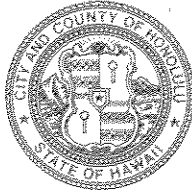


DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.cc.honolulu.hi.us

JEREMY HARRIS
MAYOR



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RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2001/ED-15

01 DEC 21 P1:55

December 20, 2001
OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

Honorable Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
State Office Tower, Room 702
235 South Beretania Street
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Acceptance Notice for Koko Head District Park Master Plan
& Koko Head Shooting Complex Improvements
Tax Map Keys 3-9-12: por. 1 and 10
Final Environmental Impact Statement (FEIS)

We are notifying you of our acceptance of the FEIS for the proposed District Park Master Plan and Shooting Complex improvements, as satisfactorily fulfilling the content requirements of the Environmental Impact Statement Rules, Section 11-200-18, Hawaii Administrative Rules (HAR) and Chapter 343, Hawaii Revised Statutes (HRS).

Pursuant to procedures contained in Section 11-200-23(c), HAR, this Acceptance Notice should be published in The Environmental Notice.

We have attached our Acceptance Report of the FEIS for the proposed Koko Head District Park Master Plan and Koko Head Shooting Complex Improvements and the "The Environmental Notice Publication Form."

If you have any questions, please contact Steve Tagawa of our staff at 523-4817.

Sincerely yours,

Randall K. Fujiki
for RANDALL K. FUJIKI, AIA
Director of Planning
and Permitting

RKF:cs
Attachments

cc: Group 70 International, Inc.
DDC (Stan Kuroda)

DN131747

2001- Oahu - FEIS -
Koko Head Park

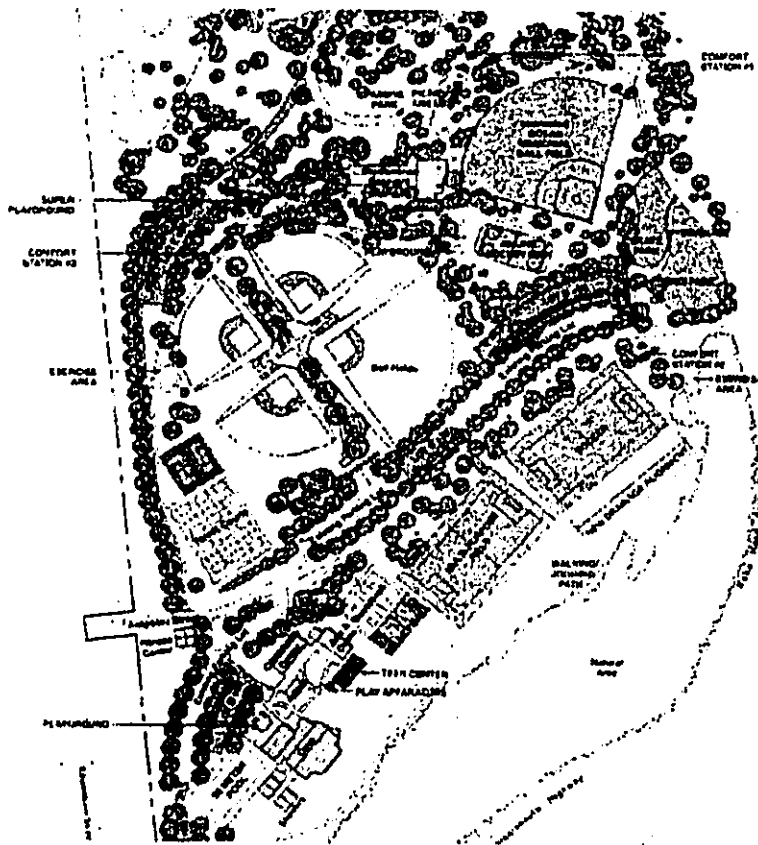
JAN 8 2002

FILE COPY

**Koko Head District Park Master Plan
and
Koko Head Shooting Complex Safety Improvements**

East Honolulu, Island of O'ahu, Hawai'i

Final Environmental Impact Statement



Applicant:

The Department of Design and Construction
City and County of Honolulu

Prepared By:

Group 70 International, Inc.
Architecture • Planning • Interior Design • Environmental Services
Honolulu, HI

December 2001

DEPT. OF PLANNING
OFFICE OF THE
C & C OF HONOLULU

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**Koko Head District Park Master Plan
and
Koko Head Shooting Complex Safety Improvements**

East Honolulu, Island of O'ahu, Hawai'i

TMK: 3-9-12:10 and Portions of 1

Final Environmental Impact Statement

This environmental document is prepared pursuant to Chapter 200 of Title 11, Administrative Rules, Department of Health, "Environmental Impact Statement Rules."

Proposing Agency:

Department of Design and Construction
City and County of Honolulu

The preparation of this document were under my direction.



Rae M. Loui, P.E., Director
Department of Design and Construction

December 10, 2001

Date

Accepting Authority:

Department of Planning and Permitting
City and County of Honolulu

Prepared By:

Group 70 International, Inc.
Architecture • Planning • Interior Design • Environmental Services
925 Bethel Street, 5th Floor
Honolulu, HI 96813

December 2001

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TECHNICAL APPENDICES

- A. Kramer One (June 16, 2001)
- B. Koko Head Firing Range Initial Soil Sampling; PSI (April, 3 2001)
- C. Geotechnical Investigation; Masa Fujioka and Associates (March 30, 2001)
- D. Archaeological and Cultural Assessment for the Proposed Koko Head District Park Master Plan and Shooting Complex Safety Improvements; Jeff Pantaleo Consultants, LLC (JPC) June 18, 2001.
- E. Historical Documentary Research: Kawaihoa-Kuamo'okane Hanauma, Kohelepelepe – The Koko Head Nature Preserve; Kumu Pono Associates (October 1998)
- F. Archaeological Inventory Survey of Eight Areas Within the Koko Head Regional Park, Maunalua Ahupua'a, Island of O'ahu; Cultural Surveys Hawai'i (November 1998)
- G. Archaeological Field Inspection Survey Koko Head Regional Park: Koko Head Regional Park Resource Plan Project; Paul Rosendahl, Ph.D., Inc. (November 1988)
- H. Botanical Study: Koko Head Regional Park & Nature Preserve, East Honolulu, Island of O'ahu; Char & Associates (November 1998)
- I. Additional Botanical Studies: Koko Head Regional Park & Nature Preserve, East Honolulu, O'ahu; Char & Associates (November 1998)
- J. Survey of The Avifauna and Feral Mammals at Koko Head and Koko Crater, O'ahu, Hawai'i; Phillip L. Bruner (May 1988)
- K. Traffic Impact Analysis Report, Phillip Rowell and Associates (July 14, 2001)
- L. Koko Head Shooting Range and District Park, Civil Engineering. SSFM International, Inc. (July 18, 2001)
- M. Acoustic Study for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements, Y. Ebisu and Associates (July 2001)

~~N. Preliminary Design Concepts for the Proposed Park Elements of the Koko Head District Park Master Plan, Working Notes and Reference Materials~~

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Section 1.0

Summary

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1.0 SUMMARY

1.1 PROJECT INFORMATION SUMMARY

Project Name: Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements

Applicant: Department of Design and Construction
City and County of Honolulu
650 S. King Street, 9th Floor
Honolulu, Hawai'i 96813
Contact: Stanford Kuroda, Project Manager
(808) 523-4755, skuroda@co.honolulu.hi.us

Accepting Authority: Department of Planning and Permitting
City and County of Honolulu

Planning/Environmental Consultant: Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813
Contact: Jeffrey Overton AICP
(808) 523-5866, Ext. 104, joverton@group70int.com

Tax Map Keys: 3-9-12: 10 and portions of 1

Land Area: Total of approximately 109 acres: Koko Head District Park is approximately 59 acres (includes former Job Corps area) and the Koko Head Shooting Complex is approximately 50 acres.

Location: 423 Kaumakani Street, 8120 Kalaniana'ole Highway
East Honolulu, O'ahu (Figure 1-1)

Ownership: City and County of Honolulu

Existing Uses: Koko Head District Park
Koko Head Shooting Complex

Proposed Use: Upgrade Existing Park Facilities

State Land Use District: Conservation

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East Honolulu Sustainable Communities Plan

Urban Land Use Map Designation: Major Parks and Golf Courses

East Honolulu Sustainable Communities Plan

Open Space Map Designation: Regional, District and Beach Parks

East Honolulu Sustainable Communities Plan

Public Facilities Map Designation: Major Parks and Golf Courses

City and County Zoning District: P-1 Restricted Preservation

Special Management Area: Within the SMA Zone

Permits Required: SMA, CDUA, construction

1.2 PROJECT SITE

The project site encompasses the City and County of Honolulu's Koko Head District Park and the Koko Head Shooting Complex. Koko Head District Park is located at 423 Kaumakani Street, Honolulu, Hawai'i on Tax Map Key: 3-9-12: 10 and a portion of parcel 1. The former Job Corps area is planned to be included into the Koko Head District Park. The Koko Head Shooting Complex is located in East Honolulu at 8120 Kalaniana'ole Highway, adjacent to the Koko Head District Park, on TMK: 3-9-12:1. The Shooting Complex is situated within Kahauloa Crater, a small crater next to Koko Crater (Figure 1-1).

1.3 PROPOSED ACTIONS

The City and County of Honolulu prepared a Master Plan for the Koko Head District Park which incorporates the former Job Corps site and expanded recreational facilities. New facilities include picnic areas, soccer and multi-purpose fields, in-line hockey and skating facilities, walking paths, additional tennis courts, playground facilities, a 50-meter pool, additional parking and improved road circulation.

The City is also proposing to design and construct safety improvements at the adjacent Koko Head Shooting Complex. Proposed improvements include a combination of earthwork, horizontal bullet catchers, and limited paving to the existing pistol, rifle and metallic silhouette ranges, site clearance for a new archery range, grading for additional parking, accessory improvements to the Range Master's facilities, fencing, signage and improved administrative controls. The installation of baffles is an anticipated future safety improvement.

Recent clay fragments from the shot ranges have been found along Koko Head Park Road. For safety measures, range consultant Kramer One, recommends closure of Koko Head Park Road from Kalaniana'ole Highway. The road will remain operational and available for emergency uses only.

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

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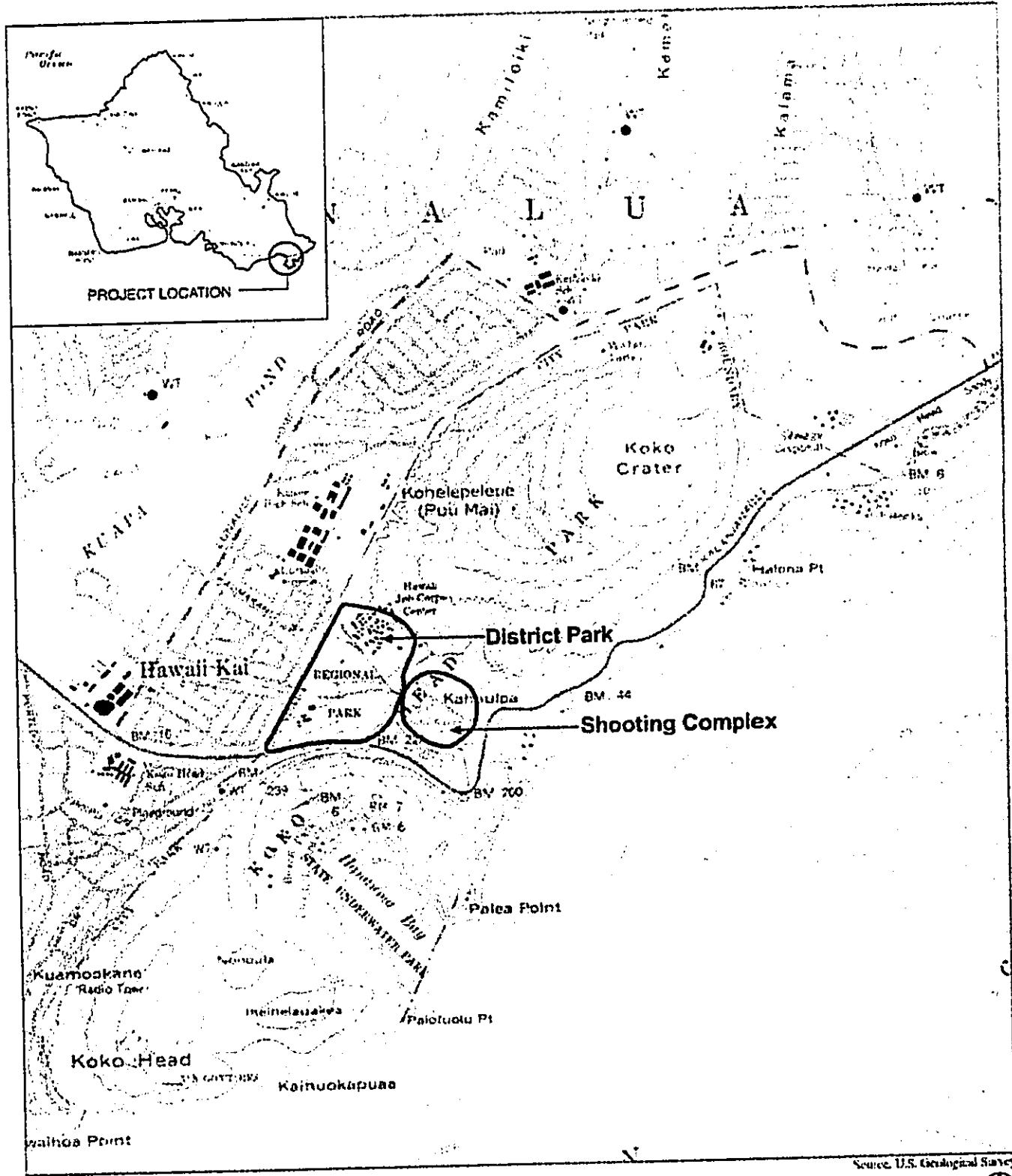


Figure I-1
Location Map

GROUP 70

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

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1.4 REASONS FOR PREPARING THIS ENVIRONMENTAL IMPACT STATEMENT

The proposed actions that are described in this Environmental Impact Statement (EIS) involve the use of County land and funding and the development in the Conservation District. Both of these actions trigger the application of Chapter 343, Hawai'i Revised Statutes (HRS), and the Environmental Impact Statement Rules, Title 11, Chapter 200 of the Hawai'i Administrative Rules (HAR). This EIS has been filed with the State of Hawai'i's Office of Environmental Quality Control (OEQC) for publication in the Environmental Notice, and copies have been distributed to concerned and interested parties, as required under the EIS Rules.

1.5 SIGNIFICANT BENEFICIAL AND ADVERSE IMPACTS

The planned improvements are intended to improve and expand recreational facilities at the District Park and enhance safety at the Shooting Complex.

As such, the significant impacts of these improvements are anticipated to be largely beneficial. These are briefly enumerated below. Also listed below are the few adverse impacts that are expected to occur. Relative to the benefits that will occur, the adverse impacts are not considered significant.

1.5.1 Beneficial Impacts

- The new facilities and improvements to existing facilities will expand recreational opportunities offered at the District Park and Shooting Complex.
- The abandoned Job Corps Site will be redeveloped in an aesthetically pleasing manner and it will be accessible to the public.
- New passive recreational activities will provide new opportunities for the public to experience the natural beauty of the area.
- Public safety will be increased as a result of safety improvements to the Shooting Complex.
- None of the planned improvements will effect existing traditional Hawaiian archaeological site and no important cultural resources will be affected.
- The two historic structures in the project area will be retained.
- New jobs will be created to staff the new recreational facilities at the District Park.

1.5.2 Adverse Impacts

- Use and enjoyment of the Koko Head District Park and Shooting Complex will be disrupted by construction activities.

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- New recreational activities, such as the planned 50-meter swimming pool, the teen center and the backboards at the tennis court may generate increased noise in the area.
- Access into Koko Head District Park from Kalaniana'ole Highway will be eliminated for safety purposes related to the operation of the Shooting Complex. This entrance is presently rarely used. Primary access to the District Park will continue along Anapalau and Kaumakani Streets.
- New and improved landscaping in the District Park will increase water usage for irrigation purposes.
- An increase in the number of visitors to the District Park is expected as a result of the expanded recreational facilities. As a result, traffic in the area will be increased.

1.6 PROPOSED MITIGATIVE MEASURES

Very few potential adverse impacts are anticipated to result from the planned improvements and relative to the benefits that will occur, they are not considered significant. Mitigative measures that will be implemented to minimize these potential impacts, as well to address and eliminate other potential adverse impacts, are as follows:

Construction Impact Mitigation – Potential impacts due to construction activities will be limited by following best management practices and applying soil stabilizers during site work to minimize dust generation. Project phasing will be implemented to minimize the closure of District Park and Shooting Complex facilities as much as possible during construction.

Noise Mitigation – Noise mitigation measures in the form of administrative controls and supervision will be planned at the 50-meter swimming pool, playground, and Teen Center. The teen center and backboards at the new tennis court will be designed to minimize the effect of noise on the surrounding residential neighborhood. Administrative controls such as limiting nighttime range operations are intended to mitigate noise impacts at the Shooting Complex.

Traffic Mitigation – The proposed phased development of the park will stage traffic growth in three phases over the next 10 years. A fence or chain link along Koko Head Park Road near Kalaniana'ole Highway will be used to restrict daily use of the roadway while keeping the access available for emergency purposes. Other considerations should be considered in the future to offset the traffic generated by the park. Alternative means of travel, such as buses, shuttle vans and bicycles, will be supported to reduce the number of vehicular trips to and from the park.

Water Conservation Measures - Dry-land landscaping materials will be used wherever possible to reduce the demand for irrigation.

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

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1.7 ALTERNATIVES

Four alternatives to the planned improvements range from 1) doing nothing, to 2) relocating the Shooting Complex, to 3) providing for more intensive recreational use of the District Park, to 4) alternative baffling system at the Shooting Complex.

No Action – This alternative would have significantly less beneficial and relatively more adverse impacts than will the completion of the planned improvements.

Relocated the Shooting Complex - Studies have not been able to find suitable alternative locations for the shooting complex.

More Intensive Use of Koko Head District Park - This alternative include a wide range of proposed uses (such as a funicular railway to the summit of Koko Crater, archery, and outdoor concert arena) that would pose significant impacts on the community and other recreational activities were given higher priorities.

Extent of Baffling System at Koko Head Shooting Complex - This alternative would include the provision of precast concrete overhead baffling panels and sidewalls along with ground baffling and trap berms with ricochet catchers. This alternative has high costs including a combination of earthwork, horizontal bullet catchers, and limited paving, along with improved administrative controls.

1.8 UNRESOLVED ISSUES

Three unresolved issues have been identified:

1. Closing the public trails along Koko Crater;
2. Prioritization of the development of the in-line hockey rink; and
3. The extent of fencing around the Shooting Complex.

Resolution of these issues is not necessary for the planned improvements to proceed.

1.9 COMPATIBILITY WITH LAND USE POLICIES AND PLANS

The planned improvements are fully compatible with State and City and County land use policies, plans and regulations related to the natural environment and recreation. They are consistent with and permitted by applicable land use designations and, as enumerated above and in Section 5, will contribute in a wide variety of ways to the implementation of stated goals, objectives and policies.

1.10 REQUIRED APPROVALS AND PERMITS

Three major approvals and permits are required in order for this project to proceed.

- Acceptance of the Final Environmental Impact Statement by the City Department of Planning and Permitting

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

• Final Environmental Impact Statement •

- Approval of a Special Management Area Use Permit by the Honolulu City Council.
- Issuance of a Conservation District Use Permit by the State Board of Land and Natural Resources.

Section 2.0

Purpose and Need for the Proposed Actions

2.0 PURPOSE AND NEED FOR THE PROPOSED ACTIONS

The purposes of the proposed actions described in this EIS are two-fold:

- To expand recreational opportunities at the Koko Head District Park; and
- To improve safety conditions at the Koko Head Shooting Complex.

2.1 PURPOSE AND NEED FOR KOKO HEAD DISTRICT PARK MASTER PLAN

In order to accommodate growing needs for recreational activities in East Honolulu, the City and County of Honolulu in collaboration with the Hawai'i Kai community has developed a Master Plan for Koko Head District Park. The purpose of the Master Plan is to provide the City and County of Honolulu Department of Parks and Recreation with strategies and guidelines for the future development and use of the Koko Head District Park. The Plan is to serve as a guide for funding decisions with respect to future capital improvements, recreational programs, and operation and maintenance budgets. Specific improvements described in the Plan are intended to indicate a recommended general course of action for the next 10 to 20 years, based on needs and preferences expressed by community representatives, rather than to provide a rigid blueprint and timetable for future capital improvements projects.

The Regional Park was created in 1928 and the District Park was created in 1975 in order to meet the needs for community-wide recreational facilities in the rapidly developing Hawai'i Kai community. Since 1990, there have been several Master Plans for the District Park and Job Corps site. In 1990, a draft master plan for the District Park was prepared which proposed new facilities including picnic areas, tennis courts and a practice wall, a skateboard area, play apparatuses and parking. In 1992, The Koko Head Park Master Plan recommended that the Hawai'i Job Corps relocate and the expansion of the District Park was included as one of the suggested new uses for the area. In 1995, the year that Job Corps vacated the property, another master plan was developed that recommended utilizing the site for the expansion of the District Park. Recommended new recreational facilities and areas included archery, disc golf and passive recreational areas and pathways for picnics, walking and jogging, roller bladers and bicyclists, etc.

The planned improvements at the District Park represent steps to implement goals of the East Honolulu Sustainable Communities Plan (1999). A brief overview of this project's planned improvements as they relate to elements of the East Honolulu Sustainable Communities Plan's is described below. A full description of the project is contained in Section 3. How it further relates to the East Honolulu Sustainable Communities Plan is described in Section 5.

The East Honolulu Sustainable Communities Plan includes several policies and planning principles and guidelines regarding community-based parks such as Koko Head District Park. These include the following:

- *Increase the inventory of community-based parks, when feasible, to provide sports and recreation facilities for East Honolulu residents in appropriate locations.*

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- *Modify recreation facilities in existing parks ... to respond to changing demographic profiles or recreational needs.*
- *Expand active recreational facilities at Koko Head District Park by incorporating and developing the adjacent Job Corps site.*
- *Have master plans for development of new parks or redevelopment of existing parks provide for facilities and accessible pathways from surrounding streets to facilitate pedestrian and bicycle access to parks.*

The planned improvements at the District Park will increase the recreational opportunities in the Hawai'i Kai area as recommended in the East Honolulu Sustainable Communities Plan.

2.2 PURPOSE AND NEED FOR SHOOTING COMPLEX SAFETY MODIFICATIONS

The Koko Head Shooting Complex is an essential and active outdoor rifle range facility. The primary purpose of the modifications to existing facilities is to improve safety conditions.

Historically, the Range has been in its present use pattern since September 1937. As the only outdoor weapons firing range, the need to provide a safe training and outdoor recreational venue for Honolulu Police Department (HPD) personnel and the general public alike is continually growing. Active and reserve sworn officers of the Honolulu Police Department train daily at the Range to ensure competency in meeting their obligations of serving and protecting our community. At the present time, approximately 3,000 civilian recreational shooters use the Range facility each month. In addition to the general public, the HPD trains at the range and approximately 200 officers use the range facilities monthly.

The pistol, rifle and silhouette ranges at the Shooting Complex currently face toward the northeast and use the southwestern side of the outer slopes of Koko Crater as their impact area and safety fan. In recent years, stray rounds have been found as far away as the Hanauma Bay parking lot, on the crater rim walls, and in close proximity to the Job Corps Center entry road. In addition, stray shotgun pellets have been found on a portion of Koko Head Park Road. Incident reports regarding the findings of expended bullet shells beyond the Shooting Complex has raised public concern regarding the safety provisions at the shooting range. Furthermore, the use of hiking trails to the summit of Koko Crater is visible from Shooting Complex. Continued use of the hiking trail, without further safety improvements, could present a potential safety hazard to hikers.

Bullet ricochet events seem to have subsided or been eliminated since the City instituted the last series of changes to the range in 1997 and 1998. However, the need to improve safety features at the Shooting Complex remains a priority and the proposed modifications are intended to improve public safety. The makai portion of Koko Head Park Road will be closed as part of the safety improvements.

Section 3.0

Project Description

3.0 PROJECT DESCRIPTION

This section describes both of the projects covered in this EIS -- the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements.

3.1 KOKO HEAD DISTRICT PARK MASTER PLAN

The Koko Head District Park currently provides active recreational activities including baseball, softball, tennis, basketball, volleyball, meetings, aerobics, and arts and crafts. To meet growing demands in the Hawai'i Kai community, the Master Plan recommends incorporating the former Job Corps site into the District Park in order to expand recreational facilities. Recommended new facilities include picnic areas, soccer and multi-purpose fields, a full-size baseball field, an in-line hockey skating rink, walking paths, a super playground, a tot lot, a teen center, additional tennis courts, a skate park, and a 50-meter olympic sized pool. The Master Plan also recommends a new road through the former Job Corps site and additional parking for vehicles and bicycles. ~~General planning design guidelines are noted in Appendix A.~~

Table 3-1 outlines and describes the existing and planned key park elements of the Koko Head District Park Master Plan. Figure 3-1 depicts existing conditions at the site while Figure 3-2 illustrates the Conceptual Site Plan.

3.1.1 Passive Recreation Facilities

The District Park is now primarily an active recreation park. The addition of passive areas for quiet enjoyment is planned in reflection of the need for greater and more diverse recreational opportunities in a growing community.

A large portion of the Job Corps site is planned for passive recreational use (Figure 3-2). The plan envisions scattered picnic facilities in areas that best take advantage of the scenic views. Much of the existing natural wooded vegetation is expected to remain, with additional plantings provided as needed to enhance the attractiveness of the environment for picnicking and other forms of passive recreational use.

3.1.2 Baseball/Softball

There are currently five fields for softball and baseball at the District Park. Four are located in a cluster near the makai entrance of the Park. The fifth and newest field is located at the entrance of the former Job Corps site, known as Goeas Memorial Ballfield. These ballfields currently support regional league tournaments as well as community-wide practice and play.

Improvements to the ballfield complex include: expanding and reorienting Goeas Field to a full-size baseball field, increasing the number of parking stalls, and adding a bathroom facility near Goeas Field and lit with 90' high poles for night use. The expansion of Goeas Field will provide a full-size baseball field for older youth and adults. For safety purposes, Goeas Field will be reoriented to minimize interference with skating activities.

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Table 3-1: Existing and Planned Key Park Elements

ACTIVITY	FACILITY DESCRIPTION
PICNIC AREAS	Create quiet scenic picnic areas in former Job Corps site.
BASEBALL	Maintain existing four youth baseball fields. Expand and reorient Goeas Memorial Ballfield to accommodate full size baseball field.
SOCCER	Add one soccer field.
MULTI-PURPOSE FIELD	Add one new multi-purpose field to accommodate additional sporting activities such as more soccer.
BASKETBALL	Maintain two basketball courts.
VOLLEYBALL	Relocate existing outdoor multi-use volleyball/basketball court to accommodate multi-purpose field.
IN-LINE HOCKEY SKATE RINK & SKATE PARK	Add one multi-use skate rink for in-line hockey and recreational skating, and one skate park for skateboarding.
TENNIS	Maintain six existing tennis courts and add two new tennis courts with backboards.
AQUATIC POOL / SHOWER BUILDING	Add a 50-meter swimming pool, without a diving board, near existing locker facilities. Renovate existing locker/shower building.
BMX	Relocate the bicycle motorcross (BMX) site towards Koko Head Park Road.
PLAYGROUNDS	Add two new playgrounds, one of which is a super playground. Relocate existing play apparatus for safety purposes.
DISC GOLF	Add a 9-hole disc golf course along the perimeter of the former Job Corps site in a location which does not compromise the quiet enjoyment of the new picnic areas.
WALKING PATHS	Develop an interconnected pathway system throughout the park for walking and jogging. Include exercise areas.
TEEN CENTER	Add a new center for indoor teen activities, to include facilities such as lounge, dance hall, and video arcade.
MAINTENANCE YARD	Retain the existing Parks Department maintenance baseyard within the District Park. Renovate to meet Building Code/ADA requirements.
COMFORT STATIONS	Provide additional restroom facilities throughout the Park.
ACCESS ROAD	Add a new perimeter loop road to provide access to park facilities that will be located on the former Job Corps site.
PARKING	Add approximately 280 new parking stalls in small clusters throughout the Park to service picnic areas and expanded sporting fields. Include drop-off stalls for loading and unloading.
CYCLING	Provide additional bike racks to encourage cycling to the District Park.
LIGHTS & BLEACHERS	Provide lights and bleachers for soccer fields, new tennis courts and the baseball fields.

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Figure 3-1
Aerial Photo of Koko Head District Park

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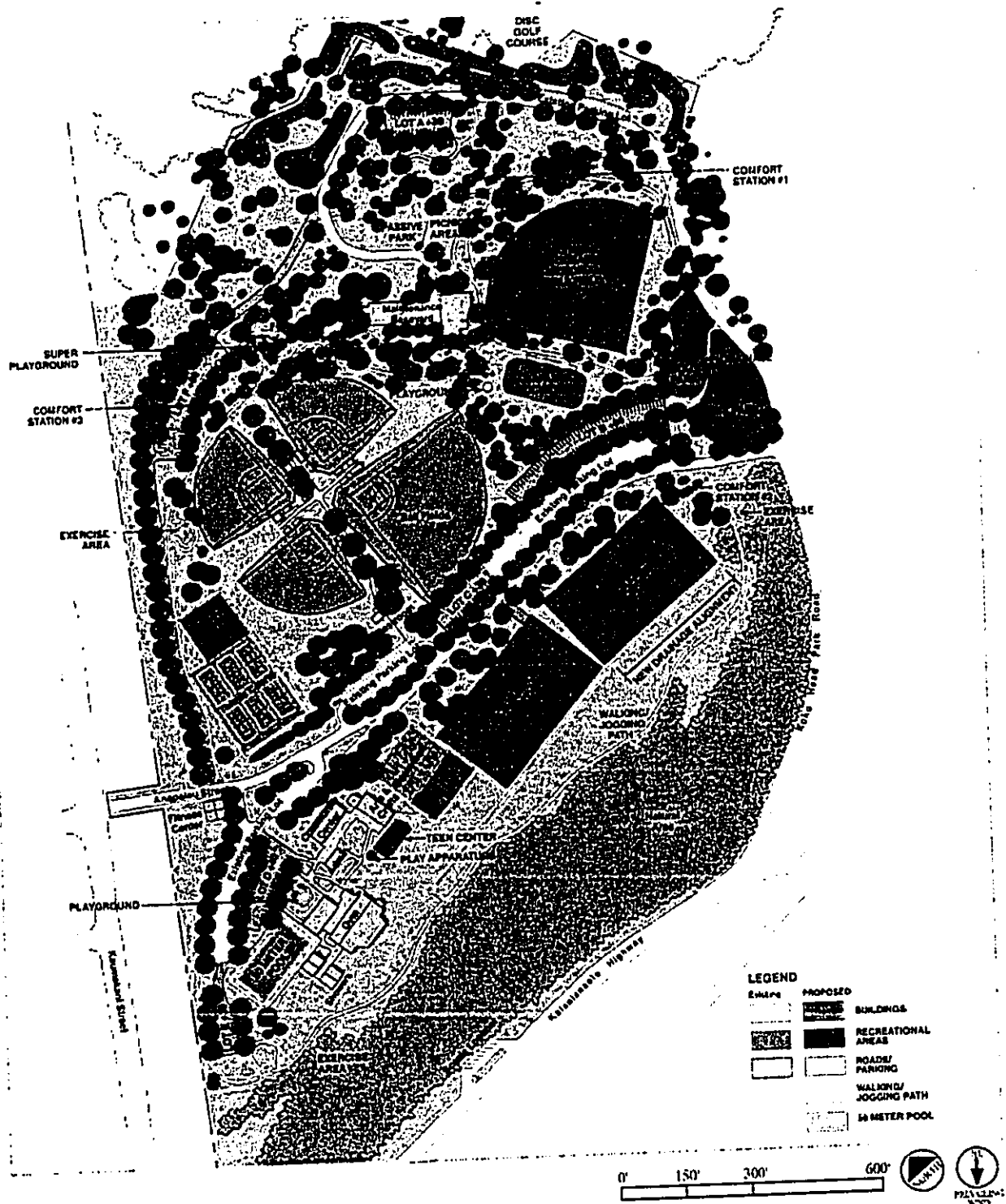


Figure 3-2
Koko Head District Park Conceptual Site Plan

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3.1.3 Soccer and Multi-Purpose Fields

A new soccer field and a multi-purpose field are planned to meet community demands for more playing fields. The recommended location for these two fields is on the vacant area across the park service road from the existing ballfields, adjacent to the existing outdoor basketball courts.

In order to accommodate regular game play as well as practice, the soccer field is planned to be regulation size. The new multi-purpose field will be similar in size to serve additional field needs, including soccer, flag football, and youth baseball practice. Additional parking and family gathering areas are planned nearby. It is also recommended that, at some point in the future, bleachers and night lights be provided for the regulation soccer field.

3.1.4 Basketball/Volleyball

There are two existing outdoor basketball courts, and one outdoor court that can be used for either basketball or volleyball, at the District Park. Basketball is expected to continue to be an active outdoor sport for all ages. Volleyball is primarily played in the gymnasium, but the option of using one of the basketball courts for volleyball will continue to be available.

There does not appear to be a need for new outdoor courts at this time. However, the recommended siting for a new multi-purpose field will require the removal of the existing basketball/volleyball court. It is planned that this court be replaced with a new one with the same multi-use capability. The proposed location is adjacent to the south side of the two existing courts that will remain.

3.1.5 In-Line Hockey Skate Rink

Provision of a new skate rink is planned to accommodate in-line hockey league play, which is popular in Hawai'i Kai, and family recreational skating. Space is reserved near Goeas Field. Specific court design will be coordinated with organized in-line hockey groups in the community.

3.1.6 Skate Park

Skateboarding is also popular among the youth of Hawai'i Kai. Provision of a skate park facility for skateboard users is recommended to be located near Goeas Baseball Field. Specific skate park design will be coordinated with organized groups in the community.

3.1.7 Tennis

There are six existing tennis courts located near the entrance of the Park which enjoy plenty of use. The provision of two additional courts with high practice backboards is planned next to the existing courts in order to accommodate the growing demand for tennis facilities.

3.1.8 Swimming Pool

A new aquatic center containing a 50-meter pool for competition, aquatic recreation and safety instructions, is planned for the Park. A site near existing gymnasium shower and bathroom facilities is planned. Renovations to the existing shower facilities are also recommended. Additional parking will be provided near the new pool to accommodate the increased park use in this area. For safety purposes, the new 50-meter pool is not planned to include a diving board.

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~~Bleachers and lighting are planned. A conceptual rendering of the swimming pool facilities is provided in Figure 3-3.~~

3.1.9 BMX Course

Koko Head District Park currently has a designated field for bicycle motor cross (BMX) course, which is located between the lighted baseball field and Goeas Memorial Field. Its relocation to a more peripheral site alongside Koko Head Park Road is planned. This will make it possible to provide needed additional parking on the existing BMX site, which is conveniently located near the existing ballfields.

The new BMX course will be enclosed by a fence and provided with a single entrance accessible to an adjacent parking lot. It is planned for the trees within the BMX course to be relocated. Course design and field drainage will be coordinated with local BMX organizations.

3.1.10 Super Playground

Two new playgrounds, one of which is a super playground are planned. The super playground is planned for the north end of the existing cluster of four ballfields. This type of playground involves large playscapes that can accommodate large numbers of kids (+/-150) in active play at the same time. The inclusion of community in the design and possibly construction of this facility will help ensure its uniqueness and success. ~~Figure 3-4 is a conceptual perspective of the super playground.~~

A new play apparatus is sited within the administrative complex to supplement the Park's Tiny Tot program. This type of playground is suitable for young children. For safety purposes, the existing playground will be relocated away from the Park entrance. The new site is planned to be located near the gymnasium. In addition, a new playground is planned to be located near existing ballparks.

3.1.11 Disc Golf

Koko Head District Park will be the first City and County Park to provide space for a disc golf course. A 9-hole disc golf course is planned along the periphery of the former Job Corps site. This location was selected because of its relative isolation, so that it could be kept separate from the new picnic areas, and because the varied terrain is well suited to the provision of scenic tees, tree hazards, and a mix of challenging fairway layouts. A very conceptual potential layout for the 9-hole course has been designed. The actual design layout will be closely coordinated with the local disc golf association.

3.1.12 Walking/Jogging Paths

A new interconnected pathway system is planned throughout the Park. The current intention is that it be primarily for walking and jogging. However, depending on community preferences and a more detailed analysis of potential terrain constraints, a wider pathway could be provided so that it could also accommodate a bike path.

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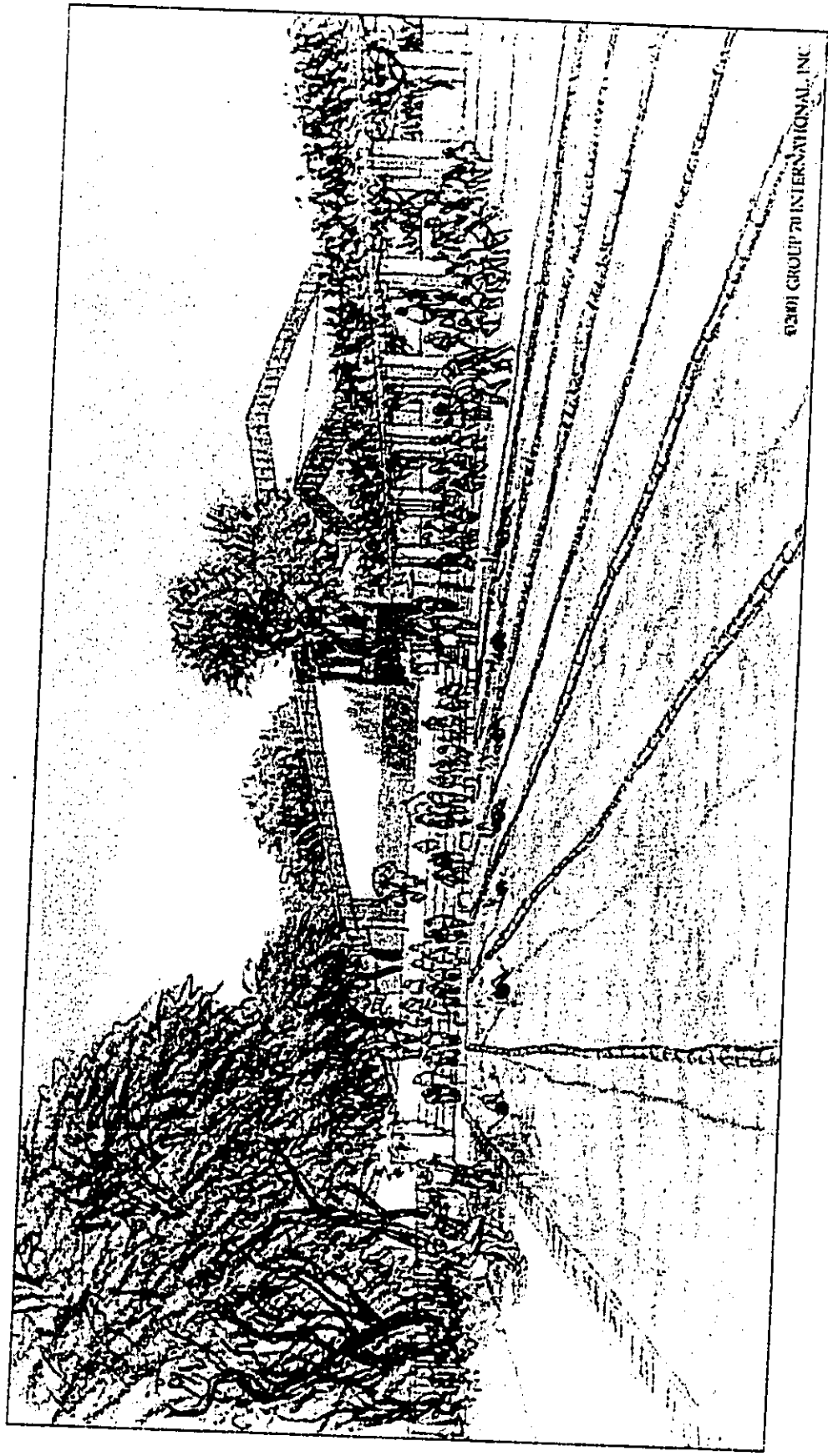


Figure 3-3
50-Meter Swimming Pool Complex

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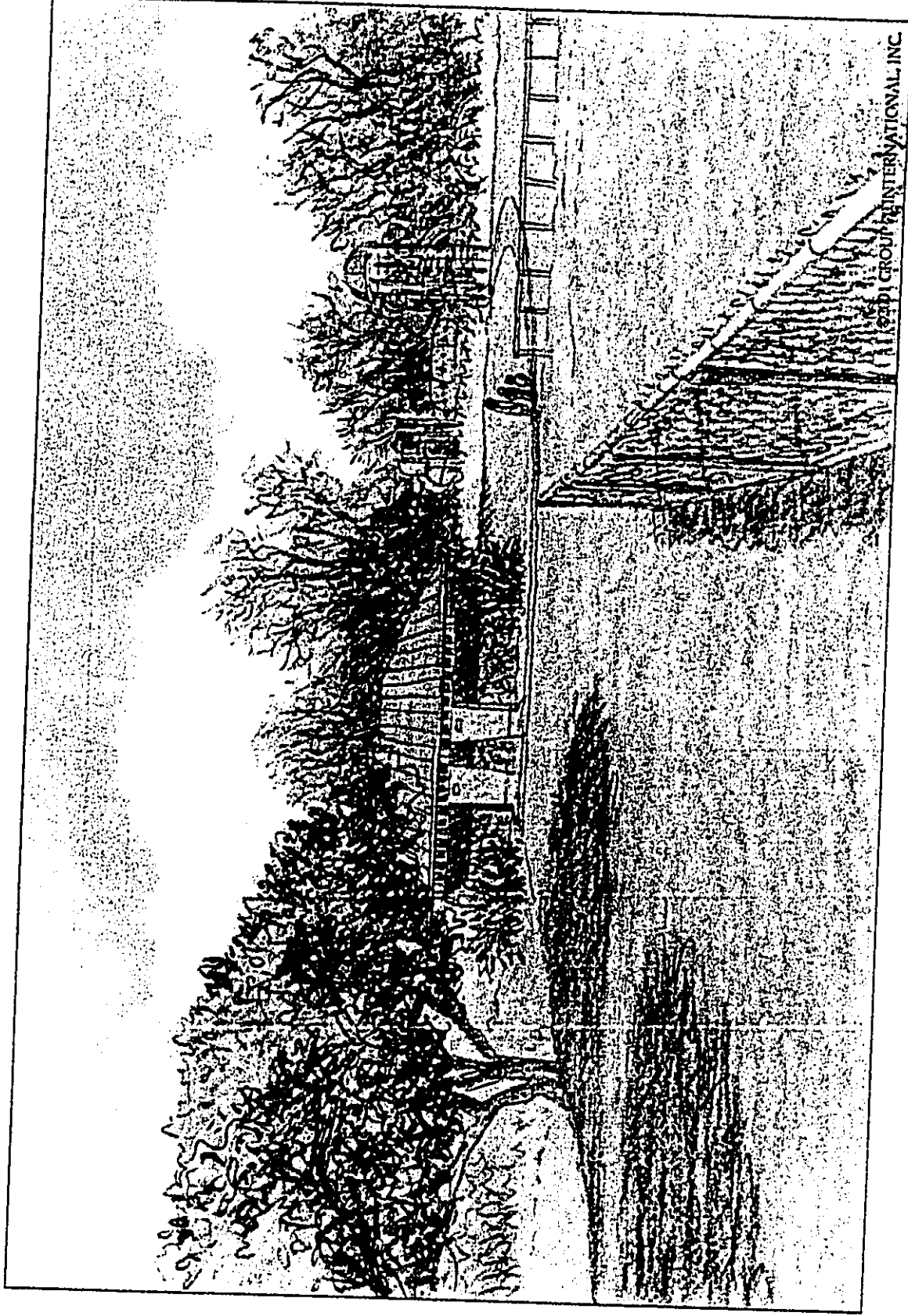


Figure 3-4

Typical Comfort Station and Super Playground



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The path route, which is conceptual in nature, circles around the perimeter of the park, alongside both active recreational fields and the picnic areas. Exercise areas are also planned at intermittent locations along the route. Design of the path will provide for handicap accessibility.

3.1.13 Gymnasium, Community Center, Arts and Crafts Building

There is an existing gymnasium near the entrance of the District Park (Figure 3-2). The gymnasium provides space for basketball, volleyball and other indoor recreational activities for the community. The existing community center building is situated near the entrance of the District Park. It is used for a variety of community functions including daycare, Tiny Tots program, aerobics, Summer Fun, and community meetings. The existing arts and crafts building provides classroom facilities for community activities such as ceramic courses. There are no plans to alter the use or function of these facilities.

3.1.14 Teen Center

The Teen Center is the only new indoor facility planned for the District Park. ~~A conceptual perspective of the teen center is shown in Figure 3-5.~~ This facility, ~~which will be approximately 3,400 square feet in size,~~ will be dedicated primarily to service teenagers of the community. The new teen center will be designed to provide teens with a safe after-school gathering area where they can enjoy teenage activities. It may include a lounge, arcade, vending machines, and a multipurpose room to accommodate dances and other events. ~~The facility may also include space for offices, meetings, and storage.~~ A site near existing administrative buildings is recommended.

3.1.15 District Park Operations and Support Facilities

The Koko Head District Park operations and support facilities include the following: a District Park administration building, parks maintenance base yard, comfort stations, roadways and parking facilities (Figure 3-2).

The existing District Park administration building is located near the entrance of the Park. It provides office space for the daily operation of the park. No changes to this facility are planned.

The Parks District No. 1 (East Honolulu) maintenance base yard is currently located in existing buildings on the former Job Corps site, in an area near both the existing District Park ballfield complex and Goeas Memorial Ballfield. Current plans are to retain this facility at its existing site, even though it is in the middle of outdoor recreation and picnic areas. The reason for this is to give first priority in the allocation of available funding to the provision of needed recreational facilities. When it becomes necessary to replace the existing buildings in the future, consideration should be given to moving the base yard to a more peripheral location. A potentially suitable location is the vacant area at the north end of the expanded Park, between the planned super playground and disk golf course.

There are currently two restroom facilities at the District Park. One is located in the gymnasium the other is by the existing baseball field complex. Three additional comfort stations are planned to support expanded recreational needs. These are located in the northeast corner of the Park, next to Goeas Memorial Ballfield and the new picnic areas; in the southeast corner of the park,

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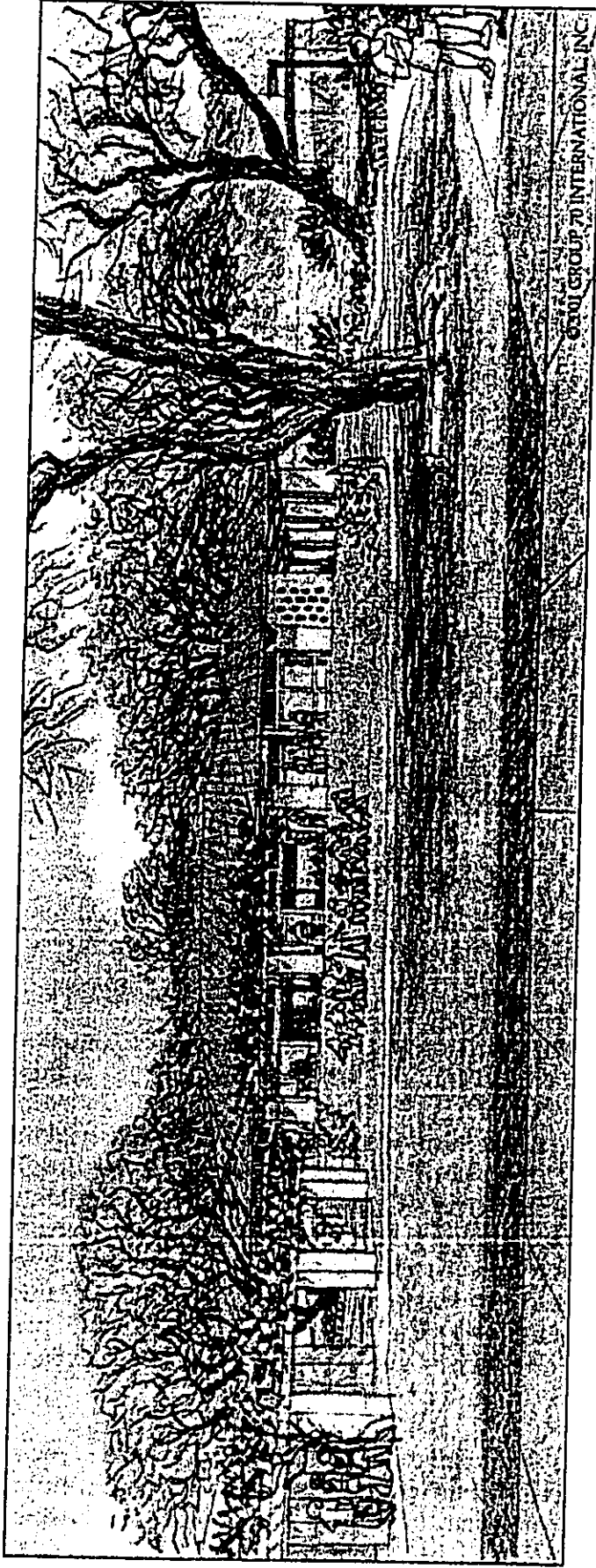


Figure 3-5
Teen Center

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between the planned new soccer field and BMX course; and at the north end of the park, near the super playground. A typical comfort station is depicted in Figure 3-4.

Circulation within the District Park is currently provided by a two-lane road that runs from the main Park entrance at the end of Anapalau Street in an east-west direction through the existing developed park area to Koko Head Park Road. Access to the former Job Corps site and maintenance base yard is provided by Koko Head Park Road mauka. The makai portion of Koko Head Park Road, from Anapalau Street to Kalaniana'ole Highway, will be closed for safety reasons. Construction of a new perimeter road is planned to provide vehicular access to the picnic areas, super playground and disc golf course in the north end of the expanded Park, and to improve overall circulation between the various areas and facilities.

There are four existing parking lots within the District Park that serve park users - one extending between the existing four ballfield complex and Goeas Memorial Ballfield, one on the southside of the four ballfield complex, and two near the indoor recreational facilities. A total of 271 vehicular stalls are currently available throughout the park. Approximately 280 additional parking spaces are planned to accommodate the existing unmet demand and new recreational activities. They will be located in three basic locations which are shown on the conceptual plan (Figure 3-2):

- Expansion of the existing lots in the southwest corner of the Park, where the complex of recreational buildings and outdoor play courts is located. These new spaces will accommodate the existing overflow demand plus the demand created by the provision of additional play courts and a new swimming pool and teen center.
- Expansion of the large existing lot in the east-central area, where the existing ballfields are located. These will relieve the existing shortage during times when the ballfields are heavily used, plus serve the new soccer and multi-purpose fields and the BMX course.
- Addition of two new parking lots in the former Job Corps site portion of the expanded District Park. One lot will be located on the north edge of the existing ballfield complex, next to the super playground. In addition to serving playground users, it will help to meet the needs of both tennis players and ballplayers. The second lot will be located at the north end of the Park and will serve picnickers and disc golf players.

Small clusters of parking lots are considered preferable to one large centralized facility, aside from being a practical necessity in this case given the already established layout of park facilities. The small parking clusters provide easier access to park facilities and minimize the visual impacts associated with large paved areas. Provision in each parking lot of short-term drop off points for family picnic and sporting needs is planned.

In addition to vehicular parking, facilities are planned throughout the park to accommodate bicycle parking.

The estimated earthwork totals, (for planning purposes only) for the planned improvements at Koko Head District Park includes approximately 60,000 cubic yards of excavation and 40,000 cubic yards of embankment.

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3.2 KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS

Koko Head Shooting Complex is the only public outdoor firing range operating on O'ahu. It is maintained by the City and County of Honolulu, Department of Parks and Recreation and staffed with a full time Parks Department Rangemaster.

The range presently operates seven days a week during daylight hours. It serves approximately 36,000 public users annually. In addition to normal operations the range is host to a variety of special activities including two public shooting fairs and four public shooting competitions annually. The Shooting Complex also serves as the primary firearms training venue for the more than 1,800 sworn position of the Honolulu Police Department. Representatives of the Honolulu Police Department are present during the training operations of their officer firearms proficiency program.

The Shooting Complex supports the following facilities: Pistol, rifle and metallic silhouette ranges, skeet range, trap and an action pistol range, three comfort stations, paved and grass parking. The pistol, rifle, and metallic silhouette ranges are oriented to the northeast and the skeet, trap, and action pistol/cowboy ranges are oriented to the south. The rifle range includes targets that are located as far out as 450 yards, towards the base of the Koko Head ridge. The metallic silhouette range includes targets that extend out from 50 meters to 200 meters. On Mondays through Fridays, the Honolulu Police Department (HPD) and State prison guards utilize the range for medium-distance (100 yards) firing practice. The HPD and prison guard trainees set up their targets at 100 yards and step on to the range field to conduct their practice sessions. The pistol range is a smaller range that is utilized by the public, as well as HPD, for short-range target practice. Located on the south side of the Shooting Complex, the skeet range and trap range are open to the public during the weekends. During the rest of the week, Monday through Friday, the ranges are utilized by HPD for training purposes. Figure 3-5 illustrates the existing conditions at the Shooting Complex.

The proposed improvements for the Koko Head Shooting Complex primarily entail improving safety at the pistol, rifle and metallic silhouette ranges. This involves providing horizontal bullet catchers, berming the backstops and leveling the grade at the pistol, rifle and metallic silhouette ranges. Other improvements planned for the Koko Head Shooting Complex include site clearance and grading for a new archery range; grading and paving for new additional parking spaces; improving the Range Master's Office and residence, adding property fencing and signage, improving administrative controls and closure of a Koko Head Park Road access from Kalaniana'ole Highway. Figure 3-6 illustrates the planned improvements for the Shooting Complex. Details of the proposed improvements are provided below.

The current pistol, rifle, and metallic silhouette ranges operate on rolling terrain, which is not ideal. The ranges will be graded level and hard objects removed. Hollow block side walls will be added for separation of the ranges. New precast concreted horizontal bullet catchers will be installed to serve as new backstops and berms will be improved to support target areas and some degree of baffling as may be appropriate. Many of the safety improvements are based on recommendations provided by a Kramer One, a shooting range design consultant (Appendix A).

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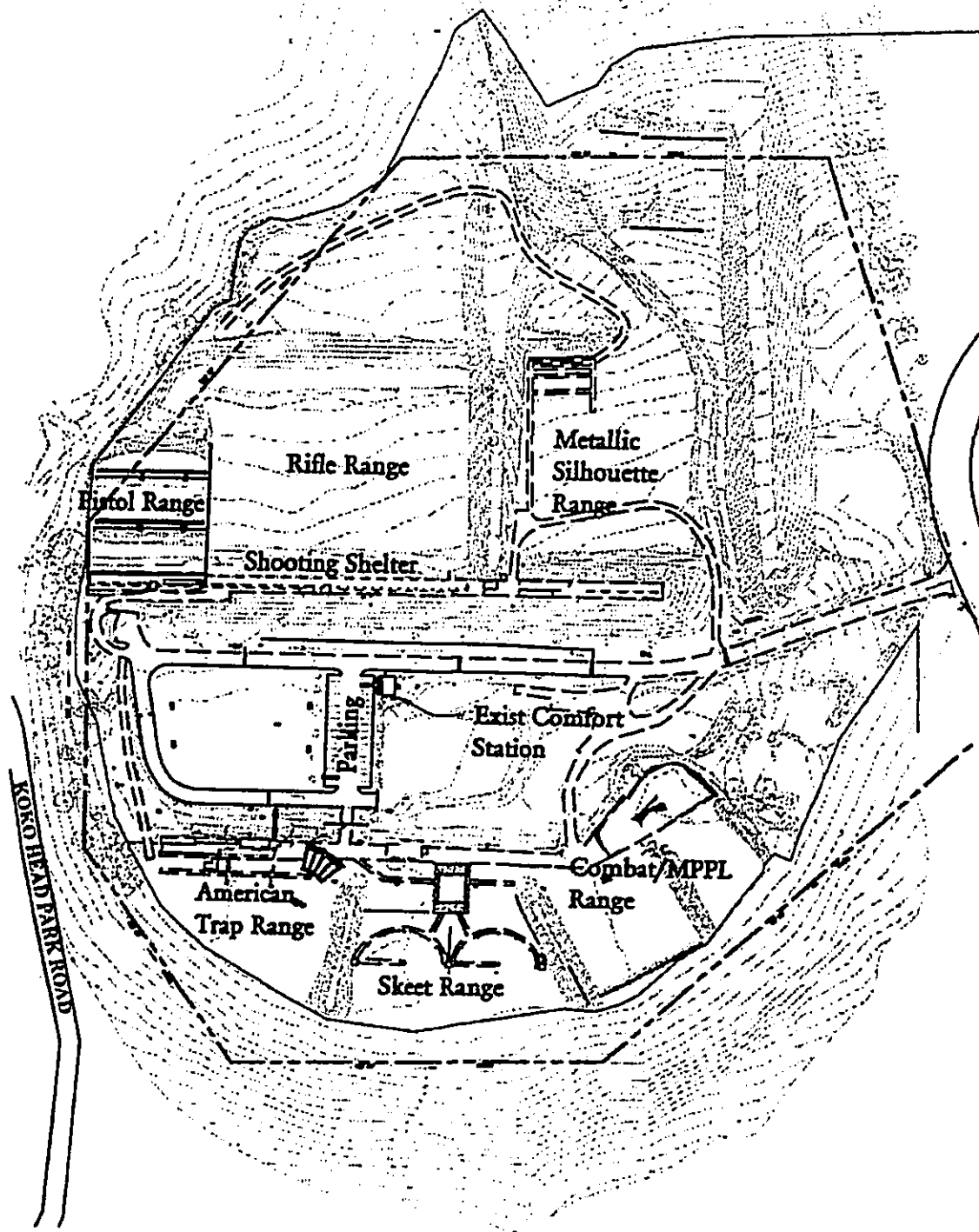
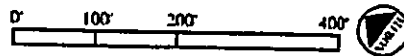


Figure 3-6

Koko Head Shooting Complex, Existing Conditions



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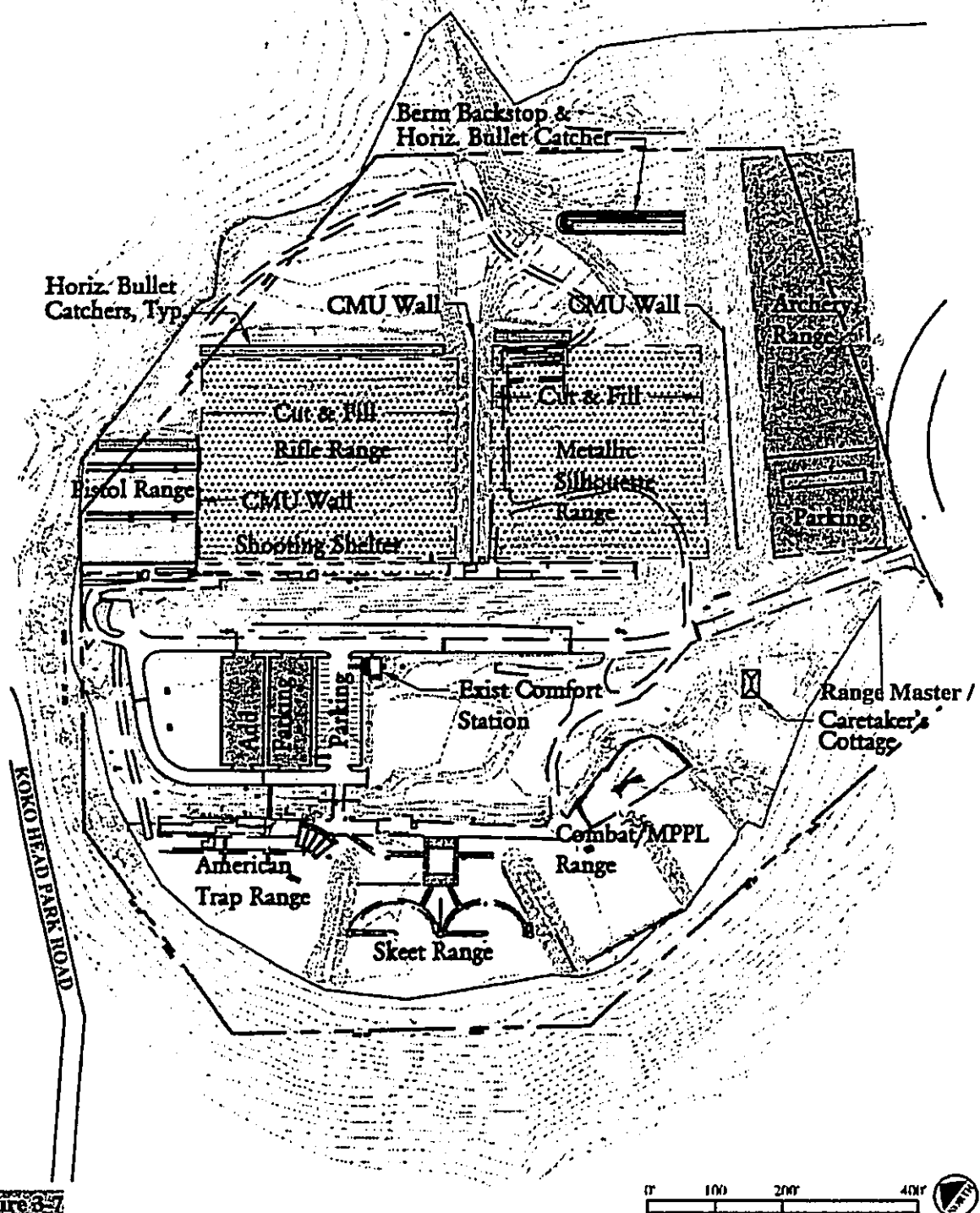


Figure 3-7

Koko Head Shooting Complex, New Site Plan

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Recent clay fragments from the shot ranges have been found along Koko Head Park Road. For safety measures, range consultant Kramer One, recommends closure of the makai portion of Koko Head Park Road from Kalaniana'ole Highway. The road will remain operational and available for emergency uses only.

Approximately 68 new parking stalls will be added to the Koko Head Shooting Complex. The current parking lot supports 34 stalls as shown in Figure 3-7. A new parking lot will be constructed near the existing comfort station.

Minor improvements of the Range Master's office including window air conditioning and electrical upgrades are planned along with construction of a new 1,200 square foot Range Master / Caretaker's Residence.

A new archery range is planned for the Koko Head Shooting Complex. The location is sited at the open field to the right of the entry road, off of Kalaniana'ole Highway. The construction of the new archery range includes grading to level the range site and construction of a firing shelter ~~and storage area.~~

Security improvements include installing perimeter site security fencing, warning signs, lighting along the entry road, and installing a speaker/paging communication system. At minimum, a new fence is planned to extend along the west ridge that separates the shooting complex and the Koko Head District Park. The need for full perimeter fencing around the Shooting Complex (along Koko Crater and Kalaniana'ole Highway) has yet to be determined. Security lighting is planned to be installed along the access road to support police monitoring. Warning signs are planned to be installed along the Koko Head hiking trail that runs along the ridge, north of the rifle range. Signage within the shooting complex is planned to improve way finding and support administrative controls regarding proper use of the facilities. A simple intercommunication system linking all the ranges is planned to improve communications throughout the complex. The present paging system of the three ranges currently operate independently.

ADA improvements at the Shooting Complex involves arrival points, exterior routes, signage and public restrooms. Specific improvements include: restriping the existing accessible parking stalls to include a van accessible stall and signage; improving the curb ramp at the existing lower comfort station; improving accessible toilet stalls and lavatories at the existing lower comfort station; installing tactile/Braille signage at the existing lower comfort station; improving existing upper firing shelter restroom to accessible standards; installing van accessible parking stall and signage at the upper site fronting the Pistol Range; ~~and auxiliary support facilities.~~

Safety improvements at the Shooting Range include installing a lead washing basin near the Pistol Range. It is important for shooters to wash the lead from their hands. Lead and arsenic are present in the soils at the Koko Head Shooting Complex along the northern range sites according to testing by PSI in April, 2001. The presence of lead is a hazardous materials concern due to the potential leaching into ground water. Whether or not lead reclamation is necessary needs to be determined by the Department of Health.

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The estimated earthwork totals (for planning purposes only) for the safety improvements at Koko Head Shooting Complex includes approximately 36,000 cubic yards of excavation and 24,000 cubic yards of embankment.

3.3 DEVELOPMENT SCHEDULE AND PROCESS

The proposed improvements of the Koko Head District Park and Shooting Complex will be developed as separate projects. The Koko Head District Park Master Plan provides a ten year time frame for implementation of the project components. The priorities for implementation are illustrated in Table 3-2. They are intended to be used as a basic framework for consideration in future project implementation and funding decisions, rather than as a rigid blueprint of what should be built when.

Priorities are described as High, Medium and Low. High priority items are generally recommended for implementation within three to four years. Medium priority projects are projected for development within five to eight years. Low priority items are scheduled to be implemented after eight years and are considered to be more long range plans. Factors considered in prioritization include community preferences, Parks Department suggestions, project readiness, and the extent to which facility users and other forms of community support are available to assist with the construction and/or operation of the new facility.

The Koko Head Shooting Complex project development is expected to begin immediately following approvals of necessary permits and available funding.

3.4 COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT

All facilities will be designed to meet the requirements of the Americans With Disabilities Act Accessibility Guidelines and the requirements of Section 103-50 Hawai'i Revised Statutes. Buildings, facilities and sites will also incorporate best design practices as noted in the most current recommendations of the U.S. Access Board's Regulatory Negotiation Committee on Access to Outdoor Developed Areas.

3.5 SUMMARY OF ESTIMATED PROJECT COSTS

Capital Improvement Costs for the Koko Head District Park Master Plan is estimated to be approximately \$13 million. The cost breakdown for the improvements at the District Park is provided in Table 3-2. Cost estimates for each project includes site preparation, landscaping and utility connections as well as construction of new improvements. They are 2000 best estimates, and are provided to serve as a guide for future programming and budgeting purposes. Implementation of park improvements may require subsequent processing and permitting such as an Environmental Assessment, a Special Management Area Use Permit and a Conservation District Use Permit.

Construction costs for the Koko Head Shooting Complex Safety Improvements are estimated to cost \$3.5 million (Table 3-3).

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Table 3-2: Koko Head District Park Master Plan Project Phasing and Estimated Costs

High Priority – Phase I (Within 3 to 4 Years)	Estimated Cost
Passive Park Landscaping and Irrigation	\$250,000
Picnic Furniture	\$150,000
Skate Park	\$650,000
9-Hole Disc Golf Course	\$75,000
Expand & Reorient Goeas Field to Regulation Baseball Field and provide lights	\$1,200,000
Relocate BMX Area	\$200,000
Soccer and Multi-Use Playfields	\$450,000
Relocate Volleyball / Basketball multi-use court	\$100,000
Comfort Station #1 – Next to Goeas Field	\$275,000
Comfort Station #2 – Next to Soccer Field	\$275,000
Resurface Koko Head Park Road	\$75,000
Parking Lot A – Job Corps (30 stalls)	\$150,000
Parking Lot B – Near Picnic Area and Goeas Field (90 stalls)	\$450,000
Parking Lot C – Across Multi-Field (30 stalls)	\$150,000
Bicycle Racks	\$12,000
Total – Phase I Projects	\$4,462,000
Medium Priority – Phase II (5 To 8 Years)	Estimated Cost
Teen Center	\$500,000
Play apparatus	\$100,000
Relocate and upgrade Playground to Admin Area	\$150,000
New Tennis Courts	\$150,000
Super Playground	\$350,000
Comfort Station #3 – Next to Super Playground	\$275,000
Walking and Jogging Path	\$250,000
New Park Access Road	\$570,000
Parking Lot D – Administration (40 stalls)	\$200,000
Parking Lot F – Super Playground (60 stalls)	\$300,000
Total – Phase II Projects	\$2,845,000
Low Priority – Phase III (9 Or More Years)	Estimated Cost
50-Meter Swimming Pool & Renovate Existing Shower Building	\$5,000,000
Skate Rink (In-Line Hockey)	\$580,000
Security Lighting	\$900,000
Parking Lot E – Pool (30 stalls)	\$150,000
Total – Phase III Projects	\$6,630,000
Total Estimated Cost	\$13,937,000

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Table 3-3: Koko Head Shooting Complex Safety Improvements Estimated Costs

Improvement	Estimated Cost
Archery Range	\$145,000
Rifle and .22 Target Range	\$465,000
Metallic Silhouette Range	\$425,000
Pistol Range	\$340,000
Parking Lot	\$115,000
Earthwork/Drainage	\$705,000
Building Facilities	\$265,000
ADA Compliance	\$80,000
New Restrooms	\$90,000
Office Upgrades	\$10,000
Caretakers Residence	\$115,000
Fencing	\$40,000
Other Site improvements (Paths, Signage, speakers, security lighting)	\$225,000
Margin and Adjustments (Bonds, taxes, insurance, project contingency)	\$415,000
Total	\$3,434,000

Section 4.0
Environmental Setting

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4.0 ENVIRONMENTAL SETTING

This section describes the existing environmental setting and conditions within which the proposed actions would occur. Potential effects of the proposed actions to the environment, and recommended mitigative measures are discussed in Section 6.

4.1 REGIONAL OVERVIEW

Koko Head District Park and Koko Head Shooting Complex are located within Koko Head Regional Park and Nature Preserve, which is located in East Honolulu, about 12.5 miles from downtown Honolulu (Figure 4-1). It is owned and operated by the City and County of Honolulu. The Hawai'i Kai community virtually surrounds the Regional Park, with the bordering neighborhoods ranging from Portlock on the west to Queens Gate on the east. Other significant park resources in the area are the City and County's Sandy Beach Park and Wāwāmalu Beach, which border the Regional Park's east shoreline, and the new 354-acre Ka Iwi State Park just beyond Wāwāmalu Beach, on the southeastern tip of O'ahu.

4.2 HISTORICAL PERSPECTIVE

4.2.1 Early History

According to ancient Hawaiian lore, Koko Crater figured in the cycle of myths involving Pele, the volcano goddess. One concerns the slope and contour of the Crater. Pele was living at Kalapana and was attacked by Kamapua'a (the half-man, half-pig demi-god). Kapo, Pele's sister, sent her Kohe Lele to distract Kamapua'a. He left in pursuit of Kapo's "charm" which landed on Koko Crater and made an impression in the hill known thereafter as Kohelepelepe.

After Kamehameha conquered O'ahu in 1795, the lands became property of the King. In the Mahele of 1848, the lands were given to Victoria Kamamalu, a descendent of Kamehameha and future queen of the Hawaiian Islands. However, through her untimely death and subsequent passing of the lands through several heirs and claimants, the lands eventually came into the hands of Bernice Pauahi Bishop in 1883. After her death the following year, the lands were placed in her estate.

Records of early land use activities primarily refer to Kuapā Pond, to the west of the Park site in the center of what is now the Hawai'i Kai community, and to the Sandy Beach and Wāwāmalu Beach area. Kuapā Fishpond was the largest on O'ahu, being over 500 acres in size. The area inland of Sandy and Wāwāmalu Beach was a fairly well-populated Hawaiian community of fishermen and farmers before 1800. Called Wāwāmalu or "shady valley", because of the heavily wooded forests of the nearby valleys, the area was renowned for the cultivation of yams and sweet potatoes. During the early 1800's, produce from Wāwāmalu was gathered for sale to whaling ships that anchored in the lee of Koko Head, outside of Haha'ione Valley.

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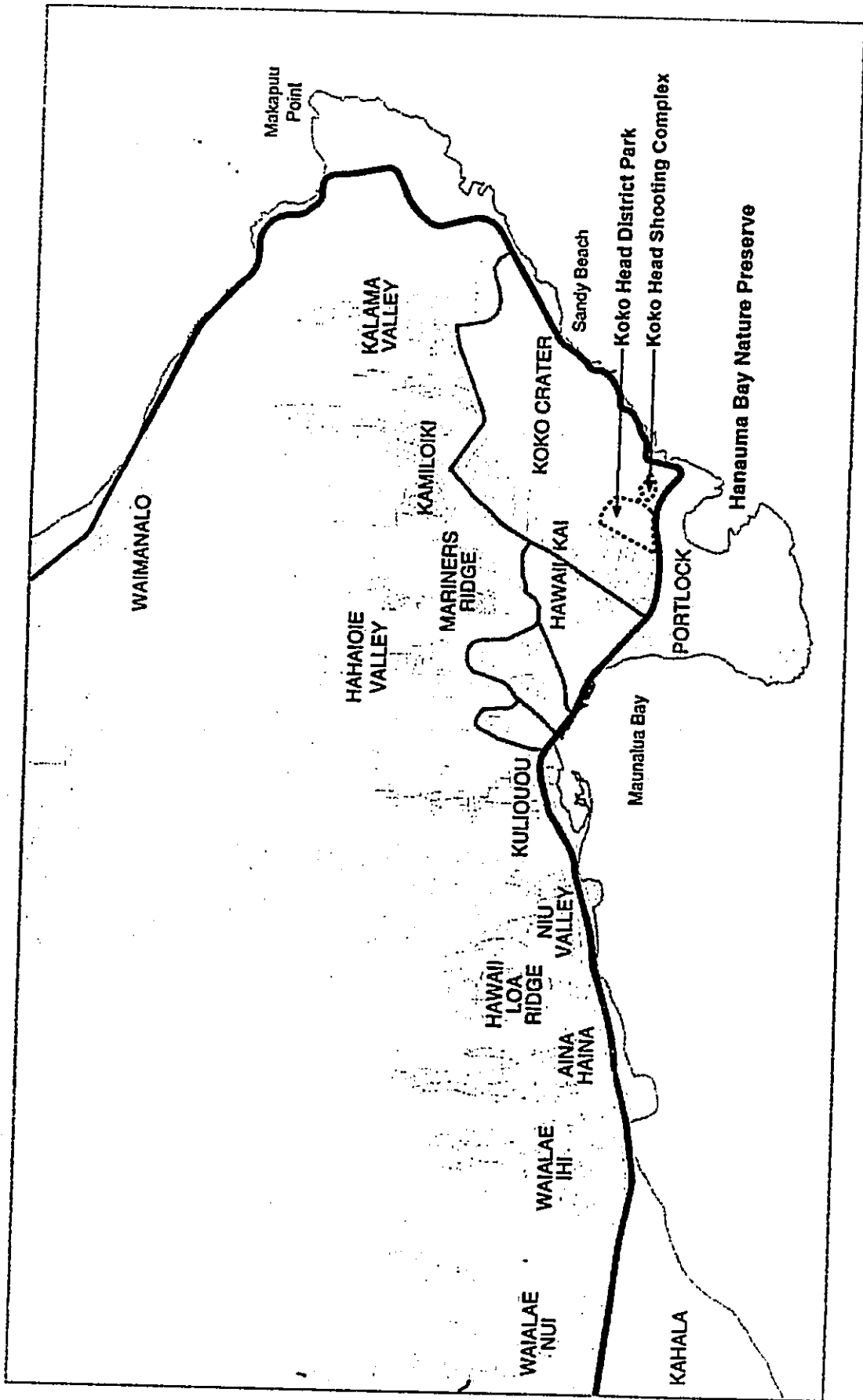


Figure 4-1

Regional Location Map

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4.2.2 Koko Head District Park and Shooting Complex's Land Use History Since Acquisition for Park Purposes

Koko Head Regional Park was established in 1928 with the acquisition of the land by the City and County from the Estate of Bernice Pauahi Bishop for the price of \$1.00 (Cultural Surveys Hawai'i, 1998). The transfer of the land included a deed restriction that limited its use to public parks or rights-of-way. While for the most part the deed restriction has been observed, some non-recreational uses have been permitted, as described below, with the approval of the Bishop Estate Trustees.

The actual development of park facilities was not begun until 1945. However, a new highway along the eastern coast of O'ahu (a portion of Kalaniana'ole Highway) was completed in December 1932. This opened the area to informal recreational use, especially fishing along the coastline.

The turmoil of war in the Pacific had an immediate impact upon the Koko Head District Park and Shooting Complex. Shortly after the attack on Pearl Harbor, coastal-watch facilities sprang up around the island of O'ahu. A U.S. Coast Guard Fire Control and Search Light station had been previously established on Koko Head in the mid-1930's.

In 1943, a 23-acre quonset hut camp was constructed at the foot of Koko Crater by the U.S. Air Force with a railroad tramway extending up the steep slope to a radar station at the summit. Up to sixty men were stationed at the site, working in three shifts, and utilizing the tramway to move up and down the crater side. The radar control center was dug deep within the hillside during the early 1940's, and access was provided via a large tunnel.

After the war, radar operations were taken over by the Hawai'i Air National Guard. Members of the 169th Aircraft Control & Warning Squadron (ACW) occupied the Koko Crater facility from 1956 until 1966. In addition to Hawai'i Air National Guardsmen, civilian air traffic controllers employed by the Federal Aviation Administration also occupied the control center during the early 1960's.

In 1966, the Hawai'i Job Corps Center was opened on a 19-acre portion of the former Hawai'i Air National Guard facility. It remained in this location until 1995, when the Jobs Corps Program was relocated to a new facility in Waimanalo. Current activities occupying portions of this site include a field office for the Parks Department's Water Safety Division, maintenance facilities for Park District No. 1, a little league ballfield, and a Police Substation.

Koko Head District Park was established in 1975 to help meet the recreational needs of the rapidly developing Hawai'i Kai community.

The City and County first established a rifle range in Kahauloa Crater in 1937, and it has remained in this general use since that time. During World War II, a building was constructed as an office for the shooting range.

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4.2.3 Cultural, Historic and Archaeological Resources

An archaeological and cultural assessment was completed for the Koko Head District Park and Shooting Complex by Jeffrey Pantaleo Consultants (JPC) in June 2001. A copy of the full report is provided in Appendix D. This assessment reviewed a historical research study and two surveys of archeological resources that were conducted in connection with the City and County's master planning of Koko Head Regional Park and Nature Preserve which included the District Park and Shooting Complex.

There are no archeological sites found at the Koko Head District Park or Shooting Complex. The assessment documented one historic building in the Shooting Range Complex. The building was originally constructed sometime after 1937, during World War II, as an office for the Shooting Range. Alterations of the building included a roof, shooting shelter, fence, glass windows, door, and interior space for an office. The building is currently used as an administration and maintenance facility by the Honolulu Police Department in support of training exercises.

With the update report by JPC, the previously completed archaeological and cultural assessments adequately cover the District Park and Shooting Range areas. The cultural assessment, conducted by Kumu Pono Associates (1998) for the improvements to the Hanauma Bay Nature Preserve, is provided in Appendix E of this EIS. Included therein is an in-depth description of the cultural and historical context provided for the Park by the ahupua'a of Maunalua. This is very briefly summarized in Section 4.2.1 and further background on the region is included below.

Detailed accounts are also provided of several narratives written by early Hawaiian historians in the 19th and early 20th centuries of the sites and events that occurred within Maunalua, and of the history of land tenure and management in the area. Finally, a detailed summary of the findings made by J. Gilbert McAllister in his 1931 survey of Maunalua archaeological sites is provided.

JPC's review of previous archeological studies in the current project area and vicinity included surveys by McAllister (1933) and PHRI (1988), and an inventory of eight areas within the Koko Head Regional Park by Cultural Surveys Hawai'i (1998) which was prepared as part of the EIS for the improvements to Hanauma Bay Nature Preserve.

The 1998 Cultural Surveys Hawaii Study identified only one historic structure, a military-style quonset hut, located on the former Job Corps site (Appendix F). It was part of the former radar installation that consisted of a base camp, tramway, and structures at the summit or Koko Crater. The quonset hut, the only remaining structure from the base camp, is believed to have been the camp mess hall which was constructed between 1948 and 1949. Since the structure, which is in a state of general disrepair, is believed to be older than fifty years it is eligible for historic designation.

No other archaeological sites were previously recorded in the District Park or Shooting Range. However, according to PHRI's survey, several significant sites were found in the vicinity of the project area (Appendix G). Most of the sites are located along the shoreline. The Koko Head Petroglyphs are located northeast of the Shooting Complex, along the coast (Figure 4-2). The

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site has been assessed as being valuable – ie., significant as an example of petroglyph art, which is rare on the Island of O'ahu – by DLNR when the site was inventoried in 1970. A human burial site of undetermined age is located on the slope of Koko Crater. Archeologists with the State Historic Preservation Division of Land and Natural Resources, identified the site in 1989. In addition, the Hanauma Shelter, situated on the northeast side of the bay (Figure 4-2), was a natural overhang shelter that had served as a prehistoric temporary habitation site.

One interesting non-cultural site, a series of eroding soil hummocks containing abundant birdbone, was found on a high ridge overlooking Palea Point, situated on the northeast side of Hanauma Bay (Figure 4-2). The bones are believed to be from the medium-sized Wedge-tailed Shearwater and the smaller Bonin Petrel. Based on known archaeological contexts, both species apparently were relatively rare on the main Hawaiian Islands during early prehistoric period, becoming common during the late prehistoric period. While the Wedge-tailed Shearwater has remained common on and around O'ahu to the present, the Bonin Petrel has now become extinct on the Main Islands and apparently disappeared from O'ahu before European contact.

4.3 CLIMATE

The climate at the Koko Head District Park and Shooting Complex is generally dry and warm. The southern exposure of the park ensures hot and clear days while its aridness and low relative humidity creates dry, cool and clear nights. Northeast tradewinds help to moderate temperature extremes for a given 24 hour period.

Rainfall averages approximately 25 to 36 inches per year, usually peaking in December and March of a given year. Koko Head's average annual temperature ranges from a low of approximately 70 degrees Fahrenheit (F), to a high of about 83 degrees F. The average mean temperature is 76.6 degrees F.

The summer, extending from about April to November, includes periods of strong northeast trade winds from approximately June to September and the transitional periods just preceding and following. During this time, winds range from northerly through easterly, and occasionally southerly, but mostly from the northeast quadrant. Wind speeds may range up to 35 or 45 m.p.h.; about 50 percent of the time the speeds exceed 12-15 m.p.h.

Winter is defined by a weakening of these northeast tradewinds and the appearance of westerly winds and frontal influences from the north temperate zone. These westerly winds are known locally as Kona storms, and are most typically represented by strong winds and high waves from the southwestern quadrant. The year to year variation in these "Kona" conditions is very large, some winters no Kona storms appear, in other years there may be four to five. Generally, during the winter months (December to March) winds from the southwestern quadrant are present 10 to 15 percent of the time.

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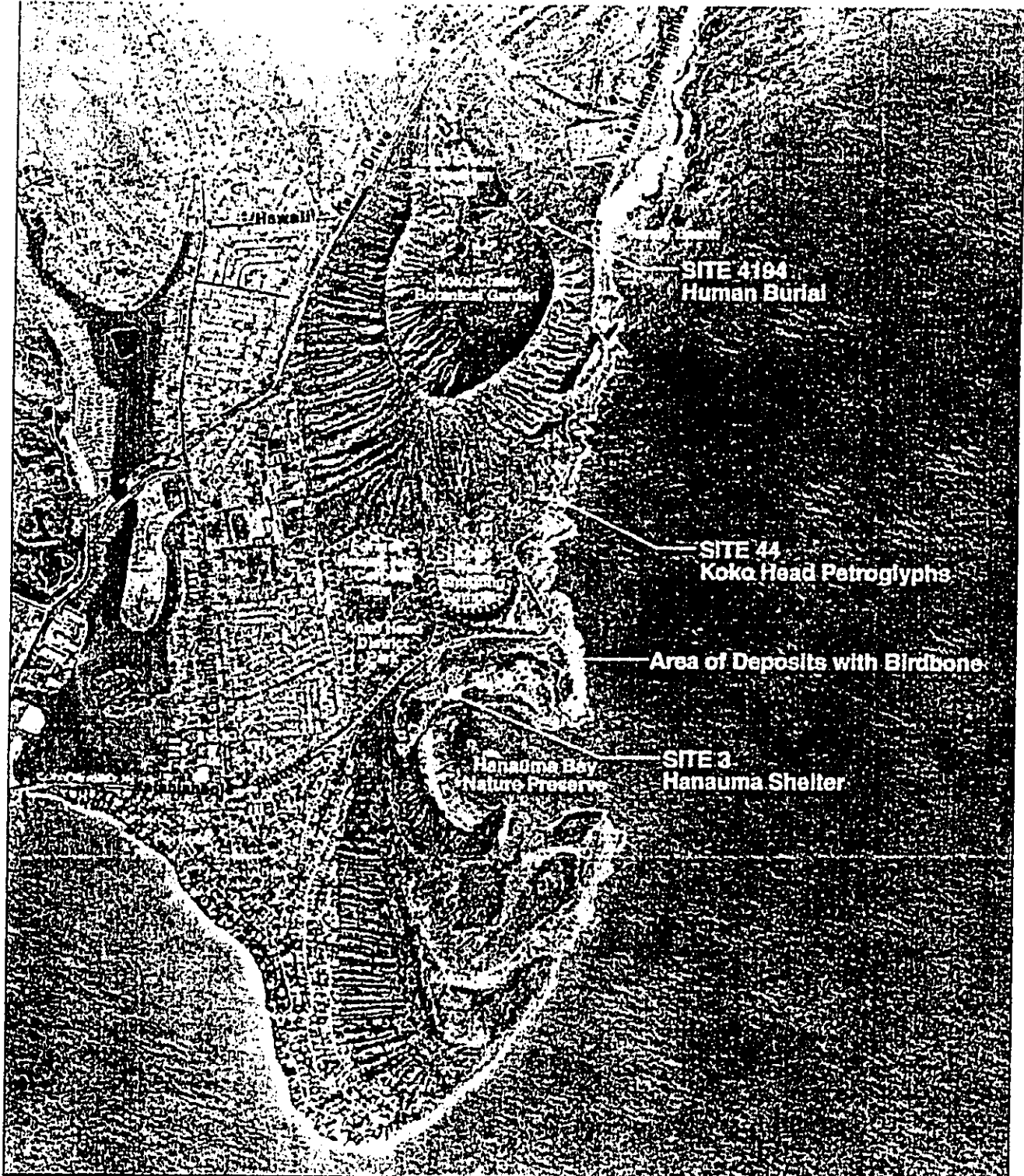


Figure 4-2

Significant Archaeological Sites

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4.4 TERRESTRIAL CONDITIONS

4.4.1 Topography

The terrain at the Koko Head District Park and Shooting Complex was built by volcanic eruptions and erosional forces (Figure 4-3). The resulting topography is characterized mainly by cones and craters. Stream erosion has etched small V-shaped gullies into the crater walls producing a rugged and harsh landscape.

The slope of the terrain at the District Park and former Job Corps site ranges from moderate to steep. A slope analysis for the Shooting Complex is provided in Figure 4-4.

Kahauloa Crater is the site for the Koko Head Shooting Complex. Its elevation ranges from about 84 feet to 110 feet above mean sea level. The crater walls enclose a grassy area of about 20 acres considered to be the floor. The walls range in elevation from approximately 280 feet at the southern rim, 160 feet at the northwestern rim and about 120 feet at the eastern rim that is parallel to Kalaniana'ole Highway. The crater's lowest point is about 84 feet above mean sea level and serves as a natural catch basin and ponding area for any surface runoff waters.

4.4.2 Views

The most spectacular views in the project area are from the proposed picnic area in the former Job Corps site. Looking west from this area offers panoramic views of Diamond Head Crater and Maunalua Bay. Impressive views are also available from the Koko Head Park Road. Most of the other views both in the Park and at the Shooting Complex are of Koko Crater.

Views of the District Park are available from Kalaniana'ole Highway and the Kuapā Pond Lookout that oversees the District Park. The shooting complex is not visible from Kalaniana'ole Highway but can be seen from the Koko Head Park Road.

Trails along Koko Crater offer incredible 360-degree views of the ocean and Ko'olau Mountains. The entire District Park and Shooting Complex can be seen from the Crater. The most important views are depicted in Figure 4-5.

4.4.3 Geology and Soils

The District Park and Shooting Complex are located in an area that consists of several cones which are aligned along the south coast at the eastern tip of O'ahu (Figure 4-6). Belonging to the Honolulu volcanic series, these cones began activity in the late Pleistocene to recent age. The tuff cones mark the Koko Head rift that extends from Hanauma Bay to Makapu'u Point. A submarine ridge indicates that this series of eruptions continued beneath the sea. Traveling in a northeastward direction, the vents located within Koko Head Regional Park and Nature Preserve include Koko Head, Hanauma Bay, Kahauloa Crater and Koko Crater.

The Koko Head-Hanauma Bay-Koko Crater complex is made up of tuff, rock composed of compacted volcanic ash, incorporated with numerous large fragments of old coral reef and country rock. Koko Crater is the highest and largest cone in the Koko Rift. On its eastern flank

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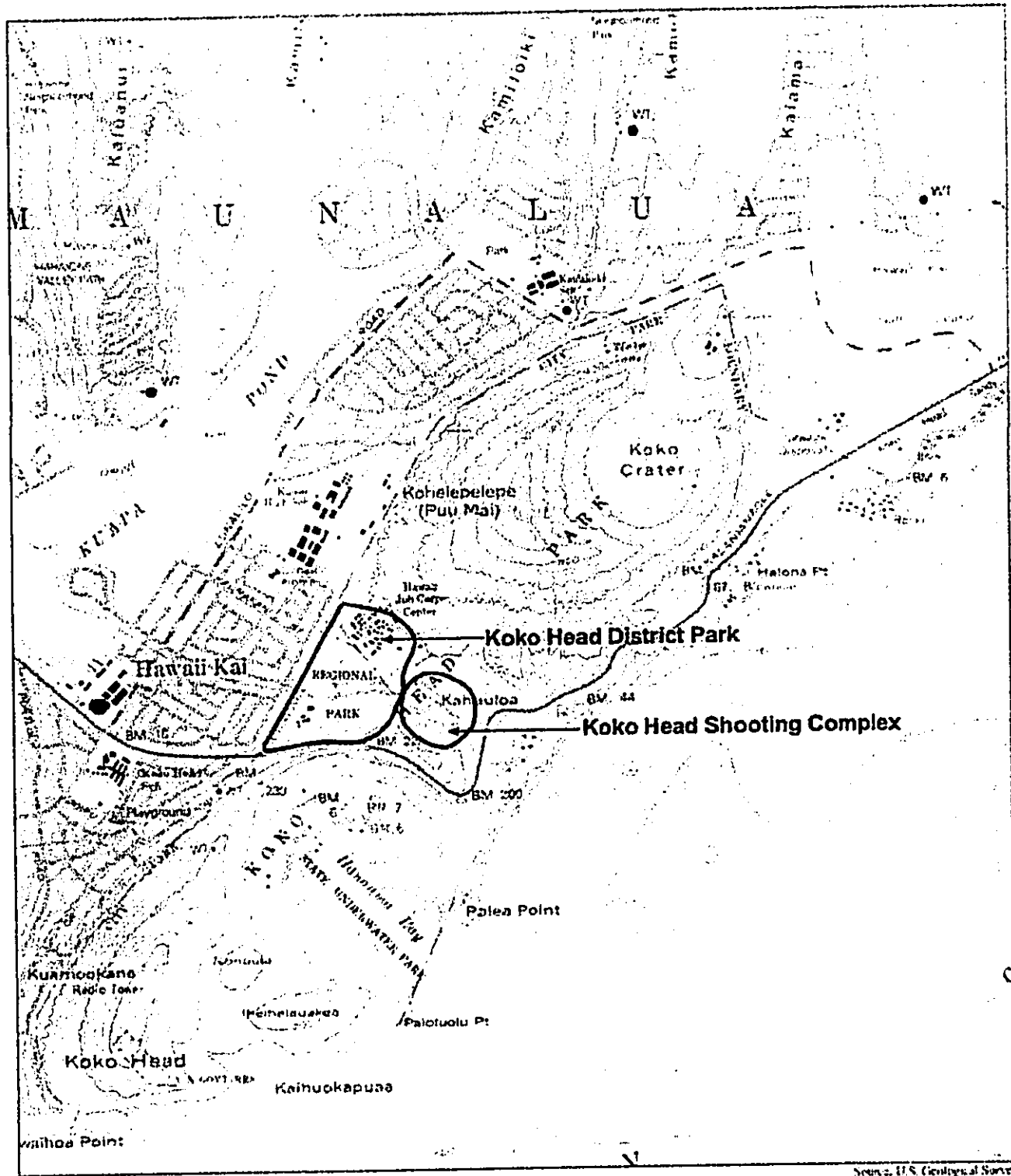


Figure 4-3
Topography

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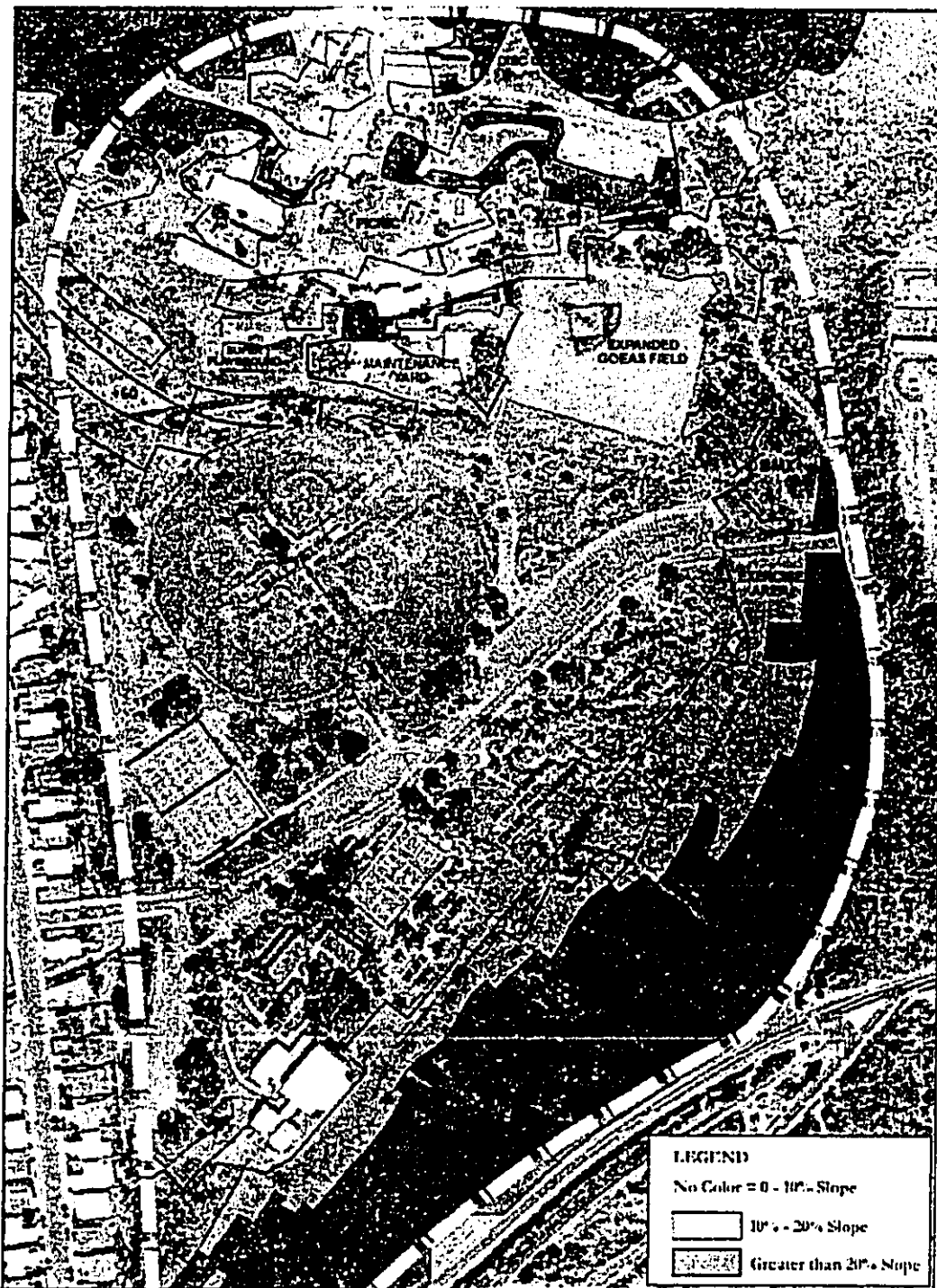


Figure 4-4

Approx. Scale 0 1000 2000 3000

Slope Analysis of Koko Head District Park

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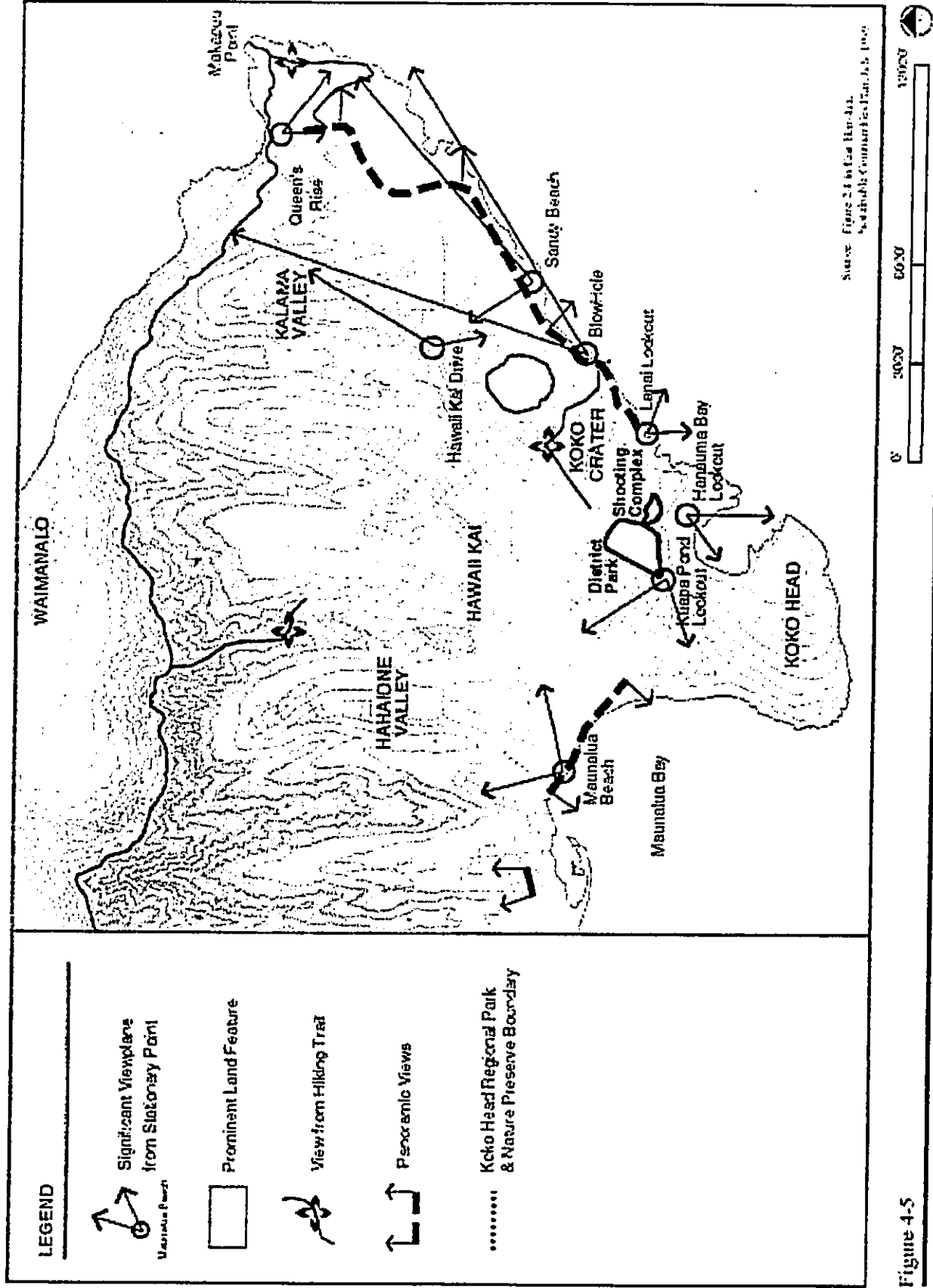


Figure 4-5

Koko Head - Makupuu Viewshed

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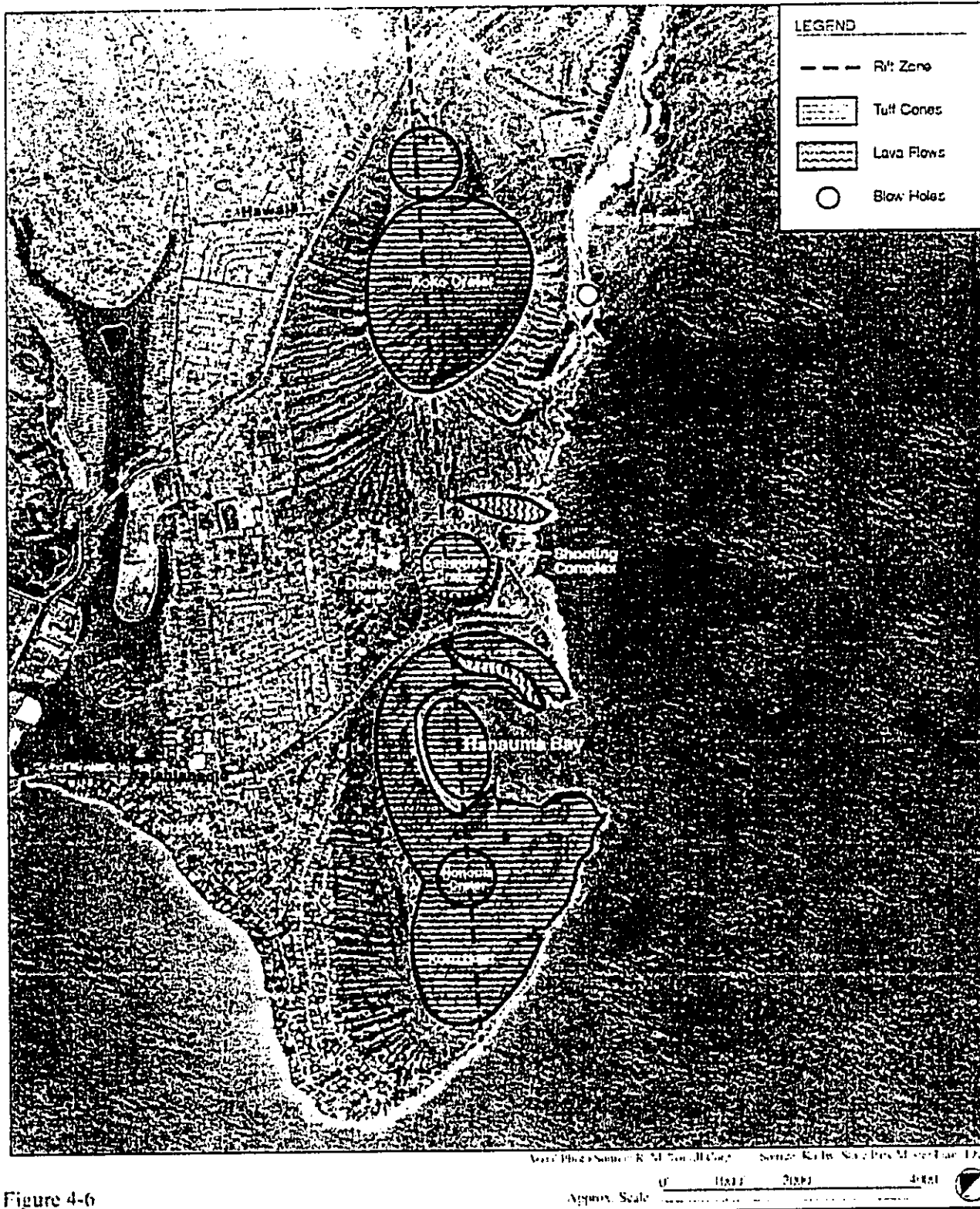


Figure 4-6
Geological Formations

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it contains one of the few base surge deposits (a deposit composed of layers of sand and gravel produced by an explosive eruption) known to exist in the islands.

The three different soil types described below have been identified within the Park area by the U.S Department of Agriculture Soil Conservation Service. Their general locations are shown on Figure 4-7.

<u>Code</u>	<u>Soil Type</u>	<u>Description</u>
KsC	Koko silt loam, 6 - 12% slopes	Medium runoff moderate erosion; slight workability.
KsD	Koko silt loam, 12 - 25% slopes	Located on fans on foot slopes of volcanic craters. Medium to rapid runoff; moderate to severe erosion; difficult workability.
rRK	Rock land	Exposed rock covers 25 to 90% of surface. Rock outcrops and very shallow soils; nearly level to very steep; soil is very sticky and plastic with high shrink- swell potential.

4.4.4 Groundwater

The Shooting Complex and District Park are located outside of the Underground Injection Control line (UIC), meaning that water below this area is not a probable drinking water source. The aquifer in this area is part of the Waialae aquifer system where freshwater may be in contact with seawater confined or unconfined and can be found in either horizontally extensive layers or in sedimentary environments. Please see Appendix B for more groundwater information.

4.4.5 Hazardous Materials

Soils sampling was performed by PSI at the Shooting Complex to provide information pertaining to the levels of metals present in the soil prior to the upcoming renovations of the facility. Laboratory results indicate that levels of lead and arsenic are present in the soils at the site above regulatory guidelines. The soils sampling results are provided in Appendix B.

4.4.6 Drainage, Flood and Tsunami Hazards

There are no streams or major drainage channels that flow through Koko Head District Park or Shooting Complex. Storm runoff generally collects and drains through a series of relatively closely spaced gullies that are carved into the sides of Koko Head and Koko Crater and then into the ocean or adjacent lower areas to the west, mauka and east. Since much of the land is rock, runoff is relatively rapid.

The entire area of Koko Head District Park and Shooting Complex is designated as "Zone D" on the Federal Emergency Management Agency's Flood Insurance Rate Map covering this area. Zone D is defined as "areas in which flood hazards are undetermined" or, in other words, areas where no studies have been conducted to determine whether or not there is a flood hazard.

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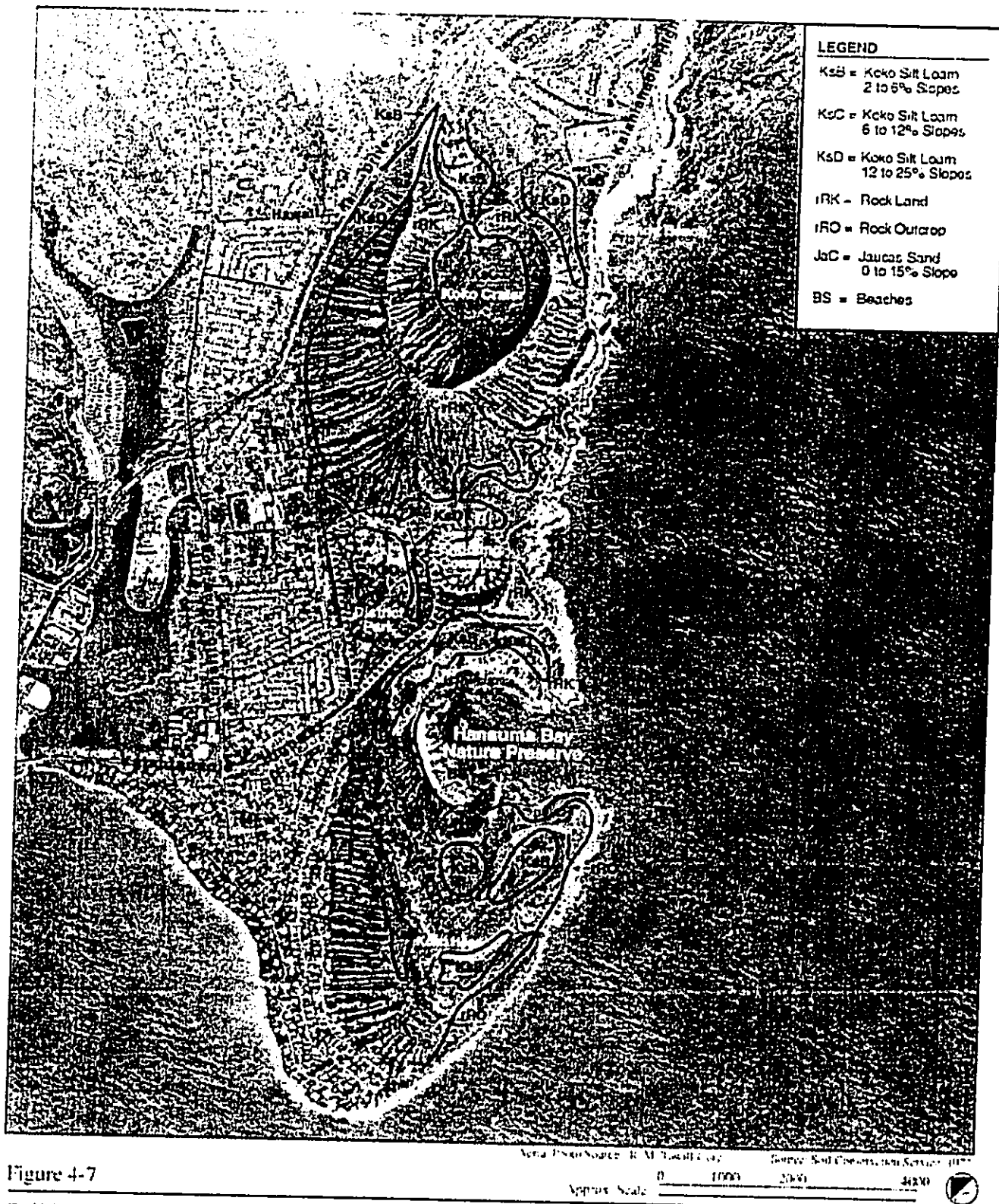


Figure 4-7
Soil Types

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The O'ahu Civil Defense Agency's Tsunami Evacuation Maps indicates that the project area is located outside of the tsunami inundation zone. The District Park is identified as a public shelter in the event of a tsunami warning.

4.4.7 Vegetation

A botanical survey was completed in October 1998 by Char & Associates in connection with the proposals being considered at that time for new park facilities in Koko Head Regional Park and Nature Preserve which includes the District Park and Shooting Complex. The primary purposes of this survey were to (1) provide a general description of the character of vegetation in the Regional Park area; (2) identify rare, threatened or endangered species, native plant communities and any exceptional trees; and (3) prepare recommendations for the preservation and management of important existing botanical resources. The results of the survey applicable to the Koko Head District Park and Shooting Complex are summarized below. They are documented in two 1998 studies by Char, copies of which are provided in Appendices H and I.

4.4.7.1 Landscape Plantings in Developed Areas

The District Park and Shooting Complex are both located in areas identified as developed and do not contain any endangered plants. Predominant vegetation includes koa haole scrub, kiawe forest and ornamental landscaping.

Plantings of various ornamental species are found around the buildings of the former Job Corp site. Large, rounded clumps of variously colored bougainvillea shrubs are a prominent feature on the grounds of the site. The Bermuda grass lawns are now weedy in most places and have been invaded by clumps of buffel grass, Guinea grass, and young koa haole shrubs, and kiawe saplings. Most of the large trees and shrubs which were used in the landscaping are in fair to good condition despite the lack of maintenance and watering.

Some plantings consist of coconut, Chinese banyan, sea grape trees, and various cultivars of Plumeria. A line of rose-flowered jatropha is found alongside the basketball court. A stand of eucalyptus trees, 40 to 50 feet tall, is found near the truck maintenance area. Other plants observed on the site include shrubs of dracaena, croton, and hybrid hibiscus.

