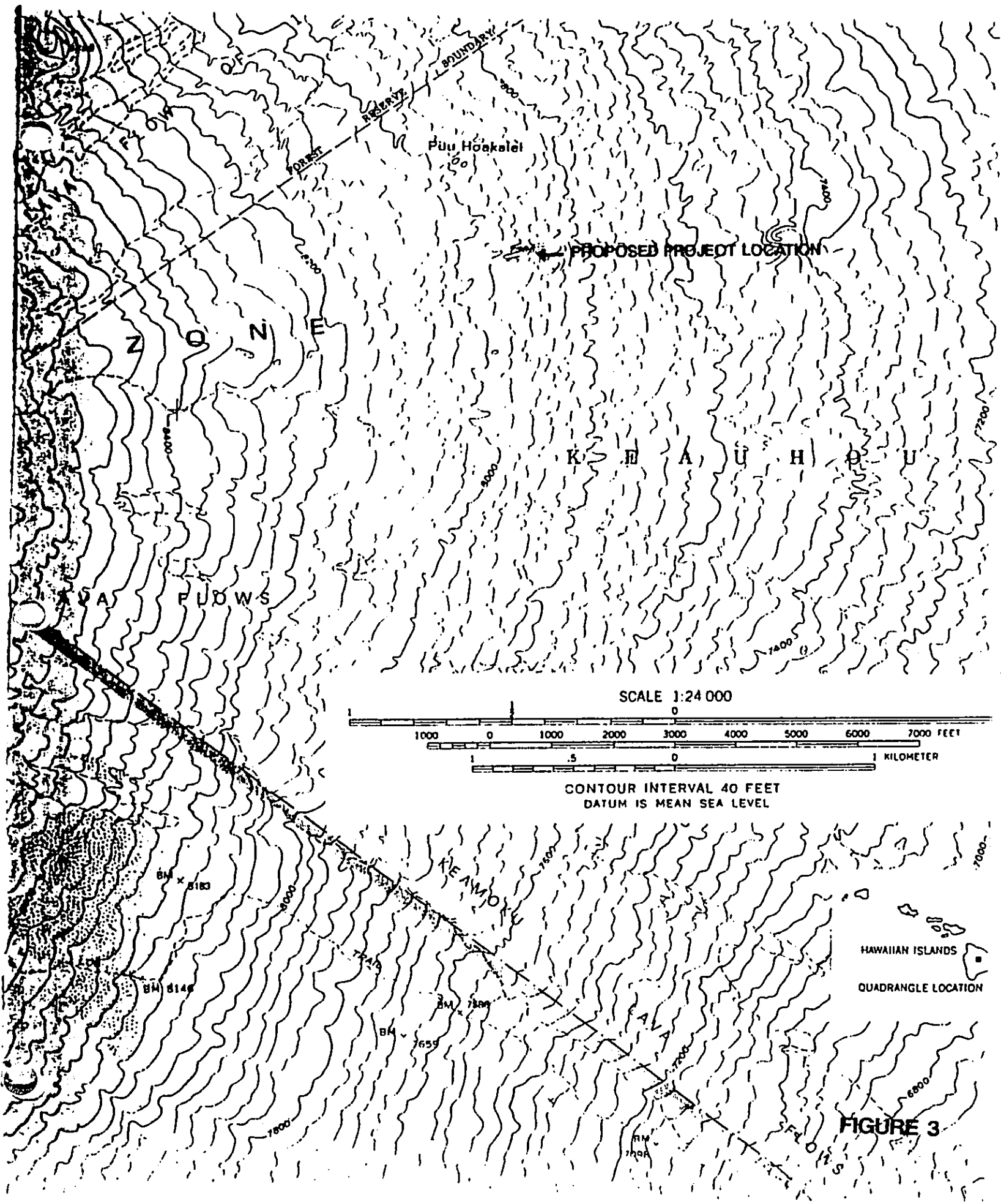


FIGURE 1