4.4.7.2 Vegetation in Undeveloped Areas

Five general vegetation types were recognized within the vicinity of undeveloped portions of the Regional Park area: coastal scrub, koa haole scrub, kiawe forest, kawelu grassland, 'a'ali'i/koa haole scrubland, and 'ihi'ihii herbland. Their general locations are depicted on Figure 4-8. All are described in detail in Appendices F and G. Some of the common species are described as follows:

Koa Haole Scrub - Koa haole is the most abundant species in undeveloped areas in the vicinity of the project site where it forms low, windswept thickets, 3 to 7 feet tall, on the slopes and ridge tops of Koko Head and Koko Crater. On the mauka (leeward) side of Koko Crater and in some gulch areas where it is more protected, the koa haole is taller and more tree-like. Scattered trees or small stands of kiawe, 10 to 20 feet tall, are commonly associated with the koa haole scrub. The understory consists of low, scattered mats of buffel grass, 1 to 2 feet tall, and clumps of somewhat taller Guinea grass in areas with slightly deeper soil. Locally common in some places

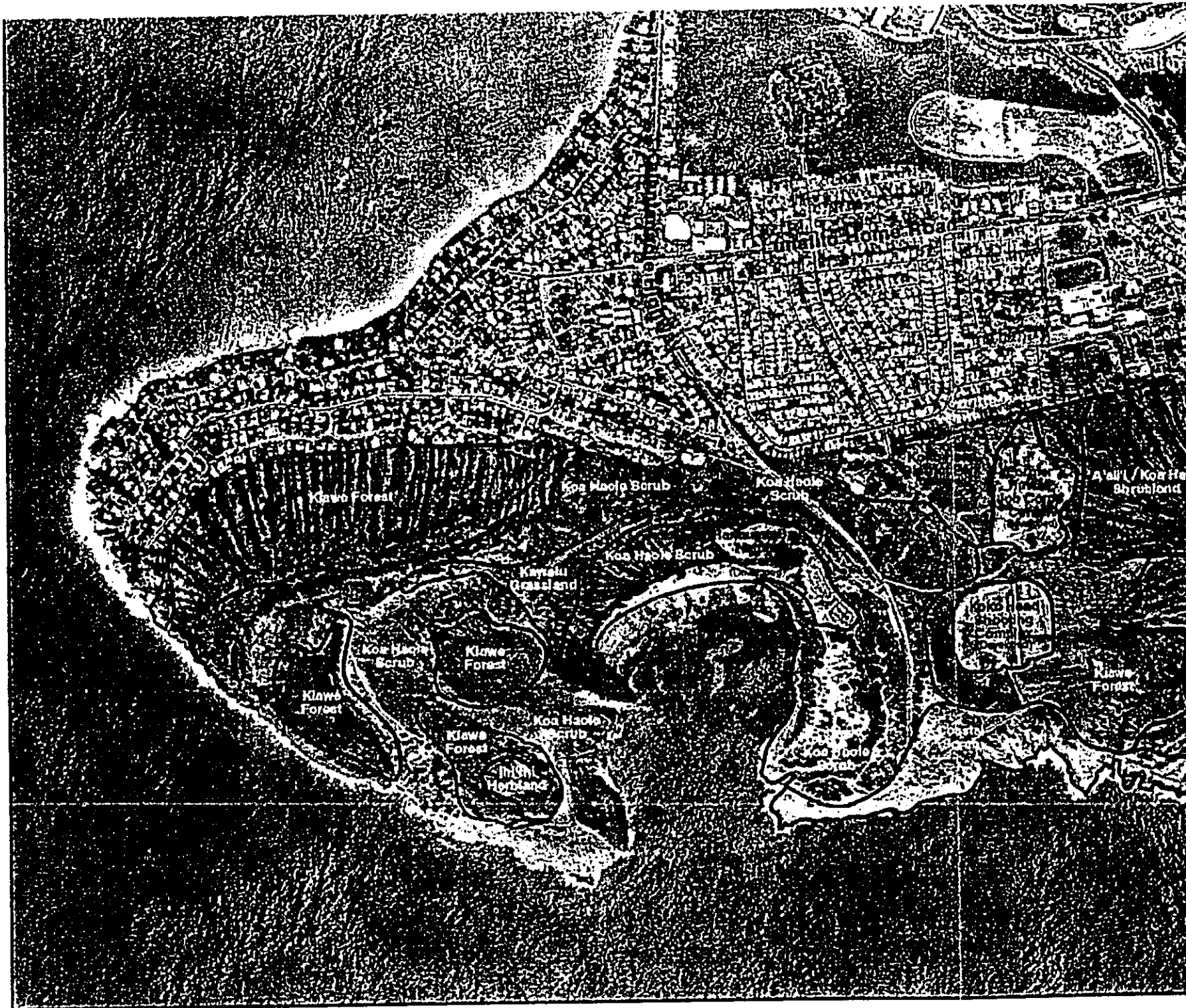
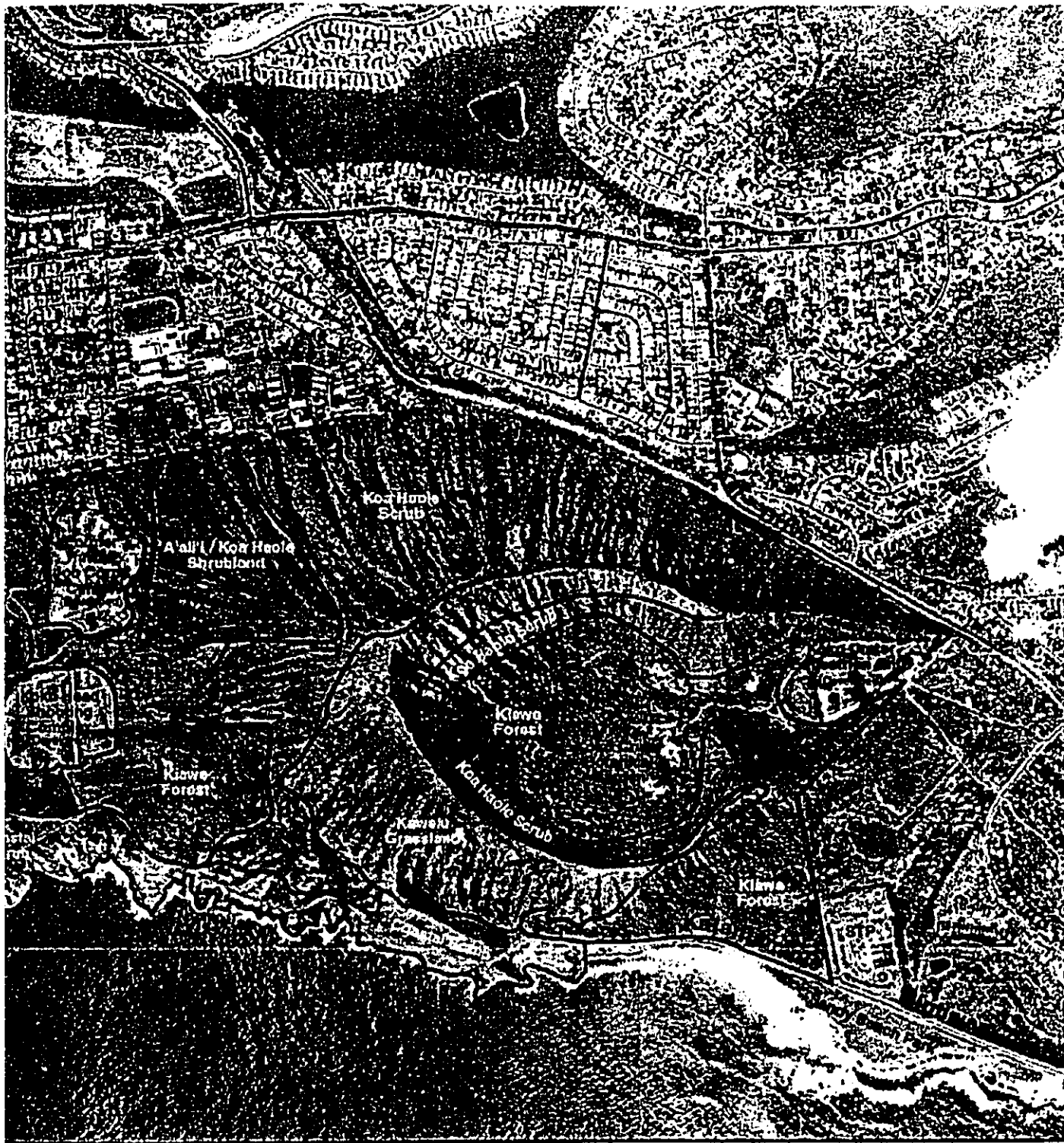


Figure 4-8
Vegetation Types



Source: Botanical Survey by Char & Associates, November 1996
Aerial Photo Source: R. M. Trevill, Corp.

Approx. Scale: 0 600' 1200' 2400'



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are shrubs of wild basil, 1 to 3 feet tall. Areas with rocky outcroppings or stony, shallow soils support carrion flower, a succulent-stemmed plant up to 10 inches tall with foetid-smelling, brownish-red flowers.

Kiawe Forest - Kiawe forest is found in the areas with deeper soil around the outside base of Koko Crater and on the crater floor. It is also found in gulches, drainageways, and Nono'ula Crater on Koko Head. In these more protected situations, tree cover may be somewhat dense and the trees 25 to 30 feet tall. Scattered patches of koa haole shrubs are found under the trees. Buffel grass and Guinea grass form dense mats between the woody components.

Kawelu Grassland - Kawelu or 'emoloa grassland is found on the more exposed, windward facing mid to upper slopes and rims of Koko Head and Koko Crater. Kawelu forms low, rounded tussocks and can be easily recognized by its large spike-like inflorescences which persist for a long time on the plant. Common associates of this vegetation type include other native species such as shrubs of 'ilima, 'uhaloa, and 'a'ali'i; clumps of pili grass; and low mats of pa'uohi'iaka, nehe, and alena. The introduced koa haole occurs here as scattered, low patches.

'A'ali'i/Koa Haole Shrubland - This vegetation is found on Koko Crater on the broad slopes surrounding the old tramway/cable car path. 'A'ali'i shrubs, 5 to 7 feet tall, are found scattered in the kiawe forest at the foot of the tramway at about 200 feet elevation, but quickly become very abundant along with koa haole on the slopes along the tramway path, up to about the 1,000-foot elevation contour.

Small stands of kiawe trees are scattered throughout this shrubland. Wild basil shrubs are locally abundant in places under the taller a'ali'i and koa haole shrubs. Ground cover consists of scattered clumps of buffel grass. The native Kawelu grass is abundant, especially on rocky outcroppings and areas with thin soils. Also quite common are small patches of carrion flower.

4.4.8 Birds, Fauna and Insects

A field survey of animal and bird life in the Koko Head Regional Park and Nature Preserve was conducted in May 1988 by Phillip L. Bruner. Its purpose was to document the species present in the Regional Park and their relative density. The results of the survey relevant to the Koko Head District Park and Shooting Complex are summarized below, and the full report is provided in Appendix J.

Birds - No endemic land birds were recorded during the course of the field survey. The Short-eared Owl or Pueo was observed on two occasions in 1986 on the slopes of Koko Crater near Kalona Point. This endemic subspecies is listed as endangered on O'ahu by the State of Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife. No other endemic land birds are known to occur on the property nor would any be expected given the nature of the present habitat.

Migratory species, such as the Pacific Golden Plover and Wandering Tattler, were observed in the vicinity of the project site. The Ruddy Turnstone and Sanderling were not observed but have been recorded regularly along this coastline of O'ahu.

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No resident indigenous land birds were observed. The Black-crowned Night Heron might occur near the project site as it has been observed foraging among the mangroves at Kaloko cove, an estuary adjacent to the survey site.

There were eleven resident indigenous seabirds observed in the Regional Park. (See Appendix J for detailed listings.) In addition, the occurrence of Wedge-tailed Shearwaters and Bulwers Petrel nesting on the inaccessible seaward facing cliffs at Koko Head is also possible, as these two species nest in burrows and under ledges in cliff faces. None of those seen in the area are listed as threatened or endangered.

A total of 17 species of exotic birds were recorded during the field survey. Descriptions of the relative abundance and typical habitat preferences of these species can be found in Appendix J. The most abundant species during the three-day survey were Japanese White-eye, Zebra Dove and Redvented Bulbul. The following exotic species were not observed on the survey but have been recorded in the past: Common Barn Owl, Common Waxbill, Chestnut Mannikin, Warbling Silverbill, and Melodious Laughing-Thrush.

Fauna – Mammals that were observed during the survey were the Small Indian Mongoose and cats. Rats and mice were not observed but are likely to occur in the District Park and Shooting Complex. The relative abundance of rats, mice, mongooses and cats are not known. However, it is likely that their numbers are typical of what one would find elsewhere in a similar habitat on O'ahu.

No Hawaiian Hoary Bats were observed in this survey. Nevertheless, bats have been observed in dry coastal habitats elsewhere in Hawai'i.

Insects – The Koko Head area experiences a seasonal habitat. During the wet winter months insects are visible and active and in the dry summer months many insects aestivate (a dry-type of hibernation) (Howarth, pers. comm. 1988). The only known published daytime reconnaissance survey of insects at East O'ahu was made by O.H. Swezy in the winter of 1934 after a heavy rain had produced growth of vegetation attractive to insects, (Department of Parks and Recreation, 1984). According to Dr. Frank G. Howarth, Entomologist at the Bishop Museum, environmental conditions at Koko Head have changed tremendously over time since the written report. As a result, the insect population recorded in Swezy's report may not represent the existing conditions at the project site.

Dr. Howarth knows of only one endemic insect, Rhyncogonus simplex, which was common among the drier slopes of Koko Head and Koko Crater and last seen in the rocky area between Sandy Beach and Makapu'u Peninsula. The Rhyncogonus simplex is a flightless Hawaiian snout beetle apparently restricted to a single host plant, Hawaiian cotton. It is listed by the U.S. Fish and Wildlife Service as a candidate "taxa for which information now in the possession of the Service indicates that proposing to list the specie as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat(s) are not currently available to support proposed rules at this time," (DPR, 1984).

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The survey concluded, with respect to bird and mammal activity in the Regional Park area, that the present environment provides a limited range of habitats that are utilized by the typical array of exotic birds one would expect at this elevation and in this type of environment on O'ahu. No unusual activity was observed during the survey.

4.5 NEARSHORE CONDITIONS

4.5.1 Coastal Water Quality

The project site is not located on the shoreline. At its closest point, the park is approximately 1,600 feet from the ocean. Runoff from the Koko Head District Park and Shooting Complex does not flow directly to the ocean.

Water quality is excellent offshore of the Koko Head Regional Park and Nature Preserve, except in the immediate vicinity of the Hawai'i Kai Sewage Treatment Plant outfall which is located 3,000 feet offshore in 35 feet of water between Halona Point and Sandy Beach. The City and County of Honolulu has a permit declaring the waters surrounding the outfall a mixing zone.

Water quality standards have been established by the Department of Health and are defined in Title 11, Chapter 54 of the Hawai'i Administrative Rules. According to these standards, the coastline from Makapu'u Point to Wāwāmalu Beach and beyond is designated as Class A. The definition of Class A waters in Hawai'i Administrative Rules §11-54-03 is as follows:

It is the objective of Class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class. No new sewage discharges shall be permitted within embayments...

4.5.2 Marine Life Habitats

The project site does not include marine life habitat. The nearby coastal waters host a rich marine life community.

No known systematic surveys of the marine biota have been conducted within the study area. The following information has been adapted from Hawai'i Coral Reef Inventory Island of O'ahu (AECOS, 1981) and pertains to typical marine biota found along rocky surge coastlines similar to shoreline along Koko Head Regional Park and Nature Preserve.

The lower portion of the rocky shoreline environment may be characterized by the presence of extensive growths of coralline algae, encrusting alga, urchins, 'opihi, and a host of other forms. Crusts of blue-green algae and rock crab, and other organisms such as the neritid, and littorinid gastropods, may also be present.

The upper portion of the shoreline on rocky coasts is characterized by strand plants. Commonly found in this area are pulmonate snails.

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Coral cover on the offshore shelf near Makapu'u Head in depths of 20 to 30 feet include Porites lobata and Leptastrea purpurea. Sea urchins found at this depth include Tripneustes gratilla, Echinometra mathaei and Diadema paucispinum.

Fish in the shallow plain is dominated by the following species: Coris venusta, Thalassoma duperrevi, and Chromis vanderbilti, Macropharyngodon geoffroyi and Stethojulis balteata. Fish most common at a depth of 25 feet are wrasses, damsels, and surgeon fishes.

Coral cover below 60 feet is primarily Porites lobata and occasionally abundant growths of "lace coral" occur. Sea urchins are common. Fishes being less abundant and relatively diverse at this depth include: Anthias thompsoni, Chaetodon kleini, and Chromis hanui. Common algae include: Boodlea composita, Codium edule, Halimeda discoidea, Neomeris sp., Asparagopsis taxiformis, Galaxaura sp., Martensia sp., Liagora sp., and Porolithon sp.

The high rocky shoreline, reached only by spray, is inhabited by relatively few species; they are dull gray or black in color and can withstand long periods without water. The littorines (pūpū kōlea) among the mollusks, and the scuttling black grapsid crab (a'ama) are the most conspicuous members of this community. Seaward of the littorines and the crab, but still above the reach of the tide, are the black nerite (pipipi) and, in a narrow band, a pulmonate limpet, Siphonaria (University of Hawai'i, Department of Geography, 1983).

Humpback and sperm whales can often be seen offshore along the coastline during the winter.

Virtually all of the near shore marine biota in this area are indigenous (occurring naturally in Hawai'i and elsewhere) rather than endemic (occurring naturally only in Hawai'i). None are considered either threatened or endangered.

4.6 EXISTING USES AND ACTIVITIES

A historical perspective on the use of the Koko Head District Park and Shooting Complex is provided in Section 4.2. Described below in greater detail are the current uses and activities that are located in the Koko Head District Park and Shooting Complex. Their locations within the overall Regional Park area are depicted on Figure 4-9.

4.6.1 Koko Head District Park

This park occupies approximately 40 acres and serves the greater Hawai'i Kai community. Outdoor recreational facilities include one full-size and three youth baseball fields, six tennis courts, two basketball and one volleyball court, and a fitness center. A complex of five buildings includes a gymnasium, locker rooms, art and crafts facilities, meeting rooms, and administrative space.

As noted in Section 4.2.2, the Hawai'i Job Corps Center was located in Koko Head Regional Park from 1966 to 1995. ~~Most of the job corps facilities have been demolished.~~ Activities currently occupying portions of this site are limited to a field office for the Department of Emergency Service's Water Safety Division, maintenance facilities for DPR's Park District No.

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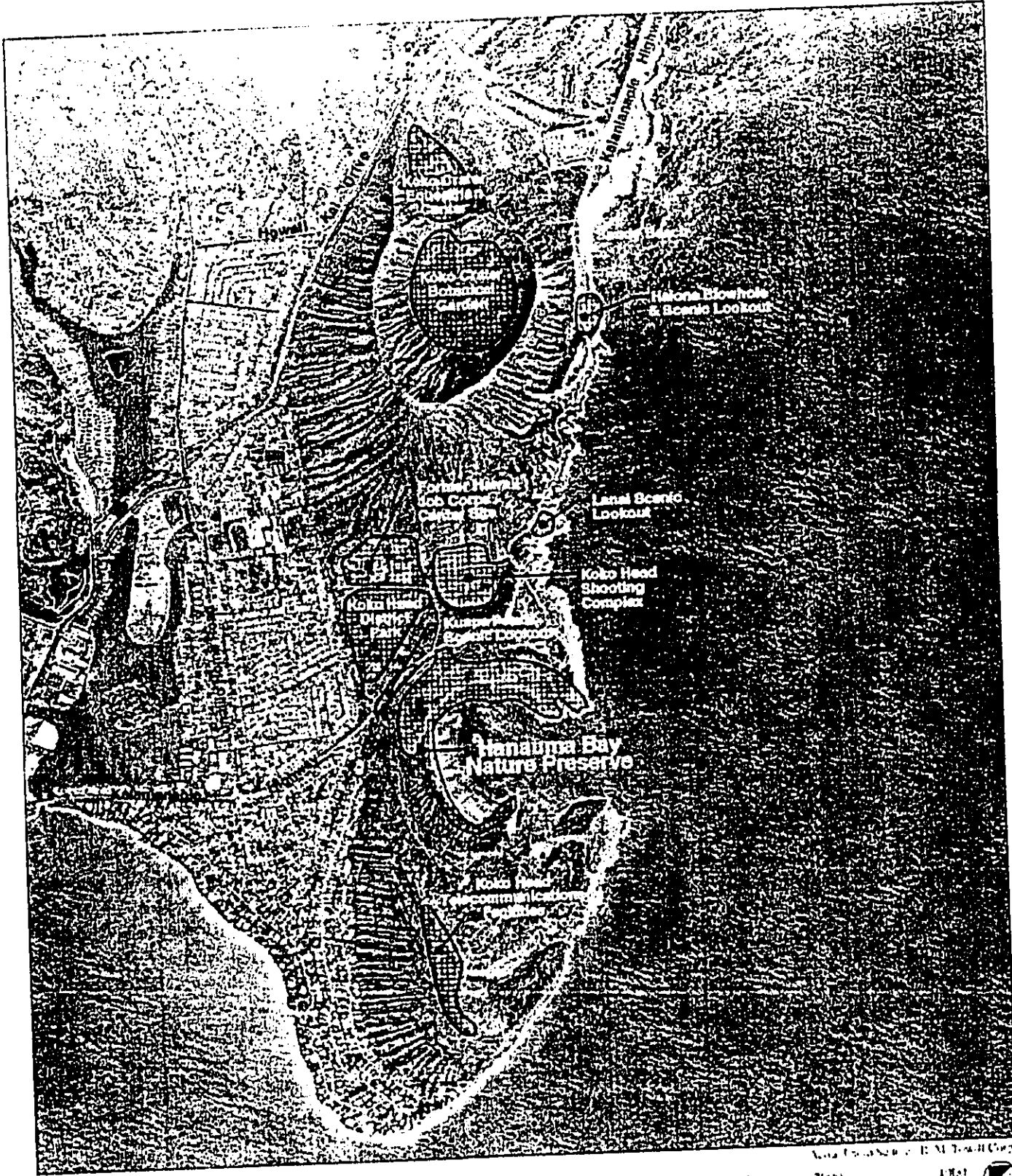


Figure 4-9
Surrounding Uses and Activities

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1, a little league ballfield, and a Police Substation. Asphalt and concrete paved parking lots are located throughout the 19-acre site. Outdoor recreational facilities include two basketball courts, a ballfield and a stage pavilion.

4.6.2 Koko Head Shooting Complex

This 20-acre facility located in Kahauloa Crater is the only public shooting range on O'ahu. It is primarily used by the general public and organized clubs for recreational shooting, but is also used by the Honolulu Police Department (HPD), other law enforcement agencies and the military for training purposes. The complex accommodates six different types of shooting ranges: a pistol range, a rifle and .22 target range, a skeet range, a trap shooting range, a combat/MPPL range, and a metallic silhouette pistol range. Structures include covered firing positions at some of the ranges, an HPD weapons and equipment storage building, and public restrooms.

HPD and other law enforcement agencies use the range during daylight hours Monday through Friday. It is open to clubs and the general public in the afternoons on Wednesday through Friday, and all day on weekends and holidays. There are no night-time shooting hours ~~for the public~~. Use of the facility by the general public is controlled by the staff to ensure that all users are qualified to use firearms. There are no fees charged for general public use of the facilities, but fees are charged for certain shooting sports.

4.6.3 Scenic Lookouts

With the opening of Kalaniana'ole Highway in 1932, sightseeing at various roadside pullouts became a popular activity. (These areas were also used by fishermen for parking.) Over time, with the increase in traffic and concern for safety, several of the more informal pullouts have been blocked off with guardrails. The Kuapā Pond Lookout oversees the District Park.

4.7 ROADWAYS AND TRAFFIC

Roadways - Kalaniana'ole Highway, which runs adjacent to the Koko Head District Park and Shooting Complex, provides the primary route of travel for users of the facilities at the District Park and Shooting Complex. It also serves as the principal traffic route for vehicles traveling to and from East Honolulu and the Waimanalo area of O'ahu, and is a major scenic route for tourist travel as well. Further, it is a major route for large trucks unable to use Pali and Wilson Tunnels, and as an alternative route in cases of emergency when other roads between the Windward side and central Honolulu are blocked or closed off. The highway is a two-lane roadway along its entire length near the District Park.

Lunalilo Home Road is a major two-way, north-south street. The intersection with Kalaniana'ole is signalized. Generally, Lunalilo Home Road is striped for two lanes in each direction and parking is allowed along both sides except in the vicinity of intersections. However, between Kaumakani Street and Kalaniana'ole Highway, Lunalilo Home Road is striped for three lanes in the southbound direction and no parking is allowed.

The main access to the Koko Head District Park is from Anapalau Street, which connects with Lunalilo Home Road at a point approximately 1,600 feet north/mauka of its intersection with Kalaniana'ole Highway.

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A smaller number of park users access the Park via Kaumakani Street, a U-shaped street east of Lunalilo Home Road. Kaumakani Street intersects Lunalilo Home Road at two locations. The southern intersection is the entrance to Koko Head Shopping Complex and is signalized.

Direct access to the Koko Head Shooting Complex is from Kalaniana'ole Highway. This route also provides a secondary access for the District Park.

Existing Traffic Conditions - Data on existing peak-hour traffic conditions at key intersections within and in the vicinity of the Park were gathered and analyzed for this project by Phillip Rowell and Associates (Figure 4-10). Their full report is provided in Appendix K.

Generally, it was found that traffic flowed smoothly during the study peak periods - weekdays between 7:30 a.m. and 8:30 a.m. and between 4:30 p.m. and 5:30 p.m., and Saturdays between 11:00 a.m. and 1:00 p.m.

During the afternoon weekday peak hour, 38 cars turned right from Lunalilo Home Road onto Anapalau Street to enter the Park and 116 turned right from Lunalilo Home Road onto Kaumakani Street. Both of these intersections operate at a Level-of-Service (LOS) C or better. There are six levels-of-service, A through F, which relate to the traffic flow conditions from best to worst, respectively. LOS C is described as light congestion with occasional backups on critical approaches.

The secondary access from Kalaniana'ole is not utilized frequently. During the weekday afternoon peak hour, only one vehicle entered from Kalaniana'ole Highway and two exited via this exit and similarly, during weekend peak hours, only two vehicles entered the Park from this entrance and three exited from this exit.

4.8 DRAINAGE FACILITIES AND UTILITIES

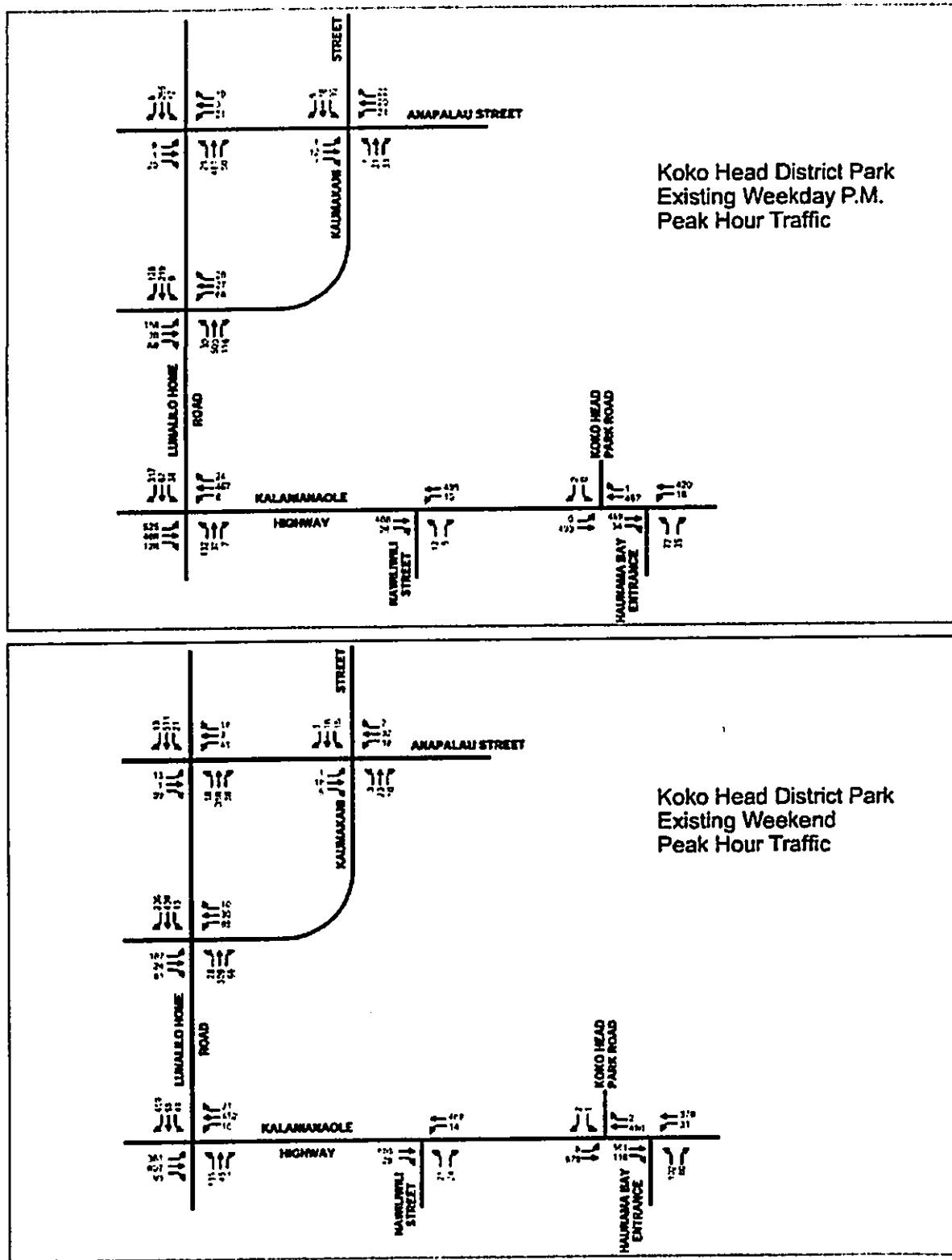
4.8.1 Drainage Facilities

Drainage at the former Job Corps site is for the most part, sheet flow drainage. There are several headwalls and culverts that carry storm runoff under the roadways. There are also several diversion ditches located just below the Job Corps site to divert storm water towards an existing concrete open channel that runs along the District Park property line. This channel was built as part of the drainage system established to intercept runoff from the Park area when the adjoining residential area and Kaiser High School were developed. The lower areas of District Park also sheet flows with several diversion ditches to protect the lower portions. The storm water from the site enters an existing storm drainage system in the adjacent residential neighborhood.

Storm runoff from the Koko Head Shooting Complex flows down the sides of the crater to a retention/detention basin near the center of the crater. There are several headwalls and culverts that carry storm runoff from other areas in the crater under the roadways toward the retention/detention basin.

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Source: Philip Rowell and Associates (July 2011)

Figure 4-10

Existing Weekday P.M. & Weekend Peak Hour Traffic



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4.8.2 Water Supply

The Board of Water Supply (BWS) provides water service to the Koko Head District Park and Koko Head Shooting Complex. The Park and Shooting Complex are located in a 170 foot Elevation Reservation Service Area. The existing water service to the Park and Shooting Complex is connected to an 8-inch main located at the Anapalau Street entrance to Koko Head District Park (Appendix L).

The average domestic water demand is estimated at 4,200 gallons per day (gpd) at the District Park and 2,000 gpd at the Shooting Complex. Water used for irrigation is estimated to be 39,826 gpd at the District Park and 14,844 gpd at the Shooting Complex.

4.8.3 Wastewater Collection, Treatment and Disposal

Wastewater treatment and disposal for Koko Head District Park is handled by the privately owned and operated Hawai'i Kai Regional Wastewater System, which is owned by the Hawai'i-American Water Company. Existing flows are collected via sewer system located on Kaumakani Street. All flows then enter the Hawai'i Kai Collection System that leads to Hawai'i Kai Wastewater Treatment Plant. The Hawai'i Kai Treatment Plant, located mauka of Sandy Beach, provides secondary level treatment. Following treatment, effluent from the plant is discharged through an ocean outfall that extends 3,000 feet offshore.

Wastewater flows for the Koko Head Shooting Complex is collected through a series of gravity sewers to a septic tank system located near the comfort station.

4.8.4 Power and Communications

Electrical and telephone services are provided to certain park facilities requiring them by the Hawaiian Electric Company and the Verizon Hawai'i, respectively.

The Hawaiian Electric Company provides service to the Park and Shooting Complex from the Kamoliki substation near the corner of Hawai'i Kai Drive and Ahukini Street. There are existing single phase overhead and single phase and three phase underground distribution lines running through the park along with two padmount transformers and one pole mount transformer which currently provides the electrical service to the park.

4.9 SOCIO-ECONOMIC CONDITIONS

There are no residents at Koko Head District Park and Shooting Complex. There are several Park and Shooting Complex related jobs including management, maintenance, and operations positions. In addition, personnel from the following City departments maintain offices at the former Job Corp Site:

- The Parks Department District No. 1 maintenance facilities;
- The Department of Emergency Services Water Safety Division field office; and
- The Honolulu Police Department.

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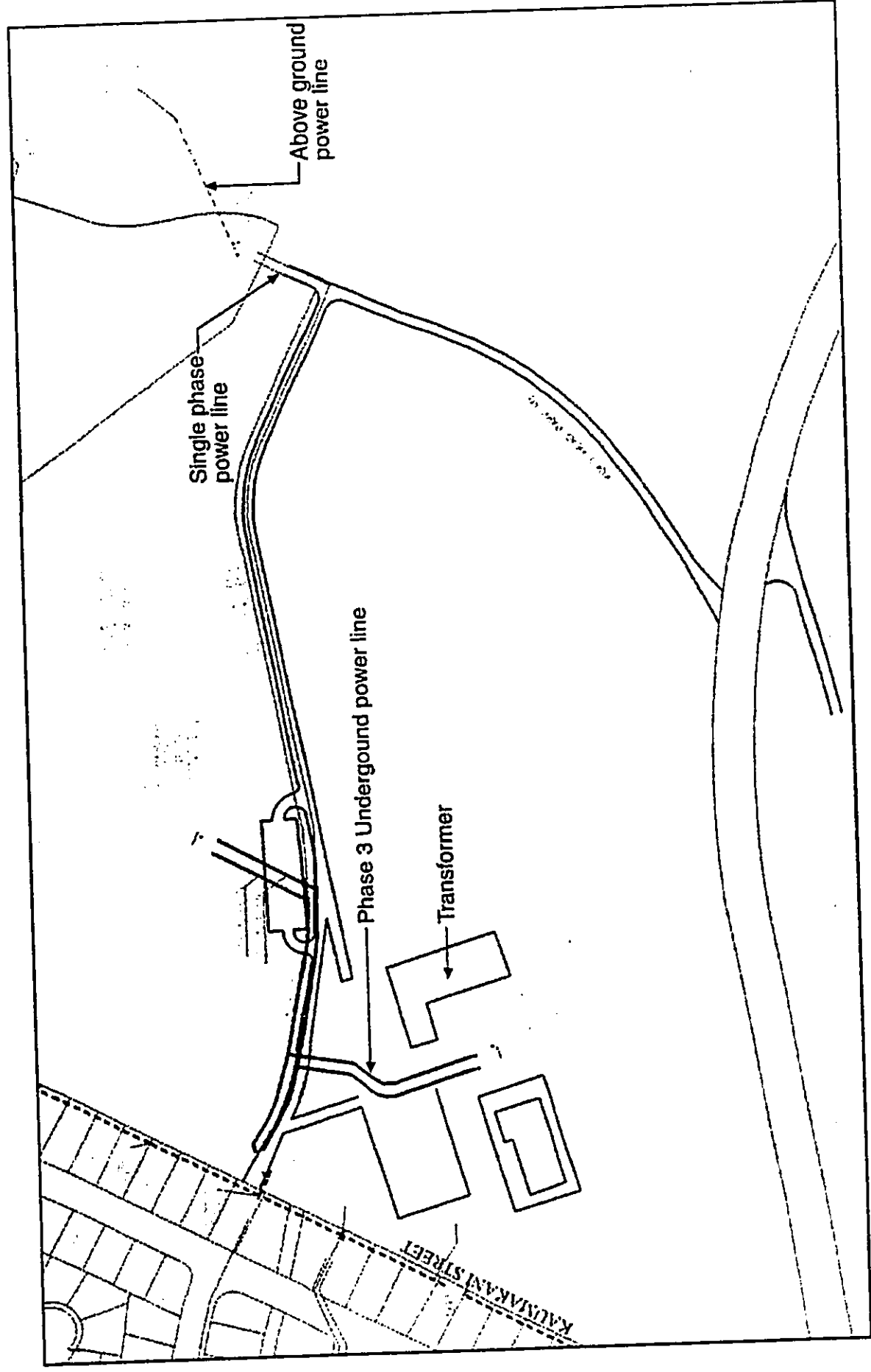


Figure 4-11

HECO Field View Map

Section 5.0

Relationship to Land Use Plans, Policies and Controls

5.0 RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

5.1 OVERVIEW

An important consideration in evaluating the potential effects of a proposed action on the environment is how it may conform to or conflict with approved or proposed land use plans, policies and controls for the affected area. The evaluation of the relationship of planned improvements to Koko Head District Park and Shooting Complex to Federal, State and City and County land use plans, policies and controls is presented below in this section.

5.2 U.S. GOVERNMENT PLANS AND CONTROLS

The federal government has no direct jurisdiction over property within the boundaries Koko Head District Park and Shooting Complex.

Relationship of the Proposed Actions - None of the planned improvements will affect U.S. government plans and controls.

5.3 STATE OF HAWAI'I PLANS AND CONTROLS

5.3.1 Hawai'i State Plan and Functional Plans

5.3.1.1 Hawai'i State Plan

It is the goal of the Hawai'i State Plan to achieve "a desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people." Objectives and policies of the State Plan which are relevant to Koko Head District Park and Shooting Complex include the following:

Section 226-11 Physical Environment - Land-based, Shoreline, and Marine Resources.

(a) **OBJECTIVE:** *Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:*

- (1) *Prudent use of Hawai'i's land-based, shoreline, and marine resources.*
- (2) *Effective protection of Hawai'i's unique and fragile environmental resources.*

(b) *To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:*

- (2) *Exercise an overall conservation ethic in the use of Hawai'i's natural resources.*
- (3) *Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.*

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- (4) Take into account the physical attributes of areas when planning and designing activities and facilities.
- (5) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- (6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.
- (8) Pursue compatible relationships among activities, facilities, and natural resources.
- (9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

Section 226-12 Physical Environment – Scenic, Natural Beauty, and Historic Resources

(a) **OBJECTIVE:** Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multicultural/historical resources.

- (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:
- (1) Promote the preservation and restoration of significant natural and historic resources.
 - (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
 - (4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.
 - (5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Section 226-13 Physical Environment – Land, Air and Water Quality

(a) **OBJECTIVE:** Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:

- (1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.
 - (2) Greater public awareness and appreciation of Hawai'i's environmental resources.
- (b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:
- (1) Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.
 - (2) Promote the proper management of Hawai'i's land and water resources.
 - (6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.

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- (8) *Foster recognition of the importance and value of the land, air and water resources to Hawai'i's people, their cultures and visitors.*

Section 226-17 Facility Systems – Transportation

- (a) *OBJECTIVE: Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:*
- (1) *An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.*
 - (2) *A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.*
- (b) *To achieve the transportation objectives, it shall be the policy of this State to:*
- (6) *Encourage transportation systems that serve to accommodate present and future development needs of communities.*

Section 226-23 Socio-Cultural Advancement – Leisure

- (a) *OBJECTIVE: Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.*
- (b) *To achieve the leisure objective, it shall be the policy of this State to:*
- (2) *Provide a wide range of activities and facilities to fulfill the cultural, artistic, recreational needs of all diverse and special groups effectively and efficiently.*
 - (3) *Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.*
 - (4) *Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historic, geological, or biological values while ensuring that their inherent values are preserved.*
 - (5) *Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.*
 - (6) *Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.*
 - (7) *Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai'i's people.*
 - (10) *Assure adequate access to significant natural and cultural resources in public ownership.*

Section 226-26 Socio-Cultural Advancement – Public Safety

- (a) *OBJECTIVE: Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:*

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- (1) Assurance of public safety and adequate protection of life and property for all people.
- (2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.
- (3) Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's people.

(b) To achieve the public safety objectives, it shall be the policy of this State to:

- (1) Ensure that public safety programs are effective and responsive to community needs.
- (2) Encourage increased community awareness and participation in public safety programs.

(c) To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:

- (1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.

Relationship of the Proposed Actions - All planned improvements will be consistent with and contribute to the implementation of these objectives and policies. Their basic intent is to support prudent use and management of natural resource areas for recreational purposes. New facilities are being planned and designed in a manner that takes into account and is compatible with the physical attributes of the different areas within the District Park and Shooting Complex, and that avoids any costly or irreparable environmental damage. Existing views and vista points will be preserved. The planned improvements will also enhance public safety by providing a shooting range for law enforcement use. Finally, the District Park will continue to serve as an Emergency Shelter in the event of a tsunami.

5.3.1.2 State Recreation Functional Plan

Most of the objectives, policies and implementing actions in this functional plan deal with ways to expand public recreational resources that do not directly relate to the proposed improvements at Koko Head District Park and Shooting Complex.

However, one of the four issues addressed under the general issue area of "Mauka, Urban, and Other Recreation Opportunities" is particularly relevant - namely, expanded urban and community recreation opportunities.

The relevant objective, policy and implementing actions are:

OBJECTIVE II-C: Improve and expand the provision of recreation facilities in urban areas and local communities.

Policy II-C(1): Meet the demand for recreational opportunities in local communities.

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Implementing Action II-C(1)b: Provide additional playing fields and upgrade existing fields for both youth and adult sports leagues. Comments: There is a high and growing demand for fields by baseball, softball and soccer leagues, and the capacity of parks to accommodate more leagues is limited. There is also a shortage of lighted fields for night games.

Relationship of the Proposed Actions – The planned improvements will be consistent with and contribute to the implementation of these objectives and policies. Several new playing fields and courts are planned for the District Park.

5.3.1.3 State Historic Preservation Functional Plan

Most of the objectives, policies and implementing actions in this functional plan deal with ways to protect and preserve historic sites, structures, cultural skills, arts and artifacts that do not directly relate to the proposed improvements at Koko Head District Park and Shooting Complex.

However, one of the three issues addressed under the general issue area of “Preservation of Historic Properties” is particularly relevant – namely, management and treatment of historic properties. The relevant objective, policy and implementing actions are:

OBJECTIVE C: Management and Treatment of Historic Properties.

Policy C.2.: Encourage the preservation and maintenance of historic properties through economic incentives and support.

Implementing Action C.2.d: Encourage State and County agencies to maintain and preserve historic buildings under their administration.

Relationship of the Proposed Actions – The historic properties in the project area will be retained. A quonset hut located in the former Job Corps Site and the HPD Range Staff Office Building have been identified as historic properties.

5.3.2 **State Conservation District Regulations**

Pursuant of Chapter 203, Hawai'i Revised Statutes, the State Land Use Commission has established the boundaries for three State Land Use Districts used on O'ahu: Urban, Agriculture and Conservation. All of Koko Head District Park and Shooting Complex is contained within a Conservation District (Figure 5-1).

The State Board of Land and Natural Resources is responsible for the regulation of land uses within the Conservation District. It has established four types of Resource Subzones (General, Resource, Limited and Protective), designated subzone areas within the various Conservation Districts based on their resource characteristics, and adopted regulations identifying permitted uses and permitting requirements. Koko Head District Park and Shooting Complex are within the General Subzone of the Conservation District. Only the upper slopes of Koko Head Crater are within the Limited Subzone of the Conservation District (Figure 5-2). The objectives and permitted uses relating to the General and Limited Subzones are listed below.

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Figure 5-1
State Land Use Districts

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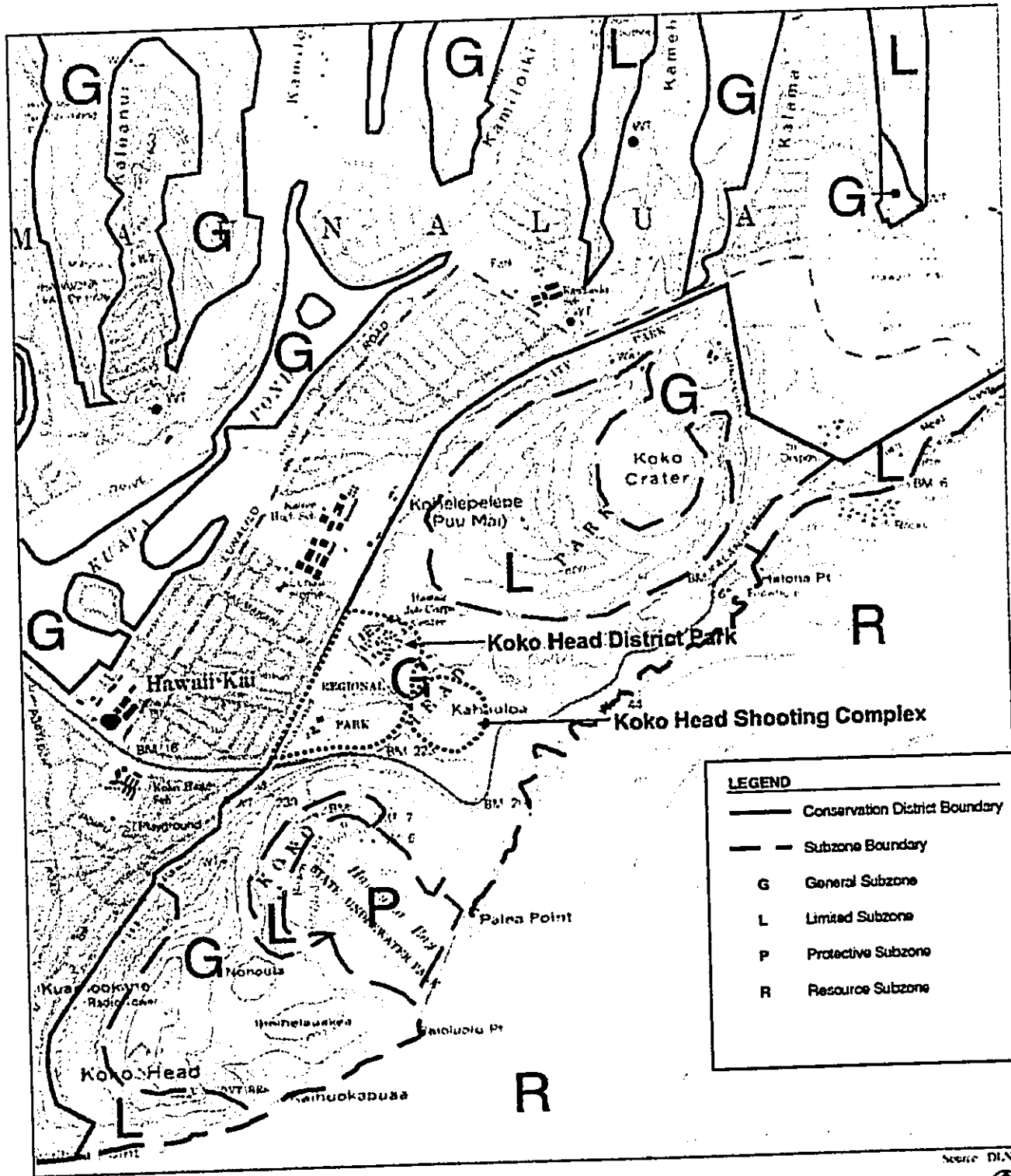


Figure 5-2
Conservation District Subzones

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Limited Subzone (L): *The objective of this subzone is to limit uses where natural conditions suggest constraints on human activities.*

Areas Included:

- Land susceptible to floods and soil erosion, lands undergoing major erosion damage and requiring corrective attention by the county, state, or federal governments.
- Land necessary for the protection of the health and welfare of the public by reason of the land's susceptibility to inundation by tsunami and flooding or to volcanic activity and landslides which incorporate a general slope of 40 percent or more.

Permitted Uses: Data collection, fishponds, Kuleana land use, landscaping (removal of noxious plants), moorings and aids to navigation, public purpose uses, sanctuaries, signs, structures (existing), structures (accessory), subdivision of consolidation of property, tree removal, agricultural, botanical gardens and private parks, erosion control, seawalls and shoreline protection, single family residence

General Subzone (G): *The objective of this subzone is to designate open space where specific conservation uses may not be defined, but where urban uses would be premature.*

Areas Included:

- Lands with topography, soils, climate, or other related environmental factors that may not be normally adaptable or presently needed for urban, rural, or agricultural use.
- Lands suitable for farming, flower gardening, operation of nurseries or orchards, grazing; including facilities accessory to these uses when said facilities are compatible with the natural physical environment.

Permitted Uses: Uses in Limited Subzones and aquaculture, artificial reefs, astronomy reefs, astronomy facilities, commercial forestry, landscaping, marine construction, marine construction, mining and extraction, open space, and land uses not previously identified which are consistent with the objectives of the General Subzone.

Relationship of the Proposed Actions – The planned improvements will occur in the Conservation District's General Subzone, which has no special limitations or protective or resource values. The District Park and Shooting Complex are existing uses. Passive recreation such as walking paths and picnic areas are proposed for the former Job Corps site.

5.3.3 Ka Iwi State Park Master Plan

The planned Ka Iwi State Park encompasses all of the land on the makai side of Kalaniana'ole Highway between the City owned Wāwāmalu Beach and Makapu'u Lookout, where Windward

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O'ahu portion of the highway begins. A master plan for this park was prepared for the State Department of Land and Natural Resources by Wilson Okamoto and Associates in 1996.

The Master Plan establishes the following goals for the future use of the park:

1. *Preservation and enhancement of the Ka Iwi site's natural, cultural and scenic qualities;*
2. *Promotion of public education and awareness of these qualities; and*
3. *Careful management of recreational activities.*

Relationship of the Proposed Actions – The proposed improvements will enhance the new Ka Iwi State Park by maintaining and improving its existing recreational activities.

5.4 CITY AND COUNTY OF HONOLULU PLANS AND CONTROLS

5.4.1 General Plan

The General Plan for the City and County of Honolulu is, firstly, a statement of long-range social, economic, environmental and design objectives for the general welfare and prosperity of the people of O'ahu. These objectives contain both statements of desirable conditions to be sought over the long run, and statements of desirable conditions that can be achieved within an approximate 20-year time horizon. Secondly, the General Plan is a statement of broad policies which facilitate the attainment of the stated objectives.

There are four of the 11 subject areas in the General Plan that relate to the proposed actions covered by this Environmental Impact Statement. Objectives and policies within the following areas are presented below: Natural Environment, Physical Development and Urban Design, Public Safety, Health and Education and Culture and Recreation.

Natural Environment

Objective A: *To protect and preserve the natural environment.*

Policy A4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation.

Objective B: *To preserve and enhance the natural monuments and scenic views of O'ahu for the benefit of both residents and visitors.*

Policy B4: Provide opportunities for recreational and educational use and physical contact with O'ahu's natural environment.

Physical Development and Urban Design

Objective A: *To coordinate changes in the physical environment of O'ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.*

Policy A8: Locate community facilities on sites that will be convenient to the people they are intended to serve.

Objective E: *To create and maintain attractive, meaningful, and stimulating environments throughout O'ahu.*

Policy E5: Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.

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- Policy E8: Preserve and maintain beneficial open space in urbanized areas.*
Objective F: To promote and enhance the social and physical character of O'ahu's older towns and neighborhoods.
Policy F2: Encourage, wherever desirable, the rehabilitation of existing substandard structures.

Public Safety

- Objective A: To prevent and control crime and maintain public order.*
Policy A2: Provide adequate criminal justice facilities and staffing for City and County law-enforcement agencies.
Objective B: To protect the people of O'ahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.
Policy B10: Provide adequate staff to supervise activities at public facilities.

Health and Education

- Objective B: To provide a wide range of educational opportunities for the people of O'ahu.*
Policy B2: Encourage the provision of informal educational programs for people of all age groups.

Culture and Recreation

- Objective B: To protect O'ahu's cultural, historic, architectural, and archaeological resources.*
Policy B2: Identify, and to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.
Objective D: To provide a wide range of recreational facilities and services that are readily available to all residents of O'ahu.
Policy D1: Develop and maintain community-based parks to meet the needs of the different communities on O'ahu.
Policy D2: Develop and maintain a system of regional parks and specialized recreation facilities.
Policy D6: Provide convenient access to all beaches and inland recreation areas.
Policy D7: Provide for recreation programs which serve a broad spectrum of the population.
Policy D12: Provide for safe and secure use of public parks, beaches, and recreation facilities.

Relationship of the Proposed Actions – The proposed improvements are generally complementary with the objectives of the General Plan. None of the planned improvements will have any substantive adverse effects on the distinctive natural and scenic beauty of the area. The improvements will be designed appropriately and open space will be preserved. The safety improvements at the Shooting Complex will benefit law enforcement thus contributing to public safety. Finally, the expansion of recreational courts and fields support the Health and Education and Culture and Recreation Objectives.

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5.4.2 East Honolulu Sustainable Communities Plan (SCP)

At the regional level, the East Honolulu Sustainable Communities Plan includes several policies and planning principles and guidelines pertaining to the proposed projects of this Environmental Impact Statement. The Koko Head District Park and Shooting Complex are located in areas classified as Major Parks on the East Honolulu Sustainable Communities Plan Urban Land Use Map (Figure 5-3). Relevant provisions of the East Honolulu Sustainable Community plan are presented below.

Vision Statement - Part of the vision statement (Sec. 2.1.1) is relevant to the planning of improvements to Koko Head District Park and Shooting Complex.

- *Protect Natural and Scenic Resources.* Significant scenic views of ridges, upper valley slopes, and shoreline areas from Kalaniana'ole Highway and scenic views from popular hiking trails that extend from Koko Head to Makapu'u Head must be protected. Furthermore, access to shoreline areas and mountainous regions will be improved and provided for all to use.
- *Preserve Cultural and Historical Resources.* These resources will be preserved by retaining visual landmarks and significant views, and by preserving significant historic, cultural, and archaeological features from East Honolulu's past.

Relationship of the Proposed Actions - The proposed improvements are generally complementary with the Sustainable Communities Plan's vision and resource objectives. Existing scenic views in the Koko Head area will not be disturbed by the proposed improvements. The historic structures at the District Park and Shooting Range will be preserved.

Key Elements of the Vision - The Sustainable Communities Plan includes seven key elements. The Koko Head-Makapu'u viewshed relates to the planning of improvements to Koko District Park and Shooting Complex. Relevant portions of the discussion in the Sustainable Communities Plan are provided below.

SCP 2.2.2 Preserve the scenic value of the Koko Head-Makapu'u Viewshed

The rugged coastal lands between Koko Head and Makapu'u Point are among O'ahu's most unique and spectacular scenic resources, offering mauka and makai views from many vantage points. Protection of the scenic value of this viewshed has island-wide importance because of its attraction to both residents and visitors. Preserving one of O'ahu's most popular visitor resources is critical to our economy since tourism, our base industry, continues to grow in significance.

Nowhere else on the island, with the exception of the Kaena coastline, are there elements of a natural environment in one large, contiguous area of undeveloped open space. Unlike Kaena, however, the Koko Head-Makapu'u coastline is easily accessible by vehicle. While easy access benefits the public's recreational needs, it can also contribute to degradation of the area's resources. Overuse, misuse, and potential urban encroachment, particularly in the Queen's Beach vicinity, are pressures which threaten the integrity of this coastal area.

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The resources of the Koko Head-Makapu'u region should be protected and enhanced. The publicly owned Koko Head Regional Park, which includes Hanauma Bay Beach Park and Sandy Beach Park, should continue to provide world-class recreational opportunities, but at the same time the value of these resources must be protected from overuse. Visual resources of the Queen's Beach and Queen's Rise sections should also be protected through creation of the proposed Ka Iwi scenic shoreline.

Relationship of the Proposed Actions – The improvements to the District Park and Shooting Range will positively affect scenic views of the area and nearby natural areas.

Land Use Policies, Principles and Guidelines – These statements, as presented in Section 3 of the East Honolulu Sustainable Communities Plan, indicate what actions need to be taken in order to implement the above-described vision for East Honolulu. Relevant statements and the accompanying discussion in the document are provided below.

SCP 3.1 OPEN SPACE PRESERVATION AND DEVELOPMENT

Open space preservation and development is a key element of the vision for East Honolulu's future. Long-term protection and preservation of scenic resources, natural areas, and recreational areas are important to maintaining the desirability and attractiveness of East Honolulu for both residents and visitors.

SCP 3.1.1. General Policies

Open space will be used to:

- *Protect scenic views and provide recreation*
- *Promote access to shoreline and mountain areas*

SCP 3.1.2 Planning Principles

The general policies listed above provide the basis for the following planning principles:

- *Provide Passive and Active Open Spaces. The open space system shall consist of areas in both active and passive uses. Active areas include community-based parks, golf courses, and the Hawai'i Kai Marina. Passive areas include lands in the State Conservation District, drainage and utility corridors, nature preserves, and tracts of lands left undeveloped because of physical constraints or hazards. Beach parks may be either active or passive, depending on the extent to which the landscape has been modified by grading and construction of facilities and the intensity of public use.*
- *Promote Accessibility of Recreational Open Space. Public parks and most golf courses will be accessible for recreation use, but the open space system should also promote the accessibility of shoreline and mountain areas (as required by City ordinance). Access to mountain trails and shoreline areas should be readily available. This also includes the need for parking areas.*

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SCP 3.1.3 Guidelines

SCP 3.1.3.4 *Community-Based Parks*

- *Expand community-based parks in areas where there is a deficit of such facilities and where recreational needs of residents are not being adequately met.*
- *Design and site structural improvements and landscaping in community-based parks in such a way as to create or add to the aesthetic value of these open space elements.*

SCP 3.1.3.6 *Shoreline Areas*

- *Place high priority on maintaining the untamed landscape quality of the Koko Head to Makapu'u viewshed. Any modification to this shoreline area should be done in a manner which preserves the aesthetic values of the undeveloped xerophytic landscape.*

Relationship of the Proposed Actions – The District Park and Shooting Complex improvements will enhance the natural resources in the area. The District Park improvements include plans for passive and active open spaces. The expansion of existing facilities such as basketball court and addition of new recreational activities such as disk golf supports the guidelines for community-based parks.

SCP 3.2 ISLAND-BASED PARKS AND RECREATIONAL AREAS

SCP 3.2.1 Overview

The City and County of Honolulu Department of Parks and Recreation (DPR) develops and maintains a system of park and recreation facilities which it classifies in a hierarchical manner. The largest and most specialized parks are classified as island-based parks since they serve the needs of all O'ahu residents. This group includes regional parks, beach/shoreline parks, beach/shoreline right-of-ways, nature parks/reserves, botanical gardens, golf courses, and zoological parks (Table 5-1 in this EIS). DPR's standard for island-based parks is eight acres for every 1,000 persons.

SCP 3.2.1.1 *Koko Head Regional Park*

Expansion of Koko Head Regional Park is proposed with the addition of the Golf Course 5 and 6 properties, located mauka of Sandy Beach and Kalaniana'ole Highway. The 38-acre park will link the existing Koko Head Regional Park and the proposed Ka Iwi scenic shoreline and will provide a continuous stretch of open space and recreational opportunities extending from Koko Head to Makapu'u Head. This area is planned for active recreation use with playfields and open space for kite flying and other outdoor activities. There will be no courts or paved areas, and a generous naturally landscaped buffer fronting Kalaniana'ole Highway will be needed to retain compatible character with the adjacent Ka Iwi scenic shoreline.

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Table 5-1: Types of DPR Island-Based Parks

Regional Parks	Large areas that may serve the entire island or a region of the island and may include a variety of recreation park types and facilities, natural and cultural sites.
Beach/Shoreline Parks	Areas and sites along the shoreline that may include facilities and support services for water activities, sunbathing, picnicking, and other passive activities.
Beach/Shoreline Rights-of-Way	Access lanes to beaches and the shoreline where residential or other uses prevent development of a beach/shoreline park.
Nature Parks/Reserve	Areas maintained primarily to preserve or conserve unique natural features.
Botanical Gardens	Areas developed for the recreational and educational appreciation of specific types of plants and plant communities.
Source: East Honolulu Sustainable Communities Plan, April 1999.	

SCP 3.2.2 General Policies

- *Maintain and enhance, to the extent possible, existing island-based parks by utilizing land area that has not been fully developed for recreation use. Island-based parks are part of the region's abundance of natural and scenic resources and contribute to the attractiveness of East Honolulu to both residents and visitors.*

Relationship of the Proposed Actions – The improvements at the District Park and Shooting Complex will complement the open space in the Koko Head Regional Park.

SCP 3.3 COMMUNITY-BASED PARKS

SCP 3.3.1 Overview

East Honolulu contains a total of approximately 120 acres of community-based parks of which the largest is the 40-acre Koko Head District Park. Expansion of the park to 59 acres is proposed by incorporating the adjacent Job Corps site. In East Honolulu, this is the most appropriate location for sports and active recreation facilities designed for league play and other major sporting events. This complex should also include passive use areas for quiet enjoyment and nature learning activities. These areas can serve as buffers from adjacent residential areas or from natural features, such as the slopes of Koko Crater.

SCP 3.3.3 Guidelines

- *Expand active recreational facilities at Koko Head District Park by incorporating and developing the adjacent Job Corps site.*

Relationship of the Proposed Actions – The planned expansion of park facilities at Koko Head District Park and the safety improvements at the Shooting Complex all support these objectives.

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SCP 3.4 HISTORIC AND CULTURAL RESOURCES

SCP 3.4.1 Overview

In 1930, an archaeological survey of O'ahu [by J. Gilbert McAllister] documented approximately 60 sites in the area now defined as East Honolulu. Many of these sites, however, have since been destroyed by the 1946 tsunami, erosion, or other land altering activities such as beach development and construction. Within the Koko Head Regional Park, for example, a survey conducted in 1988 relocated only one of five sites identified in the 1930 study. This site, the Koko Head Petroglyphs, was discovered in 1899 and is situated near the Lanai Lookout. The petroglyphs have been extensively altered by erosion and vandals since the 1930 survey, but nevertheless remain significant examples of petroglyph art.

SCP 3.4.2 General Policies

- *Emphasize physical references to East Honolulu's history and cultural roots.*
- *Preserve significant historic features from earlier periods.*

SCP 3.4.3 Planning Principles

The treatment of a particular historic or cultural site should depend upon its characteristics and potential value. The following planning principles should be used to determine appropriate treatment:

- *Preservation and Protection. Recommend in situ preservation and appropriate protection measures for sites that have high preservation value because of their good condition or unique features.*
- *Compatible Setting. Determine the appropriate treatment for a historic site by the particular qualities of the site and its relationship to its physical surroundings. The context of a historic site is usually a significant part of its value, and care should be taken in the planning and design of adjacent uses to avoid conflicts or abrupt contrasts that detract from or destroy the physical integrity and historic or cultural value of the site.*
- *Accessibility. Determine the degree of access that would best promote the preservation of the historic, cultural and educational value of the site, recognizing that economic use is sometimes the only feasible way to preserve a site. Public access to a historic site can take many forms, from direct physical contact and use to limited visual contact. In some cases, however, it may be highly advisable to restrict access to protect the physical integrity or sacred value of the site.*

SCP 3.4.4 Guidelines

The following guidelines apply to Native Hawaiian cultural and archaeological sites and implement the general policies and planning principles listed above:

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- *Determine the appropriate preservation methods on a site-by-site basis in consultation with the State Historic Preservation Officer.*
- *Determine appropriate delineation of site boundaries and setbacks and restrictions for adjacent uses on a site-by-site basis in consultation with the State Historic Preservation Officer.*
- *Include sight lines that are significant to the original purpose and value of the site in criteria for adjacent use restrictions.*
- *Determine the appropriateness of public access on a site-by-site basis in consultation with the State Historic Preservation Officer, Hawaiian cultural organizations, and the owner of the land on which the site is located.*

Relationship of the Proposed Actions – None of the planned improvements will affect existing traditional Hawaiian archaeological sites within the Park's boundaries. Archeological investigations and cultural assessments indicate that no important cultural resources will be affected.

5.4.3 Land Use Ordinance/Zoning Districts

The City and County of Honolulu Land Use Ordinance and accompanying maps define the allowable uses of land zoned for residential, apartment, business, resort, industrial, agricultural, preservation, and mixed uses. The areas of Koko Head District Park and Shooting Complex are within the P-1 Restricted Preservation District (Figure 5-4).

All lands within the State Conservation District are zoned P-1, in which "all uses, structures and development standards shall be governed by the appropriate State agencies." (Section 5.10-1(a) Ordinance No. 86-96, as amended). Use of lands within the Conservation District is administered by the State Board of Land and Natural Resources.

Relationship of the Proposed Actions – All of the planned improvements are in full compliance with the objectives and permitted uses for each of the State Conservation District subzones covering the immediate area and vicinity of the Koko Head District Park and Shooting Complex. Necessary permits will be applied for and obtained before new construction is initiated.

5.4.4 Coastal Zone/Special Management Area Program and Regulations

The Koko Head District Park and Shooting Complex are within the SMA boundary (Figure 5-4).

The State Coastal Zone Management (CZM) Law (Chapter 205A, Hawai'i Revised Statutes) charges the counties with designating and administering Special Management Areas (SMA) within the State's coastal areas. Any "development", as defined by the CZM Law, that is located within the SMA requires a SMA Use Permit. Within the City and County of Honolulu, the SMA Use Permit application review is administered by the Department of Planning and Permitting, and the decision on its issuance is rendered by the City Council, pursuant to Ordinance No. 84-4.

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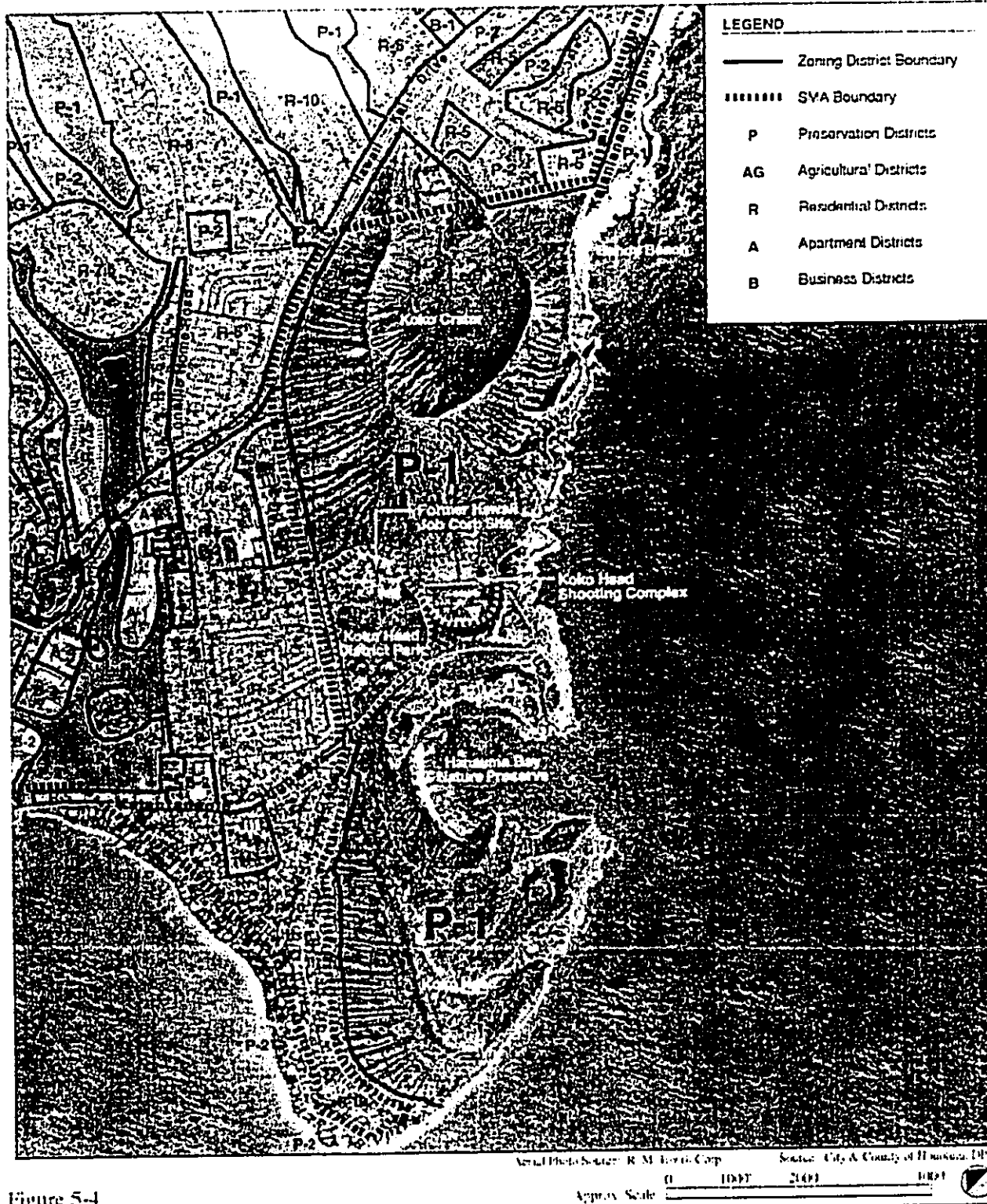


Figure 5-4
Zoning District and SMA Boundaries

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Issuance of the SMA Use Permit is based on a development proposal's consistency with the objectives, policies and review guidelines specified in the CZM Law. Relevant objectives, policies and guidelines, and the relationship of the proposed improvements to them, are presented and discussed below.

5.4.4.1 CZM Objectives and Policies

Recreational Resources Objective – Provide coastal recreational opportunities to the public.

Recreational Resources Policy (B) – Provide adequate, accessible and diverse recreational opportunities in the coastal zone management area by:

- (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.*
- (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.*
- (iv) Encouraging expanded public recreational use of county, State and federally owned or controlled shoreline lands and waters having recreational value.*

Historic Resources Objective – Protect, preserve and, where desirable, restore those natural and man-made historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Historic Resources Policies:

- (A) Identify and analyze significant archaeological resources.*
- (B) Maximize information retention through preservation of remains and artifacts or salvage operations.*

Scenic and Open Space Resources Objective - Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Scenic and Open Space Resources Policies:

- (A) Identify valued scenic resources in the coastal zone management area;*
- (B) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*

Coastal Ecosystems Objective – Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal resources.

Coastal Ecosystems Policy (B) – Preserve valuable coastal ecosystems of significant biological or economic importance.

Relationship of the Proposed Actions – The proposed improvements to the Koko Head District Park will expand recreational opportunities for the public. These improvements and those to the Shooting Range will generally affect only previously disturbed areas, thus ensuring the continued protection and conservation of the nearby coastal area.

Surveys by J. Pantaleo (2001), Kumo Pono (1998), Cultural Surveys Hawaii (1998) and Paul Rosendahl (1988) have been conducted to identify potential historic and cultural resources. (See

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Sections 4.2.3 and Appendices D, E, F and G.) The two historic structures identified within the project site, the quonset hut and the HPD Range Staff Office will not be affected by the proposed improvements.

All new structures will be one or two stories in height and located and constructed in a manner that will be compatible and blend in with the surrounding terrain. No substantive alteration of existing natural landforms will be result. None of the planned improvements will affect the Park's existing public views or shoreline open space and scenic resources.

Existing significant coastal ecosystems near the Park and Shooting Range - most notably 'Ihi'ihilauākea Preserve and Hanauma Bay Marine Life Conservation District - will not be adversely affected by the planned improvements.

5.4.4.2 Relevant SMA Review Guidelines

All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:

- (1) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas and natural reserves is provided to the extent consistent with sound conservation principles;
- (2) Adequate and properly located public recreation areas and wildlife preserves are reserved;
- (3) Provisions are made for solid and liquid waste treatment, disposition and management which will minimize adverse effects upon special management area resources; and
- (4) Alterations to existing landforms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of earthquake.

No development shall be approved unless the council has first found that:

- (1) The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;
- (2) The development is consistent with the county general plan, development plans and zoning.

The council shall seek to minimize, where reasonable:

- (1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;
- (2) Any development which would reduce the size of any beach or other area usable for public recreation;
- (3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;

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- (4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and
- (5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

Relationship of the Proposed Actions – As described in Sections 5.4.1, 5.4.2 and 5.4.3 above, all planned improvements are consistent with the General Plan, the East Honolulu Sustainable Communities Plan, and zoning.

The Shooting Complex improvements will improve public safety at the complex while improvements at the Park will expand recreational opportunities. These will be done in a manner that reflects sound conservation principles. Alterations to existing landforms will be minimal and will not adversely affect ocean water resources or scenic and recreational amenities. All new facilities and improvements will be constructed in a manner that avoids creating, either individually or cumulatively, dangers from floods, landslides, erosion, siltation or failure in the event of an earthquake.

The Park is connected to the Hawai'i Kai treatment plant and the District Park to an onsite septic tank system. Existing solid waste management practices are generally adequate to avoid adverse effects on the area's resources. Similar practices will be employed at new facilities, and improvements will be made as appropriate to ensure that adverse effects continue to be avoided.

Improvements at the District Park and Shooting Complex will not interfere or detract from the views in the area.

None of the planned improvements will affect ocean water quality, views of open water, or existing fish or other wildlife habitats. ~~Necessary permits will be applied for and obtained before new construction is initiated.~~

5.4.5 Koko Head [Regional] Park Master Plan

This Master Plan was completed in January 1992. Its purpose was to focus on planning for the future of the Regional Park as a single resource, rather than as individual components. However, three major areas were excluded – Hanauma Bay Nature Preserve, Koko Crater Botanical Garden, and Koko Head District Park - because they were the subject of a recent (the Botanical Garden) or on-going (Hanauma Bay) master planning study, or are administered as a separate facility (the District Park).

This plan includes a resource assessment and constraints analysis, goals and objectives, and a series of master plan options and recommendations. Summarized in the following paragraphs are the overall master plan goals, and the options and recommendations related to the areas that will be impacted by proposed actions.

5.4.5.1 Master Plan Goals

Four goals "are proposed to guide future management, development, and day to day operations" of the Koko Head Regional Park:

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Goal A: To preserve and enhance the natural character of Koko Head Regional Park.

Goal B: To provide low-impact recreational opportunities in the Koko Head Regional Park that minimize impacts on landforms, flora and fauna.

Goal C: To unify existing and future recreational activities in the park and provide greater linkage among them.

Goal D: To emphasize and enhance the educational value of the park and its resources.

Relationship of the Proposed Actions – Safety improvements to the Shooting Complex will benefit surrounding uses in the Regional Park. Planned recreational activities in the former Job Corps site are low-impact and will be fully integrated with the other District Park facilities.

5.4.5.2 Master Plan Options and Recommendations

Master Plan options and recommendations related to both traffic and recreation improvements are presented in this plan, and are grouped according to the following eight geographic areas: Kalaniana'ole Highway, Kahauloa Crater (Koko Head Shooting Complex), Sandy Beach, Unimproved Sandy Beach Area, (the former) Hawai'i Job Corps Center Area, Koko Crater, Koko Crater Stables, and Koko Head. The former Hawai'i Job Corps Center site and the Shooting Complex will be affected by the planned improvements discussed in this EIS. Kalaniana'ole Highway will not be directly affected by any of the planned improvements, but changes in traffic conditions could result from their completion. Recommendations in the Master Plan for these two areas are discussed below.

5.4.5.3 Kalaniana'ole Highway

The basic problem that this Master Plan attempts to address is the serious conflicts that result from the segment of the highway through the Regional Park serving both as one of the most important scenic routes on O'ahu and as a heavily traveled through route for traffic between Hawai'i Kai and Waimanalo. Suggested options range from building a new mauka by-pass highway and converting the section of the existing roadway through the Regional Park to a 15 mile-per-hour (mph) one-way scenic drive, to only minor roadway improvements such as widening at critical points, shoulder widening where possible, and improvements to guardrails and signs.

Construction of a new by-pass roadway from Lunalilo Home Road to Kalaniana'ole Highway near Queens Beach, and converting the section of the existing roadway through the Park to a 25 mph one-way scenic drive, was recommended in the 1992 Master Plan. Also recommended were the addition of a second left-turn lane from Kalaniana'ole Highway to Lunalilo Home Road, and the installation of a traffic signal at the Kealahou Street-Kalaniana'ole Highway intersection. (The latter improvement has since been completed.)

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Relationship of the Proposed Actions – As noted, none of the improvements currently being proposed for the Koko Head District Park and Shooting Complex will directly effect Kalaniana'ole Highway. As discussed in Section 6, the planned improvements are expected to result in increases in current overall attendance levels at the District Park and Shooting Complex, the mix of park users, or the patterns of their use. Thus, existing traffic volumes on Kalaniana'ole Highway could be affected. This highway is expected to have sufficient capacity to accommodate projected future traffic volumes with or without the planned improvements.

The by-pass road proposed in the 1992 Master Plan would involve both the significant widening of existing sections and construction of as-yet unbuilt sections of Hawai'i Kai Drive in the vicinity of the Regional Park. Right-of-way reservations for a major new thoroughfare (Hawai'i Kai Drive), which would extend through the entire length of the Hawai'i Kai community and pass mauka of Koko Head Regional Park and Nature Preserve, were included as part of the Master Plan for this region that was prepared in the 1960's.

However, this part of the Master Plan has not been fully implemented, and parts of the right-of-way have since been abandoned and developed with other uses. At present, the State Department of Transportation has no plans to complete even those segments of the thoroughfare where right-of-way reservations remain available. The very high costs of this roadway make it impossible for the City and County to itself fund these improvements.

Given the absence of the proposed by-pass highway, the recommended second left-turn lane for traffic moving from Kalaniana'ole Highway to Lunalilo Home Road will not be needed to accommodate anticipated future traffic volumes. The recommended traffic signal at the Kealahou Street-Kalaniana'ole Highway intersection has been installed.

5.4.5.4 Kahauloa Crater (Rifle Range)

The 1992 Master Plan states that despite numerous safety improvements over the years, complaints about stray bullets hitting parked cars at Hanauma Bay Nature Park and houses in the Hawai'i Kai area are not uncommon. The plan recommends that if a new site for a rifle range is located, the Koko Head Shooting Complex should be closed. The plan recommends landscaping the area with shade trees and linking the facility to the District Park by means of a tunnel through the existing berm between the Shooting Complex and the District Park.

The plan identifies the following options for future uses:

- If the crater becomes available for alternate uses, develop it as the site of a Koko Head Regional Park Visitor Information Center, picnic area with playground, and central parking area for the park and Hanauma Bay Nature Park. This option would also include a City operated shuttle service around the regional park's internal roadway system to reduce the impact of private vehicles on recreational resources and activities.
- If the crater becomes available for alternate uses, develop it as a passive park area with picnic and playground facilities.
- If the area continues to be used as a rifle range, a detailed study of the surface danger area needs to be undertaken to determine how the range fan (danger area) can be reduced to the physical boundaries of the crater to mitigate potential hazards. Increases in recreational activity around the rifle range cannot be realized until the surface danger is

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reduced to the physical boundaries of Kahauloa Crater. Once this is done and the range fan is reduced, other recreational activities in and around the crater can be implemented.

Relationship of the Proposed Actions - The Koko Head Shooting Complex will continued to be used as a Shooting Complex. The proposed safety improvements are based on an analysis by Kramer One (June 2001). Their full report is included in Appendix A. The proposed safety improvements will address safety issues that have been previously identified.

5.4.5.5 Former Hawai'i Job Corps Center Area

It is pointed out in the 1992 Master Plan that the use of this area by a non-recreational activity is not consistent with the natural character of the Regional Park. Termination of the site's availability for the Hawai'i Job Corps Center, once the existing lease expired, was recommended. The Job Corps vacated the site and moved to a new facility in Waimanalo in 1995.

Two options for the future use of this area were offered:

- Use part of the site for the by-pass highway right-of-way (see discussion in Section 5.4.5.3 above), and the remaining portion as an expansion area for the Koko Head District Park.
- If the by-pass highway option is not implemented, use the existing facilities for a variety of purposes, including possibly a "visitor destination center", scouting and/or high school leadership camps, and/or staging areas for organized and self-directed hikes. Any remaining underutilized portions of the site are recommended for integration into the District Park.

Recommended in this Master Plan is utilization of the site as a "new administrative center" for the Regional Park. Such a center would include "meeting rooms, educational programs, performing arts, and recreational facilities for the islandwide population, similar in scope to McCoy Pavilion at Ala Moana Park". Also recommended is the improvement of a parking area near the base of the abandoned summit railway for use by hikers.

Relationship of the Proposed Actions - The proposed improvements involve utilizing the entire Job Corps site for expanded recreational facilities.

5.4.6 Hawai'i Job Corps Site Master Plan

The Job Corps Site Master Plan was completed in September 1995, at which time the Hawai'i Job Corps Center was in the process of relocating its operations to new facilities in Waimanalo. The purpose of the plan was to establish a basic policy direction for the future use of the site and provide a framework for specific decisions on the development of new recreational facilities.

The 1995 Master Plan called for utilizing the site for the expansion of Koko Head District Park. Recommended new recreational facilities and areas include:

- Target archery and field archery facilities, which would be relocated from Kapiolani Park and Kapolei Regional Park, respectively;

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- An area for disc golf; and
- Passive recreational areas and pathways for picnics, walking and jogging, roller bladers and bicyclists, etc.
- Retention of existing recreational facilities including ballfields, which would be upgraded for multi-purpose use, and playcourts.

The Job Corps Site Master Plan also recommended some existing buildings be retained and used to house some or all of the other activities that are currently using the site. These include the Department of Parks and Recreation's Park District No. 1 Maintenance Baseyard, the Department of Emergency Services Water Safety Division field office, and the office space being used by the Honolulu Police Department personnel based in the area.

Relationship of the Proposed Actions – The proposed use of this site as a recreational area supports the Hawai'i Job Corps Site Master Plan. A disc golf field and passive recreation facilities are planned for part of the site and existing recreational facilities will be retained and upgraded. The maintenance baseyard will remain in the also remain in the area.

The target and archery facilities are planned for the Koko Head Shooting Complex area rather than the Job Corps area because it is a more compatible use.

5.4.7 Hanauma Bay Nature Park Master Plan

The Hanauma Bay Improvements Plan proposed to demolish all of the existing dilapidated buildings at the former Job Corps site except those occupied by the Park District's baseyard facilities. Goear Memorial Ballfield would remain as is. The buildings occupied by the Ocean Safety Division field office and HPD will be demolished, and these users will be relocated to other City facilities. The disturbed areas where the demolished buildings were located would be rough graded as necessary and planted with grass. No new facilities were planned for this site. The demolition was proposed primarily to remove potential public hazards and to facilitate the future use of this area for park purposes.

Relationship of the Proposed Actions – The planned improvements assume that the buildings at the Job Corps site have been demolished as proposed.

Section 6.0

Probable Impacts and Mitigative Measures

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6.0 PROBABLE IMPACTS AND MITIGATIVE MEASURES

Two types of probable effects on the environment are discussed in this section: potential short-term or construction-related effects, and potential long-term or operational-related effects. Also described are mitigative measures that are proposed for implementation, where appropriate and feasible, to minimize any adverse effects. In addition, areas where there could potentially be adverse effects, but where none are actually anticipated, are discussed.

There are some types of impacts where the potential short-term impacts of constructing a new facility, or of improving an existing facility, will be different or distinct from the potential long-term impacts that would be due to changes resulting from the existence of that new facility or improvement. In other cases, *impact concerns* will be related more to the permanent change that is being made, rather than to any distinction that could be made between impacts of the temporary or short-term construction process and the long-term impacts of the completed improvement. Where there could be significant differences between short-term and long-term impacts – e.g., in the case of noise impacts – separate discussions of both types of impacts are provided. Where little or no difference is anticipated, or is not considered to be significant – e.g., in the case of impacts on views -- the entire discussion is included in the sections addressing long-term impacts.

6.1 POTENTIAL SHORT-TERM IMPACTS

Construction of the facilities planned for the Koko Head District Park and design and safety improvements to the Koko Head Shooting Complex, will create some local short-term construction-related impacts on the environment. These will include temporary changes to drainage and runoff patterns, soil disturbance, dust and erosion due to clearing and grading; traffic in the project's vicinity due to construction equipment and trucks; and increased noise due to construction-related operations. There will also be some temporary disruptions to recreation use of the District Park and Shooting Complex.

Short-term beneficial impacts related to construction will include employment-related expenditures and the purchase of services and materials related to the design and construction of the various projects. Local retail businesses may also indirectly benefit through direct and multiplier effects associated with construction activities.

The probable short-term effects related to constructing the planned improvements and, where applicable, proposed mitigative measures are described in the following sections.

6.1.1 Topography, Soils and Drainage

The topography of the Koko Head District Park and Shooting Range will be only slightly affected by short-term construction. There will be no substantive alterations to existing drainage patterns.

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The estimated earthwork totals (for planning purposes only) for the planned improvements at Koko Head District Park includes approximately 60,000 cubic yards of excavation and 40,000 cubic yards of embankment. A breakdown of estimated earthwork for each planned improvement of the park is provided in Appendix L.

The estimated earthwork totals (for planning purposes only) for the safety improvements at Koko Head Shooting Complex includes approximately 36,000 cubic yards of excavation and 24,000 cubic yards of embankment. See Appendix L.

Mitigative Measures – Strict erosion control measures, as required by the regulations, standards and guidelines cited below, will be followed in order to ensure that any significant adverse effects are avoided. This will include the preparation and obtaining approval of an Erosion Control Plan from the City Department of Planning and Permitting (DPP) prior to initiating any construction. Erosion control measures will, where appropriate, include the use of cut-off ditches, temporary ground cover, and detention/sedimentation basins. Dust controls will include the frequent watering of exposed areas, good housekeeping at the job sites, and paving or landscaping of exposed areas as quickly as possible.

The following documents specify erosion and dust control measures that will be adhered to during construction of the planned improvements:

- *City and County of Honolulu's "Grading, Grubbing and Stockpiling Ordinance No. 3968"*. This ordinance requires the submittal and approval of appropriate plans and specifications, and the posting of a bond for larger-scale projects, prior to issuance of a permit. Minimum standards are provided with respect to the slopes and terracing of cuts and fills, size of the area that can be worked at one time, distances from property lines, preparation of ground surfaces, placement and compaction of fill, drainage provisions, dust control, etc. It also authorizes the City's Chief Engineer to "attach such conditions as may be reasonably necessary to prevent creation of a nuisance or hazard to public or private property, health or welfare".
- *DPP's "Soil Erosion Standards and Guidelines"*. This document provides guidelines and standards for the preparation and execution of erosion control plans, which are required as part of a grading permit application for larger-scale projects. These plans must include detailed information on existing site conditions, and a comprehensive plan for controlling erosion during construction activities. Areas covered include maximum soil loss rates, dust control, sediment fences/barriers, slope protection and vegetative stabilization, sediment basins and other drainage protection measures, timing of construction activities, etc.
- *U. S. Soil Conservation Service's "Erosion and Sediment Control Guide for Hawai'i"*. This is more of a "how to" manual on ways to reduce erosion and sedimentation and conserve our soil resources. It is intended for use by farmers and ranchers as well as urban developers. It provides a wealth of technical information on such things as crop planting practices, soil properties related to their susceptibility to erosion, rainfall data and charts by island for estimating runoff, and types of plants to use in different erosion control situations. [This agency has been renamed the "U.S. Natural Resources Conservation Service".]

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6.1.2 Surface Water Quality

No improvements are planned that will directly affect coastal waters or water quality.

Mitigative Measures – Adherence to the erosion control measures discussed immediately above will be critical in preventing any adverse effects on coastal water quality, as well as to controlling erosion and dust. In addition to those listed above, the following regulations and guidelines will be followed in order to minimize any possible water quality effects:

- State Department of Health's "Water Quality Standards", Chapter 11-54 in the Public Health Regulations.
- Section II "Best Management Practices" in the State Department of Health's "Nonpoint Source Water Pollution Management Plan"
- U. S. Environmental Protection Agency/National Oceanic and Atmospheric Administration's "Guidance Specifying Control Measures for Sources of Nonpoint Pollution to Coastal Waters"

6.1.3 Vegetation and Wildlife

Minor short-term effects to vegetation, wildlife and insects can be anticipated wherever site clearing and grading or excavation is necessary. Of particular concern would be any disturbance that would occur to the habitats for endangered species of vegetation or wildlife. However, as described in Section 4.4.7, there are no endangered or rare species of vegetation located in the areas to be occupied by the planned improvements.

As indicated in Section 4.4.8, no rare or endangered species of land-based wildlife or insects were found within the District Park or Shooting Complex or the remainder of the Regional Park area.

Mitigative Measures – None are considered necessary.

6.1.4 Cultural, Historic and Archaeological Resources

As indicated in Section 4.2.3, none of the traditional Hawaiian archaeological sites known to exist within Koko Head District Park and Shooting Complex are located in or near any of the areas that will be affected by the construction of the planned improvements. There are two historic structures, the quonset hut and HPD Range Staff Office, located in the project area, neither of which will be disturbed.

Mitigative Measures – If during the course of construction any cultural or archaeological deposits are unearthed, all work in the area will be halted and the State Historic Preservation Office and the Oahu Island Burial Council will be notified. The two historic properties will not be affected by the proposed improvements to the District Park and Shooting Complex. Specific treatment of the quonset hut is discussed in the August 2, 2001 letter from the Historic Preservation Division of DLNR.

6.1.5 Air Quality

During construction, three potential types of air pollution emissions will likely occur, resulting in short-term air quality effects:

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- (1) fugitive dust from soil excavation and vehicle movement;
- (2) carbon monoxide and nitrogen oxide emissions from on-site construction equipment and from vehicles of construction workers and motorized construction equipment traveling to and from the worksite; and
- (3) vehicular emissions resulting from traffic congestion along Kalaniana'ole Highway due to disruption of traffic flow by construction-related vehicles.

Factors favoring good air quality in the vicinity of the project site include good exposure to tradewinds and ample open space. Moreover, except for vehicles traveling along Kalaniana'ole Highway, there are no other sources of air pollution in the immediate vicinity.

Mitigative Measures – The short-term effects on air quality during construction will be mitigated by compliance with State Department of Health Administrative Rules, Title 11, Chapter 60, Section 5 (Air Pollution Control for O'ahu). Potential control measures to reduce fugitive dust include frequent wetting down of loose soil areas with water, use of wind screens, covering of open-bodied trucks during materials transport, and the washing down of tires on construction equipment. Establishment of landscaping early in the construction schedule can also help control fugitive dust. This would initially require frequent watering to carry young plants through the dry season.

If necessary, increased vehicular emissions due to disruption of peak-hour traffic by construction equipment and/or commuting construction workers can be alleviated by moving the equipment and personnel to the site during off-peak traffic hours.

6.1.6 Noise

Unavoidable, but temporary, noise impacts may occur during the construction period. Audible construction noise will be unavoidable during the construction of the new facilities and infrastructure at the Koko Head District Park. However, noise during construction activities at the Koko Head Shooting Complex will be less audible due to its longer distance from residences and the noise shielding effects of the ridge at Koko Head Park. See Appendix M for more information.

Mitigative Measures - Construction vehicles and activities must comply with State Department of Health Administrative Rules, Title 11, Chapter 42 (Vehicular Noise Control for O'ahu) and Title 11, Chapter 46, Section 5 (Community Noise Control for O'ahu), respectively. The State of Hawai'i Department of Health's noise control regulation requires a permit for construction activities which emit noise in excess of 95 decibels. Mitigation measures to minimize construction noise include the use of mufflers to suppress loud equipment and limitations on the hours of heavy equipment operation.

6.1.7 Recreational Resources

Operations and recreational use of the Koko Head District Park and Shooting Complex will be affected in that users may be occasionally inconvenienced by construction activities. Portions of the Shooting Range will need to be shut down to accommodate the renovations, particularly the

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rifle, pistol, and silhouette ranges. Since HPD is dependent on the range for their training accommodations, the renovation will be coordinated with HPD's schedule.

Mitigative Measures - With proper scheduling and phasing, it will be possible to minimize the inconvenience and allow continued use of the District Park and Shooting Complex at substantially current levels during most of the construction period.

6.1.8 Employment

As noted in Section 3, the estimated cost for design and construction of the planned improvements is approximately \$16.5 million and their completion is expected to take approximately 9 or more years. This will generate significant short-term direct employment, both on- and off-site, during the construction period. The number of jobs at any given time will vary considerably, depending on the level of construction activity.

Construction activity will also generate indirect and induced employment opportunities and multiplier effects. Those affected will be local material suppliers and retail businesses.

Mitigative Measures - The short-term employment effects will be beneficial to both the overall Hawai'i and local economies. While the magnitude of the effects on the local economy cannot be accurately projected, it should not be at a level that would generate any significant expansion or structural changes that could lead to negative effects when construction is completed. No mitigative measures are considered necessary.

6.1.9 Roadways and Traffic

Construction activities will create some short-term effects primarily from trucks, heavy equipment and other vehicles that will use existing roads - primarily Kalaniana'ole Highway - to access construction areas, especially for the purpose of delivering construction materials and hauling away demolition debris. While construction vehicles are relatively slow and difficult to maneuver, it is anticipated that they will only marginally affect overall traffic flow. The relative effects on highway traffic should be slight since most trucks will likely be traveling in the opposite direction of peak-hour flow, and Kalaniana'ole Highway is already a major thoroughfare for large trucks that are prohibited from using the Wilson and Pali Tunnels.

Commuting construction workers will slightly increase traffic levels, although their effect is anticipated to be negligible. It is anticipated that space will be provided within the District Park and the Shooting Complex, for parking all construction workers' cars and for other construction-related vehicles.

Safety improvements for the Shooting Range involve the closure of Koko Head Park Road from Kalaniana'ole Highway. The closure of the roadway will effectively eliminate ingress and egress opportunities for Koko Head District Park from Kalaniana'ole Highway, placing primary access through residential streets, namely Anapalau and Kaumakani Streets from Lunalilo Home Road. Koko Head Park Road will be maintained for maintenance and emergency services. This entrance is used infrequently.

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Mitigative Measures – Several mitigative measures are planned for implementation to minimize the potential impact of construction related traffic generated by the improvements:

- (1) The proposed phased development of the park will stage the traffic growth in three phases over the next 10 years.
- (2) Appropriate traffic control measures and scheduling of construction activities will be applied during the construction of the new facilities at Koko Head District Park and Shooting Complex necessary to ensure public safety and minimize the disruption of traffic.
- (3) In addition, the movement of construction equipment and slower vehicles will be coordinated to avoid peak traffic hours.
- (4) A fence or chain link along Koko Head Park Road near Kalaniana'ole Highway will be used to restrict daily use of the roadway while keeping the access available for emergency purposes.

6.2 POTENTIAL LONG-TERM IMPACTS

The improved facilities at Koko Head District Park and Shooting Complex will have the potential to generate some long-term effects on the natural and human environment. In addition to the subject areas discussed above with respect to short-term impacts, areas where long-term impacts are possible include natural hazards, visual resources, population, and roads and utilities. Probable long-term impacts related to completion and operation of the planned improvements and, where applicable, proposed mitigative measures are described in the following sub-sections.

6.2.1 Topography, Soils and Drainage

The effect of proposed improvements at the Koko Head District Park and Shooting Complex are described below. Overall, drainage patterns will not be significantly altered.

Koko Head District Park – The proposed park improvements will increase the quantity of storm water runoff by approximately 9 percent. The proposed drainage system will continue to utilize the existing sheet flow and drainage structures. Existing drainage patterns will be preserved where practicable. The existing concrete open channel that runs along the District Park property line was designed based on the previous Job Corps development, which had a greater area of impermeable concrete surfaces in comparison to the new development.

Koko Head Shooting Complex – The proposed improvements will result in a slight increase in storm water runoff. The proposed drainage system will continue to utilize surface sheet flow to the retention basin in the crater. The retention/detention basin will be expanded as necessary to accommodate the increased storm runoff. Existing drainage patterns will be preserved where practicable.

Mitigative Measures – Overall, there will be no major change in existing drainage conditions at the District Park or Shooting Complex. Runoff from parking lots at the Koko Head District Park and Shooting Complex and paved areas will be directed to grassland areas and concrete ditches. The landscape maintenance crew will continue the judicious use of fertilizers, pesticides, and herbicides.

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6.2.2 Flood and Tsunami Inundation Hazards

As noted in Section 4.4.6, the O'ahu Civil Defense Agency's Tsunami Evacuation Map for Hanauma Bay to Makapu'u indicates that both the Koko Head District Park and the Shooting Complex are outside of the tsunami evacuation zone.

Koko Head District Park is identified as a Public Shelter/ Refuge Area for evacuees. The nearest shelter is Waimanalo Elementary School. Therefore, the Koko Head District Park shelter serves the coastal areas of Hanauma Bay, the Blow Hole, Sandy Beach and Makapu'u.

Mitigative Measures – No mitigative measures are necessary. Koko Head Park Road will be opened for emergency needs.

6.2.3 Surface Water Quality

As noted in Section 6.1.2, no improvements are planned that will directly impact coastal waters or surface water quality.

Mitigative Measures - No mitigative measures are considered necessary.

6.2.4 Groundwater

The proposed improvements will not directly impact groundwater.

Mitigative Measures - No mitigative measures are considered necessary (PSL Appendix B)

6.2.5 Hazardous Materials

As noted in Section 4.4.5, lead and arsenic are present in the soils above regulatory guidelines. The safety improvements such as the bullet catchers will greatly improve the efficiency of lead reclamation for the rifle and pistol ranges. However, the two existing shotgun ranges may be directing a significant portion of the lead shot into areas in which lead cannot easily be reclaimed (Kramer, One Appendix A)

Mitigative Measures - The State of Hawaii Department of Health Hazard Evaluation and Emergency Response (HEER) was consulted regarding the high levels of lead and arsenic in the soils at the Shooting Complex (PSL Appendix B). HEER recommended that the soils on the site could remain in place and they would not require remedial actions. Any grading work will be performed in compliance with OSHA guidelines for training and exposure monitoring. Soils will not leave the site without testing and/or remediation.

6.2.6 Vegetation and Wildlife

As noted in Section 6.1.3, none of the planned improvements will affect areas where rare or endangered species of vegetation or wildlife are known or suspected to exist based on past surveys or observations.

Mitigative Measures - The O'ahu Invasive Species Committee recommends the following steps be taken to address invasive species management concerns in this area:

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1. Make an inventory of invasive species in the project area. Species should be ranked to determine what species to target for removal.
2. Continue to monitor invasive species every two to three years.
3. Before implementing a landscape plan, submit the plan to the Oahu Invasive Species Committee for review. The committee will evaluate whether any of the planned plants are invasive and make alternative recommendations.

It is also recommended that a fire plan be developed to address the threat to endangered species present in the area.

6.2.7 Cultural, Historic and Archaeological Resources

As indicated in Section 4.2.3, there are no known traditional Hawaiian archaeological sites that are located in or near any of the areas that will be affected by the construction of the planned improvements at the District Park and or safety improvements at the Shooting Complex.

Mitigative Measures – None are considered necessary.

6.2.8 Air Quality

Periodic disturbances to air quality due to construction and demolition work will cease and local air quality conditions will return to existing conditions. Overall attendance levels at the District Park are expected to almost double and attendance levels at the Shooting Complex will experience a minor increase. This will slightly increase vehicular traffic and emissions, but the effect on air quality will be minor. None of the new facilities will affect the air quality.

Mitigative Measures – Overall air quality in the Koko Head-Makapu'u area is very good, due both to the low intensity of use and the substantial winds that blow most of the time. The planned improvements will not change these conditions. No mitigative measures beyond existing vehicle emission controls are considered necessary.

6.2.9 Noise

A noise assessment was completed by Ebisu and Associates (June 2001). The complete noise assessment is provided in Appendix M.

Koko Head District Park - Future traffic noise levels within the Koko Head District Park site and in the residential areas along Kaumakani and Anapalau Streets are not expected to exceed acceptable levels. There will be a small increase in the number of vehicles accessing the park, with a slight increase in noise levels.

The majority of the new facilities planned at the District Park should not cause adverse noise impacts. The proposed multi-purpose and soccer fields, located 600 to 1,200 feet from the nearest residence, should not create adverse noise effects. The future noise levels from the baseball fields and tennis courts should be similar to existing noise levels. Risks of adverse noise impacts from these facilities should be low, since buffer distances between these facilities and the existing residences west of the park will remain the same, and the noise levels from these activities were not unusually high. Relatively large buffer distances (greater than 1,000 feet) are

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provided between the closest residences and the skate park, BMX Park, in-line hockey skating rink, and Goeas Memorial Ballfield, and the noise from these facilities will probably be inaudible at the closest residence. Other facilities that are not expected to create adverse noise impacts are the picnic areas, relocated volleyball court, the disc golf course and the walking paths.

The largest intermittent noise sources associated with the District Park will probably be the continued use of gasoline powered lawn maintenance equipment, such as lawnmowers, leaf blowers, and weedwackers. Although this equipment may be intermittently audible above the existing background ambient noise levels, they are not uncommon in urban areas, are used during the daytime hours, and should not cause severe noise impacts.

The impact noise from the new tennis backboards at the District Park may be audible at the nearest neighbors to the west. The 50-meter swimming pool may represent the highest risk of adverse noise impacts if yelling, screaming, whistles/horns, and other boisterous activities are allowed on a regular basis. Similarly, shouting and screaming at the playground may be audible at the closest residence located approximately 250 feet away. Noise from the gym and teen center such as a scoreboard horn, crowd noise, the sound of live bands at the teen center, while not significantly higher than existing daytime background ambient noise levels, may annoy some residents, particularly if the noise occurs during the late evening or nighttime hours.

Koko Head Shooting Complex - Future traffic noise levels associated with users of the Koko Head Shooting Complex are not expected to alter traffic noise levels along Kalaniana'ole Highway. The proposed safety improvements to the Koko Head Shooting Complex are not expected to increase the maximum noise levels from the Shooting Complex. A study of noise levels concluded that the noise from the Shooting Complex does not exceed the DOH noise limits for impulsive sources at the closest residences.

Mitigative Measures -

Koko Head District Park - The majority of the new facilities planned at the Park should not cause adverse noise impacts and noise mitigation measures should not be required. However, noise mitigation measures in the form of administrative controls and supervision are recommended if excessive noise from the 50-meter pool and playground are experienced within 250 feet of the residences. In addition, administrative controls and supervision of the operating hours of the Teen Center will mitigate noise. The design and location of the backboards at the new tennis courts will minimize noise effects to existing residents north of the tennis courts.

Koko Head Shooting Complex - Administrative controls and scheduling of range operating times are the noise mitigation measures proposed for the Shooting Complex. Operation during the warmest time of the day and avoidance of early morning and late evening operating hours will minimize excessively loud noise in the surrounding communities. In addition, because the audibility of the impulsive noise from the range cannot be eliminated, operation at night will be avoided as practical.

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6.2.10 Visual Resources

The picnic areas in the former Job Corps site are designed to take advantage of the scenic views of Diamond Head Crater and Maunalua Bay.

The District Park improvements will be visible from Kalaniana'ole Highway and the Kuapā Lookout. However, the safety improvements at the Shooting Complex will not be visible from Kalaniana'ole Highway.

Mitigative Measures – The District Park improvements will be designed and landscaped appropriately. Much of the existing natural wooded vegetation will remain at the former Job Corps site. The site is currently developed and the improvements will enhance the appearance. No other mitigation measures are considered necessary.

6.2.11 Recreational Resources

The planned improvements at the Koko Head District Park will greatly expand the recreational resources. Several completely new uses such as a disc golf course will be provided while other uses such as baseball fields will be expanded. The effect of these planned improvements on recreational resources will be beneficial. This is primarily because these facilities were requested by the community and will improve recreational resources.

The Koko Head Shooting Complex safety improvements will also improve recreational resources. Safety at the current ranges will be improved, and a new archery range will be constructed.

Mitigative Measures – The primary purpose of the planned improvements at Koko Head District Park is to increase the recreational facilities in the area. Improvements to the Shooting Complex, on the other hand, are intended to improve safety for range users and others in the area. As such, there should be no adverse effects on recreational resources that require mitigation.

6.2.12 Population and Employment

The planned improvements are not expected to generate any population effects. The increase will definitely not be at a level that could cause any shift in resident population growth from other areas of O'ahu to the East Honolulu region, much less have any effect on O'ahu's overall population growth rate.

New jobs will be created at the District Park as the facilities are developed. For example, lifeguards will be hired when the pool is constructed.

Mitigative Measures – Employment effects will be small and largely beneficial. No other mitigative measures are considered necessary.

6.2.13 Adjacent and Nearby Land Uses

The Koko Head District Park is located adjacent to a residential neighborhood and to the Shooting Complex. The Park will primarily serve this residential area creating an overall positive effect on the neighborhood. Buffering between the park uses and the homes will be

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provided by landscaped vegetation. The closest residences to the District Park facilities are approximately 300 feet at the west side of the park. The anticipated adverse effects to these homes will be from slight increases in the Park traffic and noise, which are discussed in Sections 6.2.14 and 6.2.9, respectively.

The District Park and Shooting Complex are also located near Hanauma Bay Nature Preserve. Distance and topography will preclude the planned improvements from having any effects on the Nature Preserve.

Mitigative Measures – Except for those discussed in Sections 6.2.9 and 6.2.14 with respect to noise and traffic effects of the increased usage of the area, no mitigative measures are considered necessary. Fencing and warning signs will be placed between Koko Head District Park and the Shooting Complex for safety purposes.

6.2.14 Roadways and Traffic

Safety improvements for the Shooting Range involve the closure of Koko Head Park Road from Kalaniana'ole Highway. The closure of the roadway will effectively eliminate ingress and egress opportunities for Koko Head District Park from Kalaniana'ole Highway, placing primary access through residential streets, namely Anapalau and Kaumakani Streets from Lunalilo Home Road. Koko Head Park Road will be maintained for maintenance and emergency services.

Overall park usage levels and the mix of users and times they come to Koko Head District Park are expected to change as a result of the completion of the planned improvements. The trip generation estimates for the total project were compiled in the traffic impact assessment study conducted by Phillip Rowell and Associates (Appendix K) and are included in Table 6-1. A comparison of existing conditions versus future trips generated by the District Park is included as Table 6-2.

Figure 6-1 illustrates future traffic conditions at key intersections in the year 2010 without the proposed improvements, while Figure 6-2 illustrates future traffic conditions in the year 2010 with the proposed improvements. The traffic study concluded that the following intersections will continue to function adequately with the proposed development at the Park and Shooting Complex: Anapalau Street at Kaumakani Street, Anapalau Street at Lunalilo Home Road, Kaumakani Street at Lunalilo Home Road, and Kalaniana'ole Highway at Nawiliwili Street.

At the intersection of Kalaniana'ole Highway at Lunalilo Home Road, the northbound left, through and right will operate with some congestion during the weekday peak hour with or without the project. The congestion, however, is a result of the traffic timing, not the result of the design of the intersection.

The closure of the Park entrance from Kalaniana'ole Highway will not create a significant effect on the traffic pattern because the entrance is used infrequently.

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Table 6-1 Summary of Vehicle Trips Generated by Park

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Picnic Area	9	7	16	12	16	28	60	60	120
Soccer Field	0	0	0	14	14	28	16	16	32
Multipurpose Field	0	0	0	12	25	37	27	0	27
In-Line Hockey/Skate Park	0	0	0	3	23	26	3	26	29
Disc Golf	0	0	0	3	3	6	6	6	12
Totals for Phase 1	9	7	16	44	81	125	112	108	220
Tennis Courts	10	10	20	10	10	20	10	10	20
Playground	0	0	0	0	0	0	0	0	0
Walking Paths	0	0	0	0	0	0	0	0	0
Teen Center	5	0	5	0	5	5	0	0	0
Totals for Phase 2	15	10	25	10	15	25	10	10	20
Swimming Pool	0	0	0	4	4	8	4	4	8
Totals for Phase 3	0	0	0	4	4	8	4	4	8
Subtotal for Total Project	24	17	41	58	100	158	126	122	248
Discount for Multi-users (10%)	4	3	7	9	15	24	19	18	37
Total Trips Generated	20	14	34	49	85	134	107	104	211

Source: Phillip Rowell and Associates, July 14, 2001

Table 6-2 Comparison of Existing Versus Future Trips Generated by Park

Period	Direction	Existing Trips	New Trips	Total Future Trips
Weekday Afternoon Peak Hour	Inbound	84	49	133
	Outbound	63	85	148
	Total	147	134	281
Weekend Peak Hour	Inbound	41	107	148
	Outbound	57	104	161
	Total	98	211	309

Source: Phillip Rowell and Associates, July 14, 2001

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Mitigative Measures – Several mitigative measures are planned for implementation to minimize the potential impact of traffic generated by the Koko Head District Park.

- (1) The proposed phased development of the park will stage the traffic growth in three phases over the next 10 years.
- (2) A fence or chain link along Koko Head Park Road near Kalaniana'ole Highway will be used to restrict daily use of the roadway while keeping the access available for emergency purposes.
- (3) Other considerations should be considered in the future to offset the traffic generated by the park. Alternate means of travel, such as buses, shuttle vans and bicycles, will be supported to reduce the number of vehicular trips to and from the park.

6.2.15 Utilities

An assessment of potential impacts to utilities was completed by SSFM International, Inc. and their full report is included in Appendix L.

6.2.15.1 Water Supply

Koko Head District Park - Water usage at the District Park will average 8,200 gallons per day (gpd) per day for domestic use and water usage for irrigation purposes will average 108,618 gpd. This represents an average increase of ~~72,792~~ gpd above existing Park water use. Review of the existing water system indicated that it will be adequate to meet the future water requirements, as well as provide fire protection flow rate of 1,000 gallons per minute (gpm).

Koko Head Shooting Complex – It is estimated that average domestic water usage at the Shooting Complex will increase to 2,800 gpd and irrigation will increase to 21,724 gpd. This represents a total increase of 7,680 gpd. Review of the existing water system indicates that it will be adequate to meet the future water requirements, as well as provide for a fire protection flow rate of 1,000 gpm.

Mitigative Measures – Water use at the District Park and Shooting Complex should be regularly monitored for leaks. Normal conservation practices should be applied to the irrigation of landscaping. Drought tolerant landscaping will be considered to minimize irrigation requirements. No other mitigative measures are considered necessary.

6.2.15.2 Wastewater Disposal

Koko Head District Park – The volume of wastewater generated at the District Park would almost double from existing levels as the result of the proposed new facilities (Appendix L). Wastewater flows are estimated at 85 percent of domestic water consumption, or about 6,970 gpd.

The sewer system will maintain flows on the lower portion of the Park with modifications to the upper portions of the Park to accommodate the proposed development. The Hawai'i American Water Company has indicated that there are no anticipated problems with additional sewer demand based on the proposed development as long as the development does not exceed the previous sewer demand of the Hawai'i Job Corps. The new park facilities will have four additional structures of sewer demand, which is significantly less than the approximately 25

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structures that were part of the former Job Corps operations. Therefore, the existing system is anticipated to be adequate to accept the flows from the Park.

Koko Head Shooting Complex – Wastewater flows are expected to increase 10 percent at the Shooting Complex. Wastewater flows are estimated at 85 percent of domestic water consumption, or about 2,380 gpd. No new water uses are proposed for this site. The planned safety improvements will not generate any wastewater flows or the need to install a new or upgrade the existing collection system.

However, due to the increase wastewater demands, the existing septic tank system may need to be expanded. Due to the location of the facility, connection to a gravity sewer system is infeasible.

Mitigative Measures – None are considered necessary.

6.2.15.3 Power and Communications

The planned new facilities will not have a substantial effect on telephone services provided by Verizon Hawai'i.

Hawaiian Electric Company has indicated that no problems are anticipated with the provision of electrical services to the planned new facilities. Any additional demand resulting from the operation of the District Park and Shooting Complex will be relatively small, and adequate service capacity is available. There will be no adverse effects on existing users.

Mitigative Measures – Depending on the electric load and the location of the load, new electrical service lines may need to be installed or existing service lines may need to be upgraded. No other mitigation measures are considered necessary.

6.3 SUMMARY OF PROBABLE IMPACTS

6.3.1 **Interrelationships and Cumulative Environmental Impacts**

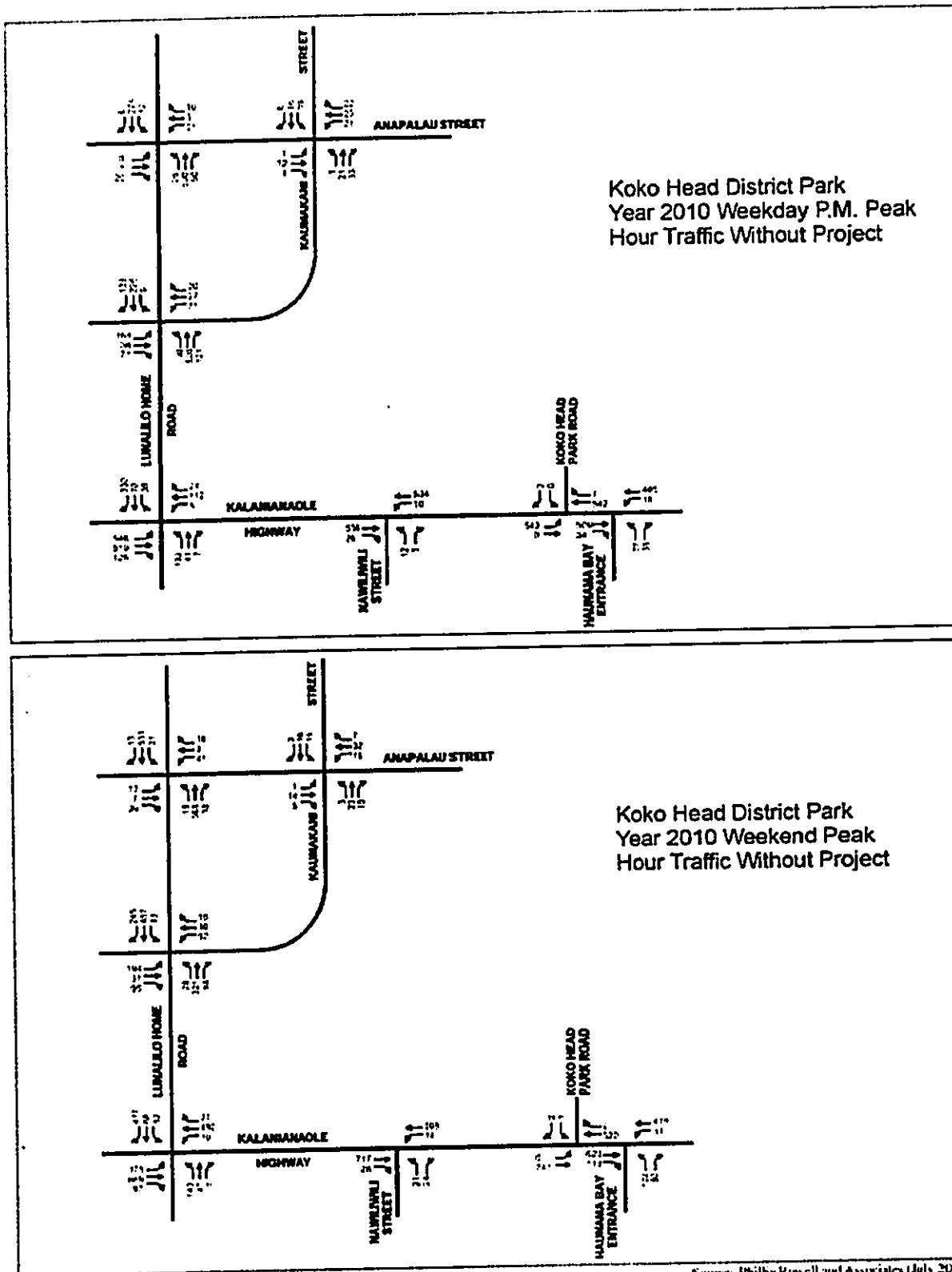
Cumulative and interrelated impacts are those associated with existing, approved and foreseeable future projects that may produce related or additive impacts.

There are planned recreational and housing developments near the Koko Head District Park and Shooting Complex that may produce related or additive effects.

Recreational developments include the new marine educational center which is currently being constructed at the upper level rim of Hanauma Bay. In addition, the State recently acquired the Ka Iwi shoreline for the development of the Ka Iwi State Park. Their plans for Ka Iwi State Park are briefly summarized in Section 5.3.3. Both projects are geared toward ensuring that the vast and unique open area at the eastern end of O'ahu will be permanently maintained as a natural resource park for the enjoyment of residents and visitors alike. The recreational facilities at the District Park and Shooting Complex will compliment the Hanauma Bay Nature Preserve and Ka Iwi State Park.

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Source: Philip Rowell and Associates (July 2001)

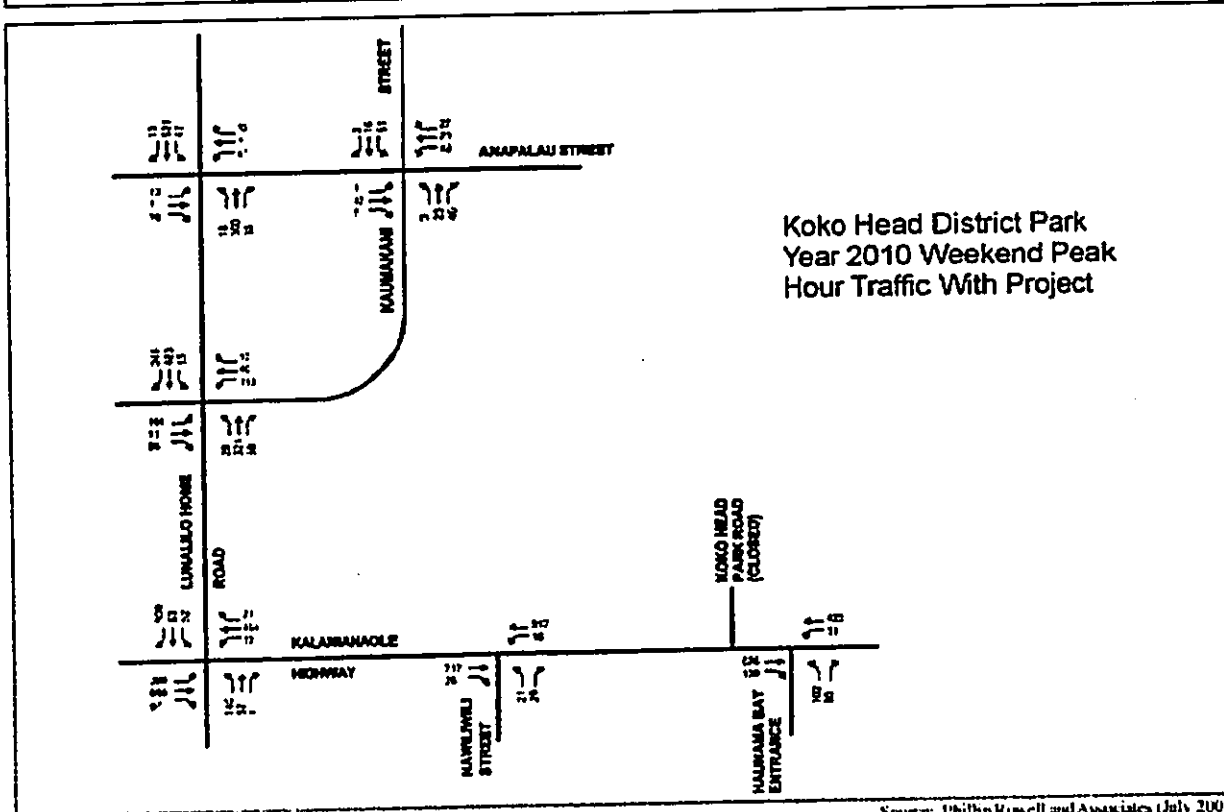
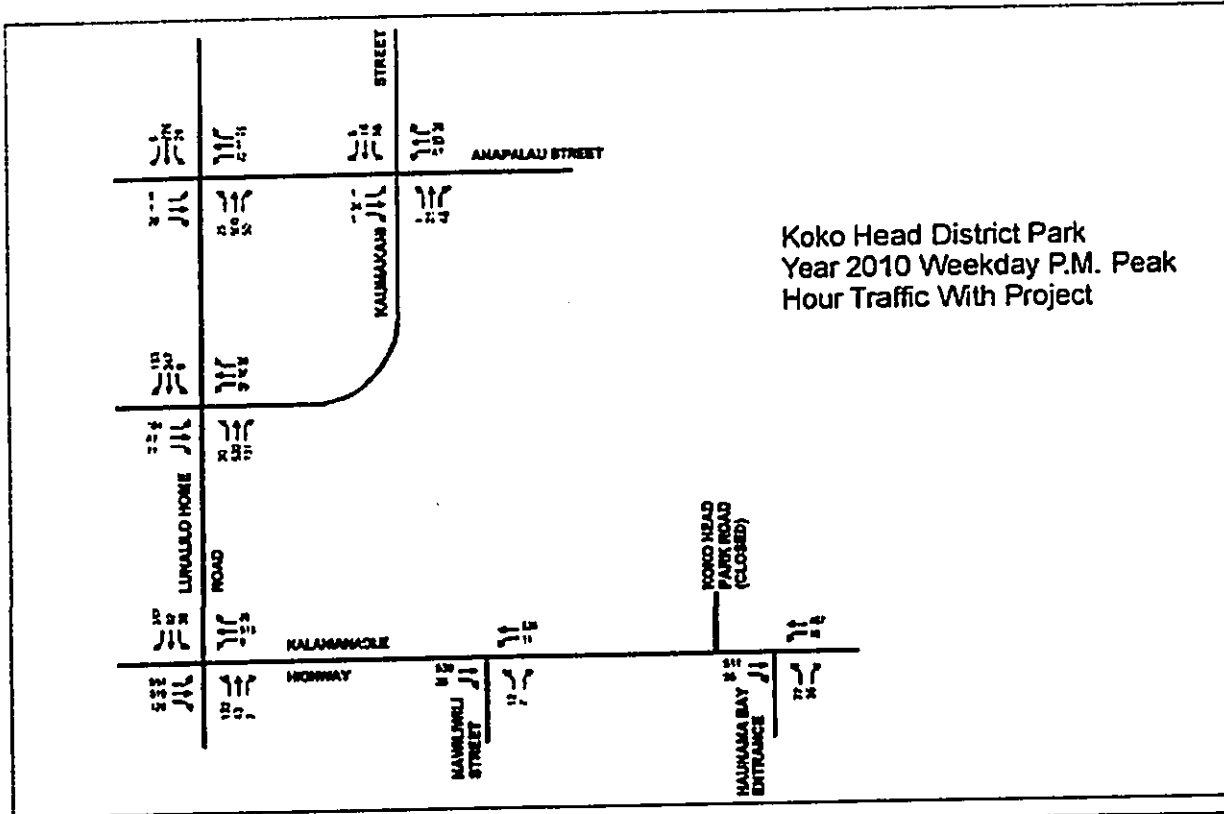
Figure 6-1
Year 2010 Weekday P.M. & Weekend Peak Hour Traffic Without Project



GROUP 70

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

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Source: Philip Rowell and Associates July 2001

Figure 6-2

Year 2010 Weekday P.M. & Weekend Peak Hour Traffic With Project

GROUP 70

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There is a cemetery planned on Hawai'i Kai Drive and approximately 1,145 new housing units are planned in Hawai'i Kai area. The new housing developments include Peninsula, a project in Kamiloiki, Kalama Valley at Queen's Circle, and an elderly housing project. The expansion of the Koko Head District Park will increase the recreational facilities available for the area residents.

The most likely effect of these new developments will be an increase in traffic. The variety of recreational activities, combined with population growth in the area, is expected to generate a general increase in traffic in the area. The effect of increase traffic may be outweighed by the benefits of having so many different types of recreational opportunities. In addition, the increased population growth in Hawai'i Kai further supports the need for the planned expansion of recreational facilities in the area.

6.3.2 Potential Secondary Effects

Both the Koko Head District Park and the Shooting Complex improvements will contain recreational activities which are unique and unavailable in other communities. It is probable that unique features such as the archery facilities, disc golf, in-line hockey and skate park may draw use from broader regional communities. In addition, there may be interest to support region-wide league tournament activities.

6.3.3 Relationship Between Local Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

These relationships are described below in the context of the following four specific areas of potential concern:

- Narrowing of the range of beneficial uses of the environment;
- Long-term risks to health and safety;
- Foreclosure of future options; and
- Trade-offs among short-term and long-term gains and losses.

The planned improvements are considered to be beneficial uses of the environment. They utilize areas that have been previously disturbed for several beneficial purposes, including:

- Adding and improving recreational facilities in the area; and
- Improving safety at the Shooting Complex.

The improvements will improve the overall safety of the Shooting Complex. No long-term risks to health and safety are anticipated from the proposed improvements to the District Park and Shooting Complex.

The option of developing the Job Corps site with alternative recreational fields will be foreclosed by the planned improvements. However, the park improvements that are planned were identified by the community, such as the disc golf and walking paths. As a result, these are considered the most favorable recreational uses for the space.

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The only potential substantive "trade-off among short-term and long-term gains and losses" that is apparent would be the commitment of funds to complete these improvements in the near-term. The other option would be waiting to make these improvements in the future, or simply leaving this potential "funding source" for use on another project at some time in the future.

6.3.4 Irreversible and Irretrievable Commitments of Resources

The construction and operation of the planned new improvements and facilities will involve the irretrievable commitment of certain natural and fiscal resources. There will be a permanent commitment of funds and resources to plan, design, construct and operate the new improvements and facilities. Planning, design and construction of the planned improvements will require the expenditure of approximately \$16.5 million. Construction will also involve the use of labor and materials, most of which is non-renewable and irretrievable.

6.3.5 Adverse Environmental Effects That Cannot Be Avoided

Adverse impacts can be divided into short- and long-term effects. Short-term effects are generally associated with construction, and prevail only for the duration of the construction period. Long-term effects generally follow completion of the improvements, relate either simply to their existence or to the operation of the new facilities, and are permanent. Effects that can be considered both adverse and unavoidable are as follows:

6.3.5.1 Unavoidable Adverse Short-term Effects

- Soils will be temporarily disturbed by grading, excavation and mounding activities at the project sites during construction.
- Temporary increases in soil erosion will also result from construction operations, and minor amounts of soil may be carried beyond construction sites, in surface runoff water.
- A small amount of natural vegetation will be removed to allow construction of the planned improvements.
- Wildlife utilizing the project sites and immediate adjacent areas will be displaced, most likely into nearby undeveloped lands, by construction activities.
- Operation of construction equipment, trucks and worker vehicles may temporarily impede traffic in the areas during the construction period.
- Negligible releases of air contaminants will occur from construction equipment emissions. Small amounts of dust may be generated during dry periods as a result of construction operations.
- Minor increases in noise levels may result from construction activities.

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6.3.5.2 Unavoidable Adverse Long-term Effects

- Minor modifications to the current topography at each project site will be made to accommodate the planned improvements and facilities.
- Noise levels will increase in the vicinity of some proposed facilities at the District Park such as the swimming pool and teen center.
- The added emissions from an increase in traffic to the area will have a negligible effect on air quality in the area.
- Increased water use by Park users and increased use for irrigation.
- The improvements will result in a small increase in wastewater disposal via the existing Hawai'i Kai treatment plant and the on-site disposal at the Shooting Complex.

Section 7.0

Alternatives to the Proposed Actions

7.0 ALTERNATIVES TO THE PROPOSED ACTIONS

Four alternatives to the planned improvements are described and evaluated in this section. They range from 1) doing nothing, to 2) relocating the Shooting Complex, to 3) providing for more intensive recreational use of the District Park, to 4) constructing a more extensive baffling system at the Shooting Complex.

Particular attention in the evaluation of the alternatives is given to the following criteria:

1. How well each alternative could attain the objectives of the planned improvements;
2. Comparing the probable environmental impacts of each alternative with those of the planned improvements; and
3. How the alternatives might better enhance environmental quality or avoid, reduce or minimize some or all of the environmental effects, costs and risks of the planned improvements.

The purpose and objectives of the planned improvements are discussed in detail in Sections 2 and 3 of this EIS. The discussion in this section concerns how well each alternative could attain these objectives.

7.1 NO-ACTION ALTERNATIVE

This alternative would involve no changes in the foreseeable future to the existing facilities at Koko Head District Park and Koko Head Shooting Complex. Thus, it would involve a deliberate decision not to provide needed recreational facilities to the community nor improve safety conditions at the Shooting Complex, effectively eliminating the possibility of achieving the objectives of the planned improvements. This outcome would contradict the community's strong desire to make these park improvements.

In terms of relative environmental impacts, the "no action" alternative would have fewer beneficial impacts than the proposed action to provide new park improvements. Similarly, the proposed action would provide greater enhancements to the overall environmental quality of the park. As one example, the proposed action would increase the landscaping of the park, and improve the habitat quality for non-native birds.

Short-term construction-related effects would not occur under the no-action alternative, such as grading, excavation, dust generation, construction traffic, park use disturbance and temporary visual impacts. The no-action option would also not generate long-term effects such as increased traffic, noise, water use and wastewater generation. Ultimately, the no-action option would result in a long-term adverse impact by not providing for the improvement of existing public recreational facilities and the addition of new facilities desired by the community.

No-action option for the shooting complex would continue the potential safety concerns. The proposed action would provide safety improvements that would upgrade shooting complex facilities to current safety standards, including closure of Koko Head Park Road.

7.2 RELOCATE SHOOTING COMPLEX

The relocation of the Koko Head Shooting Complex has been seriously considered and extensively studied at several different times in the last 30 or more years. While there have been and continue to be legitimate concerns about safety and compatibility with other Park uses, each time relocation was studied the conclusion has been that no suitable alternative locations are available, and that the existing facility both accommodates a popular recreational activity and meets a critical training need for Federal, State and City public safety officers. Consequently, the focus of past actions has been on safety improvements to minimize any incompatibilities and potential safety hazards.

Moving the Shooting Complex out of Koko Head Regional Park and Nature Preserve would offer an opportunity to better achieve the objectives of the planned improvements, reduce environmental impacts and enhance the overall environmental quality in the Park. However, the circumstances that in the past have resulted in maintaining the Shooting Complex in its existing location have not changed. Relocation, therefore, is not considered at this time to be an acceptable alternative, since removing this facility from the Park would mean discontinuing the recreational and training activities that now occur there.

The comparative environmental impacts of the proposed project and the relocation alternative indicate that more site disturbance effects would result by retaining the complex in its present location. Noise conditions relating to the complex would persist. However, the site for facility relocation would be affected by new development impacts, essentially transferring these effects to another location on Oahu.

7.3 MORE INTENSIVE USE OF KOKO HEAD DISTRICT PARK

Over the past decade more intensive recreational uses have been proposed for the Koko Head District Park area. Other proposals included construction of a funicular railway to the summit of Koko Crater, development of a scenic lookout atop Koko Crater, provision of a bandstand for outdoor concerts, provision of an archery field, and creation of an off-leash dog park.

These alternative uses were proposed to provide unique recreational opportunities to the region. The summit of Koko Crater provides panoramic views of the area. The most accessible route to the summit is along an abandoned tramway system which originates within the District Park. A railway system and lookout improvements would provide improved access to the summit and comfort amenities for viewing pleasures.

During the environmental impact assessment of the Hanauma Bay Improvements, the plans for the funicular and summit lookout improvements were evaluated and rejected. The funicular and lookout would have had significant visual impact on Koko Crater, created an overabundance of visitors and traffic through the District Park, and was in general, opposed by the neighboring community.

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Other alternative uses, such as the bandstand for concerts, archery and an off-leash dog park would also provide unique recreational opportunities for East Honolulu. Currently there are no such facilities for in the region, with the exception of the planned archery facilities at the Shooting Complex.

The proposals for an outdoor concert arena, archery field and off-leash dog park were listed as low priority items by the community during the development of the Koko Head District Park Master Plan primarily because other activities were of higher interest and priority. This alternative would have short-term construction-related impacts from expanded grading requirements. The provision of these additional activities would have an increase of users and noise generated at the park. There would be greater water use and wastewater generation resulting from this expanded user population. In general, more intensive uses increase the probability of adverse environmental impacts such as increase noise and traffic, rather than enhance environmental quality in the District Park and Shooting Complex.

7.4 EXTENT OF BAFFLING SYSTEM AT KOKO HEAD SHOOTING COMPLEX

While the installation of baffles is an anticipated future safety improvement, the extent of such a system has not been resolved. There are a variety of baffling systems available to mitigate errant rounds from escaping the shooting complex. The most conservative alternative baffling system essentially provides a "no-blue-sky" type of safety system which would include pre-cast concrete overhead baffling panels, sidewalls along the ranges, ground baffles and trap berms with ricochet catchers.

This conservative alternative exceeds the requirements of the project objectives and would require a larger amount of soil disturbance to support concrete support pilings and commitment of resources for construction materials. Such a system would also require longer closure of range facilities during construction activities.

At minimum, the proposed safety improvements which include a combination of earthwork, horizontal bullet catchers, and limited paving, and improved administrative controls is a more appropriate method to contain deflected bullets with the crater walls. As compared to existing conditions, and the future condition with proposed improvements, noise conditions would not be significantly different with the baffle system option installed.

Section 8.0

Summary of Unresolved Issues

8.0 SUMMARY OF UNRESOLVED ISSUES

Several unresolved issues are discussed below that are related to the planning and development of Koko Head District Park and Koko Head Shooting Complex. The discussion focuses on the lack of a need to resolve them prior to completion of the planned improvements, and/or the overriding reasons for proceeding without resolving the issues.

8.1 PUBLIC TRAILS ON KOKO CRATER

At present the summit of Koko Crater is often used by the public for recreational hiking purposes. The view from the summit provides a panoramic view of the coastal area and ocean conditions from Makapu'u to Diamond Head. An abandoned tramway system along the ridge of Koko Crater currently serves as the most accessible trail to the summit. The hiking trail is within the view plane of the Koko Head Shooting Complex and subject to risk of exposure to the activities generated at the rifle ranges. The proposed safety improvements at Koko Head Shooting Complex are designed to reduce the potential for range activities to interfere with hiking activities.

Consideration was given to restrict access to the summit of Koko Crater including the abandoned tramway facility, or to at least place warning signage to inform interested hikers. Whether or not the trail should remain open to the public remains an issue. However, there is no need to resolve this issue before proceeding with the planned improvements discussed in this EIS.

8.2 PRIORITY OF IN-LINE HOCKEY AT KOKO HEAD DISTRICT PARK

In recent months, an in-line hockey-rink has been planned for East Honolulu at Kamiloiki Community Park. This action calls to question the urgency for the in-line hockey-rink at Koko Head District Park. The Park Master Plan lists in-line hockey-rink as a high priority, to be developed within three to four years. Given the commitment to provide a facility at Kamiloiki, the City is recommending the in-line hockey facility be developed in Phase III (in nine or more years) of the Koko Head District Park Master Plan.

8.3 EXTENT OF FENCING AROUND KOKO HEAD SHOOTING COMPLEX

There have been discussions to provide fencing around the entire perimeter of the Koko Head Shooting Complex. The extent of the fencing, however, remains an unresolved issue. At minimum, fencing will be provided along Koko Head Park Road between Koko Head Shooting Complex and the Koko Head District Park and portions of the western slopes of Koko Crater along the hiking areas. Whether or not it is necessary to fence the open areas along the eastern slopes of Koko Crater or along Kalaniana'ole Highway is still unresolved.

Section 9.0

Required Approvals and Permits

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9.0 REQUIRED APPROVALS AND PERMITS

The proposed improvements are intended to be consistent with and support the intent of the State Conservation District, the City's General Plan, the East Honolulu Sustainable Communities Plan, and provisions of the Special Management Area of the City and County of Honolulu. The following is an approximate list of major approvals and permits and their status required for implementation of the planned improvements. Ministerial permits will be obtained such as building, grading, etc.

**Table 9-1: Required Approvals and Permits
Koko Head District Park Master Plan and Shooting Complex Improvements**

Approval or Permit	Approving Authority	Status
Sustainable Communities Plan: Open Space Map Designation	City Council	Consistent
Sustainable Communities Plan: Public Facilities Map Designation	City Council	Consistent
Environmental Impact Statement	City Dept. of Planning & Permitting	In Progress
Special Management Area Use Permit	City Council	In Progress
Conservation District Use Permit	Board of Land & Natural Resources	In Progress

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

Section 10.0

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Section 11.0

Agencies And Parties Consulted

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11.0 AGENCIES AND PARTIES CONSULTED

The following agencies, organizations and individuals were contacted during the preparation of the Environmental Impact Statement Notice of Preparation (EISPN), and the Draft Environmental Impact Statement (DEIS) for the proposed Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
A. Federal Agencies					
U.S. Army Corps of Engineers – Pacific Ocean Division	x		x		
U.S. Army Engineer District, Civil Works Technical Branch				x	x
U.S. Department of the Interior – Fish and Wildlife Service	x		x		
B. State Agencies					
Department of Accounting and General Services	x	x	x	x	x
Environmental Management Division	x		x		
Office of Environmental Quality Control	x	x	x	x	x
Department of Business, Economic Development & Tourism	x		x		
Office of State Planning	x		x		
Department of Land and Natural Resources	x		x		
Historic Preservation Division	x	x	x	x	x
Land Management Division	x	x	x		
Division of Forestry & Wildlife	x	x	x	x	x
Division of State Parks		x	x	x	x
Na Ala Hele Program, DLNR	x		x		
Department of Health	x	x	x		
Department of Defense	x		x		
Department of Transportation	x	x	x	x	x
Office of Hawaiian Affairs	x	x	x	x	x
University of Hawai'i – Environmental Center	x		x		x
Water Resources Research Center	x		x		
Representative Bertha Leong	x		x		
Representative William Stonebreaker	x		x		
Senator Sam Slom	x		x		
State Disability and Communication Access Board	x	x	x		

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Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
Waimanalo Public School and Library			x		x
State DEBT, Resources and Technology Division			x	x	x
Legislative Reference Bureau			x		x
DBET Library			x		x
Hawai'i Public Library			x		x
Department of Hawaiian Homelands			x	x	x
Honolulu Municipal References and Records Center			x		x
State Department of Agriculture			x		
State Department of Accounting and General Services			x		
UH Hamilton Library			x		x
Hawai'i Documents Center			x		
C. City and County of Honolulu					
Mayor Jeremy Harris	x		x		
Department of Design and Construction	x		x		
Department of Parks and Recreation	x	x	x		
Department of Planning and Permitting	x	x	x	x	x
Board of Water Supply	x	x	x	x	x
Fire Department	x	x	x	x	x
Police Department	x	x	x	x	x
Corporation Council	x		x		
Department of Transportation Services	x	x	x	x	x
Department of Environmental Services	x	x	x		
Department of Facility Maintenance	x		x		
Koko Head Shooting Range	x		x		
Koko Head District Park	x		x		
Department of Human Resources	x		x		
Councilman John Henry Felix	x		x		
D. Local Utilities					
Hawai'i-American Water Company			x		
Hawaiian Electric Company			x		
E. Community Organizations and Non-Profit Special Interest Organizations					
Archery Club- Jerry Hucks	x	x	x	x	x
Chinese Gun Club	x				
Commission on Persons with Disabilities	x				
Ducks Unlimited- Hawai'i	x				
Ducks Unlimited- Kaneohe	x				

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Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
East Honolulu Community Coalition	x		x		
FIL- American Sportsman Association	x				
Friends of Hanauma Bay	x				
Hawai'i 1000 Friends	x				
Hawai'i Fifty Caliber Association		x	x		
Hawai'i Historic Arms Association	x	x	x		
Hawai'i Kai Neighborhood Board	x		x	x	x
Hawai'i Kai Youth Baseball	x	x	x		
Hawai'i Metallic Silhouette Shooters Association	x				
Hawai'i Muzzleloading Society	x				
Hawai'i Precision Air Gun Club	x				
Hawai'i Rifle Association	x	x	x		
Hawai'i Skeet Shooting Association	x				
Hawai'i Trail and Mountain Club	x				
Historic Hawai'i Foundation	x				
Honolulu Clay Target Association	x				
Honolulu Police Pistol Club, Inc.	x				
K-Bay Road and Gun Club		x	x		
Kamehameha Schools	x				
Kāne'ōhe Bay Rod & Gun Club	x				
Ka Iwi Action Council	x				
Koko Head Gun Club	x				
Koko Head Skeet Club	x				
L.I.F.E.	x				
Media Shooting Club	x				
Mid Pacific Pistol League (MPPL)	x				
Mid-Pacific Gun Club	x				
National Wild Turkey Federation Hawai'i Chapter	x				
Outdoor Circle	x	x	x		x
Pig Hunters Association	x				
Pu'uloa Rifle & Pistol club	x				
Safari Club International Hawai'i Chapter	x				
Schofield Rod & Gun Club	x				
Sierra Club - Hawai'i Chapter	x				
Single Action Shooters Hawai'i	x				
The Nature Conservancy	x				
Waimānalo Neighborhood Board	x		x		

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Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
F. Individual Parties					
Ackerson, Bob & Diane	x				
Anderson, Eve G	x				
Atkinson, Alan				x	x
Berasis, Robert J.K	x				
Bright, Darrell	x				
Carney, Kevin	x				
Carter, Brett	x				
Carter, Cameron	x				
Carter, Kyle	x				
Carter, Lisa	x				
Chan, Lot	x				
Chilen, James	x				
Chu, Dean	x				
Chun, Raymond	x				
Creadick, Jean	x				
Davidson, Dan	x				
Drake, Sally	x				
Dunn, Eric	x				
Fujikawa, Jeannie	x				
Gee, Robert D.	x				
Giancaterino, Wayne	x				
Goeas, Linda	x				
Gomez, Terrence	x				
Hall, Keiko				x	x
Hardy, Frances	x				
Hedani, Audrey	x				
Henderson, Tom	x				
Higa, Lester	x				
Houghton, Mary	x				
Hu, Jak & Virginia	x				
Ikawa, H.	x				
Jackson, Thomas	x				
Johnston, Janet	x				
Joseph, David	x				
Kawano, Brian		x	x		
Kekona, Kevin	x				
Kern, Bob	x				
Kern, Susan	x				
Kim, Frank	x				

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Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
Kong, George	x				
Koyama, Marge	x				
Lee, Cyrus	x				
Luther, Murray W.	x				
Martin, Pamela	x				
Masaki, Edward	x				
Matthew, David	x				
McCool, Eileen	x				
McNeil, David		x	x		
Miyakawa, Gary	x				
Miyaki, Jay	x				
Mogue, Rick	x				
Morse, Harold	x				
Munday, Bruce	x				
Murakami, Cindy & Patrick	x				
Nagatani, Travis E.	x				
Nehmad, Robert	x				
Palenapa, Beverly	x	x	x		
Peck, Forrest	x				
Peck, Shaun	x				
Peck, Terri	x				
Perrotta, Dan	x				
Rapoza, Philip & Karen	x				
Reeder, Rob	x				
Richardson, Ken	x				
Roman, Michael	x				
Sanioki, Warren	x				
Shimabuku, Gerald	x				
Smith, Jessie	x				
Soong, Theodore		x	x		
Stash, Micki	x				
Stengle, Bob	x				
Suzuki, Gary & Jean	x				
Sydow, Joshua	x				
Terry, Mark	x				
Tomlinson, Janet & Glen	x				
Tomokiyo, Leslie	x				
Toriki, Guy	x				
Tsukamoto, Richard	x				
Tyau, Sheldon	x				

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

• Final Environmental Impact Statement •

Respondents and Distribution	Received EISNP	Comments Received	Received DEIS	Comments Received	Received FEIS
Wang, Jeffrey	x				
Washino, Kelly & Dave	x	x	x		
Wee, Michael	x				
White, Donna	x				
Wong, Lisa					x
Woodan, Lane	x				
Yamamoto, Brandon	x				
Yonaine, Eric	x				
Yoshimura, Emogene	x				
Young, Jon	x				
G. News Media					
Honolulu Advertiser			x		x
Honolulu Start Bulletin			x		x

COMMENT AND RESPONSE LETTERS

Environmental Impact Statement Preparation Notice



RECEIVED

MAR 22 2001

STATE OF HAWAII

GROUP 70

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

LETTER NO. (P) 1199.1

BENJAMIN J. CAYETANO
GOVERNOR

P.O. BOX 119, HONOLULU, HAWAII 96810

MAR 21 2001

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park and Shooting Complex
Environmental Impact Statement
Notice of Preparation

Thank you for the opportunity to review the subject project's Environmental Impact Statement. This project does not impact any Department of Accounting and General Services projects or existing facilities. Therefore, we have no comments to offer.

Should you have any questions, please have your staff call Mr. Allen Yamanoha of the Planning Branch at 586-0488.

Sincerely,

GORDON MATSUOKA
Public Works Administrator

AY:mo

c: City & County of Honolulu, Dept. of Design & Construction



BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 118, HONOLULU, HAWAII 96810

LETTER NO. (P) 1247.1

RECEIVED
APR 11 2001

GROUP 70

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
Environmental Impact Statement Notice of
Preparation (EISNP)

Thank you for the opportunity to review and comment on the subject project's EISNP. The proposed district park master plan and shooting complex safety improvements do not impact any of our facilities. Therefore, we have no comments. Furthermore, we do not wish to receive a copy of the project's Draft Environmental Impact Statement.

If there are any questions regarding the above, please have your staff call Mr. Tyler Fujiyama of the Planning Branch at 586-0492.

Sincerely,

GORDON MATSUOKA
Public Works Administrator

TBF:mo

c: City & County of Honolulu, Dept. of Design & Construction

BENJAMIN J. CAYETANO
GOVERNOR



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4186
FACSIMILE (808) 586-4186

April 26, 2001

Ms. Rae M. Loui, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Dear Ms. Loui:

Subject: EIS Preparation Notice for the Koko Head District Park Master Plan & Koko Head Shooting Complex, Oahu

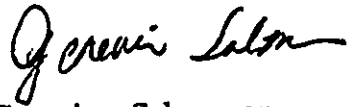
Thank you for the opportunity to review the subject document. We have the following comments.

1. We strongly recommend that the Department consider using the maximum amount of recycled glass for the construction of the new road, walking path, parking lot, play court and other such facilities.
2. Please fully describe the noise and safety impacts of the expanded shooting complex.
3. Please prepare a cultural impact assessment in accordance with the guidelines established by the State Environmental Council.
4. The purpose of preparing a Draft Environmental Impact Statement is to disclose the environmental, social, cultural and economic effects of the proposed action, consider alternatives to the action, and propose measures to minimize adverse effects. The purpose of the DEIS is not to justify a finding of no significant impact as described on page 6-1 of the EIS preparation notice.
5. Please address the cumulative impacts associated with this project and other projects in the vicinity such as the Hanuama Bay improvements.
6. Please fully describe the scope and impacts of any new roadway associated with the project. How will traffic affect the neighborhood if the road could be used as a "bypass" to and from the windward side?

Ms.Loui
Page 2

Should you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,



Genevieve Salmonson
Director

c: DPP
Group 70



DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 26, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments regarding issues for consideration in the Draft EIS

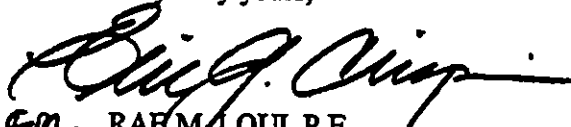
1. Recycled glass for the construction of the new road, walking path, parking lot, play courts, and other facilities will be considered. The City will address this in their design evaluation.
2. The noise and safety impacts of the shooting complex will be fully addressed, including a shooting range consultant study.
3. A cultural impact assessment will be provided in accordance with the guidelines established by the State Environmental Council,
4. We have noted that the purpose of the Draft Environmental Impact Statement is to disclose the environmental, social, cultural, and economic effects of the proposed action, consider alternatives to the action, and proposed measures to minimize adverse effects.
5. The cumulative impacts associated with this project and other projects in the vicinity, such as the Hanuama Bay improvements, will be included in the Draft EIS.

Ms. Genevieve Salmonson
Page 2
July 25, 2001

6. The Draft EIS will include a Traffic Impact Analysis Report and recommend appropriate measures to mitigate traffic impacts. The potential for new traffic circulation patterns in the area will be considered.

Your letter and this response will be included in the Draft EIS.

Very truly yours,


for RAEM LOUI, P.E.
Director

RML:gt

12 11 10 9 8 7 6 5 4 3 2 1

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWALO
LUNNEL NISHIOKA

RECEIVED

APR - 4 2001

GROUP 70

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

March 28, 2001

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-43007

LOG NO: 27167
DOC NO: 0103EJ12

Dear Mr. Overton:

SUBJECT: Chapter 6E-8 Historic Preservation Review- Koko Head District Park and Shooting Complex Environmental Impact Statement Notice of Preparation Maunaloa, Kona, O'ahu, TMK: 3-9-012:010

Thank you for the opportunity to comment on the EISPN for the Koko Head District Park and Shooting Complex expansion. The City and County of Honolulu proposes improvements to the Park will include the addition of the former Job Corps site (19 acres) and expansion of recreational facilities. The City and County is currently using several of the former Job Corps buildings and plans to demolish the remaining facilities. Initial improvements include the addition of a skate park, passive park landscaping and irrigation, a disc golf course, grading for soccer and multipurpose play fields, expansion of the Goeas baseball field, water tank demolition and new parking stalls. Other improvements to picnic areas, existing playing fields, the addition of a tot lot, teen center, tennis courts and a 50-meter pool as well as a new road through the former Job Corps site and additional vehicular parking are also planned. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas.

In 1998 an archaeological inventory survey was conducted by Cultural Surveys Hawaii of eight areas within the then proposed Koko Head Regional Park. At that time SHPD provided comment on the DEIS for the Koko Head Regional Park Nature Preserve which included development of the Job Corps site. The survey determined that no archaeological or historic sites, except for a single Quonset hut associated with the former Radar installation at the crater summit (Site 50-80-15-5699), were found in the area. We commented to the City and County Planning Department in 1998 on the Development Plan Public Facilities Map Amendment for the Koko Head Regional Park, that we believed that redevelopment of the Job Corps site would have "no effect" on significant historic sites (SHPD Log 20212).

Our earlier comments also stated that we believe that it was unlikely that subsurface habitation or agricultural deposits would be present in the area of the Koko Head Rifle Range, due to prior development, although no archaeological surveys have been conducted. However, since the Rifle Range has been in use for over fifty years, the structures are of historic age and should be assessed for their significance. You may contact Carol Ogata of our Architecture Branch (692-80232) for further information on this matter.

At this time we believe that the improvements contained in this "Notice of Preparation" will have no effect on known significant historic sites. However, we request that once the DEIS is completed we be given the opportunity to review the improvements and their locations to provide further comment.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,



DON HIBBARD, Administrator
State Historic Preservation Division

MJ:amk

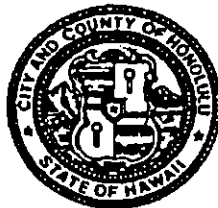
c. Stanford Kuroda, C&C of Honolulu Department of Design and Construction

1 2 3 4 5 6 7 8 9 10 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

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your March 28, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We appreciate the detailed preliminary review by Drs. Collins and Jourdane and we have prepared the following responses to your comments:

1. Archeological Inventory - We acknowledge your comment that the redevelopment of the Job Corps site would have "no-effect" on significant historic sites. In addition, you stated that according to your records that there are no known archeological or historic sites in project area, except for a single Quonset hut associated with the former Radar installation at the crater summit:
2. Subsurface Habitation or Agricultural Deposits at the Rifle Range - We also acknowledge your comment that it was unlikely that subsurface habitation or agricultural deposits would be present in the area of Koko Head Rifle Range, due to prior development, although no archeological surveys have been conducted.
3. Rifle Range Structures - The structures at the rifle range will be assessed for their historic significance.

Mr. Don Hibbard
Page 2
July 25, 2001

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



RAE M. LOUL, P.E.
Director

RML:gt





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

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 8, 2001

LD/NAV
Ref.: KOKOHEADPARK.RCM2

LOG1533

Jeffrey H. Overton, AICP
Chief Engineer Planner
Group 70 International
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

RECEIVED

MAY 09 2001

GROUP 70

Dear Mr. Overton:

SUBJECT: Environmental Impact Statement Preparation Notice for City and County of Honolulu Department of Design and Construction - Koko Head District Park Expansion of Recreation Facilities, East Honolulu, Oahu, Hawaii

Thank you for the opportunity to review and comment on the subject matter.

The Land Division has no comment to offer on the proposed project. Enclosed are copies of comment letters sent to your firm by our Division of Historic Preservation and Division of State Parks.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of our Land Division Support Services Branch at 808-587-0438.

Very truly yours,


DEAN Y. UCHIDA
Administrator

C: Oahu District Land Office



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

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

April 20, 2001

LD/NAV
Ref.: KOKOHEADPARK.RCM

LOG1039

Jeffrey H. Overton, AICP
Chief Engineer Planner
Group 70 International
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

SUBJECT: Koko Head District Park Expansion of Recreation Facilities

Thank you for your letter informing us of the City and County of Honolulu's proposed plan to expand recreational facilities at the Koko Head District Park and improve safety conditions at the Koko Head Shooting Complex.

Please provide us with four (4) copies of the Draft Environmental Impact Statement covering the proposed project for our appropriate division's review and comment.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of our Land Division Support Services Branch at 808-587-0438.

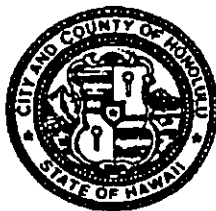
Very truly yours,


DEAN Y. UCHIDA
Administrator

C: Oahu District Land Office

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi



JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Harry Yada, Acting Administrator
Land Division
Department of Land and Natural Resources
State of Hawaii
Post Office Box 621
Honolulu, Hawaii 96809

Dear Mr. Yada:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letters regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that you do not have any comments to offer at this time.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in cursive script, reading "Eric G. Crispin".

For RAE M. LOUI, P.E.
Director

RML:gt

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

April 2, 2001

GILBERT E. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET E. KAWELO
DEPUTY

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

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

RECEIVED
APR - 6 2001
GROUP 70

Dear Mr. Overton:

Subject: Environmental Impact Statement Notice of Preparation for Koko Head District
Park and Shooting Complex

We appreciate your efforts to include us in your review of the subject matter above. Please consult with Mr. Patrick Costales, Oahu Branch Manager at 973-9787 of my staff in making recommendations to the Koko Head District Park and Shooting complex EISPN. Thank you for allowing us to comment on your project.

Sincerely yours,

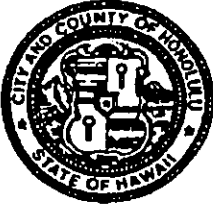
A handwritten signature in cursive script, appearing to read "M. Buck".

Michael G. Buck
Administrator

C: Pat Costales, Oahu Branch Manager
Standford Kuroda, C&C Honolulu

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4584 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us



JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Michael G. Buck, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

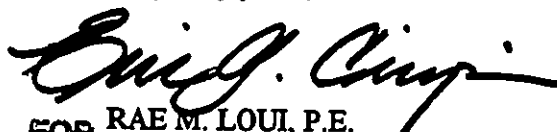
Dear Mr. Buck:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 2, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

We will contact Mr. Costales for his comments regarding this project. Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


FOR RAE M. LOUI, P.E.
Director

RML:gt

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED

MAR 22 2001

GROUP 70



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

MAR 21 2001

GILBERT S. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET E. KAWELO
DEPUTY DIRECTOR

UNNEL T. NISHOKA
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE
COMMISSION
LAND
STATE PARKS

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton,

**Koko Head District Park and Shooting Complex
Environmental Impact Statement Notice of Preparation (EISPN)**

Thank you for providing the EISPN for the Koko Head District Park and Shooting Complex for review. The Division of State Parks would like to be a consulted party in the preparation of the Draft Environmental Impact Statement.

Sincerely,

A handwritten signature in cursive script, appearing to read "Daniel S. Quinn".

DANIEL S. QUINN
Acting State Parks Administrator

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED

APR 25 2001

GROUP 70



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

GILBERT S. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET T. KAWELO
DEPUTY DIRECTOR

LINNEL T. NISHIOKA
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
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COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE
COMMISSION
LAND
STATE PARKS

APR 20 2001

REF:PPB:LT

File No.: 00-58

Group 70 International, Inc.
925 Bethel St., Fifth Floor
Honolulu, Hawaii 96813-4307
ATTN: Jeff Overton

Dear Mr. Overton:

Subject: Environmental Impact Statement Preparation Notice for the Koko Head
District Park Master Plan and Koko Head Shooting Complex Safety
Improvements

Thank you for the opportunity to review the subject document. At this time, we have
no specific comments on the Environmental Impact Statement Preparation Notice.
However, we would like to receive a copy of the draft EIS.

Very truly yours,

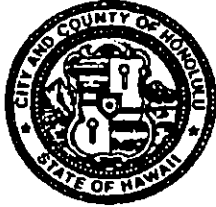
Dan S. Quinn
Acting State Parks Administrator

c: Land Division

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Daniel S. Quinn, Administrator
Division of State Parks
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96809

Dear Mr. Quinn:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letters received April 26, 2001 and March 21, 2001 regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

Your letters and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Eric G. Crispin", is written over a horizontal line.

for RAE M. LOUI, P.E.
Director

RML:gt

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

RECEIVED

APR 24 2001

GROUP 70

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

April 20, 2001

In reply, please refer to:
File:

01-009/epo

Mr. Jeffery H. Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Thank you for allowing us to comment on the Koko Head District Park Master Plan and Shooting Complex. We have the following comments to offer:

Water Pollution

1. The applicant should contact the Army Corps of Engineers to identify whether a federal permit (including a Department of Army permit) is required for this project. If a federal permit is required, then a Section 401 Water Quality Certification is required from the State Department of Health, Clean Water Branch.
2. A National Pollutant Discharge Elimination System (NPDES) general permit is required for the following discharges to waters of the State:
 - a. Storm water discharges relating to construction activities, such as clearing, grading, and excavation, for projects equal to or greater than five years;
 - b. Construction dewatering activities; and
 - c. Hydro testing water.

Any person requesting to be covered by a NPDES general permit for any of the above activities should file a Notice of Intent with the Department's Clean Water Branch at least 30 days prior to commencement of any discharge to waters of the State.

Mr. Jeffrey H. Overton
April 20, 2001
Page 2

Any questions regarding these comments should be directed to Mr. Denis Lau, Chief,
Clean Water Branch at 586-4309.

Sincerely,



GARY GILL
Deputy Director
Environmental Health Administration

c: Mr. Stanford Kuroda



DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



July 25, 2001

RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

Mr. Gary Gill, Deputy Director
Environmental Health Administration
Department of Health
State of Hawaii
Post Office Box 3378
Honolulu, Hawaii 96801

Dear Mr. Gill:

Subject: Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 20, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Federal Permit - The Army Corps of Engineers will be contacted to identify whether a federal permit (including a Department of Army permit) is required for this project. If applicable, a Section 401 Water Quality Certification will be obtained from the State Department of Health, Clean Water Branch.
2. National Pollutant Discharge Elimination System (NPDES) general permit - Thank you for the information regarding NPDES general permit. The City will address these requirements in the design and construction phase.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

RAE M. LOUI, P.E.
Director

RML:gt

BENJAMIN J. CAYETANO
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

IN REPLY REFER TO:

HWY-PS
2.2443

APR 20 2001

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APR 23 2001

GROUP 70

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Jeff Overton

Dear Sir:

Subject: Koko Head District Park Master Plan and Koko Head Shooting Complex
Safety Improvements Environmental Impact Statement (EIS)
Notice of Preparation (Revised and Expanded)

Thank you for requesting our review of the EIS Preparation Notice. We have the following comments:

1. The Draft EIS should include a Traffic Impact Analysis Report (TIAR) and recommend appropriate measures to mitigate traffic impacts.
2. The Draft EIS should also describe any proposed work within the State highway right-of-way.

If there are any questions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

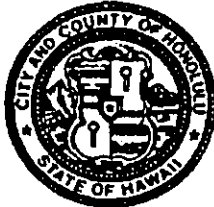

BRIAN K. MINAAI
Director of Transportation

c: City and County of Honolulu
Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Brian K. Minaai, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Minaai:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 20, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Traffic Impact Analysis Report (TIAR) – The Draft EIS will include a TIAR and recommend appropriate measures to mitigate traffic impacts.
2. State Highway Right-of-Way – The Draft EIS will describe any proposed work within the State highway right-of-way.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

for RAE M. LOU, P.E.
Director

RML:gt

PHONE (808) 594-1888



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

FAX (808) 594-1885

RECEIVED

APR - 6 2001

GROUP 70

March 22, 2001

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street - 5th Floor
Honolulu, HI 96813-4307

Subject: Environmental Impact Statement Notice of Preparation (EISPN) -
Koko Head District Park and Shooting Complex

Dear Mr. Overton:

Thank you for the opportunity to comment on the above referenced project. At this point, OHA has no substantive comments on your EISPN. However we would like to provide two suggestions:

Act 50, Session Laws of Hawai'i (SLH) - Regular Session of 2000

The purpose of Act 50, SLF 2000, is to:

- "(1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State;
- (2) Amend the definition of "significant effect" to include adverse effects on cultural practices."

OHA requests that issues concerning the effect on Native Hawaiian culture and traditional and customary rights pursuant to Section 343-2, Hawai'i Revised Statutes, as amended, be taken into consideration.

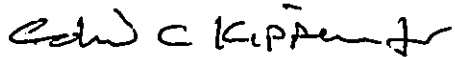
In addition should you determine that there is a potential for encountering human burials in the expansion of the facility, you should request that an archaeological monitoring plan be developed with the State Historic Preservation Division. Should there be any findings during construction, work should cease immediately and the State

MR. JEFF OVERTON
March 22, 2001
PAGE TWO

Historic Preservation Division, the Oahu Burial Council and the Office of Hawaiian Affairs should be contacted immediately.

If you have any questions, please contact Jerry B. Norris at 594-1847 or e-mail him at jnorris@oha.org.

Sincerely,



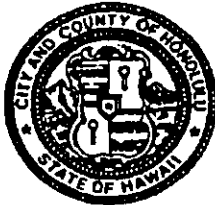
Colin C. Kippen, Jr.
Deputy Administrator

cc: OHA Board of Trustees
Mr. Randy Ogata, Administrator
Standford Kuroda, City and County of Honolulu

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



July 25, 2001

RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

Mr. Colin C. Kippen, Deputy Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Kippen:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your March 22, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

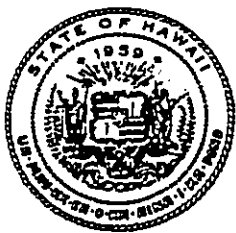
1. Section 343-2, Hawaii Revised Statutes – Issues concerning the effect on Native Hawaiian culture, tradition, and customary rights pursuant to Section 343-2, Hawaii Revised Statutes, as amended will be taken into consideration.
2. Human Burials – The State Historic Preservation Division has been consulted and has commented that the proposed development will have “no effect” on historic sites. If burials are found during construction, work will cease immediately and the State Historic Preservation Division, the Oahu Burial Council, and the Office of Hawaiian Affairs will be contacted immediately.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

For RAE M. LOUI, P.E.
Director

RML:gt



DISABILITY AND COMMUNICATION ACCESS BOARD

919 Ala Moana Boulevard, Room 101 • Honolulu, Hawaii 96814
Ph. (808) 586-8121 (V/TDD) • Fax (808) 586-8129

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MAR 19 2001
GROUP 70

March 14, 2001

Jeffery H. Overton, AICP
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307


Subject: Koko Head District Park and Shooting Complex
Environmental Impact Statement Notice of Preparation (EISPN)

Dear Jeff:

We would like to be a consulted party in the preparation of the Draft Environmental Impact Statement (DEIS) for the Kokohead District Park and Shooting Complex. An earlier review was previously provided for the Master Plan. We will need to get the revisions to determine if any additional comments are warranted.

Thank you. We look forward to hearing from you.

Sincerely,

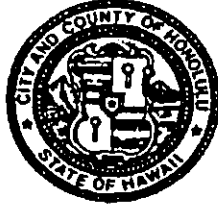

Gary L. Batcheller, ASID
Facility Access Specialist

Stanford Kuroda
City and County of Honolulu
Department of Design and Construction
650 South King Street, Ninth Floor
Honolulu, Hawaii 96813

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Gary L. Batcheller, Facilities Access Specialist
Disability and Communication Access Board
State of Hawaii
919 Ala Moana Boulevard, Room 101
Honolulu, Hawaii 96814

Dear Mr. Batcheller:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. Thank you also for your earlier comments during the development of the Master Plan. We have prepared the following responses to your comments dated March 24, 2001.

ADA accessibility of the proposed improvements has been integrated with the planning of the new facilities at the Koko Head District Park as presented in the Master Plan. All new facilities and walkways are proposed to be accessible according to ADA standards.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for this the environmental review process.

Very truly yours,

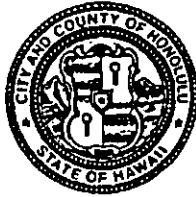
for RAE M. LOUI, P.E.
Director

RML:gt

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4182 • FAX: 527-5725 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

RECEIVED
APR 2 - 2001

GROUP 70

March 28, 2001

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813

Dear Mr. Overton:

Subject: Koko Head District Park and Shooting Complex
Environmental Impact Statement Notice of Preparation

Thank you for the opportunity to review and comment on the
Environmental Impact Statement Notice of Preparation relating to
Koko Head District Park and Shooting Complex.

The Department of Parks and Recreation would like to be a
consulted party in the preparation of the Draft Environmental
Impact Statement.

Should you have any questions, please contact Mr. John Reid,
Planner, at 547-7396.

Sincerely,

W. D. Balfour, Jr.

WILLIAM D. BALFOUR, JR.
Director

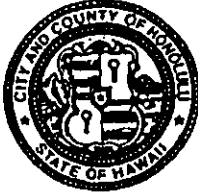
WDB:cu
(I-209JR)

cc: Mr. Stanford Kuroda, Department of Design and Construction
Mr. Donald Griffin, Department of Design and construction

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4182 • FAX: 527-5725 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

April 12, 2001

RECEIVED

APR 18 2001

GROUP 70

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park Master Plan and Koko Head
Shooting Complex Safety Improvements Environmental
Impact Statement Notice of Preparation (EISNP)

Thank you for the opportunity to review and comment on the
Environmental Impact Statement Notice of Preparation relating to
the Koko Head District Park and Koko Head Shooting Complex.

The Department of Parks and Recreation endorses the improvements
as described and requests participation as a consulted party
during the balance of the environmental impact process.

Sincerely,

A handwritten signature in black ink, appearing to read "W.D. Balfour, Jr.", written over a horizontal line.

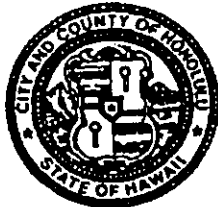
WILLIAM D. BALFOUR, JR.
Director

WDB:cu
(1-476JR)

cc: Mr. Don Griffin, Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi



JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: WILLIAM D. BALFOUR, JR., DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: *for Eric G. Crispin*
RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your letters regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that you endorse the improvements as described in your letter of April 12, 2001.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

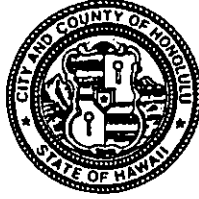
If you have any questions, please contact Stanford Kuroda of Facilities Design and Engineering Division at extension 4755.

RML:gt

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2001/CLOG-1422(RY)

May 8, 2001

Mr. Jeffrey H. Overton, AICP
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements, Honolulu, Oahu

The Department of Planning and Permitting (DPP) is the accepting authority for the above EISPN. Please inform recipients of the draft EIS that the contact person for the DPP is Mr. Raymond Young, phone number 527-5839, e-mail ryoung@honolulu.co.hi.us. Please provide **one hardcopy** of the draft Environmental Impact Statement for our review. If accepted, we will inform you in writing that the draft EIS is acceptable and that **9 additional hardcopies** will be required for review and/or submission to the Office of Environmental Quality Control (OEQC) for publication in the OEQC Bulletin. During the review of the Draft EIS, please send copies of comments and your responses to comment writers to DPP, attention Mr. Young, as soon as your responses are available. Copies of said correspondence may be via electronic transmittal in-lieu of hardcopies and may include the following formats: Acrobat (.pdf), Word 2000 (.doc), WordPerfect 8 (.wpd). Electronic submittals of said copies should be sent to Mr. Young's said e-mail address. If available, an electronic copy of the entire DEIS and upcoming Final EIS is desirable and may be submitted in the above formats except that it should be in the form of a compact disc(s). Other formats will be considered upon consultation with the DPP staff.

We have the following comments on the EISPN:


The East Honolulu Sustainable Communities Plan has replaced the East Honolulu Development Plan. In addition, the East Honolulu Development Plan Public Facilities Map and review process has been replaced by the East Honolulu Public Infrastructure Map (PIM) and review process. Currently, the PIM shows a "Park/Modification" symbol for the Koko Head Regional Park, which includes the proposed project sites.

Mr. Jeffrey H. Overton, AICP
Group 70 International, Inc.
May 8, 2001
Page 2

With respect to the area's wastewater system, the Koko Head District Park and Shooting Complex is not serviced by the City and County of Honolulu municipal wastewater system. This area is serviced privately by the Hawaii American Water Company.

If you have any questions, please contact Raymond Young.

Sincerely yours,


RANDALL K. FUJIKI, AIA
Director of Planning and Permitting

RKF:lh

cc: Stanford Kuroda/DDC

Doc 94753

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cd.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR


GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTENTION: RAYMOND YOUNG, SENIOR PLANNER

FROM: 
RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your May 8, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We commend efforts to advance the City's use of technology in the Planning and Permitting review. Group 70 International will provide electronic files of all the required materials in full compliance with your new initiative.

We have prepared the following responses to your comments:

1. Thank you for the information regarding the East Honolulu Sustainable Communities Plan and the East Honolulu Public Infrastructure MAP (PIM) and review process.
2. The plan will reflect that the project area is serviced privately by the Hawaii American Water Company and is not serviced by the City and County of Honolulu municipal wastewater system.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS).

RML:gt

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

R E C E I V E D

MAY 02 2001

GROUP 70



April 30, 2001

JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice-Chairman
JAN M.L.Y. AMII
HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

Group 70 International, Inc.
935 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Jeff Overton

Gentlemen:

Subject: Your Transmittal of March 29, 2001 of the Environmental Impact Statement Preparation Notice (Revised and Expanded) for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements, TMK: 3-9-12: 1. 10

Thank you for the opportunity to review the subject document for the proposed improvements to the park and shooting range.

Our previous comments of April 6, 2001 are still applicable and enclosed for your information. We reserve further comments until the Draft Environmental Impact Statement is submitted for our review.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

Enclosure

cc: Stanford Kuroda, Department of Design and Construction

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



April 6, 2001

JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice-Chairman
JAN M.L.Y. AMII
HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

Group 70 International, Inc.
935 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

RECEIVED

APR 10 2001

GROUP 70

Attention: Jeff Overton

Gentlemen:

Subject: Your Transmittal of March 13, 2001 of the Environmental Impact Statement Preparation Notice for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements, TMK: 3-9-12: 1, 10

Thank you for the opportunity to review the subject document for the proposed improvements to the park and shooting range.

We have the following comments to offer:

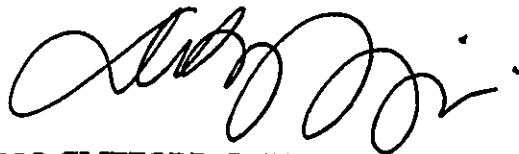
1. The off-site water system is presently adequate to accommodate the proposed project.
2. The availability of water will be determined when the Building Permit Application is submitted for our review and approval. If water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission, and daily storage.
3. There is an existing four-inch compound water meter serving the project site.
4. If an additional three-inch or larger water meter is required, the construction drawings showing the installation of the meter should be submitted for our review and approval.
5. The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

Group 70 International, Inc.
April 6, 2001
Page 2

6. We recommend the use of drought tolerant/low water use plants and xeriscaping principles for all landscaping. We also recommend the installation of an efficient irrigation system. The irrigation system should incorporate moisture sensors to avoid the operation of the system in the rain and if the ground has adequate moisture.
7. The proposed project is subject to Board of Water Supply cross-connection control requirements prior to the issuance of the Building Permit Application.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

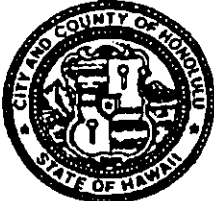


FOR CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Stanford Kuroda, Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: *for* RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your letters regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your letter dated April 6, 2001.

1. Off-site Water System – The EIS will reflect that the off-site water system is presently adequate to accommodate the proposed project.
2. Water Availability – The Board of Water Supply and City Department of Design and Construction will discuss the potential for water system facilities charges during the design phase.
3. Meter Requirements – All Board of Water Supply requirements with respect to the design of any needed modifications to the project's existing system will be met.
4. Fire Protection – The Fire Department has been consulted regarding fire protection requirements.
5. Drought Tolerant Plants and Irrigation – Drought tolerant plants will be used when possible and an efficient irrigation system will be installed.

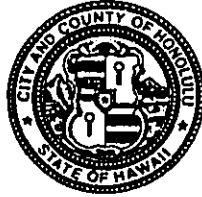
Your letters and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

RML:gt

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

RECEIVED

APR 23 2001

GROUP 70

April 16, 2001

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
Environmental Impact Statement Notice of Preparation (Revised and Expanded)

We received your letter dated March 29, 2001, regarding the above-mentioned projects. The Honolulu Fire Department (HFD) requests that the following be complied with:

1. Provide a private water system where all appurtenances, hydrant spacing, and fire flow requirements meet Board of Water Supply standards.
2. Provide a fire department access road within 150 feet of the first floor of the most remote structure. Such access shall have a minimum vertical clearance of 13 feet 6 inches, be constructed of an all-weather driving surface complying with Department of Transportation Services (DTS) standards, capable of supporting the minimum 60,000 pound weight of our fire apparatus, and with a gradient not to exceed 20%. The unobstructed width of the fire apparatus access road shall meet the requirements of the appropriate county jurisdiction. All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround having a radius complying with DTS standards.
3. Submit civil drawings to the HFD for review and approval.

Mr. Jeffrey H. Overton, AICP
Page 2
April 16, 2001

We are interested in receiving a copy of the Draft Environmental Impact Statement.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,



ATTILIO K. LEONARDI
Fire Chief

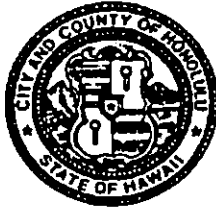
AKL/KS:jo

cc: Stanford Kuroda, Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: ATTILIO K. LEONARDI, FIRE CHIEF
HONOLULU FIRE DEPARTMENT

FROM:  RAE M. LOU, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your April 16, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Private Water System – The water system design will ensure that appurtenances, hydrant spacing, and fire flow requirements meet Board of Water Supply standards.
2. Fire Department Access – The proposed improvements will conform to Fire Department guidelines regarding access roads.
3. Approval of Civil Drawings – Civil drawings will be submitted to the Honolulu Fire Department for review and approval during the design review phase.

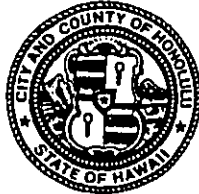
Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

RML:gt

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
<http://www.honolulu.org>
www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



LEE D. DONOHUE
CHIEF

MICHAEL CARVALHO
ROBERT AU
DEPUTY CHIEFS

OUR REFERENCE CS-LS

April 18, 2001

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Thank you for opportunity to review and respond to the Environmental Impact Statement Notice of Preparation for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements project.

This proposal should have minimal impact on the facilities and services of this department. However, we have noted that there are no specific references to items such as a classroom facility, an ammunition bunker, or an awning at the combat range as a part of the proposed improvements.

If there are any questions, please call Carol Sodetani of the Support Services Bureau at 529-3658.

Sincerely,

LEE D. DONOHUE
Chief of Police

By 
EUGENE UEMURA, Assistant Chief
Support Services Bureau

cc: Mr. Stanford Kuroda, DDC
Training Division
District 7

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

FROM:  RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your April 18, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that the proposal should have minimal impact on the facilities and services of the Police Department.

We also acknowledge your comments regarding the lack of specific reference to the classroom facility, ammunition bunker, and awning at the combat range. The Draft Environmental Impact Statement will provide more details regarding the specific components of the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

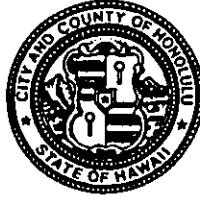
Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

RML:gt

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA • 711 KAPIOLANI BOULEVARD, SUITE 1200 • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



RECEIVED

MAY 14 2001

CHERYL D. SOON
DIRECTOR

GROUP 70

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

May 9, 2001

TPD4/01-01431R

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park Master Plan and Koko Head Shooting
Complex Safety Improvements

In response to your March 29, 2001 letter, the revised and expanded environmental impact statement (EIS) notice of preparation was reviewed. At this time, we have no comments to provide. However, we look forward to reviewing the Draft EIS. In order to facilitate our review, please provide us with two copies of the document.

Should you have any questions regarding this matter, please contact Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

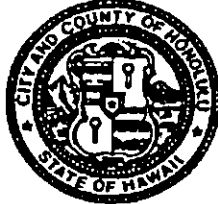
Handwritten signature of Cheryl D. Soon in cursive.

CHERYL D. SOON
Director

cc: Mr. Stanford Kuroda
Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: *Eric G. Crispin*
RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your letter received on May 14, 2001 regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that you do not have any comments to offer at this time.

Your letter and this response memorandum will be included in the Draft Environmental Impact Statement (EIS). We will forward two copies of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

RML:gt

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813

JEREMY HARRIS
Mayor



TIMOTHY E. STEINBERGER, P.E.
Acting Director

IN REPLY, REFER TO:
EST 00-050

May 15, 2001

RECEIVED

MAY 18 2001

GROUP 70

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307
Attn: Jeff Overton

Gentlemen:

SUBJECT:

KOKO HEAD DISTRICT PARK MASTER PLAN AND KOKO HEAD
SHOOTING COMPLEX SAFETY IMPROVEMENTS
ENVIRONMENTAL IMPACT STATEMENT NOTICE OF
PREPARATION (REVISED AND EXPANDED)

Thank you for the opportunity to review and comment on the above subject. The proposed project does not appear to impact any of our facilities or services. Therefore, you need not consult with us further.

For further information on this review, please call Jack Pobuk, Program Coordinator at 527-6696.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Steinberger", is written over a horizontal line.

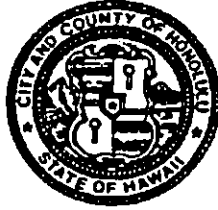
TIMOTHY E. STEINBERGER, P.E.
Acting Director

Cc: City & County of Honolulu, Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

TO: TIMOTHY STEINBERGER, P.E., ACTING DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

FROM:  RAE M. LOUI, P.E., DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND
KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS
EIS PREPARATION NOTICE

Thank you for your letter received on May 18, 2001 regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that you do not have any comments to offer at this time.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS).

RML:gt

6635 Kalopa St.
Honolulu, Hi. 96825
21 MAR 2001

Mr. Jeff Overton
Group 70 International Inc.
925 Bethel St.
Honolulu, Hi. 96813

Dear Sir:

The attached material is submitted in response to your EISPN relating to the Koko Head District Park and Shooting Complex. The Koko Head Archery Club, of which I am a member, has been tasked with insuring and operating the archery range when it is developed, as well as assisting with its development and upkeep. The attached material represents the common understanding of the club members of the configuration of a quality facility. It is the hope of the club membership that each step or stage in range development will be taken in such a way that a facility such as described may eventually be realized.

Along with the other members of the club, I look forward to providing all possible assistance with the preparation of the EIS, the development of the range, and its eventual operation/use.

Very respectfully,



J.P. HUCKS
Koko Head Archery Club
NAA Level Two Coach
Dept. of Parks and Recreation archery instructor

Copy to: (with attachments):

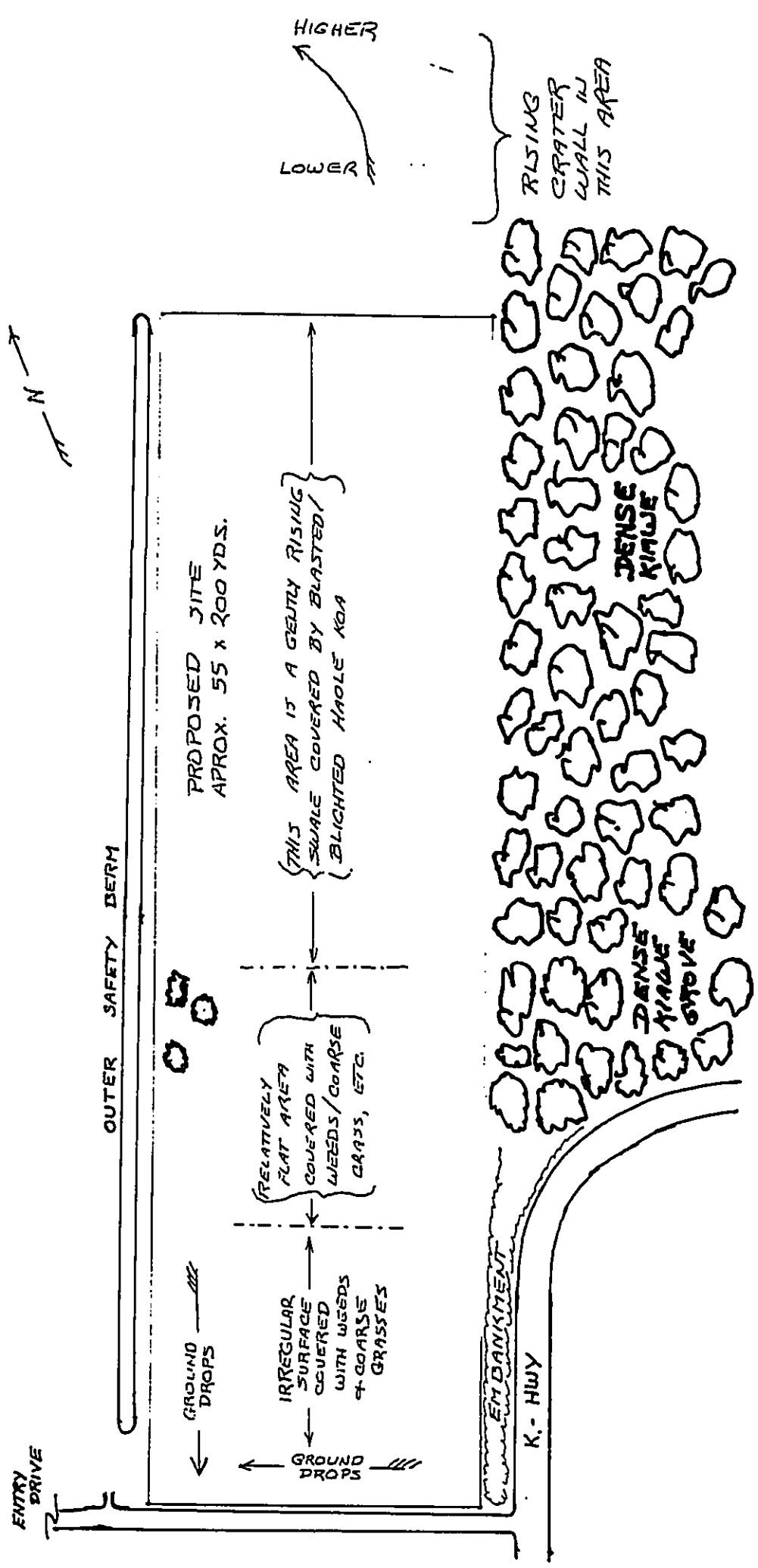
Mr. S. KURODA, Department of Design and Construction
Ms. C. BOND, coordinator, East Honolulu Vision Team
Ms. M. HOUGHTON, Hawaii Kai Neighborhood Board Rec. Comm, Chair
Mr. M. MURAMOTO, Koko Head Shooting Complex Director

ATTACHMENT (4)

PRESENT ACTIVE AREA

of

SHOOTING COMPLEX



List of Attachments

- (1) Attachment (1) is a plot type drawing that attempts to show the areas which have been considered for the development of an archery range within the Shooting Complex in relationship to the highway and other features of the range. Area (1) was originally considered, but would have remained a mixed-use facility, at the best. Interest has now shifted to areas (2) and (3) of the drawing, which are larger and might be devoted exclusively to archery. The inset photograph was taken from the beginning of the entry drive looking North from about the position of the red star on the drawing.
- (2) Attachment (2) is a listing of those improvements which are considered essential, or very desirable, to bring the area from its present condition to a quality archery range facility.
- (3) Attachment (3) is a listing of the probable activities at the archery range when it is developed and placed in use.
- (4) Attachment (4) is a larger scale drawing of this area with some indication present state.
- (5) Attachment (5) is a drawing to the same scale as Attachment (4) which provides a concept of this area laid-out as a ten-lane, common shooting line target range. No particular detail was attempted in the display of the range shack or any grading/paving for a parking facility in the area between the entry drive and the probable location of the shooting line. Storage and some type restroom are very desirable. If they are practical and allowed, some type of hard flooring, concrete or asphalt, will be required. Such flooring in a range shack structure may well be required to meet ADA standards.

ATTACHMENT (2)

The proposed site of the archery range at the Koko Head Shooting Complex is the area to the north of the entry drive, between the highway embankment and the outer safety berm of the existing range(s). Without regard to the availability of funds, or the practicality / permissibility of the work, the following construction would be very desirable in order to establish a quality target range in this area:

- (1) Grub and grade the area between the berm and kiawe grove southward from the tip of the berm to the entry drive. Both longitudinal and transverse grades should be as low as possible. Ideally, the active part of the range would be perfectly flat and level in space. Boulders and roots of any appreciable size should be removed.
- (2) Construct a range shack transverse to the berm and at a point approximately 160 yards south of its tip. The character of this structure is a wide, shallow shed with its open front facing down-range. The ideal structure would extend virtually the entire width of the shooting line, or about forty yards. The floor should be level and smooth/hard enough to accommodate disabled archers
- (3) Construct a volumn of storage that is adequate to protect the necessary targets, range maintenance materials and tools from the elements and loss from theft or vandalism. Ideally, this storage would be incorporated in the range shack, possibly as one or more storerooms along its rear.
- (4) Construct a comfort station which conforms to ADA guidelines. Ideally, there would be separate facilities for women and men, with these facilities incorporated in the range shack structure.
- (5) Grade and stabilize/compact or pave a parking area with entry/exit onto the Complex entry drive. Provide appropriate wheel stops, curbing, lane markings, etc., especially as relates to ADA guidelines.
- (6) Provide/construct an access lane from the Complex entry drive to the active portion of the range to permit entry/exit of service vehicles, including mowing equipment. This service lane might be designed in such a way that it satisfies ADA guidelines for access to the active portion of the range. If it consists of grassed-over hard-stand on the range, it might satisfy ADA requirements for at least one ADA accessible shooting lane.
- (7) Provide water service from the Complex and install adequate manual or automatic irrigation system(s) for those portions of the range to be landscaped.
- (8) Condition soil and plant mowable ground cover (e.g. grass) on the active portion of the range, and around/beside the range shack . Provide and

ATTACHMENT (3)

POST DEVELOPMENT ACTIVITIES

- (1) Landscape maintenance. Use of water for irrigation and commonly employed chemicals to control weed and insect pests.
- (2) Target butt and other range maintenance. Use of common lumber, paint and other construction materials including natural and synthetic fibers, mats and sheeting, some residue from which may remain in or on the ground.
- (3) Motor vehicles. People and/or materials will be transported to and from the range, as well as periodic mowing or the ground cover will required the use of motor vehicles and gasoline powered equipment.
- (4) Target archery. The principal activity in and on the range will be the practice of target archery. Arrows are typically wood, fiberglass, aluminum, or carbon fiber. They typically have steel points and feather or plastic vane fletching. Nocks are typically plastic. A small per cent of the total number of arrows shot will be lost or damaged. It is likely that there will be some arrows or arrow components which will remain in or on the ground. Bows and their components and attachments are constructed from a wide variety of natural and synthetic materials. It is virtually inconceivable that a bow or bow components will be left on the range to become a source of pollution. Noise and/or atmospheric pollution from the practice of the sport is essentially non-existent.
- (5) Related activities. Depending upon the amenities provided at the range, related activities may include: classroom instruction, modification/maintenance of tackle, business

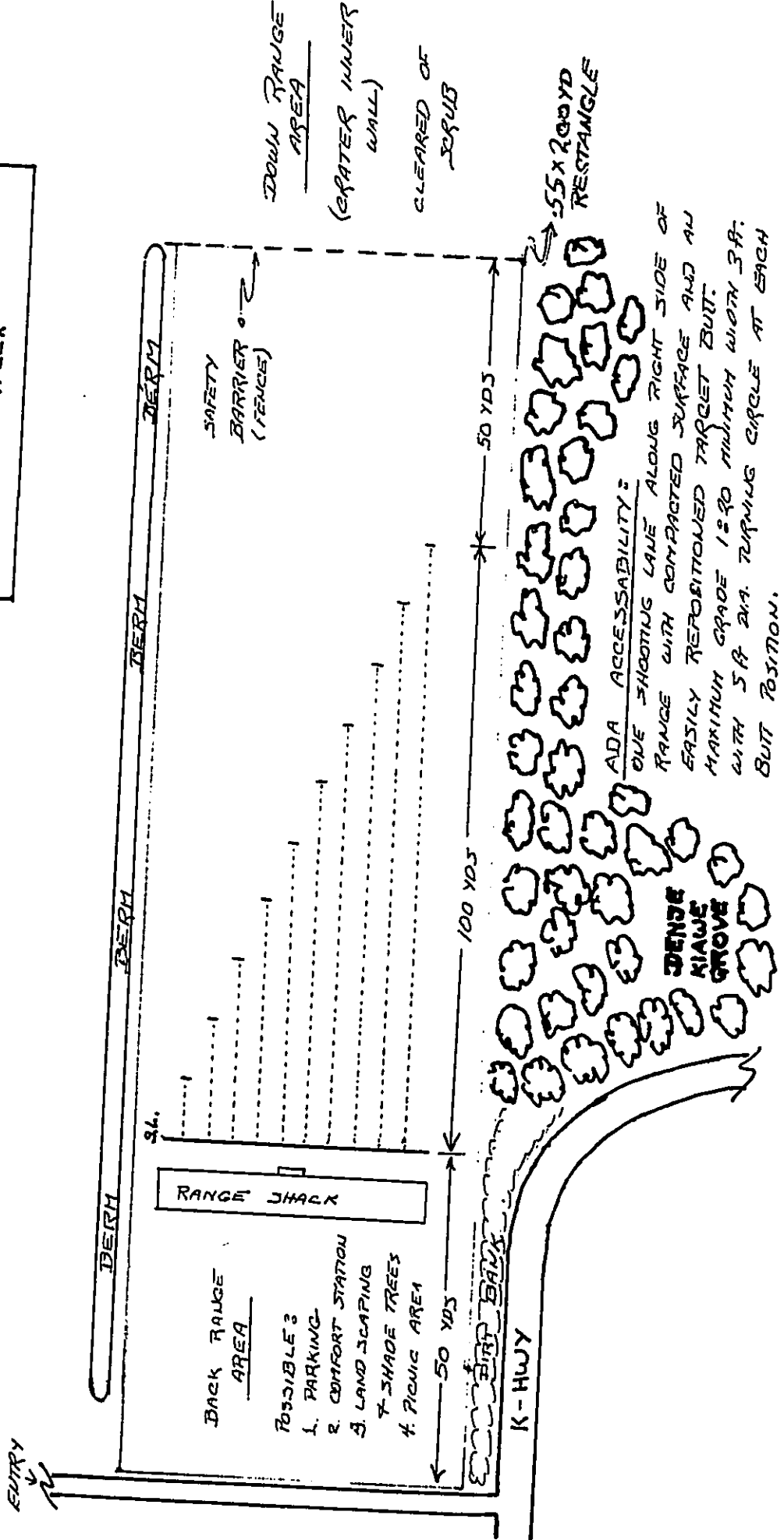
meetings of the club or range staff, the preparation/service/consumption of food and beverages during meetings, practice or tournaments. Any pollution or contamination would be that common to this type activity.

- (6) Traffic. The effect on traffic along the highway should be inconsequential except during major competitions when attendance may number as many as a hundred contestants and guests. Such shoots are unlikely to occur more often than a couple times per year.
- (7) Sewage leeching into the ground will be present in the event that restrooms are provided and put into use as a result of the necessary septic tank system of disposal. The total quantity of sewage to be disposed of should be relatively low, as the total number of operating hours is expected to be relatively low, possibly 10% or so of the monthly hours of daylight.

ATTACHMENT (5)

PROPOSED 10 LANE
ARCHERY TARGET RANGE
AT
KOKO HEAD SHOOTING
COMPLEX

PRESENT ACTIVE AREA
SHOOTING COMPLEX



RECEIVED BY THE CITY OF MIAMI

NEAR VERTICAL CRATER WALL

K. HWY.

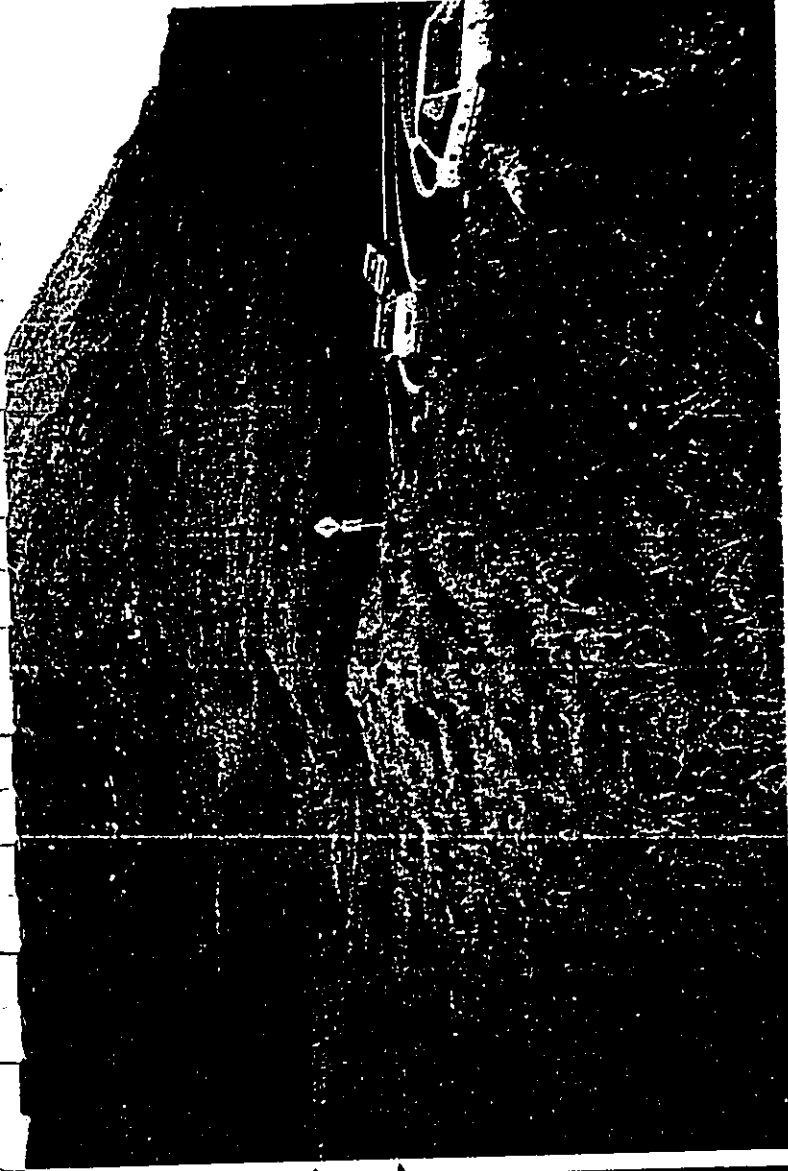
AREA #2

AREA #3

ALTERNATE RANGE AREA

ATTACHMENT (I)

ORDER DECK



ACTIVE RANGE AREA

HEAD

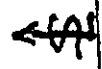
AREA #1

500-CORPS

ISTRICT PARK

R₂

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DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. J. P. Hucks
Koko Head Archery Club
6635 Kalopa Street
Honolulu, Hawaii 96825

Dear Mr. Hucks:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments dated March 21, 2001.

We appreciate the detailed comments and graphics you provided regarding archery range uses.

1. Archery Range Location – The archery range is planned to be located on the west side of the site near the entrance to the Shooting Complex. A map showing the location of the facility will be included in the Draft EIS.
2. Grub and Grade - The archery range will include grading to level off the range site.
3. Range Shack - The construction of a firing range shack is planned. Your comments regarding the construction of the shack have been noted.
4. Storage Facilities – Additional storage facilities are not part of the planned improvements.
5. Comfort Station- Improvements to the existing comfort station are planned.
6. Parking Lot – A new parking area is planned off the entry road.
7. ADA Accessibility – ADA improvements to the Shooting Complex include two-van accessible parking stalls. In addition, an improved curb ramp, improved toilet stalls, and new tactile/Braille signage are planned at the lower comfort station.

Mr. J. P. Hucks
Page 2
July 25, 2001

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



For RAE M. LOUI, P.E.
Director

RML:gt



HAWAII FIFTY CALIBER ASSOCIATION



1919 YOUNG STREET #103
HONOLULU, HI 96826

RECEIVED

MAY 04 2001

GROUP 70 INTERNATIONAL, INC.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

GROUP 70

Subject: Provide design input of how the Koko Head Shooting Complex should be constructed to handle all calibers accessed by law abiding citizens.

Dear Jeff Overton,

The Hawaii Fifty Caliber Association request that our input to the re-construction of the range in part or whole for the safe useage of any caliber, including the .50 BMG cartridge in a rifle at the Koko Head Shooting Complex.

PRESENT AND RECOMMENDED CONFIGURATION

Refer to the addendum attached, ACAD drawing of the existing problems encountered with the existing range configuration that allows ricochets, stray projectiles, and no control on muzzle direction of rifle handlers at the bench.

Included in the ACAD drawing is a re-configured range of absolute control trajectories. We are aware that surface grading out to 400 yards is cost prohibitive. It could be done in increments, or back stops constructed properly at each of the distances. This would allow better control of muzzle angle by baffle installation.

BAFFLE INSTALLATION SHOULD INCLUDE SOFT DIRT MEDIA

Another area of concern that should be addressed with the baffles! I further recommend removing hard targets (steel frame & plate targets) that allow ricochets at 50 to 300 yards due to lack of policing armor piercing bullet useage. If a satisfactory overhead barrier is constructed capable of projectile containment, only then can hard targets be used. There should be soft dirt media that provides a back stop similar to what is presently set up at the hundred yards. Visit the Complex and observe the path of the bullets beyond the fifty yard distance, having grooves and skid marks formed that reach the hundred yard distance with rocks and metal objects on the surface to cause further airborne projectile problems most susceptible with AP's.

.50 BMG BULLET TRAP AT HUNDRED AND TWO HUNDRED YARDS NOT SAFE OR PRACTICAL

Discussion on bullet traps for .50 BMG rifle restricted at a hundred or two hundred yards. We stress that this is not feasible when scopes and scope mounts installed on .50 BMG rifles from the factory are calibrated for five hundred yards and beyond.

1. Optical sights used in the October 21st incident required aiming at 50 yard marker to hit target at 100 yards or 150 yards to hit 200 yard target leading to errant projectiles.

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2. The rifle would need a supplemental close range aiming system to not disturb the original scope settings.
3. Scope adjustment allows sight adjustment at minimum of 400 yards and no adjustment at shorter ranges.

The .50 BMG rifle can only be used exclusively for the Complex or capable of bore sighting to establish accurate trajectory containment. Recommend natural bullet trap exists at the base of the mountain with approval of heavy equipment excavation.

Recommend seeking an impact study with the process of blasting out a section (did it for roads) at the base of the mountain to allow trapping bullets at 400 yards and/or extended to 500 yards, further into base of mountain (refer to attached drawing).

Existing range configuration, the existing targets set up on the side of the mountain are above the horizontal line of trajectory from it's source making for a greater window of opportunity for projectiles to skim and ricochet up and over the top and side of the mountain. Heavy equipment grading should include excavation of land so trajectory is below the natural line of the ground to rifle alignment. Excavation include heavy equipment surface grading to form soft dirt media for a natural bullet trap at all prescribed range distances!

Experience in indoor range design, construction, and actual .50 BMG rifle useage, we strongly recommend consideration to use the base of the mountain for the .50 BMG rifle bullet trap for safety and concerns to all involved in such that was described.

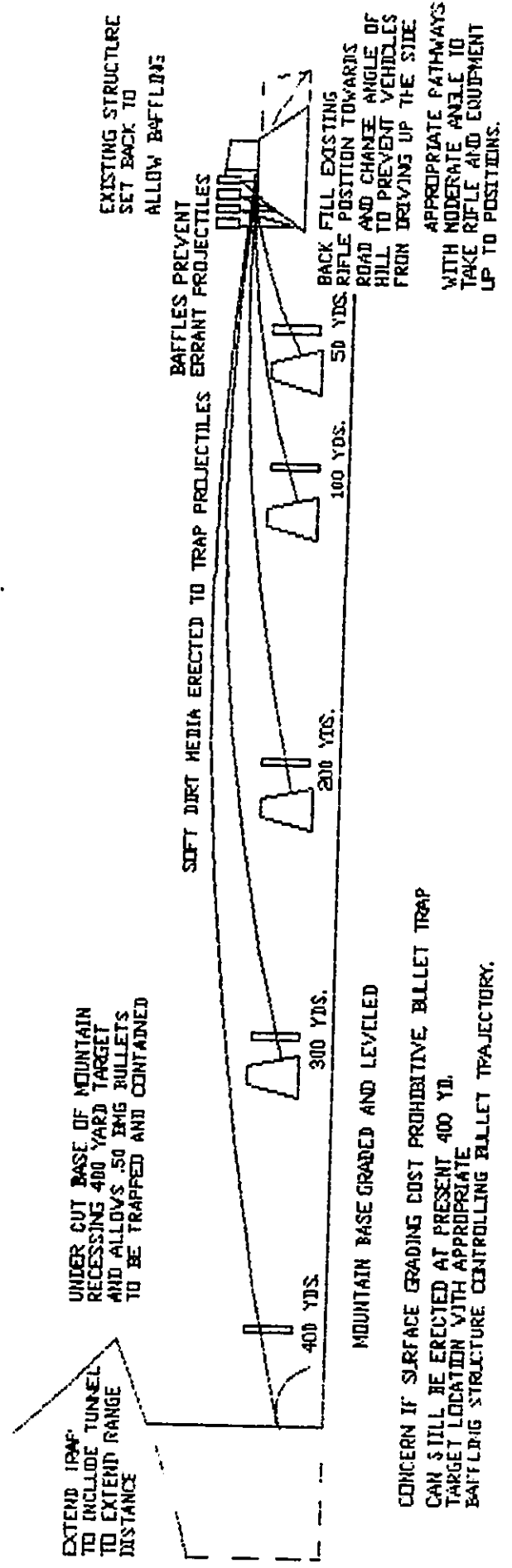
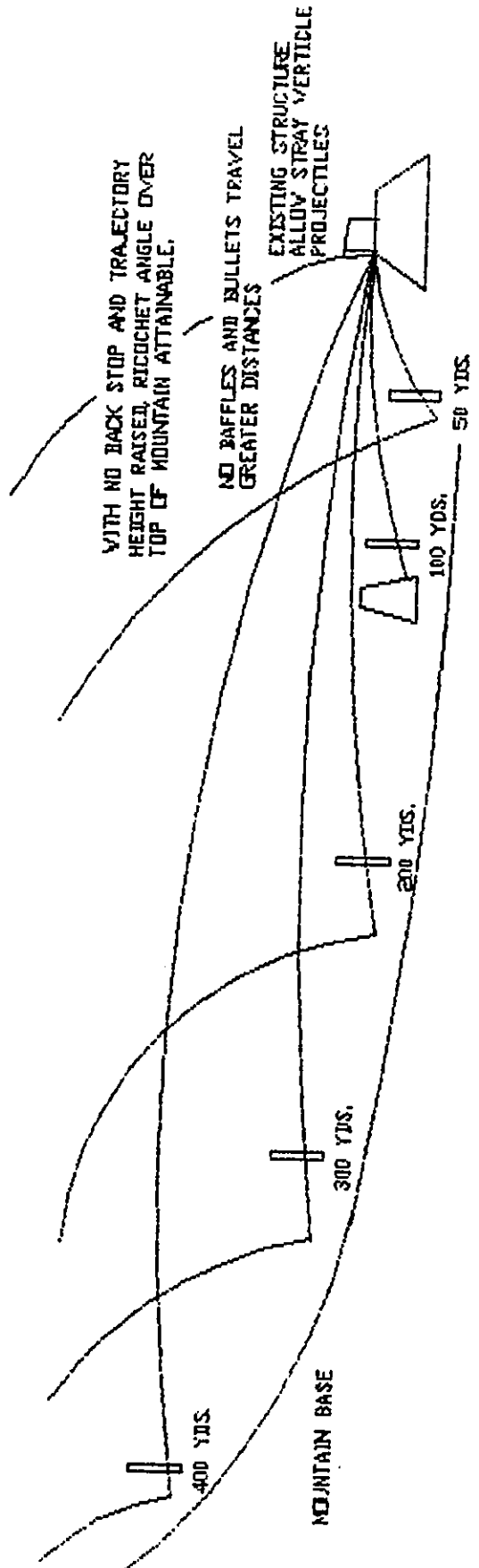
I sent a letter to the Commander and Chief of the Armed Forces, U.S. President George W. Bush, regarding the incident that initiated the re-designing of the Koko Head Shooting Complex. Suggesting additional funding be taken from the military base holding them responsible for allowing it's personnel to endanger the surrounding community.

If additional funds are provided, I recommend the design along my recommended parameters. Thank you for setting time aside to consider my concerns!

Respectfully,

Norman Chung
HFCA President

cc HRA, Dr. Maxwell Cooper



SECRET

Norman Chung
1919 Young Street #103
Honolulu, HI 96826

U.S. President George Bush
White House
Washington D.C. 20502

May 30, 2001

Subject: Had received further information of perpetrators for October 7th incident, military abusing Koko Head Shooting Complex that led to hitting a house, received letter from Pentagon Hot Line charging me for "Whistle Blowing" information I do not need, and take some of the military budget to pay for re-designed shooting complex.

Dear Mr. President Bush,

I received your encouraging words and photograph this day. I bring to your attention this issue in the follow up letter from one I sent earlier. Notify if received the January 12 letter.

IN REGARDS TO LETTER SENT AND DATED JANUARY 12th, RECALL:
"October 7th, 2000, waste of taxpayer's money by U.S. Air Force personnel using unauthorized travel with military vehicles, unauthorized use of local public shooting range that led to inexperienced judgement, unauthorized ammunition disposal, negligent firing, abuse of military equipment, .50 BMG Armor Piercing Bullet HIT HOUSE, resulting in law abiding citizens penalized for ban on .50 BMG rifle at shooting range."

PERPETRATORS WERE U.S. AIR FORCE HICKAM BASE PERSONNEL:

Having concerned persons, inquiry capability into the incident through the Inspector General of CINPAC FLEET, a verbal report was delivered by phone (not in writing). Military personnel replying to the incident, admitted it was U.S. Air Force personnel from Hickam Air Force base and the personnel were instructed not to use the Koko Head Shooting Complex for such activity again.

This is fine and dandy, but the incident caused ban of .50 BMG rifles at Koko Head Shooting Complex, is still in effect.

MOST PERPLEXING IS THE REPLY FROM THE "PENTAGON HOT LINE"

Pentagon Hot Line received a copy of the letter sent to the President, and the reply was in an official form to fill out and to charge me a monetary fee for any information they provide.

Closure to this incident is not acquiring information, but nothing less than taking away these firearms from their armory due to the stated mishap and it's ramifications affecting law abiding citizens. I re-iterate that other branches of the military are more worthy in using this firearm.

AFTERMATH OF INCIDENT

To this day, a large caliber association was formed to address proper range design to handle all calibers legally used by law abiding citizens and law enforcement in the Koko Head Shooting Complex. Further input and support is being had by local shooting clubs for re-configuring the range. It will be costly and a portion of the U.S. Air Force Hickam Base budget should be used to help with re-configuring the Koko Head Shooting Complex. PLEASE MAKE IT SO IF YOUR FINDINGS CONFIRM MY INFORMATION!

RE-DESIGN SHOOTING COMPLEX, I WARNED THAT LARGE CALIBERS SHOULD NOT HAVE PROJECTILE TRAP AT CLOSE RANGE.

In suggestions by other clubs in re-designing the Koko Head Shooting Complex, the large calibers such as the .50 BMG rifle insist constructing a projectile trap at 200 yards. It is not realistic for scopes and extremely high velocity projectile mass.

My large caliber association recommends the farthest distance of 400 yards at Koko Head Shooting Complex for the large calibers using the natural base of the mountain for the projectile trap. Much surface grading in my proposed design keeps the trajectory level with shooting source.

With .50 BMG and ultra mag projectiles, the 400 yards or possible additional 50 yards, addresses proper use of scope adjustment parameters and velocity/energy dissipation. The October 7th incident, they were shooting at 100 yards.

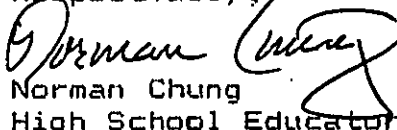
Suggestions to an independent organization appointed by the City and County of Honolulu known as Group 70 International, INC. will gather all the information, make an impact study, and provide directive how the Koko Head Shooting Range is to be designed with existing funds which isn't very much. THE DEADLINE FOR ALL INPUT IN RE-DESIGNING IS MAY 8TH.

CONCLUSION

Speaking for the large caliber association and re-configuring the Koko Head Shooting Complex to a more reasonable suggested design, THE EXPENSES BE PASSED ON TO THE MILITARY BASE THAT CAUSED THIS RE-DESIGNING AND ALLOW 400 YARD PROJECTILE TRAP.

Thank you for setting time aside to read my concerns and it would be graciously appreciated the suggestions are taken seriously, to build a safer Koko Head Shooting Complex.

Respectfully,


Norman Chung

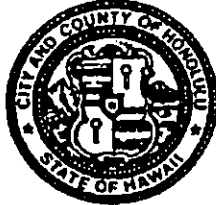
High School Educator
NRA Certified Basic Firearms
Instructor/Training Counselor
NRA Certified Coach
OIA Certified High School Coach
L.I.F.E. Basic Firearms
Instructor/Safety Advisor
OIA East Division Liaison to
HHSAA Riflery Committee
Creative Horizons Gunsmith/
Indoor Range R & D

cc Group 70 International, INC.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Norman Chung, President
Hawaii Fifty Caliber Association
1919 Young Street, #103
Honolulu, Hawaii 96826

Dear Mr. Chung:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements project received on May 4, 2001.

We have prepared the following responses to your comments:

1. Shooting Range Configuration -The safety improvements to the range facilities will be designed to maximize safety as well as the needs of shooters. Thank you for your comments regarding the configuration.
2. Baffling -The installation of baffles is an anticipated future safety improvement.
3. .50 BMG Bullet Trap - Your comments regarding the .50 BMG Bullet Trap will be taken into consideration. For high-powered rifle ammunition such as the .50 BMG, special measures are required. The City intends to continue the existing ban on 0.50 BMG ammunition.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in black ink, appearing to read "Rae M. Loui".
RAE M. LOUI, P.E.
Director

RML:gt



est 1978

RECEIVED

MAY 08 2001

GROUP 70

HAWAII HISTORIC ARMS ASSOCIATION

P. O. Box 1733
Honolulu, Hawaii 96806

7 May 2001

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307
Attn: Jeff Overton

Dear Mr. Overton;

Our club recently received from Dr. Maxwell Cooper of the Hawaii Rifle Association a copy of your letter requesting initial comments on the Draft Environmental Statement (EIS) re expansion of recreational facilities at the Koko Head District Park and improvement of safety conditions at the Koko Head Shooting Complex.

While the Hawaii Historic Arms Association (HHAA) is mainly interested in the historical aspect of firearms and their use, we do conduct a number of shooting matches at the Koko Head Shooting Complex throughout the year. Also, many of our members are regular users of the Complex for recreational shooting.

Without particulars, we do not have any comments at this time but would like to participate in the ongoing development process and to be invited to all meetings regarding the Koko Head Shooting Complex. We recognize the need for improving the safety of the range and are concerned that these improvements also meet the needs of the shooters.

Per your letter, we request a copy of the Draft Environmental Impact Statement and any subsequent literature that is developed out of this study.

Thank you for your consideration in this matter,

Sincerely,

Jack Pechous
President, Hawaii Historic Arms Association
Phone 621-7250
Fax 622-6119
E-mail jacpec@worldnet.att.net

"AN AFFILIATE OF THE NATIONAL RIFLE ASSOCIATION"

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
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Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Jack Pechous, President
Hawaii Historic Arms Association
Post Office Box 1733
Honolulu, Hawaii 96806

Dear Mr. Pechous:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letter received on May 7, 2001 regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your interest in the development process for the Shooting Complex.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

for RAE M. LOUI, P.E.
Director

RML:gt

Hawai'i-Kai Youth Baseball

PO Box 25942

Honolulu, Hawai'i 96825



March 28, 2001

Mr. Jeff Overton
Group 70 International Inc.
925 Bethel Street
Honolulu, HI 96813

RECEIVED

MAR 30 2001

GROUP 70

Dear Mr. Overton:

I recently received the latest version of the Koko Head District Park Plan which now includes an in-line hockey rink and a BMX course adjacent to the planned expansion of Goegas Field (baseball).

Throughout the early planning process which included those endless charrettes and meetings with Group 70 and City representatives, I made it clear that Hawai'i Kai Youth Baseball was interested in seeing Goegas Field expanded to accommodate the older (bigger) baseball players. This was due to the fact that Hawai'i Kai, as a community, seemed to have neglected the 13-18 year old group over the years and the bigger field would enable them to keep playing in community baseball.

Placing the hockey rink and the BMX course so near a baseball field where hard-hit homeruns, fouls and fly balls by these older players will be a constant reality may not be the best mix for safety reasons. In addition, I had provided your firm early on with the required dimensions for the expanded field which needs to accommodate, by prescribed league regulations, a field that was at least 300-310 feet along both sides (left and right field lines) and at least 350-400 feet straight away (center field). Consequently, unless the revised plans call for the field to be reversed with home plate near the existing parking area, I'm afraid there will not be sufficient space for expansion without relocating some of the "new" adjacent facilities.

Thus far, no one has contacted Hawai'i Kai Youth Baseball for input on this matter and so I at least hope that someone knowledgeable about baseball is involved in the planning stages. I'm not certain as to where the process has advanced to at this point but if Group 70 could consider the above factors or at least convey them to the powers that be, we would appreciate it very much.

Thank you for your consideration.

Sincerely,

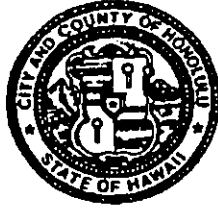
Carl Makino
President, Hawai'i Kai Youth Baseball

cc: S. Kuroda, City, Design
Director Balfour, City Parks & Rec.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Carl Makino, President
Hawaii-Kai Youth Baseball
Post Office Box 25942
Honolulu, Hawaii 96825

Dear Mr. Makino:


Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your March 28, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

1. Expanded Baseball Field - We acknowledge your comment that Goeas Field should be expanded to accommodate older players. In addition, we acknowledge your concern that the placement of the hockey rink and BMX course close to the baseball field could create a hazard. These points and the dimensions for the expanded field will be taken into consideration during the facility design.

Your letter and this response letter will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your efforts to support youth baseball and your input to the current review process.

Very truly yours,


For RAE M. LOUI, P.E.
Director

RML:gt



**HAWAII RIFLE
ASSOCIATION**
Founded 1857

THE STATE AFFILIATE
OF THE NATIONAL
RIFLE ASSOCIATION

P.O. Box 1175
Honolulu, HI 96819
(808) 261-2754

January 25, 2001

RECEIVED

JAN 29 2001

GROUP 70

Director William Balfour
Department of Parks
King Street
Honolulu, Hawaii 96813

Dear Director Balfour:

Thank you for meeting with us. The following is further detail, as you requested, on our concerns about range development at Koko Head Shooting Complex.

We believe that baffling the 2700 pistol range, rifle range, and silhouette range is a necessary safety adjunct. We will urge the Mayor to put it in his budget.

As representatives of the civilian users of the range, we wish to ensure that the baffling and other changes made are made in the best manner to ensure safety while minimizing impact on the available shooting at the Complex.

We support the current ban on .50 BMG. We want any range safety improvements, however, to include plans for a location on the firing line for civilian .50 caliber BMG single-shot, bolt action, or semi-auto firearms and appropriate shooting lanes out to 200 yards with a bullet-trap capable of containing .50 BMG. There is a range consultant in Arizona who manufactures such traps and we can make his name available to your planners.

We are also concerned about the gong targets out to 440 yards. We would like to see these included and maintained in the baffling plans. The range is used by many hunters for sighting-in purposes. It is fairly commonplace for hunters in this state to take 300 to 400 yard rifle shots at game mammals. It is unethical to make these shots on game unless they have been practiced first at a range. There is no civilian range other than Koko Head available for such practice.



**HAWAII RIFLE
ASSOCIATION**
Founded 1857

THE STATE AFFILIATE
OF THE NATIONAL
RIFLE ASSOCIATION
P.O. Box 1175
Honolulu, HI 96807
(808) 261-2754

January 24, 2001
Page 2

We look forward to being included early on in the planning for any range changes.

Sincerely,

A handwritten signature in cursive script that reads 'Max Cooper'.

Dr. Maxwell A. Cooper
Vice President
Hawaii Rifle Association

MAC/gmb

cc: Mayor Jeremy Harris
Ralph E. Portmore
Toni Robinson
Mike Muramoto



**HAWAII RIFLE
ASSOCIATION**
Founded 1857

R E C E I V E D
MAY 02 2001
GROUP 70

THE STATE AFFILIATE
OF THE NATIONAL
RIFLE ASSOCIATION
P.O. Box 1175
Honolulu, HI 96807
(808) 261-2754

May 1, 2001

Attn: Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Thank you for the opportunity to submit initial comments on issues related to preparation of a draft environmental impact statement for Koko Head District Park Shooting Complex Safety Improvements.

Hawaii Rifle Association, the state affiliate of The National Rifle Association, represents the numerous clubs and private individuals who regularly use Koko Head Range.

We agree with a need for baffling the bull's eye pistol range, rifle range and silhouette ranges so that no "blue sky" effect persists, even from a prone shooting position on the rifle and silhouette ranges.

The manner and materials involved in the construction of baffling needs to be carefully considered. They need to be adapted to Hawaii's salt air and high wind conditions so that the system is durable. Funding needs to be provided for maintenance of the surfaces, which will require regular care. Design attention needs to be paid to the increase in noise levels, which could be produced by the baffling, so that this effect is mitigated as much as possible.

Koko Head Shooting Complex is, after all, a city park, so aesthetics should be of some concern.

The baffling design should allow maintaining the metal targets beyond 200 yards. The furthest target at present, we believe, is a 440 yard gong. Many hunters in this state regularly take shots at game at ranges from 200 to 500 yards. It is unethical to take such shots without first practicing them at a shooting range. There is no other range with this capacity available to the thousands of O'ahu's hunters.

RE: Group 70 International, Inc.
May 1, 2001
Page 2

The moratorium on shooting 50-caliber civilian firearms at the Koko Head Complex needs to be addressed. There are a number of civilian owners of these, and, up until the time the U.S. Air Force abused its privileges at Koko Head, there were no incidents with these firearms. We strongly urge that the design include at least two lanes out to 200 yards or further with appropriate shooting positions and bullet traps at the target. We understand there are commercial bullet traps available capable of containing 50-caliber rounds. The firing line positions need a stable platform and some added noise abatement.

We would urge your committee to take advantage of the National Rifle Association's range development consultants. The City & County and civilian users of the range should have the advantage of their input. They have great experience in the latest techniques of range construction and safety considerations, and their consultation fees are modest.

Thank you for the opportunity to submit comments. We look forward to being included further in the development of this project.

Sincerely,



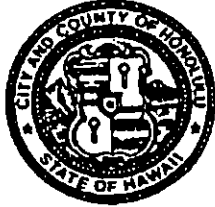
Dr. Maxwell A. Cooper
Vice President & Legislative Chair

MAC/gmb

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Dr. Maxwell A. Cooper, Vice President
Hawaii Rifle Association
Post Office Box 1175
Honolulu, Hawaii 96807

Dear Dr. Cooper:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your letters regarding the Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

1. Baffling—The installation of baffles is an anticipated future safety improvement.
2. .50 BMG — We acknowledge your comments that you support the current ban on .50 BMG but you recommend that safety improvements be implemented to make .50 BMG safe. The City intends to continue the existing ban on 0.50 BMG ammunition.
3. Gong Targets— Finally, we also acknowledge your concern regarding the gong targets out to 440 yards.

Each of these technical aspects of the Shooting Complex will be addressed in the design of facility improvements. Your letter and this response letter will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


RAE M. LOUI, P.E.
Director

RML:gt

May 7, 2001

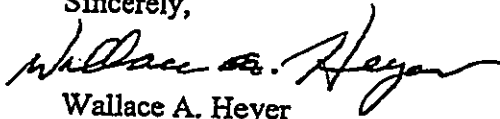
K-BAY ROD & GUN CLUB

The K-Bay Rod and Gun Club has the following recommendations concerning the proposed improvements to be made at the Koko Head District Park and Shooting Complex. These recommendations include two activities that should be added to the Shooting Complex: archery and sporting clays.

Archery: The new archery range should include at least two major activities, i.e. traditional archery targets with scoring rings, and a 3-D target range. The traditional range would include permanently installed target backing (such as straw, plastic, or other) set up at several distances (e.g., every 10 yards from 10-50 yards) from the firing line. Several target backings would be installed at each distance. Bow racks would be positioned behind the firing line. The 3-D range would include a variety of portable 3-D targets that could be located at the distances designed to meet the needs of various shooting groups, that could range from sub-junior to expert adult. The 3-D targets would be stored in a building adjacent to the range to protect them from the weather. The range would be set up, when the Koko Head Shooting Complex was open, in a configuration designed to meet the needs of the shooters. It should be noted that the K-Bay Rod and Gun Club is prepared to provide assistance as needed during the planning and implementation phases of creating the archery range.

Sporting Clays: One of the newest and most challenging shotgun shooting sports is Sporting Clays. It is growing rapidly in popularity throughout the United States. Such a range should be added to Koko Head, giving the shooters the choice of skeet, trap, or sporting clays shooting. Since sporting clays ranges tend to be free form, based on the terrain available, such a range for Koko Head would need to be tailored to the location. For example, a Sporting Clays target launching facility is available that can be towed by a truck to a shooting site, used to conduct a firing program, and then towed back to a storage area after firing has been completed. Accordingly it is strongly urged that a feasibility study be done to determine how a Sporting Clay facility can best be included in the Koko Head Shooting Complex.

Sincerely,



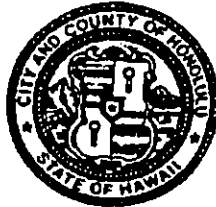
Wallace A. Heyer

Koko Head Shooting Complex Planning Committee

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
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JEREMY HARRIS
MAYOR



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DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Wallace A. Heyer
K-Bay Rod and Gun Club
181 Aikahi Loop
Kailua, Hawaii 96734

Dear Mr. Heyer:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your May 7, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

1. Archery - An archery range is planned as part of the improvements to the Shooting Range. Your comments will be considered during the design phase of the project.
2. Sporting Clays - Thank you for the information regarding Sporting Clays. Improvements to the Shooting Complex will be limited to safety improvements and the development of the archery range. As a result, the Draft EIS will not include a feasibility study regarding incorporating a Sporting Clay facility in the Koko Head Shooting Complex.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

for RAE M. LOUI, P.E.
Director

RML:gt



THE OUTDOOR CIRCLE
 1314 South King St., Suite 306 • Honolulu, HI 96814
 Phone: 808-593-0300 Fax: 808-593-0525

RECEIVED
 MAY 07 2001
 GROUP 70

May 4, 2001

Established 1912
 A Non-profit Organization

BRANCHES

O'AHU

Kane'ohe
 Lani-Kailua
 North Shore
 Wai'anae Kahala

HAWAII

Hilo
 Ka'u
 Kona
 Waikoloa Village
 Waimea

KAUAI

MAUI

GARDEN CIRCLE

Lani-Kailua

Mr. Jeff Overton
 Group 70 International, Inc.
 925 Bethal Street, 5th floor
 Honolulu, HI 96813

RE: Kokohead District Park & Shooting Complex, Environmental Impact Statement Notice of Preparation (EISPN)

Dear Mr. Overton:

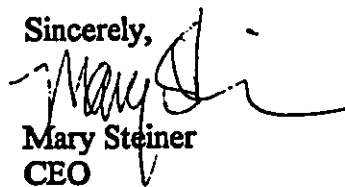
Thank you for including The Outdoor Circle as a consulted party in the early consultation for the above referenced project. We have reviewed the document and would like to see the following included in the Draft Environmental Impact Statement (DEIS):

- In the discussion regarding infrastructure and utilities we expect trees within the urban forest to be discussed and details as to species, quantities and their condition discussed.
- According to the Introduction, the Department of Planning and Permitting is the accepting authority of the Final EIS, however page 3-2 says acceptance will be made by the Department of Design and Construction. Please clarify this in the DEIS.

We feel it is premature and perhaps inappropriate to claim that there are no adverse environmental impacts, that this project will benefit the environment. Until the actual study has been completed this is impossible to know.

Please include The Outdoor Circle on the list of organizations to receive the DEIS. Thank you.

Sincerely,



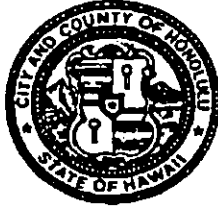
Mary Steiner
 CEO

cc: Stanford Kuroda, Department of Design and Construction
 OEQC

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Ms. Mary Steiner, CEO
The Outdoor Circle
1314 South King Street, Suite 306
Honolulu, Hawaii 96814

Dear Ms. Steiner:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your May 4, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Urban Forest The Draft EIS will include a thorough examination of trees at the District Park and Shooting Complex including details as to species, conditions, and quantities. Due to the dry micro-climate setting at Koko Head District Park, the majority of existing trees are kiawe. In addition, there will be new landscaping added in the park improvement, following the xeriscape approach to planting to minimize irrigation requirements.
2. Accepting Authority – The Department of Planning and Permitting is the accepting authority for the Final EIS.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in black ink, appearing to read "Rae M. Loui".

RML RAE M. LOUI, P.E.
Director

RML:gt

April 24, 2001

Mr. Stanford Kuroda
City and County of Honolulu
Department of Design and Construction
650 South King Street, 9th Floor
Honolulu, Hawaii 96813

RECEIVED

'01 APR 27 A9:08

Dear Mr. Kuroda:

I do not have any comments pursuant to the Environmental Impact Statement Notice of Preparation (EISNP) being conducted by the City's consultant Group 70 International, Inc. However, I would like to request a copy of the Draft Environmental Impact Statement once it has been completed. It can be mailed to me at the following address:

Mr. Brian Kawano
95-1035 Wekiu Street
Mililani, Hawaii 96789

Thank you for your assistance in this matter.

Sincerely,

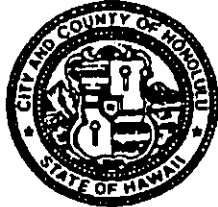

Brian N. Kawano

Post-It® Fax Note	7671	Date	4/27/01	# of pages	1
To	JEFF OVERTON	From	STAN KURODA		
Co./Dept.	GROUP 70 INT.	Co.	DOC/FDE		
Phone #		Phone #	523-4755		
Fax #	523-5874	Fax #			

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Brian Kawano
95-1035 Wekiu Street
Mililani, Hawaii 96789

Dear Mr. Kawano

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 24, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We acknowledge your statement that you do not have any comments at this time.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Sincerely,

A handwritten signature in cursive script, appearing to read "Eric G. Crispin".

For RAE M. LOUI, P.E.
Director

RML:gt

April 24, 2001

Jeff Overton
Chief Environmental Planner
Group 70
925 Bethel Street
Honolulu, HI 96813-4307

RE: KOKO HEAD PARK EIS: RELOCATION OF KOKO HEAD PISTOL RANGE

Dear Mr. Overton:

The continued location of Koko Head Pistol Range in Hawaii Kai, with its inherent noise and safety issues, is an abuse by the City & County of Honolulu of the good will and trust of the community.

The daily and constant sound of gunfire across the breadth of Hawaii Kai to Mariner's Ridge and Hahaione Valley is noise pollution in the extreme. The pop, crackle and bang of gunfire, including the staccato of submachine guns, is heard all day from 6:30 a.m. until as late as 9 p.m. at night. It makes living in Hawaii Kai feel more like Beirut than Hawaii.

The sound of gunfire is totally at odds with the peaceful nature of this suburban residential community and quite out of context with the anticipated serenity of our Hawaiian lifestyle. It is a blight on the joys of hiking Koko Crater, during which hikers are exposed to the sound of gunfire and stray bullets.

We also believe that this constant banging of gunshots sends an unwelcome message to our children, especially those nearby at Kaiser High School. The constant staccato of gunfire is completely out of context with the peaceful and restful nature of Koko Head District Park where parents and their children are being encouraged to relax and play.

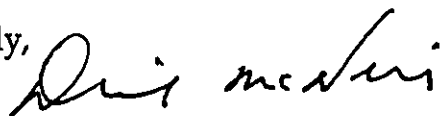
The relocation of the range has been an item of discussion dating back to the Fasi administration. It has been long promised, and it is time for the City to take action.

There are three potential solutions:

1. Relocation of the range, or have users share an existing military range.
1. Enclose the entire range in a building.
2. Construct effective sound baffles.

We urge the City to respond with swift action to this issue.