PROPOSED PROJECT SITE

FIGURE 2



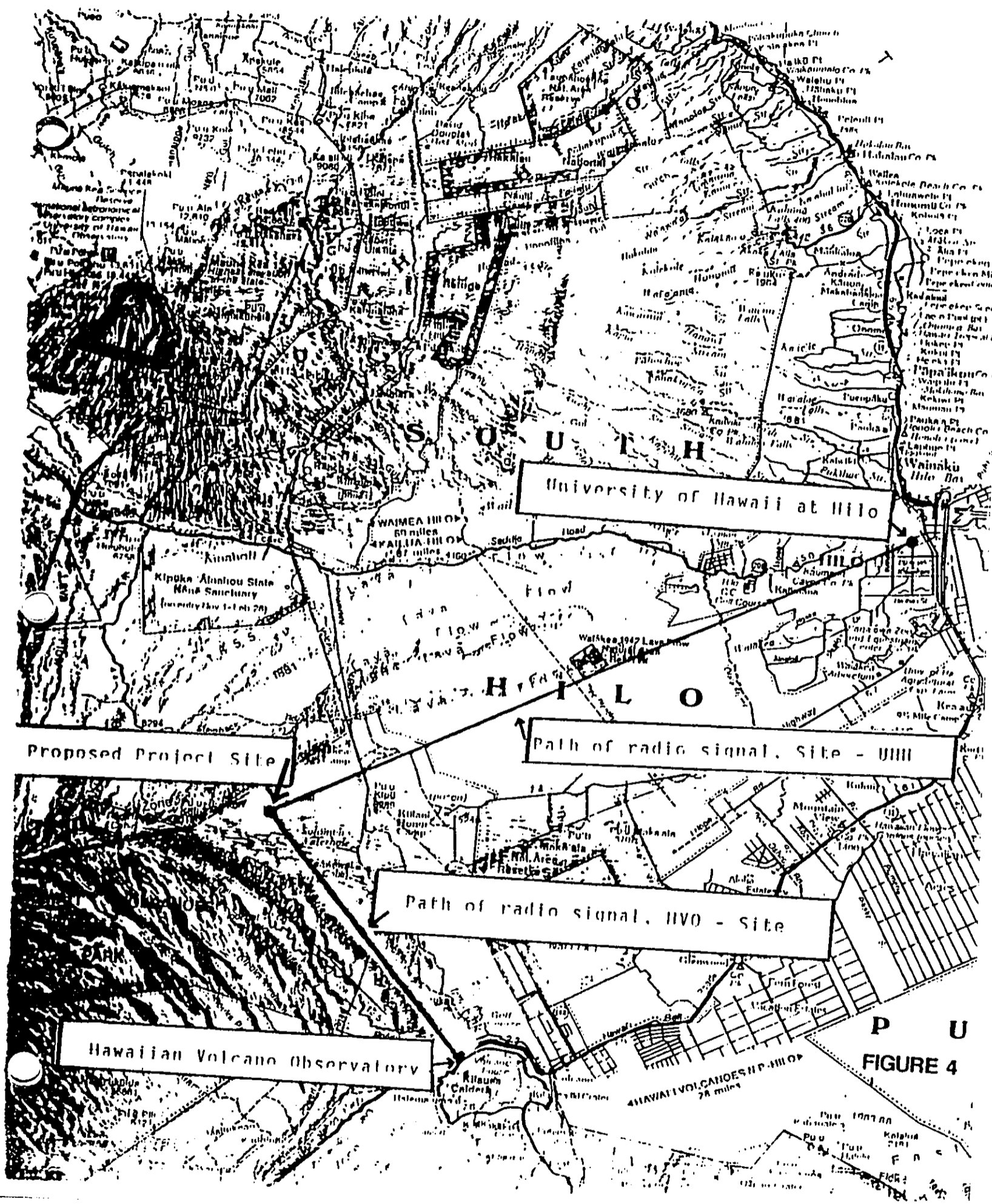
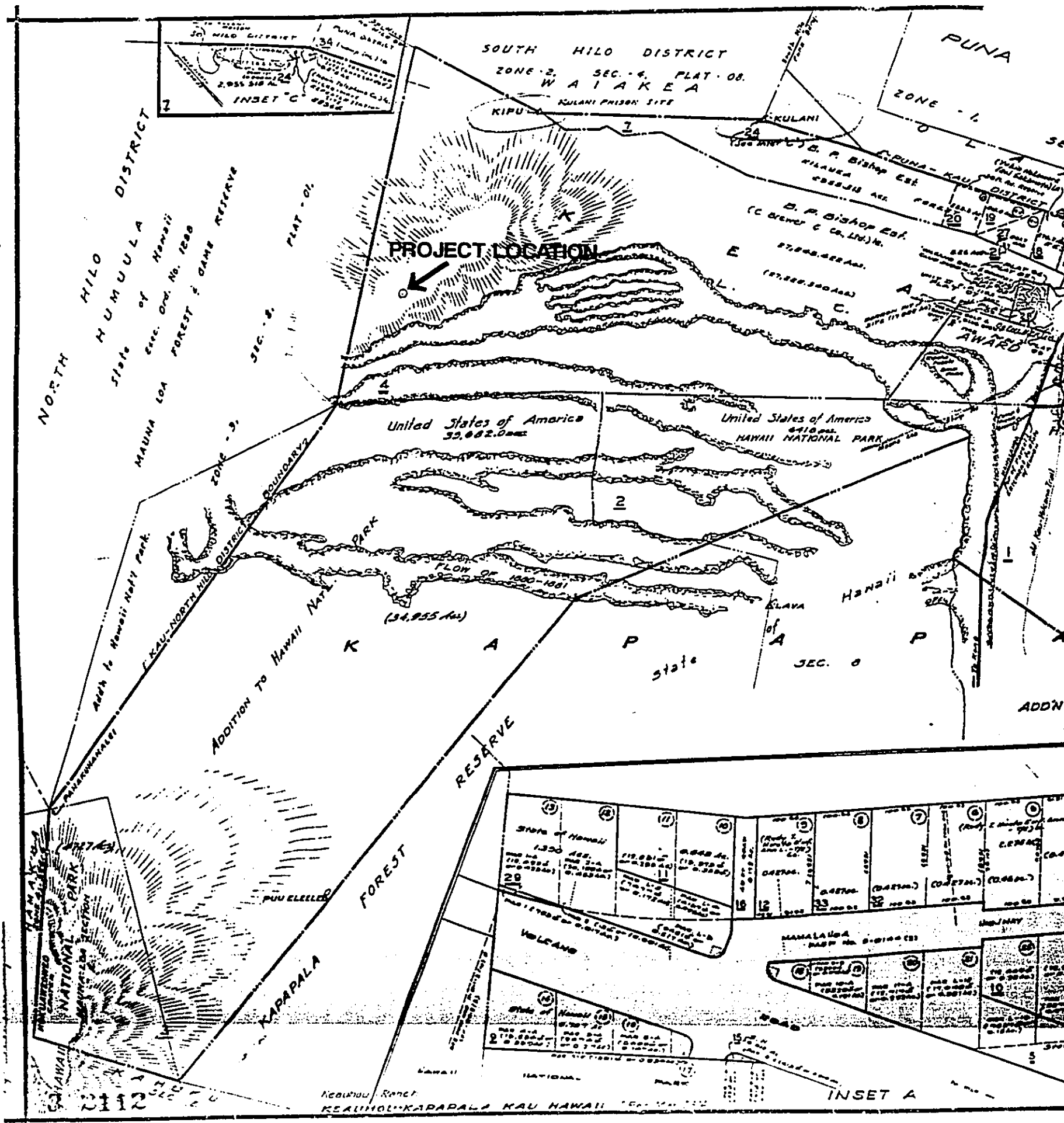