Sincerely,



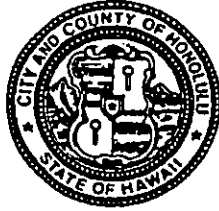
David McNeil
912 Kaahue Street, Honolulu, HI 96825 (539-3413)

c: Stanford Kuroda

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4584 • Fax: (808) 523-4567
Web site: www.co.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
ACTING DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 27, 2001

Mr. David McNeil
912 Kaahue Street
Honolulu, HI 96825

Dear Mr. McNeil:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 24, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We acknowledge your comments and recommendations for the Koko Head Shooting Complex. The installation of baffles is an anticipated future safety improvement. A noise impact study was prepared by Y. Ebisu and Associates (June 2001) for the Draft EIS. Their study indicated that noise from the shooting complex is expected to continue at current levels.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Sincerely,

A handwritten signature in cursive script, appearing to read "Eric G. Crispin".
Rae Loui, P.E.
Director

cc: Mr. Stanford Kuroda
Department of Design and Construction, City and County of Honolulu

Mr. Don Griffin
Department of Design and Construction, City and County of Honolulu

Beverly J. Palenapa
7256 Kauhako Street
Honolulu, HI 96825
Phone/Fax: 395-1188
E-Mail: pale55@aol.com

RECEIVED
MAR 21 2001
GROUP 70

March 19, 2001

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96814-4307

Attention: Jeff Overton

Subject: Koko Head District Park and Shooting Complex
Environmental Impact Statement Notice of Preparation

Dear Mr. Overton:

Thank you for your letter of March 13, 2001.

My husband and I would like to be a consulted party in the preparation of the Draft Environmental Impact Statement (DEIS).

Thank you.

Sincerely,

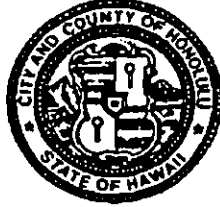

Beverly J. Palenapa

cc: City and County of Honolulu
Department of Design and Construction
650 South King Street, 9th Floor
Honolulu, Hawaii 96813
Attn: Stanford Kuroda

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Ms. Beverly J. Palenapa
7256 Kauhako Street
Honolulu, Hawaii 96825

Dear Ms. Palenapa:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your March 19, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

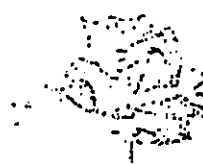
Your letter and this response letter will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Rae M. Loui".

RAE M. LOUI, P.E.
Director

RML:gt



Things to do.

APRIL 9, 2001

GENTLEMEN:

I WOULD LIKE TO SEE
INCORPORATED IN THE
19 ACRES THAT HAD BEEN
USED BY THE JOB CORPS
ADDITIONAL TENNIS
COURTS WITH LIGHTS -
SOME WITH KRAMER
TYPE SURFACES .

ADDITIONAL PICNIC
AREAS WITH RESTROOM
FACILITIES

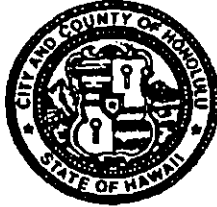
A 50 METER POOL WITH
A PORTION SUITABLE FOR
AQUATIC AEROBICS FOR SENIORS

THANK YOU - TED SOONG
Remember the young people with cystic fibro:

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
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Web site: www.cc.honolulu.hi

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. Theodore Soong
7250 Naohe Street
Honolulu, Hawaii 96825

Dear Mr. Soong:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 9, 2001 letter regarding your review of the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

1. Recreational Facilities - Two new tennis courts, picnic areas, restroom facilities, and a 50-meter swimming pool are among the planned improvements for the district park.

Your letter and this response letter will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in black ink, appearing to read "Rae M. Loui", is written over a horizontal line.

for RAE M. LOUI, P.E.
Director

RML:gt

David & Kelly Washino
727 Kealahou Street
Honolulu, Hawaii 96825

RECEIVED

APR 23 2001

GROUP 70

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307
Attn: Jeff Overton

April 20, 2001

Dear Jeff,

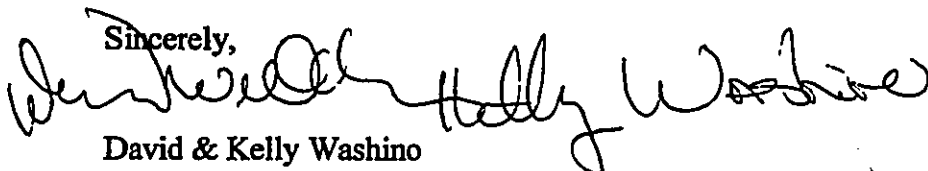
Thank you for your letter regarding notification of the Draft Environmental Statement for the Koko Head District Park and Shooting Complex. We have attended the planning charrettes for Koko Head District Park and shooting range and would very much like the opportunity to comment on the Draft Environmental Impact Statement.

We are very interested in meeting the needs of the children and the community. We especially see the need for a teen center in the Hawaii Kai area as well as a safe super playground that stimulates the children's imagination and gives them a variety of choices and activities within the super playground that is appropriate for both toddler and school age children.

We also want to make sure that the older children have activities appropriate for them such as a skate park and skate rink. A pool is also a strong desire for this community for swimming lessons.

Thank you very much for allowing us to comment.

Sincerely,



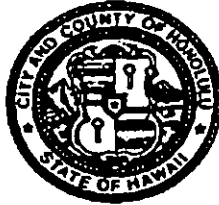
David & Kelly Washino

cc: City and County of Honolulu
Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

July 25, 2001

Mr. and Mrs. David Washino
727 Kealahou Street
Honolulu, Hawaii 96825

Dear Mr. and Mrs. Washino:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements
EIS Preparation Notice

Thank you for your April 20, 2001 letter regarding the Environmental Impact Statement Notice of Preparation (EISPN) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. New facilities - A teen center, super playground, in-line hockey skating rink, skate park, and swimming pool are among the new facilities planned for the District Park.

Your letter and this response will be included in the Draft Environmental Impact Statement (EIS). We will forward a copy of the Draft EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

A handwritten signature in black ink, appearing to read "Eric G. Crispin".

for RAE M. LOUI, P.E.
Director

RML:gt

COMMENT AND RESPONSE LETTERS

Draft Environmental Impact Statement



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

August 27, 2001

RECEIVED
AUG 28 2001

Civil Works Technical Branch

GROUP 70

Mr. Jeff Overton
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Koko Head District Park and Shooting Complex, Honolulu, Oahu (TMKs 3-9-12: 1, 10; and, 3-9-12: 1). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, a DA permit will not be required for the project at this time.

b. The flood hazard information provided on page 4-12 of the DEIS is correct.

A copy of this letter has also been furnished to Mr. Randall Fujiki of City and County of Honolulu, Department of Planning and Permitting, 650 South King Street, Honolulu, Hawaii 96853. Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

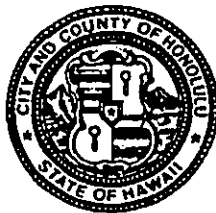
James Pennaz

James Pennaz, P.E.
Chief, Civil Works
Technical Branch

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. James Pennaz, P.E., Chief
Civil Works Technical Branch
U.S. Army Engineer District, Honolulu
Department of the Army
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Pennaz:


Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your August 27, 2001 letter regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

We acknowledge your statement that a DA permit will not be required for the project at this time. We also acknowledge your statement that the flood hazard information provided in the Draft EIS is correct.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


for RAE M. LOUI, P.E.
Director



BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

WAYNE H. KIMURA
COMPTROLLER
MARY ALICE EVANS
DEPUTY COMPTROLLER

(P)1544.1

RECEIVED

AUG 23 2001

GROUP 70

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

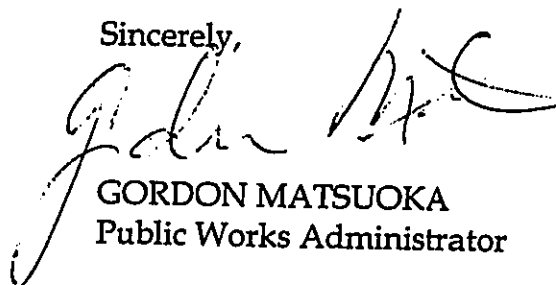
Dear Mr. Overton:

Subject: Koko Head District Park and Shooting Complex
Draft Environmental Impact Statement

Thank you for the opportunity to review the subject project's Draft Environmental Impact Statement. This project does not impact any Department of Accounting and General Services projects or existing facilities. Therefore, we have no comment to offer.

Should you have any questions, please have your staff call Mr. Bruce Bennett of the Planning Branch at 586-0491.

Sincerely,



GORDON MATSUOKA
Public Works Administrator

BB:mo

c: Mr. Stanford Kuroda, Dept. of Design & Construction
Mr. Randall Fujiki, Dept. of Planning & Permitting
Ms. Genevieve Salmonson, OEQC



December 17, 2001

Francis S. Oda, Arch. D., AIA, AICP
Norman GY. Hong, AIA
Sheryl B. Seaman, AIA, ASID
Hitoshi Hida, AIA
Roy H. Nihei, AIA, CSI
James I. Nishimoto, AIA
Ralph E. Portmore, AICP
Stephen H. Yuen, AIA
Linda C. Miki, AIA

Mr. Gordon Matsuoka, Public Works Administrator
State of Hawaii
Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810

George I. Atta, AICP
Paul P. Chorney, AIA
Wendy Lee Cook, AIA, CDT
Philip T. Cuccia
Sutobin Halim
Jeremy C. Hsu, AIA
Roy A. Inouye, AIA, CSI
Stuart M. Jow, AIA
Charles Y. Kaneshiro, AIA
Dean H. Kitamura
Frank B. McCue
Kyle K. Nakamoto
Kathryn A. Nam
Jeffrey H. Overton, AICP
Christine M. Ruotola, AICP
Norma J. Scott
Scott Tangonan
Sharon Ching Williams, AIA

Dear Mr. Matsuoka:

Subject: Koko Head District Park and Shooting Complex
Draft Environmental Impact Statement

Thank you for your letters received March 22, 2001, April 26, 2001 and August 23, 2001 regarding your review of the Environmental Impact Statement for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

Your letter and this response will be included in the Environmental Impact Statement (EIS). We appreciate your input for the environmental review process.

Sincerely,

for Jeff Overton, AICP
Chief Environmental Planner

BENJAMIN J. CAYETANO
GOVERNOR



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

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

September 21, 2001

RECEIVED
SEP 24 2001

GROUP 70

Ms. Rae M. Loui, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Dear Ms. Loui:

Subject: : Draft Environmental Impact Statement for the Koko Head District Master Plan and Koko Head Shooting Complex Safety Improvements, O'ahu

Thank you for the opportunity to review the subject document. We have the following comments.

1. Laboratory results indicate that high levels (above the regulatory guidelines) of lead and arsenic are present in the soils at the Koko Head Firing Range. The results also indicate that the lead is leachable. Please consult with the Department of Health regarding this issue. The EIS should include sections on hazardous waste and groundwater quality to fully analyze this matter.
2. Please consider applying sustainable building techniques as presented in the enclosed "Guidelines for Sustainable Building Design in Hawaii." In the EIS include a description of any of the techniques you will implement.
3. What are the impacts of this project on traditional and customary gathering rights of native Hawaiians.
4. This project should comply with sections 103D-407 and 408 of Hawaii Revised Statutes concerning the use of indigenous plants and recycled glass.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

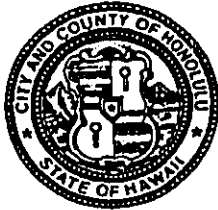
A handwritten signature in cursive script that reads "Genevieve Salmonson".
Genevieve Salmonson
Director

c: Group 70

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 21, 2001 letter regarding the Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Lead and Arsenic in Soils - The Department of Health has been consulted regarding high levels of lead and arsenic at the Shooting Complex. The Department of Health stated that the soils on the site could remain in place and they would not require remedial actions. Any grading work would have to be performed in compliance with OSHA guidelines for training and exposure monitoring.

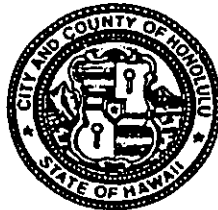
The site is located outside of the Underground Injection Control line (UIC) meaning that water below this area is not a probable drinking water source.

The Department of Health has indicated that nothing further be done on the site pertaining to the contamination. The soil must not leave the site. If it does, it may be considered hazardous waste.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 21, 2001 letter regarding the Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Lead and Arsenic in Soils - The Department of Health has been consulted regarding high levels of lead and arsenic at the Shooting Complex. The Department of Health stated that the soils on the site could remain in place and they would not require remedial actions. Any grading work would have to be performed in compliance with OSHA guidelines for training and exposure monitoring.

The site is located outside of the Underground Injection Control line (UIC) meaning that water below this area is not a probable drinking water source.

The Department of Health has indicated that nothing further be done on the site pertaining to the contamination. The soil must not leave the site. If it does, it may be considered hazardous waste.


Ms. Genevieve Salmonson, Director
December 10, 2001
Page 2

The EIS has been amended to include sections on hazardous waste and groundwater quality.

2. Sustainable Building Techniques - Sustainable building techniques will be considered during the design phase of the project. Natural ventilation will be used in the teen center. The District Park and Shooting Complex will be landscaped for dust control and to minimize heat gain to the area. Alternative energy systems such as solar water heating will also be considered.
3. Traditional and Customary Gathering Rights - The proposed improvements will have no effect on known traditional and customary gathering rights of native Hawaiians. Cultural assessments for the Koko Head Regional area have been conducted for the proposed improvements as well as for the improvements to the Hanauma Bay Nature Preserve. Complete reports are available in the appendices of each respective EIS report.
4. Sections 103D-407 and 408 of Hawaii Revised Statutes - The projects will comply with these sections concerning the use of indigenous plants and recycled glass where practical.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


for RAE M. LOUI, P.E.
Director

cc: Randall Fujiki, Director DPP

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
JANET E. KAWELO
LINNELL NISHIOKA

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SEP 13 2001
GROUP 70

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhikawa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

September 6, 2001

Mr. Jeff Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-43007

LOG NO: 28087 ✓
DOC NO: 0108EJ26

Dear Mr. Overton:

SUBJECT: Chapter 6E-8 Historic Preservation Review- Draft Environmental Impact Statement (DEIS) Koko Head District Park and Shooting Complex Maunaloa, Kona, O`ahu, TMK: 3-9-012:010

Thank you for the opportunity to comment on the DEIS for the Koko Head District Park and Shooting Complex expansion. We previously commented on the Development Plan Public Facilities Map Amendment (SHPD Log 20212) and in March 2001 on the EISPN (SHPD Log27167) for this project. Our recent comments are included in full in Section 11.0 of the DEIS. In brief, we believe that the project as proposed in the DEIS will have "no effect" on significant archaeological sites. Also, since the two identified historic structures will be retained, we believe that this project will have "no effect" on significant historic sites.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027. For any questions regarding architecture, please call Carol Ogata at 692-8032.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

EJ:jk

- c. Stanford Kuroda, C&C of Honolulu Department of Design and Construction, 650 S. King Street, 9th Floor, Honolulu, HI 96813
- Randall Fujiki, C&C of Honolulu Department of Planning and Permitting, 650 S. King Street, Honolulu, HI 96813
- Genevieve Salmonson, OEQC, 235 S. Beretania Street, Suite 702, Honolulu, HI 96813

DDC

Fax: 5234767

Sep - 5 2001 8:07 P.03

BENJAMIN J. DAYWANG
GOVERNOR OF HAWAII



ROBERT S. DONOGA-ABALAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
JANET E. LAWELO
LINA K. NISHIOKA

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhewa Building, Room 555
801 Kamehameha Boulevard
Honolulu, Hawaii 96807

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

August 2, 2001

Ms. Rae Loui, Director
Department of Design and Construction
City and County of Honolulu
650 South King St.
Honolulu, Hawaii 96813

LOG NO: 27969
DOC NO: 0107co15
Architecture

Dear Ms. Loui:

**SUBJECT: Selective Retention of Portions of Quonset Hut
Koko Head Regional Park
TMK**

We met recently with Tony Robinson who requested that we write to you regarding retention of the quonset hut for the Koko Head Regional Park. We believe that the quonset hut contributes to the historic character of the tramway and that retention should be considered. We would concur with the selective demolition of the following portions of the structure.

We concur with demolition of the theater wing, the wing at the mauka side of the structure (back) and removal of the interior partitions, ceiling, light fixtures. Also, removal of the front and rear end walls, window frames that remain, and eyebrows if desired. Essentially we would like to see the shell of the quonset hut retained, including the frame and roofing. We do not concur with the demolition of the frame and roofing. All demolition shall be done in a manner which does not compromise the structural integrity of the quonset.

Thank you for the opportunity to comment. Should you or your staff have any questions, please have your staff contact Carol Ogata at 692-8032.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

c. Tony Robinson, fax 973-7274

CO:smk



December 10, 2001

Francis S. Oda, Arch. D., AIA, AICP
Norman GY Hong, AIA
Sheryl B. Scaman, AIA, ASID
Hitoshi Hida, AIA
Roy H. Nihei, AIA, CSI
James I. Nishimoto, AIA
Raoni E. Portmore, AICP
Stephen H. Yuen, AIA
Linda C. Miki, AIA

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

George I. Atta, AICP
Paul P. Charney, AIA
Wendy Lee Cook, AIA, CDT
Philo T. Cuccia
Sutabin Halim
Jeremy C. Hsu, AIA
Roy A. Inouye, AIA, CSI
Stuart M. Jow, AIA
Charles Y. Kaneshiro, AIA
Dean H. Kitamura
Frank B. McCue
Kyle K. Nakamoto
Kathryn A. Nam
Jeffrey H. Overton, AICP
Christine M. Ruotola, AICP
Norma J. Scott
Scott Tangonan
Sharon Ching Williams, AIA

Dear Mr. Hibbard:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 6, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We acknowledge your comments that the project will have no effect on significant archeological sites or on significant historic sites. We also reference your letter of August 2, 2001 regarding the treatment of the quonset hut.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Jeff Overton, AICP
Chief Environmental Planner

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET E. KAWELO
DEPUTY

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

August 9, 2001

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

Mr. Jeffrey H. Overtone
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overtone:

Subject: Koko Head District Park and Shooting Complex Draft Environmental
Impact Statement

We appreciate your efforts to include us in your review of the subject matter above. The Department of Land and Natural Resources, Division of Forestry and Wildlife supports the discussions and recommendations made by Ms. Winona P. Char in her botanical review of the planned Koko Head Regional Park and Nature Preserve. Her observations and recommendations would be similar to the comments that we would provide in reviewing this document. We recommend that these comments be included in the final Environmental Impact Statement.

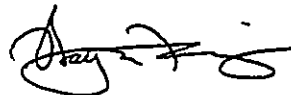
The improvements to Koko Head District Park will attract many visitors to the area seeking recreational enjoyment and educational opportunities. Sadly, this will also cause great harm to the natural resources, if not managed properly. We agree with Ms. Char's recommendation that the city complete a fire plan to address the fire issue that is a real threat to endangered species present in the area. In addition, this plan could be incorporated into a much larger and more detailed natural resources management plan as recommended by Ms. Char. Besides protecting the endangered species in the area, there is a real concern about the spread of invasive plant species that has already colonized there. For example, seven incipient species of cactus have been established that never before was seen

Koko Head District Park
Page 2

in the area. The Oahu Invasive Species Committee has established a priority list for controlling invasive species on Oahu. Dr. Colleen Cory, of The Nature Conservancy of Hawaii, chairs the committee and she can be reached at (808) 537-4508. We recommend that she be consulted with to address the invasive species management concerns for this area. The consultation should be included in the final Environmental Impact Statement.

We appreciate the opportunity to comment on the Koko Head District Park and Shooting Complex by the City and County of Honolulu. Please call Pat Costales, Oahu Branch Manager at 973-9787 if you have questions.

Sincerely yours,



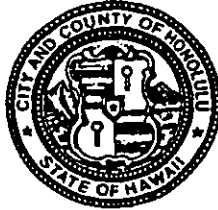
Michael G. Buck
Michael G. Buck
Administrator

C: Pat Costales, DOFAW Oahu Branch Manager
Nick Vaccaro, DLNR Land Division

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Michael G. Buck
Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Buck:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your August 9, 2001 letter regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.


We have prepared the following responses to your comments:

1. **Fire Plan:** A fire plan will be a recommended mitigation measure to address the threat to endangered species present in the area.
2. **Invasive Plant Species:** Dr. Colleen Cory of the Nature Conservancy of Hawaii has been consulted and her recommendations will be included in the Final EIS.

Mr. Michael G. Buck
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


RAE M. LOUI, P.E.
Director

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



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

GILBERT S. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET T. KAWELO
DEPUTY DIRECTOR

LINNEL T. NISHIOKA
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
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AUG 17 2001

GROUP 70

August 15, 2001

Mr. Jeffrey Overton, AICP
Group 70 International, Inc.
925 Bethel St., Fifth Floor
Honolulu, Hawaii 96813-4307

File No.: 00-85

Dear Mr. Overton:

We appreciate the opportunity to provide comments on the draft Environmental Impact Statement (EIS) for the proposed expansion of recreational facilities at Koko Head District Park and safety improvements to the Shooting Complex.

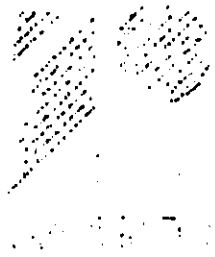
The State recently acquired the Ka Iwi scenic shoreline near Makapuu Point placing this entire coastline under public ownership. Although the area is outside the scope of this study, the State recognizes the need to address the interface and relationship between Ka Iwi and the adjacent areas managed by the City and County of Honolulu.

If you have questions, or would like more information, please feel free to contact Lauren Tanaka of our Park Planning Branch at 587-0293.

Very truly yours,

Handwritten signature of Daniel S. Quinn in cursive.

Daniel S. Quinn
State Parks Administrator



December 10, 2001

Mr. Daniel S. Quinn, Administrator
Division of State Parks
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

Francis S. Oda Arch. D., AIA A-2
Norman GY Hong A-4
Sheryl B. Seaman A-4, ASID
Hitoshi Hida, AIA
Roy H. Niha, AIA CE
James I. Nishimoto A-4
Ralph E. Portmore A-CP
Stephen H. Venti A-4
Linda C. Maki, AIA

George I. Atta, AICP
Paul P. Charney, A-4
Wendy Lee Cook, A-4, CDT
Philip T. Cuccia
Sutobin Halim
Jeremy C. Hsu, A-4
Rev. A. Inouye, A-4, CSI
Stuart M. Jow, AIA
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Dean H. Kitamura
Frank B. McCue
Kyle K. Nakamoto
Kathryn A. Nam
Jeffrey H. Overton, AICP
Christine M. Ruoto, AICP
Norma J. Scott
Scott Tangonan
Sharon Ching Williams, AIA

Dear Mr. Quinn:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter dated August 15, 2001 regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

The proposed improvements at Koko Head District Park and Shooting Complex will enhance the new Ka Iwi State Park by maintaining and improving its existing recreational activities.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Jeff Overton, AICP
Chief Environmental Planner

cc: Mr. Stanford Kuroda
Department of Design and Construction, City and County of Honolulu

Mr. Don Griffin
Department of Design and Construction, City and County of Honolulu

BENJAMIN J. GAYETANO
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

IN REPLY REFER TO:
STP 8.0029

September 18, 2001

RECEIVED
SEP 24 2001
GROUP 70

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
GROUP 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:


Subject: Koko Head District Park and Shooting Complex
Draft Environmental Impact Statement (DEIS)

Thank you for your transmittal requesting our review of the subject project.

The proposed project would affect the Kalaniana'ole Highway corridor. The document has therefore been forwarded to our Highways Division, who will be providing comment under separate cover.

We appreciate the opportunity to provide comments.

Very truly yours,


BRIAN K. MINAAI
Director of Transportation

c: Mr. Stanford Kuroda, C&C Honolulu, Department of Design and Construction
Mr. Randall Fujiki, C&C Honolulu, Department of Planning and Permitting
Ms. Genevieve Salmonson, Office of Environmental Quality Control

BENJAMIN J. CAYETANO
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRIAN K. MINAII
DIRECTOR
DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

IN REPLY REFER TO:
HWY-PS
2.4345

OCT 2 2001

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Attn: Jeff Overton

Gentlemen:

Subject: Draft Environmental Impact Statement (DEIS) for Koko Head District Park
Master Plan and Koko Head Shooting Complex Safety Improvements

Thank you for the opportunity to review the DEIS. We have the following comments:

1. Proposed City improvements mauka of Kalaniana'ole Highway will not adversely affect State highway facilities or affect our planning to address the risk of falling rocks on the Makapuu Beach Park portion of Kalaniana'ole Highway.
2. We support the Draft EIS' proposal to close the former Koko Head Job Corps access road except for emergency use.
3. We also recommend that the City:
 - construct left and right-turn lanes for access to the Hanauma Bay entrance road.
 - continue existing measures to prevent cars stacking on Kalaniana'ole Highway when the Hanauma Bay parking lot is full.
 - implement additional operational measures to discourage illegal U-turns on Kalaniana'ole Highway when the Hanauma Bay parking lot is full.

Group 70 International
Page 2

HWY-PS 2.4345

If you have any questions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,



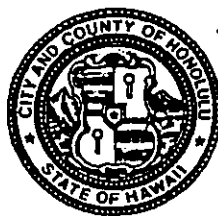
BRIAN K. MINAI
Director of Transportation

- c: State Office of Environmental Quality Control
City Department of Design and Construction
City Department of Planning and Permitting

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Brian K. Minaai, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Minaai:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 18, 2001 and October 2, 2001 letters regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

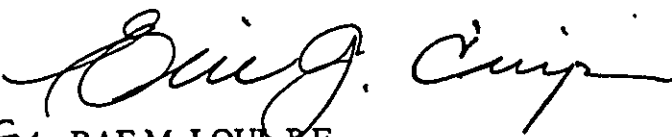
We acknowledge your comment that the proposed City improvements mauka of Kalanianaʻōle Highway will not adversely affect State highway facilities. We also acknowledge your support of the closure of Koko Head Park Road except for emergency purposes.

The City addressed previous DOT comments regarding the Improvements to Hanauma Bay Nature Preserve Draft EIS. No improvements are currently planned to address the existing traffic queues on Kalanianaʻōle Highway that result from the occasional closing of Hanauma Bay Nature Preserve parking lot when it is full.

Mr. Brian K. Minaai, Director
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


For RAE M. LOUI, P.E.
Director

PHONE (808) 594-1888

FAX (808) 594-1885



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

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AUG 15 2001

GROUP 70

August 9, 2001

Mr. Jeffrey H. Overton, AICP
Chief Environmental Officer
Group 70 International
925 Bethel Street – Fifth Floor
Honolulu, HI 96813-4307

Subject: Koko Head District Park Master Plan and Koko Head Shooting Complex
Safety Improvements – DEIS

Dear Mr. Overton:

Thank you for the opportunity to comment on the above referenced DEIS which will expand the District Park recreational facilities, and will install safety improvements at the Shooting Complex.

In the Cultural, Historic and Archaeological Resources section (page 6-3) please amend the language concerning the discovery of any cultural or archaeological deposits to indicate that both the State Historic Preservation Division and the Oahu Island Burial Council will be contacted.

If you have any questions, please contact Jerry B. Norris at 594-1847.

Sincerely,

A handwritten signature in black ink that reads "Colin C. Kippen, Jr." with a stylized flourish at the end.

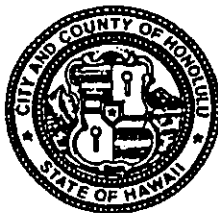
Colin C. Kippen, Jr.
Deputy Administrator
Hawaiian Rights Division

cc: OHA Board of Trustees
Clyde W. Namu'o, OHA Administrator
Randall Fujiki, Department of Planning and Permitting
Stanford Kuroda, Department of Design and Construction
Genevieve Salmonson, OEQC

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Colin C. Kippen
Deputy Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Kippen:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS


Thank you for your August 9, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following response to your comments:

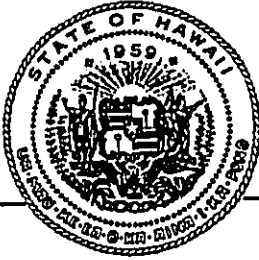
The Cultural, Historic, and Archeological Resources section of the Final EIS will be amended to indicate that both the State Historic Preservation Division and the Oahu Island Burial Council will be contacted in the event of the discovery of any cultural or archeological deposits.

Mr. Colin C. Kippen
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


for RAE M. LOUI, P.E.
Director



DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

RECEIVED

BENJAMIN J. CAYETANO
Governor
SEIJI F. NAYA
Director
SHARON S. NARIMATSU
Deputy Director
DAVID W. BLANE
Director, Office of Planning

Energy, Resources & Technology Division
235 South Beretania Street, Leiopapa A Kamehameha Bldg., 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, HI 96804-2359
Web site: www.hawaii.gov/dbedt/ert

GROUP 70

Telephone: (808) 587-3807
FAX: (808) 587-3820

August 30, 2001

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307
Attn: Jeff Overton

Dear Mr. Overton:

Subject: Draft Environmental Impact Statement—Koko Head District Park and Shooting Complex

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement (DEIS) for the Koko Head District Park and Shooting Complex. We would like to call your attention to: (1) State energy conservation goals, (2) energy saving design practices and technologies, and (3) recycling and recycled-content products.

1. **State energy conservation goals.** Project buildings, activities, and site grounds should be designed with energy saving considerations. The mandate for such consideration is found in Chapter 344, HRS ("State Environmental Policy") and Chapter 226 ("Hawaii State Planning Act"). In particular, we would like to call to your attention HRS 226 18(c)(4) which includes a State objective of promoting all cost-effective energy conservation through adoption of energy-efficient practices and technologies. We note that you have briefly mentioned these State objectives in Chapter 7 of your narrative.

We recommend that you consult the City & County of Honolulu Energy Code early on in your project. Hawaiian Electric Co., Inc., (HECO) may also have demand-side management programs that offer rebates and/or incentives for installation of energy efficient technologies.

2. **Energy saving design practices and technologies.** We recommend that energy efficient design practices and technologies be specifically addressed. Some of the methods and technologies that could be considered, as appropriate, include:

- Use of natural ventilation to increase comfort of occupants;

Mr. Jeff Overton
Page 2
August 30, 2001

- Maximum use of natural lighting without heat gain, including skylights with multiple diffusing lenses to trap heat and diffuse light;
 - Use of high efficiency compact fluorescent lighting;
 - Use of metal halide lighting for baseball fields;
 - Use of insulation/radiant barrier for an equivalent R-19 value in ceiling; use of ceiling fans;
 - Use of photovoltaics for parking lot lighting;
 - Use of light color or "green" roofs;
 - Use of landscaping for dust control and to minimize heat gain to area;
 - Use of solar water heating; and
 - Use of photovoltaics, fuel cells and other renewable energy sources.
3. **Recycling and recycled-content products.**
- Develop a job-site recycling plan for construction and recycle as much construction and demolition waste as possible;
 - Incorporate provisions for recycling into the project – a collection system and space for bins for recyclables; and
 - Specify and use products with recycled content such as: steel, concrete aggregate fill, drywall, carpet and glass tile.

Please refer to the enclosed *Guidelines for Sustainable Building Design In Hawaii: A planner's checklist* and *A Contractor's Waste Management Guide* for additional information.

Sincerely,



Maurice H. Kaya
Energy, Resources, and Technology
Program Administrator

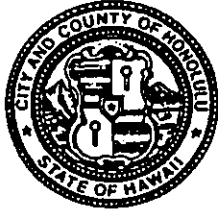
Enclosures

c: OEQC (Genevieve Salmonson)
Stanford Kuroda
Randall Fujiki

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.co.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Maurice H. Kaya
Program Administrator
Energy, Resources and Technology Division
Department of Business, Economic Development & Tourism
State of Hawaii
PO Box 2359
Honolulu, Hawaii 9604-2359

Dear Mr. Kaya:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your August 9, 2001 letter regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

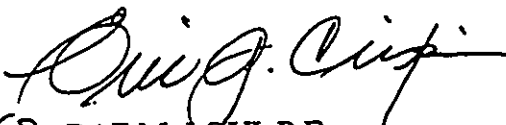
1. State Energy Conservation Goals: Project buildings, activities, and site grounds will be designed with energy saving considerations where practical. The City and County of Honolulu Energy Code will be consulted as well as HECO.
2. Energy Saving Design Practices and Technologies: Energy saving design practices and technologies will be considered during the design phase of the project. Natural ventilation will be used to in the teen center. The District Park and Shooting Complex will be landscaped for dust control and to minimize heat gain to the area. Alternative energy systems such as solar water heating will also be considered where practical.

Mr. Maurice Kaya
December 10, 2001
Page 2

3. Recycling and recycled-content products: The information you provided regarding recycling and recycled-content products will be made available to the designers of the facilities.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


RAE M. LOUI, P.E.
Director

cc: Mr. Stanford Kuroda
Department of Design and Construction, City and County of Honolulu

Mr. Don Griffin
Department of Design and Construction, City and County of Honolulu

BENJAMIN J. CAVETANO
GOVERNOR
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

August 13, 2001

RECEIVED
AUG 15 2001
GROUP 70

Mr. Jeffrey H. Overton
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Draft Environmental Impact Statement (DEIS) for
Koko Head District Park and Shooting Complex, Oahu

Thank you for the opportunity to review the subject application.
The Department of Hawaiian Home Lands has no comment to offer.

If you have any questions, please call Mr. Daniel Ornellas at
586-3836.

Aloha,

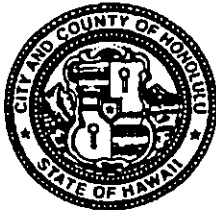
Raynard C. Soon
Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: Office of Environmental Quality Control
Department of Planning and Permitting
Department of Design and Construction

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Raynard C. Soon, Chairman
Hawaiian Homes Commission
Department of Hawaiian Homelands
State of Hawaii
PO Box 1879
Honolulu, Hawaii 96805

Dear Mr. Soon:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter dated August 13, 2001 regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects.

We acknowledge your response that you have no comments to offer at this time.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


For RAE M. LOUI, P.E.
Director

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

RECEIVED
SEP 24 2001



RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2001/CLOG-3241 (ST)
2001/ED-15

GROUP 70

September 21, 2001

Jeffery H. Overton, AICP
Group 70 International
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Draft Environmental Impact Statement (DEIS)
Koko Head District Park Master Plan and Koko Head Shooting
Complex Improvements, East Honolulu, Oahu
Tax Map Key: 3-9-12: Portions of 1, and 10

We have reviewed the Draft EIS for the above-referenced project
and provide the following comments:

Section 3.0 PROJECT DESCRIPTION

It is difficult to distinguish the different improvements
illustrated on the Conceptual Site Plan (Figure 3-2). The Final
EIS should include a color copy of this exhibit which would be
more effective.

There are no detailed conceptual plans or elevation drawings to
show what the proposed improvements to the District Park may look
like. The preliminary design, size, height, and configuration of
proposed improvements such as the Teen Center, 50-meter swimming
pool, Skate/In-line Hockey Rink, Super Playground and additional
comfort stations should be provided in the Final EIS.

Jeffery H. Overton, AICP
Page 2
September 21, 2001

6.1.1 Topography, Soils and Drainage

Although Appendix C: Geotechnical Investigation, describes the earthwork planned for the proposed Shooting Complex Improvements, no such investigation has been done for the numerous, more expensive improvements proposed for the Regional Park. The Final EIS should provide estimates of the amount of grading which is anticipated for the Regional Park improvements, or clarify what is considered "minor" grading and explain how that assessment was made.

Should you have any questions, please contact Steve Tagawa of our staff at 523-4817.

Sincerely yours,

Robert A. Bannister

for RANDALL K. FUJIKI
Director of Planning
and Permitting

RKF:cs

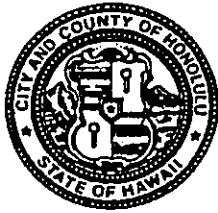
cc: Stanford Kuroda, DDC
OEQC

posse 117122

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Randall K. Fujiki, AIA, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 21, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.


We have prepared the following responses to you comments:

1. District Park Project Description: The Final EIS will include a color copy of the Conceptual Site Plan for the District Park. In addition, conceptual renderings of the teen center, swimming pool, and comfort station will be included in the Final EIS. The Final EIS will also include known information regarding the size, height, and configuration of proposed improvements such as the teen center, 50-meter swimming pool, skate/in-line hockey rink, super playground, and comfort stations.
2. Topography, Soils, and Drainage at the District Park: The Final EIS will provide very preliminary estimates of the amount of anticipated grading for the District Park improvements. The present level of design / construction information developed for the Shooting Complex is more refined than the conceptual-level information available for the District Park improvements.

Mr. Randall K. Fujiki, AIA, Director
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


for RAE M. LOUI, P.E.
Director

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



September 25, 2001

JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice-Chairman
JAN M.L.Y. AMII
HERBERT S.K. KAOPUA, SR.
BARBARA KIM STANTON

BRIAN K. MINAAI, Ex-Officio
ROSS S. SASAMURA, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

RECEIVED

SEP 24 2001

GROUP 70

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Jeff Overton

Gentlemen:


Subject: Your Transmittal of July 27, 2001 of the Draft Environmental Impact Statement for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements, Koko Head, TMK: 3-9-12: 01, 10

Thank you for the opportunity to review the subject document for the proposed improvements to the park and shooting range.

Our previous comments of April 6 and April 30, 2001 have been addressed by the Draft Environmental Impact Statement (DEIS) and your response letter of July 25, 2001. Please note the discrepancies between the existing and proposed water demands indicated on pages 4-24, 6-12 and Appendix L of the DEIS.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,


for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Department of Planning and Permitting
Department of Design and Construction
Office of Environmental Quality Control

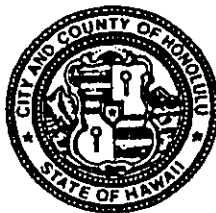
DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813

Phone: (808) 523-4564 • Fax:
Web site: www.cc.honolulu.us

(808) 523-4567

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Jamile:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

The inconsistencies between the existing and proposed water demands will be corrected in the Final EIS.

Your letters and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

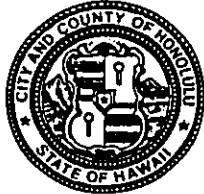
For RAE M. LOUI, P.E.
Director

v

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



RECEIVED

AUG 22 2001

GROUP 70

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

August 14, 2001

Mr. Jeffrey H. Overton, AICP
Chief Environmental Planner
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Subject: Koko Head District Park and Shooting Complex
Draft Environmental Impact Statement

We received your letter dated July 27, 2001, regarding the Draft Environmental Impact Statement for the above-mentioned project.

The Honolulu Fire Department requests that the following be complied with:

1. Provide a private water system where all appurtenances, hydrant spacing, and fire flow requirements meet Board of Water Supply standards.
2. Provide a fire department access road within 150 feet of the first floor of the most remote structure. Such access shall have a minimum vertical clearance of 13 feet 6 inches, be constructed of an all-weather driving surface complying with Department of Transportation Services (DTS) standards, capable of supporting the minimum 60,000 pound weight of our fire apparatus, and with a gradient not to exceed 20%. The unobstructed width of the fire apparatus access road shall meet the requirements of the appropriate county jurisdiction. All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround having a radius complying with DTS standards.

Mr. Jeffrey H. Overton, AICP
Page 2
August 14, 2001

3. Submit civil drawings to the Honolulu Fire Department for review and approval.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,



ATTILIO K. LEONARDI
Fire Chief

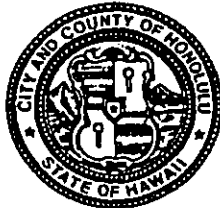
AKL/SK:jo

cc: Randall Fujiki, City and County Honolulu, Department of Planning and Permitting
Stanford Kuroda, City and County Honolulu, Department of Design and Construction
Genevieve Salmonson, State of Hawaii, Office of Environmental Quality Control

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Attilio K. Leonardi, Fire Chief
Honolulu Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869

Dear Mr. Leonardi:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your August 14, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Water System – The water system design will ensure that appurtenances, hydrant spacing, and fire flow requirements meet Board of Water Supply standards.
2. Fire Department Access – Plans and designs will be reviewed for conformance to Fire Department guidelines regarding access roads.
3. Approval of Civil Drawings - Civil drawings will be submitted to the Honolulu Fire Department for review and approval during the design review phase.

Mr. Attilio K. Leonardi, Fire Chief
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



~~For~~ RAE M. LOUI, P.E.
Director

RECEIVED
SEP 18 2001

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

<http://www.honolulu.police.org>

www.co.honolulu.hi.us

GROUP 70

JEREMY HARRIS
MAYOR



LEE D. DONOHUE
CHIEF

MICHAEL CARVALHO
ROBERT AU
DEPUTY CHIEFS

OUR REFERENCE CS-KP

September 13, 2001

Mr. Jeffrey H. Overton
Chief Environmental Planner
Group 70 International, Inc.
925 Bethal Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Overton:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Koko Head District Park and Shooting Complex.

We would like to reiterate that overall, the proposed project should have minimal impact on the facilities and services of the Honolulu Police Department (HPD). We are very pleased that the proposed improvements to the shooting complex will enhance public safety. However, we have the following concerns:

There are statements in the document which indicate that there are no nighttime shooting hours. We are not certain if these statements refer to nighttime shooting for the general public, since it should be noted that the HPD currently conducts night firings four nights a week.

In appendix D, page 2, the Consulting Archaeologist, Jeffery Pantaleo, M.A., states that a "wooden maintenance building for repairing HPD cushion vehicles is located adjacent to the west of the building." A cushion-type vehicle is used by the HPD at this site. However, we would like to state for the record that this vehicle is repaired at the HPD's vehicle maintenance facility located elsewhere.

We would like more details regarding the proposed baffling system and its location within the complex.

The proposed parking area is currently an emergency landing area for helicopters. Will another area be designated for future emergency helicopter landings?

Serving and Protecting with Aloha

Jeffrey H. Overton
Page 2
September 13, 2001

We have also noted that there are no specific references to items such as a classroom facility, an ammunition bunker, or an awning at the combat range as improvements to the shooting complex.

If there are any questions, please call Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

Sincerely,

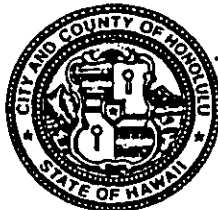
LEE D. DONOHUE
Chief of Police

By 
EUGENE UEMURA
Assistant Chief of Police
Support Services Bureau

cc: DDC
DPP
OEQC

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
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JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Lee D. Donohue
Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Chief Donohue:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 13, 2001 letter regarding your review of the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and the Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments:

1. Impact on Police Department: We acknowledge your statement that the improvements should have minimal impact on the facilities and services of the Police Department.
2. Night shooting Hours: The EIS will reflect that there is night usage of the Shooting Range by the Honolulu Police Department.
3. Cushman Maintenance: The EIS will reflect that that the wooden structure located west of the HPD Range Staff Office is not used for repairing HPD cushman vehicles.
4. Baffling System: Additional information about the baffling system and its location will be available during the design phase of the project.
5. Emergency Helicopter Landing Area: Another area within the Shooting Complex will not be designated for future emergency helicopter landings.

Mr. Lee D. Donohue
December 10, 2001
Page 2

6. Other Shooting Complex Improvements: Further coordination with the Department of Parks and Recreation is needed to confirm the inclusion of these facilities in the currently planned safety improvements.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



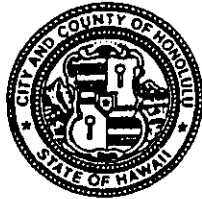
RL RAE M. LOUI, P.E.
Director

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA • 711 KAPIOLANI BOULEVARD, SUITE 1200 • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

RECEIVED
OCT 25 2001



CHERYL D. SOON
DIRECTOR

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

GROUP 70

October 22, 2001

TPD8/01-03434R

MEMORANDUM

TO: RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: CHERYL D. SOON, DIRECTOR

SUBJECT: KOKO HEAD DISTRICT PARK MASTER PLAN AND KOKO HEAD SHOOTING COMPLEX SAFETY IMPROVEMENTS

In response to the July 27, 2001 letter from Group 70 International, Inc., the draft environmental impact statement for the subject project was reviewed. The following comments are the result of this review:

1. The project proposes to close the makai portion of Koko Head Park Road, from Anapalau Street to Kalaniana'ole Highway. The elimination of this access to the park will possibly reduce usage of the bus shelters in that area of Kalaniana'ole Highway.
2. The information presented in Table ES-2, Summary of Trips Generated Total Project, that appears on Page ES-3 of Appendix K, Traffic Impact Analysis Report, is not consistent with the rest of the report. The number of trips estimated to be generated by the various park elements should be checked and the appropriate corrections made.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

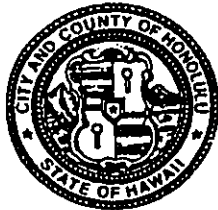

CHERYL D. SOON

cc: Mr. Stanford Kuroda
Department of Design and Construction
Department of Parks and Recreation
Ms. Genevieve Salmonson
Office of Environmental Quality Control
Mr. Jeffrey Overton
Group 70, International, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.cc.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Ms. Cheryl D. Soon
Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your October 22, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects.

We have prepared the following responses to your comments:

1. Closure of Koko Head Park Road: Recent clay fragments from the shot ranges have been found along Koko Head Park Road. For safety measures, range consultant Kramer One, recommends closure of the makai portion of Koko Head Park Road from Kalanianaʻōle Highway.
2. Traffic Impact Analysis Report (Appendix K): Table ES-2 will be corrected in the Final EIS.

Ms. Cheryl D. Soon
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



~~for~~ RAE M. LOUI, P.E.
Director

6635 Kalopa St.
Honolulu, Hi. 96825
9-17-2001

RECEIVED
SEP 20 2001
GROUP 70

Group 70 International, Inc.
925 Bethel St., 5th Floor
Honolulu, Hi. 96813-4307
Attn: Mr. Jeff Overton

Dear Mr. Overton,

Thank you for the copy of the draft environmental statement which addresses the proposed safety improvements to the Koko Head Shooting Complex and the opportunity to submit additional observations/comments.

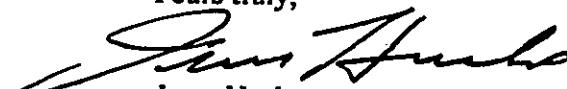
Based on our review of the draft, it is our conclusion that there are no environmental concerns known at present that preclude the development of the new archery range. The following observations/comments are offered for consideration and possible inclusion in the final document:

- (1) The description of proposed work does not mention an irrigation system or provision of water to the site. Some type of effective ground cover on the graded areas fairly early in the construction process will be necessary to prevent topsoil from blowing or washing away.
- (2) The description of proposed work does not include provision for on-site storage or comfort station facilities. The very positive impact of both of these facilities on the operation of the range suggests their inclusion in planning, even if their construction is delayed until additional funds are available or a self-help project can be organized/financed.

I have included a copy of a page from the catalogue published by a popular supplier of archery equipment to illustrate a type of target with which non-archers would not be familiar, the 3-D animal target. They would likely be used on the range, since 3-D competitions are very popular. There should be no particular impact on the environment which is different from the use of a conventional target butt. One use of an on-site storeroom would be to protect these relatively expensive targets from theft or vandalism.

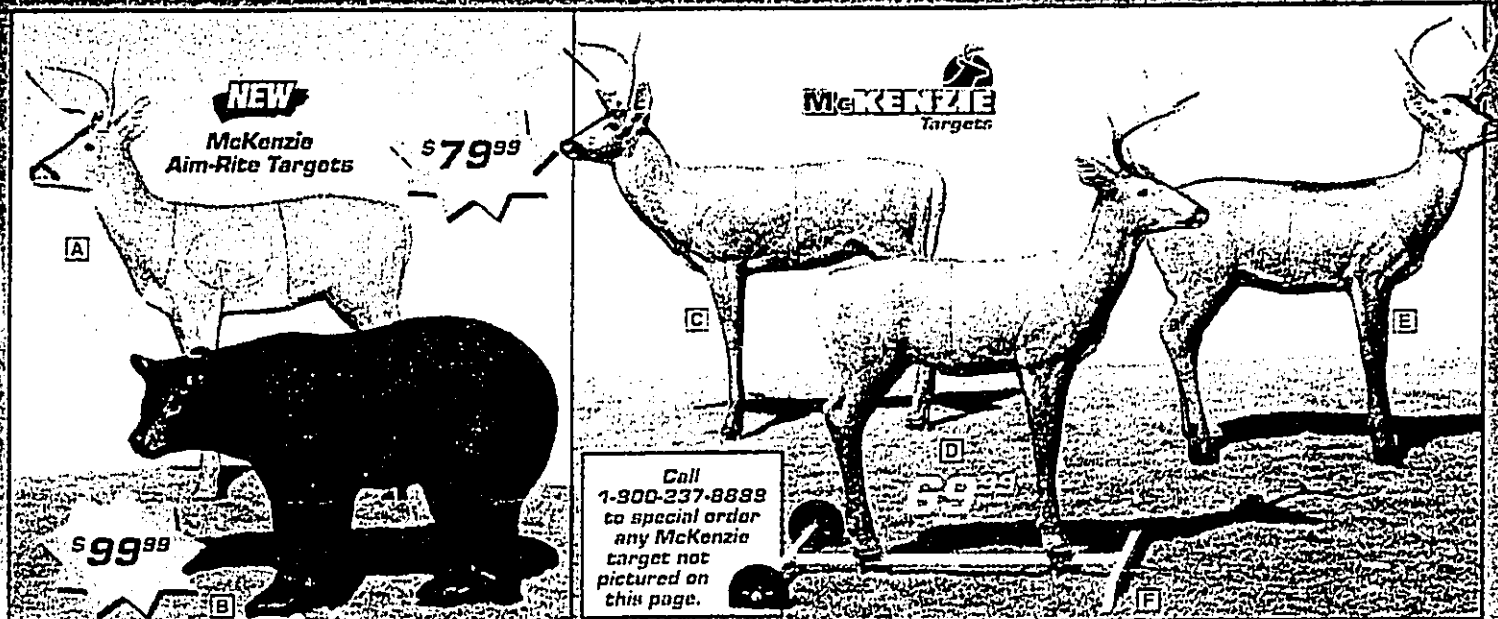
The membership of the Club looks forward to providing any assistance of which we are capable in the design and development of the range and its operation following construction. For the Koko Head Archery Club, I remain

Yours truly,


Jerry Hucks

Copy to:
City and County of Honolulu Dept. of Design and Construction, Mr. S. KURODA
City and County of Honolulu Dept. of Planning and Permitting, Mr. R. FUJIKI
State of Hawaii Office of Environmental Quality Control, Ms. G. SALMONSON

McKENZIE - ultimate 3-D targets



McKenzie Natra-Look Deer Targets

A Aim-Rite Deer - The Aim-Rite boasts a replaceable vitals area that extends through the target for realistic shooting practice from either side. Durable foam is great for practice with field points or broadheads.

B Aim-Rite Bear - Vital shooting area is outlined to guide proper shot placement. Three-piece sectional design. High-tech foam is ideal for field points or broadheads. Shoulder height 25" Body length 45"

C Bowhunter Deer - Medium alert deer target features outline of shoulder and leg bones. Anatomical detail molded into the foam. Includes two ground and anchor support stakes. 33" shoulder height.

D Tuff Buck - Replaceable Tuff Zone midsection with detailed outline of vitals and bone structure. Three-piece design.

E Trophy Whitetail - Trophy-sized target for under \$100. Anatomically accurate detailing. Three-piece sectional design with replaceable vitals. Shoulder ht.: 33"

F Target Tot - This lightweight wheeled stand makes it easy to move your target from one location to another. Accommodates most 3-D targets.

Body Description	Length	Shoulder Height	Order No.	3-D Target Price	Replacement Midsection	Midsection Price
A Aim-Rite Deer	43"	33"	MM-11-00000	\$79.99	MM-11-00000	\$25.99
B Aim-Rite Bear	45"	25"	MM-11-00000	\$99.99	N/A	-
C Bowhunter Deer	44"	33"	MM-11-00000	\$109.99	MM-11-00000	\$64.99
D Tuff Buck	44"	33"	MM-11-00000	\$69.99	MM-11-00000	\$34.99
E Trophy Practice Target	44"	33"	MM-11-00000	\$99.99	MM-11-00000	\$19.99

MM-41-4045\$42.50

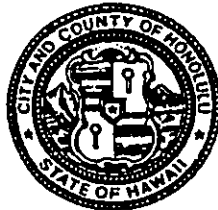


Body Description	Length	Shoulder Height	Order No.	3-D Target Price	Replacement Midsection	Midsection Price
G Large Alert Deer	50"	36"	MM-11-00000	\$144.99	MM-11-00000	\$72.99
H Mule Deer	52"	38"	MM-11-00000	\$194.99	MM-11-00000	\$89.99
I Pronghorn	46"	36"	MM-11-00000	\$164.99	MM-11-00000	\$72.99
K Large Standing Bear	18"	50"	MM-11-00000	\$234.99	MM-11-00000	\$129.99
L Medium Black Bear	45"	25"	MM-11-00000	\$164.99	MM-11-00000	\$84.99
M Javelina	30"	21"	MM-11-00000	\$94.99	MM-11-00000	\$62.99
N Turkey	11"	34"	MM-11-00000	\$79.99	N/A	N/A
P Strutting Turkey	17"	15"	MM-11-00000	\$159.99	N/A	N/A
Q Coyote	36"	33"	MM-11-00000	\$109.99	MM-11-00000	\$62.99

The best bowhunting practice you can get is on lifelike targets. They are expertly sculpted to the actual size of the live animal. Each target shows excellent detail, a big plus for practicing real-situation bowhunting. So lifelike they can also be used as decoys. These targets can be shot at from either side, at any angle or from a tree stand. Durable body construction of self-healing high-tech flexible foam surrounding the special formulated power core midsection insert greatly extends target life. Arrow holes reseal after the arrow shaft is removed. Innovative three-piece design allows the target's entire center-section vital zone to be replaced at a fraction of the cost of a new target. An IBO-approved scoring zone is permanently molded into each midsection on both sides. Deer targets feature removable synthetic antlers. For use with broadheads or field points.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Jerry Hucks
Koko Head Archery Club
6635 Kalopa Street
Honolulu, HI 96825

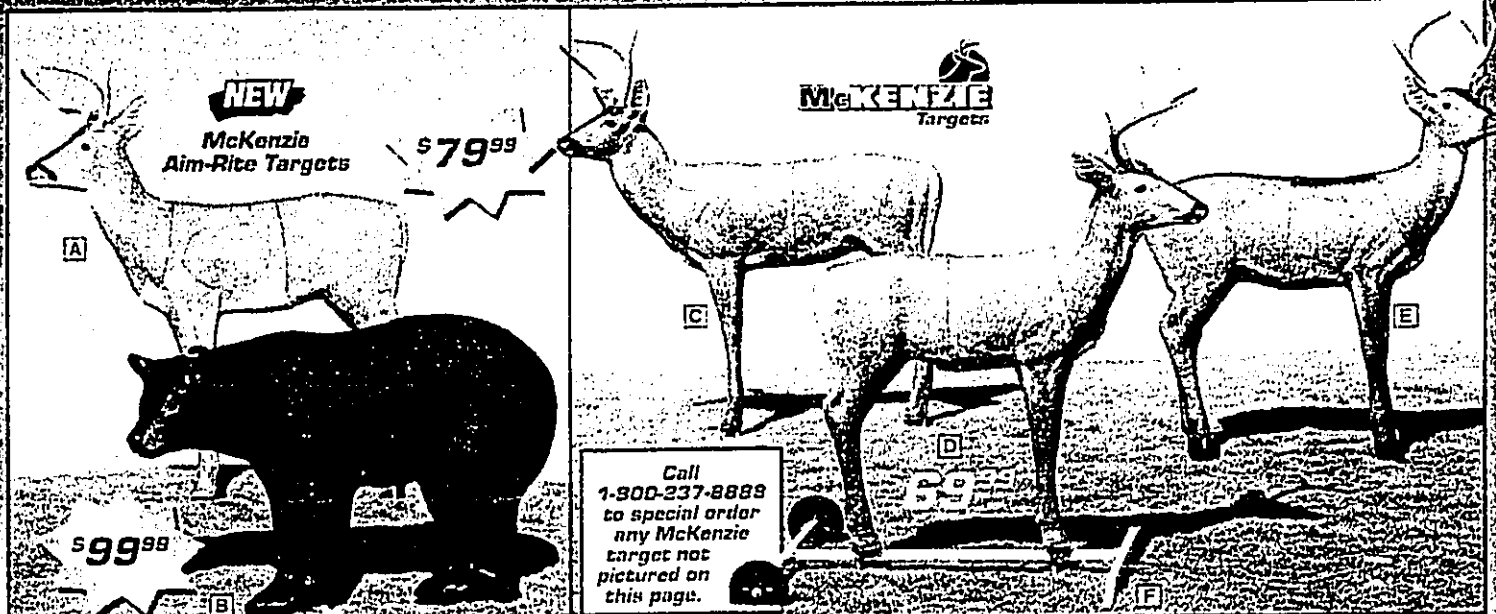
Dear Mr. Hucks:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments dated September 17, 2001.

1. Irrigation and Landscaping at Shooting Complex: Landscaping is planned at the Shooting Complex. Landscaping plans will be developed during the design phase of the project.
2. Comfort Station Facilities: A comfort station is not planned at this time. Archery range users can use the existing restroom facilities.
3. On-site Storage: The Final EIS will be amended to include a storage area for general public use, including archery equipment. The storage area may be incorporated into the design of the firing shelter although the exact design will be determined at a later date.

McKENZIE - ultimate 3-D targets



Call 1-800-237-8888 to special order any McKenzie target not pictured on this page.

McKenzie Natra-Look Deer Targets

A) Aim-Rite Deer - The Aim-Rite boasts a replaceable vitals area that extends through the target for realistic shooting practice from either side. Durable foam is great for practice with field points or broadheads.

B) Aim-Rite Bear - Vital shooting area is outlined to guide proper shot placement. Three-piece sectional design. High-tech foam is ideal for field points or broadheads. Shoulder height: 25" Body length: 45"

C) Bowhunter Deer - Medium alert deer target features outline of shoulder and leg bones. Anatomical detail molded into the foam. Includes two ground and anchor support stakes. 33" shoulder height.

D) Tuff Buck - Replaceable Tuff Zone midsection with detailed outline of vitals and bone structure. Three-piece design.

E) Trophy Whitetail - Trophy-sized target for under \$100. Anatomically accurate detailing. Three-piece sectional design with replaceable vitals. Shoulder ht.: 33"

F) Target Tote - This lightweight wheeled stand makes it easy to move your target from one location to another. Accommodates most 3-D targets. MM-41-4046\$42.50

Body Description	Length	Shoulder Height	Order No.	3-D Target Price	Replacement Midsection	Midsection Price
A) Aim-Rite Deer	43"	33"	MM-41-3200	\$79.99	MM-41-3200	\$25.99
B) Aim-Rite Bear	45"	25"	MM-41-3900	\$99.99	N/A	-
C) Bowhunter Deer	44"	33"	MM-41-3300	\$109.99	MM-41-3300	\$64.99
D) Tuff Buck	44"	33"	MM-41-3600	\$69.99	MM-41-3600	\$34.99
E) Trophy Practice Target	44"	33"	MM-41-3400	\$99.99	MM-41-3400	\$19.99



Body Description	Length	Shoulder Height	Order No.	3-D Target Price	Replacement Midsection	Midsection Price
G) Large Alert Deer	56"	36"	MM-41-4200	\$144.99	MM-41-4200	\$72.99
H) Mule Deer	52"	38"	MM-41-4300	\$194.99	MM-41-4300	\$89.99
I) Pronghorn	40"	36"	MM-41-4400	\$164.99	MM-41-4400	\$72.99
J) Large Standing Bear	18"	50"	MM-41-4500	\$234.99	MM-41-4500	\$129.99
K) Medium Black Bear	45"	28"	MM-41-4600	\$164.99	MM-41-4600	\$84.99
L) Javelina	30"	21"	MM-41-4700	\$94.99	MM-41-4700	\$62.99
M) Turkey	11"	34"	MM-41-4800	\$79.99	N/A	N/A
N) Strutting Turkey	17"	15"	MM-41-4900	\$159.99	N/A	N/A
O) Coyote	36"	33"	MM-41-5000	\$109.99	MM-41-5000	\$62.99

The best bowhunting practice you can get is on lifelike targets. They are expertly sculpted to the actual size of the live animal. Each target shows excellent detail, a big plus for practicing real-situation bowhunting. So lifelike they can also be used as decoys. These targets can be shot at from either side, at any angle or from a tree stand. Durable body construction of self-healing high-tech flexible foam surrounding the special formulated power core midsection insert greatly extends target life. Arrow holes reseal after the arrow shaft is removed. Innovative three-piece design allows the target's entire center-section vital zone to be replaced at a fraction of the cost of a new target. An IBC-approved scoring zone is permanently molded into each midsection on both sides. Deer targets feature removable synthetic antlers. For use with broadheads or field points.


Some items shown are not available in all areas. Add \$10.00 postage for orders outside the continental United States. Call for shipping and handling charges. © 1999 McKenzie Targets, Inc.

CALL 1-800-237-4444

Mr. Jerry Hucks
December 10, 2001
Page 2

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


For RAE M. LOUI, P.E.
Director



HAWAII KAI NEIGHBORHOOD BOARD NO. 1

c/o NEIGHBORHOOD COMMISSION • CITY HALL, ROOM 400 • HONOLULU, HAWAII 96813

September 21, 2001

City and County Department of Planning & Permitting
Attn: Mr. Randall Fujiki, Director
650 South King Street, 7th Floor
Honolulu, HI 96813

RECEIVED
SEP 24 2001

GROUP 70

Group 70 International, Inc.
Attn: Mr. Jeff Overton
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

City and County Department of Design & Construction
Attn: Mr. Stanford Kuroda
650 South King Street
Honolulu, HI 96813

State of Hawaii
Office of Environmental Quality Control
Attn: Genevieve Salmonson, Director
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Subject: Koko Head District Park and Shooting Complex, Draft EIS, dated July 27, 2001

Thank you for the opportunity to review and comment on this EIS. We have some comments on some of the proposed actions and other items.

Reference page 1-5 and 6-6, Closure of the Koko Head Park Road off Kalaniana'ole Highway. While we see no problem closing the road periodically, we recommend the road be routinely open to traffic.

Page 1-6 and 8-1, Closing the public trails along Koko Crater. It is a given that the public will use those trails. Where the hazard comes from the shooting range, the baffling should be installed to increase the safety of nearby park activities including hikers. Recommend signs to warn hikers.

Page 8-1, Prioritization of the in-line hockey rink. Hockey enthusiasts agreed that they would not need another rink in the Koko Head District Park in the early phases of improvements to the park. Recommend priority to phase 3.

Page 8-1, Fencing around the shooting complex. Recommend fencing be installed in conjunction with the baffling.



Oahu's Neighborhood Board System - Established 1973

Page 3-5, Swimming Pool. Recommend the pool be moved to earlier phase.

Page 3-6, Walking/Jogging Path. Should all accommodate bikers and should be designed to be wide enough for walking, jogging and biking.

Page 3-9, Archery Range. Recommend a fourth rest room be added to the shooting complex projects. Also provide sprinkler/irrigation system and landscaping. The archery shelter should also provide storage for targets and target maintenance materials.

Page 3-12, Shooting Range. When will Department of Health determine that lead reclamation is required? What method will be used for future washing off lead and reclaiming?

Page 4-19 and 5-25, will changes to the Job Corps site that were done this year, 2001, be noted anywhere in this plan? Recommend it be brought up to date on page 4-19.

Page 4-21, "there are no night-time shooting hours" add "for the public." HPD does after sunset practice.

We also support the current policy for not using 50 caliber.

The Hawaii Kai Neighborhood Board approves the subject draft EIS and offers the above comments none of which would cause the EIS not to be approved.

Respectfully,

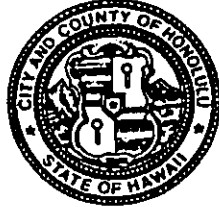
Charlie Rodgers

Charlie Rodgers,
Chair

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR
ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Charlie Rodgers, Chair
Hawaii Kai Neighborhood Board No. 1
c/o Neighborhood Commission
City Hall, Room 400
Honolulu, Hawaii 96813

Dear Mr. Rodgers:

Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your September 21, 2001 letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have provided the following responses to your comments:

1. Closure District Park entrance on Kalaniana'ole Highway: Recent clay and shot fragments from the skeet range have been found along Koko Head Park Road. For safety measures, range consultant Kramer One recommends closure of the makai portion of Koko Head Park Road from Kalaniana'ole Highway. This road will remain available for emergency uses only.
2. Closure of Public Trails on Koko Crater: Whether or not the trails on Koko Crater remain open to the public remains an unresolved issue. This will not be resolved in time for the publication of the Final EIS.
3. In-line Hockey: The in-line hockey skate rink is scheduled for Phase 3.

Mr. Charlie Rodgers, Chair

December 10, 2001

Page 2

4. Fencing of Shooting Range: Fencing is planned for portions of the perimeter of the shooting range. However, the extent of the fencing at the Shooting Complex remains an unresolved issue. At minimum, fencing will be provided along Koko Head Park Road between Koko Head Shooting Complex and the Koko Head District Park and portions of the western slopes of Koko Crater along the hiking areas. Whether or not it is necessary to fence the open areas along the eastern slopes of Koko Crater or along Kalanianaʻōle Highway remains unresolved.
5. Swimming Pool: We also acknowledge your statement that the swimming pool should be moved to an earlier phase. At this time, however, no change has been made to the priority of the swimming pool. This does not, however, preclude such change to be made during the implementation of the District Park Master Plan. The priorities set in the Master Plan are intended to serve as a basic framework for consideration in future project implementation and funding decisions.
6. Walking/Jogging Path: The width of the path will be determined during the design phase of the project. Depending on community preferences and a more detailed analysis of potential terrain constraints, a wider pathway could be provided so it could accommodate a bike path.
7. Archery Range Improvements: Restrooms are not currently planned improvements. The landscaping plan will be determined later in the design phase. The Final EIS will be amended to include a storage area for general public use, including archery equipment. The storage area may be incorporated into the design of the firing shelter although the exact design will be determined at a later date.
8. Lead Reclamation: Safety improvements at the Shooting Range include installing a lead washing basin near the Pistol Range. The type of lead washing basin will be determined during the design phase of the project. Whether or not lead reclamation is necessary, needs to be determined by the Department of Health.
9. Recent Changes to the Job Corps Site: The demolition of facilities at the former Job Corps facility was described in the Final Environmental Impact Statement for the Improvements to Hanauma Bay Nature Preserve (August, 1999).
10. Night shooting Hours: The EIS will reflect that there is night usage of the Shooting Range by the Honolulu Police Department.
11. .50 Caliber Ban: We acknowledge your statement that the Board supports the current ban on .50 caliber weapons.
12. Hawaii Kai Neighborhood Board Approval: We also acknowledge and appreciate that the Hawaii Kai Neighborhood Board approves the Draft EIS.

Mr. Charlie Rodgers, Chair
December 10, 2001
Page 3

Your letters and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,



For RAE M. LOUI, P.E.
Director

From: Alan Atkinson [mailto:ALAN@architects-hawaii.com]

Sent: Friday, September 21, 2001 1:45 PM

To: Jeff Overton

Subject: Draft EIS for Master Plan of Kokohead District Park

I have reviewed the Draft EIS and have the following comments:

1. Currently, the traffic exiting the Park on Anapalau Street frequently proceeds some distance past the stop line before stopping. This makes it both difficult and somewhat dangerous for traffic turning left from Kaumakani Street into the Park. This is caused in part by the fact that the 6 foot high chain link fence on both sides of Anapalau Street is slatted full height and the fence extends all the way to the Kaumakani Street property line, obstructing the exiting driver's visibility. Increased facilities and use of the Park will only exacerbate this problem.

Suggestion: Reduce the height of the slats to 30" max above grade for sufficient distance to allow vehicles stopped at the stop line to easily see traffic coming from either direction on Kaumakani Street.

2. I would like to voice an objection on principles alone to the City spending my taxpayer's money to build a skateboarding park for kids who have trashed the bus Park and Ride facility across from Costco. Users of the new facility should be charged a first-time-use fee and the proceeds used to replace the Park and Ride benches which have been damaged, stolen and defaced.

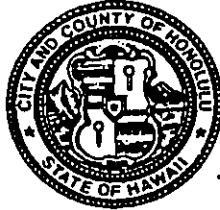
Alan Atkinson
1095 Kaaopulu Place
Honolulu, HI 96825

Business Phone: 808-523-9636
Home Phone: 808-395-2479

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CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Mr. Alan Atkinson
1095 Kaoopulu Place
Honolulu, Hawaii 96825

Dear Mr. Atkinson:


Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments dated September 21, 2001.

1. Chain Link Fence at Anapalau Street: Per our conversation with the Department of Parks and Recreation, the site distances at Anapalau Street will be studied further to determine if the fence slats need to be lowered to improve driver's visibility.
2. Skate Park: The skate park is a recommended improvement for Phase I. Prior to this improvement at Koko Head District Park, another skateboard park is being developed at the Kamiloiki Park. Appropriate administrative controls will be implemented at the District Park to ensure that the facility is used appropriately.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


for RAE M. LOUI, P.E.
Director

'01 AUG 31 PM 1 25

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

August 30, 2001

To: Dept of Planning & Permitting, C&C
Re: Koko Head District Park

I strongly support the plan for a swimming pool. Please consider an Olympic size (50 meters) instead of a 25 meter pool. We, Hawaii Kai residents are forced to drive to the Palolo on Manoa pool for an access to a public swimming pool. I am very pleased that C&C finally decided on a pool in the Hawaii Kai area. It would be also nice to have a kid size shallow pool.

Post-It® Fax Note	7671	Date	9/28/01	# of pages	2
To	Jeff / Megan	From	Steve T		
Co./Dept.	Group 70	Co.	DPP		
Phone #		Phone #	523 4817		
Fax #	523-5874	Fax #	5276743		

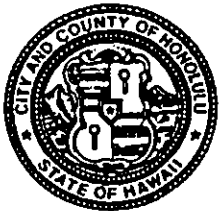
Keiko Hall
Hawaii Kai Resident

Keiko Hall
7160 Hawaii Kai Dr. #216
Honolulu, HI 96825

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Ms. Keiko Hall
7160 Hawaii Kai Drive, #216
Honolulu, Hawaii 96825

Dear Ms. Hall:


Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS

Thank you for your letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments dated August 30, 2001.

A 50-meter swimming pool is a planned improvement for the Koko Head District Park. A kid size shallow pool is not planned at this time.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,


For RAE M. LOUI, P.E.
Director

cc: William Balfour, DPR

1425 Miloiki Street
Honolulu, Hawaii 96825

'01 AUG 31 PM 1 24

DEPT OF PLANNING
and PERMITTING
CITY & COUNTY OF HONOLULU

August 27, 2001

Department of Planning and Permitting
650 S. King St.
Honolulu, HI 96813

Attn: Steve Tagawa

Dear Mr. Tagawa,

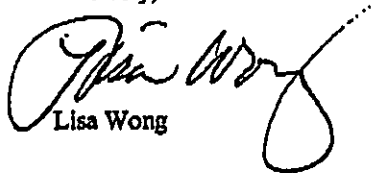
I just finished reading the "Koko Head park plan released" article in Thursday's Advertiser, August 23, 2001. I was quite disappointed that the article did not mention any plans for a "bark park" for dogs. We only have two major bark parks in downtown Honolulu now and that means all the families in East Honolulu (Hawaii Kai, Kalama Valley, Aiea, Hahaione, etc) would need to drive into town all the time to take our pets to a bark park just to socialize. I know the Hawaiian Humane Society is lobbying for more bark parks in other areas. But I feel by the time they find a space in Hawaii Kai to put one up there will be no funding. Why not automatically include it in your plan?

If kids and adults can have their in-line skate hockey rink, swimming pool, basketball, volleyball, tennis court, archery, playground and the list goes on, why can't dogs have a one place to play? I would think it would cost less to build a bark park than to make several paved or concrete slabs and the City would still have to do trash pickup all over the new "planned" park anyway.

My pet is very sociable and we would like to take him to a place where he can socialize with other dogs in our community. There are a lot of responsible pet owners in East Honolulu and I'm sure they feel the same. There have been many times my family have taken our dog to a park here in Hawaii Kai only to be told by a police officer it is against the law to bring a pet here. If that is the case, we need a bark park in Hawaii Kai.

Thank you for taking the time to read our concern.

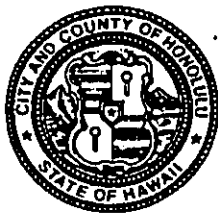
Sincerely,


Lisa Wong

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.co.honolulu.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

December 10, 2001

Ms. Lisa Wong
1425 Miloiki Street
Honolulu, Hawaii 96825

Dear Ms. Wong:

**Subject: Koko Head District Park Master Plan and
Koko Head Shooting Complex Safety Improvements Draft EIS**

Thank you for your letter regarding the Draft Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements projects. We have prepared the following responses to your comments dated August 27, 2001.

The Master Plan was developed with the participation of community members through public "charrettes" or intensive working sessions. During these charrettes, participants considered many possible uses for the District Park, one of which was a bark park for dogs. Unfortunately the community gave higher priorities to other activities.

Your letter and this response will be included in the Final EIS. We will forward a copy of the Final EIS for your review upon its completion. We appreciate your input for the environmental review process.

Very truly yours,

For RAE M. LOUI, P.E.
Director

cc: William Balfour, DPR

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Section 12.0
Preparers of the EIS

KOKO HEAD DISTRICT PARK & SHOOTING COMPLEX

• Draft Environmental Impact Statement •

12.0 PREPARERS OF THE EIS

This environmental impact statement was prepared for the applicant, the City and County of Honolulu Department of Design and Construction, by Group 70 International, Inc. The following list identifies the individuals and organizations involved in the preparation of this EIS and their respective contributions.

Group International, Inc.

Jeffrey Overton, AICP: Project Manager
Kim Evans: Senior Planner
Megan York: Planner
Roy Nihei, AIA: Project Architect, Koko Head Shooting Complex
Pete Galvez, AIA: Architect, Koko Head Shooting Complex
Kathryn A. Nam: Graphics Preparation
Joy Rarbera: Graphics Preparation

Technical Consultants

Accessibility Planning & Consulting, Inc.
Cedric Chong & Associates, Inc.
Clarence Lee Design & Associates, Inc.
Control Point Surveying, Inc.
Ebisu and Associates
Engineering Surveyors Hawaii
Jeff Pantaleo Consultants
Kramer One, Inc.
Masa Fukioka & Associates
PSI
Phillip Rowell and Associates
Rider Hunt Levett & Bailey
SSFM Engineers
Tanimura & Associates

Technical Area

ADA
Mechanical (Shooting Range)
Signage (Shooting Range)
Range Surveyor
Noise
Civil (Shooting Range)
Archaeology
Range Consultant
Geotechnical (Shooting Range)
Environmental (Shooting Range)
Traffic
Cost Estimator (Shooting Range)
Civil Engineering/Utilities
Structural (Shooting Range)

Consultant Studies Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko Head Regional Park and Nature Preserve, East Honolulu, Island of O'ahu, Final Environmental Impact Statement

Technical Consultants

Char and Associates
Cultural Surveys Hawai'i
Kumu Pono Associates
Paul Rosendahl
Phillip L. Bruner

Technical Area

Flora
Archeology
Cultural Assessment
Archeology
Fauna

APPENDIX A

Kramer One

June 16, 2001

June 16, 2001

RE: CITY/COUNTY SHOOTING RANGE COMPLEX AT KOKO HEAD

Roy H. Nihei
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

RECEIVED

JUN 20 2001

GROUP 70

Dear Roy:

While meeting with you during this past week you requested our firm provide some detailed information and recommendations for your environmental impact statement. Following is a brief description of the issues known at this time.

Projectile Escapement

I am unaware of any codes or rules specifically related to the design of outdoor shooting ranges applicable to the Koko Head project. Using suggestions from the National Rifle Association, I recommend the Koko Head facility limit projectiles to the Trust lands under its control by means of both physical and administrative controls. It is important to note we have no information from the City/County regarding the amount of Trust land they are willing to make available for potential projectile impact. At this time I am assuming we may use however much it takes.

Based on several concepts accepted in the shooting range industry, I believe the projectiles fired on most of the rifle and pistol ranges should remain on the Trust lands with proper administrative controls. That is, no overhead safety baffling systems would be necessary. The possible exception is the Metallic Silhouette Range. At this time we are working with your office to determine whether the Metallic Silhouette Range needs an overhead safety baffling system. The advantages of not building an overhead safety baffling system are aesthetics, construction and maintenance costs. The advantage of building an overhead safety baffling system is greater access to portions of the mountain. The other rifle and pistol ranges would require less of the mountain face be restricted without overhead safety baffling than Metallic Silhouette.

The existing tram trail appears to be outside of the area impacted by an appropriately administered shooting range. However, there may be a perceived problem by trail users, as they may be able to view the muzzle ends of firearms from the trail. There are several choices the City/County has. First, ignore the situation, as it is a perception issue rather than a real problem. Second, relocate the trail to be out of view of the shooting ranges. Third, close the trail during range operations.

kramer
ARCHITECTURE
& PLANNING **One** inc.

6839 E. Avalon Dr. • Scottsdale, AZ 85251
phone 480.941.9179 • fax 480.970.3830

RN, File
PG

June 16, 2001

I recommend increasing the height of the earth backstops and adding a horizontal bullet catcher on the three ranges in the northern portion of the crater. This combined with regrading portions of these ranges should allow bullets fired from designated shooting positions through designated targets to consistently impact an earth backstop and remain in the backstop. The current construction appears to have some deficiencies in this regard.

The shotgun ranges are currently situated to allow shot to escape the crater rim. At this time I don't believe the shot could escape the Trust lands, but shot impact on at least one of the adjacent roads is known to occur. I know of no easy solution to this problem. Relocating the shotgun ranges within the crater does not seem to be a potential solution. Relocating the shotgun ranges to another site does not appear to be an option at this time. Relocating the road appears difficult. Closing the road may cause future traffic problems.

If you request, we can provide a list of recommended additional administrative controls for the Koko Head facility. During my site visit I observed a number of patched bullet holes in the overhead structure on the Pistol Range that in my opinion should not have been permitted to occur. I have no doubt the City/County, including the range personnel, have the best intention for their operation, but I believe there are administrative controls that could improve the safety level of the Koko Head facility.

Lead Reclamation

The safety improvements recommended in the previous section of this letter should greatly improve the efficiency of lead reclamation for the rifle and pistol ranges.

The two existing shotgun ranges may be directing a significant portion of the lead shot into areas in which lead cannot easily be reclaimed. At this time I have no suggestions for correcting this situation.

Enclosed are two copies of an amendment to our original letter agreement of September 4, 2000. This amendment authorizes our firm to assist you with the additional services you requested. Please sign both copies, keep one for your records and return the other. I understand your time frame is very short. As I believe it will be difficult to impossible for us to complete all the work in the time frame you requested, including receiving certain decisions from the City/County outlined above, I would recommend you return the signed amendment as soon as possible, so we may start the work you requested.

Sincerely,



Lorin D. Kramer
President

Enclosure (2)

APPENDIX B

Koko Head Firing Range Initial Soil Sampling

PSI

April 3, 2001



Memorandum

To: Roy Nihei – Group 70 International
From: Michael Polkinghorn
Date: April 3, 2001
Subject: Koko Head Firing Range Initial Soil Sampling

PSI performed soil sampling at the Koko Head Firing Range on February 21, and 23, and March 2, 2001. The soil sampling was performed to provide information pertaining the levels of metals present in the soil prior to the upcoming renovations of the facility. A soil sample from the existing surface grade to a depth of one foot was collected using a stainless steel drive-sampling device. The one foot composite samples were placed in laboratory approved jars and were submitted to EL Pacific for Resource Conservation and Recovery Act (RCRA) 8 Total Metals analysis. This method provides the amounts of total lead, cadmium, chromium, mercury, silver, barium, arsenic and selenium. The results are as follows:

Range	Sample	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Rifle	1-L-1	ND	187	2.88	79.3	28.8	ND	ND	ND
Rifle	1-L-2	ND	204	2.76	82.6	ND	ND	ND	ND
Rifle	1-L-3	ND	174	2.26	104	32,200	ND	ND	ND
Rifle	1-L-4	11.6	185	2.71	81.1	46,200	ND	ND	ND
Rifle	1-L-5	ND	186	2.84	83.4	86.2	ND	ND	ND
Pistol	2-L-1	84.7	149	12.1	78.4	98,500	ND	7.07	ND
Pistol	2-L-2	50.3	124	2.05	84.8	47,100	ND	ND	ND
Silhouette	3-L-1	5.30	218	2.68	109	3,650	ND	ND	ND
Silhouette	3-L-2	ND	227	3.07	87.4	3,670	ND	ND	ND
Trap	4-L-1	ND	177	2.62	81.0	285	ND	ND	ND
Trap	4-L-2	685	187	2.58	64.4	49,500	ND	5.94	ND
Trap	4-L-3	101	109	ND	56.8	66,100	ND	ND	ND
Skeet	5-L-1	ND	172	2.93	80.3	330	ND	ND	ND
Skeet	5-L-2	ND	79.5	2.92	100	850	ND	ND	ND
Skeet	5-L-3	ND	193	2.82	78.4	4,200	ND	ND	ND
Skeet	5-L-4	5.21	249	3.03	74.4	2,040	ND	ND	ND
SWAT	6-L-1	19.9	145	2.49	121	18,800	ND	ND	ND
SWAT	6-L-2	8.83	175	2.33	115	11,500	ND	ND	ND
SWAT	6-L-3	ND	168	2.09	67.5	4,190	ND	ND	ND
SWAT	6-L-4	16.5	287	2.43	72.1	34,200	ND	ND	ND

Notes: Analytical results exceeding regulatory guidelines are in bold italics. All sample results are reported in milligrams per kilogram.

Of the twenty samples collected, ten samples were submitted for Toxicity Characteristic Leachate Procedure (TCLP) analysis to determine if the levels of metals present were leachable. The samples submitted for TCLP analysis and the specific constituents that were analyzed for follows:

RN, PG
File

Roy Nihei
 April 3, 2001
 Page: 2

Range	Sample	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Rife	1-L-1	NA	ND	ND	ND	2.09	NA	NA	NA
Pistol	2-L-1	0.52	NA	ND	ND	128	NA	NA	NA
Pistol	2-L-2	ND	ND	NA	ND	22	NA	NA	NA
Silhouette	3-L-2	NA	ND	ND	ND	98	NA	NA	NA
Trap	4-L-1	NA	ND	ND	ND	ND	NA	NA	NA
Trap	4-L-2	ND	NA	NA	ND	ND	NA	NA	NA
Trap	4-L-3	ND	ND	NA	ND	ND	NA	NA	NA
Skeet	5-L-2	NA	ND	ND	ND	ND	NA	NA	NA
Skeet	5-L-3	NA	ND	ND	ND	ND	NA	NA	NA
SWAT	6-L-4	ND	ND	NA	ND	1.5	NA	NA	NA

Notes: Analytical results exceeding regulatory guidelines are in *bold italics*. All sample results are reported in milligrams per kilogram.

Regulatory guidelines for metals are listed in the following table

	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
DOH	NA	NA	38	NA	400	NA	NA	NA
EPA	22	5,400	37	210	400	390	390	23
TCLP	5	100	0.5	5	5	1	5	0.7

Notes: Values are in milligrams per kilogram. TCLP values are in milligrams per liter. EPA values correspond to the PRG value for a residential area.

Laboratory results indicate that levels of lead and arsenic are present in the soils at the site above regulatory guidelines. The results also indicate that the lead is leachable potentially making these materials hazardous waste. It is recommended that further testing be performed to characterize this soil. This will include the development of a sampling plan to be submitted to DOH for approval and implementation. The work must be performed in accordance with the state TGM.

We appreciate this opportunity to provide our services to you. If you have any questions you can call me at 947-1127.

Attachments: Lab Results
 Sample location diagram



Facsimile Memorandum

To: Jeff Overton – Group 70 International
From: Michael Polkinghorn
Date: October 3, 2001
Subject: Koko Head Shooting Complex

Per your request of September 27, 2001, I have reviewed the correspondence from Genevieve Salmonson to Rae Loui, dated September 21, 2001. I have discussed the project with Bryce Hataoka of the State of Hawaii Department of Health Hazard Evaluation and Emergency Response (HEER). He has been informed of the test data from our memo of April 3, 2001. Mr. Hataoka has stated that the soils on the site could remain in place and they would not require remedial actions. Any grading work would have to be performed in compliance with OSHA guidelines for training and exposure monitoring. Soils could not leave the site without testing and/or remediation.

The site is located outside of the underground injection control line (UIC) meaning that water below this area is not a probable drinking water source. Mink and Lau further classify the aquifer in this area as part of the Waialae aquifer system where fresh water may be in contact with seawater confined or unconfined and can be found in either horizontally extensive lavas or in sedimentary environments. According to the groundwater protection codes for the aquifer the following can be assumed:

Developmental Stage:	Potential use
Utility:	Drinking/neither
Salinity: Fresh to High	(250 to 15,000mg/LCl)
Uniqueness:	Irreplaceable/Replaceable
Vulnerability to Contamination:	High to Low

At this time Bryce has indicated that nothing further be done on the site pertaining the contamination. The soil must not leave the site location. If it does it may be considered hazardous waste.

Call me at 947-1127 if you have further questions.

APPENDIX C

Geotechnical Investigation

Masa Fujioka and Associates

March 30, 2001



MASA FUJIOKA & ASSOCIATES
A PROFESSIONAL PARTNERSHIP

ENVIRONMENTAL • GEOTECHNICAL • HYDROGEOLOGICAL CONSULTANTS

99-1205 Halawa Valley Street, Suite 302 • Aiea, Hawaii 96701-3281
Phone 808 484-5366 • Fax 808 484-0007

March 30, 2001

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

Attn: Mr. Roy Nihei, AIA

Subject: Geotechnical Investigation Letter Report
Geotechnical Investigation - Pre -Design Charette
Koko Head Shooting Complex Safety Improvements
Koko Head, Oahu, Hawaii

Dear Mr. Nihei:

Masa Fujioka & Associates (MFA) is pleased to submit this letter report which presents the findings of a preliminary geotechnical investigation for the subject development. A preliminary investigation was conducted to provide information for use during a design charette.

We understand that the project will include the following structural and earthwork components:

1. 65,000 cy of earthwork for ground leveling and berms.
2. concrete baffles on 168 columns which will be supported by pier type foundations, between 10 to 20 feet deep, or possibly spread foundations.
3. 1270 feet of concrete fence and partial retaining walls.
4. Concrete canopy and pedestrian walkways at firing lines.

The main geotechnical concerns will include the following:

1. Geotechnical criteria for design of pier or spread foundations for concrete columns.
2. Earthwork recommendations.
3. Stability of proposed one to one slopes for earth berms.
4. Lateral pressures for design of partial retaining walls.

We understand that the existing range is located on an old landfill. Long terms settlements may also be a design concern.

Group 70 International, Inc.
March 30, 2001
Page 2

SCOPE OF WORK

The following scope of work was proposed and performed:

1. Geological Reconnaissance

MFA conducted a geological reconnaissance of the range areas. Soil and geological features were noted and mapped.

2. Field Investigation

We drilled 3 shallow borings to check foundation conditions. Borings were drilled to a depth of 20 feet except where hard drilling conditions were encountered at shallower depth.

The borings were sampled and logged by an MFA geologist.

3. Laboratory Testing

Field and laboratory testing, consisting of identification, moisture/density, organic content and strength tests, were performed to evaluate soil properties.

4. Engineering Analysis and Letter Report

We performed analysis based on the results of the field investigation and laboratory testing. Based on the available data, we prepared this geotechnical letter report presenting our preliminary conclusions and recommendations. Our report includes:

- a. Geological conditions mapped during our geological reconnaissance;
- b. Subsurface conditions encountered by the borings; and
- c. Preliminary recommendations regarding geotechnical foundation support criteria, slope stability, earthwork and settlements.

GEOLOGIC AND SURFACE SOIL CONDITIONS

The island of Oahu is of volcanic origin and was built by the Waianae and Koolau Volcanoes. The two ranges have lost most of their original shield outlines and are now long narrow ridges shaped largely by erosion. A rejuvenated phase of volcanism interrupted the slow decay of Koolau and produced the Honolulu series of volcanics. The youngest cluster of these pyroclastic cones exists along chain that extends northwest from Koko Head at the southeastern

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Page 3

end of the island. The Koko fissure eruptions were hydromagmatic and built cones of vitric ash, now consolidated into tuff. The site is located in the Kahauloa crater.

Kahauloa Crater (Rifle Range) lies directly between Koko Crater and Koko Head, with Koko Crater to the northeast and Koko Head to the southwest. Kahauloa Crater rim is at an elevation of approximately 220' above sea level and the basin of the crater lies at approximately 100' above sea level. The Koko cones consist of a well bedded tuff. The tuff contains blocks of Koolau basalts and fragments of reef limestone which were torn from underlying rocks and deposited with ash during explosive hydromagmatic eruptions. The oldest radiocarbon age dates on volcanic rock from Hanauma Bay and Kakauloa Crater are about 32,000 years. Some ash layers contain blasted bits of coral that date as young as 7,000 years. These dates bracket the eruptions at between 32,000 and 7,000 years.

The Rifle Range is located at the base of the crater. The interior of Kahauloa Crater has been mapped as consisting of the Koko Series soils, though significant grading and filling has occurred in the central portion of the crater. According to the U.S. Soil Conservation Service, there is one soil type at the site, subdivided into two classifications based on slopes. These two soil classifications at the site are the Koko silt loam; 2 to 6 percent slopes (KsB), and 12 to 25 percent slopes (KsD). This series consists of well drained soils which developed in alluvium washed from deposits of volcanic ash, cinders and tuff. They are gently sloping to moderately steep. The annual rainfall amounts to 15 to 25 inches, most of which occurs between November and April.

The Koko silt loam 2 to 6 percent slopes (KsB), which occurs at the base of the crater is a dark reddish-brown to dark brown silt which extends down to about 37 to 56 inches. The substratum consists of cinders and tuff. Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The Koko silt loam 12 to 25 percent slopes (KsD), is similar to KsB except that it fans on the foot of the slope of the crater. Runoff is medium to rapid and the erosion hazard is moderate to severe.

Office of Solid Waste Management records show that the crater was used as a municipal solid waste landfill during 1961 to 1962. The landfill was operated by the City & County of Honolulu as an interim measure during a City incinerator renovation. The method of operation was "burn and dump", and the landfill was closed prior to regulation.

SUBSURFACE CONDITIONS

Three borings were drilled, two within the rifle range and one within the silhouette range to obtain general subsurface information. The location of boring B1 was selected based on



Group 70 International, Inc.
March 30, 2001
Page 4

reports of periodic ground settlement at that location, indicating the possible presence of buried landfill materials.

The two borings located within the rifle range both encountered buried landfill materials (trash). In boring B1, landfill materials were encountered to a depth of approximately 15 feet below grade. In boring B2, landfill materials were encountered to a depth of approximately 19 feet below grade.

The boring located within the silhouette range encountered dense sand fill to a depth of 6.5 feet over basaltic boulders.

DISCUSSIONS AND PRELIMINARY RECOMMENDATIONS

Foundation Support

The main structures requiring foundation support are the 168 concrete baffles and the partial retaining wall structures (total of 1270 feet).

Concrete Baffles - For the concrete baffles, we anticipate that the foundations will primarily be moment foundations requiring a pier foundation. We anticipate that the piers within the landfill area will need to extend through the landfill materials and be founded within the underlying native materials (tuff rock and tuffaceous materials), in order to avoid excessive settlements.

Since the foundation is primarily a moment resisting foundation, lateral soil resistance is required in order to minimize the diameter of the pier. Although the landfill materials contain between 16% and 42% organics based on the results of 4 organic content tests, the filler material used in the landfilling consists of a relatively high strength granular soil. Direct shear testing conducted on samples reconstructed from the sand portion of the landfill material indicates relatively good friction factors. We therefore anticipate that lateral resistance can be obtained by a combination of the following:

1. Compaction of the near surface soils and/or adding compacted granular fills to provide relatively high lateral resistance near the ground surface.
2. Embedding the pier into natural materials to provide relatively high lateral resistance at the bottom of the pier.
3. Assigning relatively lower lateral resistance for landfill materials based on the presence of sandy filler material placed with the organic materials.



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March 30, 2001
Page 5

The actual size and depth of the pier foundations will be dependent upon the applied moment and shear loads, and the results of further investigation and testing. We estimate that piers would likely be on the order of 20 feet deep and 3 to 6 feet in diameter for piers located in former landfill areas.

For piers located where non-landfill type fill materials overlie natural materials, we anticipate that piers would be shallower. The actual size and depth of the pier foundations will be dependent upon the applied moment and shear loads, and the results of further investigation and testing. We estimate that piers would likely be on the order of 10 to 15 feet deep and 3 to 5 feet in diameter.

Partial Retaining Walls - We understand that these structures would provide separation between the ranges, and may be partially retaining in that the ground surface may vary on the two sides of the walls.

We anticipate that these partial retaining walls will be relatively light structures, possibly CMU block walls similar to that currently under construction between the pistol and rifle ranges. For such a structure, we anticipate that near surface spread foundations would be feasible with surface preparation of the near surface fills. Deep foundations may be required for areas with very poor subsurface conditions or if it is anticipated that the walls and foundations would be highly susceptible to settlement damage due to compression of underlying landfill materials.

For planning purposes, we recommend sizing wall foundations based on the following criteria:

Allowable bearing pressure of 1500 PSF.
Active pressure of 35 PCF equivalent fluid
Passive pressure of 250 PCF equivalent fluid
Friction Factor of 0.35

Earthwork and Slope Stability - Based on our site visit, we anticipate that earthwork to fill low areas of the existing ranges and to construct a berm at the back of the range will generally require import of materials. We therefore anticipate that earth berm slope stability requirements can be met by control of the types of materials and by specification of compaction requirements.

We anticipate that we will recommend the use of granular backfills with fines, i.e. silty sands and gravel, compacted to a minimum of 95% of maximum dry density.

M
F
A

MASA FUJIOKA & ASSOCIATES

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Group 70 International, Inc.
March 30, 2001
Page 6

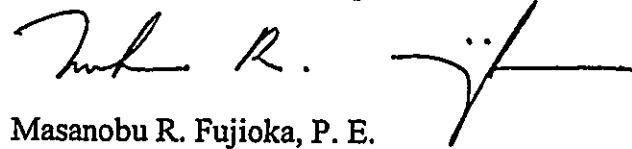
More detailed earthwork specifications will be developed during the design phase of the project.

- o o o -

It has been our pleasure to prepare this geotechnical letter report for you. Please contact the undersigned if there are any questions regarding this letter report.

Respectfully submitted,

MASA FUJIOKA & ASSOCIATES
A Professional Partnership

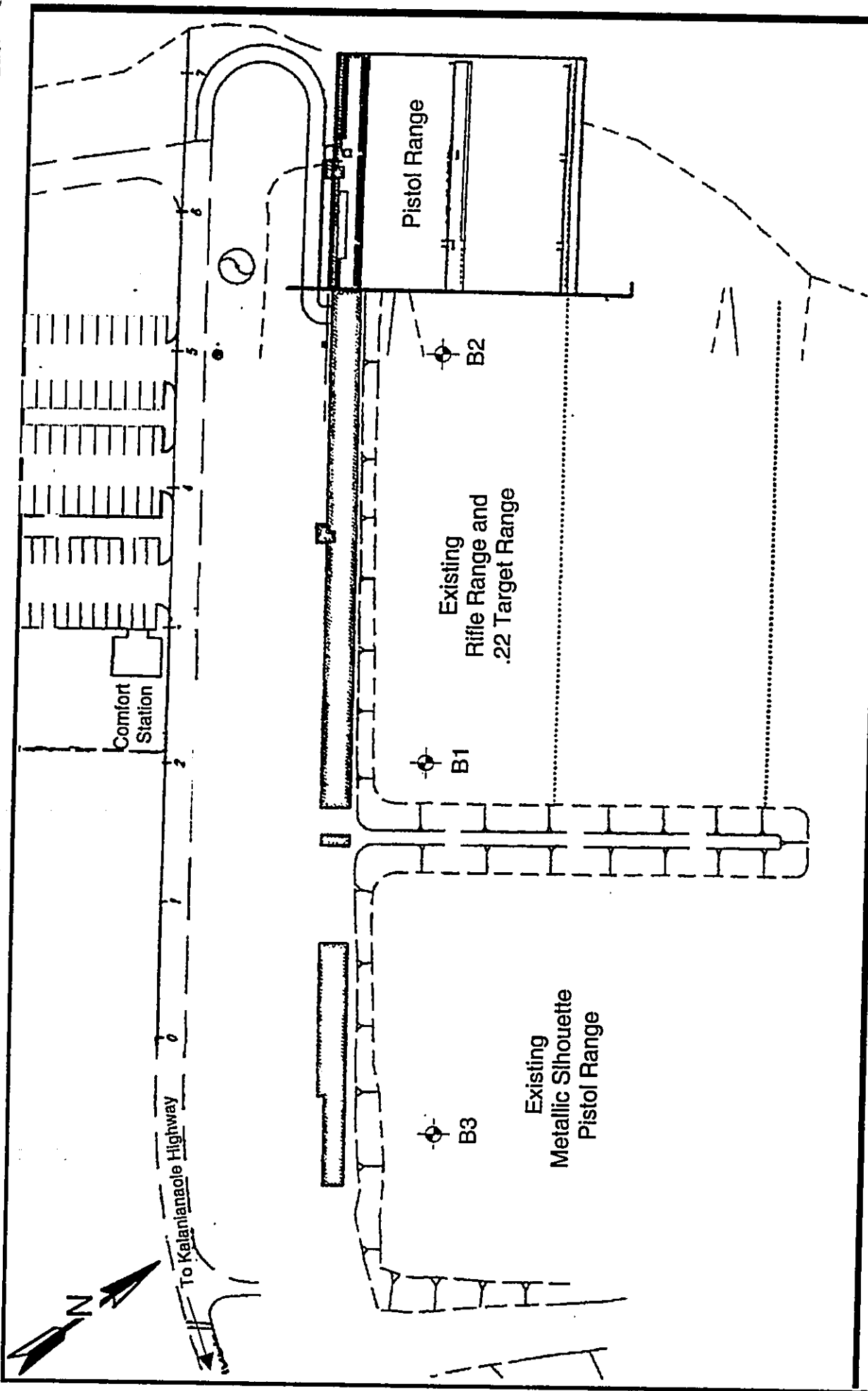


Masanobu R. Fujioka, P. E.
Principal-In-Charge

MRF

(four copies submitted)

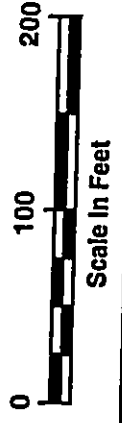
Attachments:	Figure 1	Site Plan
	Figure 2	Geological Reconnaissance Map
	Appendix A	Log of Borings
	Appendix B	Laboratory Test Data



LEGEND

⊕ B3 Boring Location

Source: General Plan Drawing C-2, Sheet 3 of 29
 Department of Parks & Recreation
 City & County of Honolulu Facilities Development Division
 Safety Improvements to Koko Head Rifle Range (7/27/93)



Project No. 01191-015

Drawing No. 001

Approved By: DRD
 Drawn By: BATS

Date: 02-28-01

Scale: 1"=100'

**Figure 1
 SITE MAP**

Koko Head Rifle Range Safety Improvements
 Koko Head Regional Park
 Koko Head, Oahu, Hawaii

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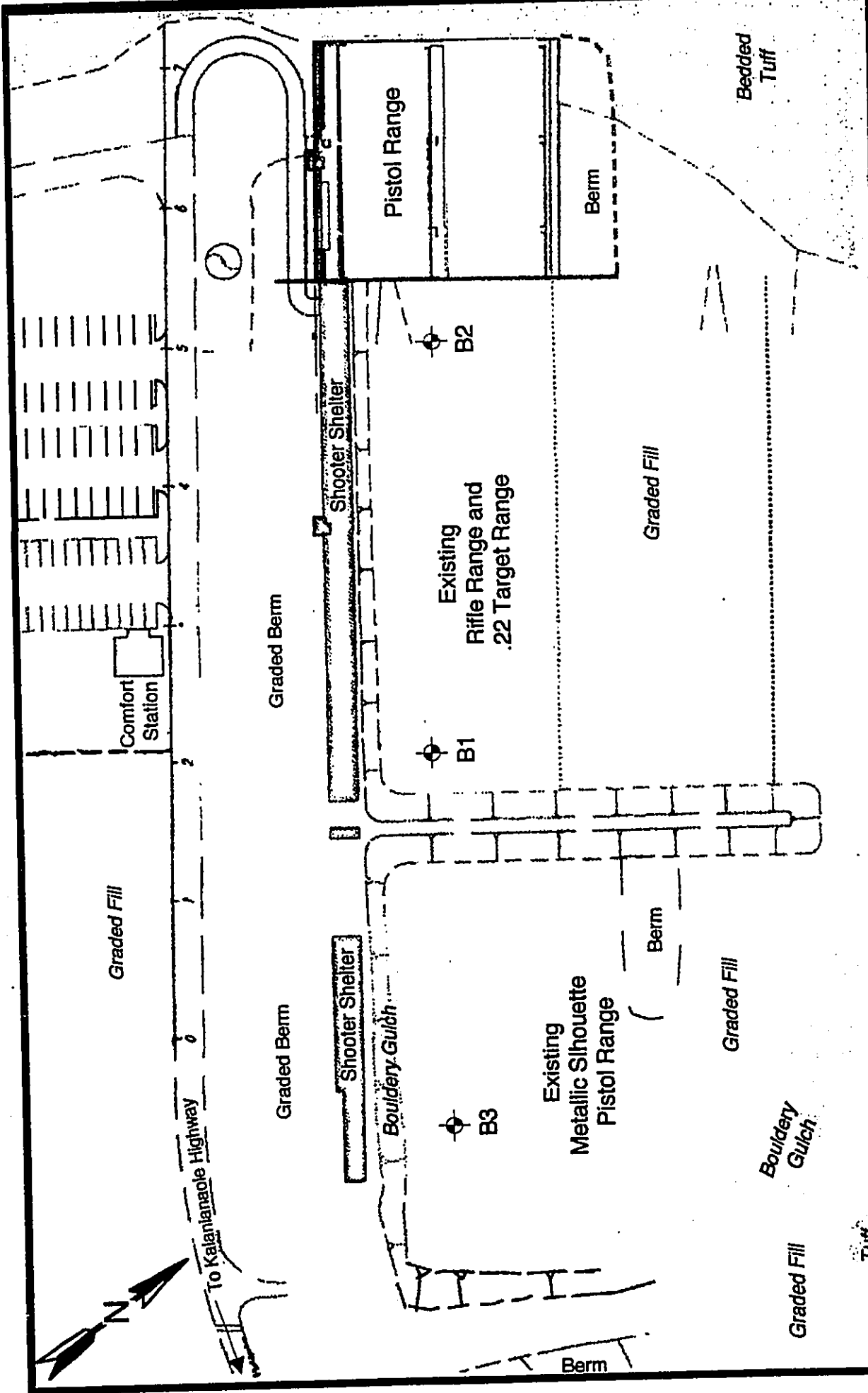


Figure 2
GEOLOGICAL RECONNAISSANCE MAP
 Koko Head Rifle Range Safety Improvements
 Koko Head Regional Park
 Koko Head, Oahu, Hawaii

Project No. 01191-015
Drawing No. 001
Approved By: DRD
Drawn By: BATS
Date: 02-28-01
Scale: 1"=100'

M.F.A. MASA FUJIOKA & ASSOCIATES
 ENVIRONMENTAL - GEOTECHNICAL - HYDROGEOLOGICAL CONSULTANTS

LEGEND

- B3 Boring Location
- Bedded Tuff
- Bouldery Gulch
- Graded Fill

Source: General Plan Drawing C-2, Sheet 3 of 29
 Department of Parks & Recreation
 City & County of Honolulu Facilities Development Division
 Safety Improvements to Koko Head Rifle Range (7/27/93)

APPENDIX A

Log of Borings

Project:
Koko Head Rifle Range Safety Improvement
Koko Crater, Oahu, Hawaii

LOG OF BORING: B1

Date Started: 2/22/01

Date Finished: 2/22/01

Drilling Method: 6" Hollow Stem Auger

Driller: MFA

Surface conditions were barren soil.

Hammer Weight/Drop: 140 lbs, 30" drop

Sampler Type: Split spoon, 2.5" O.D.

Static Water Level: none

Logged By: DRD

Distance
 Along Slope
 (feet)

Material Description

Sample Data

Lab Data

Distance Along Slope (feet)	Material Description	Sample Data				Lab Data		
		Number	Type	Depth	Blows (Per Ft)	Organic Content (%)	M.C. (%)	Density (pcf)
0	Surface Elevation: Unknown							
0 - 5	SM Brown fine silty sand, with basalt gravel/cobbles (fill), loose to medium dense, garbage odor	B1-3	■	1.5'-3'	8	26%	29	68
5 - 10	SM Brown-grey fine to medium silty sand, loose, with trash (landfill materials)	B1-5	■	3.5'-5'	9		10	65
10 - 15	grades with burned wood fragments	B1-10	■	8.5'-10'	10	19%	29	66
15 - 20	RK Green-brown tuff rock SW Greenish-brown sand, loose	B1-15	■	13.5'-15'	53		20	66
20 - 25	END Boring completed at 20 feet on February 22, 2001 - groundwater was not encountered in this borehole.	B1-20	■	18.5'-20'	4		32	63

Masa Fujioka & Associates

Group 70
 01191-015

A-1
 Page 1

Project:
Koko Head Rifle Range Safety Improvement
Koko Crater, Oahu, Hawaii

LOG OF BORING: B2

Date Started: 2/27/01 Date Finished: 2/27/01
 Drilling Method: 6" Hollow Stem Auger Driller: MFA
 Hammer Weight/Drop: 140 lbs, 30" drop Sampler Type: Split spoon, 2.5" O.D.
 Static Water Level: none Logged By: DRD

Surface conditions were barren soil.

Distance Along Slope (feet)	Material Description	Sample Data				Lab Data		
		Number	Type	Depth	Blows (Per Ft)	Organic Content (%)	M.C. (%)	Density (pcf)
0	Surface Elevation: Unknown							
0 - 5	SW Red brown fine sand with basaltic gravel, dense (fill)	B2-3	■	1.5'-3'	41		22	81
5 - 8.5	SM Red brown fine silty sand with basaltic gravel, very loose, with garbage and burned wood	B2-5	■	3.5'-5'	27	16%	21	78
8.5 - 10	SM Red brown fine silty sand with basaltic gravel, very loose, with garbage and burned wood	B2-10	■	8.5'-10'	5	42%	25	52
10 - 13.5	SW Grey basaltic sand, dense	B2-15	■	13.5'-15'	28		18	78
13.5 - 18.5	SM Yellow brown, fine to medium sand (tuff), hard wood pieces	B2-20	⊗	18.5'-20'	Auger grab		25	
20	END Boring completed at 20 feet on February 27, 2001 -- groundwater was not encountered in this borehole.							