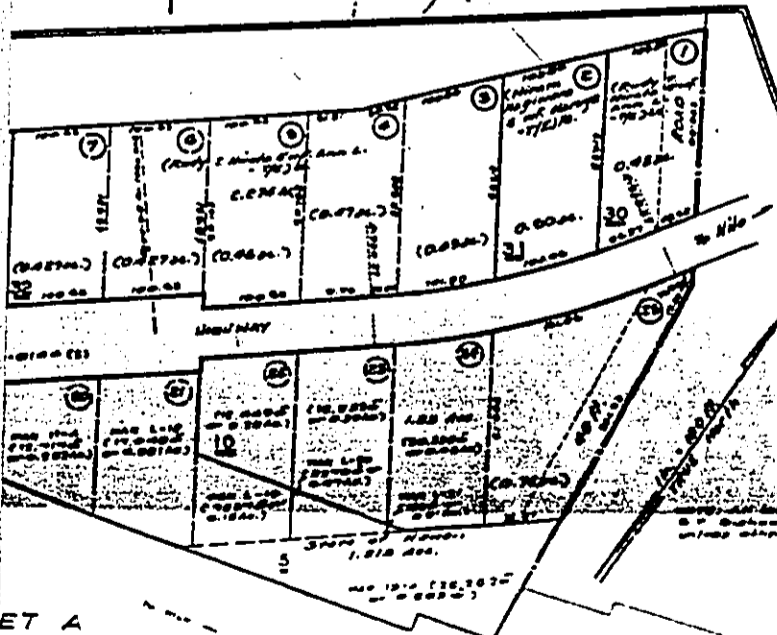
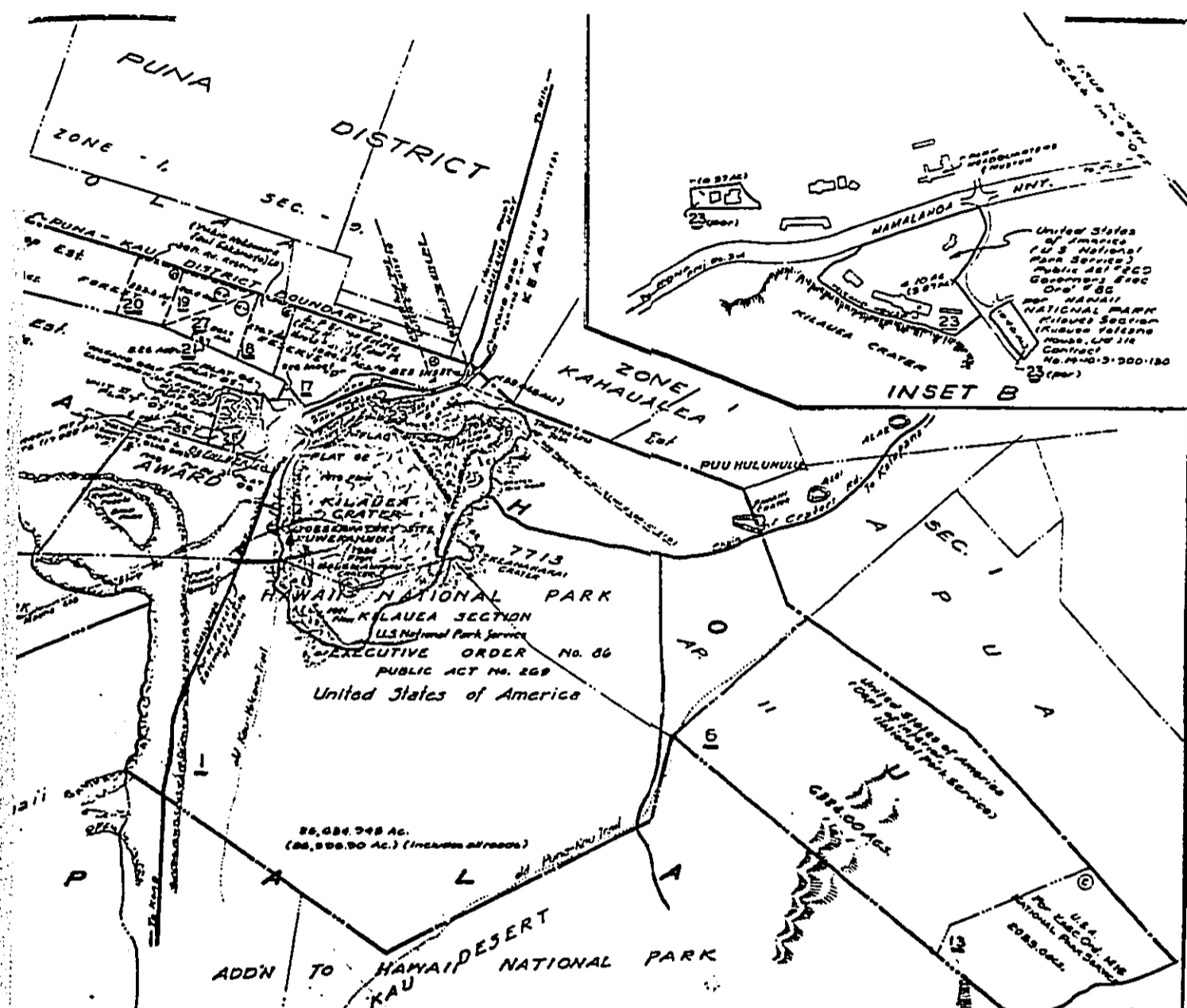