SuperLog v2.2 CivilTech Software www.civiltch.com

Masa Fujioka & Associates

Group 70
01191-015

A-2
Page 2

Project: Koko Head Rifle Range Safety Improvement Koko Crater, Oahu, Hawaii	LOG OF BORING: B3
--	-------------------------------

Date Started: 2/27/01	Date Finished: 2/27/01	Surface conditions were bare gravelly grassy soil.
Drilling Method: 6" Hollow Stem Auger	Driller: MFA	
Hammer Weight/Drop: 140 lbs, 30" drop	Sampler Type: Split spoon, 2.5" O.D.	
Static Water Level: none	Logged By: DRD	

Distance Along Slope (feet)	Material Description	Sample Data				Lab Data		
		Number	Type	Depth	Blows (Per Ft)	Organic Content (%)	M.C. (%)	Density (pcf)
0	SM	Surface Elevation: Unknown						
0	SM	Brownish grey silty sand, medium dense (fill)						
1.5		B3-3	■	1.5'-3'	11		28	75
3.5		B3-5	■	3.5'-5'	31		7	78
6.5	BL END	Basaltic boulders Boring terminated at 6.5 feet on February 27, 2001 due to refusal in basaltic boulders – no groundwater was encountered in this borehole.						
10								
15								
20								
25								
30								
35								

www.mfain.com
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APPENDIX B

Laboratory Test Data

TABLE 1
Moisture and Density Test Results

Sample Number	Boring	Depth (in feet)	Moisture %	Dry Density
B1-3	B1	1.5	29.38	67.82
B1-5	B1	3.5	9.76	65.04
B1-10	B1	8.5	29.23	65.69
B1-15	B1	13.5	19.85	66.03
B1-20	B1	18.5	32.37	63.22
B2-3	B2	1.5	21.79	81.12
B2-5	B2	3.5	20.72	78.21
B2-10	B2	8.5	25.27	52.24
B2-15	B2	13.5	17.59	78.34
B2-20	B2	20	25.37	--
B3-3	B3	1.5	27.56	75.13
B3-5	B3	3.5	6.97	77.61

Notes:

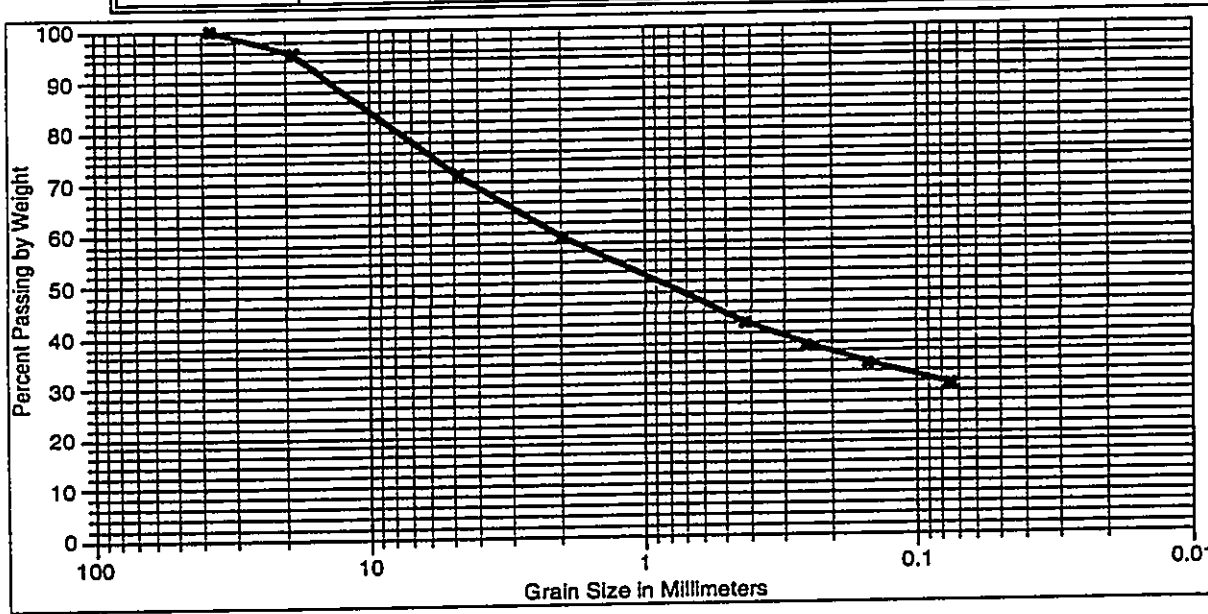
-- = No test done for this sample

TABLE 2
Percent Organics Test Results

Sample Number	Boring	Depth (in feet)	% Organics
B1-3	B1	1.5	25.56
B1-10	B1	8.5	18.96
B2-5	B2	3.5	15.84
B2-10	B2	8.5	41.51

TABLE 3
Grain Size Analysis Test Results

Sample Number	Boring	Depth (in feet)	USCS Soil Type	Soil Description
B1-5	B1	3.5	SM	Brown silty sand



Sample Number	Boring	Depth (in feet)	USCS Soil Type	Soil Description
B2-3	B2	1.5	SW	Tan gravelly silty sand

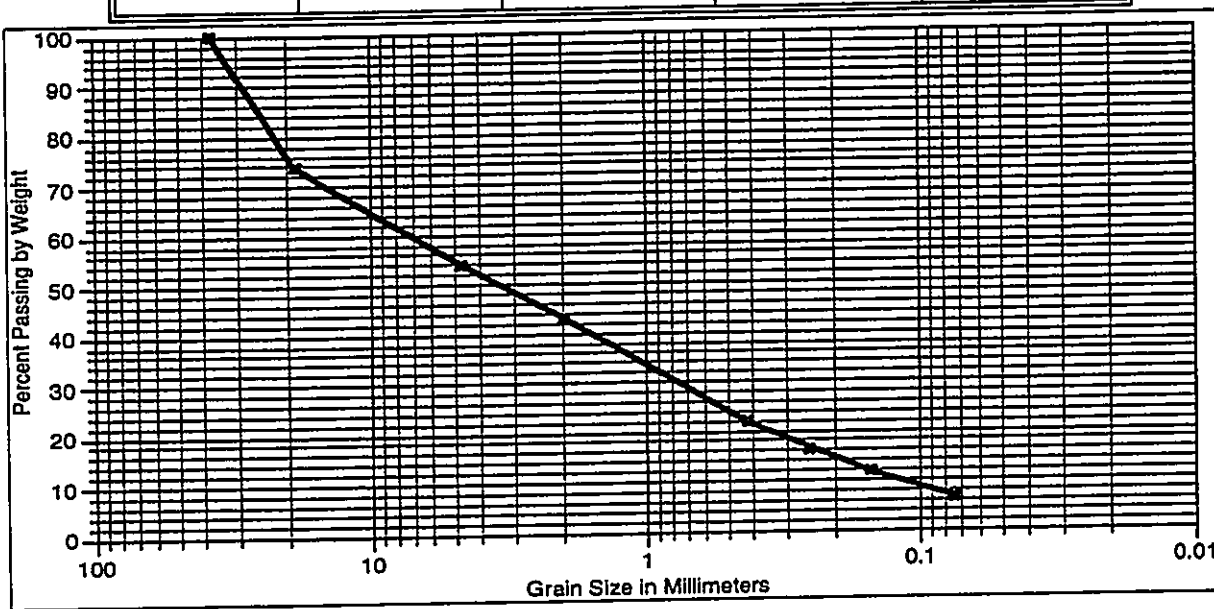
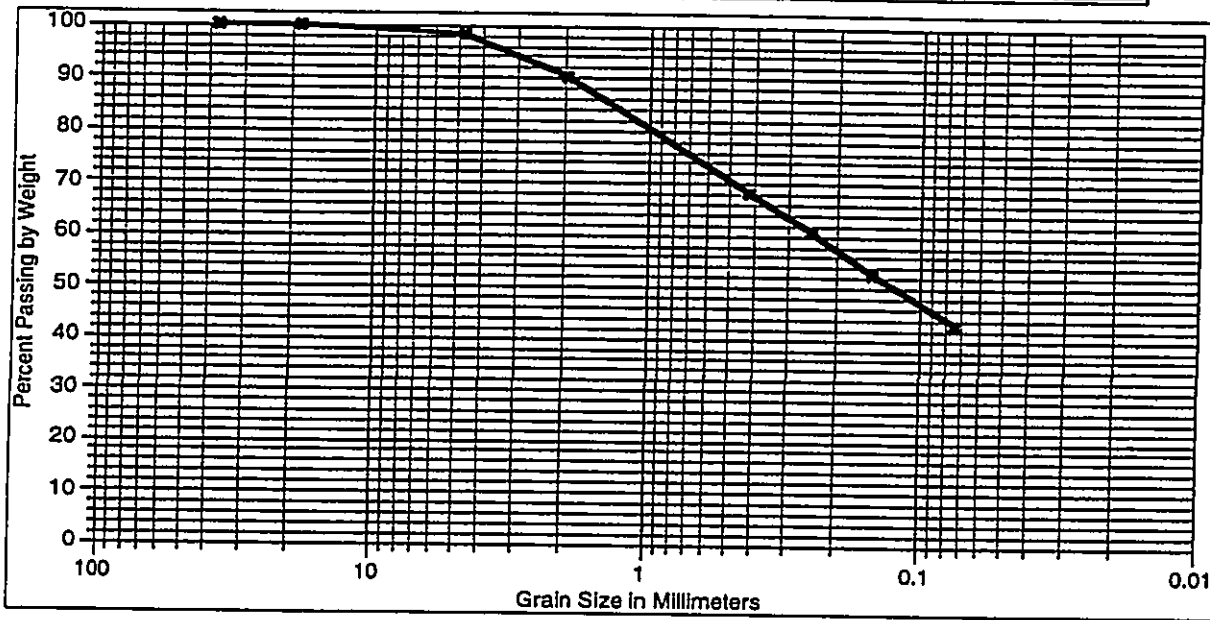


TABLE 3 (Continued)
Grain Size Analysis Test Results

Sample Number	Boring	Depth (in feet)	USCS Soil Type	Soil Description
B2-20	B2	18.5	SM	Brown silty sand



Sample Number	Boring	Depth (in feet)	USCS Soil Type	Soil Description
B3-3	B3	1.5	SM	Gray silty sand

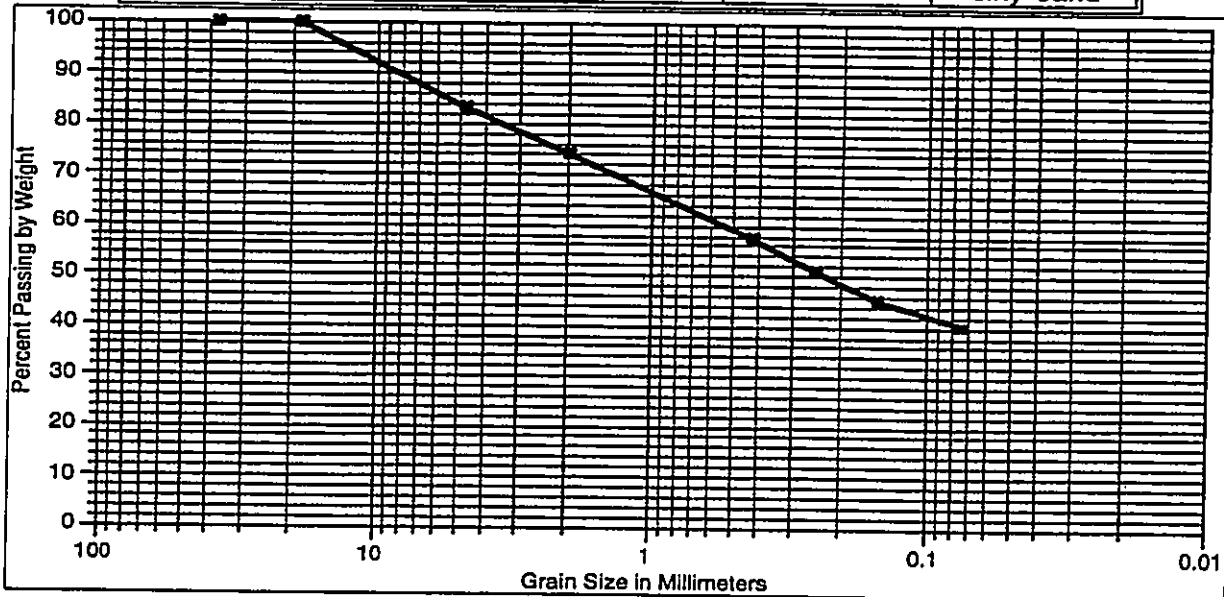


TABLE 4
Direct Shear Test Results

Sample Number	Boring	Depth (in feet)	USCS Soil Types	Internal Friction Angle
B1-20	B1	18.5	SM	36 Degrees

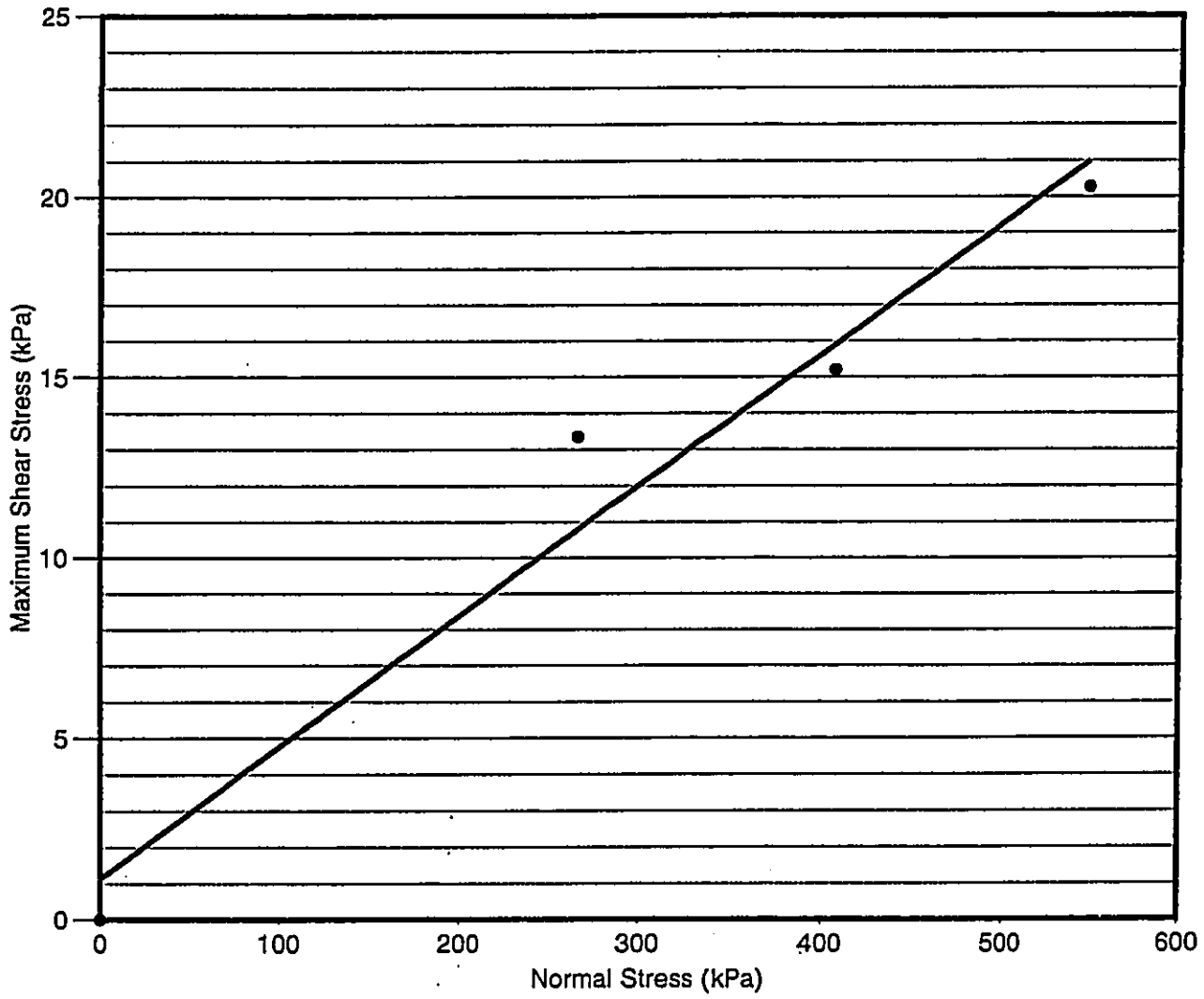


TABLE 4 (Continued)
Direct Shear Test Results

Sample Number	Boring	Depth (in feet)	USCS Soil Type	Internal Friction Angle
B2-15	B2	13.5	SW	39.5 Degrees

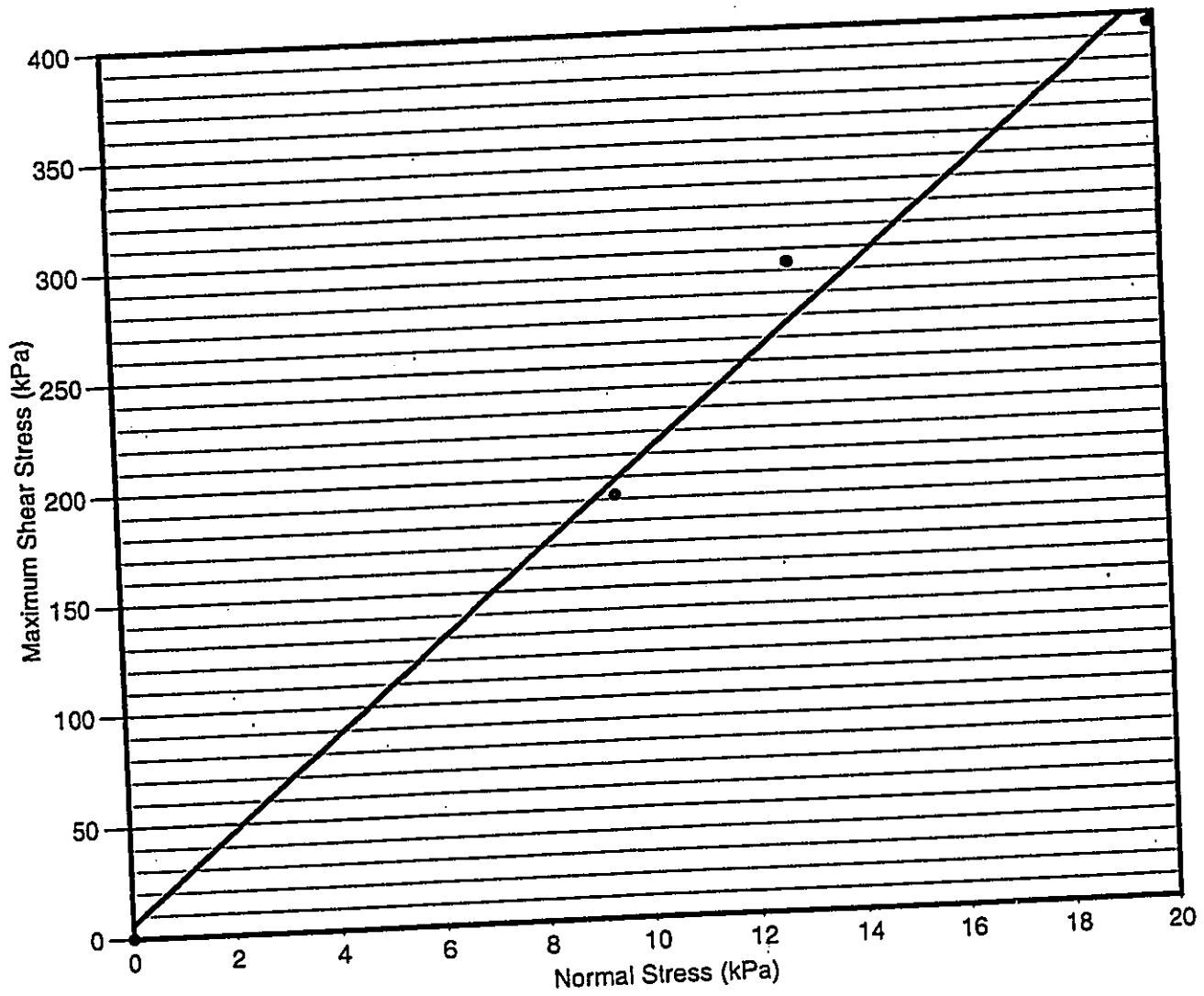
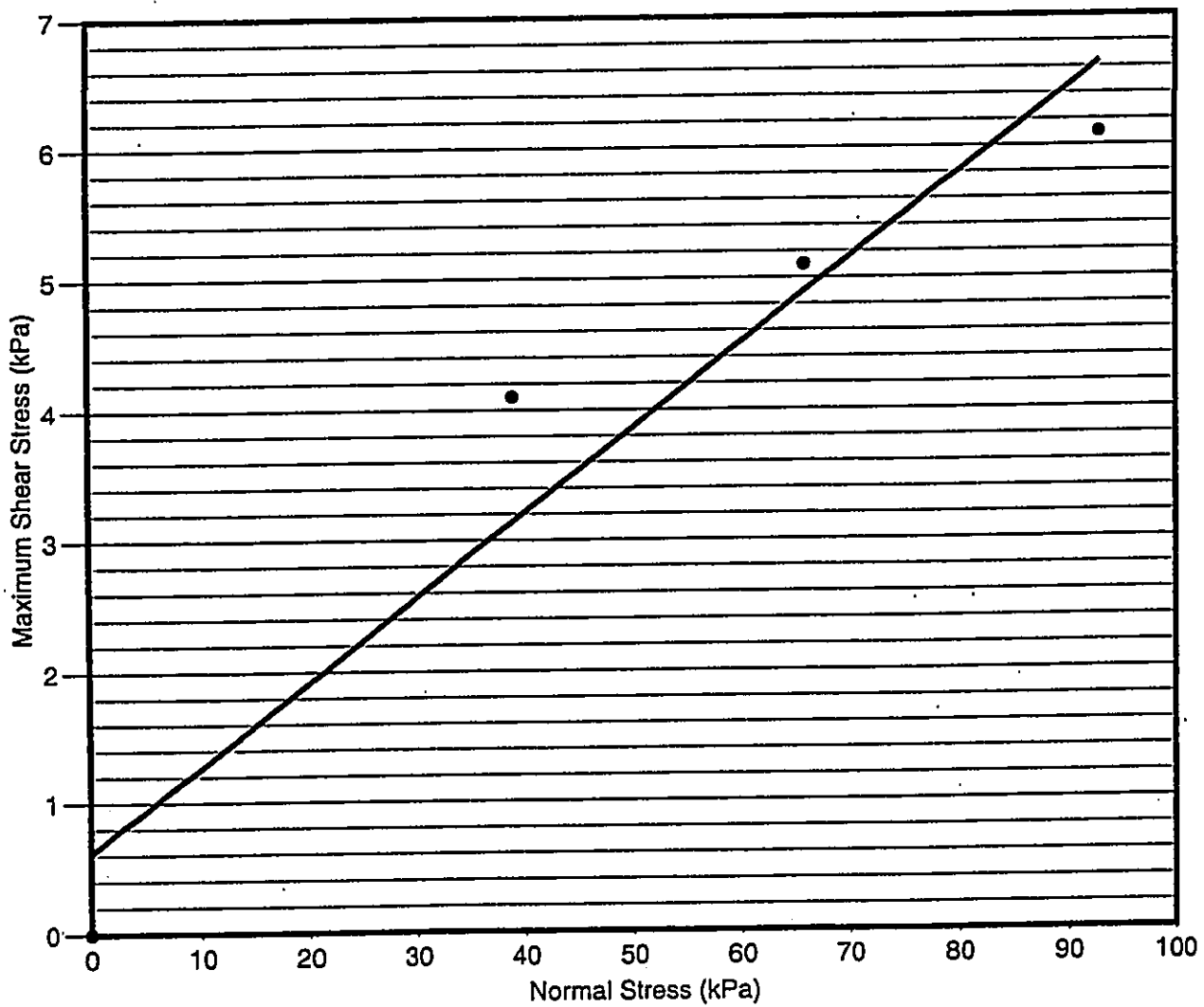


TABLE 4 (Continued)
Direct Shear Test Results

Sample Number	Boring	Depth (in feet)	USCS Soil Type	Internal Friction Angle
B3-5	B3	3.5	SM	38.5 Degrees



APPENDIX D

**Archeological and Cultural Assessment for the Proposed Koko Head
District Park Master Plan and Shooting Complex Safety
Improvements**

Jeff Pantaleo Consultants, LLC

June 18, 2001

JEFFREY PANTALEO CONSULTANTS, LLC (JPC)
1120 Hassinger St. #207
Honolulu, Hawaii 96822
Tel./Fax (808) 524-5142
e-mail: Jpanta4149@aol.com

18 June 2001

Mr. Jeffrey Overton
Group 70 International
925 Bethel St. 5th Floor
Honolulu, Hawaii 96813

Re: Archaeological and Cultural Assessment for the Proposed Koko Head District Park
Master Plan and Shooting Complex Safety Improvements

Dear Mr. Overton:

Jeffrey Pantaleo Consultants, LLC (JPC) conducted an archaeological and cultural assessment in conjunction with an Environmental Impact Statement (EIS) for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements. The project area is located in Maunalua *ahupua'a*, Kona District, along the southeastern coast of O'ahu Island (TMK 3-9-12, por. 10)(Figure 1). The objective of the current investigation was twofold; 1) to review previously completed archaeological and cultural studies in the current project area and vicinity to determine whether sufficient information had been obtained to evaluate the cultural significance of the area and satisfy State regulatory requirements, and 2) to conduct any additional work as deemed necessary. This assessment was conducted through a review of previous reports and consultations with representatives of community groups in Hawaii Kai and the State Historic Preservation Division of the Department of Land and Natural Resources (SHPD/DLNR).

New facilities proposed at the Koko Head District Park include picnic areas, a soccer field, a multi-purpose field, a multi-use skate rink for in-line hockey and recreational skating, a skate park for skateboarding, two tennis courts with backboards, a 50-meter pool, two playgrounds, a 9-hole disc golf course, and a new center for indoor teen activities. Relocation and/or renovation of existing facilities includes expanding and re-orienting Goear Memorial Ballfield, maintaining the basketball courts, relocating the existing volleyball/basketball courts, and relocating the existing bicycle motorcross. Infrastructural improvements include creating an interconnected walking/jogging path, adding restrooms, building a new perimeter access road, adding approximately 280 parking stalls, adding bike racks, and installing lights and bleachers for the soccer fields and tennis courts (Figure 2). Proposed improvements at the Koko Head Shooting Range include design and construction of a baffling system for the pistol, rifle, and metallic silhouette ranges; an archery range; additional parking spaces; improving the Range Master's office and residence; and installing fencing and signage (Figure 3).

The scope of work for the current investigation included:

1. reviewing previous archaeological and cultural documents;
2. determining whether the existing reports satisfy State regulations;
3. consultation with representatives of community groups in Hawaii Kai;
4. coordination with the SHPD/DLNR; and
5. preparation of a report.

A review of previous archaeological studies in the current project area and vicinity was conducted at the SHPD/DLNR library in Kapolei, O'ahu Island. These included cursory surveys by McAllister (1933) and PHRI (1988), and an inventory survey of eight areas within the Koko Head Regional Park by Cultural Surveys Hawaii (1998). SHPD/DLNR (1989) recorded State Site 50-80-15-4194, a human burial, located in a cave along the outer southeastern slope of Koko Head Crater.

No archaeological sites were previously recorded in the subject project areas. According to review letters addressed to the City and County of Honolulu Planning Department (1998) and Group 70 International, Inc. (2001), SHPD/DLNR stated that the proposed improvements would have no effect on significant historic sites, and no further archaeological work is recommended (SHPD March 19, 1998, Log. 20212, Doc. 9802EJ21). "However, since the rifle range has been in use for over fifty years, the structures are of historic age and should be assessed for their significance." (SHPD/DLNR March 28, 2001, Log. 27167, Doc. 0103EJ12)

The cultural assessment involved determining whether further procedures such as oral interviews were warranted. An historical documentary research by Kumu Pono Associates (1998), conducted in conjunction with the 1998 EIS, provided detailed background information concerning Kawaihoa-Kuamo'okane, Hanauma, and Kohelepelepe-The Koko Head Nature Preserve. This study provided insights into the traditional history of Maunaloa *ahupua'a*, and customs and practices of the people of the area. Early historical accounts of the area were also cited, and provided information regarding history, land tenure, and changes in land use.

Based on previous archaeological and historical research, together with compounded development in the proposed areas for a shooting range and district park, no further archaeological or cultural work is recommended. However, since the shooting range has been used for 64 years, any structures 50 years or older are considered historic sites.

The Koko Head Shooting Complex has been used as a firing range since 1937. The only extant structure remaining from the World War II period in the complex is the Honolulu Police Department (HPD) Range Staff Office, currently being used as an administrative and maintenance facility in support of HPD training exercises. In consultation with SHPD/DLNR, Architectural Branch, an assessment of this building was conducted (see Attachment, Historic Resources Inventory Form).

The HPD Range Staff Office has been altered since its initial construction during the World War II period. This altered building is located in its original site. It is rectangular in plan view and situated on a level area in the southwestern corner of the Shooting Complex (Figure 4). The building is bounded by a small drainage to the north, open land to the west, a parking area to the east, and a trap range to the south. The building measures approximately 12 by 5 m, and is constructed of CMU and a flat wooden roof covered with metal sheets (Figure 4). The roof overhangs the building on all sides. The flat roof is slightly slanted from south to north (Figure 5). A shooting shelter was later added to the south end of the building. It is constructed of wooden beams covered with corrugated tin, and extends approximately 5 meters south from the southern end of the building (Figure 5). The doors of the building are wooden, and the windows along the south wall are glass and along the eastern side of the north wall are glass jalousies. Vents along the west wall and western side of the north wall are covered with vertical wooden slats (Figure 6).

The interior of the building has been converted into an office. Public restrooms are located along the western side of the structure.

The remaining structures in the Shooting Complex, including the rifle range shooting shelters, comfort station, skeet range, and combat range, are less than 50 years old. Other World War II structures that may have been located in the Shooting Range are no longer present. The entire project area has been extensively altered, and the potential of encountering subsurface cultural remains is low.

In closing, the previously completed archaeological procedures and cultural assessment adequately cover the current project areas. SHPD/DLNR has stated that no further work is warranted with the exception of documenting historic buildings in the Shooting Complex. The current undertaking has fulfilled this requirement. Thus, no further archaeological or cultural procedures are deemed necessary for this project. In view of the compounded previous disturbances and negative results of previous investigations, archaeological monitoring during construction also appears not to be warranted.

If you have any questions or comments concerning this project, please contact me at (808) 524-5142.

Sincerely,



Jeffrey Pantaleo, M.A.
Consulting Archaeologist

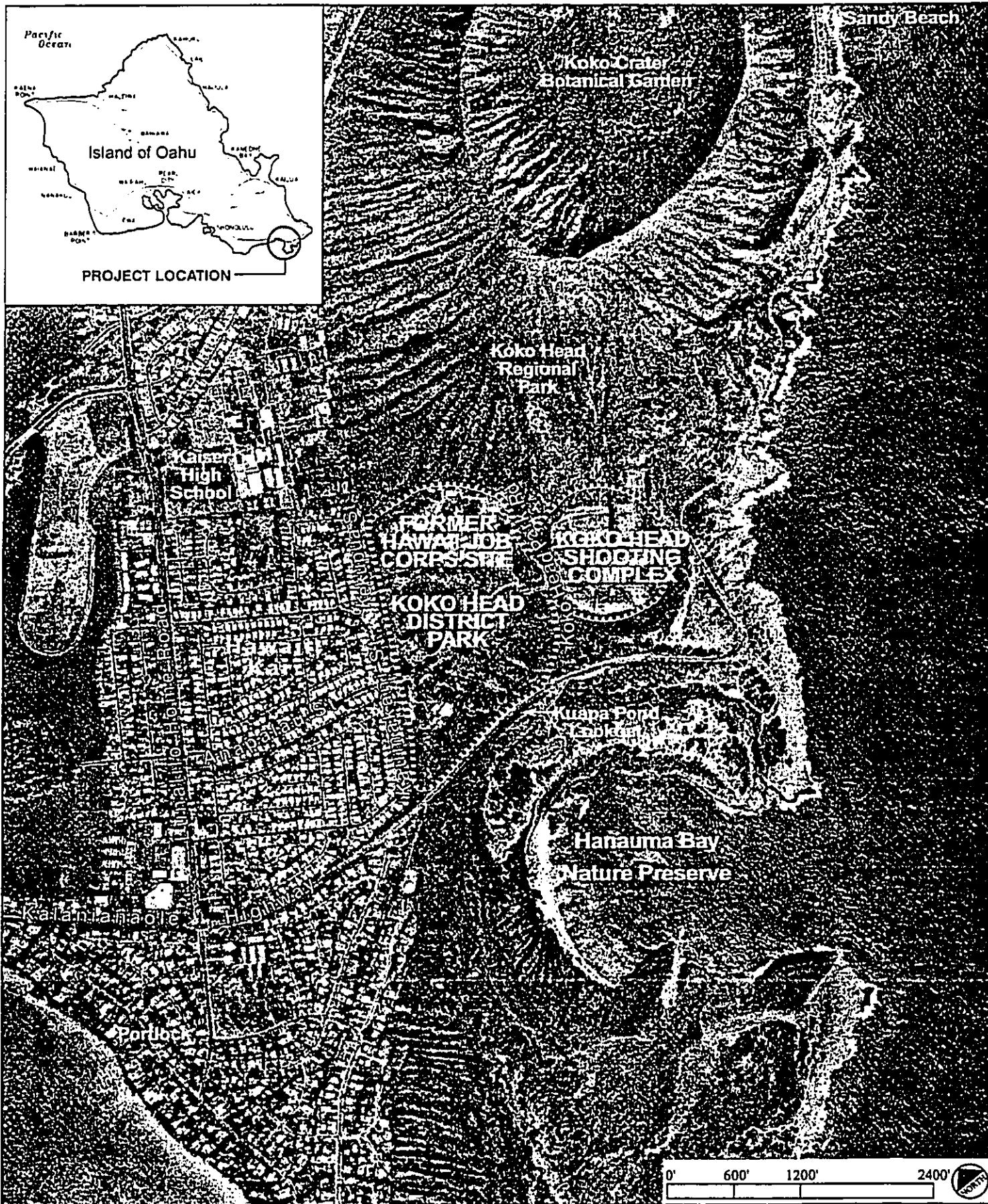


Figure 1. Location of Koko Head District Park and Koko Head Shooting Complex

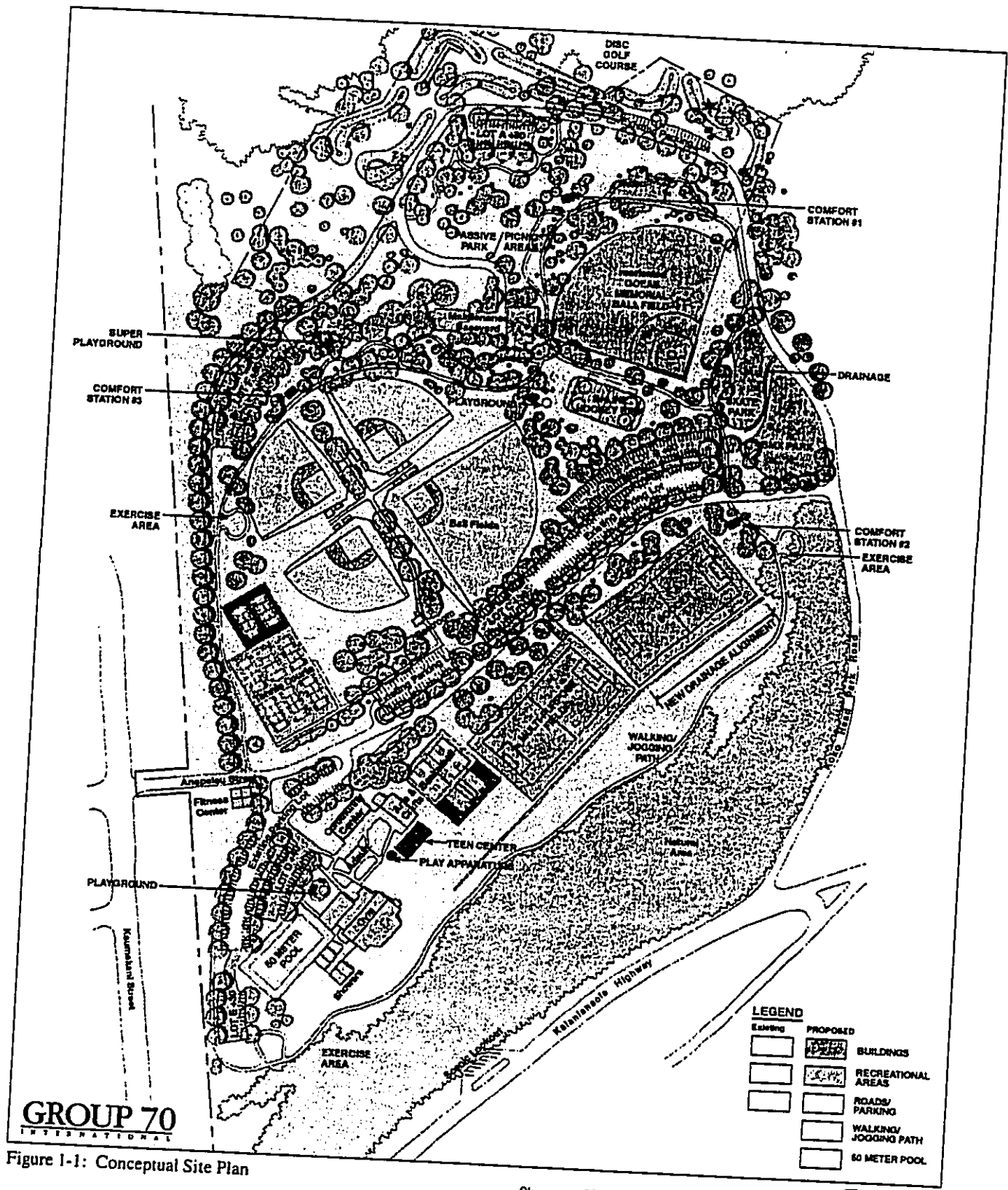


Figure 1-1: Conceptual Site Plan

Figure 2. Koko Head District Park Master Plan

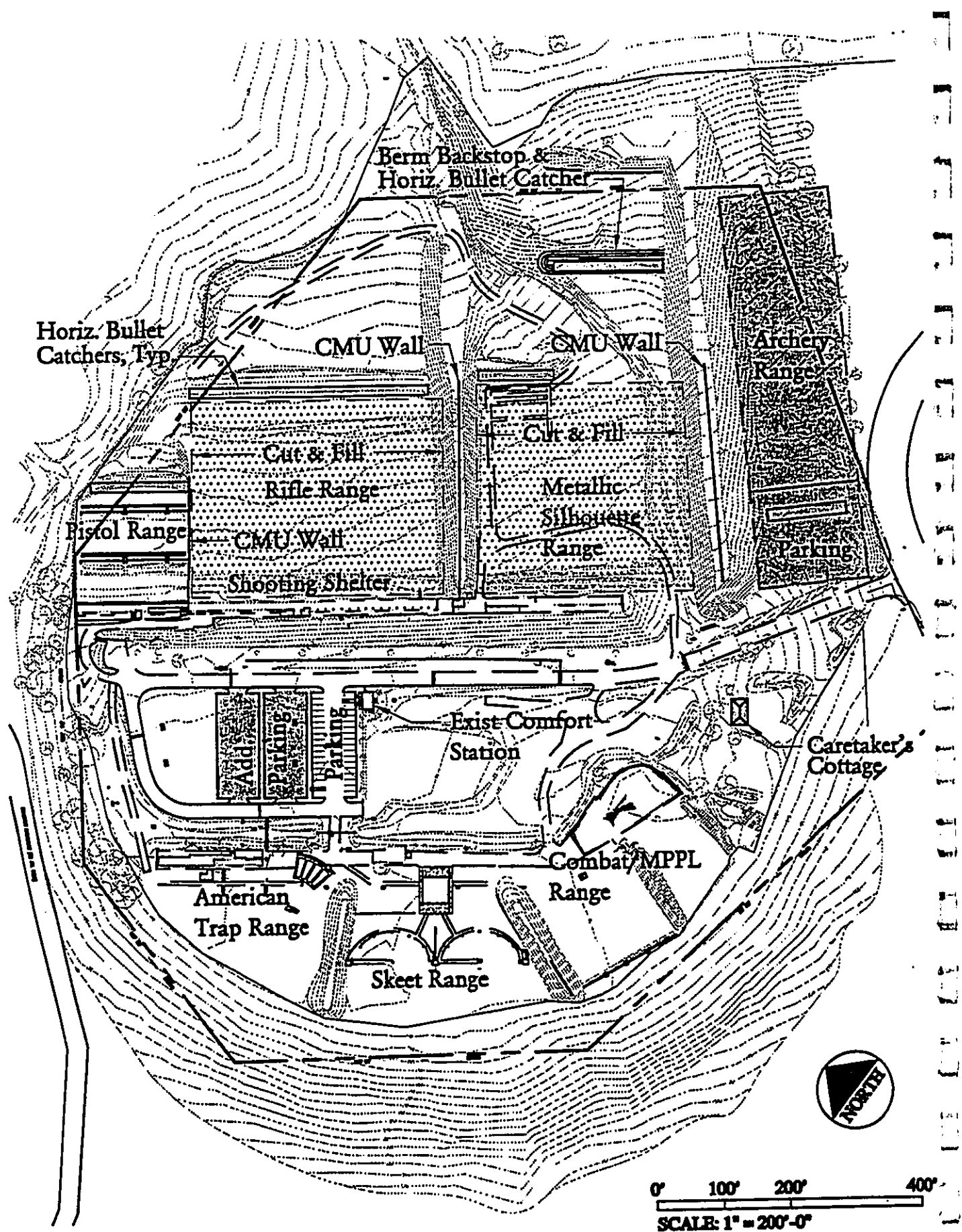


Figure 3. Koko Head Shooting Complex Site Plan

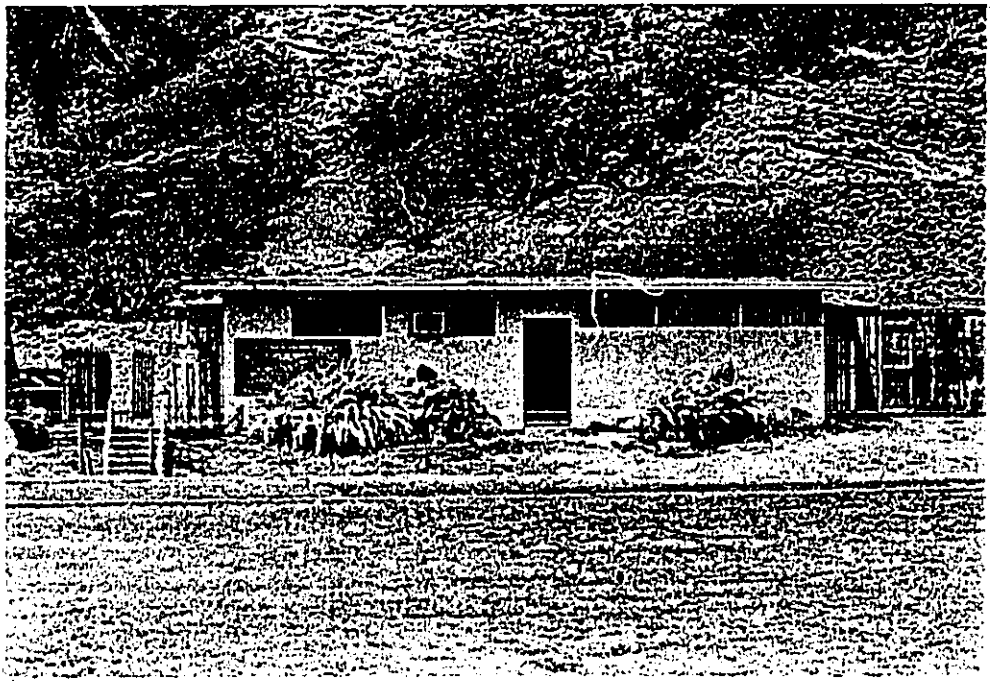
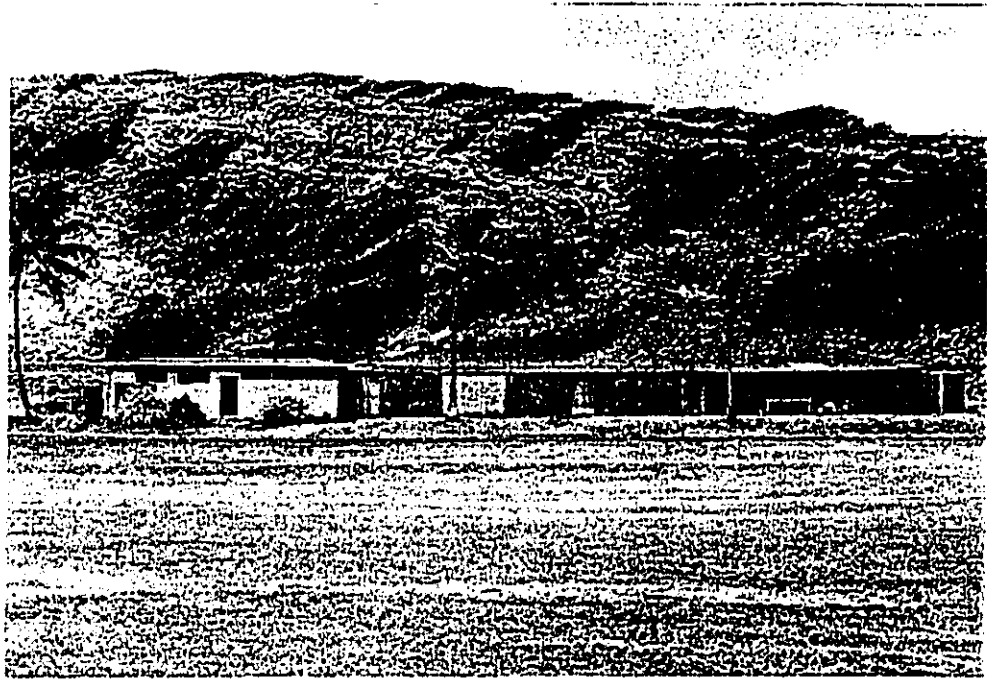


Figure 4. Top: Overview of Historic Building, View to South. Bottom: Historic Building Showing Recent Modifications, View to South

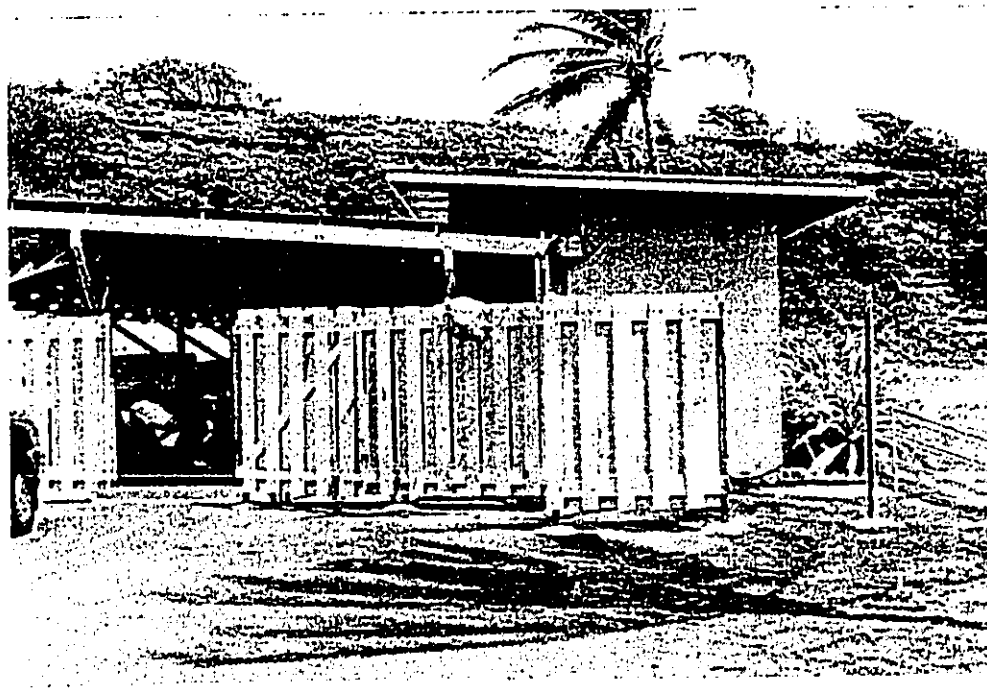
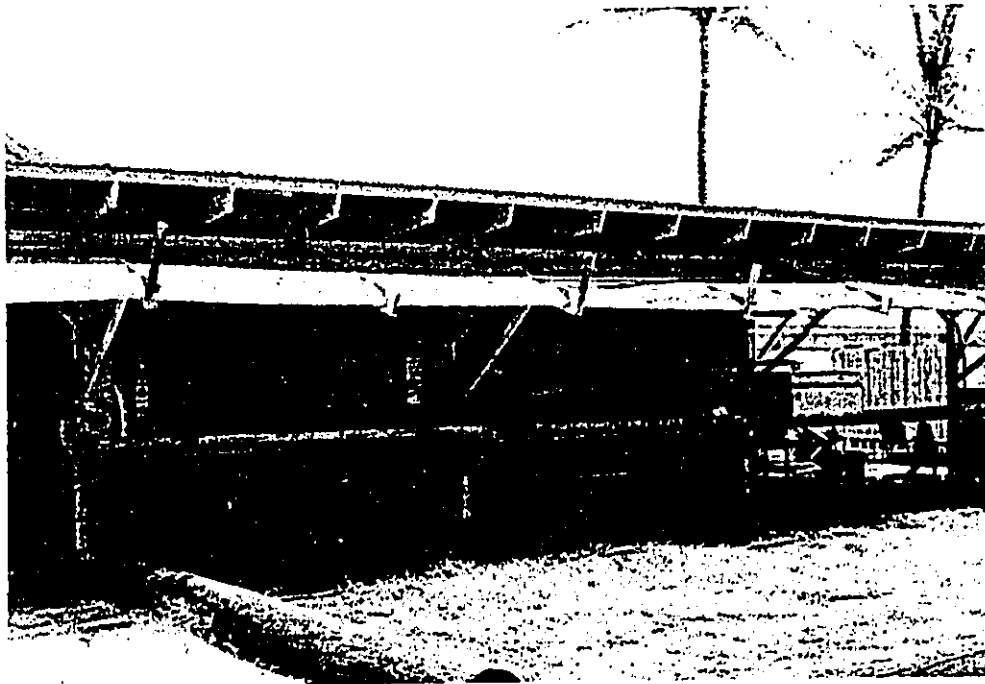


Figure 5. Top: South Side of Building Showing Shooting Shelter, View to Northeast.
Bottom: East Side of Building Showing Shooting Shelter and Fence, View to West.

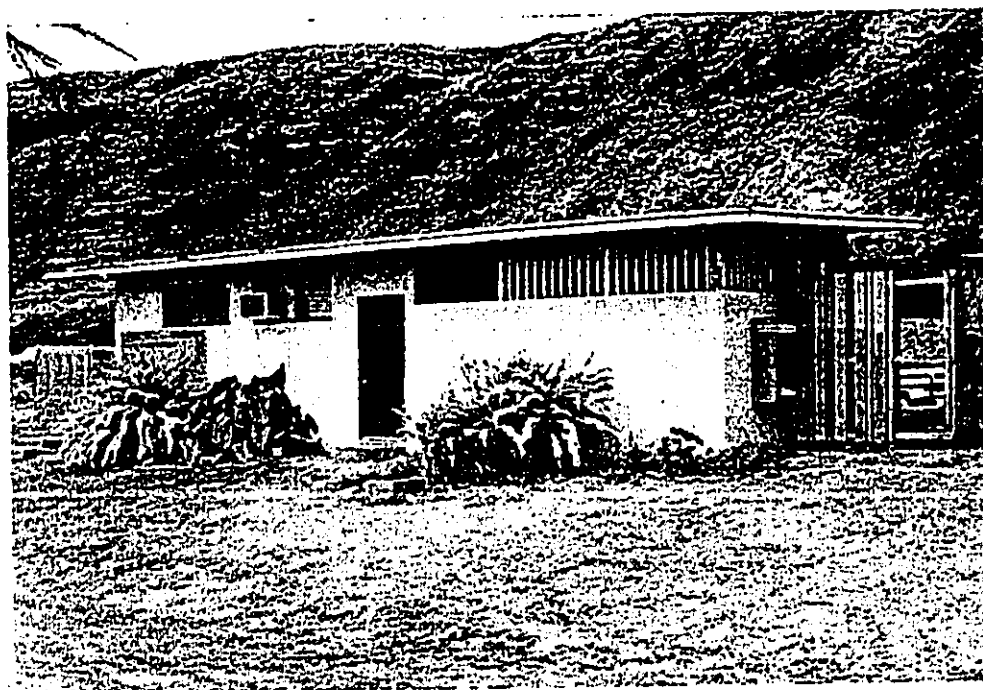
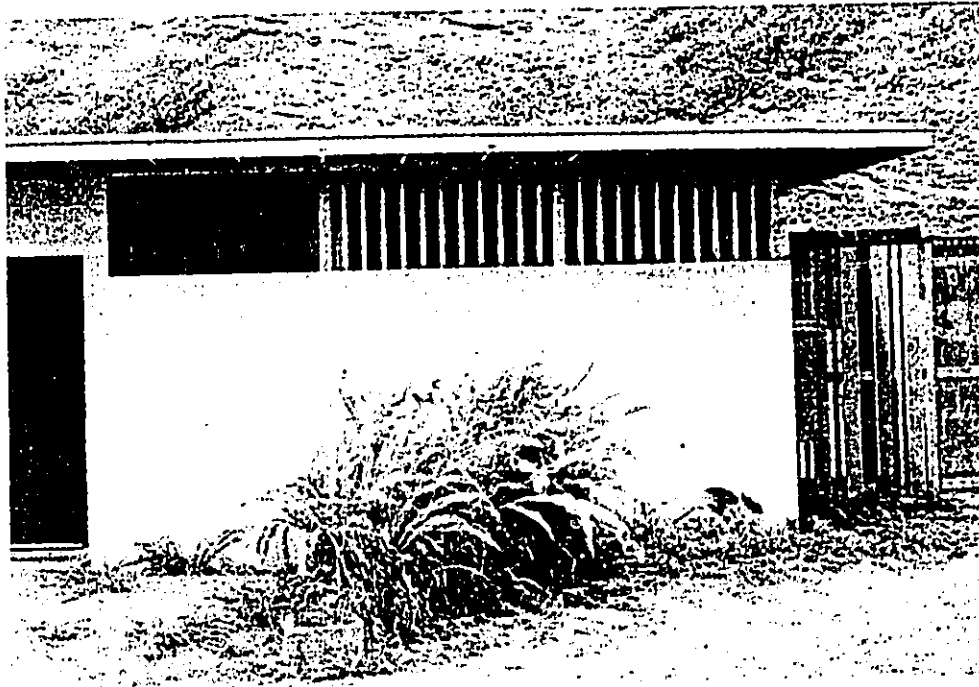


Figure 6. Top: North Wall of Building Showing Vents, View to South.
Bottom: North and West Sides of Building, View to Southeast

REFERENCES

- Borthwick, D., J. Winieski, R. Chiogioji, and H. Hammatt
1998 *Archaeological Inventory Survey of Eight Areas within the Koko Head Regional Park, Maunaloa Ahupua'a, Island of Oahu*. Cultural Surveys Hawaii.
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1998 *Historical Documentary Research: Kawaihoa-Kuamo'okane, Hanauma, and Kohelepelepe-The Koko Head Regional Park and Nature Preserve*. Kumu Pono Associates
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1933 *Archaeology of Oahu*. B.P. Bishop Museum Bulletin 104. Bishop Museum Press, Honolulu
- Rosendahl, Paul
1988 *Archaeological Field Inspection Survey Koko Head Regional Park Resource Plan Project*. Paul H. Rosendahl Inc.
- SHPD, DLNR
1989 Koko Crater Slope Burials, State Site No. 80-15-4194. State Department of Land and Natural Resources File Memorandum (December 14, 1989)
- 1998 Letter: Chapter 6E-8 Historic Preservation Review – Development Plan Public Facilities Map Amendment for East Honolulu – Koko Head Regional Park and Nature Preserve 98/EH-100(1C), Maunaloa, Kona, O'ahu.
- 2001 Letter: Chapter 6E-8 Historic Preservation Review – Koko Head Regional Park and Shooting Complex Environmental Impact Statement Notice of Preparation, Maunaloa, Kona, O'ahu (TMK 3-9-012:010)

ATTACHMENT
Historic Resources Inventory Form

Site #
TMK 3-9-12:10 p.c.

HISTORIC RESOURCES INVENTORY

IDENTIFICATION

1. Common Name: Honolulu Police Department Range Staff Office
2. Historic Name, if known: _____
3. Street or rural address: Keke Head Shooting Range complex
City: Honolulu Zip: 96825 County: HAWAII KAI/HNL
4. Present Owner, if known: City and County of Honolulu
Address if different from above: _____
5. Ownership is: Public Private
6. Present Use: HPD office/maintenance Original Use: office
Other Past Uses: _____

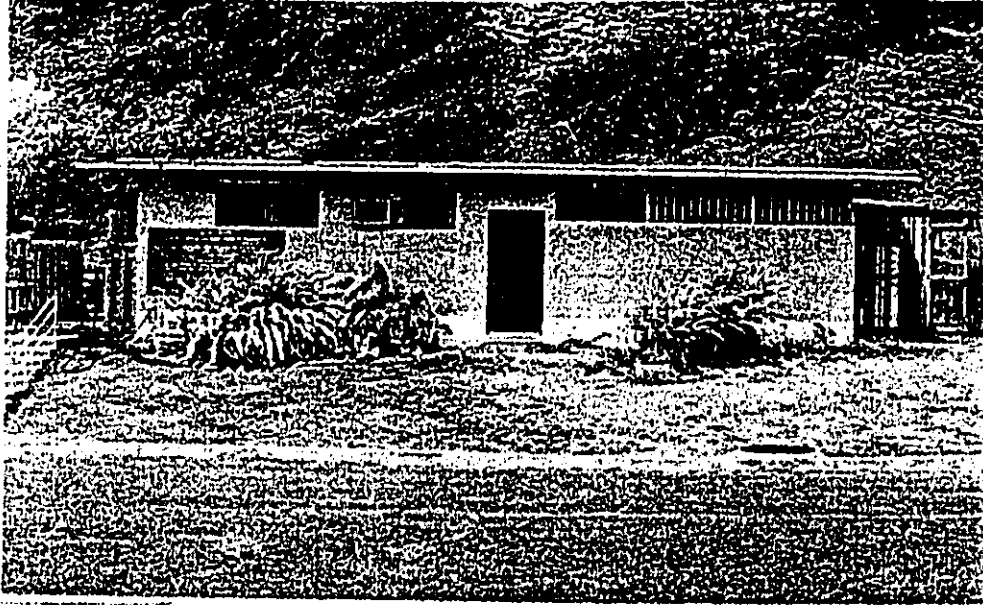
DESCRIPTION

7. Physical Appearance:

Style: slab built block
Primary Exterior Building Material: Stone Stucco Adobe CMU Other
Wood: Clapboard Shiplap Vertical Board Board and Batten
 Shingle Other
Roof: Gable Hipped Other Flat single Pitch Special features
Roofing Material wood covered with metal South to North
Roof Trim: Closed Eaves Overhanging Eaves Brackets
Dormers: Gabled Hipped Shed Eyelid Other
Porch: Inset Outset Open Enclosed Facade length
 Wraparound Centered Offset
Door: Centered Offset Inset Transom Side Panels
 Sidelights Window Other
Windows: Double-Hung Sliding Casement Awning Jalousies
 Plate glass Other
Number of panes: 7
Chimney: Brick Concrete Rock Other
Interior features: restrooms
Other Features: _____

8. Approximate Property Size: Frontage 12x5m Depth _____
or approximate acreage _____
9. Is the feature Altered Unaltered? Note when and what alterations on back of sheet.
10. Surroundings: Open Land Scattered Buildings Densely Built-up
 Residential Commercial Industrial Other
11. Is the structure on its original site moved unknown
12. Year of initial construction WWII This date is factual estimated.
13. Architect (if known) _____
14. Builder (if known) _____
15. Related features: Barn Carriage House Outhouse Shed(s)
 Formal Garden(s) Windmill Watertower/Tankhouse
 Garage Servants' or Guest House Trap Range Other

16. Date of attached photograph JUNE 12, 2001



SIGNIFICANCE

17. Briefly state historical and/or architectural importance, including dates, events, and persons associated with the site, when and what alterations have been made (if known):

Building was originally constructed during World War II, post A.D. 1937, as an office for a shooting range. Alterations included a roof, shooting shelter, fence, glass windows, door, and interior space for an office. The building is currently used as an administrative and maintenance facility by the Honolulu Police Department in support of training exercises.

18. Sources: List books, documents, surveys, personal interviews, and their dates:

personal interview, Koko Head Shooting Range caretaker, 2001, June 12

Berthwick, D.S., Winicki, R., Chiogioji, and H. Hammit

1998 Archaeological Inventory Survey of Eight Areas within the

Koko Head Regional Park, Maunaloa Ahupua'a, O'ahu. Cultural Surveys Hi

Maly, Kapa, and Helen Smith

1998 Historical Documentary Research: Kawaihau-Kuamoo Kane,

Hanauma, and Kokohelelope - The Koko Head Regional Park and Nature Preserve.

CREDITS

Date form prepared 6/18/01 By (name): JEFFREY PANTALEO

Address: 1120 HASSINGER ST. #207 City: HONOLULU Zip: 96822

Phone: (808) 524-5142 Organization: Jeffrey Pantaleo Consultants

STATE USE ONLY:

APPENDIX E

**Historical Documentary Research: Kawaihoa-Kuamo'okane
Hanauma, and Kohelepelepe –
The Koko Head Regional Park and Nature Preserve**

Kumu Pono Associates

October 19, 1998

**Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko
Head Regional Park and Nature Preserve, East Honolulu, Island of
Oahu, Final Environmental Impact Statement, August 1999.**

HISTORICAL DOCUMENTARY RESEARCH:

**Kawaihoa-Kuamo 'okāne, Hanauma, and Kohelepelepe—
The Koko Head Regional Park and Nature Preserve**

**Ahupua'a of Maunaloa
District of Kona, Island of O'ahu
(TMK: 3-6-12; por. 1,2,4,6,8,9,10,12,13,14 & 16)**

BY
Kepi Maly • Cultural Resources Specialist
&
Helen Wong Smith • Archivist.

PREPARED FOR
Group 70 International
923 Becket Street, 7th Floor
Honolulu, Hawaii 96813-4307

October 19, 1998
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Kumu Pono Associates
Kepi Maly, Consultant
Historical & Archival Documentary Research • Oral History Studies • Partnerships in
Cultural Resources Management • Developing Preservation Plans and Interpretive Programs
534 Keawana St. - Hilo, Hawaii 96720 • (ph-fax) 808.931.0196 • (e-mail) kpm@harpoc.net

**HISTORICAL DOCUMENTARY
RESEARCH:
KAWAIHOA-KUAMO'OKANE, HANAUMA,
AND KOHELEPELEPE – THE KOKO HEAD
REGIONAL PARK AND NATURE PRESERVE**

**AHUPUA'A OF MAUNALUA,
DISTRICT OF KONA,
ISLAND OF O'AHU**



Kumu Pono Associates
Historical & Archival Documentary Research • Oral History Studies • Partnerships in
Cultural Resources Management • Developing Preservation Plans and Interpretive Programs

EXECUTIVE SUMMARY

Overview

At the request of Mr. George Aita, AICP, of Group 70 International, Kēpā Maly and Helen Wong Smith (Kumu Pono Associates), conducted archival and historical documentary research and prepared the following report in conjunction with the preparation of an Environmental Impact Statement for the Koko Head Regional Park and Nature Preserve (the park). The study area is situated in the *āhupuaʻa* (native land division) of Maunaloa, in the district of Kona (Honolulu), Island of Oʻahu (TMK: 3-9-12; por. 1,2,4,6,8,9,10,12,13,14 & 16). The park is approximately 1,265 acres in size, and includes portions of the shoreline, the summits of two volcanic cones (at elevations of 642 feet and 1208 feet above sea level), and *kaula* (islands) extending a short distance inland of the craters, on the arid, southeastern side of Oʻahu. The park is fronted by approximately six miles of shoreline and bounds the three landward sides of Hanalei Bay.

Archival Research

The archival historical documentary research reported in this study was primarily conducted between September 10th to October 9th, 1998, and includes archival resources from land documents, survey and cartographic records, historic literature and journals, native texts from Hawaiian language newspapers, and selected archaeological studies. Resource materials were reviewed in the collections of the City and County of Honolulu; the Hawaiʻi State Archives, Survey Division, Land Management Division, and Bureau of Conveyances; the Bernice Pauahi Bishop Museum; the University of Hawaiʻi-Hilo Campus Hawaiian newspaper microfilm collection; and personal collections of the authors.

Findings and Recommendations

The archival-historical documentary research provides readers with insights into the traditional (generally pre-1800) history of the Maunaloa study area, and customs and practices of the people who lived on the land. Additionally, nineteenth century and early twentieth century narratives cited in the study provide further documentation on the history and nature of the land, and document changes in land tenure, residency, and land use.

Perhaps of greatest cultural significance, some of the traditional and early historic accounts, associate several features of the natural landscape with events in which Hawaiian gods and deity participated. Some of the place names which remain in use today call to mind those times when the gods walked the land with the people. Additionally, accounts cited in this study reference resource collection and access practices as recorded up until ca. 1950. Thus, this study provides resource planners and interested readers with narratives that will be of use in interpreting the history of the land. To better understand the significance of the natural and cultural landscapes of lands in and neighboring the park, and determine the best methods of long-term management and interpretation of resources, the City and County of Honolulu and a "Friends of the Park" organization could develop an oral history and consultation program to record histories of knowledgeable residents and practitioners.

ACKNOWLEDGMENTS

In preparing this report, the authors wish to acknowledge the collections and resource staff of — the Hawaiʻi State Archives, Survey Division, Land Management Division, and Bureau of Conveyances; the University of Hawaiʻi-Hilo Campus, Moʻokini Library; Jon Griffin of the Department of Land and Natural Resources-Divisions of Forestry and Wildlife (for making the volumes Hawaiian Forester and Agriculturalist available); Lurline Niione-Salvador (Kamehameha Schools/Bishop Estate); John Griffith of The City and County of Honolulu; and Mrs. Margery Hastert (for sharing with us, her personal copy of "Our Hawaii Kai - A History of Hawaii Kai and Maunaloa"). To all of you —

— Mahalo nui nō, ke aloha o ke Akua pū me ʻoukou a pau!

In reading this collection of archival and historical documentation, we humbly ask you — "O ka mea maikaʻi mālama, o ka mea maikaʻi ʻole, kāpae ʻia." (Keep that which is good and set that which is not good aside). We have not recorded all that could have, or perhaps should have been said about Kawaiho-Kuamoʻokāne, Kohalepelepe, and the neighboring lands of Maunaloa, or the study matter. But, we have made a sincere effort to present readers with an overview of the rich and varied history of the area, and to provide readers with access to the original documentation.

māua nō me ka haʻahaʻa —
Kēpā Maly
&

Heleen Wong Smith

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Historical Documentary Research
Koko Head Regional Park and Nature Preserve
Kumu Pono Associates
OAHU-25c (10/1993)

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Historical Documentary Research
Koko Head Regional Park and Nature Preserve
Kumu Pono Associates
OAHU-25c (10/1993)

INTRODUCTION BACKGROUND

At the request of Mr. George Aita, AICP, of Group 70 International, Kepā Maly and Helen Wong Smith (*Kumu Pono Associates*), conducted archival and historical documentary research and prepared the following report in conjunction with the preparation of an Environmental Impact Statement (EIS) for the Koko Head Regional Park and Nature Preserve (hereinafter, the park). The study area is situated in the *ahupua'a* (native land divisions) of Maunaloa, in the district of Kona¹ (now called Honolulu District), Island of O'ahu (TMK: 3-9-12; par. 1,2,4,6,8,9,10,12,13,14 & 16) (Figure 1). The park is approximately 1,265 acres in size, and includes portions of the shoreline, the summits of two volcanic cones (at elevations of 642 feet and 1208 feet above sea level), and *kūia* (flatlands) extending a short distance inland of the craters, on the arid, southeastern side of O'ahu. The park is fronted by approximately six miles of shoreline and bounds the three landward sides of Hanaleia Bay.

Archival Research

The archival historical documentary research reported in this study was primarily conducted between September 10th to October 13th, 1998, and includes archival resources from land documents, survey and cartographic records, historic literature and journals, native texts from Hawaiian language newspapers, and selected archaeological studies (cited in text). Resource materials were reviewed in the collections of the City and County of Honolulu; the Hawai'i State — Archives, Survey Division, Land Management Division, and Bureau of Conveyances; The Bernice Pauahi Bishop Museum; the University of Hawai'i-Hilo Campus Hawaiian newspaper microfilm collection; and personal collections of the authors.

It is noted here, that to-date only limited documentation for the traditional (pre-western contact) and early historic periods, regarding long-term residence patterns and traditional practices has been located for the *ahupua'a* of Maunaloa. There are a few studies which have been conducted in the past, that provide readers with several references to specific sites, and the broader traditions of the area. These studies include, but are not limited to — "The Archaeology of Oahu" (McAllister 1933); "Native Planters in Old Hawai'i" (Handy, Handy and Fukui 1972); and "Sites of Oahu" (Sterling and Summers 1978). Pertinent excerpts from original sources and the studies identified above, are included below.

¹ It is noted here, that there is some apparent confusion in historic records about the disposition of the land of Maunaloa. Though situated on the *koae* (seaward) side of O'ahu some historic land records identify Maunaloa as an *ūi* (parcel of land attached to another *ahupua'a*), rather than an independent *ahupua'a*. The "Indices of Awards...Lands of Aliis and Chiefs" (1929-4) identifies Maunaloa as a land of Kona, O'ahu, awarded to Victoria Kaimihahu (L.C.A.W. 7113:10). The *Index Māhale* (book of the Māhale between the King, Chiefs and Government) identifies Maunaloa as an *ūi* (land parcel) belonging to Waimanalo (1848). Yet another section of the (Board of Commissioners...Oahu, 1929-412) lists Maunaloa as an *ahupua'a* in Waimanalo, district of Ko'olanu. Coulier (1935) notes that by 1839, Maunaloa was considered to be a part of the Honolulu (Kona) District (Coulier 1935:223).

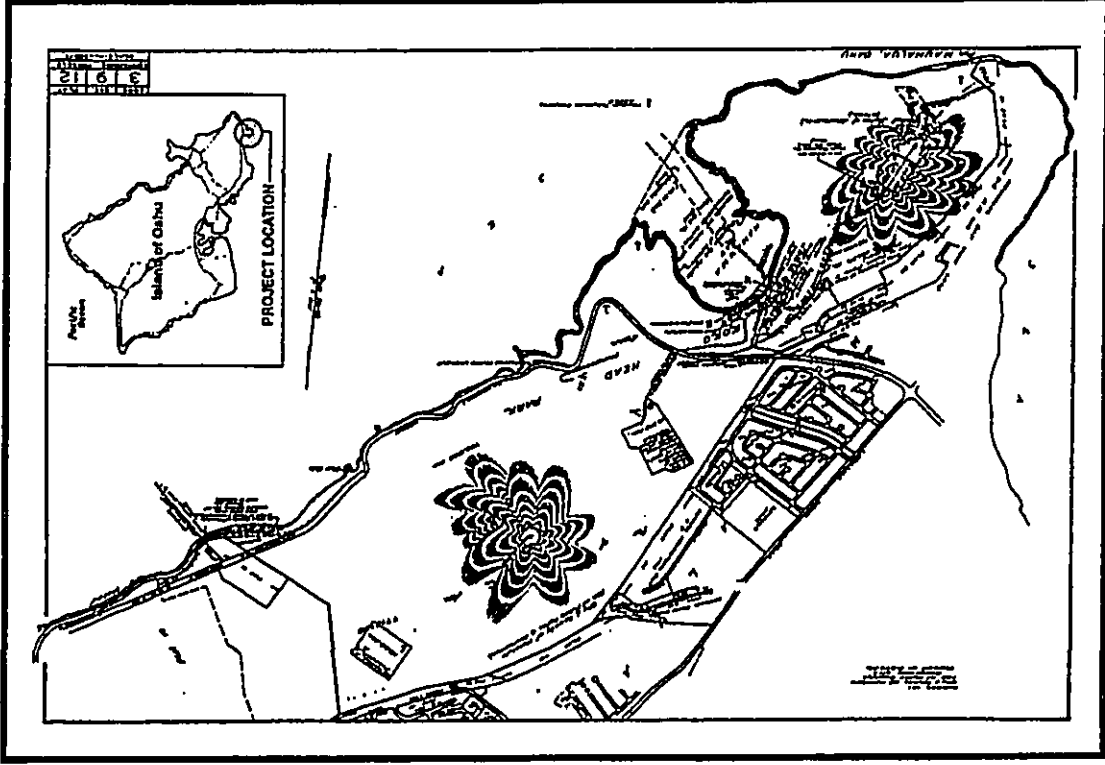


Figure 1. Study Area — Koko Head Regional Park and Nature Preserve, Maunaloa, Island of O'ahu (TMK Map 3-6-12; prepared by Group 70 International)

Historical Overview:

Lands of the Koko Head Regional Park and Nature Preserve

In discussing the Koko Head Regional Park and Nature Preserve it will be helpful to first look at the park lands in the larger context of the land of Maunaloa. The natural resources (both coastal and inland) of Maunaloa have been of interest to the growing population of O'ahu for the greater part of the 1900s. By the middle 1800s, the lands of Maunaloa were consolidated under the ownership of Chiefess Victoria Kaiāmalu, who's estate eventually inherited by Chiefess Pauahi Bishop. In the 1800s, Hawaiian residency practices, land use, fishpond and fisheries management, and access to resources were radically changed. The changes of that period also altered the natural landscape of Maunaloa.

Shortly after the turn of the century, the Board of Commissioners of Agriculture and Forestry and the Trustees of the Bishop Estate, began working on plans to protect and restore the upland forests of Maunaloa. As a result of their cooperation and efforts, the Maunaloa Forest Reserve was established in 1921 (Judd 1921). Three years later, portions of the *fa'a* (flat lands) and *ka'ihakai* (coastal zone) were leased (Bishop Estate Lease No. 3348³) to the City and County of Honolulu, and initial planning for the Koko Head Park (in which the Koko Head Regional Park and Nature Preserve is situated) were undertaken. Subsequently the Estate decided to the land to the County in 1928 (Land Office Deed 3486). In regards to park development, a stipulation of the land deed specified:

(b) ...they shall use the conveyed premises for purposes of public parks and/or rights of way, and for no other purposes... (Bureau of Conveyances Lib. 986:257-265; December 29, 1928).

In the following years, further land acquisition occurred, and facility planning and development was under taken. In 1945, the Planning Division, of the Park Board of the City and County of Honolulu, prepared "A Proposed Plan for the Development of the Koko Head Park Area." The plan formalized County efforts at Koko Head, which shaped the park as we see it today, and provide the impetus for the present master plan project. The authors of the 1945 report provided readers with an orientation to the park's—then past and present—importance in the County system. The park vision at that time was made up of several interest areas, and were described as:

One of the most valuable assets in the park system of the City and County of Honolulu is the 1,285 acre park property at Koko Head. No serious attempt has previously been made for its development, although it has long been a favorite picnic and swimming spot for the public.... Certain precepts have been used in working out the ideas which are embodied in the plan. First of all, every effort has been made to retain as much of the rugged natural scenery of the park as is possible. Secondly, because of the size and physical features of Koko Head Park, certain recreational facilities are especially adaptable to this area... (City and County of Honolulu 1945:1)

In 1945, a number of park facilities, projects, and activities were also proposed, among them were:

- Improvements to the undeveloped Kuli'ou'ou Beach Park;
- Dredging of a portion of Maunaha Bay for enhanced swimming and anchorage activities;
- A polo and racing facility in Ka'alakei Valley;
- An eighteen-hole municipal golf course in Hahaione Valley;
- Dredging of Kuaupō Pond for boating purposes, fishpond development, a bird life sanctuary and game preserve;
- Field sports facilities;
- Development of riding academies and eighteen miles of bridle paths;
- Dredging of Hanuama Bay and development of public facilities;
- Development of an amphitheater in Kahauloa;
- Development of camp grounds in other areas;
- As a part of the post-war conversion of the Army facilities on Koko Crater, develop rides on the cable railroad, up the ridge of Koko Crater;
- Development of twenty-four miles of hiking trails;
- Recessed in one corner of the park could be suitable ranges for pistol, rifle, trap and skeet shooting;
- Preservation of points of interest such as the Blow Hole areas of geologic interest; and
- A considerable amount of planting and reforestation... (City and County of Honolulu 1945:2-8)

We see that over the last 50 years, several aspects of the park plan have been accomplished, while others were abandoned. Today, there are a number of natural areas that are of particular interest to the public within the park. The park has several prominent natural features—Kohalelepepe (Koko Crater) and Kuamo'o-Kāne—Kawaihoa (Koko Head), Hanuama Bay (beach and marine life conservation district), and the rugged shoreline. While much of the park lands remain undeveloped, the natural resources, existing recreational facilities, and the Koko Crater Botanical Garden offer park users many opportunities to enjoy the park complex.

Place Names of the Maunaloa-Koko Head Vicinity

There are a number of place names that have been recorded within and adjacent to the park lands. The occurrence of place names demonstrates the broad relationship of the natural landscape to the culture, practices and beliefs of the Hawaiian people. In "A Gazetteer of the Territory of Hawaii," Coulter (1935) observed that Hawaiians had place names for all manner of features, ranging from "outstanding cliffs" to what he described as "trivial land marks" (Coulter 1935:10). In 1902, W.D. Alexander, former Surveyor General of the Kingdom (and later Government) of Hawai'i, wrote an account of "Hawaiian Geographic Names" (1902). Under the heading "Meaning of Hawaiian Geographic Names" he observed:

It is very difficult, if not impossible, to translate most of these names, on account of their great antiquity and the changes of which many of them have evidently undergone. It often happens that a word may be translated in different ways by dividing it differently. Many names of places in these islands are common to other groups of islands in the South Pacific, and were probably brought here with the earliest colonists. They have been used for centuries without any thought of their original meaning... (Alexander 1902:395)

³ An overview of Bishop Estate's tenure is provided in a later section of this study.

History tells us that named locations were significant in past times, and it has been observed that "Names would not have been given to [or remembered if they were] mere worthless pieces of topography" (Handy and Handy with Pukui, 1972:412). In ancient times, named localities served a variety of functions, including: (1) triangulation points such as *ko'a* (markers for fishing grounds); (2) residences; (3) areas of planting; (4) water sources; (5) trails and trail side resting places (*o'io'io*), such as a rock shelter or tree shaded spot; (6) *heiau* or other features of ceremonial importance; (7) may have been the source of a particular natural resource or any number of other features; or (8) the names may have recorded a particular event that occurred in a given area (cf. Lyons 1875, Alexander 1902, and Coulter 1935). Thus, we see that the place names of the Koko Head Regional Park and Nature Preserve are of cultural and historical significance and remind us of the history of the land and its ancient residents.

Below, is a list of selected place names that have been recorded for sites and features in and/or neighboring the preserve lands. The source of the place name meaning is indicated, as well as whether or not the interpretation is literal or interpretive.

Hawaiian Place Names in the Vicinity of the Koko Head Regional Park and Nature Preserve

Place name	Meaning	Literal (Lit) Interpretive (Int.)	Reference
Awāwa-mahu	Shady valley (now known as Wāwā-mahu)	Lit.	Pukui et al. 1974:15, 229
Hikona	Peering place	Lit.	Pukui et al. 1974:39
Hana-ama	Curved-bar or Hand-wrangling-bay	Int.	Pukui et al. 1974:41
ʻŪhū-bu-ākea	Wide-backed-ʻŪhū (named for a goddess)	Lit.	Pukui et al. 1974:55
Ka-hau-ka	The tall-haw-tree	Lit.	Pukui et al. 1974:63
Ka-hu-ka-pua'a	The spouse-of-the-pig	Lit.	Pukui et al. 1974:68
Ka-hū	The-bone	Lit.	Pukui et al. 1974:71
Ka-lama	The-orchard, or the-Lama-tree	Int.	Author
Ka-mālo-iki	Ka-mālo may be literally translated as "The-mālo tree" - <i>iki</i> means the little land section, while <i>mālo</i> means the larger land section.	Int.	Author
Ka-mālo-nui			
Ka-u-uono-ʻuhū	The-royal-red-rain (descriptive of a rain fall seen through sun lighting or that sets up the red soil of the mountain slope named for a goddess.)	Int.	Author (cf. Pukui et al. 1974:166)
Ka-wai-hoa	The-companion's-water	Lit.	Pukui et al. 1974:78
Kahe-kepeke	Vagina-bibb mānoa (descriptive of the natural shape of the inland side of the crater, named for a goddess)	Lit.	Pukui et al. 1974:115

Hawaiian Place Names in the Vicinity of the Koko Head Regional Park and Nature Preserve

Place name	Meaning	Literal (Lit) Interpretive (Int.)	Reference
Koko	Blood (for the red earth of the area)	Int.	Pukui et al. 1974:115
Kuamo'o-Kāna (also written To'okua-o-Kāna'āna)	Kāna-backbone	Lit.	Pukui et al. 1974:119
Ka-āhu-pua-o-Maunāka	The-shirt-of-the-baby-mullet-of-Maunāka	Lit.	Handy et al. 1972:483
Maunāka	Two-mountains	Lit.	Pukui et al. 1974:149
Pāka	Bushes aside	Lit.	Pukui et al. 1974:176
Pāka-ākea	Outcrops earth-cliff	Int.	Author
Pū-ama	Genitalia-Hill (see Kahe-kepeke above)	Lit.	Author

**CULTURAL-HISTORICAL CONTEXT:
KA HO'ONOHO ANA-KA MOKU PUNI O O'AHU
(SETTLEMENT: THE ISLAND OF O'AHU)**

In speaking about land divisions, settlement, land use, and native customs in Maunaloa, it is helpful to first look at Maunaloa's place on the Island of O'ahu. The narratives below, provide readers with a general overview of some of the history of Hawaiian settlement and land tenure practices on O'ahu. The archaeological study (D. Borthwick et al., 1998) conducted in conjunction with the development of the HIS for the Koko Head Regional Park and Nature Preserve should be referenced for detailed documentation of settlement and cultural remains in the study area and larger *ahupua'a*.

The island of O'ahu is the third largest island in the Hawaiian Archipelago, and includes a land area of approximately 598 square miles. O'ahu was formed by two primary volcanic mountains, which are now known as the Waianae and Ko'olanau mountain ranges. Initial Polynesian settlement voyages between the Hawaiian Island and the Marquesas and Society Islands (*Kahiki*) appear to have occurred in two major periods, AD 300 to 600 and AD 1100 to 1250 (Emory IN Tamar 1982:16-18); though it should be noted that it is likely that intermittent voyages continued throughout much of Hawaiian history.

Anthropologist, Sir Peter Te Raangi Hiroa Buck posited that "some push from behind" must have sent early Polynesian seafarers on their first journeys to unknown islands (Buck 1965:27). It is assumed that there must have been substantial pressures, either social or environmental, that encouraged men and women to set off on voyages to the unknown. Buck also observed:

From such evidence as we have, it seems that the early people had a simpler form of social organization in which the blood kinship of all members was stressed. They had an open religious meeting place in which spaced upright stones formed the main feature... [1965:27-28]

The second period of migrations is remembered in numerous legendary accounts, and like the earlier period, social and environmental conditions seem to have been a part of the reason for undertaking the long and dangerous voyages. The legends also record that there was great sense of adventure in many of the voyages. Buck commented the voyagers were:

...brave men who feared neither adverse elements nor hostile forces. If they weathered the storm and emerged to a fair haven, all was well. If they were engulfed in the waters of the great ocean, they went down as men... [1965:28]

Regarding settlement, and the subsequent arrival of new seafarers, Buck further posited that:

Where people of the early period were in occupation, conflict sooner or later occurred but in the end the *alii* chiefs of the later wave acquired dominance and rule... [1965:28]

³ *Kahiki* - is a general Hawaiian term which identifies the ancestral homeland of the Hawaiian gods and people.

In their discussion on Hawaiian settlement—based on native traditions, and land use customs, Handy, Handy and Fukui (1972) reported that when the first settlers reached the Hawaiian islands, they found a flora that was much like that of their homeland, but the topography of the islands was notably different (Handy et al. 1972:12). The broad watered flatlands of Kaula, O'ahu, and Maui, and the expansive cultivable mountain slopes of Kona and Ka'u, on Hawaii, permitted the development of a systematic and elaborate planting system that reached a higher level in Hawaii than in other Polynesian islands (Handy et al. 1972:16).

Generally, ethnographic and archaeological information suggests that for generations following initial settlement of the Hawaiian Islands, the population clustered along the better watered windward shores, small bays, and watered valleys where fresh water was available. They sought out areas where agricultural production could become established, and fishing was good (ibid. 1972:287). Thus the tropical *ko'olau*, or windward shores of O'ahu, with sheltered bays and canoe landings, numerous springs and rivers, and natural pond features that could easily be modified for use as fishponds and taro ponds where the likely locations of early settlement. Also, certain areas along the *kona*, or leeward shores of O'ahu—the Awa-lau-o-Pu'uola (Pearl Harbor) section of 'Ewa, the Waikiki flatlands, and possibly Maunaloa with its natural inlet, which could be easily modified into a *loko kupa* (walled fishpond)—where many of the similar natural resources existed, also appear to have been ideal locations for early settlements.

It is suggested that only after the best areas became populated, and perhaps crowded (ca. 1100 to 1400 AD), that the Hawaiians begin major efforts at settling more remote, and possibly less desirable areas (cf. Hommon 1976, Green 1980). Native traditions record that by the c. 14th century, Waikiki had become the ruling seat of O'ahu when the *alii nui* Mailikukahi assumed control of the government (Handy et al. 1972:480). Beckwith (1970) provides the following description of this period:

Land reforms and other means of strengthening the power of the ruling chief and stabilizing control over a growing population were carried out on Oahu... by Mailikukahi, successor on the Moikeha line of the last ruling chief of the elder Kumuhonua line, who was forced to retire because of his unpopularity. The names of Mailikukahi, his son Kahoana-iki, and his granddaughter Kukanihoku are handed down in tradition as wise and just rulers. He [Mailikukahi] carried out strict laws, marked out land boundaries, and took the firstborn son of each *alii*'s family to be educated in his own household. He honored the priests, built heiaus, and discontinued human sacrifice... (Beckwith 1970:383).

One of the ancient Hawaiian terms used to identify an island was "*moku puni*," which can be interpretively translated as land surrounded by water. With formalization of the O'ahu chiefdom and land management practices, the island of O'ahu was divided into six primary districts. Among these districts, called *moku-o-loko* (interior islands), we find the district of Kona, in which at least a portion of Maunaloa was situated in ancient times. A Hawaiian proverb describes the boundaries of the Kona District:

Kona, mal ka pu'u o Kapikaka a ka pu'u o Kawaihoa.
Kona, from Kapikaka to Kawaihoa.
The extent of the Kona district on O'ahu is from Kapikaka
(now Red Hill) to Kawaihoa (now Koko Head). (Puhai 1983:199 No. 1845)

Hawaiian Land and Resource Management Practices

In order to further facilitate management of the *moku o lolo*, or larger districts of O'ahu, they were further subdivided into smaller divisions of land. Perhaps the most important of these land divisions was the *ahupua'a*. These were subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name *ahu-pua'a* or pig-altar). *Ahupua'a* may be compared to pie-shaped wedges of land that in most cases, extended from the mountain peaks to the ocean fisheries fronting the land unit. Their boundaries were generally defined by cycles and patterns of natural resources occurring within the lands (cf. Lyons, 1875). Like the larger district, the *ahupua'a* were also divided into smaller, manageable parcels in which cultivated resources could be grown and natural resources harvested. As long as sufficient tribute was offered to the *ali'i*, *kapu* (restrictions) were observed, and responsibility for the care and use of the resources was exercised, the common people, who lived in a given *ahupua'a* had access to most of the resources from mountain slopes to the ocean.

Entire *ahupua'a*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali'i-ai-ahupua'a* (chief who controlled the *ahupua'a* resources). The *ali'i-ai-ahupua'a* in turn answered to an *ali'i ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua'a* resources supported not only the *maka'āhiana* and *'ohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. It is within this native system of land and resources management that we find the basis of traditions and early historic accounts for the *ahupua'a* of the study area.

MAUNALUA MA KE KAHA KONA, O'AHU (MAUNALUA ON LEeward SHORE OF O'AHU)

Situated along the southern shore of O'ahu, the *ahupua'a* of Maunaloa may be divided into two distinct land divisions or traditional use regions. These regions are defined by the natural resources of the land.

1. Southwestern Maunaloa

The southwestern portion of Maunaloa is fronted by an extensive reef system and backed by the Ko'olau mountain range. Because of its geographic location, the land is not frequented by the tradewinds or the rains they bear. Though seasonally, Maunaloa does experience the rains born by the *kona*, or southerly storms and those rains that carry over from the Ko'olau region. While the *kona* storms can bear strong winds and high surf, southwestern Maunaloa is sheltered by the Kawaihoa-Kuamo'okāne bluff (Koko Head). Even though the land does not have significant above surface sources of fresh water, over tens of thousands of years, a watershed forest formed in the uplands. The rains that fell on the mountains settled into a water table that watered the *kula* (flat lands) of Maunaloa.

A portion of the southwestern shore line of Maunaloa is also indented and submerged, and forms a shallow bay fed by fresh water springs and ocean tides. This indentation was developed by ancient Hawaiians into a rich fishpond system, known as *Ke-ahu-pua-o-Maunaloa* or *Lolo Kuapā*. The fishpond, the reef flats and ocean fishery, and arable *kula* made southwestern Maunaloa a comfortable land for early Hawaiian residents. It was in this region of Maunaloa, sheltered by Kawaihoa-Kuamo'okāne (Koko Head), and with easy access to the fishpond and inland agricultural fields that most of the ancient residents of Maunaloa lived year round.

2. Southeastern Maunaloa

On the southeastern (Makapu'u) side of Kawaihoa-Kuamo'okāne (Koko Head), the land of Maunaloa is generally arid. The land is subjected to *kona* (southerly) storms—strong winds that carry salt spray to the inland slopes, and quickly dry out the land. The *kona* storms can also generate high surfs along the coast, and access to the near shore fishery is often dangerous. There is a Hawaiian proverb that speaks of the nature of the ocean of Maunaloa:

Kal paki o Maunaloa

The spraying sea of Maunaloa.

(Pukā 1983:199 No. 1413)

Even in this arid environment, one finds evidence of residency (both long-term and temporary) and agricultural field systems in sheltered valleys and on the *kula* (flat lands). Also, along the southeastern shore of Maunaloa, protected from the rough ocean, is Hanalei which has been a sheltered haven for canoes for generations. In both ancient and modern times, Hanalei is praised as one of the famous natural features of O'ahu. In this region of Maunaloa, there are several traditions and place names associated with various topographic features and Hawaiian deity that provide us with insight into the significance of the landscape of the lands which are now a part of the Koko Head Regional Park and Nature Preserve.

Maunaloa: An Overview of Residency and Land Use
Handy, Handy and Pukui (1972) provide readers with several important narratives of Maunaloa. The documentation was gleaned from earlier historic visitors and work done with native informants and residents as early as the 1930s. Handy et al., wrote:

Maunaloa, the land area at the southeastern most tip of Oahu, marked by the two great barren mountain masses, Koko Head jutting seaward and Koko Crater... Maunaloa (Two-Mountains) was notable for its great fishpond (*loto kuapa*) covering 523 acres. Actually this great pond, named Ke-ahu-pua-o Maunaloa (The-shrine-of-the-baby-mulle-of-Maunaloa) was a broad shallow bay, walled off at its seaward side, with an inlet and a gate which was opened to let fish in as the tide came in and was closed when the tide began to run out. Chamberlain (1957, p. 29) crossed the causeway in 1828. There was evidently a sizable village in the vicinity because there was a school in which he addressed thirty people, although most of the men were away cutting sandalwood. Before that, and since the time of the chiefs Mahoo for whom the *Menehune* built the *kuapa*, Maunaloa valley was said to have been amply inhabited, and in the hinterland of Maunaloa and beyond (to the southeast) there are many evidences of former sweet potato culture.

...[I]ts headland (Koko Head)...whose real name is Mo'o-ku-o-Kane'apua (Backbone-of-Kane'apua) (most often written as "Kuamo'o Kane"), forms the eastern rim of Maunaloa Bay. Kane'apua was a younger brother of Kane. It is said (Ka *Ni'ipepa* *Xu'oko*, March 4, 1921) that Kane and Kama'oa came here and opened a spring, which later dried up. The area is now bare and arid... (Handy et al. 1972:483-484).

In 1940, Handy reported on sweet potato cultivation across Maunaloa:

Sweet potatoes were cultivated on Oahu on the coastal plain and in sandy soil... The *hula* lands below the cliffs of Waianai also supported sweet potato plantations... On the south side of the ridge at the end of the island, Maunaloa and Hahaione districts were famous for their sweet potatoes. In this section there are various enclosures and walls which were thrown up around the old plantations before Hawaiians abandoned the land and it was utilized for ranching. The following observations were made by McAllister...

From the Lighthouse road to the small old crater in Kaiama [sic - Kalamā] Valley are to be found traces of old Hawaiian sweet potato patches. Located on the crest of the old (red) lava flow are small piles of rocks, a foot or more high and a few feet apart, with comparatively clear spaces between them. It is said that sweet potatoes were planted between these rock piles in the rich red soil that covers this region. The distance from the road to the crater is about 800 feet, and the top of the flow, which was used for cultivation is between 250 and 350 feet wide... Throughout this 5.5 acre tract are a number of irregular walls from a few feet to 50 or 100 feet in length. There is nothing in the location of these walls to indicate a 'pattern'... For many years this site was used as a cattle range (McAllister 1933:64 IN Handy 1940:155).

Handy continued his own description of the area from field work and interviews, noting that:

According to the last surviving *Kamaaina* of Maunaloa, sweet potatoes were grown in the small valleys, such as Kamiloani, as well as on the coastal plain. The plain

below Kamiloani and Kealakipapa (the narrow pass that ascends to the present-day Makapu'u overlook) was known as Ke-Kula-o-Kamauiwa. This was the famous potato-planting place from which came the potatoes traded to ships that anchored off Hahaione in whaling days. The village at this place, traces of which may still be seen, was called Wawamalu (Handy 1940:155).

MO'OLELO 'ĀINA (TRADITIONS OF THE LAND)

This section of the study includes several narratives written by early Hawaiian historians. Writing in Hawaiian language newspapers in the middle nineteenth century, Hawaiian historians John Papa I'i and Samuel Mānākaalani Kamakau documented accounts about sites and events which occurred within Maunaloa. By the turn of the century, native writers and other interested historians were also collecting and writing traditional accounts. Through their narratives, readers today, are able to view and experience the landscape in a personal and at times, animated manner. To the early writers, each part of the natural landscape and environment represented living nature-forms and documented the history of their elders. It will be seen that several of the narratives provide readers with specific documentation of cultural-historical sites in and neighboring the park lands.

Native Accounts Recorded in the Nineteenth and Early Twentieth Centuries

Kamakau (1991) recorded that the gods Kāne and Kanaloa were perhaps the first to come to Hawai'i from Kahiki (the ancestral homelands). When they arrived, the landed first at Kanaloa (now called Kaho'olawe), and from there, they went to Kahikinihi, Maui. At each place they stopped, they did wondrous things to enhance the land and benefit the people. At many places, they caused water to flow, where there had been none previously. On O'ahu one of the places at which Kāne and Kanaloa made water to flow, was at Kawaihoa-Kuamo'okāne, Maunaloa (Kamakau 1991:112).

During one of the periods of great voyages between Hawai'i and Kahiki, the chief La'a-mai-Kahiki came to Hawai'i, and settled on O'ahu. The fame of O'ahu had spread throughout Kahiki, as "being the most fertile" of the islands, and of what "industrious farmers the people were and how they raised fish in ponds..." (Kamakau 1991:108). When La'a-mai-Kahiki (La'a) and his followers came to Hawai'i, they approached O'ahu from the south, passing Moloka'i. La'a also brought with him on this journey, a *pahu* (hollowed log drum with a shark skin head—not previously heard in the Hawaiian Islands), and in passing Moloka'i the drum was played and chants sung. Kamakau records the tradition that:

A man named Ha'ikamalama who lived at Hanauna on O'ahu heard this sounding at sea and was puzzled. What was this strange thing? There was a voice within [accompanying] the sound of the *pahu*—a voice chanting within the drumming... Ha'ikamalama thrust out his chest and tapped quickly and lightly on it — "E Ka'i-a — Ka'i-ku-pu-ū. E Kūpa-a, Kūpa-a; e La'a, e ho'ohēhēi, ana i ka moana." Ha'ikamalama learned all of the *mēle*... The sound was coming from the windward, so Ha'ikamalama ran to Makapu'u to see who was sailing by. Then he went *mauē*... (Kamakau 1991:109)

Kamakau continued the account, documenting the landing of La'a at Kāne'ohie, and how Ha'ikamalama learned to make a *pahu* for himself.

In his narratives about deified sharks, Kamakau (1968) also mentioned Hanauna when writing about the relationship shared between humans and the *manō* (sharks). He noted that there were families who relied upon the assistance of their shark deities when they traveled the ocean. Those people who traveled the ocean, and were without shark-formed guardians,

and whose canoes were overturned or destroyed, would die at sea — "if their canoe broke to pieces, their dead bodies would be cast up on Launi or at Hanauna" (Kamakau 1968:76).

In another account about gods and deity, Kamakau referenced the *loko kūpō* (walled fishpond) of Maunaloa, noting that it and other ponds were home to "*Ahū mo'o*" (lizard-formed water gods). In ponds like that at Maunaloa, these gods were believed to ensure the "health and welfare of the people, and to bring them fish" (Kamakau 1968:82). Kamakau noted that these *mo'o* gods were not like the house of rock lizards, but had "extremely long and terrifying bodies, and they were often seen in the ancient days at such places as Maunaloa..." (Kamakau 1968:83). At Maunaloa, Laukupu was the goddess, and when people cared for, and remembered her, "The ponds would fill with fish, and the fish would be fat" (Kamakau 1968:84). Similar accounts (cited later in this study) pertaining to beneficial deity causing ponds to be well stocked, were told to McAllister during his archaeological survey in 1930 (McAllister 1933).

At a later time in Hawaiian history, Kamakau recorded that in ca. 1737, Alapa'i, king of Hawai'i attempted to take O'ahu in war, from the king, Peli'oholani. During the expedition, Alapa'i and his forces attempted landings at several locations, among them were the landings of Koko and Hanauna in the *ohupua'a* of Maunaloa. These attempts were thwarted, and eventually, the two kings met, acknowledged their genealogical connections, and agreed to end their disagreements (Kamakau 1961:71).

Referencing the Maunaloa fishpond, Kamakau noted that in the early 1800s, at the time that Kamehameha I resided on O'ahu, Kamehameha participated in the restoration of the Maunaloa fishpond. Kamehameha:

...encouraged the chiefs and commoners to raise food and he went fishing and would work himself at carrying rock or timber... He worked at the fishponds at Ka-wai-nui, Ka-'ele-pūhi, Uko'a, Māma-lua, and all about O'ahu... (Kamakau 1961:192)

During that time, the chief Ku'ihelani (one of Kamehameha's stewards) had been given control over the lands of Maunaloa (Kamakau 1961:389).

John Papa I'i was raised as an attendant and companion of Liholiho (Kamehameha II), and served the royal family until his death in 1870. In his narratives, I'i (1959) are found accounts of the trails traveled around O'ahu in the early 1800s. Referencing travel through Maunaloa, I'i wrote that there were two *ala loa*, or main trails which passed inland of Leahi (now called Diamond Head), and then met at the shore of Wai'alae. One trail was situated between the craters of Kaimuki and Leahi, and the other trail was further *mauka*, above Kaimuki. I'i's description tells readers that the *mauka* trail passed the "upper side of, the taro patches and pools of Waialeale," and that it then joined "the other trails at the sand and go along Keahia and on to Maunaloa, to the sea of Koko, and to Makapu'u" (I'i 1959:94).

While I'i's description doesn't tell us whether or not the *ala loa* crossed between Kawaihoa-Kuamo'okāne and Kōhelepepe (Koko Head and Koko Crater), other narratives written by him (below), do place trails along the summit of "Kuamo'okāne," and by reference to the importance of Hanauna, tell us that early trails passed through various areas within the park. Historic maps of the later nineteenth century (Figure 2), show that the *Alanui Aupuni* (Government Road) through Maunaloa to Makapu'u and Waimānalo (via Ke ala kīpapa — the paved trail, now a part of the road to, and overlook at Makapu'u) went inland of

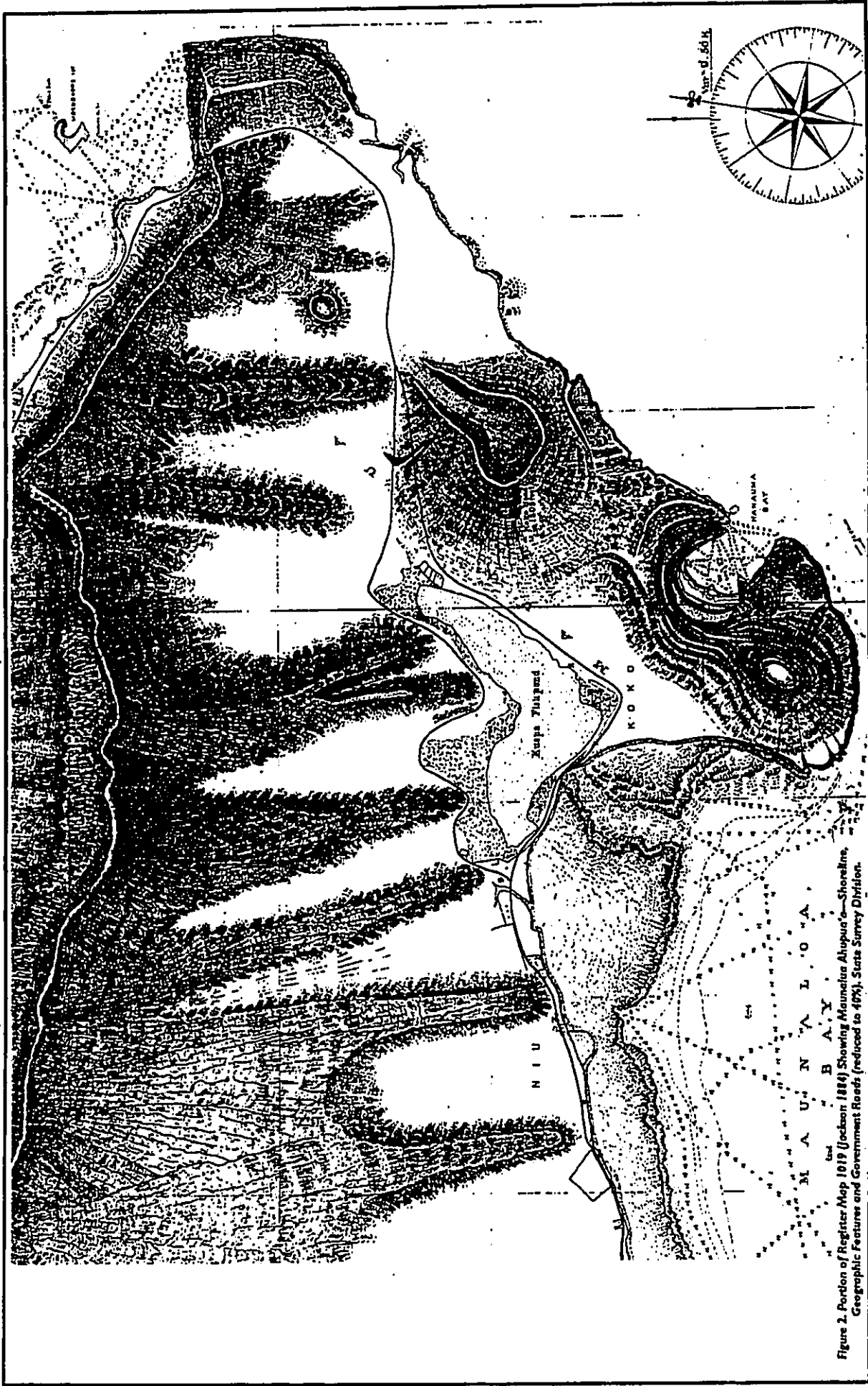


Figure 2. Portion of Register Map 1019 (Jockson, 1884) Showing Maunaloa Ahupua'a—Shoreline, Geographic Features and Government Roads (reduced to 40%). State Survey Division.

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Kohēlepelepe, thus avoiding the cliffs and rocky coastal region of the *ahupua'a*. A later map prepared by the Territorial Survey Division (Dunn 1906), depicts a road going from Koko inland on the slope of Kawaihoa-Kuamo'okāne to Hanalei (Figure 3).

Additional references to lands in and neighboring the park, are found in I'i's writings about his childhood travels with the royal family, and the return of Kamehameha I and the royal household to Hawai'i from O'ahu (in ca. 1811). The narratives for the Koko-Kawaihoa-Hanalei region, are significant, in that they reference several place names, describe travel in the area, and they tell us that navigators of the time found the prominent important observation points for determining the best time of sailing. I'i wrote:

After leaving Honolulu, they landed at Hanalei Bay, which was a good place to wait until the wind was better for sailing to Molokai. The wind observers climbed up to Kuamo'okāne and to Ihililaukaea, which is located at the front o Kuamo'okāne, on the west side of the bay. Hanalei faces the southeast and is well sheltered and rather shallow on the upper, sandy side. As it is surrounded by cliffs except for the entrance, it is an inland bay.

After two or three days of waiting for the wind to lessen, it was seized with a longing for his mother. He was standing with Manu at the edge of the cliff looking toward Leahi and Kaimuki, which lay in full view, when they longing came to him... (I'i 1959:104)

I'i also described Maunaloa Bay as a safe harbor for foreign ships that were accompanying the royal family at the time. He noted:

As these ships had no boats or canoes, the passengers had to swim to shore and back when the ship was at anchor... (I'i 1959:108)

"*He Mo'olelo Ka'ao no Hi'iaka-i-ka-poli-o-Pele*"
In the early twentieth century, Hawaiian writers continued to record traditional narratives in Hawaiian newspapers. One source for narratives of the area between Maunaloa and Makapu'u, is found in the epic account of the journey of Hi'iaka-i-ka-poli-o-Pele (Hi'iaka) the youngest sister of the goddess Pele to Kaula'i. Excerpts of one version of the legend "*He Mo'olelo Ka'ao no Hi'iaka-i-ka-poli-o-Pele*" (A Legendary Tale of Hi'iaka who is Held in the Bosom of Pele) was published in the Hawaiian newspaper, *Ka Hōkū o Hawai'i* between September 18, 1924 to July 17, 1928 (translated by Maly).

While this version of the story follows the basic format of Nathaniel Emerson's 1915 popularized rendition of the story of "*Pele and Hi'iaka*," it contains an added wealth of alternate island-wide place name accounts, narratives about the famous deity which gave their names to sites between Maunaloa and Makapu'u. The following English translations are a synopsis of the Hawaiian texts, with emphasis upon the main events of the narratives.

Entering the story, we find that the goddess Hi'iaka is on a journey from the island of Hawai'i to Kaula'i, where she was to fetch the chief Lohi'au-ipo (Lohi'au) from Hi'ema and her companions made preparations to travel to O'ahu.

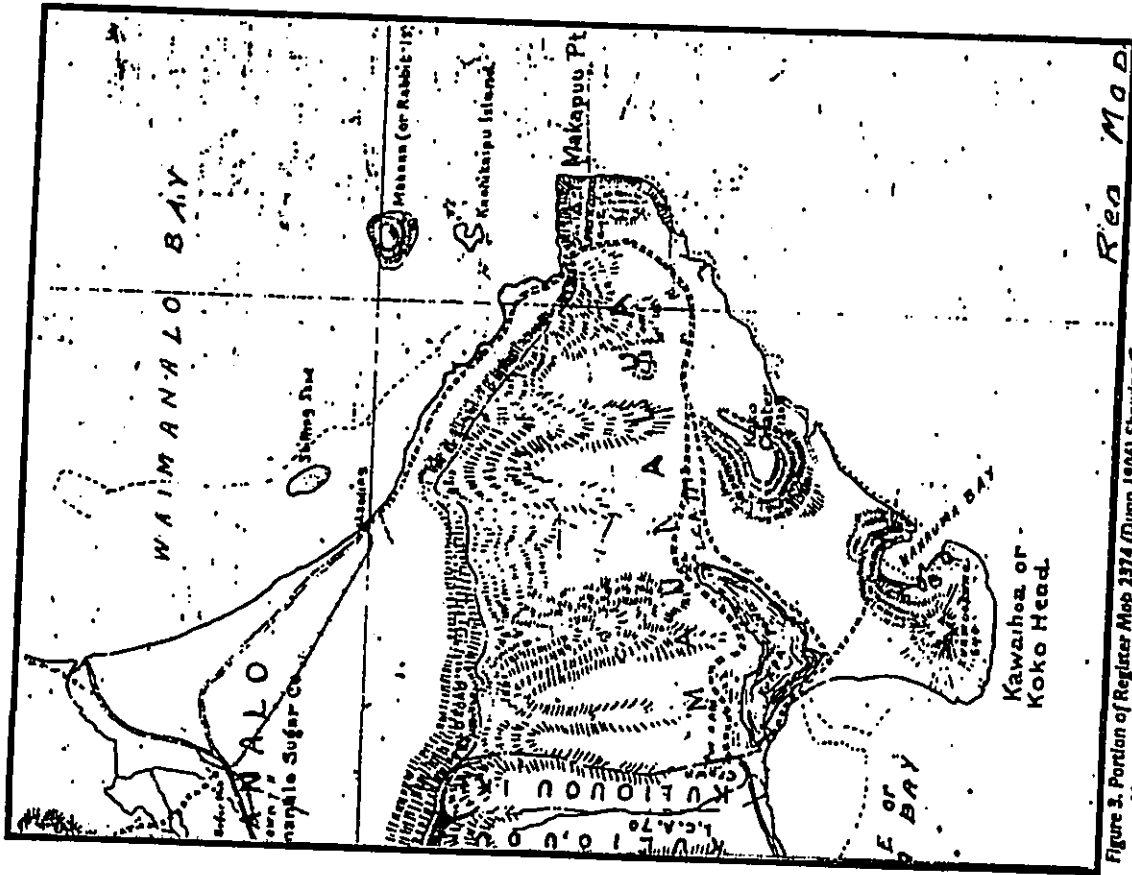


Figure 3. Portion of Register Map 2374 (Dunn 1906) Showing Government Roads of Maunaloa, Including a Road to Hanalei (State Survey Division).

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...On the shores of Kā'ūnāpali, Hi'iaka, Wahine'ōma'o, and Pū'ūpālā'e, met with two men who were preparing their canoe for a journey to O'ahu. The canoe men told Hi'iaka that their journey would take them to the Kō'olau (windward) side of O'ahu, where they would probably land on the shore of Waianānalo, below Makapu'u...

Boarding the canoe, they passed the point of Kālī'au, Mōloka'i (the southwestern point of Mōloka'i), they reached the area between Mōloka'i and O'ahu. It was here that Hi'iaka saw the large fleet of canoes at rest outside of Makapu'u. The task of the fishermen of this canoe fleet, was fishing for the famous fish of Makapu'u, "ka uhu ka'i o Makapu'u" (the parrot fish cliff of Makapu'u)...

...Drawing closer to O'ahu, Hi'iaka turned and saw the expanse of 'Ihī'ihīlanūka with the water of Kanono'ūla, the plain of Kā'eā and the place called Kuzumo'ō-a-Kāne. Hi'iaka then chanted calling to the deity of those names:

A Kuzumo'ō-a-Kāne
 A 'Ihī'ihīlanūka
 A ka wai o Kanono'ūla
 Ka kula o Kā'eā nei la
 Hōmai ana ho'i ua 'ai--eā
 Kuzumo'ō-a-Kāne
 'Ihī'ihīlanūka
 The water of Kanono'ūla
 The plain of Kā'eā
 Bring forth something to eat

They then heard the rumbling of voices come from that land reaching to them:

E Hi'iaka-ka-pū-ka-Pele, ai'ōhe o mākau 'ai'ōhe waiho waike no o le kula'ōla ma'āwe no a 'Ihī'ihīlanūka-ka'ū'i, o ka lāna no a ka wai, a'ōhe 'ai'ōhe. (O Hi'iaka-in-the-bosom-of-Pele, we have no food, all that is left on the plain are the strands of the small leafed 'Ihī'ihī, and the water is only that which is left in puddles, there is no food.)

Hi'iaka responded to the women:

Ua oia o'e la no mākau i ka pane ana mai o ka leo o le aloha. Aloha no 'oukū! (We have found relief in the answer of your voices of aloha.)

As they continued their journey, they drew near to Makapu'u. Hi'iaka then saw the woman which dwelt along that shoreward point.... (November 17, 1925)

...While drawing nearer to O'ahu, a strong wind began to blow, and also the current from the Kona (seaward) side of O'ahu began pulling at the canoe of these two men. Though they tried with all their strength to paddle, they couldn't, and the current took them around the cliffs of Makapu'u. So great was the fear of these men for the many-eyed woman [Makapu'u], that when they saw a small, calm landing on the Kona side of O'ahu, they paddled quickly to it and landed their canoe. The moment the crunching sound of the canoe landing on the shore was heard, the two men leapt from the canoe with their possessions and fled from the piece of that fearful woman which they had seen. They fled across the plain of Kā'eā and the canoe remains at the place where they left it... (November 24, 1925)

Having reached Kāua'i, Hi'iaka found Lohi'au and began her journey back to Hawai'i. During this journey, they traveled through the Kona District (seaward side) of O'ahu. The narratives, which provide readers with documentation of an ancient trail to the summit residence of the goddesses 'Ihī'ihīlanūka and Kanono'ūla, are cited below:

...Departing from Kaulāliehu-o-Pēloa, Hi'iaka mā traveled to Kaimuki. Hi'iaka turned and looked towards Hawai'i and the burning fires of her elder sister descending to the shores of Pūna at Kūhi'i... Hi'iaka turned and looked towards Waialeale where she saw the canoe of Kaulāiehu-o-Pēloa sailing by. They then left Kaimuki and passed Waialeale and Waialeale and arrived at Māmalū. Upon reaching Ni'a at Kūhi'i'ou, they looked around and saw some women fishing for pōpō'i (crabs) and gathering 'ōhune (seaweed). Going to the shore, Hi'iaka asked the two ladies if she might have a small amount of what they had collected in order that her companions might have something to eat.

The women sarcastically answered, "What a question!! You have not put your nose down into the water and grasped for the things to be caught. Perhaps if you wouldn't haughtily stand there asking shamelessly, you would have some food to eat!" Because of the words which these women spoke to Hi'iaka, she chanted:

He mākau holo'ūka
 Ko Kā'ēlekele o Pūku
 Pūi waiho ho'i le alo
 i le noi ana
 O ka la ho'i e
 A chilling wind brushes across the thighs
 It is the Kā'ēlekele of Pūku
 The breath [patience] is expended
 in asking
 The day is here

When she finished her chant, they then departed, and shortly thereafter, those women were killed. Hi'iaka mā then arrived at Kōko where they ascended to the heights of Kuzumo'ō-a-Kāne. It was there that 'Ihī'ihīlanūka and Kanono'ūla dwelt. Arriving at their home, the two women affectionately greeted Hi'iaka mā, welcoming them into their home. Thus, the residents of this community (Kaulāiehu) welcomed the travelers from the island of Hawai'i. When the greetings had been exchanged, Hi'iaka mā stood to leave, and Hi'iaka looked to the ocean where she saw the canoes of Kaulāiehu entering the landing of this place. They then traveled down to the shore and departed from that place expressing their aloha to the natives of those shores, and then sailed to Mōloka'i... (May 3, 1927)

Kohe-lepelepe

Another account of Pele and her sisters, provides readers with a native tradition of how the crater, Kohe-lepelepe (vagina labia minor), was named. One of Pele's sisters, Kapo-kobe-lele (Kapo-with-the-traveling-vagina), also called Kapo-ma'i-lele Kapo-with-the-flying genital), was able to separate her ma'i (sexual organ) from her body. At one point in antiquity, Kapo did this to protect Pele from the ravages of Kama-pua'a (the pig-man deity). Beckwith (1971) recorded:

When Kama-pua'a attacked Pele near Kalapana, Kapo sent this *kohe* as a lure and he left Pele and followed the *kohe lele* as far as Koko Head [i.e., Koko Crater] on Oahu, where it rested upon the hill, leaving an impression to this day on the Makapu'u side. Then she withdrew it and hid it in Kalibi. When the Hawaiians dream of a woman without a vagina it is Kapo... (Beckwith 1971:186-187)

At Koko Crater, another name, Pu'u ma'i (Genital hill) near the summit of Kohe-lepelepe also commemorates this event.

Hana-uma and Hāloano Vicinity
Citing Hawaiian accounts translated and/or collected by Mary Kawena Pukui, Sterling and Summers (1978) provide readers with a few other historical accounts for sites or features in the study area. The following accounts are excerpted from their collection:

Ōlu'u - On the Makapu side of Hāloano is a healing stone in the ocean. One has to swim over it. The sea is also called Ōlu'u. Co-author Pukui tells: "I went with an old lady out past the Blow Hole, right where the sandy stretch of beach begins. Out there is a stone where Hawaiians used to go. The Name of the stone was 'Ōlu'u' which means 'crouch'. The old lady headed out there and sat beside 'Ōlu'u, and had her ceremonial bath before we went on. She said that's where her people always went with prayer. 'Ōlu'u was the healing stone... So named because people crouched beside it while taking the *kapa lani*. Healing stones were found near the shoreline of each island. Each stone was given a name. (Sterling and Summers 1978:265)

Hanauma Bay was a favorite royal fishing resort...

Queen Kaahumanu came by canoe and went to Hanauma, where Pahi (father of Bernice Pauahi Bishop) was the *konohiki* over the remains of the (legendary) chiefesses, Ihihilaauka and Kaunonouka. These were the *hula* dancers, Mīx Alapai, Mr. Hewahewa, and Mr. Ahukai who gathered for the love of and to entertain royalty. The men place the gamies of Uma. One man gripped the hand of the other and pushed to get it down. Women joined in and a whole month was spent there. That was why the place was called Hana-uma, a noted place. (Sterling and Summers 1978:267)

The authors also provide an account of a stone named Nā-maka-o-Kaha'i (The-eyes-of-Kaha'i; an elder ocean-formed sister of Pele):

This stone is located at Hanauma Bay. Mrs. Pukui thinks on the north side a way up the slope. It was left by Namaka o kaha'i when she came to fight Pele.

It is a dark stone which glows in the night provided it has *owu*. The drops of the *owu* were left at the stone. (Sterling and Summers 1978:267)

Ko-wai-aoe (Koko Head Crater and Vicinity)

...The chiefesses Ihihilaauka and Kaunonouka were beautiful women and kind to the people of Makapu... These chiefesses like going to the beach with the people to fish, a customary occupation of the natives of this land...

...Hiiaka turned aside to address in words of consolation and compliment the forlorn mythical creatures whom she recognized as kindred. They were creations of Pele, Ihihilaauka, manifest to us today as a lifeless cinder-cone... and Nono-ua, as a clear spring of water welling out of the mountain...

Mookoo-o-Kaneepua

...that hill yonder, forming the point is Kaneepua's hill. There is an 'awa container there but it is all broken up. That was where Kane and Kanaloa drank 'awa.

There was a pool near the point that was very strange. One day it vanished. Kane and Kanaloa sent their younger brother, Kaneapua, to bring some water down from the top of the hill. At the top of [Kohē] Lepelēpe was a spring, Waikuaiea. As the boy

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went after it, he was told that he must not urinate on the way. He carried the container in his hand and he was warned lest the urine enter the water. The boy also seized with a great desire to urinate so he set aside the warning and relieved himself. Strangely, the container became filled when he lifted it up and the spring dried up.

The brothers were waiting and when they saw that he had not obeyed, Kane told Kanaloa, "Thrust your cane down so that we may have water for our 'awa." Kanaloa thrust his cane and water gushed out. They had what they wanted and the water remained there. It is gone now.

It is said that menstruating women made it dry up and vanish. They (Kane and Kanaloa) made ready to go back to their home because their brother did not heed their warning. They went off and when their brother who was on his way back saw them he called and called but no attention was paid to him. He knew that he was in the wrong for not obeying and so he turned into the hill called Mookoo-o-Kaneepua [The ridge of Kōkō'apua]. The hill begins where the telegraph poles of Koko Head stand and runs in a straight line till it dips into the sea. This is the hill mentioned. (Sterling and Summers 1978:268)

Moundia and Vicinity in Journals and Logs of

Nineteenth and Early Twentieth Century Visitors and Residents
Perhaps the earliest description of the Maunaloa area, was recorded by Captains Portlock and Dixon, commanding the *King George* and *Queen Charlotte*. On June 2, 1786, the two and members of their crew, rowed to the shore of Maunaloa, in search of fresh water. They were directed by natives to a bubbling spring at the mouth of Kuli'ou'ou. Captain Portlock gave the name King George to what is now called Maunaloa Bay (Scott 1968:691). Portlock also named Koko Head "Point Dick," in honor of one of his patrons, Sir John Dick (Scott 1968:696). Subsequently, the Koko landing of Maunaloa was named for Captain Portlock, who is believed to be the first Caucasian to have named sites along the Maunaloa coast line (Scott 1968:695).