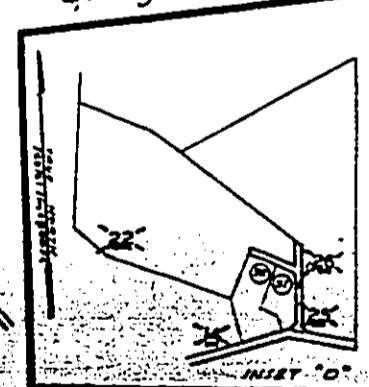
FIGURE 4

FIGURE 5





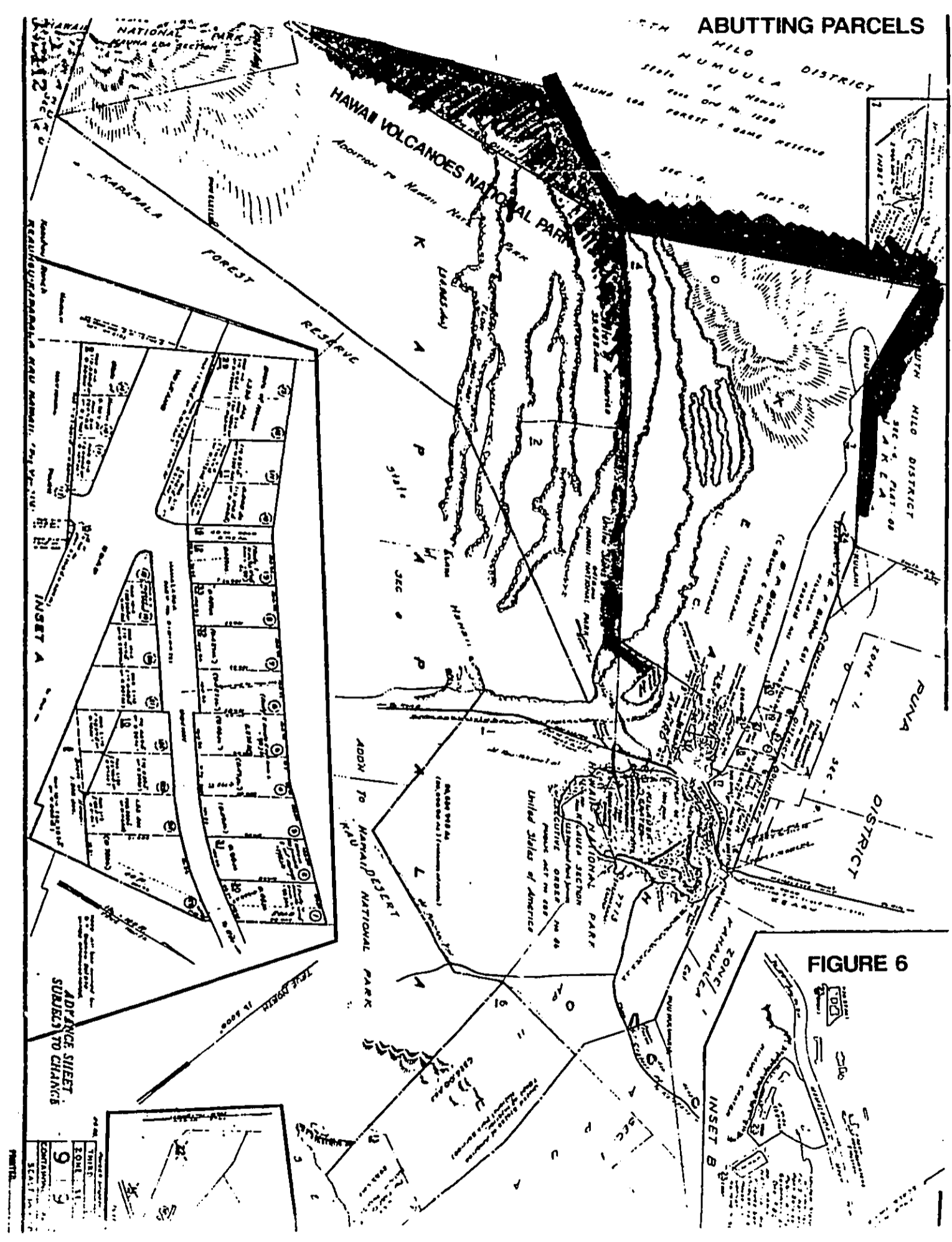
ADVANCE SHEET
SUBJECT TO CHANGE



Parcel Dropped: 2, 14, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

THIRD DIVISION		
ZONE	SEC.	PLAT
9	9	01
CONTAINING PARCELS		
SCALE: 1 in = 5000 ft		

PRINTED



SHEET NO. 9
 CONTAINS
 SECTION 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

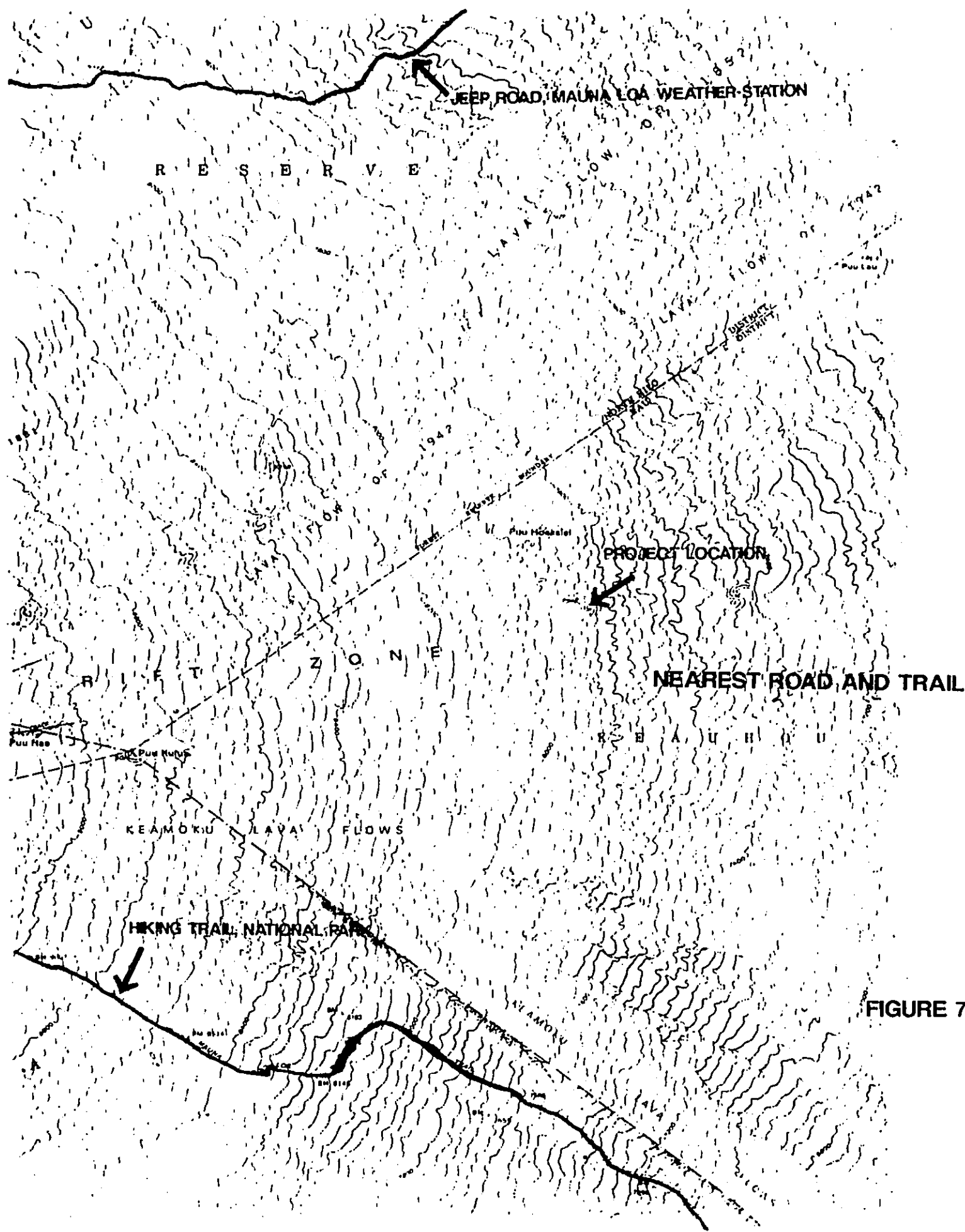


FIGURE 7

SITE PLAN

SHOWING VEGETATION, ROADS, WATER, AND UTILITIES WITHIN 1/4 MILE OF PROJECT

Project Location



N

(Note: No roads, water, or utilities exist within 1/4 mile of site)