In 1822, Gilbert F. Mathison, who visited Hawai'i, walked from Waimānalo to Maunaloa, on a tour around O'ahu (Mathison 1825 IN McAllister 1933). By his description, it would appear that the main trail around southeastern O'ahu actually passed behind Koholepelepe, as indicated on *Figures 2 and 3*. After crossing the ridge from Waimānalo, Mathison wrote:

We descended through a valley thickly wooded [Kamiloiki-Kalama], which sloped gradually downwards to the plain, and after infinite fatigue, found ourselves once more on the sea-shore, at the southeastern side of the island. We rested for two hours in an untenanted hut...then pursued our journey. We soon passed a village mostly inhabited by fishermen, and containing perhaps one hundred huts. Here was a large salt-water lake, similar to those I have seen on the coast of Brazil. It was divided from the sea by a large embankment of sand, which on extraordinary occasions is probably overflowed by the tide... [Mathison IN McAllister 1933:69]

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MAUNALUA—LAND TENURE

In ancient Hawai'i a system of land tenure and management evolved that mirrored the natural landscape of the islands. This management system was so integral to the well-being of the native population, that nature itself was personified and deified. The islands—every facet of the ecosystem—were believed to be alive and the elder relatives of the Hawaiian people.

In pre-western contact Hawai'i, all land and natural resources were held in trust by the high chiefs (*ali'i* 'ai *ahupua'a* or *ali'i* 'ai *moku*). W.D. Alexander, Surveyor General of the Hawaiian Kingdom wrote:

...It is admitted that under the ancient feudal system, the allodium of all land belonged to the King, not, however, as an individual, but "as the head of the nation or in his corporate right..." (Alexander, Survey Letter Book No. 9, September 30, 1891:107. Hawaii State Archives)

The use of lands and resources were given to the *hoo'a'iina* (native tenants), at the prerogative of the *ali'i* and their representatives or land agents (*konohiki*), who were generally lesser chiefs as well. In 1848, the Hawaiian system of land tenure was radically altered by the *Māhele 'Āina* (Division of Land). The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawai'i came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands; and (3) *Konohiki* Lands (Chinen 1958:vi and Chinen 1961:13).

Laws in the period of the *Māhele* record that ownership rights to all lands in the kingdom were "subject to the rights of the native tenants," those individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs (*Kanawai Hoopai Karaima*... [Penal Code] 1850:22). The 1850 resolutions in "*Kanawai Hoopai Karaima no ka Hawaii Pae Aina*," authorized the newly formed Land Commission to award fee-simple title to all native tenants who occupied and improved any portion of Crown, Government, or *Konohiki* lands. These awards were to be free of commutation except for house lots located in the districts of Honolulu, Lāhainā, and Hilo (cf. Penal Code, 1850:123-124; and Chinen 1958:29).

In order to receive their awards from the Land Commission, the *hoo'a'iina* were required to prove that they cultivated the land for a living. They were not permitted to acquire "wastelands" (e.g. fishponds) or lands which they cultivated "with the seeming intention of enlarging their lots." Once a claim was confirmed, a survey was required before the Land Commission was authorized to issue any award (ibid.). The lands awarded to the *hoo'a'iina* became known as "*Kuleana* Lands." All of the claims and awards were numbered (Land Commission Awards or LCA), and the LCA numbers remain in use today to identify the original owners of lands in Hawai'i.

By the time of its closure on March 31, 1855, the Land Commission issued only 8,421 *kuleana* claims, with a land area of only 28,658 acres to the native tenants (Kame'eiehiwa 1992:295). It appears that no native tenants were awarded *kuleana*—house lots or agricultural

plots—in the *ahupua'a* of Maunaloa (Board of Commissioners 1929). The entire land⁴ was awarded to Chiefess Victoria Kāmāmalu, a granddaughter of Kamehameha I, in LCA 7713:10 (Board of Commissioners 1929).

Looking further into the history of land tenure at Maunaloa, S.M. Kamakau (1961) tells readers that in the late 1790s and early 1800s, the land of Maunaloa was entrusted to Kūihelani (a chiefly steward who served Kamehameha I). For a time, was also the governor of O'ahu. Kūihelani fell out of favor, and his land was redistributed (Kamakau 1961:173, 389). The chief Ke'eumoku took up residency at Maunaloa, where in 1804, he died at a place in Koko called Kapopo (Kamakau 1968:189). Ke'eumoku's daughter, Ke'eumoku and Namāhana retained Maunaloa, and she subsequently bequeathed the land to Chiefess Kīna'u, a daughter of Kamehameha I, and mother of Victoria Kāmāmalu. As noted above, Kāmāmalu retained the Maunaloa during the *māhele 'āina* (land division) (cf. Burrell 1994). When Kāmāmalu died in 1866, her father Kekūānoa inherited her estate, and upon his death in 1868, Lot Kamehameha V (son of Kekūānoa's), inherited the land. When Lot Kamehameha died intestate, his estate was settled in court and Chiefess Ke'elikōlani (half sister of Kāmāmalu and Kamehameha V) inherited the estate lands. Ke'elikōlani died in 1883, and Chiefess Bernice Pauahi Bishop inherited her lands, including Maunaloa. Following the death of Pauahi Bishop, the *ahupua'a* of Maunaloa, District of Kona, O'ahu, was deeded to the Bishop Estate (Kamehameha Schools/Bishop Estate) on February 25, 1890 (cf. Kame'eiehiwa 1992:244-245; and Bishop Estate Trustees, 1957:40).

Overview of Nineteenth Century

Government Land Records

Following the *Māhele*, records of land use in Maunaloa began to be recorded in a more formal system, though available documentation is still fragmented. Most of the Maunaloa records houses in State collections reference the Maunaloa Valley and *hula* lands, and fishpond, with almost no references to the Kawaihoa-Hanauma Headlands until the early twentieth century. The land was generally used for ranching, and the large pond of Ke-ahu-o-Maunaloa (now the Hawai'i Kai Marina) was leased for fish cultivation. The documentation below, is an overview of selected references to Maunaloa:

In 1851, William Webster surveyed the land of Maunaloa for Chiefess Victoria Kāmāmalu. Register Map 211 (Figure 4), records the alignment of the Kuupā fishpond, a few prominent place names, and the Kealākōpua Trail passing over Makapu'u into Waialalo. The map identified a land area of 6,491 acres and fishpond area of 523 acres, making a total area of 7464 acres.

On August 12th, 1852, in compliance with the law (1850) requiring *Konohiki* to declare the *hoo'a'iina* (restricted fish) of their lands, Kekūānoa, on behalf of V. Kāmāmalu noted that "none (maile) was the restricted fish of Maunaloa (Interior Department Letters; State Archives).

⁴ Interior Department Document 382 (nd.), a list of Lands of V. Kāmāmalu and record of her payment for those lands, identified Maunaloa as "*ili Koolāpoko*" (State Archives).

⁵ Based on Maly's past review of Bishop Estate Lease records (in association with other lands), it is likely that a fuller understanding of land use, residency, and site development can be found in Bishop Estate's private files. Such records have been proven in the past to be a great help in understanding the history of the land.

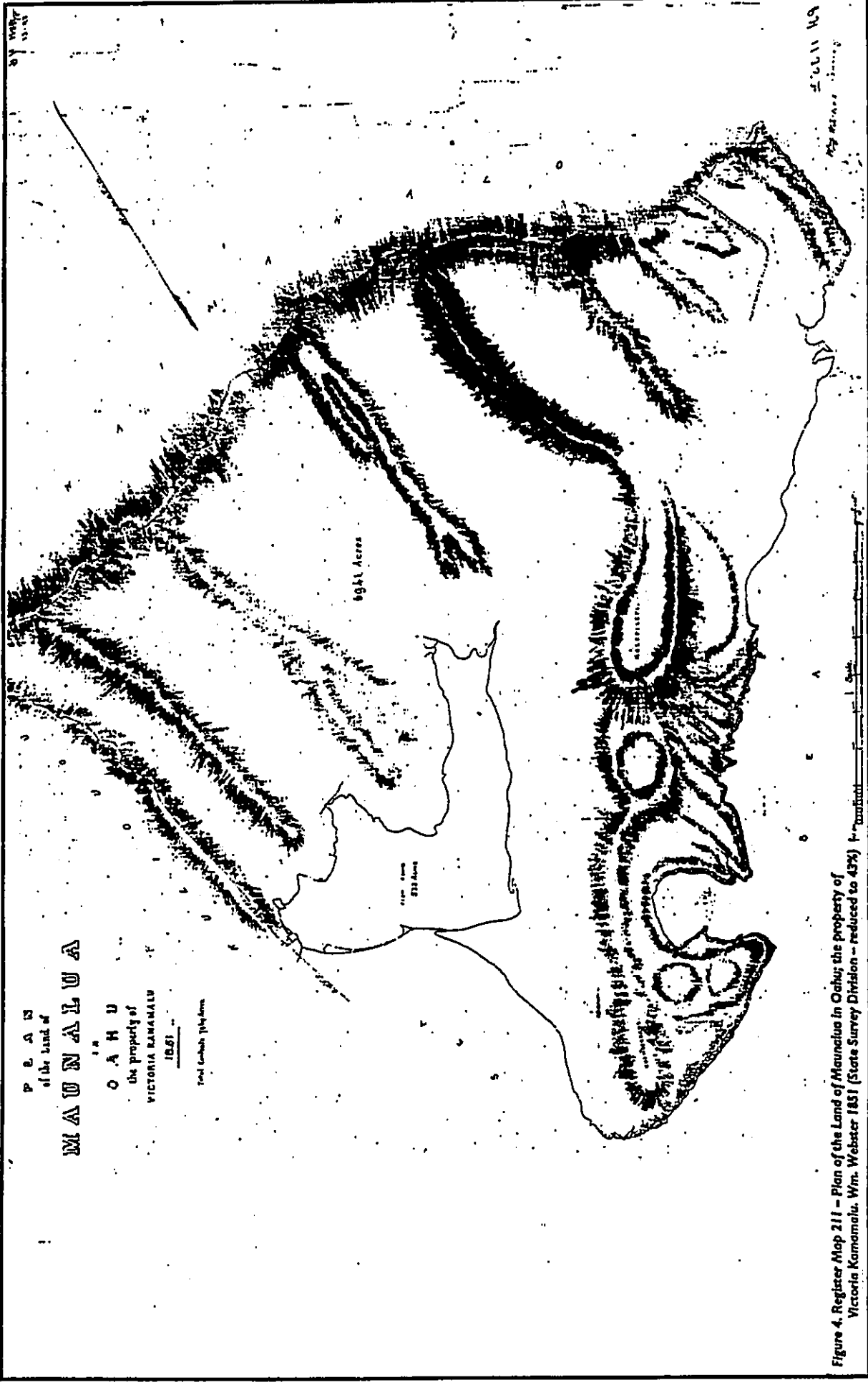


Figure 4. Register Map 211 - Plan of the Land of Maunaloa in Oahu; the property of Victoria Kamomalu. Wm. Webster 1851 (State Survey Division - reduced to 43%)

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 Oahu-35e (10/1999)

ARCHAEOLOGY OF OAHU (McALLISTER 1933)⁴

In 1930, J. Gilbert McAllister conducted the first detailed survey to document information about archaeological sites of O'ahu. McAllister (1933) had the benefit of working with knowledgeable Hawaiian informants while he recorded various features around O'ahu. Thus, he also collected stories about a number of these sites, including some of those in Maunaloa. McAllister did lament that for the lands on the Makapu'u side of Koko Head-Koko Crater, "There are no old Hawaiians in the region, and it is not possible to obtain information..." on sites he'd located (McAllister 1933:57). It will be seen below, that at the time of McAllister's survey, he recorded only a few sites on the slopes of Koko Head, with additional sites on the slopes of Koko Crater and beyond. But in the larger land of Maunaloa, McAllister documented approximately 50 sites. Many of the sites he recorded were either in the southern section of Maunaloa (the Wawanalu-Kaloko area), or in the remote valleys above the *kūia*. This can probably be attributed to the fact that by 1930, development was already occurring in the Maunaloa Valley-Kuapā vicinity (thus sites which would have existed were already destroyed). On the other hand, there was only limited interest in residency or land use in the arid salt spray covered southern lands of Maunaloa, thus more sites survived.

Sites recorded by McAllister included habitation features (both long-term and temporary), ceremonial sites, burials, agricultural features, petroglyphs, and trails. The following texts are excerpted from McAllister's writings; with emphasis on sites in and/or neighboring the Koko Head Regional Park and Nature Preserve. The documentation below also includes selected sites of Maunaloa for which detailed historical documentation was recorded—thus adding to the historical context for interpreting the history of Maunaloa.

Sites of Mounokū

(see Figure 5 - for approximate locations of identified sites)

Site 3. Keakikipapa valley road.

Running from a point slightly mountainwards of the lighthouse road up Keakikipapa Valley, down the Waimanalo gap, and through the village site in Waimanalo, are the remains of an old road. It has not been definitely determined if it is of old Hawaiian origin or of post-European construction. As the road appeared when I saw it, before the opening of the new government highway, it did not seem to be old Hawaiian.

The name of the valley, Keakikipapa (The paved path, trail, or road), indicates that a trail at least has been here for many years... This path may have existed in 1822, when Mathison passed from Waimanalo to Maunaloa, but it was not known to him... From the lighthouse road to the gap, about 1,250 feet, the roadway lies in a straight line and is fairly distinct. From the top of the gap it zigzags down to the sea, making four bends in the descent. In places the natural outcroppings of rocks have been used as steps, but where stones have been laid and a terraced wall built up to support the paving, this paving has been constructed with large stones laid at an angle sometimes as great as 45 degrees. From the foot of the gap the road ran into the village site on the Waimanalo side (Site 384). Near the top of the gap, on the Maunaloa side, is a small walled enclosure which, according to Stokes, is said to have been made at the time of the rebellion in 1895. From the top of the gap down

Interior Department Book 15:107 (1878) recorded that the land of Maunaloa had "sea coast frontage along the reef of 11.76 miles" (State Archives).

On January 1, 1856, M. Kekūanā'ōle and John I'i, guardians of Victoria Kamāmalu leased all the land of Maunaloa to William Webster. Specific of the lease include:

Land of Maunaloa in the district of Kona, Island of Oahu, an area of 5,680 acres at a yearly rental rate of \$300.00... All rights excepting only the Konohiki's legal fishing rights in the sea for a term of 30 years... The said lessee will build or cause to be built within one year from the date of these presents, a sufficient permanent fence to stop cattle on the boundary line... (Bureau of Conveyances Lib. 7:525-526)

By the early 1870s, the land of Maunaloa and the fishpond were leased to various individuals, among whom were J. Kānepu'u, M. Pico. In March 1873, D. Kalikūna (who less than a year later would become King of Hawaii), applied to the *Estate of Loi Kamehameha* for a lease of Maunaloa. On May 12, 1873, R. Ke'elikōlani chose to retain Maunaloa as her personal property, rather than lease it out (State Archives Interior Department Land Files - Maunaloa).

By the late 1880s, the Maunaloa Fishpond was under lease to Chinese pond keepers (Interior Department Land Files - Maunaloa, Nov. 7, 1889).

Ranching and fisheries activities were continued at Maunaloa through the first decades of the 20th century (cf. Takemoto, Joerges, Mitchell and Baring 1975:20-22). C.S. Judd (1921) noted that the cattle of Maunaloa Ranch had nearly destroyed the native forest of Maunaloa. Judd also reported that goats were no longer a problem by 1921, as they had nearly been exterminated (Judd 1921:151). By that time, the population in Honoohila was growing, and the attraction of Hanoama Bay and other natural features of the Maunaloa region had begun drawing more and more visitors.

⁴ Readers should review the archaeological study (Borthwick et al., 1998) prepared as a part of the present EIS for further information on current archaeological studies and site descriptions.



Figure 5. McAllister's Sites of Maunaula and Vicinity (Numbered on a 1909-1919 Survey Map of the Island of Oahu Bishop Museum MS SC McAllister Box 2.2)

Kealahipapa Valley for about 600 feet the road is in fairly good condition and can be followed with ease. The central part is paved with flat stones 1 to 2 feet in width with smaller stones heaped about a foot in height on either side.

Along this distance the road averages between 15 and 16 feet in width. Farther into the valley the road runs into a heavy growth of *Koawe*. Here it is generally without the side rock-walls, about 11 feet wide, and of arched or curved surface. Throughout the lower part of the valley the road is in a poor state of preservation. On the immediate mountain side of the lighthouse road it cannot be found. Seaward of the lighthouse road it appears again and seems to end some 140 feet from the present road, for on the sea side of this point it cannot be found... [McAllister 1933:59]

Site 14. Fishing shrine (*ho'a*), Maunaula. Built on a lava outcrop which is about 10 feet higher than the surrounding area is a small platform 19 by 16.5 feet in extent, with the northwest and southwest corners rounded. On the southwest corner there may have been a small additional elevation, for the stones are piled 3 feet higher. Except for this corner and the slight indication of a 1-foot wall at the northeast end, the surface is comparatively level, paved with

coral and small lava rocks, embedded in which was a small bottle of distilled spirits, with the top slightly protruding. The platform is 4 to 8 feet higher than the outcrop, depending on the slope. To the west at the foot of the platform are two walls approximately 2 feet in height and 1.5 in width, which are only visible for a short distance. While I was taking measurements on this site, a Hawaiian who was fishing came up and offered the following information:

There were once two brothers and a sister living on this beach. While the men were talking together, the sister was out fishing. The older brother wanted a drink, but the younger told him to wait until their sister returned. Then the younger brother quenched his thirst, but immediately he was turned into the stones upon which this *ho'a* was built. The younger [older?] brother was also turned into stone, the rocks upon which another *ho'a* [Site 6] is built. The sister was turned into stone on the beach. The rock representing her is no different nor more outstanding than any of the surrounding rocks... [McAllister 1933:61]

Site 21. Cave habitation (?), Maunaula. A cave which was probably used as a habitation, located about 20 feet from Site 20, is 20 feet long, 15 feet wide and 4 feet in maximum height. There is another small entrance which is now filled with trash. Douglas Damon said the old Hawaiians had told him that during times of war the women and children were hidden here and the mouth was closed by a large stone.

Site 22. Possible *heiau* site, Maunaula. Two large inclosures now used for a yard around a few occupied houses and an adjoining cattle pen. The Mana map in the Bishop Estate office marks the region of this inclosure "Kaiwi" and a little to the west "Heiau Koaia." Mr. Miami's authority for these names was an old native woman now dead. If there ever was a *heiau* in this section, these apparently rebuilt walls would probably indicate the site... [McAllister 1933:62-63]

Site 36. House site on the low ridge of Koko Crater, Makapuu side. Only a few of the foundation stones of the house remain; they are insufficient to give any idea of the size. A low wall was formed about the site by placing large stones on end. It is approximately 85 feet wide and much longer. On the Makapuu side of the crater, south of and lower than the house, is a series of three terraces, in poor state of preservation, which were probably used for agricultural purposes. Though the site is old, it may be post-European.

Site 37. Terraces, northwest slope of Koko Crater, facing Kamiloihi Valley. A series of terraces from 12 to 20 feet wide run across the slope of the land. The terraces are low and un faced, not more than 1 foot above each other, with stones gathered in clearing places along the edges. Seventeen terraces were counted, along one slope. One area which was rounded up had a considerable number of large stones scattered about and was probably a house site... [McAllister 1933:65]

Site 44. The "Koko Head petroglyphs" (fig. 24) have been reported by a number of writers.

The cave was discovered in January, 1899, and Mr. C.L. Beal, a member of the party, returned at a later date and made rubbings. These he inked in and photographed, and I am greatly indebted to him for a copy of the pictures, from which my drawing has been made. Rubbings on file at Bishop Museum made in 1900 and in 1915 show that at some time between these dates the figure with the "spiked headdress" was

removed. The carvings in 1931 were in almost the same condition as in 1915. They are on the slanting floor of the cave, distinctly cut into the rough basalt surfacing. Judd (46) has published the following description:

The cave has a low ceiling and a sharply a dined roof of hard rufa. Photographing the carvings is not an easy task in consequence. The surf at high tide washes into the mouth of the cave and the lower carvings are much corroded. There is no evidence now that the cave was or was not walled up. The figures are in three sizes, respectively six, nine and fifteen inches in length. In some of the figures an attempt has been made to show the contour of the thigh and calf; the knee is small and in some figures the toes and heels are shown. All of the arms save in one figure point down. (There is another figure toward the center of the group in which both arms are turned up.) This one figure has its right arm raised and has a head dress of four spikes radiating from one side of the head. Some of the figures represent neither men nor women....

All the carvings are three-quarters to one-sixteenth of an inch deep. There is no evidence that the cutting had been made with an iron instrument. The bodies of several men are square, all the interior of the square being removed evenly. Storms have swept all through the cave and there are but few of the inscriptions left but they probably at one time covered the entire floor of the cave. The area covered by the carvings is about six and one half by eleven feet. Several figures may be of four-footed animals.

Site 45. Platform, side of Koholepelepe, facing into Kahaulou (sic - Kahaulou) Crater. According to Miss Marie Neal, Botanist, Bernice P. Bishop Museum, there was a small platform of stones with a pathway in association located on the side of Koholepelepe, facing into Kahaulou Crater. I have not been able to locate this site. It is apparent that several places within the small crater were used as house sites.

Site 46. Fishing shrine (*ho'a*) known as Pajialaea, for mullet.

Merely a stone at the edge of the water, but it had a great attraction for mullet.

Site 47. Fishing shrine (*ho'a*) known as Huruui, for mullet.

The shrine is not far from the one described in Site 48 and is an exact duplicate, except that it is slightly larger.

Site 48. Fishing shrine (*ho'a*) on the beach, Honolulu side of Kuamookamae, known as Hina and built for ead (*akula*) (pl. 6, B).

The shrine is roughly square in shape with the corners rounded, and measures 16.5 feet across. It is formed by coral walls 1 foot high and from 1 to 2 feet wide. Inside the walls is a paving of small bits of coral and sand which is about 6 inches higher than the outside. Facing the sea is an entrance 2.5 feet wide, just within the entrance are six sharp lava stones forming an oval about 1 foot wide and 1.5 feet long. It was here that the offering of fish was placed. A foot from the wall opposite the entrance are two flat coral stones embedded securely in the paving. They protrude about 6 inches.

Site 49. Keahupua-o-Maumaha fishpond, located in the land of Maunahua. On the maps the pond is designated as Kuapa, though among the Hawaiians and market people now it is known as Maunahua pond.

According to the Webster map of 1851, the pond covered 523 acres. In 1921 the water area was 301 acres with a swampy land of 125 acres. The water is brackish.

The old wall of the pond was approximately 5000 feet long. It appears to have been a sand embankment, faced on the top and seaward side with lava and some coral stones. These were probably added later. The sand embankment is now between 10 and 15 feet wide. The stone facing is only a few feet wide. It is interesting to note that on the Honolulu end the wall did not connect to the nearest land, but was built back to the brackish spring which is about 14000 feet from the beach. The wall is located on the seaward side of the spring, just inclosing it.

According to Makea Nipahii my informant, the pond was built by Mahoe, her great-grandmother. When the pond had been only partially completed, the *mehehune* came and in one night finished the construction. Mr. Moe of the Kamehameha schools is of the opinion that a large fishing village originally existed in Hahaione Valley at the head of the pond, which, according to him was not a pond, but an arm of the sea. The people from this village fished off Maunahua in their canoes, and when the pond was built it cut off their access to the sea and the village declined. There was a great number of ruins in and about the Kamehameha farm school. Mr. Moe also believes that the Honolulu end of the pond was so peculiarly indented in order that boats from ships might have ready access to the brackish spring, from which they might obtain water....

...Toward the center of the wall of the fishpond is a rather large stone standing upright. It is 4.5 feet high, 3 feet wide at the bottom, 2 feet wide at the top, and 3.5 inches thick. It is securely embedded diagonally across the wall, with one of its broad sides facing exactly north. This stone is said to be Waiakeia, named for a man who once lived in Maunahua. This man was married to a woman of whom he was apparently very fond. In keeping with Hawaiian customs of marital life, Waiakeia gave consent for his wife to stay with other men. However, when she was away he was greatly worried, and it preyed so consistently upon his mind that he became insane. One night when she was gone, he left the lonely hut and went to Hanauma Bay, where in great rage he tore up a large stone and carried it to the fishpond wall. This was a super-human feat, as one can see from the size of the stone. This stone he placed on the wall of the pond, naming it after himself, and it stands there today as a monument to his memory.

At times there was a dearth of fish, which Mahoe coped with in this manner. On the nights of Kame, she took a baby pig as it came from the womb of the mother, and had her small grandson carry the squeaking animal about the pond. There was a strict *tapu* until the next night, which was the night of Lono. No fishing was permitted, and no noise was allowed to disturb the praying *kohuna*. On the night of Lono, seaweed and *limu* were gathered and placed on the shrine. After the night of Lono when this ceremony was apparently completed, there was plenty of fish.

The pond is said to connect by means of an underground tunnel with Kaelepulu pond (Site 377) in Kailua. From time to time great schools of mullet disappear from the Maunahua pond and are to be found in the Kailua pond. At the same time the *awa* which were in the Kailua pond appear in the Maunahua pond. When the mullet reappear in the Maunahua pond the *awa* disappear. Kamea, the fish warden, tells me that this occurs even today, but cannot be explained by the Japanese who leases the pond. This same phenomenon occurs between the Kualoa pond (Site 313) and the Kahana pond (Site 301)... [McAllister 1933:67-70]

SUMMARY

This study provides planners and interested readers with narratives that will be of use in interpreting the history of the land, and in formulating long-term resource management guidelines. As noted earlier, some of the traditional and early historic accounts, associate several features of the natural landscape with events in which Hawaiian gods and deity participated. Some of the place names which remain in use today also call to mind those times when the gods walked the land with the people. Additionally, accounts cited in this study reference resource collection and access practices as recorded up until ca. 1950.

As noted earlier in this study, land acquisition and planning for Koko Head Park (now the Koko Head Regional Park and Nature Preserve) began in the 1920s. Hanauma Bay, a popular swimming and picnicking area was being developed and by ca. 1931 the Kalamiana'ole Highway provided paved access to upper Hanauma and a small road was made part of the way down to the bay. In early 1950, work was underway to extend the Hanauma Bay access road to the shore (Figure 6) and there were plans to excavate a portion of the reef to enhance the swimming hole.



Figure 6. Hanauma Bay Road Half Finished (Hansuku Advertiser Photos; March 13, 1950)

In 1956, a joint project by the Hawaiian Telephone Company and A.T. & T. blasted out a portion of the reef to facilitate the laying of a transpacific telephone cable. Thus, a "greatly improved aquatic pool rewarded O'ahu's swimmers" (Scott 1968:698). Since that time, the popularity of the Koko Head Park/Nature Preserve, particularly Hanauma Bay has grown, and several efforts have been made at formulating a plan for long-term park development and management of the resources.

It is likely that the City and County of Honolulu and a "friends of the park" association could develop important preservation and interpretive plans through the conducting of an oral history study. Such a study would logically be conducted with individuals descended from families with genealogical attachments to traditional residents of the Maunaloa Ahupua'a, and others who have gained an intimate knowledge of the resources and landscape through decades of travel and resource use in the area. Such a study should document who interviewees were; how they were selected; describe the scope and methodology of interview process; present an overview and detailed documentation of the historical insights gained through the interviews; identify the presence of family and community sites, and significance of cultural and/or ceremonial sites; document areas of concerns to the interviewees; and elicit recommendations for long-term protection, preservation, interpretation, and management of the Koko Head Nature Preserve.

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APPENDIX F

**Archaeological Inventory Survey Of Eight Areas Within the Koko
Head Regional Park, Maunaloa Ahupua'a, Island of Oahu (TMK 3-
9-12:1, 2, 4, 6, 8, 9, 10, 12, 13, 14 & 16)**

Cultural Surveys Hawaii

November 1988

***Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko
Head Regional Park and Nature Preserve, East Honolulu, Island of
Oahu, Final Environmental Impact Statement, August 1999.***

ABSTRACT

At the request of Group 70 International Inc., Cultural Surveys Hawaii has conducted an archaeological inventory survey of eight areas within the Koko Head Regional Park. The survey areas were specific localities at Koko Head, Koko Crater, and Hanaua Bay.

No traditional Hawaiian archaeological sites were observed within any of the study areas. However, two military sites were recorded. Background historical research indicated that both sites comprised structures constructed more than fifty years ago. Site 50-80-15-5698 are bunkers and an associated structure at the end of Koko Head which were constructed in the 1930s as an element of O'ahu's coastal defenses. Site 50-80-15-5699 is the remnants of the former Koko Crater radar installation which, besides the radar instruments at the summit, included a tramway and a base camp. The installation was first established in 1942.

It is Cultural Surveys Hawaii's recommendation that both sites be preserved if possible. It is additionally recommended that research (e.g. archival-quality photographs) be conducted with the aim to further document the architectural qualities of these sites. Additional research would be particularly appropriate if the sites or components of the sites could not be preserved.

**ARCHAEOLOGICAL INVENTORY SURVEY
OF EIGHT AREAS WITHIN THE KOKO HEAD REGIONAL PARK,
MAUNAIUA AHUPUA'A,
ISLAND OF O'AHU**

(TMK 3-8-12:1,2,4,6,8,9,10,13,14 & 16)

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Prepared for

GROUP 70 INTERNATIONAL INC.

Cultural Surveys Hawaii
November 1988

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I. INTRODUCTION

A. Project Description

At the request of Group 70 International Inc., Cultural Surveys Hawaii has conducted an archaeological inventory survey of eight areas within the Koko Head Regional Park, located in Maunaloa *ohupua* on the island of Oahu (TMK 3-9-12:1,2,4,6,8,9,10,12,13,14 &) (Figure 1-8). Koko Head Regional Park comprises approximately 1,265 acres at the southeast tip of Oahu and includes: the Hanauma Bay Nature Preserve, Koko Head District park, Hibona Blow Hole, Koko Crater Botanical Garden, Koko Head Shooting Complex, and a portion of Sandy Beach Park.

The eight areas within the park - designated Study areas 1 to 8 throughout this report - which are the focus of the present inventory survey include:

- | | |
|---------------|---|
| Study Area 1: | Former Hawai'i Job Corps camp at the southwest base of Koko Crater |
| Study Area 2: | Corridor of the former tramway on southwest slope of Koko Crater |
| Study Area 3: | Summit of Koko Crater at the terminus of the tramway (site of former radar installation) |
| Study Area 4: | Area at intersection of Kalaniana'ole Highway and the entrance road to Hanauma Bay |
| Study Area 5: | Area of the present Hanauma Bay visitor center and parking lots |
| Study Area 6: | Beach area of Hanauma Bay limited to the grounds surrounding the concession and comfort station at the base of the access road to the beach |
| Study Area 7: | Koko Crater Botanical Garden loop trail |
| Study Area 8: | Koko Head communication facilities access road and area at summit |

These areas are proposed for future park development projects.

B. Scope of Work

The scope of the work for the archaeological inventory comprised:

1. Historic background research including study of historic maps, archival documents, previous archaeological and historical studies, and other sources for the purpose of identifying 20th century land use within the Koko Head Regional Park area and Maunaloa *ohupua*. Special concern focused on documentation of pre-1950 building activity - especially by the U.S. military - within the portions of the Koko Head Regional Park subject to the present inventory survey.

Note: Group 70 International Inc. has commissioned Kumu Pono Associates to prepare a separate report presenting archival-historical documentary research on the Koko Head Regional Park area and Maunaloa *ohupua*, focusing on the pre-contact traditions, but including 19th and early 20th documentation of land use.

2. Inventory survey fieldwork consisting of surface survey of the eight study areas for the purpose of locating and documenting any archaeological or historical sites. Documentation to include photographs and field notes.
3. Preparation of a report detailing the results of the historic research and fieldwork. The report includes significance assessments and recommendations for mitigation of impact to archaeological and historical sites.

C. Methodology of Work Accomplished

Archaeological inventory survey of the eight areas within the Koko Head Park Nature Preserve was accomplished on October 28 & 29, and November 4, 1988. The survey field crew consisted of: Douglas Borthwick, supervising archaeologist; John Winiateski; and Rodney Chiogioji.

The inventory survey consisted of complete ground coverage by pedestrian sweeps. All of the study areas inspection Study areas 1, 2, 3, 4, 5, 6, 7 and 8 were surveyed by a team of two archaeologists. Study area 6 - the portion of the beach at Hanauma Bay - was surveyed by one archaeologist. Photographs of existing features and appropriate notes were taken at each study area. Visibility was excellent in all areas, since all have been developed; improvements in these areas include: roadways, a tramway, concrete foundations, concrete bunkers, a former Job Corps camp, and currently in-use visitor facilities at Hanauma Bay.

Background research included: a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; review of documents at Hamilton Library of the University of Hawaii, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Research on former military activity within the Koko Head Nature Preserve was accomplished at the Army Museum at Ft. DeRussy and the History Office at Hickam Air Force Base.

II. NATURAL SETTING

The geology, topography, and coastline of Maunaloa *chupua'a* are the result of the erosional history of the Koolau volcanic series and the more recent activity of the Honolulu Volcanic Series. The ridge of the Koolau mountains was created, during a two million year period, by the cutting of windward and leeward valleys into the Koolau shield volcano. Subsequently, at Maunaloa *chupua'a*, the Honolulu volcanic series created the Koko Rift, an ensemble of cones, vents and other formations on top of the Koolau series. These formations include: Hanauma Bay, Koko Crater, Koko Head, and Makapu'u Head. A National Park Service report notes:

In its entirety, the Koko Rift contains examples of virtually all types of Honolulu volcanic series activity, including lava flows, tuff and ash cones, and cinder cones. Sea caves and at least two blowholes occur in the Koko Rift...

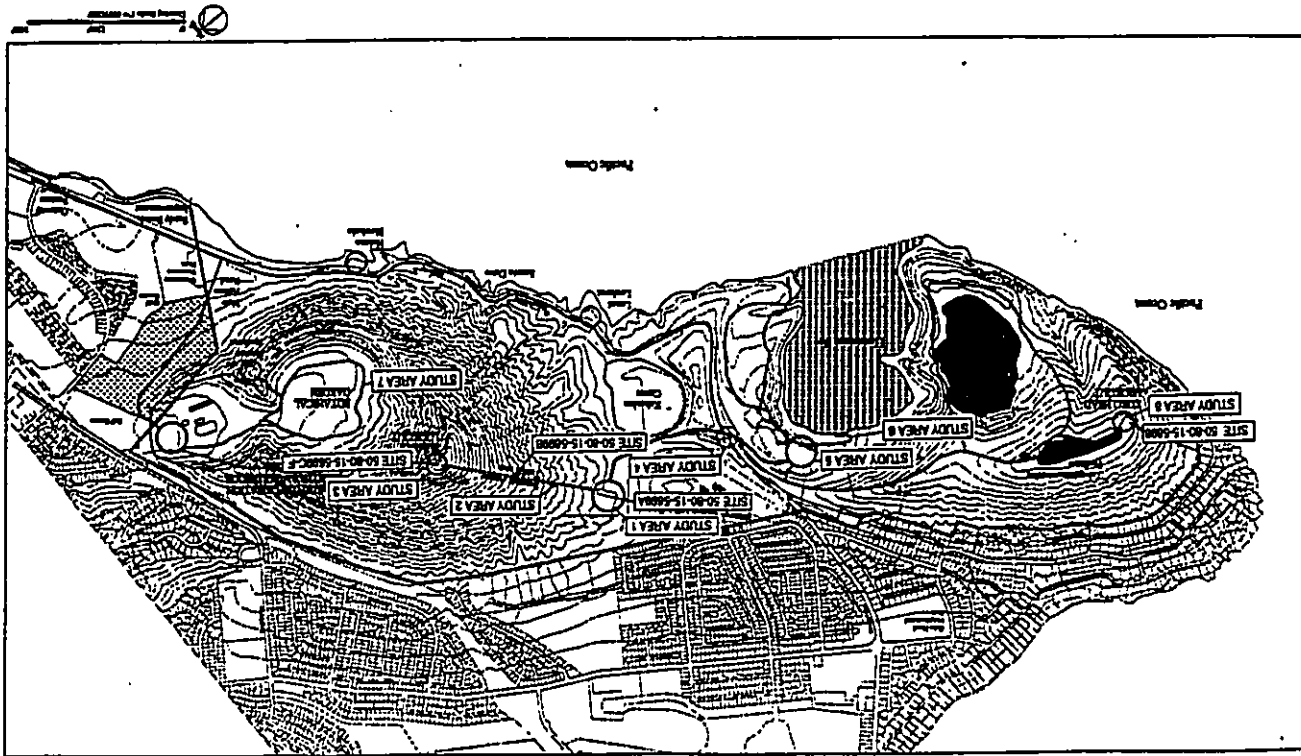
...the eastern flank of Koko Crater contains the only base surge cinder cones known on the islands, and the Koko Head-Hanauma Bay-Koko Crater complex contains one of the best examples of tuff cones in the islands...Hanauma Bay occupies the former principal crater of Koko Head and...provides a unique example of an old tuff cone that has been breached by wave erosion. Koko Crater is the largest, highest (at 1,208 feet elevation), and best preserved cone in the Koko Rift...(National Park Service 1992:14)

Vegetation within the Koko Head Nature Preserve includes *koe haole*, predominantly on the slopes of Koko Crater and Koko Head; *Miconia*, predominantly surrounding Hanauma Bay and on the floor of and the flatlands below Koko Crater; and various native shoreline plants.

Also to be noted are plantings within and surrounding the Koko Crater Botanical Garden, inside Koko Crater. As was recorded in the same National Park Service report cited above:

The floor of the crater is covered with dryland plants, including introduced *Pinus* and a large grove of native *Wrightia*...Plant collections in the inner crater include climbing cacti, aloes, euphorbias, *Sesuvium*; and palms. *Bougainvillea* and plumeria cultivars decorate the outer crater. (*Ibid.*:14)

Figure 3 Eight survey areas in Koko Head Regional Park showing locations of archaeological sites recorded during present survey



III. MAUNALUA AHUPUA'A AND THE KOKO HEAD REGIONAL PARK: MODERN HISTORICAL DOCUMENTATION

A discussion of pre-20th century land use, history and Hawaiian traditions of Maunaloa ahupua'a is provided in a separate report prepared by Kumu Pono Associates (Maly and Wong-Smith 1998).

This section of the present archaeological inventory survey report details developments within Maunaloa ahupua'a - with special focus on the Koko Head Regional Park lands - that have occurred since the beginning of the 20th century. The majority of the modifications to the eight areas under present study occurred during this modern period. Especially relevant for the purposes of the present survey study is documentation of building activities within the Koko Head Regional Park pre-dating 1950, since extant structures older than fifty years may be eligible for nomination to the Hawai'i Register of Historic Places and/or the National Register of Historic Places.

A. 1800 to 1920s

By the beginning of the 20th century, Maunaloa ahupua'a had come under the ownership of the Bernice P. Bishop Estate. After having been awarded Maunaloa ahupua'a during the mid-19th century *Mahalo*, Victoria Kamāmalu had mortgaged her lands in Maunaloa to Charles Bishop in order to pay off accumulated debts. When Kamāmalu died in 1866 it fell to her father, Kekuanoa, to pay off the debts and the mortgage in order to be awarded the title to Maunaloa (Jones 1986:22-23; Takemoto 1976:21). With the death of Kekuanoa, the land of Maunaloa passed to Lot Kamehameha V. When Lot died without a will, the probate court decided that his half sister, Ruth Ke'elikolani, would inherit his entire land holdings. When Ruth died in 1883, Maunaloa was inherited by Bernice Pauahi Bishop. Bernice Pauahi Bishop was the last surviving Kamehameha and as a result inherited all of the Kamehameha lands, becoming the largest land-holder in the Kingdom of Hawaii. When Bernice Pauahi Bishop died in 1884 her husband Charles Bishop followed her will and set up the Bishop Estate Trust, of which Maunaloa became a part (Takemoto 1976:21-23).

Since the mid-1850s Maunaloa ahupua'a had been leased for ranching purposes, first by William Webster, a government employee and land surveyor, and, after Webster's death in 1864, by Manuel Paiko, who had been leasing the adjacent lands at Kuliouou. Into the 20th century Maunaloa continued to be used as ranch land.

The fishing rights to Kuapa fishpond below Koko Crater and Maunaloa's offshore fishing grounds were important resources that had been leased to various parties since the 1850s. Kuapa Fishpond was leased in 1868 at a considerable sum for the period. The offshore fishing rights were leased and sold to various individuals until 1900 when Territorial and United States legislatures reconsidered the legality of the traditional idea of ownership of offshore fishing rights. It is clear from the high lease rates for the time period that the fishing resources of Maunaloa were productive and highly valued (Takemoto 1976:21-27).

By 1900, the population of Maunaloa had risen after precipitous decreases throughout the second half of the 19th century. Tax records indicate 38 households with 98 people living in the ahupua'a in 1855. By 1870 there were only 6 households and population bottomed out in 1880 with only 4 households. The repopulation of Maunaloa at the turn of the 20th century

likely reflects the increased ranching and commercial fishing activities that had replaced the traditional settlement and land use patterns:

By 1900, Maunaloa Ranch and Yit Lee Company, who owned a big fishing complex, employed most of the inhabitants. Maunaloa Ranch had over 1500 head of cattle, ten oxen, sixty-four horses, thirteen mules and six pigs roaming throughout Maunaloa. Five Chinese families were working for the Damons (who held the lease for Maunaloa at the time), probably as ranch hands. Five other Chinese families worked for Yit Lee. The eight Hawaiian families on the land, including one blind man, were truck farmers of some sort since all but two owned carts used for bringing goods to Honolulu . . . Thus by the turn of the century most families in the *if* were ranch hands, fishermen, or truck farmers living a relatively quiet life in an area which would be considered the country. (Ibid.:25)

The "country" atmosphere of Maunaloa at the turn of the century is suggested by a contemporary photograph (ca. 1897-1901) of Hanauma Bay (Figure 4). During the first decades of the 20th century, visitors to Hanauma Bay, traveling from Honolulu, first had to drive over sand flats, at low tide, on the *makai* side of Kuapa fishpond. A dirt road then ascended the flank of Koko Head and a trail then curved down to the bay. An early 20th century map shows the unimproved route to Hanauma Bay (Figure 5). No roadway then continued along the coastline beyond Hanauma. As also shown on the map, access to Maunaloa lands east of Koko Crater was provided by a road that flanked the east side of Kuapa pond, passed Hahaione, ran between Kamehame Ridge and Koko Crater, and stretched across the Wawamalu/Kaho'ohai area of Maunaloa.

Maunaloa became more closely tied to the modern world after 1900. In 1906 the luxury steamer *Manchuria* ran aground off Waimanalo. The result of the outcry that followed was the construction, in 1909, of the Makapu'u lighthouse which contains, until the present, the largest magnifying lens of all U. S. lighthouses (Dean 1991:Part 14). In 1914, the Marconi Wireless Telegraph Company of America built a receiving station on the slopes of Koko Head on land that was leased from the Bishop Estate for 50 years. The station was built to receive messages 24-hours a day from San Francisco and was billed as the most powerful wireless station in the world. The station linked the Hawaiian islands with the mainland and Asia on a 24-hour basis. Early in the 1920s the Marconi station was taken over by the Radio Corporation of America and was used for transmission (Takemoto 1976:28). A portion of the network of Marconi radio towers below Koko Crater is shown in a photograph of 1919 (Figure 6).

Agriculture, in the form of truck farming and an agricultural school, increased in Maunaloa after the turn of the century. The Kamehameha School for boys ran an agricultural farm in Hahaione Valley with 45 acres for vegetables and 200 acres for livestock (Jones 1996:27). Truck farmers increased in number in the area as well, providing hogs, flowers, lettuce and other vegetables for the growing population of Honolulu. Much of the area around Kuapa Fishpond was occupied by truck farmers by the end of the 1920s and this type of farming would expand (Kelly et al. 1984:47).

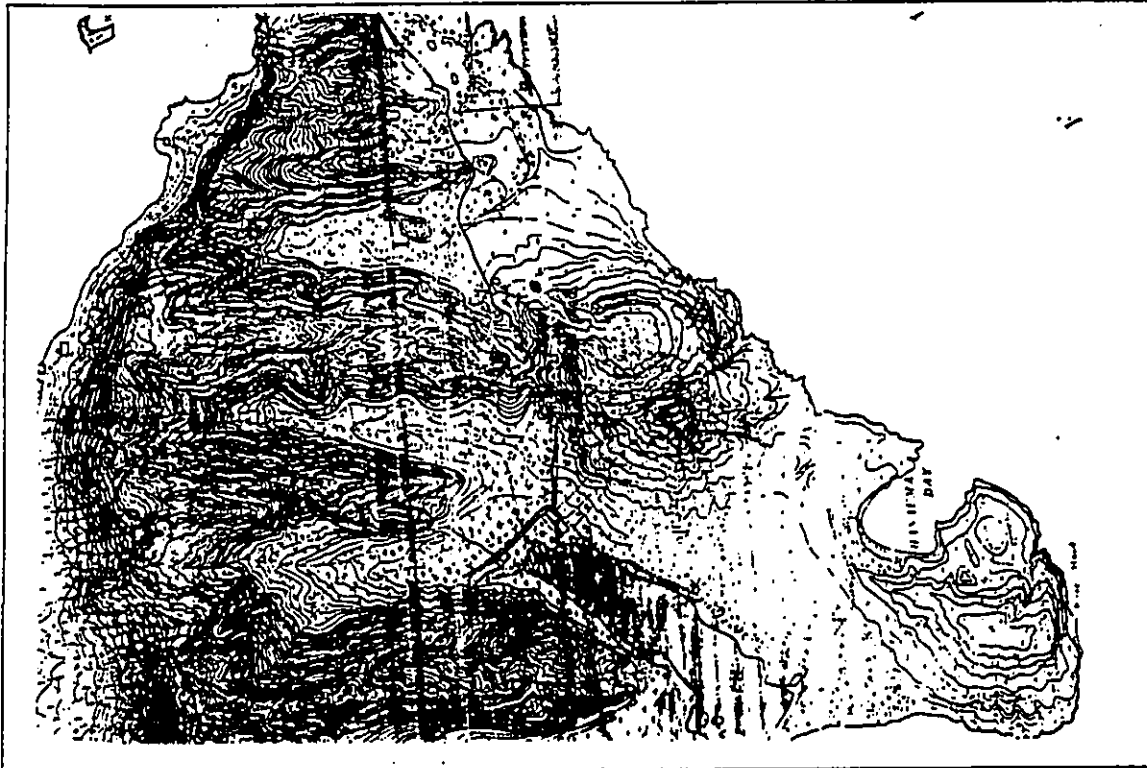


Figure 5 Portion of 1909-1913 military survey map of O'ahu showing Hanauma Bay, Koko Crater and Kaloko Beach area of Maunaloa *ahupua'a*

10



Figure 4 Hanauma Bay, west portion, ca. 1897-1901 (Photo by Frank Davey, Courtesy of Bishop Museum)

By the late 1920s, development plans for its lands at East O'ahu spurred the Bishop Estate to sell a portion of its Maunaloa lands to the City and County of Honolulu. Marion Kelly summarizes the transaction:

In 1928 the Bishop Estate Trustees sold to the City and County of Honolulu a large area of land in the *ahupua'a* of Maunaloa (1,325.100 acres in 5 parcels) for the amount of \$1.00...According to Geoffrey Podmore, retired Bishop Estate Land Division Superintendent, the real gain for the Estate was the assurance that the City and County would extend and maintain the City water system through Maunaloa. As Podmore recalled, the City water system went only as far as the boundary of Maunaloa, and the Trustees wished to develop the Portlock subdivision as well as other land in the area...

To protect its business interests, the Estate Trustees also restricted use of the conveyed land to "public parks and/or rights of way..." The City was further specifically restricted from using the conveyed land for any wireless telegraph or telephone stations "during the continuance of Bishop Estate Lease No. 1472a which will expire April 31, 1963." This was the 60-year lease originally to Marconi Wireless Telegraph Co. of America in 1913, and taken over by Radio Corporation of America in 1922, from which Bishop Estate received income...(Kelly et al. 1984:50)

The 1928 land sale created the present Koko Head Park, the boundaries of which are indicated on a 1928 U.S.G.S. map (Figure 7). The map also shows how access had developed in Maunaloa toward the end of the 1920s. Paved roads now extended to Hanauma Bay. The unpaved road to Hanauma Bay had been extended along the coastal trail, *maka'i* of Koko Crater, to the Sandy Beach area. The paved road to Hanauma Bay and the trail down to the bay itself are shown in a 1929 photograph (Figure 8), also shown in the photograph are the building facilities for the Radio Corporation of America adjacent to Kuapa Pond.

As shown on the 1928 U.S.G.S. map, the unpaved road to the Sandy Beach/Blow Hole area had an extension which ran parallel to the coast to a spot marked "Heiau" on the map at Wawamalu. Wawamalu (the Maunaloa lands between Sandy Beach and Makapu'u Head) was a portion of Maunaloa Ranch. The ranch controlled most of the land of Maunaloa outside of Kuapa Pond. From its inception in 1900 until it closed in 1926 over 1600 cattle made up the ranch's stock (Jones 1996:23). In 1920 the Maunaloa Ranch sublet parcels to the Honolulu Honey Company, Ltd., which had eight apiaries. The ranch land also had charcoal makers harvesting *kiawe* during this time (Kelly et al. 1984:47).



Figure 6 View of Koko Crater, 1919 (Photo by E.H. Dortmund, Courtesy of Bishop Museum)

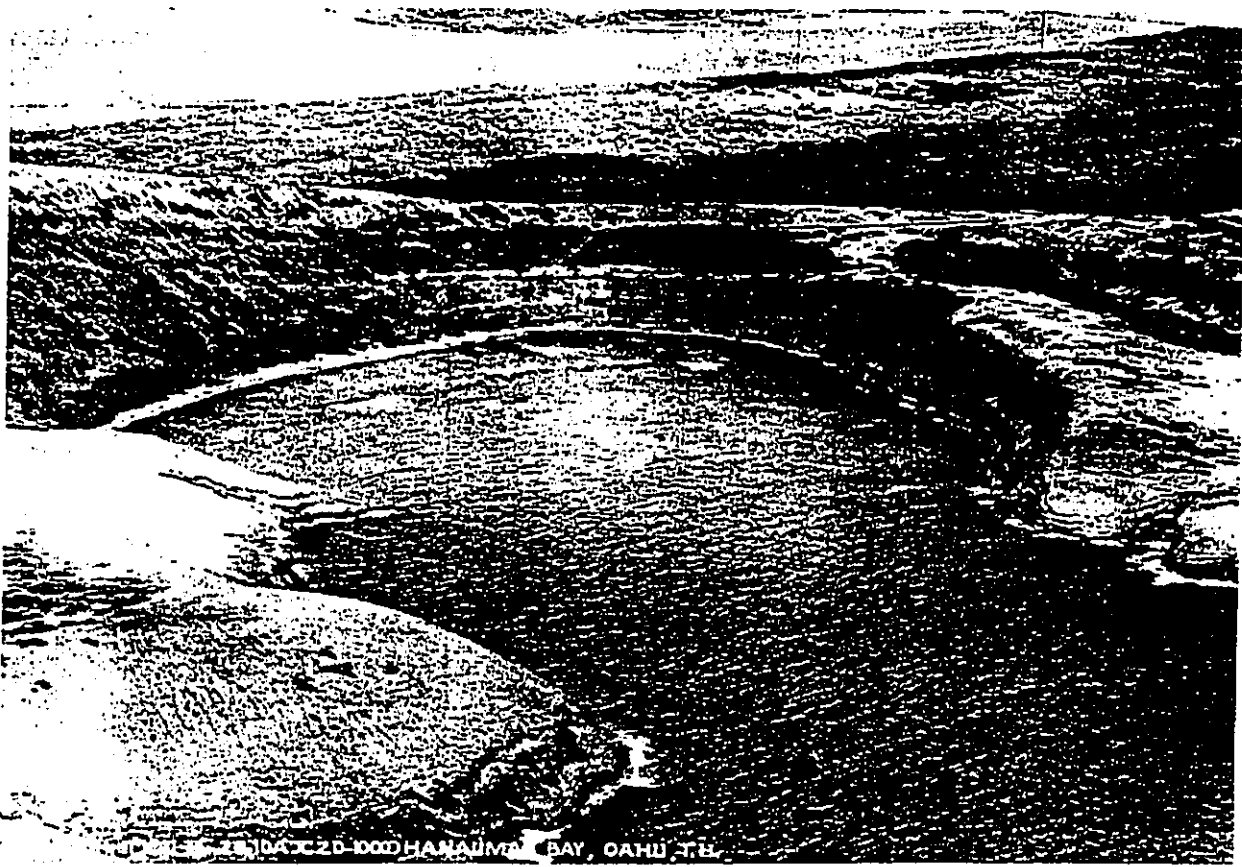


Figure 8 Hanauma Bay, November 15, 1929 (Photo Courtesy of Bishop Museum)

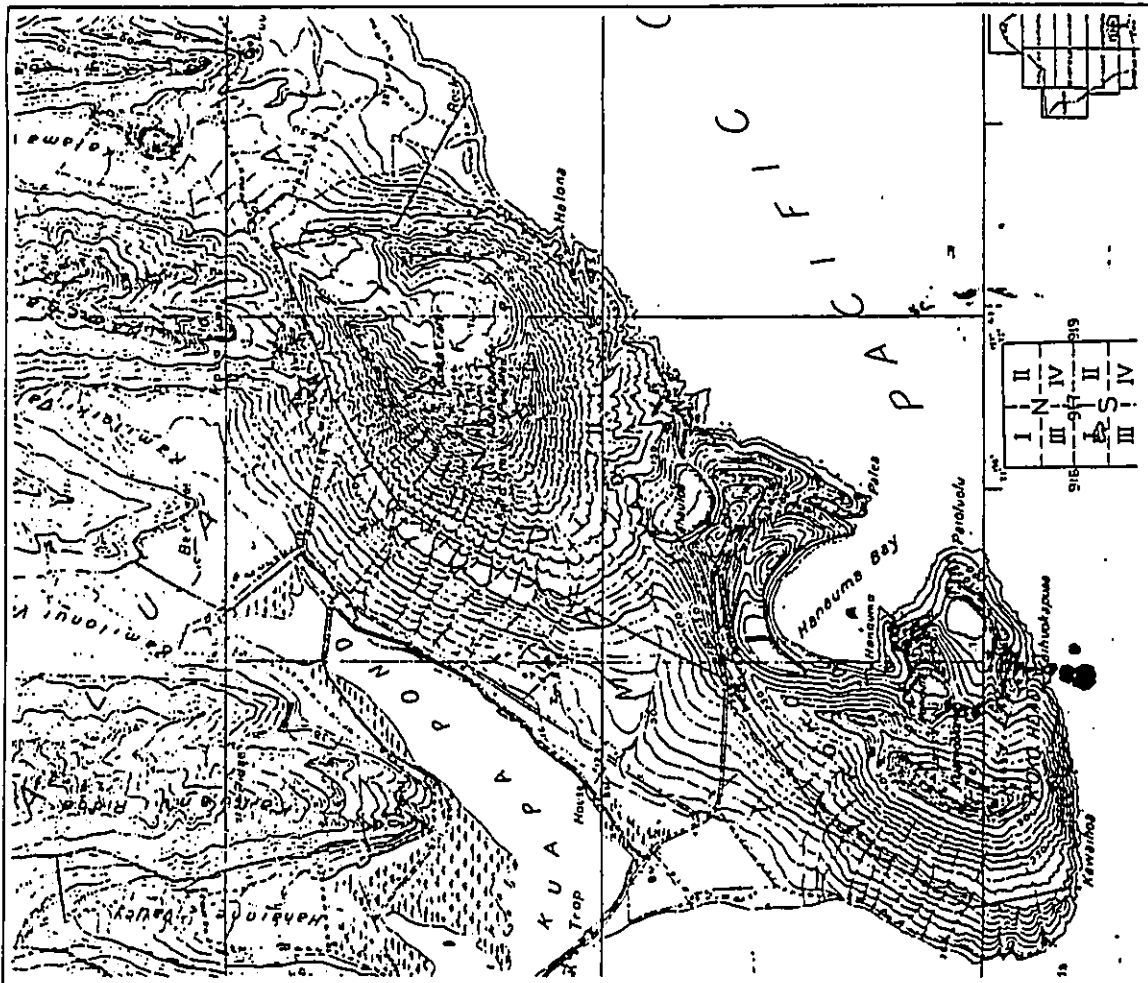


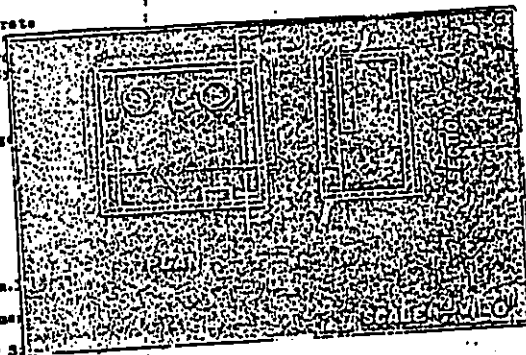
Figure 7 Portion of 1928 U.S.G.S. map showing boundaries of the newly-established Koko Head Park

U. S. GOVERNMENT PRINTING OFFICE
DEC 19 1934

HARBOR DEFENSES OF HONOLULU
Structure: Fire Control Station "BII",
Koko Head for Battery GRANGER ADAMS,
Fort Ruger, T. H.

REPORT OF COMPLETED WORKS - SEACOAST FORTIFICATIONS
Form No. 2. Corrected to December 5, 1934.

Location	C. & G. Survey Trig. Sta. Koko Head (S); Az. 354° 20' Dist. 54.11.
Date of transfer to date of construction:	October 29, 1934. \$2,647.21
(a) Roof	Reinforced concrete
(b) Remainder of building	Earth fill on top Cut and cover to Not above
How concealed	No
How protected	Portable storage
Height above concealment	0.1 M
Height above protection	Commercial
Conspicuous at 500 yards	Not required
Source of electric current	No
Kilowatts required	None
Type of lighting fixtures	No
How heated	Permanent
Connected to water main	Good
Type of latrine	650.0' above m.s.
Connected to sewer	658.6'
Permanent or temporary installation	D.P.F. Instrum.
Present condition	None
Reference of site	Telephones by 3
Type of observing board	
plotting board	
data transmission	



*Enclosure installed on final base
Based on report of operations for October
1934 (2010) and 1934-35.*

Courtesy of
U.S. Army Museum of Hawaii,
Reference Library, Ft. DeRussy

Figure 9 1934 U.S. Army Engineers information sheet on fire control station unit at Koko Head (Courtesy of U.S. Army Museum of Hawaii, Ft. DeRussy)

B. 1930 to 1950
In the 1930s, the broadening U.S. military presence in the Hawaiian Islands would impinge upon the lands of Maunaloa and the Koko Head Park.

In 1933, the War Department approved a project for Hawaii that called for the addition of eighteen 8-inch guns to the secondary defenses. While 16 of these were to be railway guns, the other two were to be mounted at Black Point. Upon its completion in May 1935, the new [battery] was named in honor of Brigadier General Granger Adams... (Thompson [no date]:73)

Three fire control stations - look-out installations to direct fire for gun emplacements - were constructed to support Battery Granger Adams: at Diamond Head, Makapu'u Point, and Koko Head (Ibid.:74). An information sheet for one of the Koko Head fire control station units indicates that it was constructed in 1934, and consisted of a reinforced concrete bunker which was concealed by earth fill on its roof (Figure 9).

After the Maunaloa Ranch Co. had closed in 1926, their subletters were given direct leases from the land owner, Bishop Estate. Alan Davis and others were given a ranching lease in 1932. They started the Wawamalu Ranch. The Davis home and swimming pool were constructed near the shore at Ka'ilili, while various ranch infrastructure, such as corrals, wall, and water tanks was situated at Kaloko (Kelly et al. 1984:56).

The Alan Davis ranch house at Kaloko was the easternmost private residence on Oahu during the 1930s and 1940s, until its destruction in the 1946 tsunami. Ranching didn't prove profitable enough, so the subleasing of Maunaloa land for truck and flower farms, chicken farms, and piggeries was expanded. Pig farmers and other were pushed out of the Hawaii Kai area and moved over the hill back of Koko Crater and into Kalamia and Wawamalu Valleys. As farmers were evicted from other communities, such as when Wai'alaie-Kamalei, Wailupe, and Niu were urbanized, more of them moved to Maunaloa with short-term leases. (Kelly et al. 1984:56)

The construction of Kalamiana'ole Highway through Maunaloa was finally completed in 1932, when the last stretch of road from Waimanalo to Wawamalu was completed. The bridge at Wawamalu was constructed in 1931. At the Hanalei Bay end of the Maunaloa coastline, the unimproved road from the bay to Sandy Beach had been paved over to complete the southeastern portion of Kalamiana'ole Highway. This portion of the new highway is shown in two aerial photographs of the 1930s (Figures 10 & 11). The photographs indicate that little development of the park areas had taken place, but the improved access along the coast between Hanalei Bay and Sandy Beach would spur the installation of the rifle range in Kahaukoa Crater later in this period.

World War II initiated significant developments within Maunaloa ahupua'a and the lands of Koko Head Park. The entire park area was taken over by the U.S. military and designated the Koko Head Training Center (Figure 12). Areas along the training center coastline were used for amphibious landing exercises throughout the war.



Figure 11 View from Koko Crater, O'ahu, 1937 (Ray Jerome Baker Collection, Bishop Museum)



Figure 10 Aerial view of Koko Crater, O'ahu, ca. 1930 (Photo by Inter-Island Airways, Courtesy of Bishop Museum)

In 1942 a radar station was installed at the top of Koko Crater. The station was accessed by a tramway running from the base of Koko Crater, where a camp housing the radar personnel had been constructed. To grade the tramway corridor, a bulldozer had been brought to the top of Koko Crater via a less-steep slope. The bulldozer, secured by a winch line, cut the tramway grade from the top of the crater to the bottom.

Following the war the radar station continued in operation, manned by the U.S. Air Force. A series of military photographs taken in 1948 and 1949 shows the extent of the radar complex at the top and bottom of Koko Crater at mid-century (Figures 13-28). Comparisons among the photographs indicate considerable building activity between 1948 and 1949. (The photographs comprise valuable clues for the present inventory survey, helping to establish the ages and functions of any extant structures of the radar facility.)

C. 1950s to Present

The radar installation at Koko Crater continued in operation - first manned by the U.S. Air Force and then by the Hawai'i Air National Guard - until it was closed in 1966. The camp at the base of the crater subsequently became the site of the Hawai'i Job Corps center and of the Koko Head District Park.

In 1967, state law designated Hanauma Bay an underwater park and conservation area:

The present regulations state that it is "unlawful for any person to hook, spear, seine, capture, kill, destroy, alter, deface, possess or remove any fish, crustacea, mollusk, sea shells, coral or any other animal life, or any sand or any geologic features, from the Conservation District. Possession by any person of fishing gear, including, but not limited to hook and line, rods, reels, seines and spears, crowbar and noxious chemicals, with the Conservation District shall be deemed to be prima facie evidence of violation of this regulation." (Clark 1977:30)

Above Hanauma, Koko Head became a "prime location for telecommunications facilities. The summit has become the site of an aircraft navigational facility, radio receivers, antennas and radio relay stations, and most recently microwave receiver sites and cellular telephone facilities" (National Park Service 1992:19). At the northeast end of Koko Head Park, the botanical garden was established.

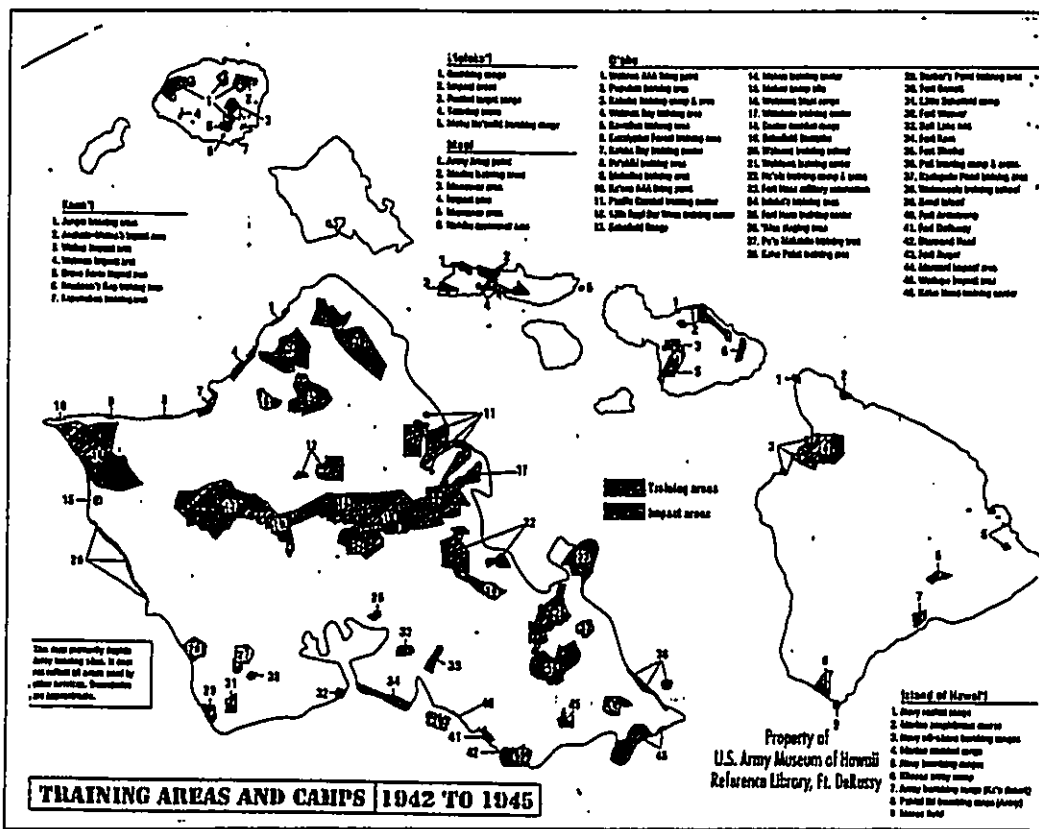


Figure 12 Map of U.S. Army training areas and camp in the Hawaiian Islands, 1942-1945 (Courtesy of U.S. Army Museum of Hawai'i, Ft. DeRussy)

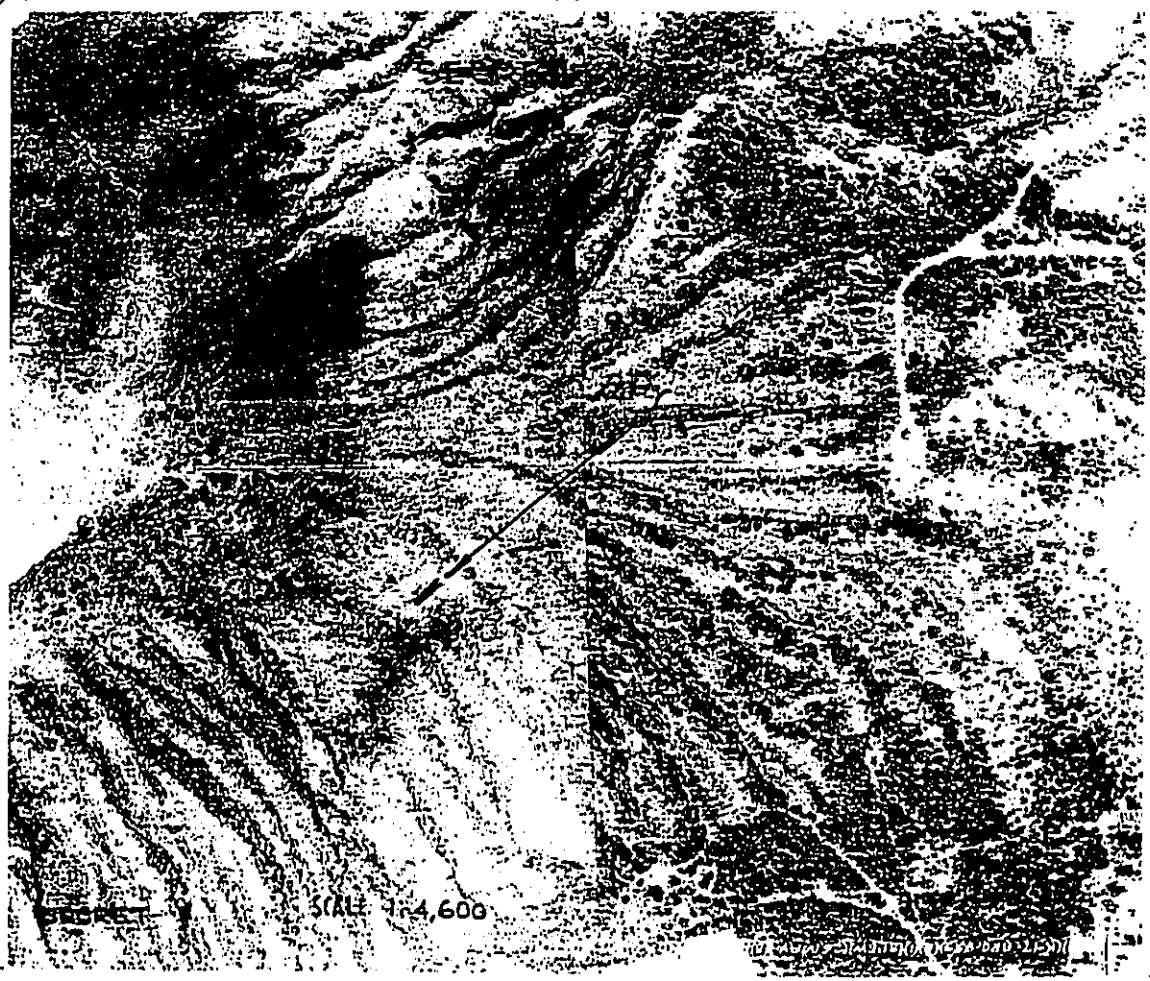
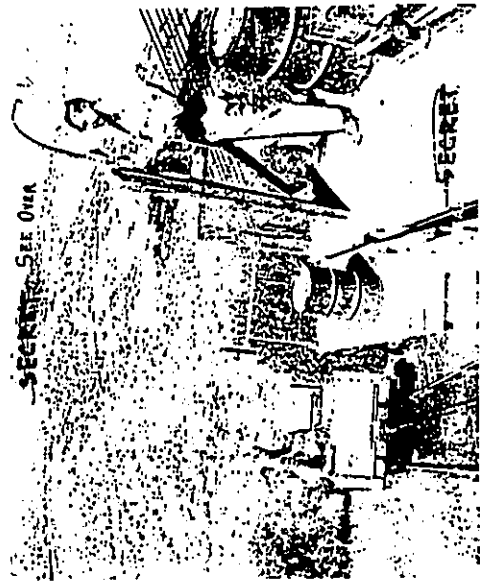


Figure 13 "Koko Head Radar Site", Oahu, May 26, 1948 (Courtesy of History Office, Hickam Air Force Base)



~~SECRET~~ SEE OVER



Figure 14 Views of Koko Crater tramway, Aug. 7, 1948 (Courtesy of History Office, Hickam Air Force Base)

SECRET

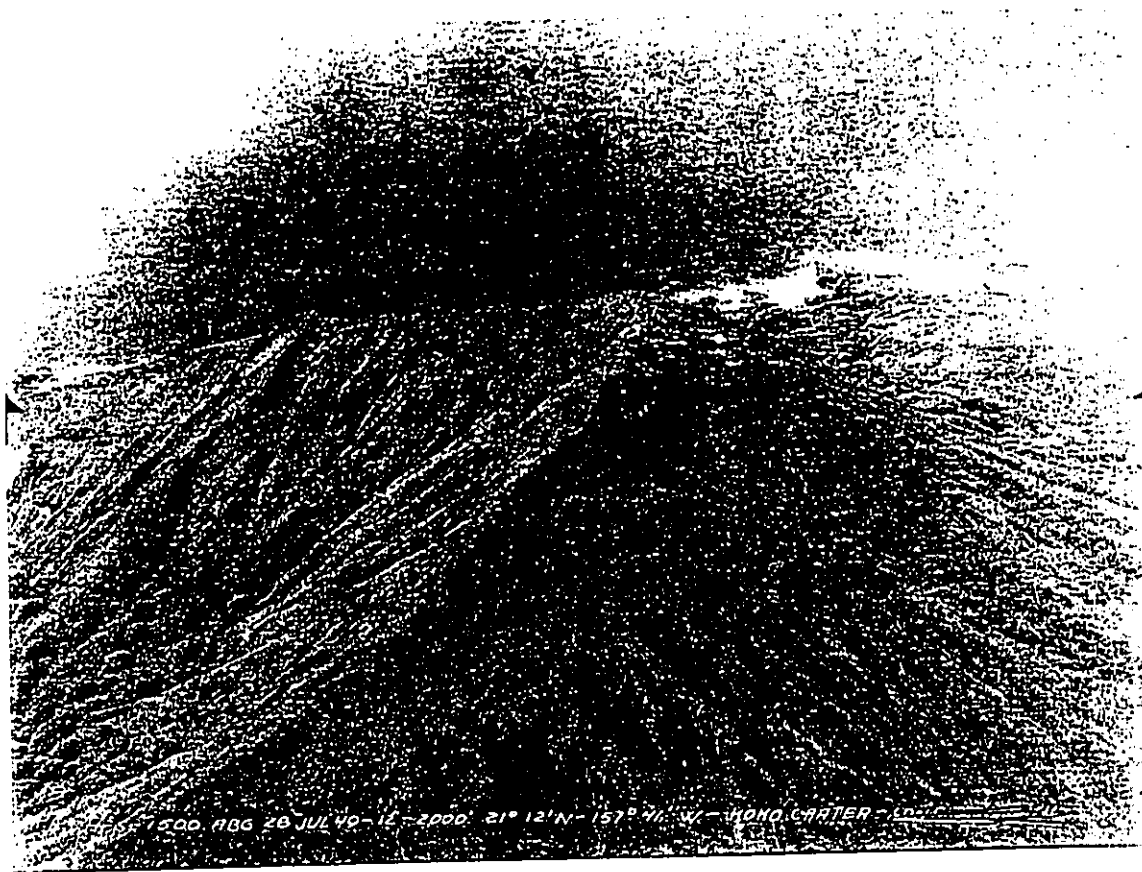


Figure 16 Radar installation at top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

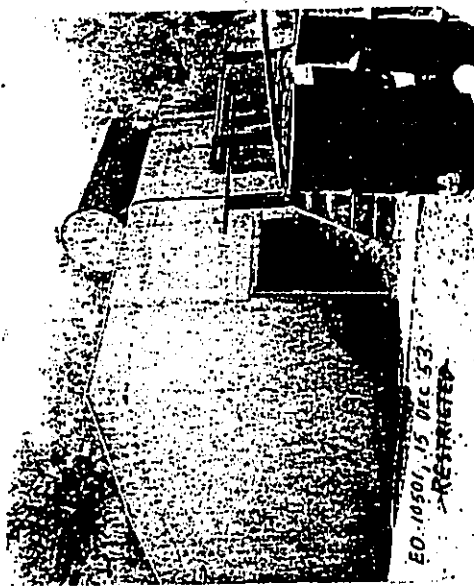
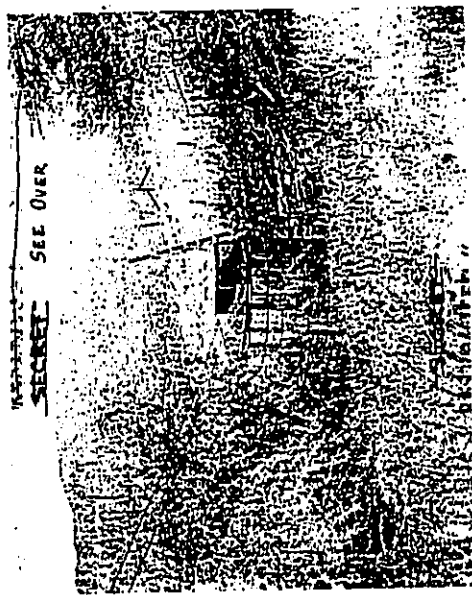


Figure 15 Water tank on slope of Koko Crater and concrete structure near top of crater (Courtesy of History Office, Hickam Air Force Base)

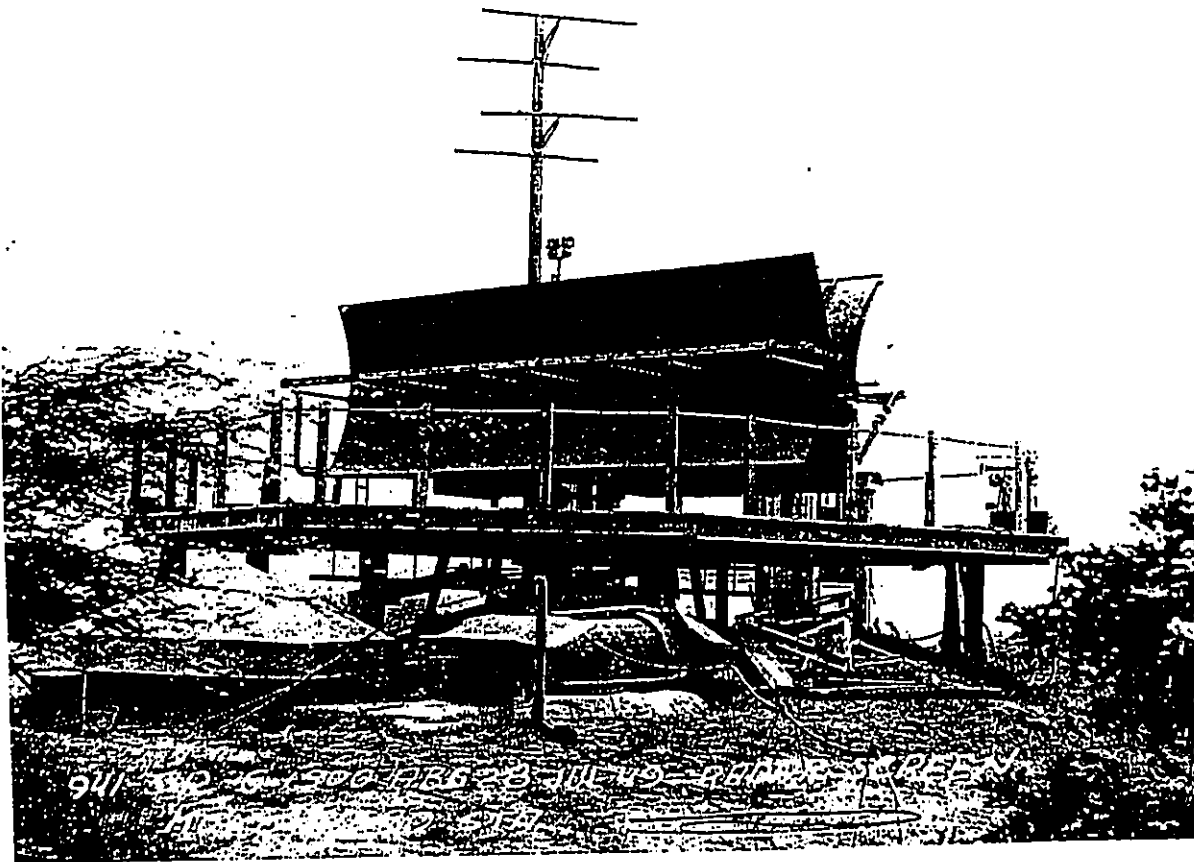


Figure 18 Radar screen at top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

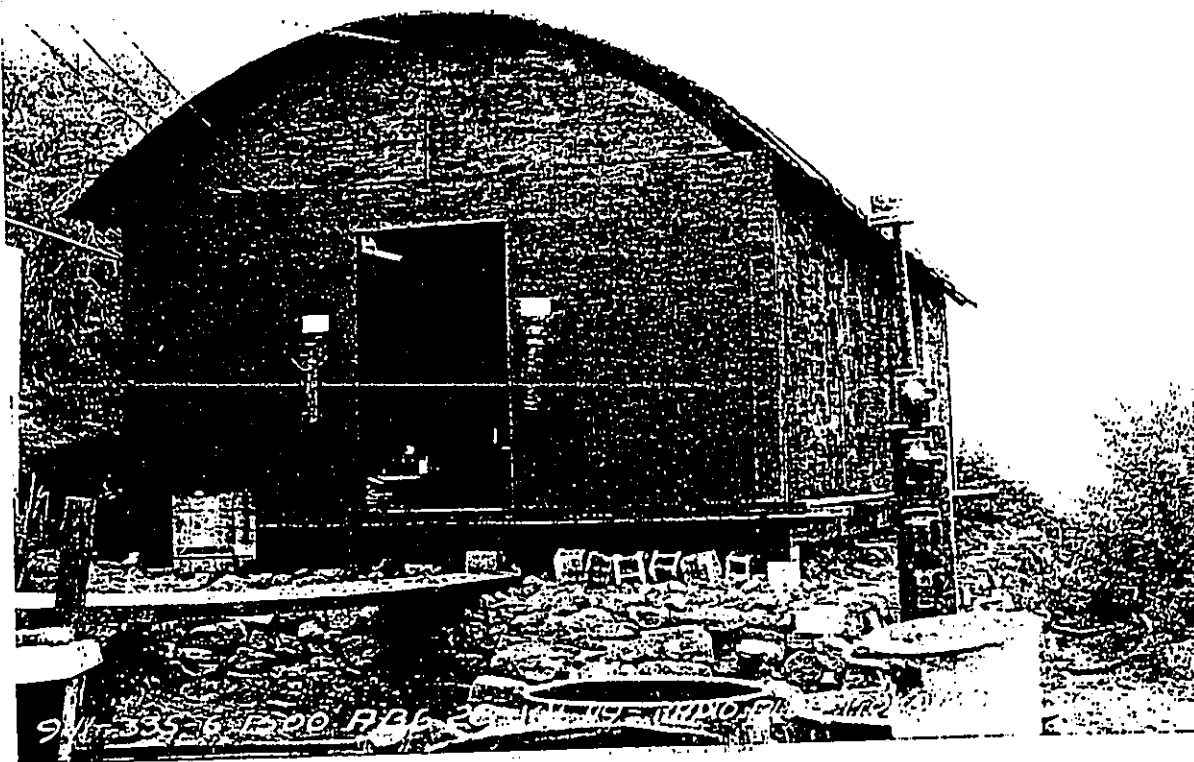


Figure 17 Radio building near top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

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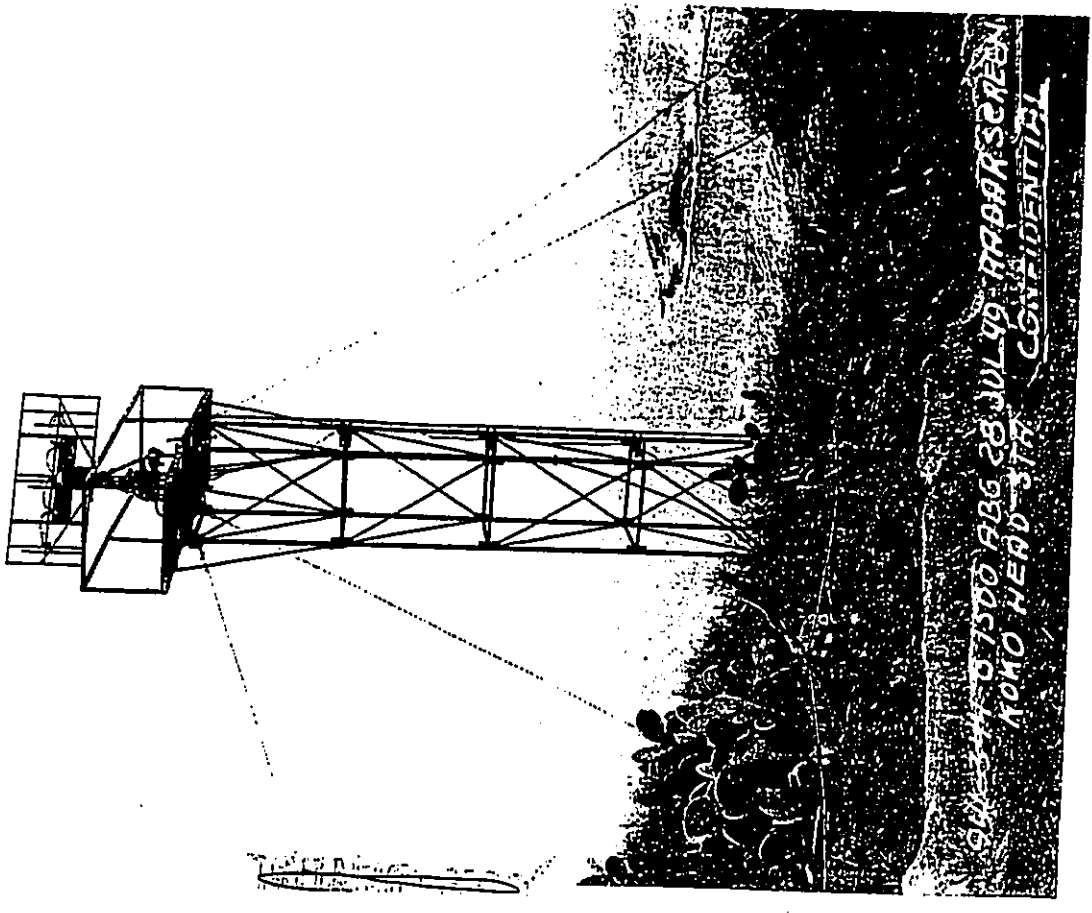


Figure 20 Radar screen at top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

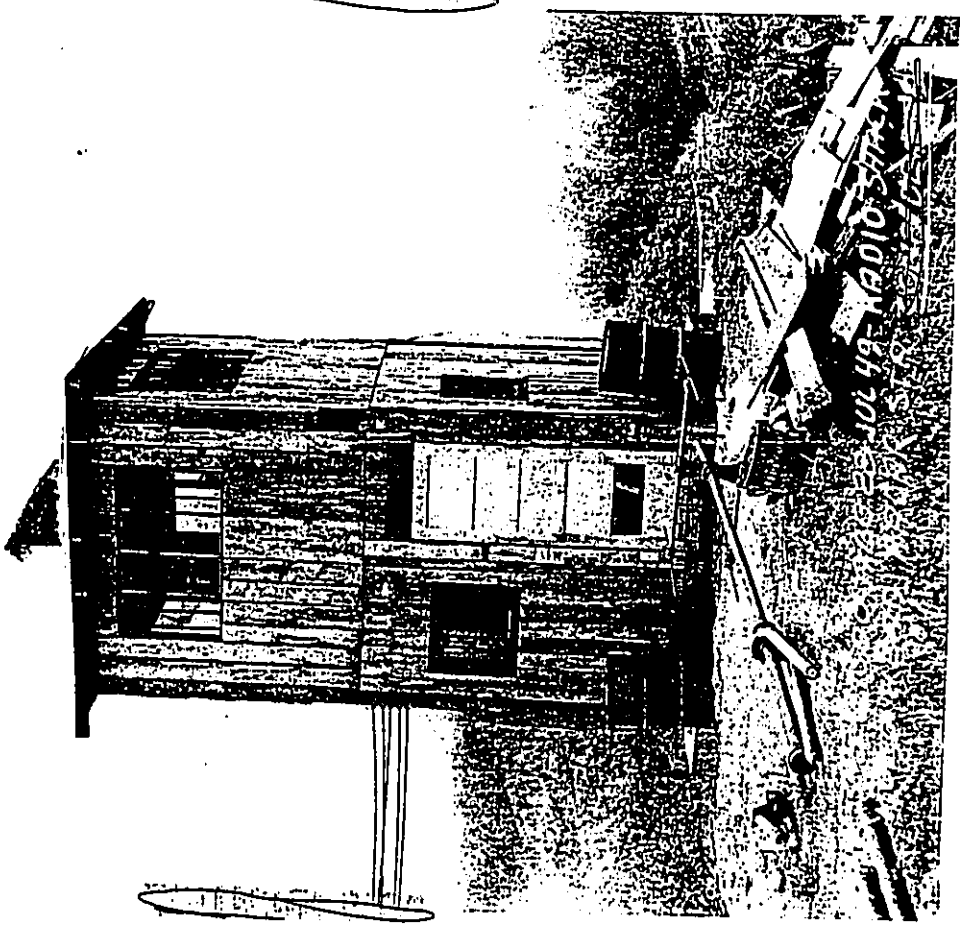


Figure 19 Radio shack at top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

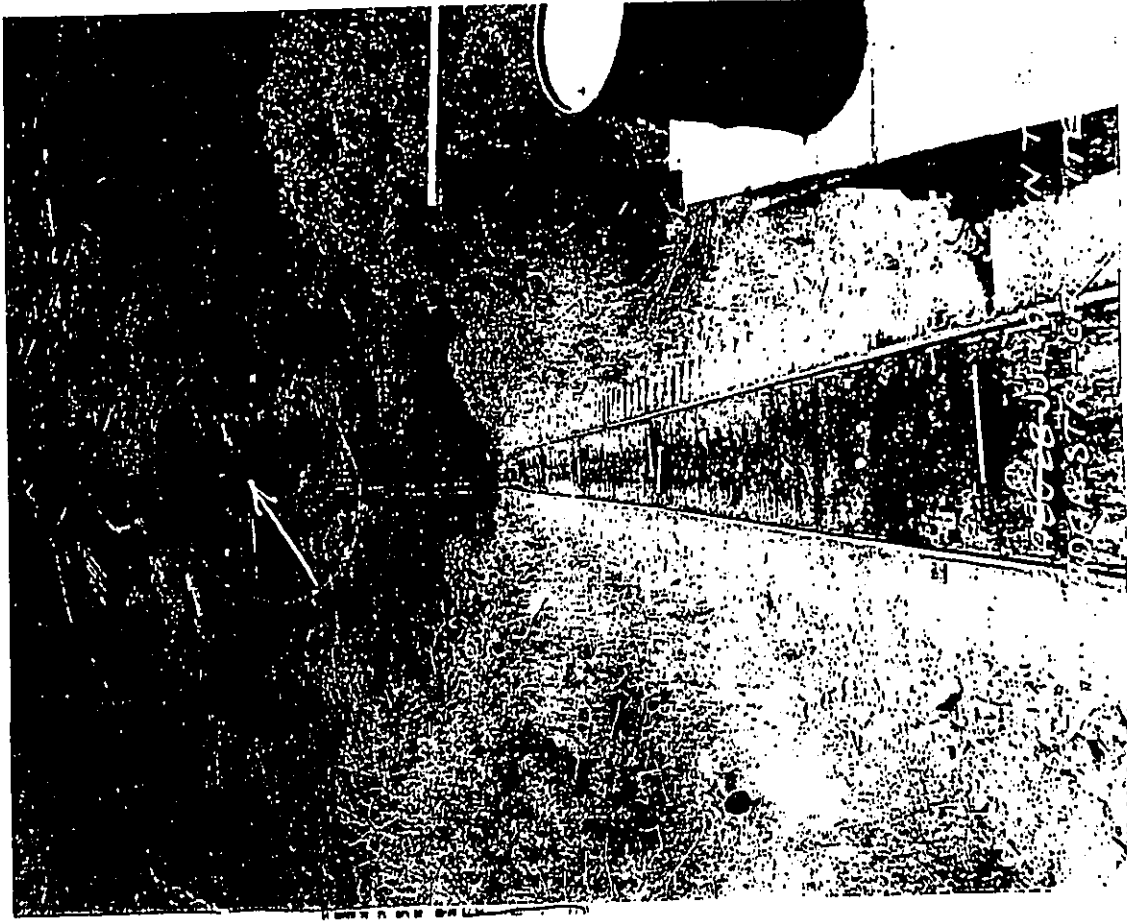


Figure 22 View down tramway from top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

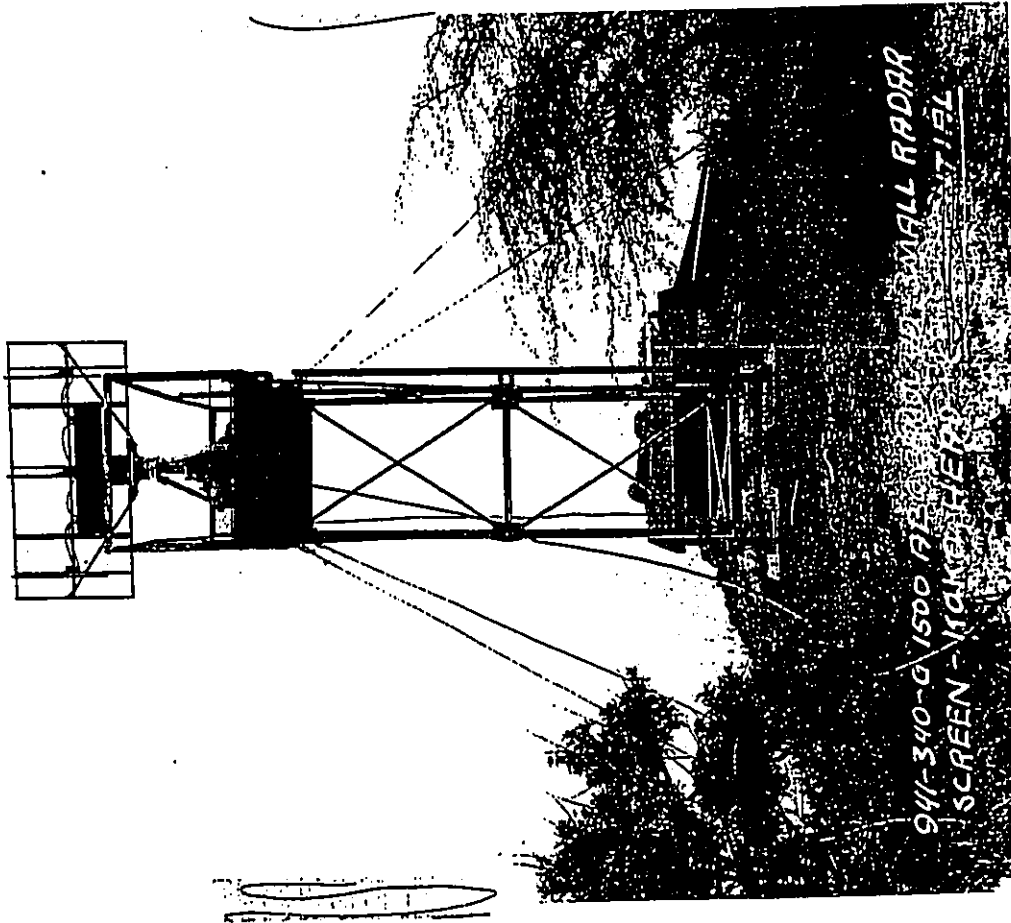


Figure 21 Small radar screen at top of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

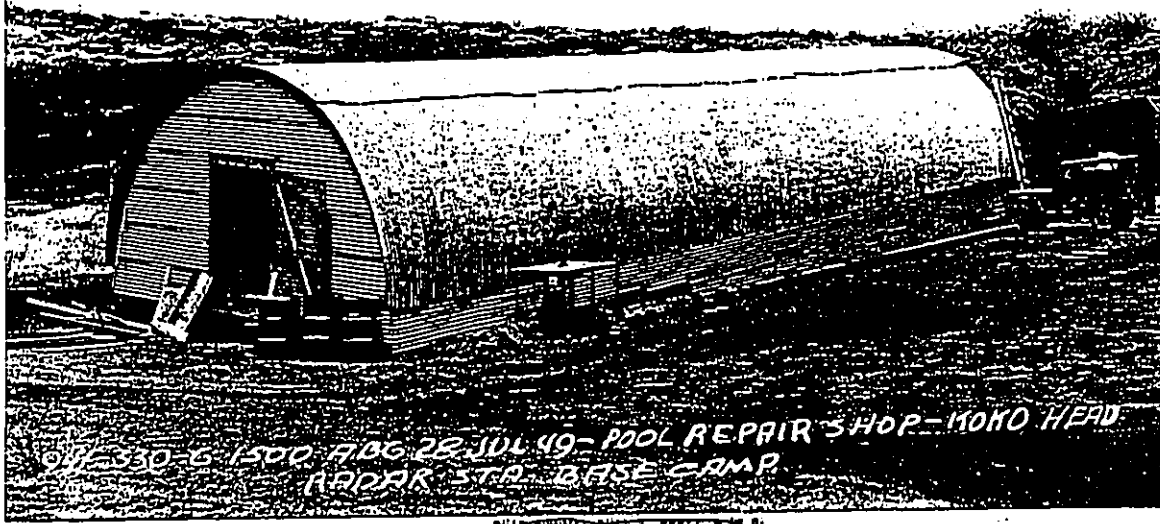


Figure 24 "Pool Repair Shop - Koko Head Radar Sta. Base Camp", July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

32

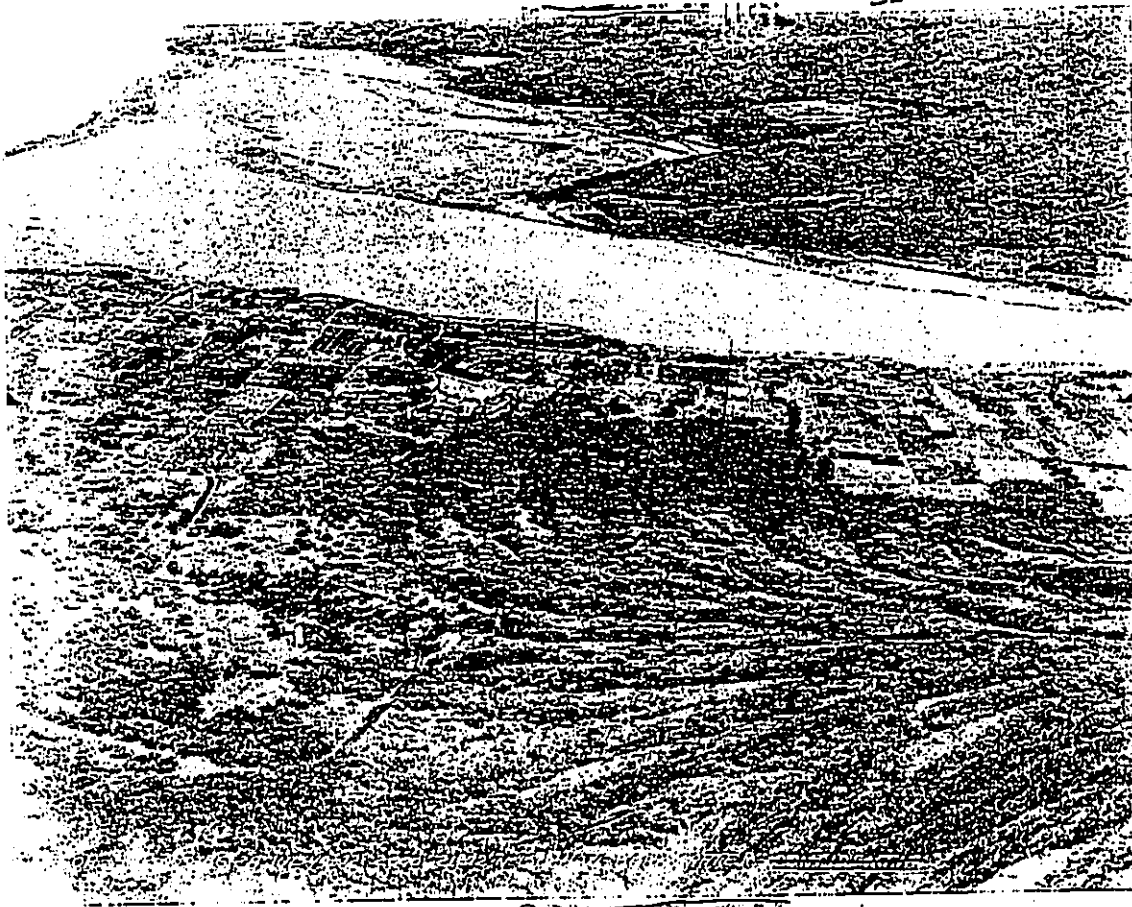


Figure 23 Camp at base of Koko Crater, July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

31

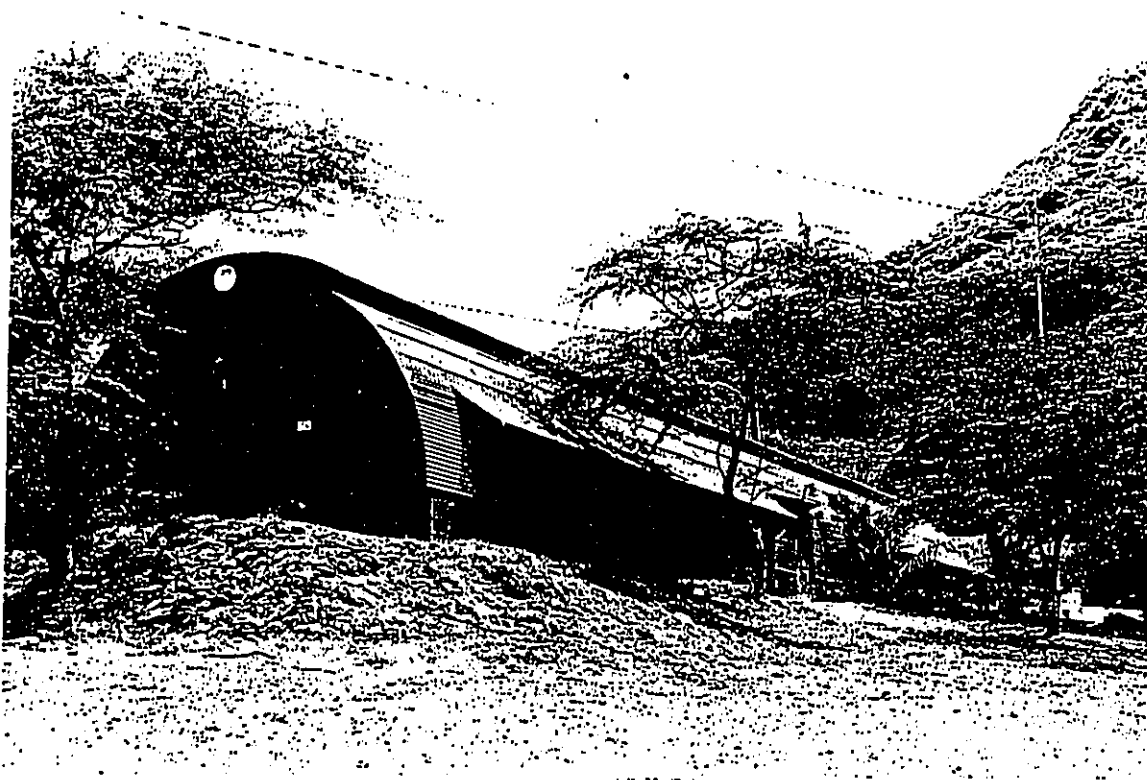


Figure 26 "Mess - Koko Hd. Rd. Sta.", July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

34

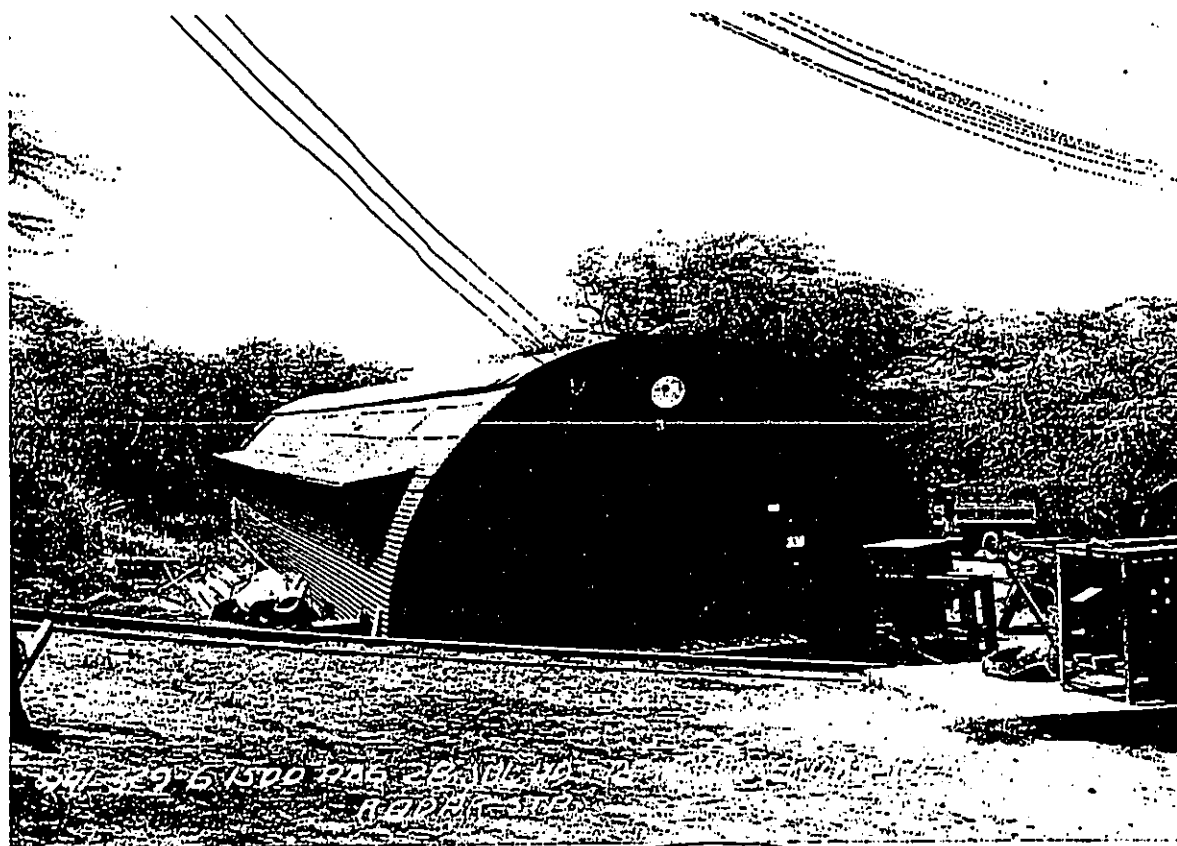


Figure 25 "Day Room Koko Head Radar Sta.", July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

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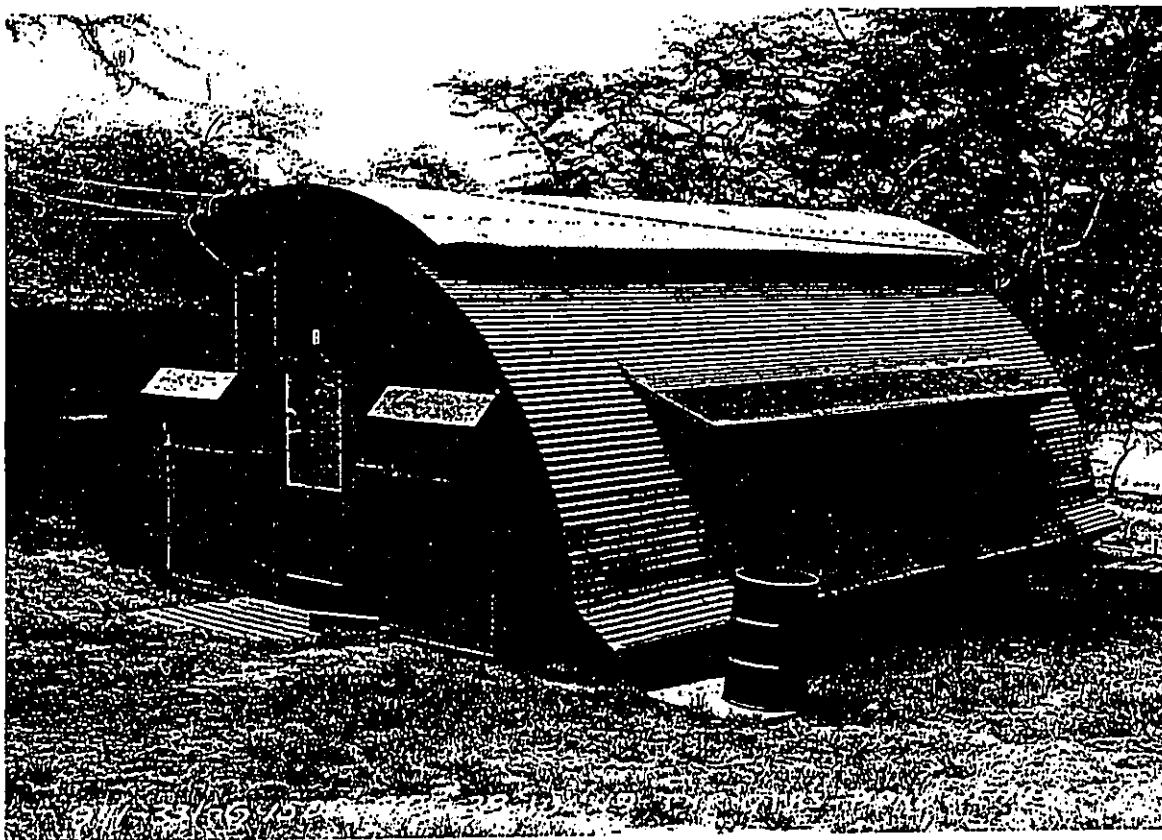


Figure 28 "Typ. Qtrs.- Koko Head R. Sta.", July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

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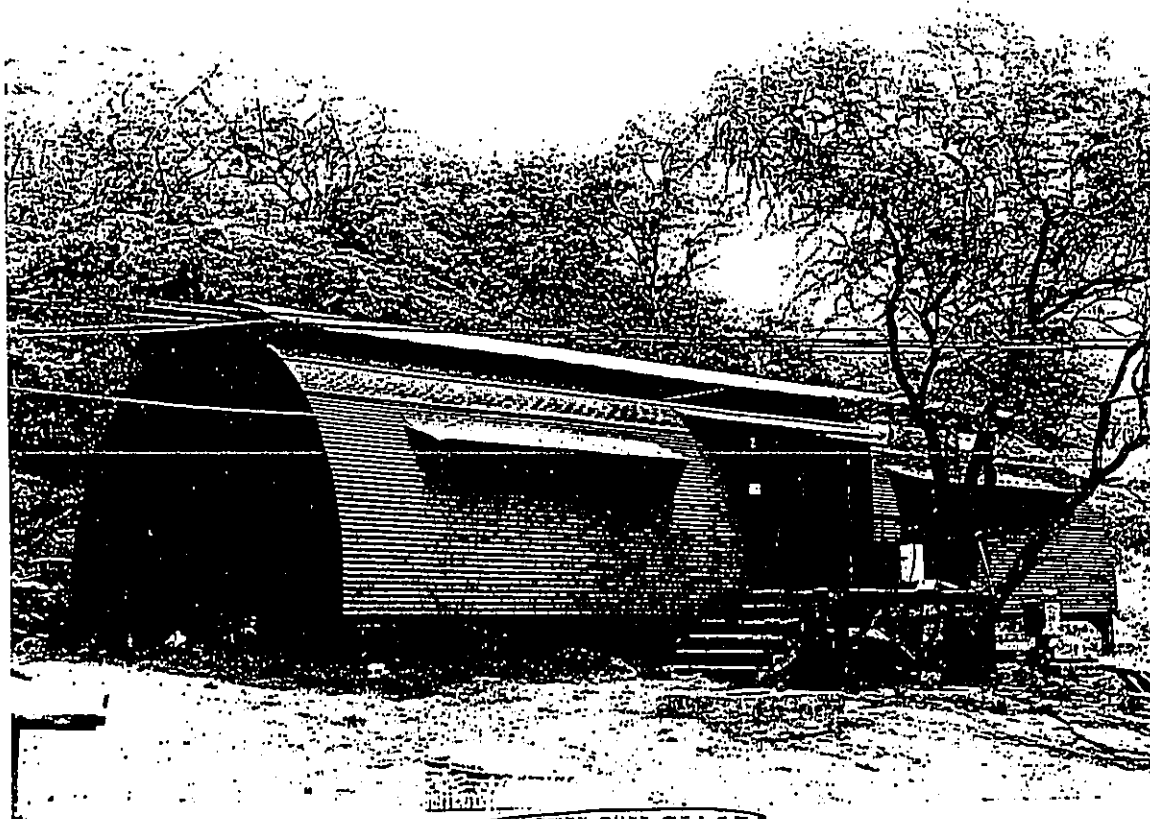


Figure 27 "Supply Rm. Koko Hd. Rad. Sta.", July 28, 1949 (Courtesy of History Office, Hickam Air Force Base)

35

IV. PREVIOUS ARCHAEOLOGICAL RESEARCH IN MAUNALUA AHUPUA'A

The following summary is based on information presented in McAllister (1933), Kelly *et al.* (1984), Walker *et al.* (1996), and Jones (1996).

The first archaeological survey in Maunaloa was conducted by McAllister (1933) in 1930. As part of his 9-month, island-wide, archaeological survey of Oahu, McAllister located, mapped, and described 49 archaeological sites in the Maunaloa region. The sites McAllister located included traditional Hawaiian origin as well as historic sites related to activities such as ranching and road construction. Of these 49 sites, four were located within the present Koko Head Park. Three sites were located on the outer slopes of Koko Crater; McAllister (1933:65, 68) describes these sites as:

- Site 36: House site on the low ridge of Koko Crater, Makapuu side. (McAllister notes that "though the site is old, it may be post-European.)
- Site 37: Terraces, northwest slope of Koko Crater, facing Kamiloiki Valley. (McAllister notes that a probable house site was located amidst the terraces.)
- Site 45: Platform, side of Koko Crater, facing into Kahauloa Crater. (McAllister notes that he had not been able to locate the site but it was "apparent that several places within the small crater (*i.e.* Kahauloa) were used as house sites.)

The fourth site was the "Koko Head petroglyphs" (Site 44) located in a low-ceilinged cave at the coastline near the present Lana'i look-out.

Also within the present Koko Head Park, Emory and Sinolo (1961) reported the results of University of Hawaii excavations in site 03, a natural rockshelter at the northeastern corner of the beach at Hanauma Bay (carried out in 1952). The majority of recovered artifacts were unsurprisingly related to fishing and the creation and maintenance of fishing gear. The midden consisted primarily of marine shell and fish bone, although a small amount of dog, pig, and bird bone were also recorded within the shelter. The remains of hearths were also recorded.