VEGETATION KEY



OHA TREES

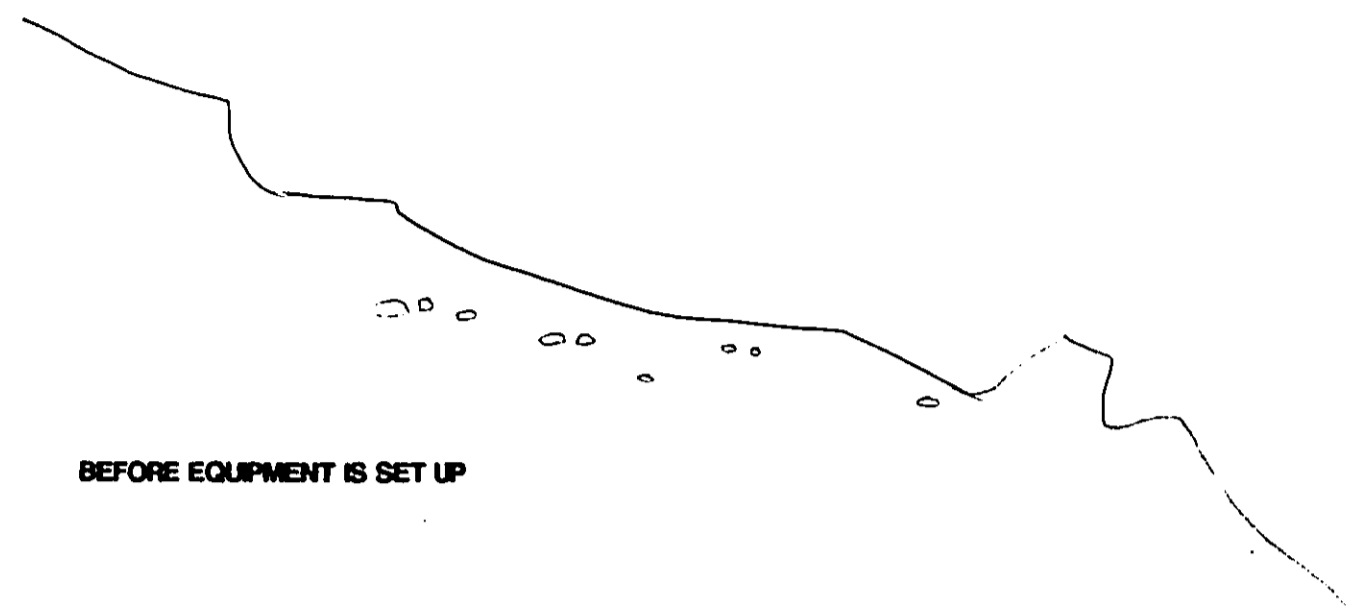


PUKEAWE, OHELO, AND GRASSES

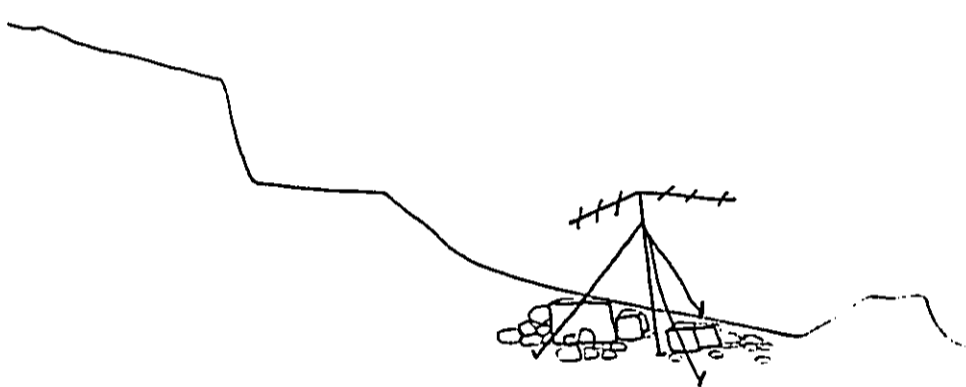
SCALE

1/4 MILE

FIGURE 8



BEFORE EQUIPMENT IS SET UP



AFTER EQUIPMENT IS SET UP

SCALE
—
5 FEET

SKETCH OF EQUIPMENT ON THE CONE

FIGURE 9