In 1966 students from the University of Hawaii excavated and conducted limited surface survey at the Kaloko point region (Wallace *et al.* 1966). This research was carried out in McAllister's high site density area around the Kaloko point area. Excavations uncovered no structural remains, with the exception of hearths. The artifact and midden deposits characterize the occupation as marine-oriented. Surface survey brought to light a few structural remnants--drastically reduced in number from those reported by McAllister. The work made clear that road construction and the 1946 tsunami had heavily impacted the archaeological deposits since they were reported by McAllister in 1930 (Wallace *et al.* 1966:6).

Further University of Hawaii excavations and survey were carried out at the western and southern margins of Kahaunui Ridge at the mouth of Hahaione Valley. Conducted over a period of three years, these investigations documented features from more than one related complex. Occupation of these features spanned from the late prehistoric to early 20th century

(Bayard 1969:1). Features included rock shelters, house platforms, stone "cairns", and a stone enclosure. Bayard also conducted excavations at site 50-80-15-2908, the Hawaii Kai rock shelter. Three dates ranging from AD 1330 to 1800 were obtained (Bayard 1965: 7-8, cited in Jones 1996:181).

Sponsored by the US Army Corps of Engineers, Anne Takemoto wrote a cultural and historical overview for the Kuapa fishpond area in western Maunaloa. This report included a literature and document search, an analysis of place names, oral traditions, and 19th century historic accounts, summaries of previous archaeological investigations, as well as recommendations on how the additional information might be obtained with further research (Takemoto 1975). The mythological and historical resources of the region are highlighted. Regarding the archaeology of the region Takemoto notes:

The quantity and quality of the archaeological sites discovered in the area does not significantly help unfold the history of the Kuapa Pond region. It can be assumed that the area was not extremely populous and that its importance compared to other *ahupua'a* was marginal. (Takemoto 1975:4).

Takemoto further states in her conclusions: "Maunaloa and Kuliouou today have only a few archaeological sites still in existence...The sites McAllister found in the 1930's have been destroyed" (Takemoto 1975:32).

During the development of the Kuapa fishpond area into the residential neighborhood of Hawaii Kai, Hawaiian burial sites were discovered on Kaalakei Ridge and Maunaloa O Ahi Ridge (McCoy 1971 and Bevaqua 1972, respectively, cited in Jones 1996:12).

The area of Kahaunui received several archaeological investigations as the result of development plans. The land around Hawea *heiau* was systematically surveyed and, although previously bulldozed, 11 sites were recorded. The sites found included a historic habitation, caves, platforms, petroglyphs, and the possible remains of Hawea *heiau* (Price-Beggarly and McNeill 1985). Further work was conducted by Rosendahl, Inc. (PHRI) as part of an inventory survey within a 21-acre portion of the same approximately 36-acre Kahaunui parcel investigated by Price-Beggarly and McNeill. PHRI relocated sites and tested the "bedrock cavities" for cultural remains. Results were negative (Carlson and Rosendahl 1990).

Davis (1984) conducted excavations and reconstructions at the site of Pahua *heiau*. This work was carried out intermittently from the mid-1970s to 1985 by the Bishop Museum as part of a larger settlement pattern study of the region of southeast O'ahu.

Barrera (1986) conducted archaeological reconnaissance on 30 acres between the Hawaii Kai Golf Course and Koko Crater. McAllister had recorded a house site (site 36) and terraces (site 37) in this area. No sites of any kind were located during the field work, however. Barrera indicates this was due to modern ground disturbances.

Thirty-one acres of proposed golf course and subdivisions were surveyed by PHRI *mauka* of Sandy Beach (Spear 1987). No surface features were observed and shovel and auguring tests yielded no evidence of subsurface cultural deposits.

Shun (1988) carried out archaeological inventory survey on 28 acres on the southern portion of Kamehame ridge. No archaeological features were found, although numerous small caves and rock overhangs were observed within the project area. Also on Kamehame ridge, Cultural Surveys Hawaii conducted inventory survey for the relocation of an electrical transmission line. Due to the steepness of the slope, survey was generally limited to pole locations along the 8,400 foot transmission line. No archaeological sites were found (Borthwick and Hammatt 1991a). The archaeological survey for the proposed Kamehame Ridge Water Reservoir was also done by Cultural Surveys Hawaii. The reservoir site and the associated access roads contained no archaeological features (Borthwick and Hammatt 1991b).

Kawachi and McEldowney (1989) reported the discovery of multiple mound burials on the southeast slope of Koko Crater (above Sandy Beach) within Koko Head Park. A human burial in the area was subsequently given State site no. 50-80-16-4194.

Cultural Surveys Hawaii conducted survey and subsurface testing for the proposed Fiber Optic Cable Landing at Sandy Beach Park. Although located in the suspected area of Wawamalu village, no archaeological features or deposits were found. This was due to the disturbed beach sediments in the project area (Borthwick and Hammatt 1992).

In 1993 Cultural Surveys Hawaii surveyed a 6-acre parcel along Hawaii Kai Drive just south of Kaluanui ridge at the site of the proposed Kaluanui Park. Re-location and limited sub-surface testing of sites found by McAllister, Bayard, and Price-Beggary and McNeill was carried out. The field work documented limited prehistoric subsurface deposits at site 50-80-16-2900 (described by Price-Beggary and McNeill as a U-shaped enclosure) and made several reinterpretations of previously described features. Excavations carried out by Cultural Surveys Hawaii at site 2900 yielded a radiocarbon date of 1800-1940. This supports the interpretation that the site was used in the historic period through Maunaloa's prominence in the "victualing trade" into the early 20th century (Folk et al. 1993).

The investigations at Kaluanui document archaeological resources which include habitations, burials, historic house-sites, petroglyphs, historic road-way remnants, and religious structures. The area was utilized from the prehistoric through the historic era. It is evident that modern development has greatly impacted the archaeological resources of the region.

In eastern Maunaloa, there have been a number of archaeological and cultural studies since the 1980s. A "Cultural Resources Overview for the Queen's Beach Park Feasibility Study" was prepared for the Department of Parks and Recreation by Kelly, Kurashina, and Sinoto (1984). This study consisted of "a historical overview and assessment of the surface archaeological resources" for an area that included all of the current project area as well as the Kaloko peninsula and the coastline from Kapali o kamao to Makapu'u Point (Kelly et al. 1984).

Kurashina and Sinoto wrote up the assessment of archaeological remains within the project area. In their field reconnaissance Kurashina and Sinoto could not relocate McAllister's sites 6-13 along the coast of the project area. They state that these sites were likely destroyed by the recent dredging, material stockpiling, and bulldozing from the Kaiser development plans--and by the devastating effects of the 1946 tsunami (Kelly et al. 1984:11). The only McAllister sites within the project area that were relocated consisted of sites 2 (a pile

of stones with coral), 3 (historic road way), and the cement foundation/emplacement of the Mallet stone--all within Kealakekapa Valley. Kurashina and Sinoto failed to detect structural remains of site 2 but did note the presence of coral on the valley slopes in the general vicinity of site 2. They suggest the stones of the structure were removed for construction of the adjacent military pill-boxes on the Makapu'u cliff face (Kelly et al. 1984:9). Related to the McAllister's site 3 paved roadway, they report seeing 11 to 15-foot wide sections of the stone paved road between the Coast Guard road and Makapu'u Lookout (Ibid.).

Kurashina and Sinoto located previously unrecorded sites: T-1, T-2, T-3 and T-4. Site T-1 is a cave located on the coast between Kapali o kamao and Makapu'u Point. Site T-2 was the Davis Ranch swimming pool, at Ka'ilili peninsula, T-3 is a midden site on the Kaloko peninsula, and T-4 is the Davis Ranch boundary wall at Wawamalu Beach--see Figure 5 for the locations of Kurashina and Sinoto's sites.

Archaeological Consultants of Hawaii conducted surface survey and subsurface testing for an extension to Sandy Beach Park at Wawamalu. No surface features were found and subsurface testing located no cultural deposits. Stratigraphy in the project area indicates that road construction (both the original and re-aligned Kalamiana 'ole Highway) as well as the 1946 tsunami have removed "any traces of historic or prehistoric sites" (Kennedy and Denham 1992:1).

Not all archaeological coastal deposits were removed from this stretch of coastline between Sandy Beach Park and Makapu'u Head. In 1990 State Historic Preservation Division officials were called to the *noupoaka*-covered coastal dunes just northwest of Wawamalu Beach and just northeast of the boundary wall between the beach park and the former Davis Ranch. Approximately 30 m northwest of the water-line, off-road recreational vehicles had disturbed an *in situ* prehistoric burial (Kawachi and Smith 1990). This burial was located in the general area of the midden deposit (site T-3) recorded by Kelly, Kurashina, and Sinoto. They noted a gray stained area of compacted sand containing a disturbed stone alignment, marine shell midden, and basalt flakes. They suggest this may represent a prehistoric occupation floor.

In 1992, as part of the feasibility study for the inclusion of the Makapu'u Head and Queen's Beach area within the State Parks System, Alan Carpenter did a field check of the Kealakekapa Road remnants (McAllister's site 3) (Carpenter 1992). Carpenter reports two sections of the road that could still be discerned. One section consisted of switchbacks (paved road surface with terraced road bed) extending down the steep cliff from Makapu'u Lookout towards Waimanalo. The second section is located in the same area described by Kelly, Kurashina, and Sinoto (1984) parallel to Kalamiana 'ole Highway, just up slope of the light house access road. Carpenter describes this section as "straight . . . conspicuously clear of large rocks and . . . very level . . ." The sides of the road are roughly defined on the west by a border of stones and on the east by a rough boulder alignment modifying a natural ledge" (Carpenter 1992:5). He also describes the road as nearly devoid of flat paving stones and very much overgrown (Ibid.). From this description it appears that the mossrock pickers observed by Kelly in 1984 have continued to degrade the road remnant.

PHRI conducted an archaeological assessment of the Kaloko Beach area in 1994. The report's primary objective was to "assess the potential impacts of proposed development upon any significant archaeological resources that might be present within the project area" (Walker et al. 1996:ii). Background historical document research and a review of previous archaeology

together with one day of limited ground survey was the basis for this report. Three previously identified sites were relocated. Kelly, Kurashina, and Sinoto's site T-3 (middens deposit) at Wawamalu Beach and the 1931 Wawamalu bridge (Kelly et al. 1984) were relocated. McAllister's site 3, Kealahipapa Road was relocated and was described by Walker et al. (1996:11) as "a cleared zone within the *kiuawe*, usually containing no vegetation other than grasses or small shrubs. The road is relatively straight, and no curb stones or paving were visible." Kurashina and Sinoto recorded seeding stone paving along the road way in 1984 (Kelly et al. 1984:9). Walker's (et al. 1996) description indicates that degradation of the site had occurred since the archaeological assessment of Kurashina and Sinoto in 1984 and possibly since the field check of Carpenter in 1992. The FHRI assessment makes recommendations for a full inventory survey of the project with subsurface testing to locate any buried cultural deposits.

A recent report within Maunaloa *ahupua'a* was completed by Aki Sinoto Consulting on a total of 375 acres in nine separate parcels scattered about Maunaloa (Jones 1996). The investigation consisted of surface survey and limited test excavations. Four of their parcels (Marina UScrip, Marina 4B, Golf Course 2/LA, and Kalama Valley) were found to be without archaeological or historic sites due to extensive prior disturbances. These disturbances included dredging and expansion of land masses with dredged material. The remaining five parcels contained 11 archaeological sites consisting of 71 features. However, even within the five parcels containing archaeological sites, there has been ample modern disturbance from road construction, bull-dozing, and grading.

The 11 sites found within the five parcels consist almost exclusively of temporary habitation and/or activity areas, burials, and agricultural features. One of the most common site types reported is a modified rock shelter. These natural shelters are found along the ridges within the project area parcels. They provide ready-made shelter from sun, wind, and rain. They are also located adjacent to the agricultural land in the valley and drainage bottoms. These agricultural areas were renowned in historical and traditional accounts for their sweet potato production (Summers and Sterling 1978:257). The rock shelters contain basalt lithic scatters, volcanic glass, *kukui* endocarps, marine shell midden, and fish and bird bone. These midden deposits are consistent with recurrent, temporary habitation and the use of the sites as activity areas, e.g. lithic reduction and tool manufacture. The elevation and distance from the ocean of these sites, in most cases, allowed good accessibility to agricultural land as well as marine resources.

The rock shelters are also the sites of human burials. Internment in lava tubes and bedrock cavities was a common practice in prehistoric and early historic Hawaii. Jones (1996) described incomplete burials and bundle burials which often appeared disturbed or redeposited.

The agricultural features reported by Jones are located in the vicinity of Kamilonui and Kamiloniki valleys. Site 4950 is an extensive agricultural complex which incorporates "much of the traditional Hawaiian types of irrigation and agricultural systems in its construction" (Jones 1996:183).

Five radiocarbon dates were obtained from charcoal samples excavated within the 11 sites recorded within the project area. Three rockshelter features were dated to the precontact period. Sites 4941-8, 4945-1, and 4951-2 were dated to 1665 AD, 1475 AD, and 1665 AD,

respectively. Site 4942-1, a rock shelter located in the Mau'uwai parcel was dated to the late historic period (1880 AD). This late date is credited to ranching activity. The large agricultural complex, site 4950, was dated to AD 1900-1930. Jones suggests the complex "represents the efforts of Chinese lessees common in Kamilonui Valley from the 1860s to modern times (1996:160).

In 1997, Cultural Surveys Hawaii completed an archaeological inventory survey of approximately 166 acres in Kealahipapa Valley, the flats below the valley, and along the coast of Queen's Beach (McDermott et al. 1997). The area had been heavily impacted by the 1946 tsunami and by subsequent grading, dredging, excavating, and material stockpiling associated with development activities in the 1960s and 1970s. Only one site, an historic roadway remnant, was identified during the survey.

V. PREDICTIVE MODEL

The previous archaeology of Maunaloa documents a procession of changes which transformed the landscape. Traditional Hawaiian settlement consisted of coastal settlement (house sites, *ko'a*, canoe sheds, and *heiau*) with agricultural features in the plains and valleys behind the coast. Natural rock shelters were utilized as temporary habitations or activity areas as well as interment places for the dead. *Heiau* were constructed in the interior. The large Kuapa fishpond was constructed and was another location of settlement. Trails connected these settlements.

Unfortunately, the small number of radiocarbon dates from Maunaloa offer little towards settlement chronology. We do know that utilization of the ridge rock shelters was occurring by at least the 16th century (Jones 1996:180). Bayard's excavations at the Hawaii Kai rock shelter yielded three dates spanning AD 1330-1800 (Bayard 1965: 7-8, cited in Jones 1996:181). From these dates it is clear that settlement occurred by the 14th century, possibly earlier.

In the historic era traditional settlement gave way to ranching and cash-crop farming. More permanent coastal settlement was replaced in many areas with recurrent temporary habitation. Agricultural fields were maintained in some areas, and abandoned and incorporated into ranch lands in others. The 1946 tsunami was a major destructive force. In the 1960s and 1970s, the development of Hawaii Kai drastically changed large portions of Maunaloa.

Within the bounds of the present Koko Head Regional Park, decades of 20th century military, commercial and recreational activities have altered the landscape as it had been previously shaped by the Hawaiian inhabitants. Previous archaeological studies discussed above have recorded the presence of habitation, burial and petroglyph sites within discrete portions of the park. As burials have been noted on the outer southeast slope of Koko Crater, it is likely that others are present along its slope. However, within the eight study area of the present survey, it is unlikely that any traditional Hawaiian archaeological site would be present. All eight study areas are localities where the decades of 20th century development have been focused.

Of specific concern for the present inventory survey is identification of structures older than fifty years which may be eligible for historic site designation. As noted in Section III above, a fire control station was established atop Koko Head during the 1930s. During World War II a radar installation - with associated base camp and a tramway - was constructed at the summit of Koko Crater. Remnants of the tramway have long been evident and it is likely that other structures associated with the military activities at Koko Head and Koko Crater continue to exist.

VI. INVENTORY SURVEY RESULTS

Study Area 1: Former Hawaii Job Corps center at the southwest base of Koko Crater

Study Area 1 is dominated by the abandoned buildings and associated infra-structure of the former Hawaii Job Corps camp. The camp consists of a variety of buildings, walkways, a basketball court, and other miscellaneous small structures. There is a large, old quonset hut in the northern corner of the camp that was formerly a part of the base camp associated with the radar installation at the summit of Koko Crater. The hut is addressed as a feature of the radar installation in radar installation base camp. The quonset hut is designated a feature of the radar installation and is addressed in the discussion of Study Area 3 below. No other archaeological or historic sites were observed in the area.

Study Area 2: Corridor of the former tramway on southwest slope of Koko Crater
The tramway was accessed from the Koko Crater summit trail. The survey was conducted by two archaeologists inspecting both sides of the tramway corridor on the descent to the base at the former Hawaii Job Corps camp. The tramway is designated a feature of the radar installation at the Koko Crater summit and is addressed in the discussion of Study Area 3 below. No other archaeological or historic sites were observed on either side of the tramway corridor.

Study Area 3: Summit of Koko Crater at the terminus of the tramway
The summit area contains the remains of the former radar installation originally installed in 1942. Since the installation continued to operate until 1966, an effort was made to correlate the existing remnants with structures observed in the historic 1948 and 1949 photographs presented in Section III above (see Figures 13-28 above). Any such structures would thus be approximately older than 50 years and thus eligible for historic site designation. These remnants, along with the quonset hut and tramway noted in Study areas 1 and 2 respectively, have been assigned State Site no. 50-80-15-5699.

State Site #: 50-80-15-5699
Site Type: Remnant Communications Facility
Function: Ascent/Descent, Communications, and Support
Features (#): 6 (A-F) CSH Site #: 2

General Description: State Site -5699 consists of wooden, concrete, and metal structures located on the slope and at the highest point of the rim of Koko Crater (1208 ft. a.m.s.l.), facing south-west towards Koko Head. The site complex consists of a tramway with adjacent utility poles, metal support platforms for radar screens, wooden support structures, cable and heavy machinery related to the tramway, and concrete foundations which supported either other structures or antenna arrays.

The summit can be accessed by the tramway corridor or from the crater rim trail which originates from within the botanical garden in Koko Crater. The summit portion of the site, which was originally used by as a radar and radio communications facility by the U.S. military, is in a state of general disrepair.

Additionally, a quonset hut, located near and to the west of the base of the tramway is the last remnant of the base camp which provided maintenance and support for the summit activities. The remainder of the base camp was later supplanted by a Hawai'i Job Corps facility, the unoccupied buildings of which remain to this day.

Pleasant modern trash and graffiti indicates that the summit of the site complex is frequently visited by bikers. The overall site, from the base camp quonset hut, to the highest structure on the summit are sub-divided into features, and are described here from the lowest in elevation to the highest respectively.

Feature A: Quonset Hut

Feature A, a military-style quonset hut, is located at the original radar installation base camp approximately 40 m. west of the base of the tramway. It consists of quonset hut in a general state of disrepair. Historic photographs (see Figures 24-28 above) indicate that quonset huts served multiple functions at the base camp. Based on examination of the photographs, the existing quonset hut appears to have been the camp mess hall which was constructed between 1948 and 1949 (see Figure 26 above).

Feature B: Tramway and Adjacent Utility Poles

Feature B is the almost complete remnant of a fixed rail tramway which rises approximately 1000 ft. from the base of Koko Crater's southwestern slope until it reaches the summit where it joins the upper communications complex. Though the track itself has been kept clear of the vegetation, *Koa haole* predominates the whole slope. The track originates from behind the Hawai'i Job Corps main office building, and consists of railroad track and wooden ties (Figure 29). The majority of the tramway tracks are on a slightly elevated and leveled berm measuring approximately 4 meters wide and generally 0.5 m. in height. Midway up the slope a section of the track bridges a gully where concrete foundations are utilized to support the tracks. The upper reaches are very steep (Figure 30), and some grading of the bedrock is evident near the top. The original tram cable still lies the entire length of the track. The bottom cable tie off has been removed, but the heavily corroded remains of the upper wench are still in place at the summit. Wooden utility poles, which would have provided electricity to the summit complex, border the entire length of the track, approximately 6 to 10 meters to its west, and are still strung with what appears to be the original electrical cable.

Feature C: Summit Support Buildings

The radar complex at the summit consists of roughly four levels. The lowest level, Feature C, consists of a cluster of dilapidated structures constructed of concrete (Figure 31), metal, wood, and tin roofing and siding, which are located on both sides of the tracks. These structures would have probably served as offices, work areas, equipment storage, tram way platforms, etc., necessary for the operation and maintenance of both the communications array and the tram way system.

Feature D: Support Platforms

Above the support buildings, unenclosed concrete and steel platforms, designated Feature D, are grouped on the west side of the tracks (Figure 32). These platforms probably would have served as supports for various communications equipment, such as radio antennae and radar screens. Presently they are devoid of any equipment, and covered with graffiti spanning at least a decade.

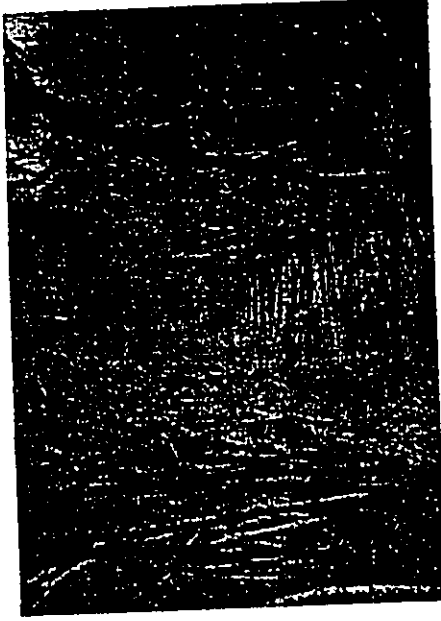


Figure 29

Site 50-80-15-5699B; tramway alignment near base of slope; view to northeast

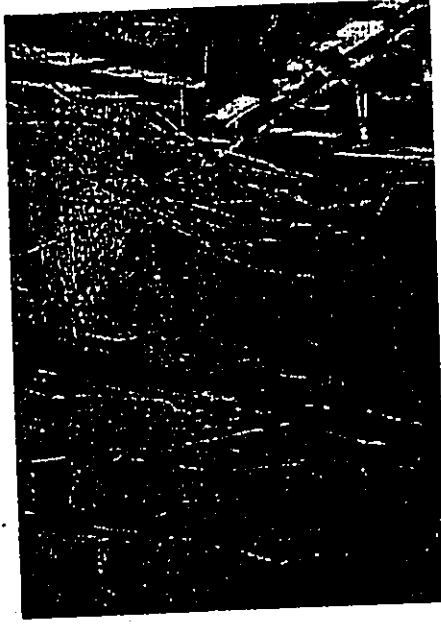


Figure 30

Site 50-80-15-5699B; tramway at top with former landing area in right foreground; view to southwest

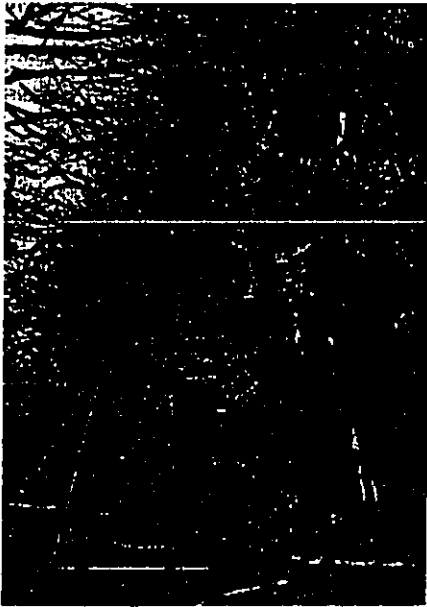


Figure 31
Site 50-80-15-5699C; concrete building on lowest summit support facility level; view to southeast

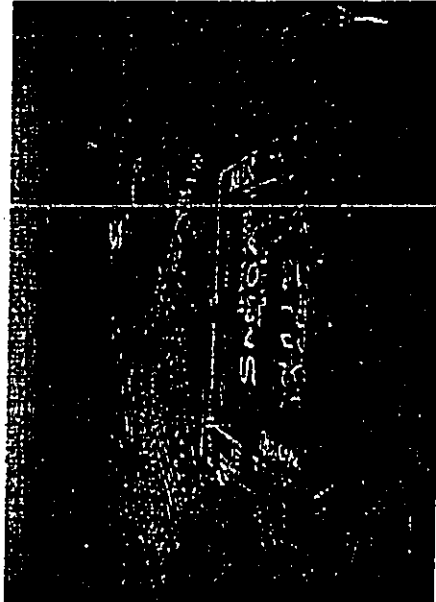


Figure 32
Site 50-80-15-5699D; two levels of concrete platforms

Feature E: Summit Structures

On the summit ground surface are the remnants of various structures associated with the communications complex, here designated Feature E. Functional designations for these structures is based on comparison with designs and locations of the structures identified in the historic photographs.

Not included within this feature designation, but located in the same area are the upper terminus of the tram track and the associated cable wench (Feature B), and a large steel grated support platform which bore a large radar screen, described below (Feature F). To the west of the large steel grid are the remnants of the foundation footings for the installation's radio shack (see Figure 19 above). Nothing else remains of the two-story wooden structure (Figure 18 above). Next to the western side of the structure identified as a radar screen support (see Figure 18 above) is a small rectangular concrete bunker of unknown function. It is not of the typical World War II anti-aircraft design however, and if not a shelter designed for human occupancy, possibly served as storage for equipment related to the radar screen it was adjacent to. Directly adjacent to the east side of the radar screen support is located a small concrete structure, with a pyramid shaped roof and a steel door. The interior is vented with small windows, suggesting that it may have served to store the generator which powered the radar screen. Further to the east of the radar screen support is another small rectangular bunker with adjacent footing pads. These are apparently the remnants of a small radar screen set atop a high metal frame support, with an associated small bunker adjacent to it (Figure 34). Plentiful modern trash is strewn throughout the soil surface of the summit, and upon and within the remnants of the structures.

Feature F: Large radar screen platform

The largest feature on the summit is the large metal grating which served as the support platform for a large radar screen (Figures 35&36; see Figure 20 above). It is elevated approximately six feet above the ground surface on a framework of steel girders and thick timber posts, thus becoming, albeit artificially, the highest point on the rim of Koko Crater. Standing atop the platform affords a panoramic view all surrounding areas. As with all the other structures in the area, the platform and its framework contain scattered modern trash and graffiti.

Study Area 4: Area at the intersection of Kalaniana'ole Highway and the entrance road to Hanauma Bay

This area includes portions of the modern Kalaniana'ole Highway right-of-way, the Hanauma Bay entrance road, and a single-lane road leading to the former Hawa'i Job Corps camp and Koko Head District Park. The construction and subsequent use of these roadways since the 1930s have altered the area significantly. No archaeological or historical sites were observed.

Study Area 6: Area of the present Hanauma Bay visitor center and parking lots
This area includes the modern visitor facility, park lots and open landscaped areas above Hanauma Bay. These constructions and decades of visitor use have altered the area significantly. No archaeological or historical sites were observed.

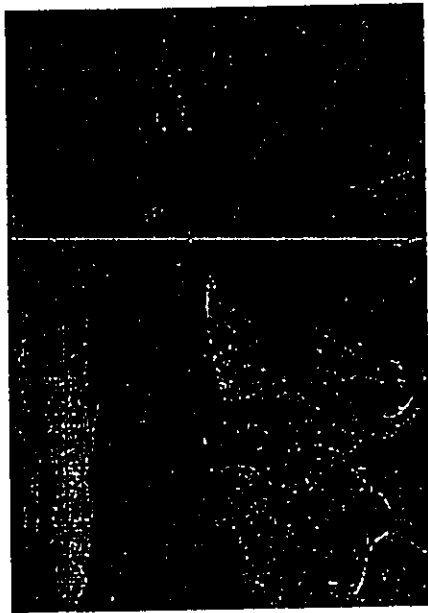


Figure 33 Site 50-80-15-5699E; concrete foundation, presumed to have been for two-story wooden "radio shack"; view to northwest

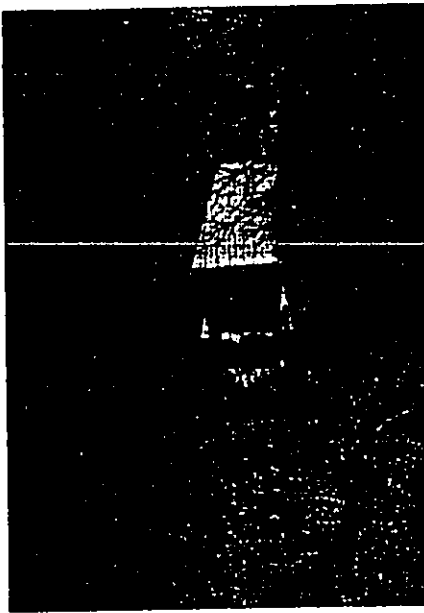


Figure 34 Site 50-80-15-5699E; roofless bunkers on crater rim summit, east of metal grate radar foundation; view to north



Figure 35 Site 50-80-15-5699E; large metal grate foundation for former radar antenna with probable generator house to right; view to north



Figure 36 Site 50-80-15-5699E; metal grate and upper terrace level with probable generator house at center

Study Area 6: Portion of Hanalei Bay limited to the grounds immediately surrounding the concession and comfort station at the base of the access road to the beach

No structures in this study area are older than fifty years. Decades of public use of the bay have removed all traces of any surface sites that may have existed in the area. The location of the rockshelter excavated by the University of Hawaii (Emory and Sinoto 1961) (see PREVIOUS ARCHAEOLOGICAL STUDY section above) was identified. This rockshelter is located well away from the present study area, on the opposite side of the access road to the beach.

Study Area 7: Koko Crater Botanical Garden loop trail

The loop trail is a well-defined, up to eight-meter wide, dirt path that is used both as a foot and horse trail. No sites were observed along the route of the loop trail or within ten meters on either side of the trail.

Study Area 8: Koko Head communication facilities access road and area at summit

The study area included the asphalt-paved access road which commences at the Study Area 4 road intersection and follows the spine of Koko Head. There are modern facilities including a Board of Water Supply tank and telecommunication installations that are accessed from the paved roadway.

Near the southwestern tip of Koko Head are three reinforced concrete bunkers and a basalt-and-concrete structure. The design of the concrete bunkers corresponds to that of the structure identified as a "Fire Control Station, Koko Head for Battery Granger Adams, Fort Ruger, T.H.", constructed in 1934, on a U.S. Army Engineers information sheet (see Figure 9 above). As discussed in Section III above, fire control stations were look-out installations which directed fire from associated gun emplacements. The station at Koko Head supported Battery Granger Adams at Black Point. The information sheet for one of the Koko Head fire control station units indicates that it consisted of a reinforced concrete bunker which was concealed by earth fill on its roof. The three bunkers and the associated structure have been assigned State site no. 50-80-15-5698.

State Site #:	50-80-15-5698	CSH Site #: 1
Site Type:	Reinforced Concrete Bunkers & Associated Structure	
Function:	Military	
Features (#):	4 (A, B, C, D)	
Site Area:	68 m. ² (731.7 ft. ²)	

Feature A Description: Feature A (Figure 37) is a reinforced concrete bunker located 20 m. (65.6 ft.) north of a new communications building within the communications complex at the end of Koko Head. The bunker is square, with exterior dimensions of 6 m. (19.7 ft.) by 6 m. (19.7 ft.). A square opening in the top of the bunker provides access to the interior by means of a metal ladder. The interior is square, measuring 4.6 m. (15.1 ft.) by 4.6 m. (15.1 ft.), with a ceiling height of 2.4 m. (8 ft.). A seaward facing continuous slit opening, approximately 0.5 m. wide, provides an unobstructed view to the south and west. On the floor of the bunker, directly fronting the slit, are located two 1 m. (3.28 ft.) wide raised octagonal concrete pads,

providing the bases for the mounts which would have supported either observation or gunnery equipment. At present, the structure is in generally good condition, however, it has sustained some minor damage due to bulldozing with the result that soil, vegetation and modern trash now covers much of it. It is now devoid of the military equipment it once contained, with the interior littered with modern trash and graffiti. A rough inscription, drawn into wet concrete on the surface of the structure read "1941". Additionally, a USGS marker, dated 1953, is located on the top of the structure at its southeast corner.

Feature B Description: Feature B (Figure 38) is a reinforced concrete bunker located approximately 85 m. (280.5 ft.) south of a Feature A. The bunker is square, with exterior dimensions of 4 m. (13.1 ft.) by 4 m. (13.1 ft.). A square opening in the top of the bunker provides access to the interior by means of a metal ladder. The interior is square, measuring 3 m. (9.8 ft.) by 3 m. (9.8 ft.), with a ceiling height of 2.4 m. (8 ft.). A seaward facing continuous slit opening, approximately 0.5 m. high, provides an unobstructed view to the south and west. On the floor of the bunker, directly fronting the slit, is located one 1 m. (3.28 ft.) wide raised octagonal concrete pad, providing the base for a mount which would have supported either observation or gunnery equipment. At present, the structure is in generally good condition, however, it has sustained some minor damage due to bulldozing with the result that soil and vegetation now covers much of the slit opening. It is devoid of the military equipment it once contained, with the interior littered with modern trash and graffiti.

Feature C Description: Feature C (Figure 39) is a reinforced concrete bunker located approximately 30 m. (98 ft.) south of a Feature B. The bunker is square, with exterior dimensions of 4 m. (13.1 ft.) by 4 m. (13.1 ft.). A square opening in the top of the bunker provides access to the interior by means of a metal ladder. The interior is square, measuring 3 m. (9.8 ft.) by 3 m. (9.8 ft.), with a ceiling height of 2.4 m. (8 ft.). A seaward facing continuous slit opening, approximately 0.5 m. high, provides an unobstructed view to the south and west. On the floor of the bunker, directly fronting the slit, is located one 1 m. (3.28 ft.) wide raised octagonal concrete pad, providing the base for a mount which would have supported either observation or gunnery equipment. At present, the structure is in generally good condition. It is devoid of the military equipment it once contained, with the interior littered with modern trash and graffiti.

Feature D Description: Feature D (Figure 40), just north of Feature A, is a basalt rock and mortar structure, measuring roughly 1.5 m. square and in height. The structure has parallel walls that used to support metal pipes at the base and top, which was formerly capped by concrete. The structure may have supported a communications tower, or may have been a support anchor for a larger structure. Though not of reinforced concrete, it is presumed associated with the bunkers, based on proximity.

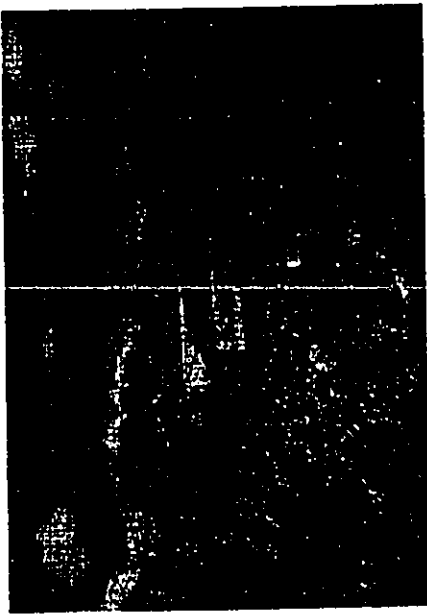


Figure 37 Site 60-80-15-5698A; concrete bunker showing partially-covered slit opening; view to northwest

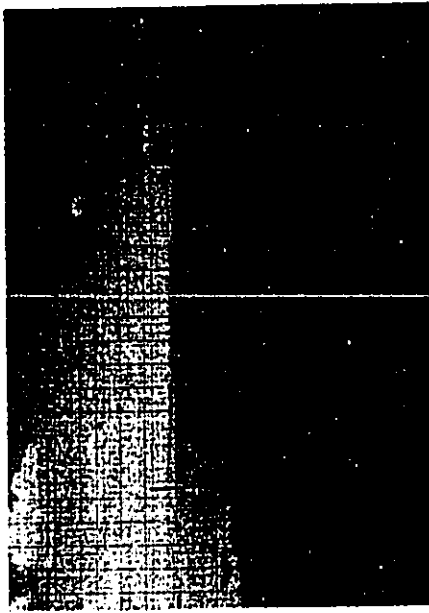


Figure 38 Site 60-80-15-5698B showing soil cover over bunker and paved access; view to south

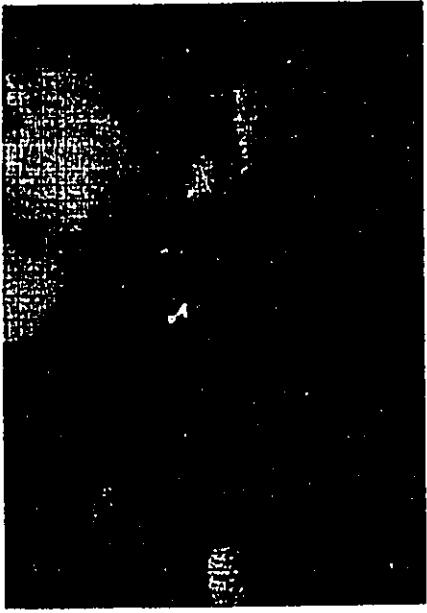


Figure 39 Site 60-80-15-5698C; soil-covered bunker; view to north

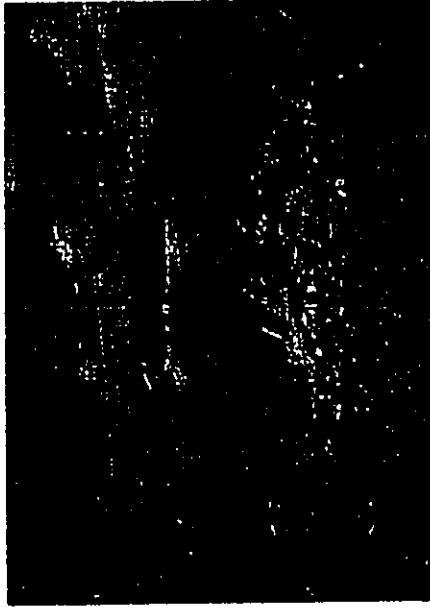


Figure 40 Site 60-80-15-5698D; boulder and concrete structure

VII. SIGNIFICANCE AND RECOMMENDATIONS

A. Significance Evaluation

Archaeological sites are evaluated for significance according to the broad criteria established for the National and State Registers of Historic Places. The five criteria are:

- A Site reflects major trends or events in the history of the state or nation.
- B Site is associated with the lives of persons significant in our past.
- C Site is an excellent example of a site type.
- D Site may be likely to yield information important in prehistory or history.
- E Site has cultural significance; probable religious structures (shrines, *heiau*) and/or burials present.

State site 50-80-15-5698 refers to the three reinforced concrete bunkers and the boulder-and-concrete structure at the end of Koko Head, identified in Study Area 8. Site 50-80-15-5698 is assessed as significant under Criteria A and D. The Criterion A assessment is based on major trends and events related to Hawai'i role in U.S. military history. The criterion D assessment is based on information already gathered, such as: location, condition and basic recordation, as well as future research or interpretive potential.

State site 50-80-15-5699 refers to the complex of features associated with the former Koko Crater radar installation. Site 50-80-15-5699 is assessed as significant under Criteria A, C and D. The Criterion A assessment is based on major trends and events related to Hawai'i's role in U.S. military history, beginning in World War II and continuing on into the Cold War era. Criterion C is based on the unique engineering accomplishment that the tramway and the associated summit radar facility represent. Criterion D is based on information already gathered, such as: location, condition and basic recordation, as well as future research or interpretive potential.

B. Recommendations

The following recommendations are appropriate to the findings of the present Koko Head Park inventory survey:

- 1) No further archaeological investigation is deemed necessary for:
 - Study Area 4: Area at intersection of Kalaniana'ole Highway and the entrance road to Hanauma Bay
 - Study Area 5: Area of the present Hanauma Bay visitor center and parking lots
 - Study Area 6: Beach area of Hanauma Bay limited to the grounds surrounding the concession and comfort station at the base of the access road to the beach

Study Area 7: Koko Crater Botanical Garden loop trail

This recommendation is limited to the specific, delimited areas subjected to the present inventory survey. It does not apply to other localities in the near vicinity of these study areas.

- 2) It is Cultural Surveys Hawaii's recommendation that State sites 50-80-15-5698 and 50-80-15-5699 be preserved, if possible.
 - Site 50-80-15-5698 - the bunkers and associated structure at the end of Koko Head - though in fair to poor condition, could be integrated into any future park development.
 - As noted above, Site 50-80-15-5699 - the former Koko Crater radar installation remnants - represents a unique engineering accomplishment dating back to Hawai'i's World War II experience.
- 3) It is Cultural Surveys Hawaii's recommendation that additional research, such as archival-quality photographs be undertaken, with the aim of further documenting and preserving the architectural quality of the sites.

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APPENDIX G

Archaeological Field Inspection Survey Koko Head Regional Park: Koko Head Regional Park Resource Plan Project

Paul H. Rosendahl, Ph.D., Inc.

November 1988

*Referenced in the Improvements to Hanauma Bay Nature Preserve, Koko
Head Regional Park and Nature Preserve, East Honolulu, Island of
Oahu, Final Environmental Impact Statement, August 1999.*



PA ROSE Phil
Consulting Archaeology, Inc.

Report 403-081788

**ARCHAEOLOGICAL FIELD INSPECTION SURVEY
KOKO HEAD REGIONAL PARK**

KOKO HEAD REGIONAL PARK RESOURCE PLAN PROJECT

Land of Maunaloa, Honolulu District
Island of Oahu

November 1988

305 Mokuuli Street • Hilo, Hawaii 96720 • (808) 969-1763 or 966-8038

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Consulting Archaeologist

Report 403-051788

ARCHAEOLOGICAL FIELD INSPECTION SURVEY
KOKO HEAD REGIONAL PARK

KOKO HEAD REGIONAL PARK RESOURCE PLAN PROJECT

Land of Maunaloa, Honolulu District
Island of Oahu (DMS:1-3-9-12:1.2.Var.)

by

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Principal Archaeologist

Prepared for

City and County of Honolulu
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c/o Belt, Collins & Associates
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November 1988

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SUMMARY

At the request of Belt, Collins & Associates (BCA), acting for their client, the City and County of Honolulu (CCOHO), Paul E. Rosendahl, Ph.D., Inc. (PHI) conducted an archaeological field inspection survey of the approximately 1,270 acre Koko Head Regional Park project area, situated in the Land of Maunaloa, Honolulu District, Island of Oahu. The primary objective of the field inspection survey was to make a general assessment, in conjunction with the preparation of a park master plan, concerning the presence or absence of any sites or features of possible archaeological significance within the limits of the project area.

The archaeological field inspection of the Koko Head Regional Park project area was carried out on May 12, 14-15, 1988. Approximately 48 man-hours of labor were expended in conducting the field work. The project area was sampled by a series of unsystematic pedestrian sweeps, the routes of which were selected for the following reasons: (a) find and reevaluate previously identified sites; (b) identify and evaluate any new sites; (c) sample the project area in terms of both the overall geographic area and the range of terrain variation present; (d) physical access; and (e) current land use.

Of the five previously identified sites which apparently were situated within the Koko Head Regional Park project area, only one site--Site 112B, Koko Head Petroglyphs (McAllister's Site 44)--was relocated. Three other McAllister sites (Sites 25, 36, 37) were searched for, but were not found. A fourth McAllister site (Site 45) was not even searched for because of the current active use of the Mahaula Crater area as a public firearms range. Site 112B--Koko Head Petroglyphs (McAllister's Site 44) was the only one of the previously identified sites that was relocated and inspected. While the present condition of the site does not appear to have changed substantially from the condition noted in 1976, it is obvious that the site has been extensively altered, by both natural causes (soil erosion) and collectors who cut out several of the figures, in the intervening years since McAllister recorded the site in 1931. Even so, the site was assessed as being valuable--i.e., significant as an example of petroglyph art, which is rare on the Island of Oahu--by DMR when the site was inventoried in 1976. No new archaeological sites were identified during the field inspection survey.

Evaluation of the archaeological field inspection survey findings indicates that several areas within the project area are considered likely to have archaeological remains present, and that a full-scale inventory-level survey (with variable intensity aerial and ground coverage) of the entire Koko Head Regional Park project area should be carried out as part of the subsequent planning and development of the park. The principal objectives of this survey would be four-fold: (a) to identify (find and locate) all sites and features present within the project area; (b) to evaluate the potential significance of all identified archaeological remains; (c) to determine the possible impacts of proposed park development upon the identified remains; and (d) to define the scope of any subsequent archaeological mitigation work that might be necessary or appropriate.

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INTRODUCTION

BACKGROUND

At the request of Belt, Collins & Associates (BCA), acting for their client, the City and County of Honolulu (CCHONO), Paul W. Rosendahl, Ph.D., Inc. (PHI) conducted an archaeological field inspection survey of the approximately 1,270 acre Koko Head Regional Park project area in Land of Maunaloa, Honolulu District, Island of Oahu. The primary objective of the field inspection survey was to make a general assessment, in conjunction with the preparation of a park master plan, concerning the presence or absence of any sites or features of possible archaeological significance within the limits of the project area.

Field inspection survey field work was carried out on May 12, 14-15, 1988. An oral preliminary report on survey findings was given to BCA Project Manager Lee W. Sisker on May 17, 1988. Survey findings and conclusions--including evaluations and recommendations, were subsequently discussed with Dr. Joyce Bath, staff archaeologist for Oahu in the Hawaii State Department of Land and Natural Resources-Historic Sites Section (HNR-HSS). The present report constitutes the final report on the field inspection survey.

SCOPE OF WORK

The basic purpose of the archaeological field inspection survey was to identify sites or features of possible archaeological significance. Often formerly referred to as a reconnaissance survey, a field inspection survey is extensive rather than intensive in scope and is conducted to determine the presence or absence of archaeological resources within a specified project area. Generally covering only a sample of a project area, a field inspection survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A field inspection survey permits a general significance assessment of archaeological resources present, and facilitates the formulation of realistic recommendations and estimates for such further work as might be necessary or appropriate. Such further archaeological work could include inventory-level survey--identification, recording, and possibly of all sites present, and perhaps selected test excavations; and subsequent mitigation--data collection and data recovery work, interpretive planning and development, and/or preservation of sites and features with significant research, interpretive, and/or cultural values.

Based on a preliminary review of available background literature and records, and based on discussions with several representatives of BCA and with Dr. Bath of HNR-HSS, the following specific objectives were determined to constitute an appropriate scope of work for the archaeological field inspection survey of the Koko Head Regional Park project area:

1. To review readily available archaeological and historical literature relevant to the immediate project area;
2. To conduct a sample field inspection of the approximately 1,270 acre project area to determine the presence or absence of any potentially significant archaeological sites;
3. To determine the nature of the physical conditions of the project area that would influence the conduct of any subsequent archaeological field work, should such be necessary; and
4. Prepare an appropriate scope of work (including specific field work and other non-field tasks) for any subsequent archaeological work, such as a full-scale inventory-level survey, that might be necessary.

It was anticipated that should the field inspection survey suggest the presence of potentially significant archaeological remains within the project area, and/or the probability of subsurface archaeological deposits, a subsequent full-scale inventory-level survey of the project area, in connection with more detailed park planning and development, would most likely be necessary.

As defined by the scope provided to BCA by CCHONO, certain areas were to be excluded from the overall project area; these were the Koko Head District (formerly Regional) Park adjacent to the Hawaii Job Corps Center, Hanalei Bay Park (beach and upper level areas), and Koko Crater Botanic Garden. The scope provided by CCHONO called for an archaeological report which would include the following items: (a) a review of any previous archaeological findings within the project area; (b) an assessment of surface archaeological resources within the project area; (c) a "culture and lore, historical account and a chronological overview" of the project area and immediate local regions; (d) any pertinent maps or photographs; (e) other pertinent observations and recommendations; (f) a comprehensive reference list; and (g) a summary of facts, findings, and recommendations. Based on discussions between BCA and CCHONO, it was mutually agreed that the cultural and historical lore research would be conducted by BCA.

PROJECT AREA DESCRIPTION

Situated at the extreme southeastern corner of the Island of Oahu, the Koko Head Regional Park project area is located in the Land of Maunaloa, Honolulu (Kona) District (TK:1-3-912:1.2.Var.) (Figure 1, at end). Approximately 1,270 ac in extent, the project area is distinguished by such prominent natural features as Koko Head, Hanalei Bay, Koko Crater, and Sandy Beach. The project area is surrounded by coastal waters for the entire extent along the southeast side, while the residential areas of Portlock and Hawaii Zai border the southwest and northwest sides of

the project area, and the Hawaii Kai Golf Course and adjacent residential development border the northeast end.

With the exception of the flat Sandy Beach portion of the project area which extends northeast-southwest of Kaimanalo Highway--from the east-southwest corner of the project area, the terrain is generally irregular in aspect, with precipitous lava cliffs and surf-washed lava shelves along the shoreline. The Koko Head portion of the project area is characterized by steep slopes. Frequently barren and eroded. Prominent natural features are the summit of Koko Head (Kuniochama, elevation 642 ft), a fairly deep lava-filled gulch which opens east-southeastward toward the sea, the deeply indented Hanamaia Bay, and the two smaller craters (Thaialanaka (Thaialanaka) and Koochala) situated between Koko Head and Hanamaia Bay. (See Fukui, Elbert, and Hokini (1974), and Sterling and Summers (1978) for information concerning these and other place names mentioned below.) The Koko Crater portion of the project area is characterized by very steep, generally barren and dissected slopes. Prominent natural features are the summit of Koko Crater (Puu Kai, elevation 1,208 ft), Koko Crater (Kohalepalepe), the smaller Kahauloa Crater, and Sandy Beach (Wewamala and Oahu).

Vegetation cover within the project area varies from very dense in several of the gullies and gulches to scattered and open on more exposed and eroded slopes. For the most part, the present vegetation appears to be introduced exotics, with the dominants being *Metrosideros polymorpha* (Rumb. and Bonpl. ex Willd.) HBK. and *Leucaena glauca* (Lam.) DC. (distribution, and a variety of low shrubs and grasses. The nature, annual rainfall (less than 30 in), the often steeply sloping and irregular dissected terrain, and the patchwork scatter of shallow soils.

PREVIOUS ANTHROPOLOGICAL WORK

Based on a review of published sources, site files, records, and manuscripts available at MNR-HSS, it was apparent that several previously identified sites were known to exist at one time in or immediately adjacent to the project area; however, the maps and site files at MNR-HSS indicated that during the statewide Inventory of Historic Sites survey field work, conducted by MNR in 1970, only two sites had been definitely found within the Koko Head Regional Park project area overall. These two sites were Site 50-80-15-1128--Koko Head Petroglyphs, which is situated within the project area covered by the present field inspection, and site 50-80-15-3--Hanamaia Shelter, which is situated in the beach level area of Hanamaia Bay. An area excluded from coverage during the present field inspection (MNR 1970a, b) (Figure 1, at end.)

Site 1128--Koko Head Petroglyphs was recorded as Site 44 by McAllister (1933) in 1931 during his survey of Oahu sites for Bishop Museum. He pointed out that the site, which consisted of numerous figures pecked into a thin lava layer atop a natural sandstone or volcanic tuff shelf within a

small shoreline cave, had been reported and described previously by a number of writers since its discovery in 1899 (McAllister 1933:67-8). (Also see Cox and Stessel 1970:96-7, and Sterling and Summers 1978:263-6.) Notes in the site file at MNR-HSS indicate that the site has been extensively damaged in recent years both by natural causes and by collectors, who had cut away sections of the thin lava in which figures had been pecked, and removed panels with figures.

Site 3--Hanamaia Shelter was a natural overhang shelter that had served as a prehistoric temporary habitation site. The site was identified and excavated in 1952 by a field team from Bishop Museum and the University of Hawaii. The excavations and recovered artifacts are described in Zooy and Siroto (1961), and the fishbones were subsequently incorporated into a more detailed analysis by Zooy, Bonk, and Siroto (1968). Site file notes at MNR-HSS indicate that very little of the site cultural deposit remained in 1970. The site apparently was not visited by Connolly (1980) during his survey of the Hanamaia Bay Beach Park, as the latter project area was limited to the upper area of the park.

Of the numerous sites recorded by McAllister (1933) at the southeast corner of Oahu in the general vicinity of Koko Head and Koko Crater, only five seemed to have been situated within the present project area limits (McAllister 1933:57-8, 63, 65, 67-8).

Site 25--Fishing shrike (Do's). Apparently situated along the sandy beach area aboraline, this site was believed by Sterling and Summers (1978:263) to have been destroyed by the 1946 tidal waves.

Site 36--House site. This site was situated on a low ridge of Koko Crater, on the Makapuu side, and apparently in the general vicinity to the southeast of the present Koko Crater Stables and to the northwest of the present sewage disposal facility.

Site 37--Terraces. This site was situated on the northwest slope of Koko Crater, facing Kamiloiki Valley, and apparently in the general vicinity to the northwest of the present Koko Head Stables.

Site 44--Koko Head Petroglyphs. Situated in a small cave along the shoreline roughly midway between Hanamaia Point and Hanamaia Bay, this site was subsequently inventoried by MNR in 1970 and designated Site 1128 (see above).

Site 45--Platform. This site was reported to McAllister as being situated on the side of Koko Crater, facing into Kahauloa Crater, but McAllister never located the site.

In addition, both McAllister (1933) and Sterling and Summers (1978) indicated the presence of numerous sites in the general Hawaii Kai area. Several of these sites were located in the Kaloheo area, near the northeast

end of the Sandy Beach portion of the project area, while others were located northeast of Koko Crater, in the general vicinity of the mouth of Kaloana Valley, and still others were located to the west of the project area, along the shoreline at the base of Koko Head, around Kuapa Pond, and in the general vicinity of Kamiloani Valley and Kamiloiki Valley.

In the Kaloana area—immediately adjacent to the northeast end of the Sandy Beach portion of the project area, McAllister listed noted approximately 20 sites, including enclosures, fishing shrines (heiau), house platforms, a habitation cave, a complex of walls and piles of stones, a possible hale, and a possible pig pen (McAllister 1933:18-43, Figure 20). (See also Kelly et al. 1964:6-9.) More recent survey work in the Kaloana area by Bishop Museum in 1984 as part of a park feasibility study for the Queen's Beach area between Sandy Beach and Makapuu Head identified several sites, but failed to find any of McAllister's sites (Kelly et al. 1984:19-16, from discipia map). This park feasibility study also included legendary and historical-documentary information relating to the Land of Manuana. Barrers (1986) conducted a surface survey of a construction borrow pit area situated just outside of the present project area, to the north of the present sewage disposal facility, and found only extensive recent disturbances. A surface and subsurface survey of a proposed residential development area along Kalamalama Highway, immediately inland of the Sandy Beach portion of the project area, was carried out by HRI in 1986 (Speck 1987); this survey failed to find any cultural remains.

Two other surveys have been conducted within the overall limits of the Koko Head Regional Park. The surface survey by Connolly (1980) of the upper area of Hanalei Bay Park has already been mentioned above. More recently, Kennedy (1987) monitored trenching of sewer lines at the Hawaii Job Corps Center; no cultural remains were encountered.

Other work in the Land of Manuana, generally to the west of the present project area, includes excavations done by Bishop Museum and the University of Hawaii in the early 1950s at three shallow caves (Maury and Simoto 1961; Maury, Bonk, and Simoto 1968), as well as several small-scale surveys and limited excavations done at other sites in the general Kaloana Kai area (Gayard 1969, n.d.; Wallace et al. 1969; McCoy 1971; and Bergeau 1972). Fabus Heiau, situated at the base of the ridge separating Kamiloani Valley and Kamiloiki Valley, has been the focus of a recent excavation and stabilization/partial restoration project (Davis 1984; 1985a, b). Finally, mention should be made of the historical-documentary study of the Kuapa Pond area done in 1975 by Takemoto et al. (1975).

FIELD METHODS AND PROCEDURES

The archaeological field inspection of the Koko Head Regional Park project area was carried out on May 12, 14-15, 1988 by Principal Archaeologist Dr. Paul H. Rosenzweig and Supervisory Archaeologist Victoria K. Kai. Approximately 48 man-hours of labor were expended in conducting the

field work. Inspection survey field work was greatly facilitated by use of black-and-white aerial photographs (R.H. Towill Corp./USGS, 1977, scale 1"=400') and topographic maps (scale 1"=200', 40-ft contours) provided by USGS.

The project area was sampled by a series of unsystematic pedestrian sweeps, the approximate routes of which are shown on Figure 1 (at end). These routes were selected for several reasons, including the following:

1. Find and reevaluate previously identified sites;
2. Identify and evaluate any new sites;
3. Sample the project area in terms of both the overall geographic area and the range of terrain variation present;
4. Physical access—which excluded the precipitous sea cliffs, and the densely vegetated Honolulu Crater and main gulch of the Koko Head portion of the project area, as well as most of the steep and deeply dissected slopes of Koko Crater and
5. Current land use—active use of Kalamalos Crater as a public firearms range, which prevented inspection of the crater area.

FINDINGS

Of the five previously identified sites which apparently were situated within the Koko Head Regional Park project area, only one site—Site 1128, Koko Head Petroglyphs (McAllister's Site 44)—was relocated. Three other McAllister sites (Sites 25, 36, 37) were searched for, but were not found. As mentioned previously, Site 25—a fishing shrine situated along the shoreline in the Sandy Beach area, was believed to have been destroyed by the 1946 tidal wave. Two other sites said to be situated on the lower north slopes of Koko Crater, Site 36—a house site and Site 37, terraces—might easily have been destroyed by recent land modification activities noted in their apparent general vicinities. Alternatively, the sites might have gone unidentified in the dense vegetation covers also present in their apparent general vicinities. A fourth site, Site 45—a platform said to be situated on the side of Koko Crater and facing into Kalamalos Crater, was not even searched for because of the current active use of the crater area as a public firearms range.

Site 1128—Koko Head Petroglyphs (McAllister's Site 44) was the only previously identified site relocated and inspected. The present condition of the site, as indicated in Figure 2, does not appear to have changed substantially from the condition noted in 1976 and documented in the DNR site file. However, it is obvious that the site has been extensively altered, by both natural causes (wave erosion) and collectors, who

cut out several of the figures, in the intervening years since McAllister recorded the site in 1931. Even so, the site was assessed as being valuable—i.e., significant as an example of petroglyph art, which is rare on the Island of Oahu—by DMR when the site was inventoried in 1970.

No new archaeological sites of any kind were identified during the field inspection survey. A close inspection of the Sandy Beach portion of the project area failed to reveal any evidence of human burials, even though one occurrence of such a find was said to have been known from the general vicinity of the northeast end of the Sandy Beach area (W. Kam. pers. comm.).

One interesting non-cultural site, a series of eroding soil hummocks containing abundant bird-bone, was found on a high ridge overlooking Palae Point, situated on the northeast side of Hanalei Bay (Figure 1, at end). A sample of diagnostic bones was collected and submitted to Zoological Consultant Dr. Alan C. Ziegler for identification (Ziegler 1988). According to Ziegler, the bones represented two species of the family Procellariidae (Terns and Shearwaters), the medium-sized *Puffinus pacificus* (Wedge-tailed Shearwater) and the smaller *Puffinus pacificus* (Common Tern). Based on known archaeological contexts, both species apparently were relatively rare on the Main Hawaiian Islands during early prehistoric period, becoming common during the late prehistoric period. While *Puffinus pacificus* has remained common on and around Oahu to the present, *Puffinus pacificus* has now become extinct on the Main Islands and apparently disappeared from Oahu before European contact. While the materials examined by Ziegler indicated "...an interesting deposit although not a substantially significant one in a scientific sense," it does appear that the deposit should be explored in greater detail for the possible presence of additional species and other information that might help explain the nature and origin of the deposit.

CONCLUSION

DISCUSSION

In comparison to areas adjacent to the west, north, and east, the Koko Head Regional Park project area would appear to have a relative paucity of archaeological sites. The present field inspection survey, which sampled the project area, relocated only one of five previously identified sites which were apparently situated within the project area, and no new sites were identified. Perhaps this paucity of sites reflects to a large degree the relatively marginal nature of most of the project area, in terms of traditional habitation and exploitation activities, when compared to the areas adjacent to the west, north, and east. However, based on previous knowledge of the nature and distribution of sites within and adjacent to the project area, as well as more general knowledge of Hawaiian archaeological sites in general, it is considered likely that sites might well be present in several specific areas within the park project area.

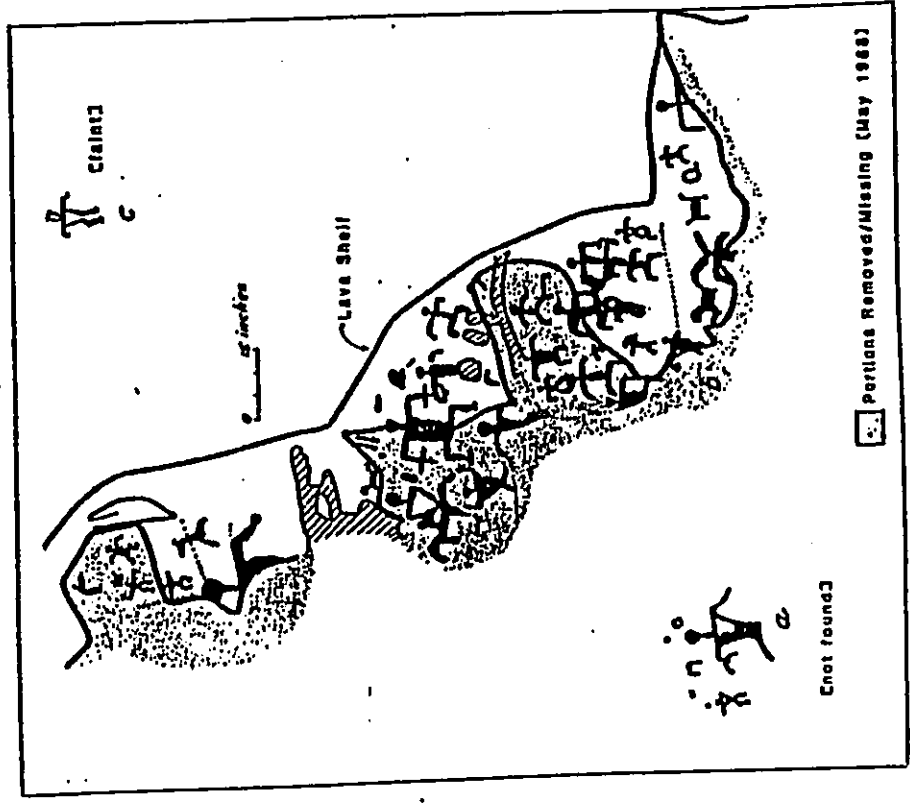


Figure 2. SITE 1128--KOKO HEAD PETROGLYPHS. Based on Figure 24 in McAllister (1933), and shaded to indicate portions noted as removed or missing as of May 1988.

While much of the Koko Head portion of the project area is exposed and barren and lacking in archaeological remains, several specific areas are considered likely to have sites. The areas include the following: (a) the sea cliffs and immediate shorelines, from Kawaiho Point to the vicinity of site 112B; (b) the densely vegetated interior, and immediately adjacent vicinity of Konoia Crater to the west and north; (c) the interior area of the major, fairly deep, lagoon-filled gulch which opens east-southeastward toward the sea; and (d) the area of eroding soil hummocks, some having deposits with bitumens, overlooking Pales Point and Hanuwa Bay.

McAllister's 1931 survey identified several sites in the Koko Crater portion of the project area, and while the field inspection survey did not relocate most of them, the earlier report does suggest the likelihood of habitation sites, and possibly dryland agricultural sites, being present in several specific areas. The areas include the following: (a) unaltered interior areas of Kahuloa Crater, especially the lower slope of Koko Crater facing southwest into Kahuloa Crater; (b) natural overhang shelter areas along the dissected, seaward-facing lower slopes of Koko Crater, above Kalamisole Highway; (c) the interior of Koko Crater, especially immediately adjacent to the base of the steep slope; and (d) the two ridges immediately adjacent to the base of the steep slope, that extend to the northeast on both sides of the gap into Koko Crater.

While the Sandy Beach portion of the project area has apparently been extensively altered by the 1946 tidal wave, as well as more recent road construction and beach park development activities, there is still a good possibility that subsurface cultural deposits (or deposit remnants) and scattered human burials might be present in this portion of the project area. The presence of subsurface remains is considered especially likely, given the large number of sites recorded by McAllister in 1931, in immediately adjacent areas to the northwest and northeast.

RECOMMENDATIONS

Evaluation of the findings of the archaeological field inspection survey indicates that a full-scale inventory-level survey of the entire Koko Head Regional Park project area should be carried out as part of the subsequent planning and development of the park. The principal objectives of such an inventory-level survey would be four-fold: (a) to identify (find and locate) all sites and features present within the project area; (b) to evaluate the potential significance of all identified archaeological remains; (c) to determine the possible impacts of proposed park development upon the identified remains; and (d) to define the scope of any subsequent archaeological mitigation work that might be necessary or appropriate.

Based on discussion of the field inspection survey findings with Dr. Joyce Bach, DNR-HSS staff archaeologist for Oahu, the following specific tasks have been determined to constitute an adequate and appropriate scope of work for the recommended full-scale inventory-level survey:

1. Historical documentary research, the specific purposes of which would be (a) to locate and summarize readily available documentary resources (e.g., books, maps, journals, archival recordings) relating to the land of Kawaiho in general and to the project area specifically, (b) to integrate and synthesize the findings of this research in order to define prehistoric, early historic, and later historic period land use patterns, and (c) to assess the potential for any further research that might be appropriate in connection with any subsequent mitigation work needed for park development;
 2. 100% coverage low-level (c.30-50 ft elevation) aerial survey by helicopter of the entire project area, with special emphasis upon those areas for which ground survey would be difficult (sea cliffs, steep slopes), in order (a) to identify sites and features, and (b) to define areas devoid of sites which would not require subsequent ground survey;
 3. Partial to 100% coverage variable intensity (30 to 90-ft intervals) ground coverage of the project area, with (a) relatively higher intensity coverage being given to those areas identified during the aerial survey as either having good potential for the presence of sites, or as undetermined because of dense vegetation cover, and (b) relatively lower intensity coverage being given to those areas identified during the aerial survey as either devoid of sites or extensively modified in recent times;
 4. Limited subsurface testing of selected sites and areas (a) to determine the presence or absence, and general nature, of any subsurface cultural deposits, and (b) to obtain sample materials for absolute age dating analyses;
 5. Analysis of all historical documentary and field survey data; and
 6. Preparation of appropriate reports.
- The significance of all archaeological sites identified within the project area would be assessed in terms of the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60). DNR-HSS uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. To further facilitate management decisions regarding the subsequent treatment of resources, the general significance of all archaeological sites identified during the inventory-level survey would be evaluated in terms of potential scientific research, interpretive, and/or cultural values. Scientific research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological

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resources for public education and recreation. Cultural values, within the framework for significance evaluation used here, refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

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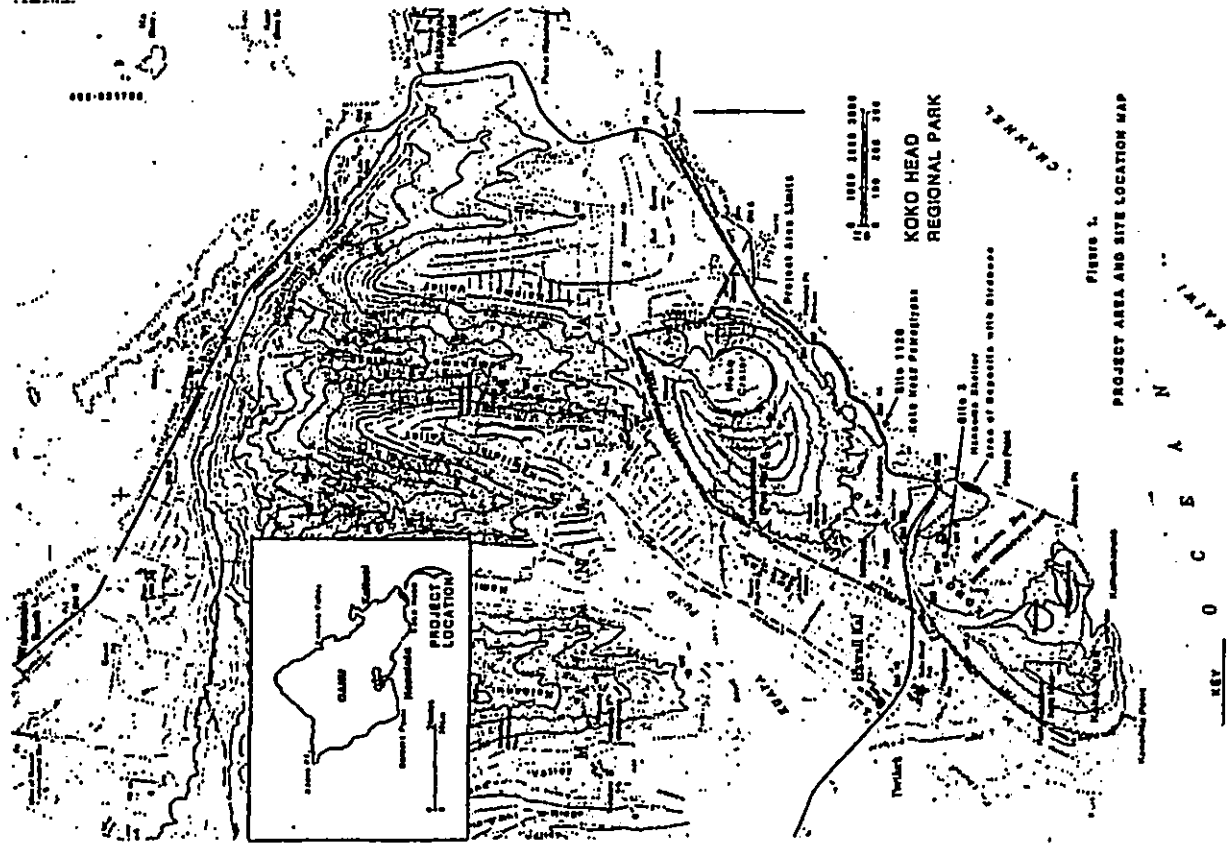


FIGURE 1.
PROJECT AREA AND SITE LOCATION MAP

KEY
 --- Project Area
 ○ Site Locations
 * Other Points of Interest
 □ Other Inspected Sites

APPENDIX H

Botanical Study: Koko Head Regional Park & Nature Preserve, East Honolulu, Island of Oahu

Char & Associates

November 1998

Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko Head Regional Park and Nature Preserve, East Honolulu, Island of Oahu, Final Environmental Impact Statement, August 1999.

BOTANICAL STUDY
KOKO HEAD REGIONAL PARK & NATURE PRESERVE
EAST HONOLULU, ISLAND OF O'AHU

by

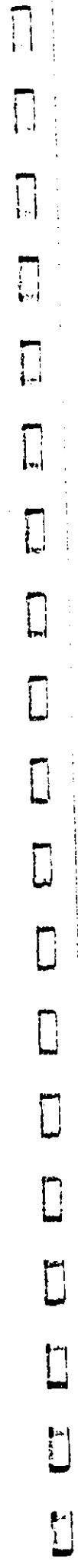
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Prepared for: GROUP 70 INTERNATIONAL, INC.

November 1998

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BOTANICAL STUDY
KOKO HEAD REGIONAL PARK & NATURE PRESERVE
EAST HONOLULU, ISLAND OF O'AHU

INTRODUCTION

The proposed Koko Head Regional Park and Nature Preserve is approximately 1,265 acres. The Park encompasses the City and County of Honolulu's Koko Head Regional Park which includes the Hanauma Bay Nature Preserve. Other recreational areas within the Regional Park include Koko Head District Park, Halona Blow Hole, Koko Crater Botanical Garden, Koko Head Shooting Complex, and a portion of Sandy Beach Park.

The Koko Head Regional Park and Nature Preserve is envisioned as a world-class natural attraction. The Park will highlight themes of creation and nature; culture, volcanism, rift zone features, and the dramatic interface between the land and sea will be emphasized. Existing park facilities will be improved and new facilities constructed within Koko Head Regional Park at: Hanauma Bay Nature Preserve, the Job Corps site, and Koko Crater Botanical Garden and Stables (Group 70 International, Inc.).

Field studies to assess the botanical resources found on the undeveloped portions of the proposed Park, that is, the trails and scenic lookout areas, were conducted on 21 to 22 October 1998; a team of two botanists conducted the studies. The primary objectives of the survey were to: 1) provide a general description of the vegetation along the trails; 2) inventory the flora; and 3) search for threatened and endangered species as well as species of concern.

No studies were conducted for the areas proposed for the new facilities such as the Main Visitor/Nature Center and the Hanauma Bay Visitor/Education Center. These areas have been previously developed and support landscape plantings, parking lots, and buildings and other structures. No studies were made for the 60-acre Koko Head Botanical Garden. The botanical garden, located within the crater, features collections of dryland plants from four major geographic areas: the Americas, Hawai'i, Madagascar, and Africa; as well as several major plant groups including Euphorbia, Aloe, Adenium, cactus family, etc.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. A search was also made of The Nature Conservancy's Hawai'i Natural Heritage Program database for rare and endangered species. Topographic maps as well as the master plan maps for the new Park were examined to determine terrain characteristics, access, boundaries, and reference points.

A walk-through (pedestrian) survey method was used. Notes were made on plant associations and distribution, substrate types, drainage, exposure, disturbances, topography, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature.

The species recorded are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey.

A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight variations in the species list, especially of the weedy, annual plants. Woody species have been censused to a greater degree of reliability.

DESCRIPTION OF THE VEGETATION

A brief description of the vegetation found along each of the proposed trails is presented below. An inventory of all the plants observed along the trails during the field studies is found in the plant checklist at the end of this report.

Koko Head

Koko Head Scenic Lookout Trail: This trail follows the existing paved access road which services the telecommunication facilities on Koko Head. A scenic lookout platform feature will be located at the end of the trail overlooking the ocean and offering sweeping panoramic views from Moloka'i to Diamond Head.

The vegetation bordering the access road consists of low, wind-swept, scattered thickets of koa haole shrubs (Leucaena leucocephala), 3 to 7 ft. tall, and a few small stands or individual trees of kiawe (Prosopis pallida), 10 to 15 ft. tall. Wild basil shrubs (Ocimum gratissimum) are locally common in some places under the koa haole thickets. Buffel grass (Cenchrus ciliaris) forms low, lumpy mats, 1 to 2 ft. tall, along the road. Clumps of Guinea grass (Panicum maximum) are found in low lying spots where there is somewhat deeper soil. Areas with stony, shallow soils support carion flower (Stapelia gigantea), a succulent plant with thick, four-angled stems and reddish-brown, foul-smelling flowers which are pollinated by flies. A number of weedy, mostly annual species such as Spanish needle (Bidens pilosa), garden spurge (Chamaesyce

hirta), pigweed (Portulaca oleracea), etc., are found adjacent to the paved road. Runoff from the road surface even from light rains is funneled off to the sides of the road, creating somewhat moister soil conditions.

A number of native species are found close to the access road, primarily on the more exposed, makai, windward facing slopes. Rounded tussocks of kawelu (Eragrostis variabilis), an endemic grass with large, somewhat open or dense, spike-like cluster of flowers, are common. A few shrubs of 'a'ali'i (Dodonaea viscosa) also occur here; these can be easily identified by their yellowish-green colored, somewhat shiny leaves. Patches of the orange-flowered 'ilima (Sida fallax), a small upright shrub, are locally abundant especially during the rainy season. Nehe (Lipochaeta integrifolia), a low mat-forming, succulent perennial herb, is also found on the windward facing slopes, but the plants are more common along the Nature Preserve Loop Trail. Other native species found here include pili grass (Heteropogon contortus), alena (Boerhavia repens), 'uhaloa (Meltheria indica), and pa'uohi'iaka (Jacquemontia ovalifolia ssp. sandwicensis).

Koko Head Nature Preserve Loop Trail: This trail is accessed from the Scenic Lookout Trail and loops around both Nono'ula and 'Ihi'ihilauea (on USGS maps as 'Ihe'ihelauea) craters. A nature preserve is planned for both of the craters and will include a native dryland vegetation restoration project. The endangered 'Ihi'ihii fern (Marsilea villosa) occurs within 'Ihi'ihilauea Crater (U.S. Fish and Wildlife Service 1992). The crater is managed cooperatively by the City and County of Honolulu, The Nature Conservancy of Hawai'i, and the U.S. Fish and Wildlife Service. There is a sign noting that the crater is the "Ancestral home of the 'Ihi'ihilauea". Barriers have been erected to keep four-wheeled recreation vehicles out of the Marsilea area; these

were put in place by volunteers in 1987 (Wilkinson 1997). There is a small planting of young willow trees (Erythrina sandwicensis) near one of the barriers.

The vegetation along the loop trail consists of low, windswept, scattered patches of koa haole scrub and large barren areas. A nearby gulch and Nono'ula Crater support dense forests of kiawe trees. The trees are taller, 25 to 30 ft. tall, in these more protected areas. Where the trail overlooks Hanaua Bay, near Nono'ula Crater, the seaward facing slopes support a grassland vegetation dominated by the native kawelu. Low, succulent mats of mehe, small tussocks of Fimbristylis cymosa, and sprawling mats of pa'uohi'iaka are also locally abundant.

Koko Head Palea Point Loop Trail: The vegetation along this trail is similar to that found along the other loop trail, but this portion of Koko Head appears to be somewhat more exposed and drier. Vegetation cover is roughly 50% and consists of low, windswept koa haole scrub, 2 to 4 ft. tall, with scattered windpruned kiawe trees, 3 to 6 ft. tall. Clumps of buffel grass and pitted beardgrass (Bothriochloa pertusa) are usually found along the edges of the koa haole scrub patches. Areas with exposed, reddish-brown colored, weathered substrate are abundant.

A small planting of native dry, lowland species is found along a portion of the trail where there are a few benches. These include maio (Myoporum sandwicense), ma'o (Gossypium tomentosum), maui (Xylosma hawaiiense), ho'awa (Pittosporum sp.), and Achyranthes splendens.

Koko Crater

Koko Crater Rim Lookout Trail: From the Koko Crater Botanical

5

Garden, this trail follows up a side ridge and onto the crater rim. The trail passes through a portion of the Garden's Adenium and Aloa collections on the side ridge, and then through dense koa haole scrub, 6 to 12 ft. tall. Under the koa haole shrubs, there are clumps of Guinea grass and buffel grass. Wild basil shrubs are locally common in places. Also locally common are trailing clumps of Chinese violet (Asystasia gangetica).

The koa haole scrub becomes shorter and more open as one approaches the rim area, and rocky outcrops become more numerous. On the exposed, windward facing, outer slopes, the vegetation consists of kawelu grassland with scattered pockets of low, windswept koa haole scrub.

Koko Crater Summit Trail: This trail will follow the straight-line path of the old tramway up the crater side. The proposed trail will be improved with steps, railings and rest stops along the way to the top. A summit lookout with signage and cleared viewing areas is planned. The summit at Kohelepelepe (or Pu'u Mai) is 1,208 ft. high; the trailhead, located at the proposed entrance plaza, is about 200 ft. elevation.

The native 'a'ali'i shrub along with koa haole are the dominant components of the vegetation along this trail. Scattered throughout the 'a'ali'i/koa haole shrubland are small stands of kiawe trees, 15 to 20 ft. tall. Wild basil shrubs, 2 to 3 ft. tall, are locally abundant in places along the trail. Ground cover consists of scattered clumps of buffel grass and occasionally a few Guinea grass clumps. Rocky outcroppings and areas with very shallow soil support catrion flower and tussocks of the native kawelu grass.

Where the trail/old tramway bridges a gulch, there is a large Chinese banyan tree (Ficus microcarpa) in the gulch. Other plants

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found in this somewhat damper gulch microhabitat are four-o'clock (*Mirabilis jalapa*), West Indian beggar's tick (*Bidens synapiifolia*), Christmas berry (*Schinus molle*), comb hyptis (*Hyptis pectinata*), autograph tree (*Clusia rosea*), Chinese violet, and huehue haole (*Passiflora suberosa*). One large wilow tree, with a trunk diameter of roughly 17 inches, is found about 150 ft. upslope of the gulch. As one approaches the summit, the 'a'ali'i shrubs become less numerous and kawelu increases, but koa haole shrubs are still abundant.

On the summit area, there are a number of concrete and metal structures which were part of the former cable/tram operation. One planting of a red-flowered *Bougainvillea* is found here. The branches of the kiawe trees and koa haole shrubs, in many places, are covered by lichens; primarily, a grayish-green, strap-shaped *Ramalina* species and the bright orange colored, pin cushion-like *Teloschistes flavicans*. Again, the windward facing, upper slopes on the summit area support kawelu grassland. A few plants of the native spurflower (*Plectranthus parviflorus*), a succulent, fuzzy-leaved perennial with pale blue flowers, and *Schiedea globosa*, a member of the pink or carnation family, are found on the wind-swept ledges on the summit area. A few members of the cactus family have escaped from the botanical garden and have become established on the upper slopes and rim of the crater.

RARE AND ENDANGERED PLANTS

The largest population of 'ihi'ihii fern (*Marsilea villosa*) is found within 'Ihi'ihilauea Crater. The Koko Head Nature Preserve Loop Trail skirts the crater area. The fern, which resembles a four-leaf clover, is found in dry, lowland areas subject to periodic flooding during the rainy season. Recently, the U.S. Fish and Wildlife Service (1996) has prepared a recovery plan for

this species. The main threats to this population of 'ihi'ihii fern are habitat degradation and competition from introduced (alien) plant species; off-road vehicles; and trampling from humans. The *Marsilea villosa* lowland dry herbland plant community is considered a GIS1.1 element by the The Nature Conservancy's Hawai'i Natural Heritage Program. That is, the plant community is critically imperiled globally because of its extreme rarity or factors that make it especially vulnerable to extinction; one relatively pristine/intact/viable occurrence known.

One other endangered species is found within the proposed park, but not within the areas to be developed or proposed for trails. The endangered 'awiwi (*Centaureium sebaceousoides*) is known from the steep slopes above Malona Blow Hole.

Three species considered rare by the Conservancy's Natural Heritage Program are: *Lipochaeta lobata* var. *lobata*, *Portulaca villosa*, and *Schiedea globosa*. Only the *Schiedea* was observed during this survey; three rounded clumps were found on the narrow ledges overlooking the interior of the Koko Crater.

Two species are believed to be extirpated from the Koko Head region. The endangered *Spermolepis hawaiiensis* was collected from the Koko Head area around 1864-1865, but has not been observed since then. *Kokia lanceolata*, a species of concern, was originally known from southeastern O'ahu on the hills of Makaku and Koko Head and from Waialupe Valley, but is believed to be extinct since the late 1800's or early 1900's (Wagner et al. 1990; U.S. Fish and Wildlife Service 1997).

DISCUSSION AND RECOMMENDATIONS

A world-class nature park which will highlight the themes of creation and nature is planned for the approximately 1,265-acre

project site. The park facilities and programs will emphasize nature, culture, volcanism and rift zone features, and the dramatic interface between land and sea (Group 70 International, Inc. 1998). The Main Visitor/Nature Center, Operations Center, parking lot, and trolley holding area will be located on the old Job Corps site. The Hanauma Bay facilities will be expanded and improved to include a Hanauma Bay Visitor/Education Center, and expanded picnic areas and lookout areas. Landscaping will be xeriscape with an emphasis on native species. Several pedestrian trails are planned for the Koko Head and Koko Crater areas.

Field studies were conducted for the proposed trails in October 1998. Low, windswept koa haole (Leucaena leucocephala) scrub dominates much of the landscape with barren areas especially common at the Koko Head site. Native plants generally occur as scattered patches within the koa haole scrub, but become the dominant components on the exposed, windward facing, upper slopes of Koko Head and Koko Crater; these areas support kawelu (Eragrostis variabilis) grassland. The endangered 'ihi'ihii fern (Marsilea villosa) covers the bottom of 'ihi'ihilaukes Crater at Koko Head, forming a thick, light-green colored carpet during the rainy season. 'A'ali'i (Dodonaea viscosa)/ koa haole shrubland is found along the Koko Crater Summit Trail.

The only endangered species observed during the studies was the 'ihi'ihii fern. Three plants of Schiedea globosa, considered rare by The Nature Conservancy's Hawai'i Natural Heritage Program, were found on the narrow, windswept ledges near the summit lookout on Koko Crater. No other naturally occurring threatened and endangered species, or species of concern (U.S. Fish and Wildlife Service 1997) were observed during the field studies. A small planting of a few native species, some of them rare, is found along the Koko Head Pales Point Loop Trail.

Recommendations: Increased human presence and use of the trail areas is expected to have an impact on the vegetation.

Fires -- The chances for catastrophic wildfires will increase, especially during the drier, summer months. Areas with large concentrations of native plants are especially vulnerable; once these areas are burned, introduced or alien plants tend to invade and replace the native components. A fire plan which addresses these concerns should be prepared. The recovery plan prepared for the 'ihi'ihii fern (U.S. Fish and Wildlife Service 1996) outlines procedures for the protection and management of the fern; these procedures/recommendations can be applied to some of the other areas with large concentrations of native plants.

Erosion -- In many places, the substrate is very weathered and soft. Increased foot traffic will erode parts of the trail, especially on the more steeply sloping portions of the Koko Head loop trails. These areas may need to be hardened such as was done for the popular Diamond Head Crater Trail.

Natural Resources Management Plan -- A natural resources management plan will need to be prepared to address alien plant control in areas dominated by native species such as 'ihi'ihilauka Crater, and to monitor rare and endangered species throughout the park. The native dryland restoration project planned for Koko Head should be included in the plan; an irrigation system may be needed for the initial plantings. The plants which have escaped from the Koko Crater Botanical Garden, most of them spiny or with poisonous sap, should be controlled.

The management plan should include input from and be reviewed by the U.S. Fish and Wildlife Service which also oversees the management of the 'ihi'ihii habitat.

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PLANT SPECIES LIST -- Koko Head Regional Park/Nature Preserve

The following checklist is an inventory of all the plants observed on the proposed trails at Koko Head and Koko Crater, O'ahu. The plant names are arranged alphabetically by families within each of three groups: Ferns, Dicots, and Monocots. The taxonomy and nomenclature of the Ferns follow Lamoureux (1988), while the flowering plants, Dicots and Monocots, are in accordance with Wagner et al. (1990). The few recent name changes for the flowering plants follow those reported in the Hawaii Biological Survey series (Evenhuis and Miller 1995-1998).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:
 - E = endemic = native only to the Hawaiian Islands.
 - I = indigenous = native to the Hawaiian Islands and also elsewhere throughout the Pacific and/or tropics.
 - I? = questionably indigenous = data not clear if dispersal by natural or human-related mechanisms, but weight of evidence suggests probably indigenous.
 - P? = questionably Polynesian = may be a Polynesian introduction, or possibly introduced in early historical times (after Western contact, i.e., Cook's discovery of the islands in 1778).
 - X = introduced or alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact.
4. Presence (+) or absence (-) of a particular species on each of the trails within the proposed park (see text for discussion):
 - 1 = Koko Head Scenic Lookout Trail
 - 2 = Koko Head Nature Preserve Loop Trail

- 3 - Koko Head Palea Point Loop Trail
- 4 - Koko Crater Rim Lookout Trail
- 5 - Koko Crater Summit Trail

Trail	1	2	3	4	5
Chinese violet, coromandel	+	+	+	+	+
'akutiku]	-	-	+	-	-
Christmas berry	+	+	+	+	+
desert rose, rock azalea	-	-	-	+	-
carrion flower, Zulu-giant	+	+	+	+	+
white-flowered bidens	-	-	-	-	+
Spanish needle, ki, ki	-	-	-	-	+

Status

X
X
X
X
X
E
X
I
X
E

Common name

'thi'thi'aukeea
Marsilea villosa Kaulf.
DICOTS
FLOWERING PLANTS
ACANTHACEAE (Acanthus family)
Asystasia gangetica (L.) T. Anderson
AIZOACEAE (fir-marigold family)
Sesuvium portulacastrum (L.) L.
Trianthema portulacastrum L.
AMARANTHACEAE (Amaranthus family)
Achyranthes splendens Mart. ex Hogg.
ANACARDIACEAE (Hango family)
Schinus terebinthifolius Radde
APOCYNACEAE (Periwinkle family)
Adenium coelebs Stapf
ASCLEPIADACEAE (Milkweed family)
Ceropegia sp. (?)
Stapelia gigantea H.E. Brown
ASTERACEAE (Daisy family)
Bidens alba var. radiata (Schultz-Bip.)
Ballard ex Meibohm
Bidens cynoptifolia Kunth
Bidens pilosa L.

Scientific name

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Scientific name	Common name	Status	Trail				
			1	2	3	4	5
<i>Emilia fosbergii</i> Nicolson	pua'ele	X	-	+	+	-	+
<i>Lipochaeta integrifolia</i> (Nutt.) A. Gray	nehe	E	+	+	-	-	-
<i>Pluchea carolinensis</i> (Jacq.) G. Don	pluchea, sourbush	X	+	+	+	-	-
<i>Pluchea indica</i> (L.) Less.	Indian pluchea, Indian fleabane	X	-	+	+	-	-
<i>Tridax procumbens</i> L.	coat buttons	X	+	-	-	-	-
<i>Xanthium strumarium</i> var. <i>canadense</i> (Mill.) Torr. & A. Gray	cocklebur, kikanta	X	-	+	-	-	-
BORAGINACEAE (Borage family)							
<i>Heliotropium procumbens</i> var. <i>depressum</i> (Cham.) Fosb.	heliotrope	X	+	-	-	-	-
CACTACEAE (Cactus family)							
<i>Cereus</i> sp.		X	-	-	-	+	+
<i>Hylocereus</i> sp.		X	-	-	-	+	+
<i>Opuntia ficus-indica</i> (L.) Mill.	panini	X	-	-	-	+	-
<i>Trichocereus</i> sp. (?)		X	-	-	-	+	+
Indet. sp.		X	-	-	-	+	+
CARYOPHYLLACEAE (Pink family)							
<i>Schiedea globosa</i> H. Mann		E	-	-	-	-	+
CHENOPODIACEAE (Goosefoot family)							
<i>Atriplex semibaccata</i> R. Br.	Australian saltbush	X	+	-	+	-	-
<i>Chenopodium murale</i> L.	'aheahea	X	-	-	+	-	-
CLUSIACEAE (Mangosteen family)							
<i>Clusia rosea</i> Jacq.	autograph tree, copeny, Scotch attorney	X	-	+	-	-	+
CONVOLVULACEAE (Morning glory family)							
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	field bindweed	X	+	-	-	-	-
<i>Jacquemontia ovalifolia</i> ssp. <i>sandwicensis</i> (A. Gray) K. Robertson	pa'uohi'taka	E	+	+	+	-	-

Scientific name	Common name	Status	Trail				
			1	2	3	4	5
EUPHORBIACEAE (Spurge family)							
<i>Chamaesyce hirta</i> (L.) Millsp.	hairy spurge, garden spurge	X	+	+	-	-	-
<i>Euphorbia heterophylla</i> L.	Mexican fireweed, kaliko	X	-	-	-	-	+
<i>Euphorbia nerifolia</i> L.	Indian spurge tree	X	+	-	-	-	-
FABACEAE (Pea family)							
<i>Acacia farnesiana</i> (L.) Willd.	kīu	X	+	+	+	-	-
<i>Alysicarpus vaginalis</i> (L.) DC	alysicarpus	X	+	-	-	-	-
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea, lauki	X	+	-	-	-	+
<i>Desmanthus pernambucanus</i> (L.) Thellung	virgate mimosa, slender mimosa	X	+	-	-	-	-
<i>Desmodium triflorum</i> (L.) DC	three-flowered beggarweed	X	+	-	-	-	-
<i>Erythrina sandwicensis</i> Degener	wiliwili	E	-	+	-	-	+
<i>Indigofera spicata</i> Forssk.	creeping indigo	X	+	-	-	-	-
<i>Leucaena leucocephala</i> (Lam.) de Wit	koa haole	X	+	+	+	+	+
<i>Macroptelium latyroides</i> (L.) Urb.	wild bean, cow pea	X	+	-	-	-	-
<i>Pithecellobium dulce</i> (Roxb.) Benth.	'opiuma	X	+	-	-	-	-
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth	kiawe	X	+	+	+	+	+
FLACOURTIACEAE (Flacourtia family)							
<i>Xylosma hawaiiense</i> Seem.	maua	E	-	-	+	-	-
LAMIACEAE (Mint family)							
<i>Hyptis pectinata</i> (L.) Poit.	comb hyptis	X	-	-	-	+	+
<i>Leonotis nepetifolia</i> (L.) R. Br.	lion's ear	X	-	-	-	-	+
<i>Ocimum gratissimum</i> L.	wild basil	X	+	-	+	+	+
<i>Plectranthus parviflorus</i> Willd.	'ala'ala wai nui, spurflower	I	-	-	-	-	+
MALVACEAE (Mallow family)							
<i>Gossypium tomentosum</i> Nutt. ex Seem.	ma'o, huluhulu	E	-	-	+	-	-
<i>Sida ciliaris</i> L.		X	+	-	-	-	-
<i>Sida fallax</i> Walp.	'i'ima	I	+	+	+	+	+
<i>Sida rhombifolia</i> L.	Cuba jute	X	+	-	-	-	-

Scientific name	Common name	Status	Trail				
			1	2	3	4	5
MORACEAE (Mulberry family) <i>Ficus microcarpa</i> L.f.	Chinese banyan, Malayan banyan	X	+	+	-	+	+
MYOPORACEAE (Myoporum family) <i>Myoporum sandwicense</i> A. Gray	naio, false sandalwood	I	-	-	+	-	-
NYCTAGINACEAE (Four-o'clock family) <i>Boerhavia coccinea</i> Mill. <i>Boerhavia repens</i> L. <i>Bougainvillea</i> hybrid <i>Mirabilis jalapa</i> L.	red-flowered boerhavia alena red-flowered bougainvillea four-o'clock, nani ahiahi	X I X X	+	-	-	-	-
OXALIDACEAE (Wood sorrel family) <i>Oxalis corniculata</i> L.	yellow wood sorrel, 'ihi 'ai	P?	-	-	-	-	+
1/ PASSIFLORACEAE (Passion flower family) <i>Passiflora foetida</i> L. <i>Passiflora suberosa</i> L.	pohapoha, running pop, love- in-a-mist huehue haole	X X	+	+	+	-	+
PITTOPOURACEAE (Pittosporum family) <i>Pittosporum</i> sp.	hoawa	E	-	-	+	-	-
PORTULACACEAE (Purslane family) <i>Portulaca oleracea</i> L. <i>Portulaca pilosa</i> L.	pigweed, common purslane, 'ihi	X X	+	-	-	-	+
SAPINDACEAE (Soapberry family) <i>Dodonaea viscosa</i> Jacq.	'a'ali'i	I	+	-	-	-	+
STERCULIACEAE (Cacao family) <i>Waltheria indica</i> L.	'uhaloa, hi'aloa, kanakaloa	I?	+	+	+	+	+
VERBENACEAE (Verbena family) <i>Lantana camara</i> L. <i>Stachytarpheta jamaicensis</i> (L.) Vahl	lantana Jamaica vervain, owi, oi	X X	+	-	+	-	-

Scientific name	Common name	Status	Trail				
			1	2	3	4	5
MONOCOTS							
COMMELINACEAE (Spiderwort family) <i>Commelina benghalensis</i> L.	hairy honohono	X	-	-	-	-	+
CYPERACEAE (Sedge family) <i>Fimbristylis cymosa</i> R. Br.		I	-	+	-	-	-
LILIACEAE (Lily family) <i>Aloe vera</i> L. <i>Aloe</i> spp.	aloe	X X	+	-	-	-	-
POACEAE (Grass family) <i>Bothriochloa</i> aff. <i>barbinodis</i> (Lag.) Harter <i>Bothriochloa pertusa</i> (L.) A. Camus <i>Bothriochloa</i> sp. 18 <i>Cenchrus ciliaris</i> L. <i>Chloris barbata</i> (L.) Sw. <i>Cynodon dactylon</i> (L.) Pers. <i>Digitaria insularis</i> (L.) Mez ex Ekman <i>Eragrostis variabilis</i> (Gaud.) Steud. <i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult. <i>Melinis repens</i> (Willd.) Zizka <i>Panicum maximum</i> Jacq. <i>Panicum maximum</i> var. <i>trichoglume</i> Eyles ex Robyns <i>Setaria verticillata</i> (L.) P. Beauv. <i>Sporobolus indicus</i> (L.) R. Br.	fuzzy top pitted beardgrass buffelgrass swollen fingergrass, mau'u lei Bermuda grass, manienie sourgrass kawelu, 'emoloa, kalamalo pili, pili grass Natal redtop, Natal grass Guinea grass green panicgrass bristly foxtail, mau'u pilipili Indian dropseed	X X X X X X X E I? X X X X X X	+	-	-	-	-

APPENDIX I

Additional Botanical Studies: Koko Head Regional Park & Nature Preserve, East Honolulu, Oahu

Char & Associates

November 20, 1998

Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko Head Regional Park and Nature Preserve, East Honolulu, Island of Oahu, Final Environmental Impact Statement, August 1999.

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20 November 1998

ADDITIONAL BOTANICAL STUDIES KOKO HEAD REGIONAL PARK & NATURE PRESERVE EAST HONOLULU, O'AHU

INTRODUCTION

A general description of the landscape plantings found on the developed areas at Hanauma Bay and on the former Job Corps site is presented. Additional information is also provided for the vegetation types found on the undeveloped portions of the project site. Only a brief discussion is provided, drawn largely from the field notes and observations made during the 21 to 22 October studies, and from the literature.

The plant names used follow Wagner et al. (1990) for the native and naturalized species and St. John (1973) for the ornamental plants.

LANDSCAPE PLANTINGS ON DEVELOPED AREAS

Hanauma Bay: Landscaping on the developed upper plateau area consists of large expanses of Bermuda grass or manienie (Cynodon dactylon) lawn with scattered large, old kiawe trees (Prosopis pallida); these appear to have been originally growing on or near the site and were incorporated into the landscaping plan. Plantings around the comfort stations, visitor checkin building, and other

structures consists of beach naupaka (Scaevola sericea) and red hibiscus (Hibiscus rosa-sinensis cultivars) hedges and trees such as tiger's claw (Erythrina variegata), hala (Pandanus tectorius), and milo (Thespesia populnea). A small planting of variously colored hybrid Bougainvillea is found near the visitor parking lot.

On the lower beach level, there are patches of Bermuda grass lawn and scattered coconut palms (Cocos nucifera). Also present are kiawe trees, beach naupaka shrubs, and tree heliotrope (Tournefortia argentea).

Job Corps Site: On the former Job Corps site, plantings of various ornamental species are found around the buildings. Most of the buildings are not occupied except for those in use by the lifeguard service, the police, and the truck maintenance area.

The Bermuda grass lawns are now weedy in most places and have been invaded by clumps of buffel grass (Cenchrus ciliaris), Guinea grass (Panicum maximum), and young koa haole shrubs (Leucaena leucocephala) and kiawe saplings. Most of the larger trees and shrubs which were used in the landscaping are in fair to good condition despite the lack of maintenance and watering. Around the lifeguard building, plantings consist of coconut, Chinese banyan (Ficus microcarpa), sea grape trees (Coccoloba uvifera), and various cultivars of Plumeria. A line of rose-flowered jatropha (Jatropha integririma) is found alongside the basketball court. Large, rounded clumps of variously colored Bougainvillea shrubs are a prominent feature on the grounds of the former Job Corps site. A stand of Eucalyptus trees, 40 to 50 ft. tall, is found near the truck maintenance area. Other plants observed on the site include shrubs of dracaena (Pleomele emarginata), croton (Codiaeum variegatum), and hybrid Hibiscus

cultivars; trees of mango (Mangifera indica), Cook pine (Araucaria columnaris), various Citrus cultivars -- lime, orange, lemon, octopus tree (Schefflera actinophylla), kiawe, tiger's claw, gourka (Garcinia dulcis), and papaya (Carica papaya).

Scattered between the buildings in some places are areas which were never landscaped. These areas support scattered stands of large kiawe trees and thickets of koa haole shrubs. Clumps of buffel grass and Guinea grass are scattered between the woody components. The weedy ivy gourd vine (Coccoloba grandis) is common in these areas.

VEGETATION TYPES ON UNDEVELOPED AREAS

Five general vegetation types are recognized on the undeveloped portions of the project site and are described below.

Koa Haole Scrub: Koa haole is the most abundant species on the project site where it forms low, windswept thickets, 3 to 7 ft. tall, on the slopes and ridge tops of Koko Head and Koko Crater. On the mauka (leeward) side of Koko Crater and in some gulch areas where it is more protected, the koa haole is taller and more tree-like. Scattered trees or small stands of kiawe, 10 to 20 ft. tall, are commonly associated with the koa haole scrub.

The understory consists of low, scattered mats of buffel grass, 1 to 2 ft. tall, and clumps of somewhat taller Guinea grass in areas with slightly deeper soil. Locally common in some places are shrubs of wild basil (Ocimum gratissimum), 1 to 3 ft. tall. Areas with rocky outcroppings or stony, shallow soils support carrion flower (Stapelia gigantea), a succulent-stemmed plant up to 10 inches tall with foetid-smelling, brownish-red flowers.

Kiawe Forest: Kiawe forest is found in the areas with deeper soil around the outside base of Koko Crater and on the crater floor. It is also found in gulches, drainageways, and Nono'ula Crater on Koko Head. In these more protected situations, tree cover may be somewhat dense and the trees 25 to 30 ft. tall. Scattered patches of koa haole shrubs are found under the trees. Buffel grass and Guinea grass form dense mats between the woody components.

Along the windward facing lower slopes of Koko Crater, above the Halona Blow Hole area and the rugged coastline, the kiawe trees form low, dense, windswept thickets, 3 to 6 ft. tall.

Kawelu Grassland: Kawelu or 'emoloa (Eragrostis variabilis) grassland is found on the more exposed, windward facing mid to upper slopes and rims of Koko Head and Koko Crater. Kawelu forms low, rounded tussocks and can be easily recognized by its large spike-like inflorescences which persist for a long time on the plant. Common associates of this vegetation type include other native species such as shrubs of 'ilima (Sida fallax), 'uhaloa (Waltheria indica), and 'a'ali'i (Dodonaea viscosa); clumps of pili grass (Heteropogon contortus); and low mats of pa'uohi'iaka (Jacquemontia ovalifolia subsp. sandwicensis), nehe (Lipochaeta interifolia), and alena (Boerhavia repens, B. glabrata). The introduced koa haole occurs here as scattered, low patches.

'A'ali'i/Koa Haole Shrubland: This vegetation type is found on Koko Crater on the broad slopes surrounding the old tramway/cable car path. 'A'ali'i shrubs, 5 to 7 ft. tall, are found scattered in the kiawe forest at the foot of the tramway at about 200 ft. elevation, but quickly become very abundant along with koa haole on the slopes along the tramway path, up to about the 1,000-foot elevation contour.

Small stands of kiawe trees are scattered throughout this shrubland. Wild basil shrubs are locally abundant in places under the taller 'a'ali'i and koa haole shrubs. Ground cover consists of scattered clumps of buffel grass. The native kawe'u grass is abundant, especially on rocky outcroppings and areas with thin soils. Also quite common are small patches of carrion flower.

'Ihi'ihi Herbland: This vegetation type or plant community is dominated by the endangered 'ihi'ihi fern (Marsilea villosa). It occurs in perennially dry lowland areas subject to seasonal flooding. On O'ahu, it is found at 'ihi'ihilaueka Crater on Koko Head and in Lualualei Valley.

At 'ihi'ihilaueka Crater, an almost solid mat of the fern covers about 0.5 acre (0.2 hectares) of the crater floor. A dense ring of kiawe trees surrounds the Marsilea except for a small entrance on the east side of the crater. During the dry summer months or drought conditions, the fern becomes dormant. During the winter season and the arrival of the rains, the ferns quickly send out new leaves and the crater floor turns a bright green color from the dense mat of ferns. Every few years, the crater floor may be flooded; during the 1987-1988 flooding, several species of crustaceans appeared in the ponded crater bottom (U.S. Fish and Wildlife Service 1996). Weedy species found in this vegetation type include cocklebur (Xanthium strumarium var. canadense), bristly foxtail (Setaria verticillata), Bermuda grass, swollen fingergrass (Chloris barbata), hairy merremia (Merremia aegyptia), Guinea grass, sourgrass (Digitaria insularis), and jungle-rice (Echinochloa colona). A few shrubs of the native 'ilima are also found here (Gagne and Cuddihy 1990; U.S. Fish and Wildlife Service 1996).

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APPENDIX J

Survey of The Avifauna and Feral Mammals at Koko Head and Koko Crater, Oahu, Hawaii

Phillip L. Bruner

May 27, 1988

*Prepared for the Improvements to Hanauma Bay Nature Preserve, Koko
Head Regional Park and Nature Preserve, East Honolulu, Island of
Oahu, Final Environmental Impact Statement, August 1999.*

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS AT KORO HEAD
AND KORO CRATER, OAHU, HAWAII

Prepared for
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SURVEY OF THE AVIFAUNA AND FERAL MAMMALS AT KOKO HEAD
AND KOKO CRATER, OAHU, HAWAII

GENERAL SITE DESCRIPTION

The field site is located on the south shore of Oahu (see Fig. 1). Total acreage of the property is 1,270 acres. This sector of Oahu normally receives light precipitation and strong trade winds and hence is quite arid and wind swept in appearance. Vegetation on the property consists of mostly exotic (introduced) trees with an understory of exotic weeds and grasses. Kiawe (Prosopis pallida) and Koa Huole (Leucaena glauca) are the dominant trees.

Weather during the field survey varied from clear to overcast. Winds were gusty NE trade winds on all days of the survey.

STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. These observations were concentrated during the peak activity periods of early morning and late afternoon. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity.

At various locations (see Fig. 1) eight minute counts were made of all birds seen or heard. Between these count stations walking tallies of birds seen or heard were also kept. These counts provide the basis for the population estimates given

INTRODUCTION

The purpose of this report is to summarize the findings of a three day (12, 25 April and 18 May, 1988) bird and mammal field survey at Koko Head and Koko Crater, Oahu, for the proposed Koko Head Regional Park Resource Plan Land of Maunaloa, Honolulu District, Island of Oahu (see Fig. 1). Also included are references to pertinent literature as well as unpublished reports.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely occur given the range of habitats available.
- 2- Provide some baseline data on the relative density of each species and where possible, within the constraints of the available time, determine the extent to which each species may be dependent on the resources located on the property.
- 3- Compare these findings with published and/or unpublished data.

in this report. Data on habitat preferences come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Census data on birds contained in the annual Christmas bird surveys conducted by the Hawaii Audubon Society were also consulted along with unpublished records of birds in order to acquire a more complete picture of avifauna activity on the site and in adjacent lands (Pyle 1987, 1988). Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative density and distribution. Two nights were devoted to searching for the presence of owls and the Hawaiian Hoary Bat (Lasiorus cinereus semobus).

Scientific names used herein follow those given in the most recent American Ornithologist's Union Checklist (A.O.U. 1983), Hawaii's Birds (Hawaii Audubon Society 1984) and Hawaii, species of the World (Honacki et al. 1982).

RESULTS AND DISCUSSION

Resident Endemic (Native) Land Birds:

No endemic land birds were recorded during the course of the field survey. On two occasions, in 1986, I observed the Short-eared Owl or Pueo (Asio flammeus sandwicensis) on the slopes of Koko Crater near Kalona Point. This endemic subspecies

is listed as endangered on Oahu by the State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife. No other endemic land birds are known to occur on the property nor would any be expected given the nature of the present habitat.

Migratory Indigenous (Native) Birds:

Pacific Golden Plover (Pluvialis dominica fulva) - Seventy eight plovers were recorded during the first two days of the field survey. Most were in breeding plumage. Plovers prefer open areas such as mud flats and lawns. They arrive in Hawaii in early August and depart to their arctic breeding grounds during the last week of April (Johnson et al. 1981). Johnson et al. (1981) and Bruner (1983) have also shown plovers are extremely site-faithful on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These populations likewise remain relatively stable over many years.

Wandering Tattler (Hieroscolus incanus) -

Three tattler were seen during the survey. All three were observed foraging along the rocky shelf between Kalona Point and Koko Head. Studies of site-faithfulness in this species have not been conducted. S. Conant (Chairperson of General Sciences, University of Hawaii pers. comm.) has some limited

unpublished data from her work in the mid Hawaiian islands that would suggest tattler may be site-faithful but are probably not territorial on their winter foraging grounds.

Two other migratory species of shorebirds, Ruddy Turnstone (Arenaria interpres) and Sanderling (Callidris alba), have been recorded regularly along this coastline of Oahu (Bruner- personal unpublished observations).

Resident Indigenous (Native) Land Birds:

No resident indigenous species were observed. The only possible bird in this category that might occur would be Black-crowned Night Heron (Nycticorax nycticorax). I have observed this species foraging among the mangroves at Kaloko cove, an estuary adjacent to the survey site.

Resident Indigenous (Native) Seabirds:

If one is patient and spends enough time virtually all the seabirds common to Hawaiian waters could likely be seen from this sector of Oahu's coastline. The following is a list of only those species recorded during this survey along with the number seen:

Laysan Albatross (<u>Diomedea immutabilis</u>) -	1
Wedge-tailed Shearwater (<u>Puffinus pacificus</u>) -	12
Brown Noddy (<u>Anous stolidus</u>) -	100 +
Black Noddy (<u>Anous minutus</u>) -	6
White Tern (<u>Gygis alba</u>) -	18
Sooty Tern (<u>Sterna fuscata</u>) -	600 +
Red-tailed Tropicbird (<u>Phaethon rubricauda</u>) -	3
White-tailed Tropicbird (<u>Phaethon lepturus</u>) -	1
Red-footed Booby (<u>Sula sula</u>) -	9
Brown Booby (<u>Sula leucogaster</u>) -	1
Great Frigatebird (<u>Fregata minor</u>) -	3

Seabirds typically nest on offshore islands which are free from disturbances brought about by dogs, cats, mongoose and rats. However, there are areas on the main islands where predators lack access and nesting can be successful (Bruner 1988). The first nesting activity of the White Tern on Oahu was recorded at Koko Head (Ord 1961). Red-tailed Tropicbirds nested successfully in 1987 at Makapu Point (Bruner personal observation). Wedge-tailed Shearwaters and Bulwer's Petrel (Bulweria bulwerii) nest in burrows and under ledges in cliff faces. It would not be surprising to find these two species nesting on the inaccessible seaward facing cliffs at Koko Head.

Laysan Albatross have recently been observed in increasing numbers on the main Hawaiian Islands (Morarty et al. 1986). This event may be due to over crowding in the Leeward N.W. Hawaiian Islands which has caused some birds to disperse to the main islands. Predators, however, will likely limit the success of this strategy.

Exotic (Introduced) Birds:

A total of 17 species of exotic birds were recorded during the field survey. Table One shows the relative abundance and typical habitat preferences of these species. The most abundant species during the three day survey were Japanese White-eye (Zosterops japonicus) Zebra Dove (Geopelia striata) and Red-vented Bulbul (Pycnonotus cafer). Exotic species not recorded on the actual survey but which also, in the past, have been

the actual survey plus those observed on the property in the recent past, include the typical array of introduced birds one would expect in this type of habitat on Oahu (Hawaii Audubon Society 1984, Pratt et al. 1987).

Feral Mammals:

The only feral mammals observed during the survey were the Small Indian Mongoose (Herpestes surpunctatus) and cats. No rats or mice were recorded but it would be highly unusual if these ubiquitous mammals did not occur on the property. Without a trapping program it is difficult to conclude anything about the relative abundance of rats, mice, mongooses and cats. However, it is likely that their numbers are typical of what one would find elsewhere in similar habitat on Oahu.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotis) are sketchy but the species has been reported from Oahu (Toanich 1986). None were observed on this field survey despite two nights of intense searching. However, bats have been observed in dry coastal habitat elsewhere in Hawaii (Bruner 1985).

CONCLUSIONS

A brief field survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will necessarily be observed and information on their

observed on the property include: Common Barn Owl (Tyto alba), Common Nighthawk (Estrilda astrild), Chestnut Mannikin (Lonchura malacca), Warbling Silverbill (Lonchura malabarica) and Melodious Laughing-Thrush (Sarrulia canorus) (Bruner personal field notes, Conant 1984).

Warbling Silverbill has had a rather spotty history of occurrence in the area. First recorded on Oahu at Sandy Beach (Conant 1984) it has subsequently been reported from a variety of localities along the leeward coast (Pyle 1987), but to date no actual breeding populations are known for Oahu. This species has shown a spectacular display of dispersal ability since its first introduction to Hawaii (Berger 1975; Hiral 1980; Conant 1983, 1984; Starrett 1984).

Red-vented Bulbul have become one of Oahu's most abundant species in recent years. The adaptability of this species to a wide variety of habitats and its remarkable population increase have been well documented (Williams 1983, Williams and Giddings 1984, and Williams and Evenson 1985).

Earlier studies (Wilson et al. 1977, VTH 1984) reported a more limited list of birds for this area. These studies were inadequate. In addition the Wilson (1977) study includes a species, Mourning Dove (Zenaidura macroura) (genus misspelled Zenaida), that is not known from Oahu (Pratt et al. 1987) and is therefore suspect.

The combined list of exotic species, those obtained on

use of the site must be sketched together from brief observations and the available literature. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire both a broad view as well as a more definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of the conclusions drawn are significantly increased.

The following are broad conclusions related to bird and mammal activity on the property:

- 1- The present environment provides a limited range of habitats which are utilized by the typical array of exotic birds one would expect at this elevation and in this type of environment on Oahu.
- 2- In order to obtain more data on mammals, a trapping program would be required. The brief observations of this survey did not reveal any unusual activity.

PLC
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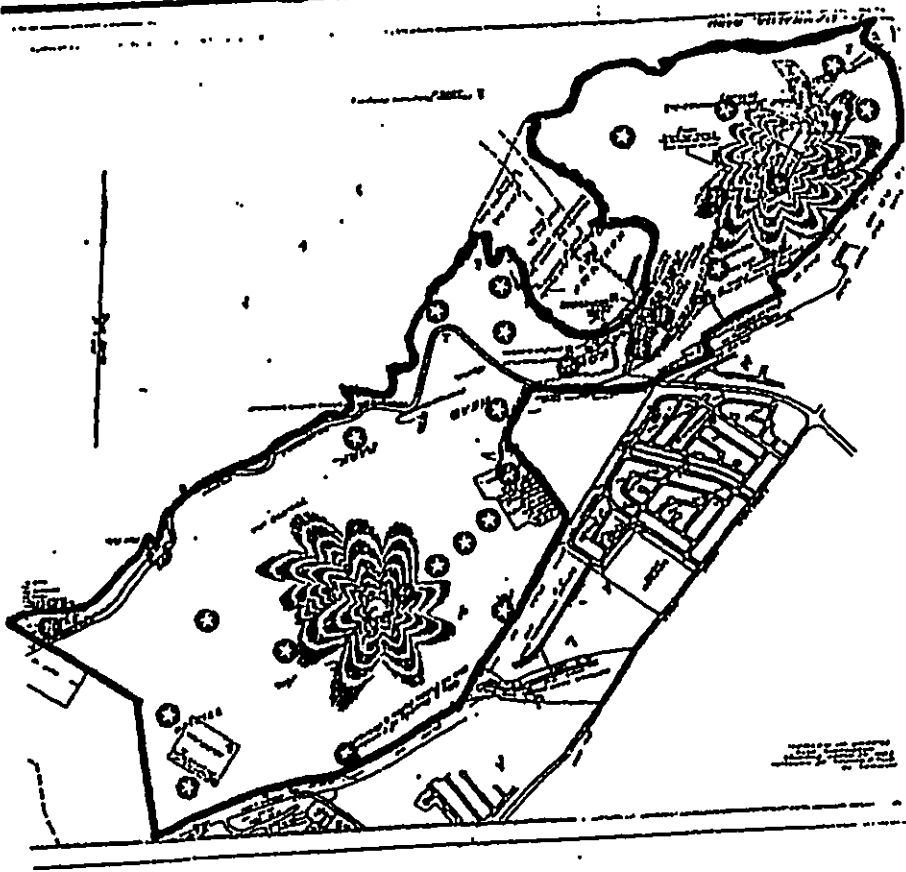


Fig. 1. Project site with eight minute count stations indicated by a ●

KEY TO TABLE 1

Relative Abundance = Average number of individuals observed during walking survey or average frequency on eight minute counts in appropriate habitat.

- A = Abundant (ave. 10+) on 8 min. counts
- C = Common (ave. 5-10) on 8 min. counts
- U = Uncommon (ave. less than 5) on 8 min. counts
- R = Rare (number which follows is total recorded)

(*R* may be followed by a large number as in the case of the Common Peafowl and Java Sparrow. In such cases "R" does not mean rare but recorded only once)

Habitat Preference = Area most likely to occur

G = Open grassland

T = Thickets of dense vegetation (trees/brush)

E = Ecotone (boundary of wooded areas and open grasslands)

TABLE 1
Relative abundance and general habitat preferences of exotic birds at Koko Head and Koko Crater, Oahu.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*	HABITAT*
Common Peafowl	<i>Pavo cristatus</i>	R = 16	E (Koko Crater only)
Ring-necked Pheasant	<i>Phasianus colchicus</i>	R = 2	G, E
Spotted Dove	<i>Streptopelia chinensis</i>	U = 4.5	E, G
Zebra Dove	<i>Geopelia striata</i>	A = 15.1	E, G
Rock Dove	<i>Columba livia</i>	C = 6.4	G
White-rumped Shama	<i>Copsychus saibabicus</i>	R = 7	T (Koko Crater only)
Common Myne	<i>Acridotheres tristis</i>	C = 5.2	E, G
Red-vented Bulbul	<i>Pycnonotus cafer</i>	A = 11.6	E
Northern Mockingbird	<i>Mimus polyglottos</i>	U = 3.3	E
Northern Cardinal	<i>Cardinalis cardinalis</i>	U = 4.3	T, E
Red-crested Cardinal	<i>Paroaria coronata</i>	U = 2.1	E
Java Sparrow	<i>Padda olivacea</i>	R = 10	G
Japanese Bush-warbler	<i>Coccyzus diophanes</i>	R = 1	T (Koko Crater only)
Japanese White-eye	<i>Zosterops japonicus</i>	A = 13	T, E
House Sparrow	<i>Passer domesticus</i>	U = 3.9	E, G
House Finch	<i>Carpodacus mexicanus</i>	C = 8.6	E, G
Hutton's Vireo	<i>Vireo huttoni</i>	C = 6.2	G

(See page 12 for key to symbols)

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APPENDIX K

Traffic Impact Analysis Report

Phillip Rowell and Associates

July 2001

TRAFFIC IMPACT ANALYSIS REPORT

**KOKO HEAD DISTRICT PARK MASTER
PLAN AND KOKO HEAD SHOOTING
COMPLEX SAFETY IMPROVEMENTS**

IN OAHU, HAWAII

Prepared For

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July 14, 2001

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EXECUTIVE SUMMARY

Project Location and Description

The proposed project is located in the Koko Head area of Oahu. The project encompasses the area of the existing Koko Head District Park. There are two access points to the park. The first is via Anapulu Street and the second is via Koko Head Park Road. The second access via Koko Head Park Road will be closed as part of this project due to safety issues associated with the adjacent Koko Head Shooting Complex. There will be no future access to Koko Head District Park directly from Kalaniana'ole Highway.

In addition to the park facilities, safety improvements will be made at the Koko Head Shooting Complex. These improvements include improvement of office spaces, additional parking facilities and modification to comply with Americans with Disabilities Act (ADA) requirements. Improvements also include a new caretakers residence. None of these improvements will generate additional traffic to or from the shooting complex. The existing shooting complex is closed during both weekday morning and afternoon peak hours. There is no anticipated change in the hours of operation. Saturday and Sunday peak hour traffic to the site is negligible.

2010 Cumulative Traffic Projections

2010 cumulative traffic projections were calculated using the following assumptions:

1. Existing traffic volumes along Kalaniana'ole Highway were increased 1.6% per year for 9 years, or 11.3%.
2. Existing traffic volumes along the side streets were increased 0.4% per year for 9 years, or 3.7%.

3. Traffic from related projects identified would not have an impact on traffic growth for the study intersections for the study period. Any traffic generated by these projects to and from the park are considered in the project related trip generation calculations.

The resulting 2010 cumulative peak hour traffic volumes were calculated by adding the background growth to the existing traffic volumes determined from the traffic counts at the study intersections.

Proposed Project Phasing

The first step in estimating the new traffic that the project will generate is to identify the elements of the master plan that will generate traffic. For instance, additional comfort stations (restrooms) will not generate additional park related traffic and the number of parking spaces are based on anticipated use of the park. Each of the park improvements are listed in Table ES-1 . The appropriate phase and whether the project will generate traffic or not is indicated.

Table ES-1 Project Phasing

Activity	Facility Description	Generator		Phase		
		Yes	No	1	2	3
Picnic Area	50 new sites	<input type="checkbox"/>		<input type="checkbox"/>		
Baseball	No change		<input type="checkbox"/>			
Soccer	One new field	<input type="checkbox"/>		<input type="checkbox"/>		
Multi-Purpose Field		<input type="checkbox"/>		<input type="checkbox"/>		
Basketball	No change.		<input type="checkbox"/>			
Volleyball	No change.		<input type="checkbox"/>			
In-Line Hockey/Skate Park		<input type="checkbox"/>		<input type="checkbox"/>		
Tennis	6 existing plus 2 new courts	<input type="checkbox"/>			<input type="checkbox"/>	
Pool		<input type="checkbox"/>				<input type="checkbox"/>
BMX	Minimal use		<input type="checkbox"/>			
Playgrounds	150 persons capacity	<input type="checkbox"/>			<input type="checkbox"/>	
Disc Golf	10 to 12 users per week	<input type="checkbox"/>		<input type="checkbox"/>		
Walking Paths			<input type="checkbox"/>		<input type="checkbox"/>	
Teen Center		<input type="checkbox"/>			<input type="checkbox"/>	
Maintenance Yard	No new employees.		<input type="checkbox"/>			
Comfort Station			<input type="checkbox"/>			
Access Road			<input type="checkbox"/>			
Parking (Spaces)			<input type="checkbox"/>	150 spaces	150 spaces	150 spaces
Cycling			<input type="checkbox"/>			
Lights & Bleachers			<input type="checkbox"/>			

Project Trip Generation

Table ES-2 summarizes that trip generation estimates for the total project. It should be noted in reviewing these trip generation estimates that the analysis assumes that all the proposed facilities are in use during the peak hours, which results in a worse-case condition.

Table ES-2 Summary of Trips Generated Total Project

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Picnic Area	9	7	16	12	16	28	60	60	120
Soccer Field	0	0	0	14	14	28	16	16	32
Multipurpose Field	0	0	0	12	25	37	27	0	27
In-Line Hockey/Skate Park	0	0	0	3	23	26	3	26	29
Disc Golf	0	0	0	3	3	6	6	6	12
Totals for Phase 1	9	7	16	44	81	125	112	108	220
Tennis Courts	10	10	20	10	10	20	10	10	20
Playground	0	0	0	0	0	0	0	0	0
Walking Paths	0	0	0	0	0	0	0	0	0
Teen Center	5	0	5	0	5	5	0	0	0
Totals for Phase 2	15	10	25	10	15	25	10	10	20
Swimming Pool	0	0	0	4	4	8	4	4	8
Totals for Phase 3	0	0	0	4	4	8	4	4	8
Subtotal for Total Project	24	17	41	58	100	158	126	122	248
Discount for Multi-users (15%)	4	3	7	9	15	24	19	18	37
Total Trips Generated	20	14	34	49	85	134	107	104	211

As shown in the table, the new facilities will generate additional traffic into and out of Koko Head District Park. Table ES-3 is a comparison of existing and estimated future trips generated by the park.

Table ES-3 Comparison of Existing Versus Future Trips Generated By Park

Period	Direction	Existing Trips	New Trips	Total Future Trips
Weekday Afternoon Peak Hour	Inbound	74	26	100
	Outbound	66	34	100
	Total	140	60	200
Weekend Peak Hour	Inbound	43	111	154
	Outbound	60	86	146
	Total	103	197	300

The summary of total trips generated concludes that traffic generated by the new park facilities will not have a significant impact on morning peak hour traffic conditions because the study intersections operate at relatively good levels-of-service and most of the park facilities are not expected to open until mid-morning. The Institute of Transportation Engineers recommends that if a project adds less than 100 vehicles per hour in the peak direction, then an impact analysis is not warranted.¹ Therefore, the weekday morning peak hour

¹ Institute of Transportation Engineers, *Traffic Access and Impact Studies for Site Development, A Recommended Practice*, Washington, D.C., 1991

was not analyzed. Even though the weekday afternoon peak hour and the weekend peak hour also fall in this category, an impact analysis for these periods should be performed because the study intersections, especially the intersection of Kalaniana'ole Highway at Lunalilo Home Road, experience congestion during these periods.

Definition of Significant Impacts

Criteria for determining if a project has a significant traffic impact for which mitigation measures must be investigated have been established based on traffic impact study guidelines used in other traffic studies. Since there is no locally defined criteria, the following criteria is used to define a significant impact for a signalized intersection:

<u>Final Level-of-Service</u>	<u>Final V/C Ratio</u>	<u>Project Related Increase in V/C</u>
C	0.700-0.800	equal to or greater than 0.040
D	0.800 - 0.900	equal to or greater than 0.020
E or F	> 0.900	equal to or greater than 0.010

NOTES:

(1) Los Angeles Department of Transportation, Traffic Study Policies and Procedures, 1993, page 10

There are no similar criteria for unsignalized intersections. However, if the final delay results in a Level-of-Service D or worse, mitigation measures are evaluated. Mitigation includes widening, additional lanes or traffic signals, if warrants are satisfied.

Project Related Traffic Impacts

The assumptions used for the level-of-service analysis are:

1. The traffic signal timing is optimized for cumulative plus project conditions.
2. There are no changes to the lane configurations of the intersections.
3. Access to the park from Kalaniana'ole Highway via Koko Head Park Road is prohibited.
4. The level-of-service analysis was performed for the total project, rather than each phase.

The traffic impact of a project is the change in level-of-service at the study intersections between the cumulative and cumulative plus project conditions. The level-of-service analysis can be performed for the total intersection or each traffic movement at the study intersection. The level-of-service analysis for the total intersection may overlook a traffic movement with a poor level-of-service. Therefore, each traffic movement was analyzed for this study. The results of the level-of-service analysis of cumulative and cumulative plus project conditions are compared in Tables ES-5 and ES-6. The conclusions of the level-of-service analysis are:

1. Anapalau Street at Kaumakani Street will operate at level-of-service B or better during weekday and weekend peak hours, without and with the project. Impacts are insignificant and no mitigation is required.
2. Anapalau Street at Lunalilo Home Road will operate at level-of-service C or better during weekday

and weekend peak hours without and with the project. Since the impact of insignificant, no mitigation is required.

3. All traffic movements at the intersection of Kaunakani Street at Lunalilo Home Road will operate at level-of service B or better during weekday and weekend peak periods, without and with the project. Therefore, no mitigation is required.
4. At the intersection of Kalaniana'ole Highway at Lunalilo Home Road, the north bound left, through and right will operate at level-of-service D during the weekday peak hour, without and with the project. The change in the V/C ratio is from 0.63 to 0.65. The final V/C ratio is 0.65, which is defined as level-of-service B. This implies that there is sufficient capacity and the level-of-service D is a result of the traffic signal timing, not the result of a geometry deficiency no mitigation is recommended.

The level-of-service of the southbound left and through movement will change from C to D based on delay. However, the final V/C ratio is 0.42, indicating sufficient capacity.

All remaining traffic movements operate at level-of-service C or better during weekday and weekend peak periods, without and with the project.

5. The intersection of Kalaniana'ole Highway at Nawiliwili Street will operate at level-of-service C or better during weekday and weekend peak periods. No mitigation is required.
6. The intersection of Kalaniana'ole Highway at Haunama Bay entrance will operate at level-of-service C or better during the weekday peak hour. During the weekend peak hour, the left turn from Haunama Bay Drive to Kalaniana'ole Highway will operate at level-of-service D. However, this is not a result of the project the level-of-service is D both without and with the project and there is no project related traffic in this movement.

Conclusions and Recommendations

The conclusions of the level-of-service analysis for 2010 cumulative plus project conditions are:

1. No mitigation measures are required to mitigate traffic related impacts of the proposed project. All traffic movements at the study intersections will operate at D or better, which is considered acceptable for urban conditions. The movements that operate at Level-of-Service D have a volume-to-capacity ratio indicating that the Level-of-Service D is a result of the signal timing and not geometry.
2. Access to the park from Kalaniana'ole Highway via Koko Head Park Road is to be prohibited. However, it is recommended that the road not be removed. It should be maintained for maintenance and emergency services. A knock-down or keyed gate would be sufficient.
3. The safety improvements associated with the Koko Head Shooting Complex will not generate additional traffic during peak hours, and therefore will have no traffic related impacts.

Traffic Impact Analysis Report
For Koko Head District Park

Table ES-5 Impact Analysis for 2010 Weekday Afternoon Cumulative Plus Project Conditions⁽¹⁾

Intersection and Movement	Cumulative			Cumulative Plus Project			Change	
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay
1. Anapalau Street at Kaumakani Street								
Northbound Left, Thru & Right	0.00	7.2	A	0.00	7.2	A	0.00	-0.2
Southbound Left, Thru & Right	0.03	7.4	A	0.04	7.5	A	0.01	0.1
Westbound Left, Thru & Right	0.09	9.9	A	0.96	11.5	B	0.87	1.6
Eastbound Left, Thru & Right	0.02	10.2	B	0.15	11.0	B	0.13	0.8
2. Anapalau Street at Lunalilo Home Road								
Northbound Left & Thru	0.02	8.0	A	0.02	8.0	A	0.00	0.0
Southbound Left & Thru	0.02	8.9	A	0.03	9.0	A	0.01	0.1
Westbound Left, Thru & Right	0.12	17.5	C	0.25	20.0	C	0.13	2.5
Eastbound Left, Thru & Right	0.06	12.3	B	0.07	12.6	B	0.01	0.3
3. Kaumakani Street at Lunalilo Home Road								
Eastbound Left	0.31	11.8	B	0.31	11.9	B	0.00	0.1
Eastbound Thru & Right	0.11	7.9	A	0.12	9.9	A	0.01	2.0
Westbound Left	0.14	10.2	B	0.19	10.6	B	0.05	0.4
Westbound Thru & Right	0.05	9.4	A	0.06	9.5	A	0.01	0.1
Northbound Left & Thru	0.43	12.2	B	0.43	12.2	B	0.00	0.0
Northbound Right	0.13	10.0	B	0.15	10.2	B	0.02	0.2
Southbound Left, Thru & Right	0.19	10.1	B	0.20	10.2	B	0.01	0.1
4. Kalaniana'ole Highway at Lunalilo Home Road								
Eastbound Left	0.85	32.4	C	0.86	33.6	C	0.01	1.2
Eastbound Thru & Right	0.48	3.7	A	0.48	3.7	A	0.00	0.0
Westbound Left	0.03	15.6	B	0.03	15.6	B	0.00	0.0
Westbound Thru	0.83	33.2	C	0.83	33.2	C	0.00	0.0
Westbound Right	0.02	15.4	B	0.03	15.5	B	0.01	0.1
Northbound Left, Thru & Right	0.63	41.5	D	0.65	42.4	D	0.02	0.9
Southbound Left & Thru	0.35	34.2	C	0.42	35.4	D	0.07	1.2
Southbound Right	0.29	34.8	C	0.29	34.9	C	0.00	0.1
5. Kalaniana'ole Highway at Nawiliwili Street								
Westbound Left & Thru	0.01	8.9	A	0.01	8.9	A	0.00	0.0
Northbound Left	0.05	18.9	C	0.06	19.1	C	0.01	0.2
Northbound Right	0.01	11.5	B	0.01	11.5	B	0.00	0.0
6. Kalaniana'ole Highway at Koko Head Park Road								
Eastbound Left & Thru	0.00	8.9	A	CLOSED				
Southbound Left & Right	0.00	12.9	B	CLOSED				
7. Kalaniana'ole Highway at Haunama Bay Entrance								
Westbound Left & Thru	0.02	8.5	A	0.02	8.5	A	0.00	0.0
Northbound Left	0.28	23.4	C	0.28	23.5	C	0.00	0.1
Northbound Right	0.06	11.9	B	0.06	11.9	B	0.00	0.0

NOTES:

1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Tables 1 and 2 for definitions.

Table ES-6 Impact Analysis for 2010 Weekend Cumulative Plus Project Conditions⁽¹⁾

Intersection and Movement	Cumulative			Cumulative Plus Project			Change	
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay
1. Anapalau Street at Kaumakani Street								
Northbound Left, Thru & Right	0.00	7.2	A	0.00	7.2	A	0.00	0.0
Southbound Left, Thru & Right	0.01	7.3	A	0.04	7.5	A	0.03	0.2
Westbound Left, Thru & Right	0.08	9.7	A	0.28	12.2	B	0.20	2.5
Eastbound Left, Thru & Right	0.03	9.5	A	0.09	11.0	B	0.06	1.5
2. Anapalau Street at Lunaliio Home Road								
Northbound Left & Thru	0.02	9.0	A	0.02	9.0	A	0.00	0.0
Southbound Left & Thru	0.02	8.4	A	0.05	8.5	A	0.03	0.1
Westbound Left, Thru & Right	0.24	20.0	C	0.48	24.7	C	0.24	4.7
Eastbound Left, Thru & Right	0.16	15.8	C	0.18	17.4	C	0.02	1.6
3. Kaumakani Street at Lunaliio Home Road								
Eastbound Left	0.36	12.5	B	0.37	12.5	B	0.01	0.0
Eastbound Thru & Right	0.15	10.1	B	0.16	10.2	B	0.01	0.1
Westbound Left	0.18	10.6	B	0.25	11.3	B	0.07	0.7
Westbound Thru & Right	0.04	9.3	A	0.05	9.4	A	0.01	0.1
Northbound Left & Thru	0.29	11.0	B	0.29	11.0	B	0.00	0.0
Northbound Right	0.05	9.4	A	0.09	9.7	A	0.04	0.3
Southbound Left, Thru & Right	0.38	11.5	B	0.40	11.6	B	0.02	0.1
4. Kalaniana'ole Highway at Lunaliio Home Road								
Eastbound Left	0.74	29.1	C	0.77	30.7	C	0.03	1.6
Eastbound Thru & Right	0.65	8.3	A	0.65	8.3	A	0.00	0.0
Westbound Left	0.05	14.5	B	0.06	14.6	B	0.01	0.1
Westbound Thru	0.82	30.2	C	0.82	30.2	C	0.00	0.0
Westbound Right	0.02	14.0	B	0.04	14.1	B	0.02	0.1
Northbound Left, Thru & Right	0.41	25.9	C	0.42	26.2	C	0.01	0.3
Southbound Left & Thru	0.23	23.6	C	0.28	24.1	C	0.05	0.5
Southbound Right	0.60	32.3	C	0.61	32.6	C	0.01	0.3
5. Kalaniana'ole Highway at Nawliwili Street								
Westbound Left & Thru	0.02	9.7	A	0.02	9.7	A	0.00	0.0
Northbound Left	0.11	23.5	C	0.14	24.2	C	0.03	0.7
Northbound Right	0.06	13.6	B	0.06	13.7	B	0.00	0.1
6. Kalaniana'ole Highway at Koko Head Park Road								
Eastbound Left & Thru	0.00	8.8	A	CLOSED				
Southbound Left & Right	0.01	20.1	C	CLOSED				
7. Kalaniana'ole Highway at Haunama Bay Entrance								
Westbound Left & Thru	0.04	9.3	A	0.04	9.3	A	0.00	0.0
Northbound Left	0.46	33.8	D	0.46	34.5	D	0.00	0.7
Northbound Right	0.18	14.6	B	0.18	14.7	B	0.00	0.1

NOTES:

1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Tables 1 and 2 for definitions.

1. INTRODUCTION

Phillip Rowell and Associates has been retained by Group 70 International, Inc., to prepare a Traffic Impact Analysis Report (TIAR) for the proposed Koko Head District Park Master Plan and Koko Head Shooting Complex Safety Improvements. The general location of the Koko Head District Park on Oahu is shown in Figure 1.

The purpose of this study is to identify the traffic impacts of the proposed project. The following is a report of this analysis and the conclusions.

This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

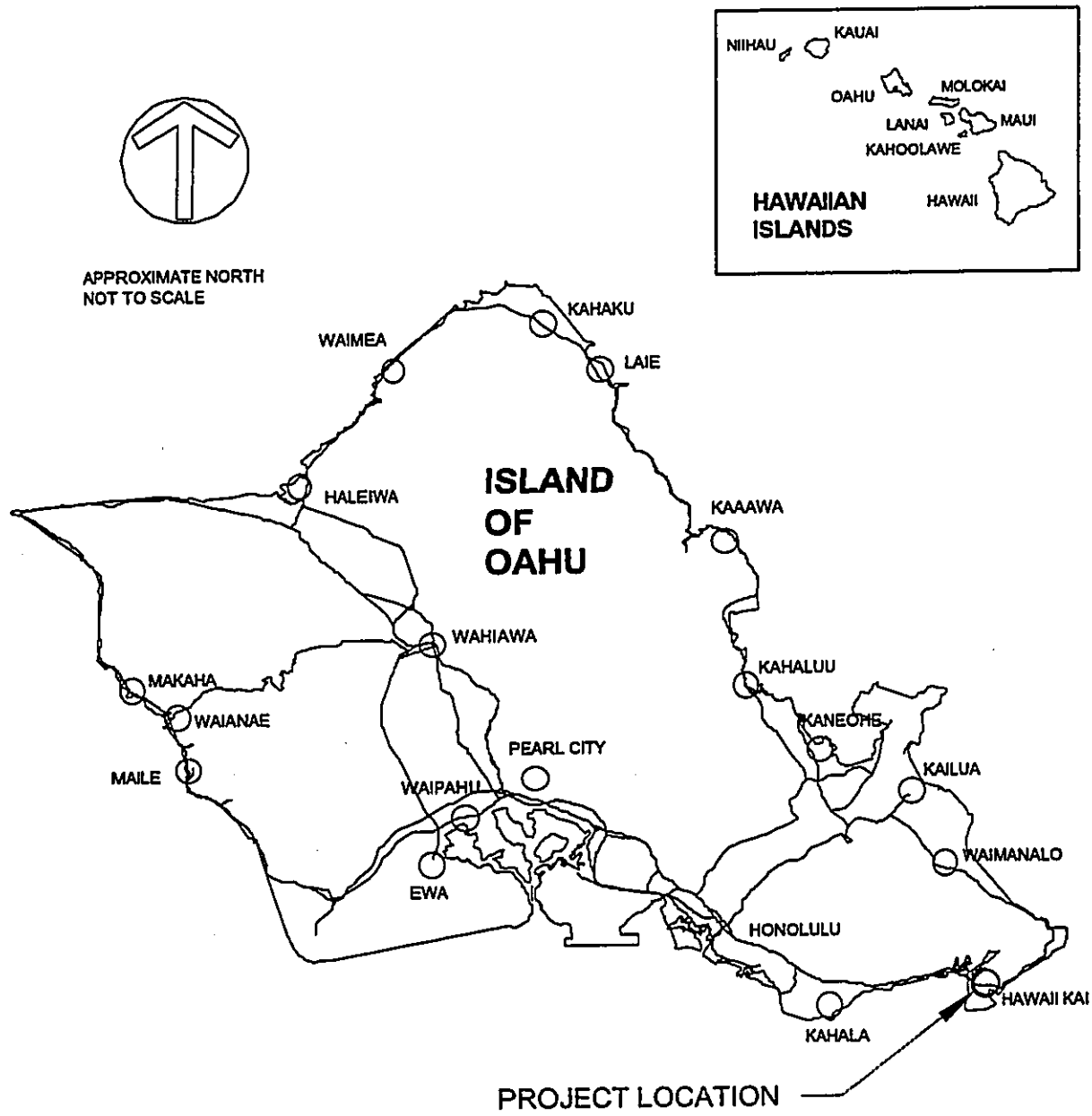


Figure 2
PROJECT LOCATION

Project Location and Description

The proposed project is located in the Koko Head area of Oahu. The project encompasses the area of the existing Koko Head District Park. There are two access points to the park. The first is via Anapulu Street and the second is via Koko Head Park Road. The second access via Koko Head Park Road will be closed as part of this project due to safety issues associated with the adjacent Koko Head Shooting Complex. There will be no future access to Koko Head District Park directly from Kalaniana'ole Highway.

The proposed park related improvements are summarized in Table 1 and a Conceptual Site Plan is shown as Figure 2.

Activity	Facility Description	Comments
Picnic Area	50 new sites	
Baseball	No change	Improve existing field.
Soccer	One new field	
Multi-Purpose Field	New facility	May be used for soccer or football
Basketball	No change.	
Volleyball	No change.	
In-Line Hockey/Skate Park	New facility	
Tennis	6 existing plus 2 new courts	
Pool	New	Minimal use
BMX		
Playgrounds	150 persons capacity	
Disc Golf	10 to 12 users per week	
Walking Paths		
Teen Center	New facility	
Maintenance Yard	No new employees.	
Comfort Station		
Access Road		
Parking (Spaces)	450 new spaces	
Cycling		
Lights & Bleachers		

In addition to the park facilities, safety improvements will be made at the Koko Head Shooting Complex. These improvements include improvement of office spaces, additional parking facilities and modification to comply with Americans with Disabilities Act (ADA) requirements. Improvements also include a new caretakers residence. None of these improvements will generate additional traffic to or from the shooting complex. The existing shooting complex is closed during both weekday morning and afternoon peak hours. There is no anticipated change in the hours of operation. Saturday and Sunday peak hour traffic to the site is negligible.

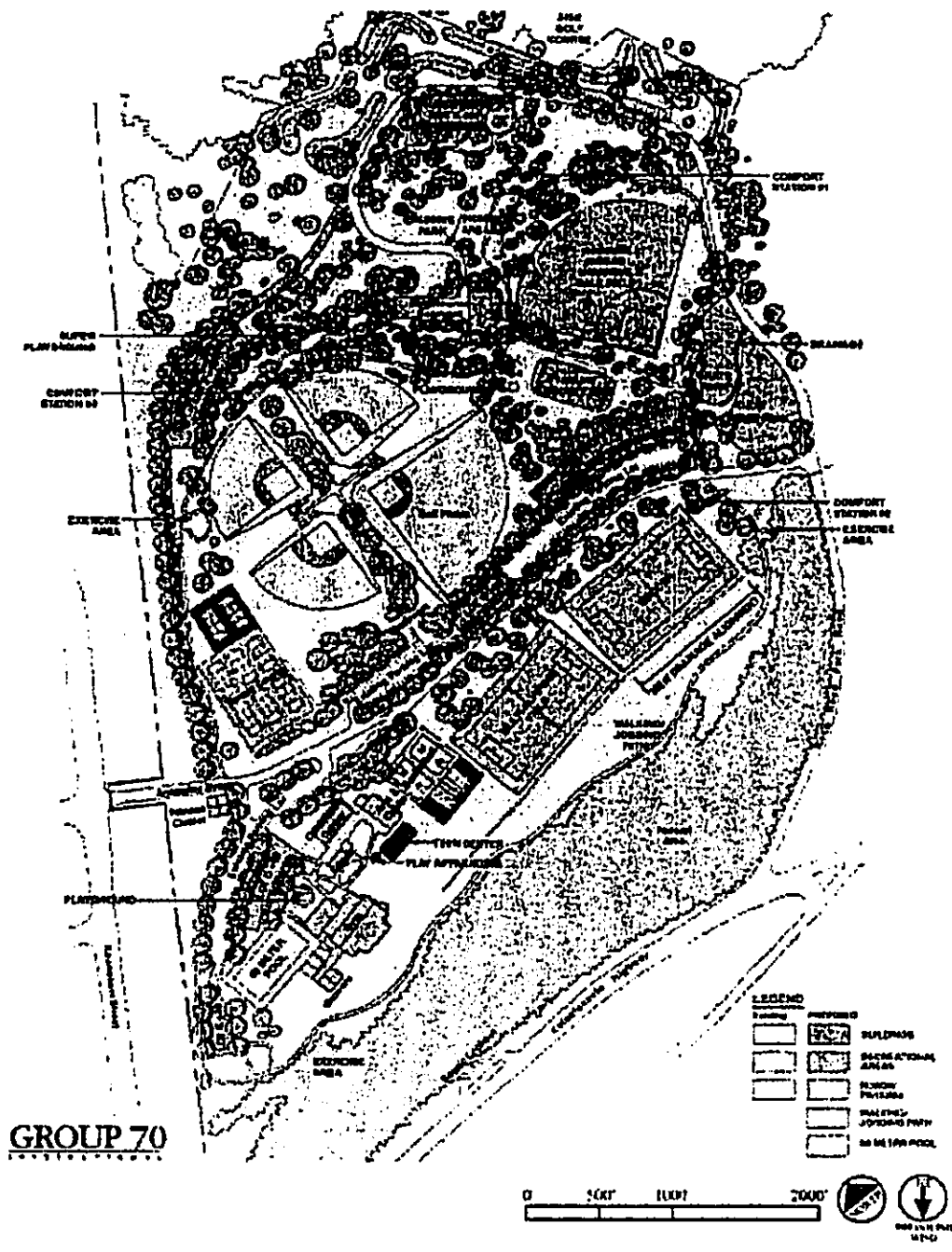


Figure 2
CONCEPTUAL SITE PLAN

Study Methodology and Order of Presentation

1. Analysis of Existing Traffic Conditions

Existing traffic volumes at the study intersections were determined from traffic counts performed during May and June, 2001. Intersection configurations and traffic control information were also collected in the field at the time of the traffic counts. Other data collected included speed limits and right-of-way controls.

Using the data collected, existing traffic operating conditions in the vicinity of the project were determined. The methodology for signalized and unsignalized intersections described in the 2000 *Highway Capacity Manual* (HCM) ² was used to determine the level-of-service (LOS) at the study intersections.

Existing traffic conditions, the LOS concept and the results of the LOS analysis for existing conditions are presented in Chapter 2.

2. Determination of Cumulative Traffic Projections

The year 2010 was used as the design year. This does not necessarily represent the project completion date. It represents occupancy for purposes of estimating future background traffic without the study project. Cumulative traffic conditions are defined as future traffic conditions *without* the proposed project. A description of the process used to estimate 2010 cumulative traffic projections is presented in Chapter 3.

3. Analysis of Project-Related Characteristics

The next step in the traffic analysis was to estimate the peak-hour traffic that would be generated by the proposed project. This was done using standard trip generation procedures outlined in *Trip Generation*³. The procedure is described in Chapter 4. The traffic generation analysis determined that further analysis of the weekday morning peak hour was not warranted because most of the proposed new facilities will not be open during the morning peak hour.

The project generated trips were distributed based on the available approach and departure routes. The project-related traffic was then superimposed on 2010 cumulative traffic volumes at the study intersections.

The trip generation, distribution and assignment process is discussed in Chapter 4.

4. Analysis of Project-Related Traffic Impacts

The HCM methodology was used to conduct a LOS analysis for 2010 cumulative plus project conditions. The results of this analysis were compared to 2010 cumulative conditions to determine the incremental impacts of this project. The results and the conclusions of the impact analyses are presented in Chapter 5.

² *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 2000

³ *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 1997

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service (LOS) concept and the results of the LOS analysis for existing conditions are also presented. The purpose of this analysis is to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

Description of Existing Streets and Intersection Controls

The following is summary of the major roadways in the study area:

Kalaniana'ole Highway

Kalaniana'ole Highway is a major State Highway. West of Lunalilo Home Road, Kalaniana'ole Highway is two lanes in each direction. East of Lunalilo Home Road, the highway is one lane in each direction. No parking is allowed along either side.

Lunalilo Home Road

Lunalilo Home Road is a major two-way, north-south street. The intersection with Kalaniana'ole Highway is signalized. Generally, Lunalilo Home Road is stripped for two lanes in each direction and parking is allowed along both sides except in the vicinity of intersections. However, between Kaumakani Street and Kalaniana'ole Highway, Lunalilo Home Road is stripped for three lanes in the southbound direction and no parking is allowed.

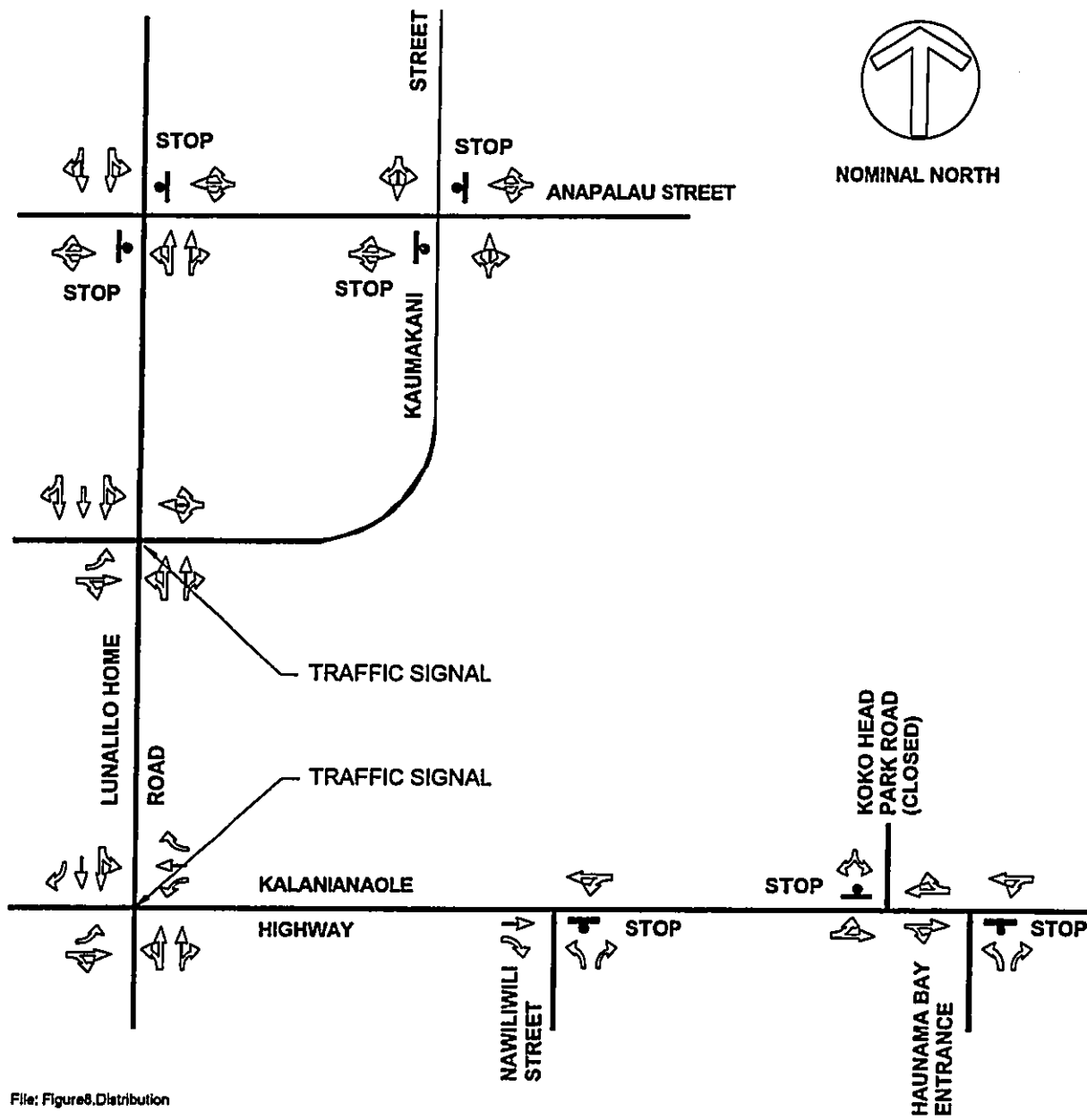
Kaumakani Street

Kaumakani Street is a U-shaped street east of Lunailo Home Road. Kaumakani Street intersects Lunailo Home Road at two locations. The southern intersection is the entrance to Koko Head Shopping Center and is signalized.

Anapalau Street

Anapalau Street is a two-lane, two-way residential street connecting Lunailo Home Road with Koko Head District Park. The intersection of Anapalau Street with Kaumakani Street is the entrance to the park. All intersections are STOP sign controlled.

Figure 3 is a schematic of the roadway conditions adjacent to the project.



File: Figure8.Distribution

Figure 3

SCHEMATIC OF EXISTING ROADWAY CONFIGURATION

Existing Peak Hour Traffic Volumes

Peak hour traffic volumes for all the study intersections were collected during May and June, 2001, except for the intersections of Kalaniana'ole Highway at Nawiliwili Street and Kalaniana'ole Highway at the Haunama Bay Entrance. The traffic counts were performed over several weeks to account for daily variations in traffic flows and because counts were performed during non-holiday weekends.

The traffic volumes shown for the intersections of Kalaniana'ole Highway at Nawiliwili Street and Kalaniana'ole Highway at the Haunama Bay Entrance were provided in the *Traffic Impact Study for the Koko Head Regional Park*.⁴ One-hour traffic counts were performed during the 2001 study period to verify that traffic characteristics had not changed significantly and that the data was still valid.

The traffic counts are summarized in Figures 4 and 5. The counts include buses, trucks and motorcycles. They do not include bicycles and mopeds.

The approach and departure volumes of adjacent intersections do not match in some because counts were not performed at driveways and minor side streets.

⁴ Pacific Planning and Engineering, Inc., *Traffic Impact Assessment for Koko Head Regional Park and Nature Preserve*, February, 1999

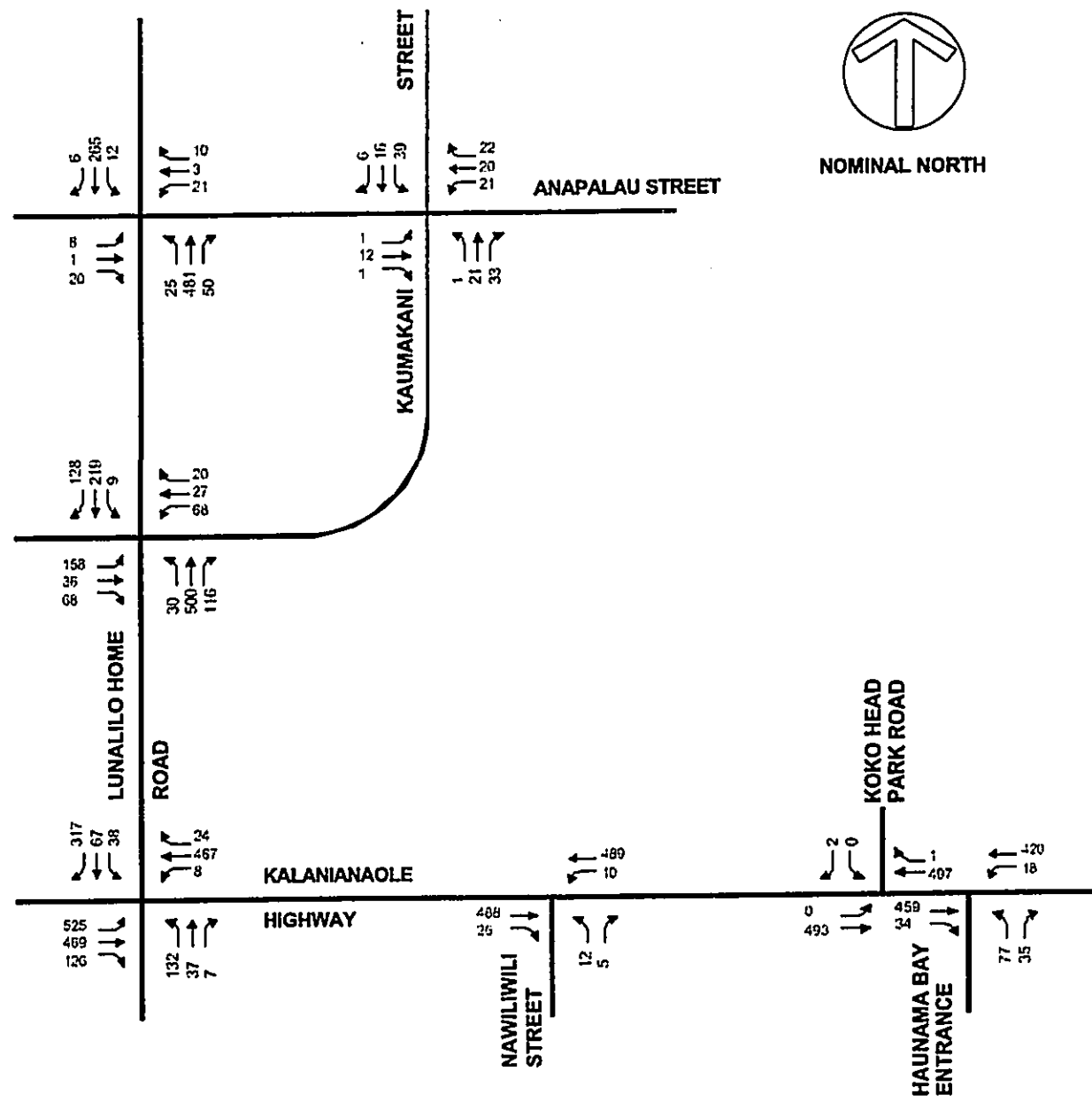


Figure 4
EXISTING (2001) AFTERNOON PEAK HOUR TRAFFIC VOLUMES

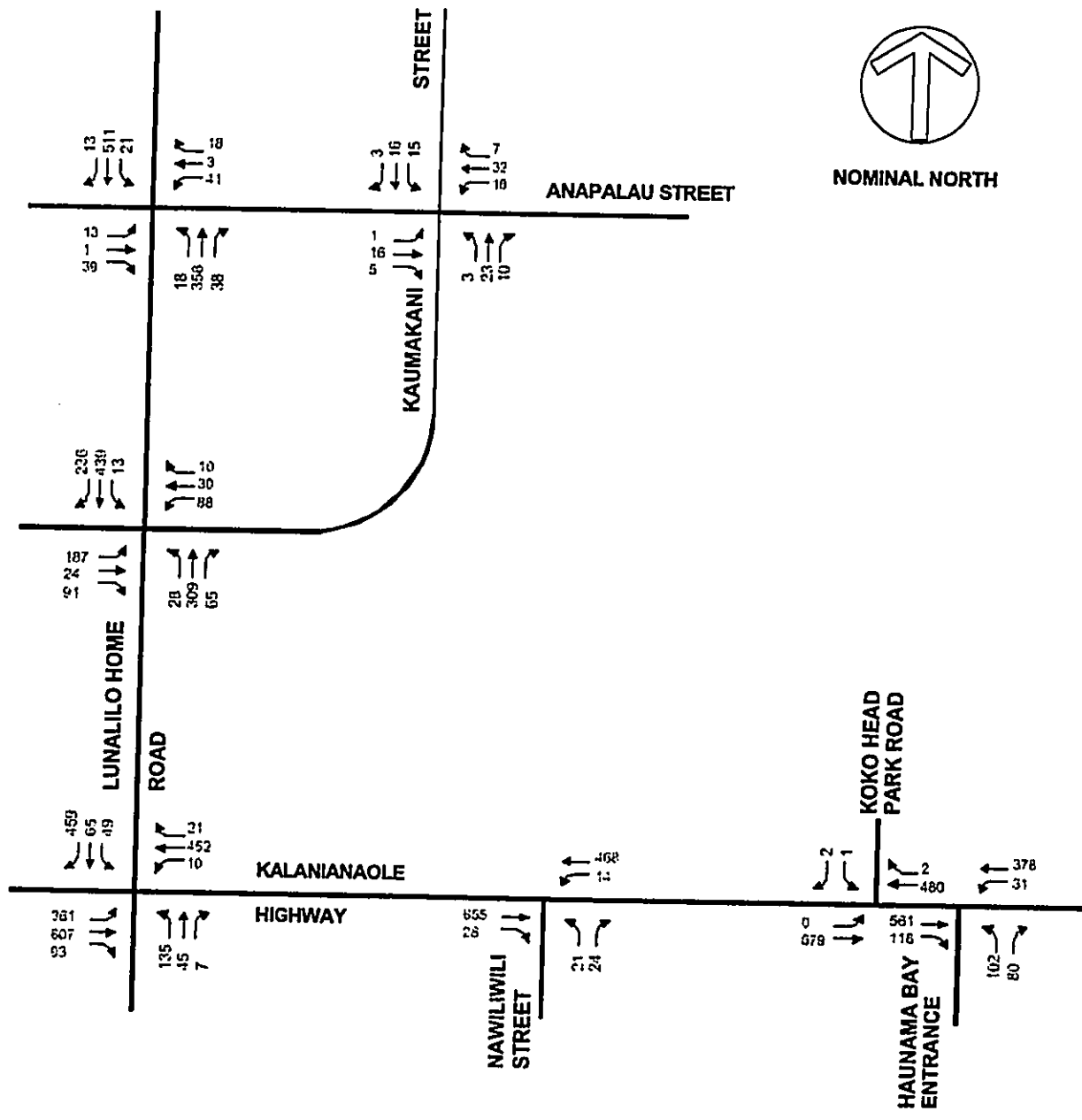


Figure 5
EXISTING (2001) WEEKEND PEAK HOUR TRAFFIC VOLUMES

Level-of-Service Concept

Signalized Intersections

The operations method described in the *2000 Highway Capacity Manual (HCM)* was used to analyze the operating efficiency of the signalized intersections adjacent to the study site. This method involves the calculation of a volume-to-capacity (V/C) ratio which is related to a level-of-service.

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 2. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 2 Level-of-Service Definitions for Signalized Intersections⁽¹⁾

Level of Service	Interpretation	Volume-to-Capacity Ratio ⁽²⁾	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:

- (1) Source: *Highway Capacity Manual, 2000.*
- (2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 3 summarizes the definitions for level-of-service and the corresponding delay. A subsequent calculation to determine an overall LOS was made, and these results are presented in tables to summarize traffic conditions using parameters similar to those used for signalized intersections.

Table 3 Level-of-Service Definitions for Unsignalized Intersections⁽¹⁾

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	>10
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:

- (1) Source: *Highway Capacity Manual, 2000.*
- (2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Existing Levels-of-Service

The results of the level-of-service analysis for existing conditions are summarized in Table 4.

Table 4 Level-of-Service Analysis for Existing Peak Hour Conditions⁽¹⁾

Intersection and Movement	Existing PM Peak Hour			Existing Weekend Peak Hour		
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS
1. Anapalau Street at Kaumakani Street						
Northbound Left, Thru & Right	0.00	7.2	A	0.00	7.2	A
Southbound Left, Thru & Right	0.03	7.4	A	0.01	7.3	A
Westbound Left, Thru & Right	0.09	9.9	A	0.08	9.7	A
Eastbound Left, Thru & Right	0.02	10.2	A	0.03	9.5	A
2. Anapalau Street at Lunaliio Home Road						
Northbound Left & Thru	0.02	8.0	A	0.02	8.9	A
Southbound Left & Thru	0.01	8.9	A	0.02	8.4	A
Westbound Left, Thru & Right	0.12	16.9	C	0.23	19.3	C
Eastbound Left, Thru & Right	0.06	12.1	B	0.16	15.3	C
3. Kaumakani Street at Lunaliio Home Road						
Eastbound Left	0.30	11.7	B	0.35	12.3	B
Eastbound Thru & Right	0.11	9.8	A	0.13	10.0	A
Westbound Left	0.13	10.1	B	0.18	10.5	B
Westbound Thru & Right	0.05	9.4	A	0.04	9.3	A
Northbound Left & Thru	0.42	12.1	B	0.28	10.9	B
Northbound Right	0.12	9.9	A	0.04	9.3	A
Southbound Left, Thru & Right	0.24	10.4	B	0.37	11.4	B
4. Kalaniana'ole Highway at Lunaliio Home Road						
Eastbound Left	0.82	30.1	C	0.72	27.9	C
Eastbound Thru & Right	0.44	3.5	A	0.59	7.3	A
Westbound Left	0.03	15.6	B	0.05	14.4	B
Westbound Thru	0.76	28.8	C	0.75	26.5	C
Westbound Right	0.02	15.4	B	0.02	14.0	B
Northbound Left, Thru & Right	0.62	41.0	D	0.39	25.7	C
Southbound Left & Thru	0.34	34.0	C	0.22	23.5	C
Southbound Right	0.22	33.4	C	0.54	30.4	C
5. Kalaniana'ole Highway at Nawliwili Street						
Westbound Left & Thru	0.01	8.7	A	0.02	9.4	A
Northbound Left	0.05	17.2	C	0.10	20.9	C
Northbound Right	0.01	11.1	B	0.06	12.9	B
6. Kalaniana'ole Highway at Koko Head Park Road						
Eastbound Left & Thru	0.00	8.7	A	0.00	8.7	A
Southbound Left & Right	0.00	12.4	B	0.01	18.1	C
7. Kalaniana'ole Highway at Haunama Bay Entrance						
Westbound Left & Thru	0.02	8.4	A	0.03	9.0	A
Northbound Left	0.25	20.5	C	0.40	27.9	D
Northbound Right	0.06	11.5	B	0.16	13.7	B

NOTES:

1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Tables 1 and 2 for definitions.

The conclusions of the level-of-service analysis are:

1. All the intersections operate at acceptable levels-of-service for urban peak hour conditions, which is Level-of-Service D or better.
2. The results of the level-of-service analysis are consistent with field observations during the traffic surveys and previous traffic studies in the area.

3. PROJECTED CUMULATIVE TRAFFIC CONDITIONS

The purpose of this chapter is to discuss the assumptions and data used to estimate 2010 cumulative traffic conditions. Cumulative traffic conditions are defined as future traffic volumes without the proposed project.

Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Background Traffic Growth

Background traffic growth was estimated from data provided by the *2020 Oahu Regional Transportation Plan*.⁵ Travel estimates from the Plan concluded that traffic would increase an average of 1.6% per year until the year 2020. Therefore, the growth rate for 2001 to 2010 would be 11.3%. This growth rate was calculated using the following formula for compounded interest:

$$F = (1 + i)^n$$

where i = average annual growth rate
 n = years (2001 to 2010)

This growth rate was applied to through traffic along Kalaniana'ole Highway.

⁵ Kaku Associates, Inc., *Oahu Regional Transportation Plan*, November 1995

The TIAR for the *Koko Head Regional Park* determined that traffic along the residential streets would increase 0.4% per year based on population growth data from the *Oahu Regional Transportation Plan*. The growth rate was used to calculate growth along the side streets.

Related Projects

The second component in estimating background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are under construction or have been approved for construction and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements.

Five projects were identified in the vicinity but not within the study area. The projects are along Hawaii Kai Drive and would not have a direct impact on traffic projections at the study intersections. Traffic from these projects was considered to be part of background growth discussed previously.

Traffic from these projects to the park would be a component of project generated traffic and would therefore be included in the estimate of project generate traffic. To provide a separate traffic estimate for these projects would result in double counting a portion of their trips.

2010 Cumulative Traffic Projections

In summary, 2010 cumulative traffic projections were calculated using the following assumptions:

1. Existing traffic volumes along Kalaniana'ole Highway were increased 1.6% per year for 9 years, or 11.3%.
2. Existing traffic volumes along the side streets were increased 0.4% per year for 9 years, or 3.7%.
3. Traffic from related projects identified would not have an impact on traffic growth for the study intersections for the study period. Traffic generated by these projects to and from the park are considered in the project related trip generation calculations.

The resulting 2010 cumulative peak hour traffic volumes were calculated by adding the background growth to the existing traffic volumes determined from the traffic counts at the study intersections. The resulting 2010 weekday afternoon and weekend peak hour cumulative traffic volumes are shown in Figure 6 and 7, respectively.

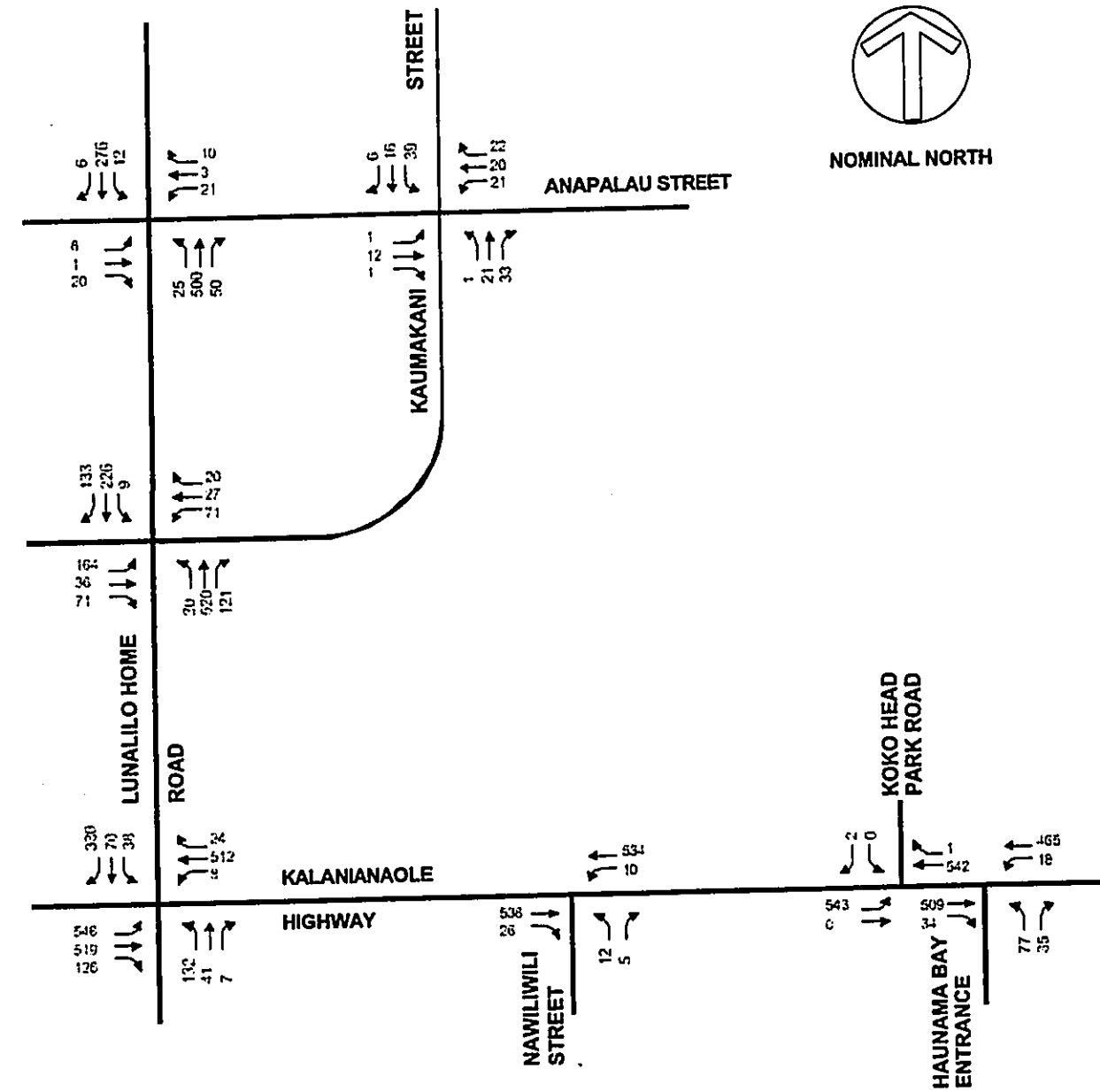


Figure 6
2010 WEEKDAY AFTERNOON PEAK HOUR TRAFFIC VOLUMES

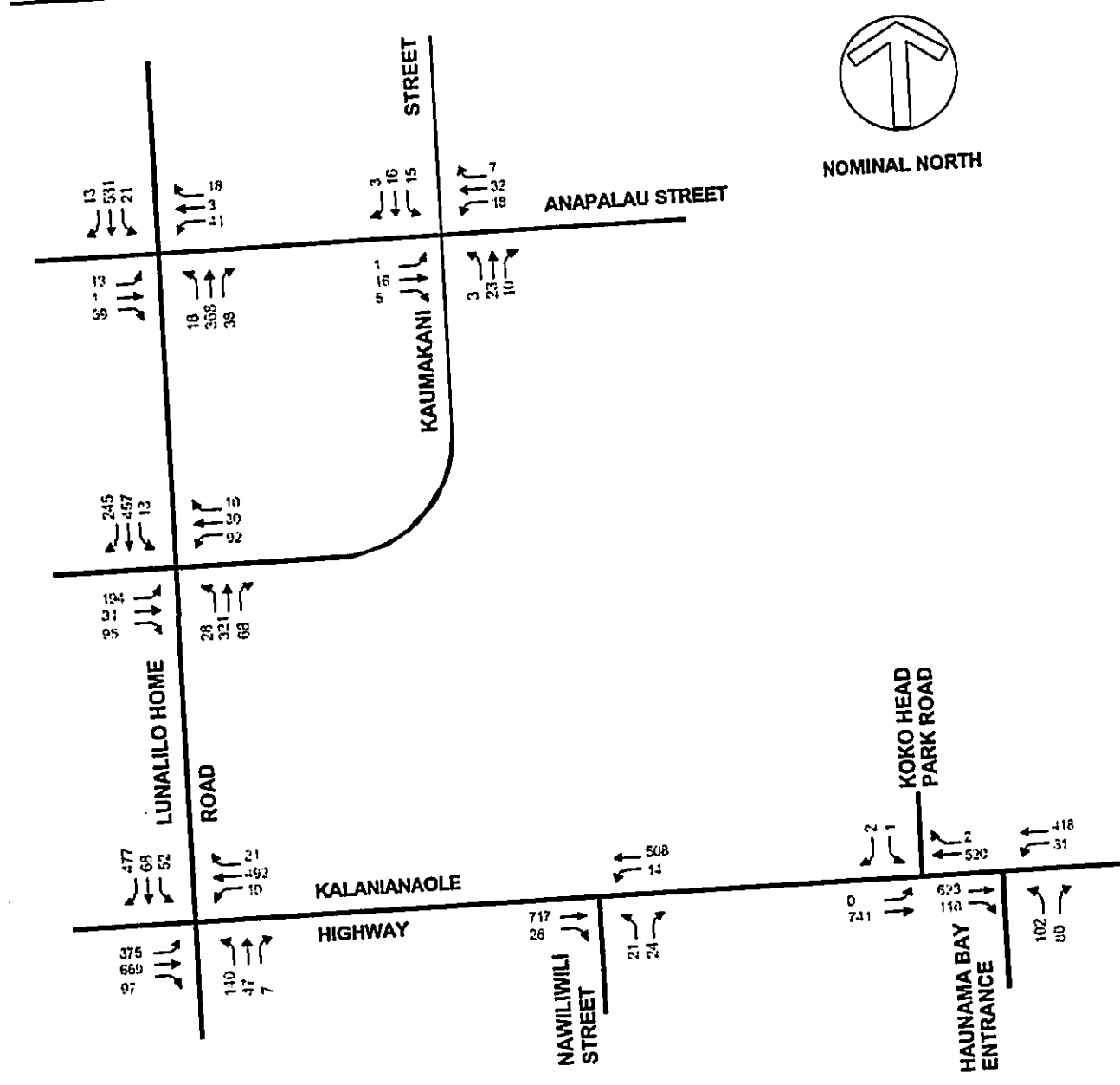


Figure 7
2010 WEEKEND PEAK HOUR TRAFFIC VOLUMES

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. Generally, the process involves the following steps:

<u>Step</u>	<u>Task</u>
1.	Determine the improvements that will generate additional traffic to and from the park
2.	Separate the improvements according the proposed phase on the total project.
3.	Estimate the peak hour trips that the proposed improvements will generate.
4.	Distribute and assign the project generated trips to the approach and departure routes.
5.	Perform a level-of-service analysis for the study intersections and driveways.

Each of these tasks are described in more detail in the following paragraphs.

Proposed Project Phasing

The first step in estimating the new traffic that the project will generate is to identify the elements of the master plan that will generate traffic. For instance, additional comfort stations (restrooms) will not generate additional park related traffic and the number of parking spaces are based on anticipated use of the park. Each of the park improvements are listed in Table 6. The appropriate phase and whether the project will generate traffic or not is indicated.

Table 6 Project Phasing

Activity	Facility Description	Generator		Phase		
		Yes	No	1	2	3
Picnic Area	50 new sites	<input type="checkbox"/>		<input type="checkbox"/>		
Baseball	No change		<input type="checkbox"/>			
Soccer	One new field	<input type="checkbox"/>		<input type="checkbox"/>		
Multi-Purpose Field		<input type="checkbox"/>		<input type="checkbox"/>		
Basketball	No change.		<input type="checkbox"/>			
Volleyball	No change.		<input type="checkbox"/>			
In-Line Hockey/Skate Park		<input type="checkbox"/>		<input type="checkbox"/>		
Tennis	6 existing plus 2 new courts	<input type="checkbox"/>			<input type="checkbox"/>	
Pool		<input type="checkbox"/>				<input type="checkbox"/>
BMX	Minimal use		<input type="checkbox"/>			
Playgrounds	150 persons capacity	<input type="checkbox"/>			<input type="checkbox"/>	
Disc Golf	10 to 12 users per week	<input type="checkbox"/>		<input type="checkbox"/>		
Walking Paths			<input type="checkbox"/>		<input type="checkbox"/>	
Teen Center		<input type="checkbox"/>			<input type="checkbox"/>	
Maintenance Yard	No new employees.		<input type="checkbox"/>			
Comfort Station			<input type="checkbox"/>	XXXXXXXXXXXXXXXXXXXX		
Access Road			<input type="checkbox"/>	XXXXXXXXXXXXXXXXXXXX		
Parking (Spaces)			<input type="checkbox"/>	150 spaces	150 spaces	150 spaces
Cycling			<input type="checkbox"/>	XXXXXXXXXXXXXXXXXXXX		
Lights & Bleachers			<input type="checkbox"/>	XXXXXXXXXXXXXXXXXXXX		

Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the procedures described in *Trip Generation Handbook* published by the Institute of Transportation Engineers. The trip generation rates for various categories of parks are summarized in Table 7.

Table 7 Summary of Trip Generation Rate for Park Uses

Land Use Category		Trip Generation Rates for:									
		City Park		County Park		State Park		Regional Park		Golf Course	
Land Use Code		411		412		413		417		430	
Trips Based On		Acres	Picnic Sites	Acres	Acres	Picnic Sites	Employees	Employees	Acres	Picnic Sites	Holes
Time Period	Direction	Trip Generation Rates									
Weekday	Total	1.79	5.87	2.28	0.65	9.95		79.77	4.57	61.82	35.74
AM Peak Hour	Total			0.52				7.23	.015		3.01
	% In			71%				57%	57%		47%
	% Out			29%				43%	43%		53%
PM Peak Hour	Total			0.59				12.77	0.26		3.56
	% In			35%				44%	44%		43%
	% Out			65%				56%	56%		57%
Saturday	Total			12.14	0.61	6.42	42.55	128.04	5.65	70.39	40.63
Saturday Peak Hour	Total			2.24	0.02	0.60	4.83	16.54	0.34		4.59
	% In			59%	50%	50%	50%	48%	48%		49%
	% Out			41%	50%	50%	50%	52%	52%		51%
Sunday	Total			4.13	1.10	14.51		162.81	6.44	76.06	39.53
Sunday Peak Hour	Total			3.60	0.03	0.95	7.59	20.46	0.42		4.43
	% In			47%	48%	48%	48%	34%	34%		na
	% Out			53%	52%	52%	52%	66%	66%		na

Notes:
(1) na = not available

As shown, there are no trip generation rates for the uses proposed for this project. There are rates for specific elements of the proposed plan, such as the picnic area and golf course. The number of AM and PM peak hour trips was estimated using trip generation rates for the elements for which rates were available. For the remaining elements, the number of peak hour trips was estimated using standard assumptions of usage, vehicle occupancy and directional distribution.

Each element of the park master plan is discussed separately by phase.

Trip Generation - Phase 1

Picnic Area

The plan provides approximately 50 new sites. The number of total weekday trips was estimated using the total weekday trips per picnic site provided for State parks, which is 9.95 trip per day, for a total of 498 trips per day.

Peak hour factor were calculated using the trip rates for regional parks and applied to the weekday total trips. The morning and afternoon peak hour factors were 3.3% and 5.7%, respectively. The directional distribution for regional parks was also used to calculate the inbound and outbound trips for each period.

The number of weekday peak hour trips generated by the picnic sites was calculated as follows:

Weekday Total: 50 sites x 9.95 trips/site/day = 498 trips per day

AM Peak Hour Total: 498 trips/day x 3.3% = 16 trips/hour
 AM Inbound: 16 x 0.57 = 9 trips/hour
 AM Outbound: 16 - 9 = 7 trips/hour

PM Peak Hour Total: 498 trips/day x 5.7% = 28 trips/hour
 PM Inbound: 28 x 0.44 = 12 trips/hour
 PM Outbound: 28 - 12 = 16 trips/hour

Weekend trips were estimated using trips rates for State parks and were calculated as follows:

Peak Hour Total: 50 sites x 0.60 trips/site/hour = 30 trips/hour
 Inbound: 30 trips/hour x 0.50 = 15 trips/hour
 Outbound: 30 - 15 = 15 trips/hour

Based on observations and field surveys of district park uses during weekends, there are usually several large groups having parties at parks. There were usually four to six groups ranging in size from 20 to 100. The typical groups appeared to be approximately 50 persons on a non-holiday weekend. Because this additional traffic (and parking) demand is relatively heavy and consistent, trips generated by these group parties should be added to the weekend traffic generation estimates. Trips from these groups was estimated using the following assumptions:

- a. The typical number of groups is 5.
- b. A typical group consist of 60 persons.
- c. The average vehicle occupancy is 3 persons per vehicle.
- d. Half (50%) of the vehicles arrive during the peak hour, the remainder depart during the peak hour.

Using these assumptions, the number of additional trips generated by these party groups is calculated as follows:

Inbound: 5 groups x 60 persons/groups x 0.33 vehicles/person x 0.5/hour = 50 vehicles/hour
 Outbound: 5 groups x 60 persons/groups x 0.33 vehicles/person x 0.5/hour = 50 vehicles/hour

Finally the total number of peak hour trips generated by the picnic area is summarized in Table 8.

<u>Park Element</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>			<u>Weekend Peak Hour</u>		
	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
Picnic Area	9	7	16	12	16	28	60	60	120

Soccer Field

The master plan provides one new soccer field. Trips generated by a soccer field were estimated using the following assumptions:

- a. No weekday soccer games
- b. Each game last one hour, therefore the number of inbound trips equals the number of outbound trips
- c. 7 players per game
- d. 2 teams per game
- e. 1 player per vehicle
- f. 2 officials per game
- g. 1 official per vehicle
- h. Coaches ride with a player
- i. Players and coaches for following game will arrive prior to end of previous game

Weekend Inbound or Outbound:

$$(7 \text{ players/team} \times 2 \text{ teams/game} \times 1 \text{ veh/player}) + (2 \text{ officials/game} \times 1 \text{ veh/official}) = 16 \text{ veh/hour}$$

It is anticipated that there would be practice games during weekday afternoons. Traffic generated by these practice games was estimated to be the same as the weekend games but without the officials. Therefore, there would be 14 inbound and 14 outbound trips during the peak hour.

The estimate of trips generated by the soccer field is summarized in Table 9.

Table 9 Summary of Trips Generated By Soccer Field

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Soccer Field	0	0	0	14	14	28	16	16	32

Multipurpose Field

The new multipurpose field may be used for soccer or football and may be used concurrently with the new soccer field. A football use would generate a larger number of trips and was therefore used to estimate the peak hour trips using the following assumptions:

- a. No weekday football games
- b. Each game last longer than one hour
- c. 25 players per game
- d. 2 teams per game
- e. 2 players per vehicle
- f. 2 officials per game
- g. 1 official per vehicle
- h. Coaches ride with a player

Weekend Inbound or Outbound:

$(25 \text{ players/team} \times 2 \text{ teams/game} \times 0.5 \text{ veh/player}) + (2 \text{ officials/game} \times 1 \text{ veh/official}) = 27 \text{ veh/hour}$

On weekdays, there would be practices during the afternoon. Trips for these practices were estimated as follows:

- a. 25 players per team
- b. 2 teams per game
- c. 2 players per vehicle (or 0.5 vehicle per player)
- d. Coaches ride with player
- e. 25 % drop-offs
- f. Inbound before peak hour (approximately 3:30 PM, outbound during peak hour (approximately 5:30 PM

$\text{PM Inbound} = 25 \text{ player} \times 2 \text{ teams} \times 0.5 \text{ vehicles/person} \times 0.25 \text{ drop-offs} = 12 \text{ trips/hour}$

$\text{PM Outbound} = 25 \text{ players} \times 2 \text{ teams} \times 0.5 \text{ vehicles/person} = 25$

The estimate of trips generated by the multipurpose field is summarized in Table 10.

Table 10 Summary of Trips Generated By Multipurpose Field

<u>Park Element</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>			<u>Weekend Peak Hour</u>		
	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
Multipurpose Field	0	0	0	12	25	37	27	0	27

In-Line Hockey/Skate Park

No activities are anticipated during the morning peak hour.

The number of players and officials per game was estimated from data provided on the web site for the In-Line Hockey League. Using this information, the number of weekday afternoon and weekend peak hour trips was estimated as follows:

- a. Practice games are between 3:30 PM and 5:30 PM on weekday afternoon. Therefore, inbound trips are before the afternoon peak hour and outbound trips are during the peak hour.
- b. Two teams per practice.
- c. 15 players per team.
- d. 15 % of players are drop offs.
- e. Coaches ride with a player.
- f. 1.5 persons per vehicle, or 0.67 persons per vehicle

$\text{PM Inbound} = 2 \text{ teams} \times 15 \text{ players} \times 0.67 \text{ persons/vehicle} \times 15\% \text{ drop-offs} = 3 \text{ vehicles per hour}$

$\text{PM Outbound} = 2 \text{ teams} \times 15 \text{ players} \times 0.67 \text{ persons/vehicle} = 20 \text{ vehicles per hour}$

During the Saturday peak hour, all assumptions are the same except for the additional trip generated by

officials for the game. There are three officials per game. It was assumed that these officials would be on-site prior to the game but would depart during the peak hour. Therefore, there would be 3 inbound and 26 outbound trips during the weekend peak hour.

The weekday and weekend trip generation estimates for the In-Line Hockey field is summarized in Table 11.

Table 11 Summary of Trips Generated By In-Line Hockey Field

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
In-Line Hockey Field	0	0	0	3	23	26	3	26	29

Disc Golf

An estimate of 10 to 12 users of the disc gold area was provided. It was assumed that there would be no use during the weekday morning peak hour, one-fourth of these persons would use the park during the afternoon peak hour and one-half would use the area during the weekend. Using these assumptions and a vehicle occupancy of one person per vehicle, this element would generated the peak hour trips shown in Table 12.

Table 12 Summary of Trips Generated By Disc Golf Park

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Disc Golf	0	0	0	3	3	6	6	6	12

Phase 1 Summary

The total estimated trips associated with Phase 1 is summarized in Table 13. The total number of trips was discounted to account for multi-users of the park, which are persons using more than one facility, and persons walking into the park from the adjacent community.

Table 13 Summary of Trips Generated By Phase 1

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Picnic Area	9	7	16	12	16	28	60	60	120
Soccer Field	0	0	0	14	14	28	16	16	32
Multipurpose Field	0	0	0	12	25	37	27	0	27
In-line Hockey/Skate Park	0	0	0	3	23	26	3	26	29
Disc Golf	0	0	0	3	3	6	6	6	12
Subtotal for Phase 1	9	7	16	44	81	125	112	108	220
15% Reduction	1	1	2	7	12	19	17	16	33
Phase 1 Trips	8	6	14	37	69	106	95	92	187

Trip Generation - Phase 2

Phase 2 consists of three elements that affect peak hour traffic estimates. These elements are the tennis courts, the new playgrounds and the teen center. The remaining elements of Phase 2 for which trip generation was not assessed are the following:

BMX Minimal use, especially during peak traffic hours

Tennis Courts

There will be two new tennis courts. The additional trips generated by these courts was estimated using the following assumptions:

- a. Two new courts
- b. 4 persons/game
- c. 1.5 persons/vehicle (0.67 vehicle/person)
- d. 1 game/hour
- e. Arrivals and departures overlap at beginning and end of each hour

The resulting peak hour trip estimated are summarized in Table 14.

Table 14 Summary of Trips Generated By New Tennis Courts

<u>Park Element</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>			<u>Weekend Peak Hour</u>		
	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
Tennis Courts	10	10	20	10	10	20	10	10	20

Playground

It was assumed that the playground would generate negligible peak hour traffic.

Walking Paths

The walking paths will generate negligible peak hour traffic. Users of the walking paths will be walk-ins from the surrounding community.

Teen Center

The area of the teen center was estimated to be approximately 30,000 square feet. It was assumed that major events at the teen center would be limited to off-peak traffic periods. However, there would be traffic associated with employees. For purposes of this traffic analysis, it was assumed that there would be approximately five employees at the team center and that all five would arrive during the morning peak hour and that all five would depart during the afternoon peak hour. Each employee would drive a vehicle. These employees would be at work during the weekend peak hour.

Teen use of the center was assumed to be minimal during typical traffic peak hours and that a significant portion of the users would be walk-ins or bicyclists from the community. A portion of the teen center users during the peak hour could also be users of other park facilities, such as the soccer field or in-line skating area. Therefore, no peak hour traffic associated with the teen center was estimated.

Phase 2 Summary

The trip generation calculations for Phase 2 is summarized in Table 15.

Table 15 Summary of Trips Generated By Phase 2

<u>Park Element</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>			<u>Weekend Peak Hour</u>		
	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
Tennis Courts	10	10	20	10	10	20	10	10	20
Playground	0	0	0	0	0	0	0	0	0
Walking Paths	0	0	0	0	0	0	0	0	0
Teen Center	5	0	5	0	5	5	0	0	0
Totals for Phase 2	15	10	25	10	15	25	10	10	20
15% Reduction	2	2	4	2	2	4	2	2	4
Phase 2 Trips	13	8	21	8	13	21	8	8	16

Trip Generation - Phase 3

Swimming Pool

Phase 3 consist on the new swimming pool. No data was provided relative to size or capacity. To estimate traffic associated with a swimming pool, a survey of district park swimming pools in the Honolulu are was performed during a weekend in July. It was determine that the typical number of users during the peak period was between 60 and 100 persons. Using the higher number (100 persons) and a vehicle occupancy of 2 persons per vehicle, a peak hour factor of 15% and a directions distribution of 50/50, the number of peak hour trips was estimated to be four inbound and four outbound.

Trip Generation - Total Project

Table 16 summarizes that trip generation estimates for the total project. It should be noted in reviewing these trip generation estimates that the analysis assumes that all the proposed facilities are in use during the peak hours, which results in a worse-case condition.

Table 16 Summary of Trips Generated Total Project

Park Element	AM Peak Hour			PM Peak Hour			Weekend Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Picnic Area	9	7	16	12	16	28	60	60	120
Soccer Field	0	0	0	14	14	28	16	16	32
Multipurpose Field	0	0	0	12	25	37	27	0	27
In-Line Hockey/Skate Park	0	0	0	3	23	26	3	26	29
Disc Golf	0	0	0	3	3	6	6	6	12
Totals for Phase 1	9	7	16	44	81	125	112	108	220
Tennis Courts	10	10	20	10	10	20	10	10	20
Playground	0	0	0	0	0	0	0	0	0
Walking Paths	0	0	0	0	0	0	0	0	0
Teen Center	5	0	5	0	5	5	0	0	0
Totals for Phase 2	15	10	25	10	15	25	10	10	20
Swimming Pool	0	0	0	4	4	8	4	4	8
Totals for Phase 3	0	0	0	4	4	8	4	4	8
Subtotal for Total Project	24	17	41	58	100	158	126	122	248
Discount for Multi-users (15%)	4	3	7	9	15	24	19	18	37
Total Trips Generated	20	14	34	49	85	134	107	104	211

As shown in the table, the new facilities will generate additional traffic into and out of Koko Head District Park. Table 17 is a comparison of existing and estimated future trips generated by the park.

Table 17 Comparison of Existing Versus Future Trips Generated By Park

Period	Direction	Existing Trips	New Trips	Total Future Trips
Weekday Afternoon Peak Hour	Inbound	84	49	133
	Outbound	63	85	148
	Total	147	134	281
Weekend Peak Hour	Inbound	41	107	148
	Outbound	57	104	161
	Total	98	211	309

The summary of total trips generated concludes that traffic generated by the new park facilities will not have

a significant impact on morning peak hour traffic conditions because the study intersections operate at relatively good levels-of-service and most of the park facilities are not expected to open until mid-morning. The Institute of Transportation Engineers recommends that if a project adds less than 100 vehicles per hour in the peak direction, then an impact analysis is not warranted.⁶ (Los Angeles DOT recommends 50 vehicles). Therefore, the weekday morning peak hour was not analyzed. Even though the weekday afternoon peak hour and the weekend peak hour also fall in this category, an impact analysis for these periods should be performed because the study intersections, especially the intersection of Kalaniana'ole Highway at Lunalilo Home Road, experience congestion during these periods.

Trip Distribution and Assignments

The project-related trips were distributed along the anticipated approach routes to the project site based on the directional distribution of peak hour traffic into and out of the study area. The approach and departure distributions are shown in Figure 8.

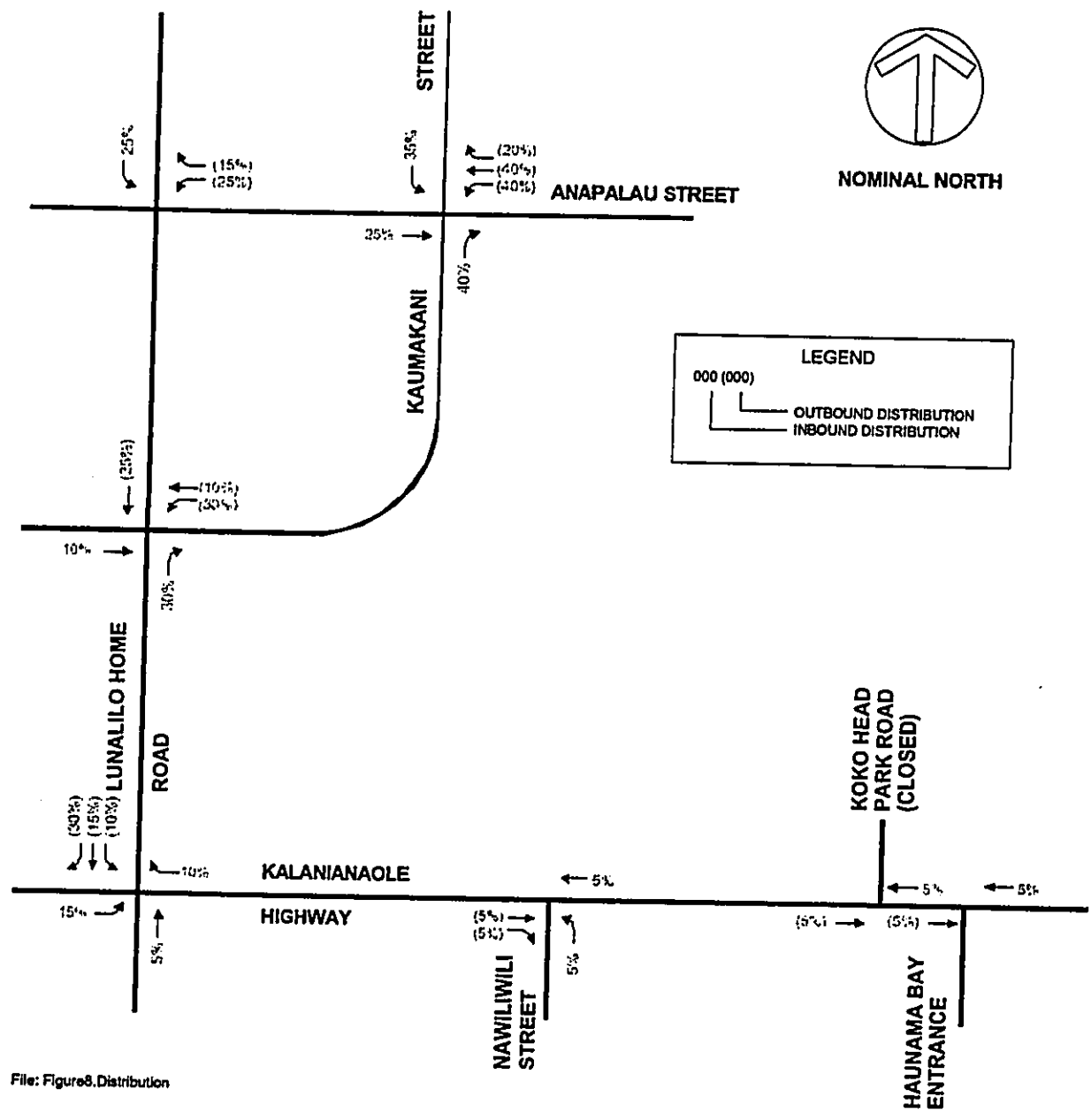
Using the trip generation and trip distribution previously discussed, project-related traffic was assigned to the various traffic movements at the intersections studied. The assignment of project generated traffic is shown in Figure 9 and 10 for weekday afternoon and weekend peak hours, respectively.

2010 Cumulative Plus Project Projections

Cumulative plus project traffic conditions are defined as 2010 background traffic conditions plus project related traffic. The incremental difference between cumulative and cumulative plus project is the traffic impact of the project under study.

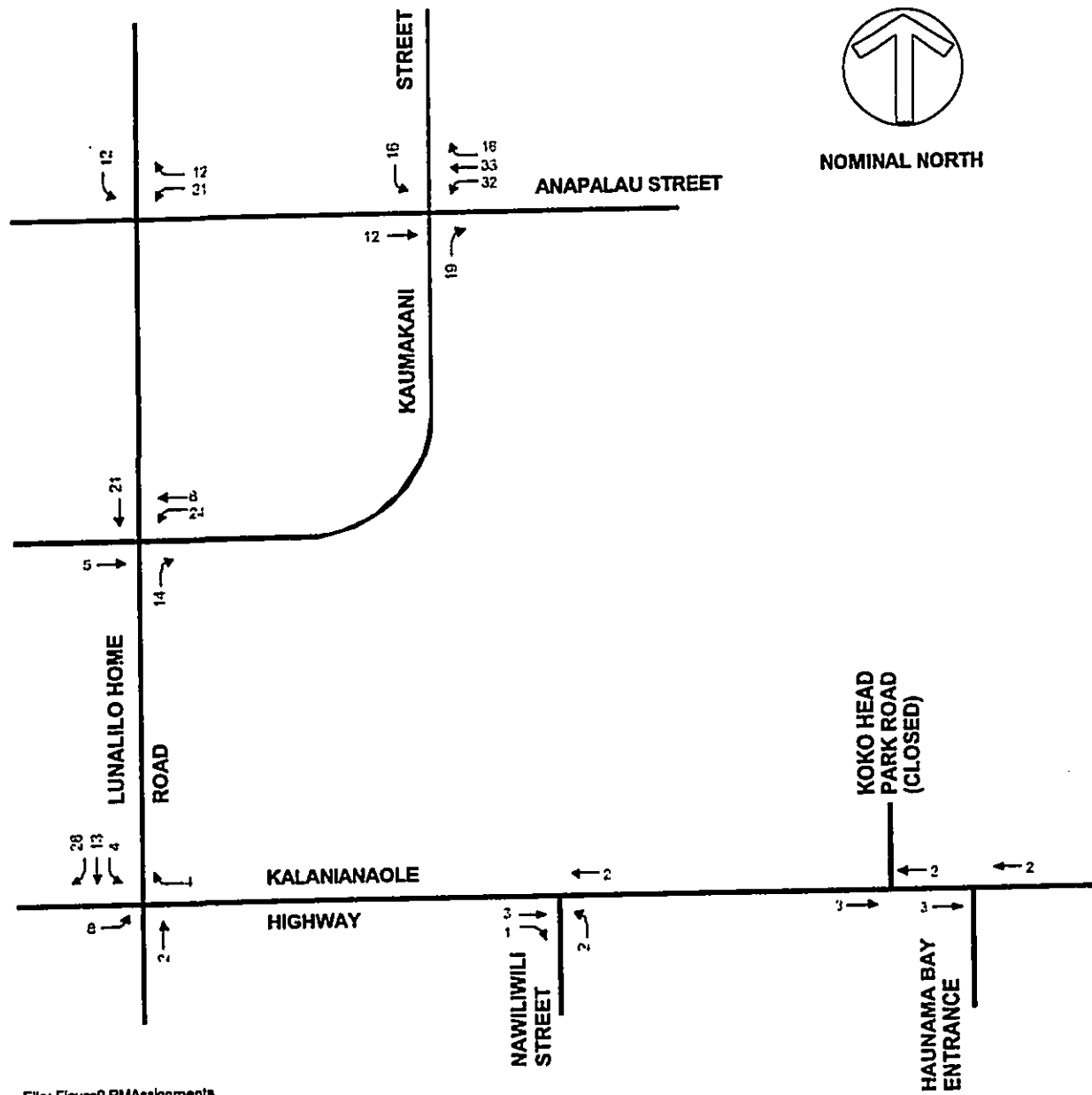
2010 cumulative plus project traffic volumes with the project were estimated by superimposing the peak hourly traffic generated by the proposed project on the 2010 cumulative peak hour traffic volumes presented in Chapter 3. The traffic projections for 2010 cumulative plus project conditions are shown on Figures 11 and 12.

⁶ Institute of Transportation Engineers, *Traffic Access and Impact Studies for Site Development, A Recommended Practice*, Washington, D.C., 1991



File: Figure8.Distribution

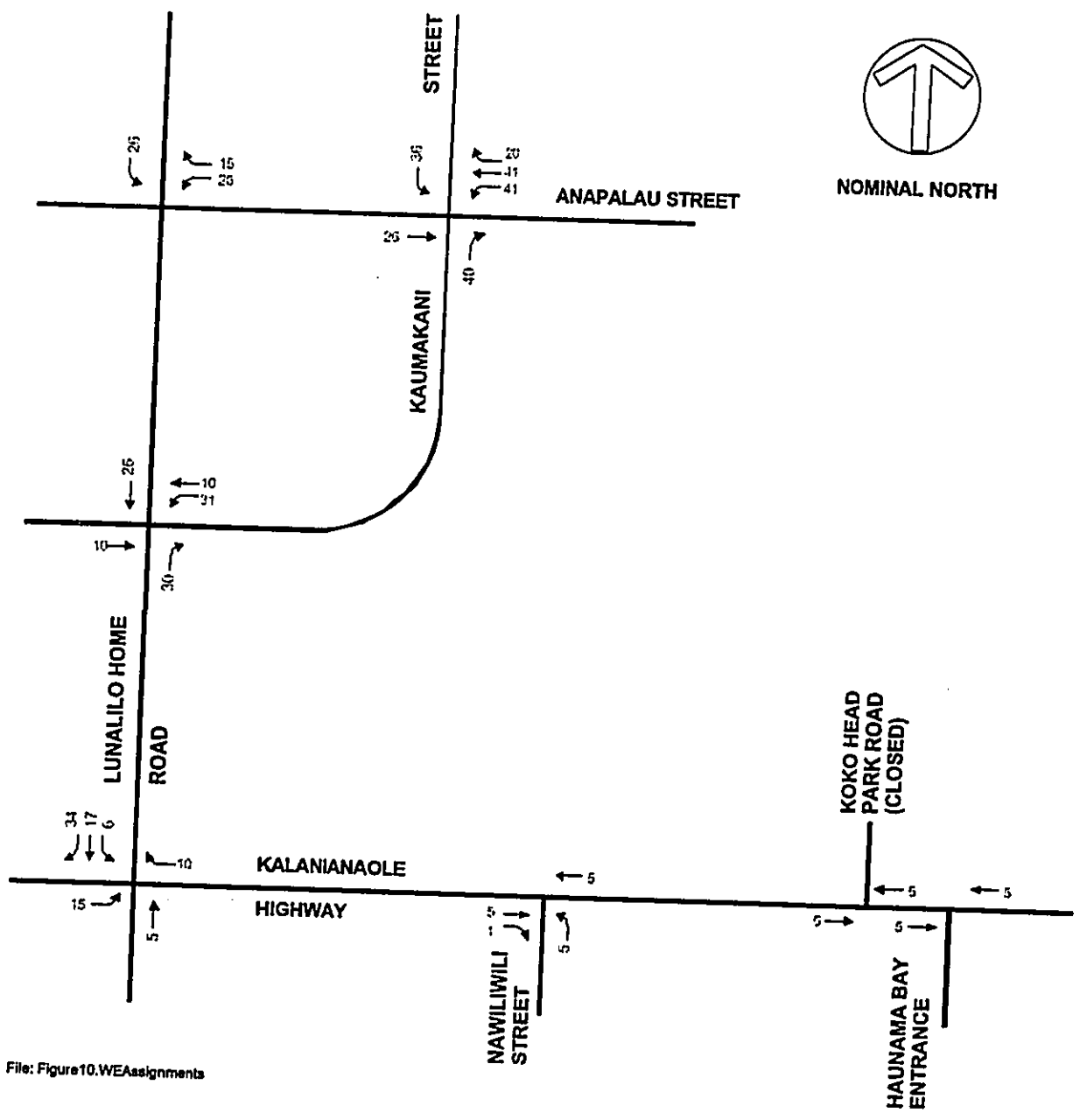
Figure 8
PROJECT TRIP DISTRIBUTION



File: Figure9.PMAAssignments

Figure 9

WEEKDAY AFTERNOON PEAK HOUR TRIP ASSIGNMENT



File: Figure10.WEAassignments

Figure 10
WEEKEND PEAK HOUR TRIP ASSIGNMENT

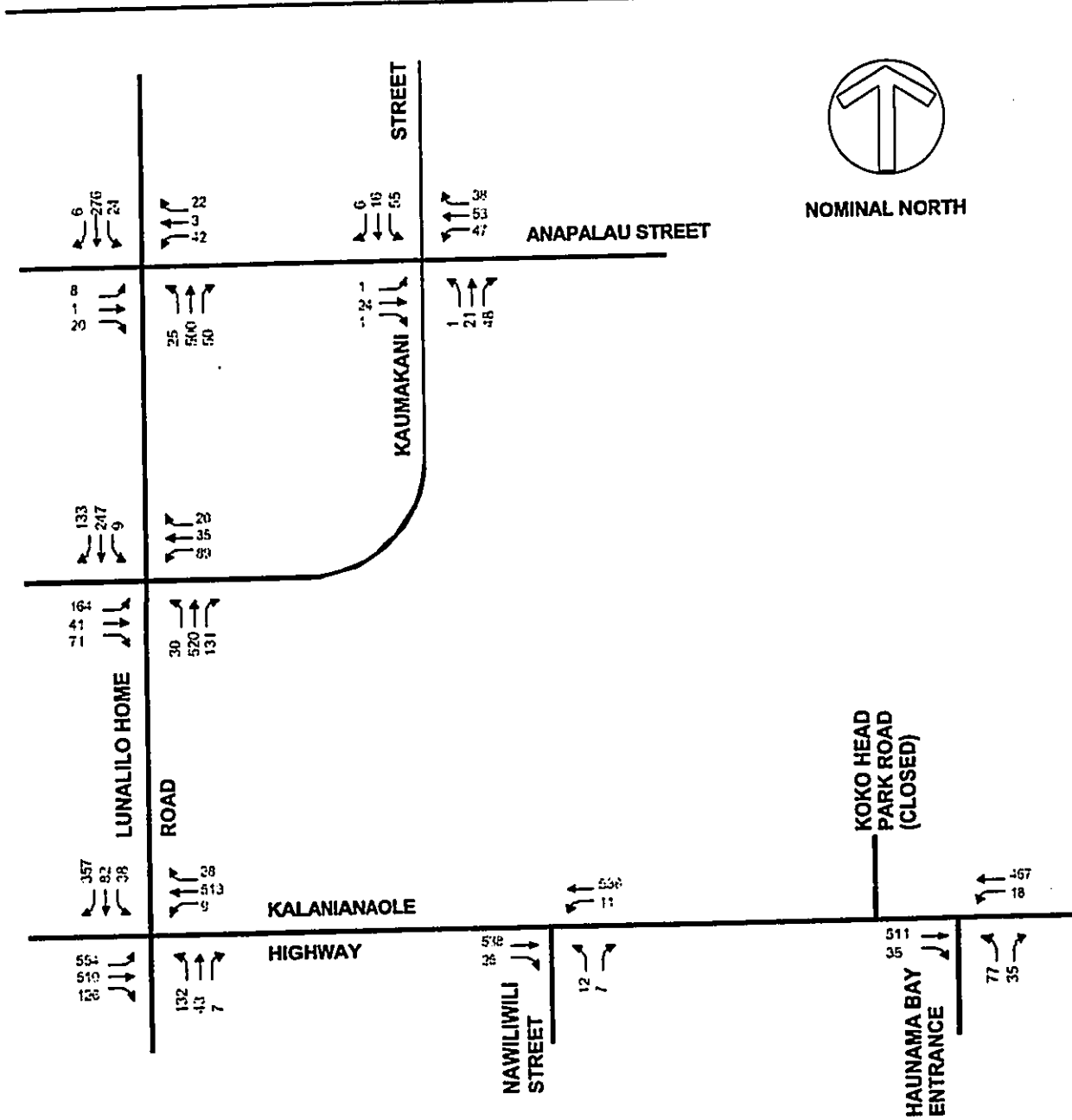


Figure 11

2010 CUMULATIVE PLUS PROJECT WEEKDAY AFTERNOON PEAK HOUR
TRAFFIC VOLUMES

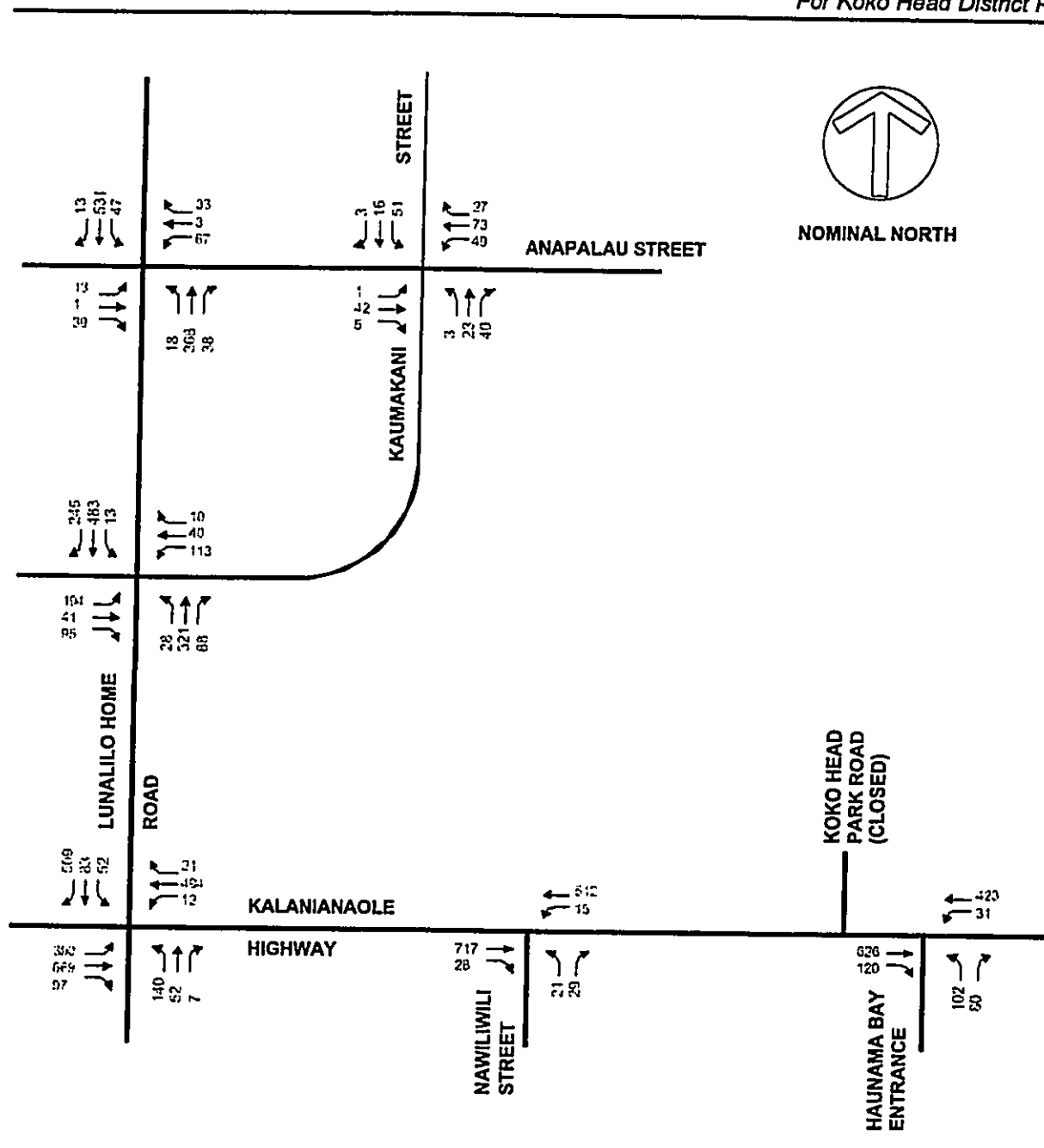


Figure 12

2010 CUMULATIVE PLUS PROJECT WEEKEND PEAK HOUR TRAFFIC VOLUMES

5. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to summarize the results of the level-of-service analysis, which identifies the project-related impacts. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed.

Definition of Significant Impacts

Criteria for determining if a project has a significant traffic impact for which mitigation measures must be investigated have been established based on traffic impact study guidelines used in other traffic studies. Since there is no locally defined criteria, the following criteria is used to define a significant impact for a signalized intersection:

Final Level-of-Service	Final V/C Ratio	Project Related Increase in V/C
C	0.700-0.800	equal to or greater than 0.040
D	0.800 - 0.900	equal to or greater than 0.020
E or F	> 0.900	equal to or greater than 0.010

NOTES:

(1) Los Angeles Department of Transportation, Traffic Study Policies and Procedures, 1993, page 10

There are no similar criteria for unsignalized intersections. However, if the final delay results in a level-of-service D or worse, mitigation measures are evaluated. Mitigation includes widening, additional lanes or traffic signals, if warrants are satisfied.

Project Related Traffic Impacts

The assumptions used for the level-of-service analysis are:

1. The traffic signal timing is optimized for cumulative plus project conditions.
2. There are no changes to the lane configurations of the intersections.
3. Access to the park from Kalaniana'ole Highway via Koko Head Park Road is prohibited.
4. The level-of-service analysis was performed for the total project, rather than each phase.

The traffic impact of a project is the change in level-of-service at the study intersections between the cumulative and cumulative plus project conditions. The level-of-service analysis can be performed for the total intersection or each traffic movement at the study intersection. The level-of-service analysis for the total intersection may overlook a traffic movement with a poor level-of-service. Therefore, each traffic movement was analyzed for this study. The results of the level-of-service analysis of cumulative and cumulative plus project conditions are compared in Tables 19 and 20. The conclusions of the level-of-service analysis are:

1. Anapalau Street at Kaumakani Street will operate at level-of-service B or better during weekday and weekend peak hours, without and with the project. Impacts are insignificant and no mitigation is required.
2. Anapalau Street at Lunalilo Home Road will operate at level-of-service C or better during weekday and weekend peak hours without and with the project. Since the impact of insignificant, no mitigation is required.
3. All traffic movements at the intersection of Kaumakani Street at Lunalilo Home Road will operate at level-of service B or better during weekday and weekend peak periods, without and with the project. Therefore, no mitigation is required.
4. At the intersection of Kalaniana'ole Highway at Lunalilo Home Road, the north bound left, through and right will operate at level-of-service D during the weekday peak hour, without and with the project. The change in the V/C ratio is from 0.63 to 0.65. The final V/C ratio is 0.65, which is defined as level-of-service B. This implies that there is sufficient capacity and the level-of-service D is a result of the traffic signal timing, not the result of a geometry deficiency no mitigation is recommended.

The level-of-service of the southbound left and through movement will change from C to D based on delay. However, the final V/C ratio is 0.42, indicating sufficient capacity.

All remaining traffic movements operate at level-of-service C or better during weekday and weekend peak periods, without and with the project.

5. The intersection of Kalaniana'ole Highway at Nawiliwili Street will operate at level-of-service C or better during weekday and weekend peak periods. No mitigation is required.

Table 19 Impact Analysis for 2010 Weekday Afternoon Cumulative Plus Project Conditions⁽¹⁾

Intersection and Movement	Cumulative			Cumulative Plus Project			Change	
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay
1. Anapalau Street at Kaumakani Street								
Northbound Left, Thru & Right	0.00	7.2	A	0.00	7.2	A	0.00	-0.2
Southbound Left, Thru & Right	0.03	7.4	A	0.04	7.5	A	0.01	0.1
Westbound Left, Thru & Right	0.09	9.9	A	0.96	11.5	B	0.87	1.6
Eastbound Left, Thru & Right	0.02	10.2	B	0.15	11.0	B	0.13	0.8
2. Anapalau Street at Lunaliio Home Road								
Northbound Left & Thru	0.02	8.0	A	0.02	8.0	A	0.00	0.0
Southbound Left & Thru	0.02	8.9	A	0.03	9.0	A	0.01	0.1
Westbound Left, Thru & Right	0.12	17.5	C	0.25	20.0	C	0.13	2.5
Eastbound Left, Thru & Right	0.06	12.3	B	0.07	12.6	B	0.01	0.3
3. Kaumakani Street at Lunaliio Home Road								
Eastbound Left	0.31	11.8	B	0.31	11.9	B	0.00	0.1
Eastbound Thru & Right	0.11	7.9	A	0.12	9.9	A	0.01	2.0
Westbound Left	0.14	10.2	B	0.19	10.6	B	0.05	0.4
Westbound Thru & Right	0.05	9.4	A	0.06	9.5	A	0.01	0.1
Northbound Left & Thru	0.43	12.2	B	0.43	12.2	B	0.00	0.0
Northbound Right	0.13	10.0	B	0.15	10.2	B	0.02	0.2
Southbound Left, Thru & Right	0.19	10.1	B	0.20	10.2	B	0.01	0.1
4. Kalaniana'ole Highway at Lunaliio Home Road								
Eastbound Left	0.85	32.4	C	0.86	33.6	C	0.01	1.2
Eastbound Thru & Right	0.48	3.7	A	0.48	3.7	A	0.00	0.0
Westbound Left	0.03	15.6	B	0.03	15.6	B	0.00	0.0
Westbound Thru	0.83	33.2	C	0.83	33.2	C	0.00	0.0
Westbound Right	0.02	15.4	B	0.03	15.5	B	0.01	0.1
Northbound Left, Thru & Right	0.63	41.5	D	0.65	42.4	D	0.02	0.9
Southbound Left & Thru	0.35	34.2	C	0.42	35.4	D	0.07	1.2
Southbound Right	0.29	34.8	C	0.29	34.9	C	0.00	0.1
5. Kalaniana'ole Highway at Nawiliwili Street								
Westbound Left & Thru	0.01	8.9	A	0.01	8.9	A	0.00	0.0
Northbound Left	0.05	18.9	C	0.06	19.1	C	0.01	0.2
Northbound Right	0.01	11.5	B	0.01	11.5	B	0.00	0.0
6. Kalaniana'ole Highway at Koko Head Park Road								
Eastbound Left & Thru	0.00	8.9	A	CLOSED				
Southbound Left & Right	0.00	12.9	B	CLOSED				
7. Kalaniana'ole Highway at Haunama Bay Entrance								
Westbound Left & Thru	0.02	8.5	A	0.02	8.5	A	0.00	0.0
Northbound Left	0.28	23.4	C	0.28	23.5	C	0.00	0.1
Northbound Right	0.06	11.9	B	0.06	11.9	B	0.00	0.0

NOTES:

- V/C denotes ratio of volume to capacity.
- Delay is in seconds per vehicle.
- LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Tables 1 and 2 for definitions.

Table 20 Impact Analysis for 2010 Weekend Cumulative Plus Project Conditions⁽¹⁾

Intersection and Movement	Cumulative			Cumulative Plus Project			Change	
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay
1. Anapalau Street at Kaumakani Street								
Northbound Left, Thru & Right	0.00	7.2	A	0.00	7.2	A	0.00	0.0
Southbound Left, Thru & Right	0.01	7.3	A	0.04	7.5	A	0.03	0.2
Westbound Left, Thru & Right	0.08	9.7	A	0.28	12.2	B	0.20	2.5
Eastbound Left, Thru & Right	0.03	9.5	A	0.09	11.0	B	0.06	1.5
2. Anapalau Street at Lunaliilo Home Road								
Northbound Left & Thru	0.02	9.0	A	0.02	9.0	A	0.00	0.0
Southbound Left & Thru	0.02	8.4	A	0.05	8.5	A	0.03	0.1
Westbound Left, Thru & Right	0.24	20.0	C	0.48	24.7	C	0.24	4.7
Eastbound Left, Thru & Right	0.16	15.8	C	0.18	17.4	C	0.02	1.6
3. Kaumakani Street at Lunaliilo Home Road								
Eastbound Left	0.36	12.5	B	0.37	12.5	B	0.01	0.0
Eastbound Thru & Right	0.15	10.1	B	0.16	10.2	B	0.01	0.1
Westbound Left	0.18	10.6	B	0.25	11.3	B	0.07	0.7
Westbound Thru & Right	0.04	9.3	A	0.05	9.4	A	0.01	0.1
Northbound Left & Thru	0.29	11.0	B	0.29	11.0	B	0.00	0.0
Northbound Right	0.05	9.4	A	0.09	9.7	A	0.04	0.3
Southbound Left, Thru & Right	0.38	11.5	B	0.40	11.6	B	0.02	0.1
4. Kalaniana'ole Highway at Lunaliilo Home Road								
Eastbound Left	0.74	29.1	C	0.77	30.7	C	0.03	1.6
Eastbound Thru & Right	0.65	8.3	A	0.65	8.3	A	0.00	0.0
Westbound Left	0.05	14.5	B	0.06	14.6	B	0.01	0.1
Westbound Thru	0.82	30.2	C	0.82	30.2	C	0.00	0.0
Westbound Right	0.02	14.0	B	0.04	14.1	B	0.02	0.1
Northbound Left, Thru & Right	0.41	25.9	C	0.42	26.2	C	0.01	0.3
Southbound Left & Thru	0.23	23.6	C	0.28	24.1	C	0.05	0.5
Southbound Right	0.60	32.3	C	0.61	32.6	C	0.01	0.3
5. Kalaniana'ole Highway at Nawiiwill Street								
Westbound Left & Thru	0.02	9.7	A	0.02	9.7	A	0.00	0.0
Northbound Left	0.11	23.5	C	0.14	24.2	C	0.03	0.7
Northbound Right	0.06	13.6	B	0.06	13.7	B	0.00	0.1
6. Kalaniana'ole Highway at Koko Head Park Road								
Eastbound Left & Thru	0.00	8.8	A	CLOSED				
Southbound Left & Right	0.01	20.1	C	CLOSED				
7. Kalaniana'ole Highway at Haunama Bay Entrance								
Westbound Left & Thru	0.04	9.3	A	0.04	9.3	A	0.00	0.0
Northbound Left	0.46	33.8	D	0.46	34.5	D	0.00	0.7
Northbound Right	0.18	14.6	B	0.18	14.7	B	0.00	0.1

NOTES:

1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Tables 1 and 2 for definitions.

6. The intersection of Kalaniana'ole Highway at Haunama Bay entrance will operate at level-of-service C or better during the weekday peak hour. During the weekend peak hour, the left turn from Haunama Bay Drive to Kalaniana'ole Highway will operate at level-of-service D. However, this is not a result of the project the level-of-service is D both without and with the project and there is no project related traffic in this movement.

Conclusions and Recommendations

The conclusions of the level-of-service analysis for 2010 cumulative plus project conditions are:

1. No mitigation measures are required to mitigate traffic related impacts of the proposed project. All traffic movements at the study intersections will operate at D or better, which is considered acceptable for urban conditions. The movements that operate at Level-of-Service D have a volume-to-capacity ratio indicating that the Level-of-Service D is a result of the signal timing and not geometry.
2. Access to the park from Kalaniana'ole Highway via Koko Head Park Road is to be prohibited. However, it is recommended that the road not be removed. It should be maintained for maintenance and emergency services. A knock-down or keyed gate would be sufficient.
3. The safety improvements associated with the Koko Head Shooting Complex will not generate additional traffic during peak hours, and therefore will have no traffic related impacts.

APPENDIX L

Koko Head District Park and Shooting Complex

SSFM International, Inc.

June 26, 2001

KOKO HEAD SHOOTING RANGE AND DISTRICT PARK

Civil Engineering

July 18, 2001

Prepared By:



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APPENDIX A

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DRAINAGE AREAS

KOKO HEAD SHOOTING RANGE

I. Utilities

A. Water System

1. Basis of Design

The following information is based on the State of Hawaii Board of Water Supply "Water System Standards, Volume 1", dated 1985.

2. Existing Supply

The project is located in a 170' Elevation Reservoir Service Area. The existing water service connection to the complex is provided from the adjacent Koko Head District Park through Koko Head Park Road. The water is distributed for domestic use at the existing comfort station and maintenance building and in limited areas, for irrigation. See Appendix for figure.

3. Domestic Water Demands

The calculated demands for domestic use are based on the average daily demands:

$$\begin{aligned} \text{Maximum Daily Demand} &= 1.5 \times \text{Average Daily Demand} \\ \text{Peak Hour Demand} &= 3.0 \times \text{Average Daily Demand} \end{aligned}$$

See Table 1 for the existing and projected domestic water demands. Detailed calculations are presented in Appendix A, Table A1.

Table 1: Existing and Proposed Domestic Water Demands

Area	Existing Demand (gpd)	Proposed Demand (gpd)
Comfort Station	1,000	1,000
Maintenance Building	1,000	1,000
Caretaker's Cottage	N/A	800
Average Domestic Daily Demand	2,000	2,800
Irrigation	14,844	21,724
Total Facility Demand	16,844	24,524

Water source will be maintained from the existing system. Based on the proposed improvements, the domestic water demand is anticipated to increase to 2,800 gpd. The Board of Water Supply has indicated that there are no anticipated problems with additional water needs for

the development, since irrigation will be done during non-peak hours.

4. Fire Flow Requirements

For Agricultural Land: 1000 GPM fire flow for 0.5 hour
For Single Family: 1000 GPM fire flow for one hour

Fire Hydrant Spacing

Access Roads: 700 feet.

Around Structures: 250 feet.

Parking Lots: 350 feet. This increased level of fire protection is recommended since "tailgate parties" increase the risk of fires in the parking lot.

Existing fire protection for the complex is comprised of standpipes located in various places within the crater.

5. On-Site Water Distribution System

Lateral sizes will be controlled by the fire protection requirements.

Distribution lines will be located under roads and paved areas for access, maintenance and protection with a minimum pipe cover of three feet.

The Koko Head Shooting Range will continue to share the 4-inch compound water meter (#82129403) with the Koko Head District Park located off Kaumakani Street.

B. Wastewater Collection System

1. Wastewater Basis of Design

The anticipated wastewater demand is based on the "Design Standards of the Department of Wastewater Management, Volume 1", dated July 1993, from the State of Hawaii, City and County of Honolulu, Department of Wastewater Management.

2. Existing Wastewater Facilities

Wastewater flows for the Koko Head Shooting Complex is collected through a series of gravity sewers to a septic tank system located near the comfort station. Wastewater flows from the various shooting

ranges and the comfort station contribute to the total flow for the complex. See Appendix for figure.

3. Wastewater Demands

See Table 2 for the existing and proposed wastewater demands. Detailed calculations are presented in Appendix A, Table A3.

Table 2: Existing and Proposed Wastewater Demands

	Existing Flow (gpd)	Proposed Flow (gpd)
Domestic Water Demand	2,000	2,800
Average Domestic Water Demand	1,700	2,380
Design Maximum	29,000	32,400
Wet Weather Infiltration/Inflow	5,000	5,000
Peak Design Flow	34,000	37,400

The proposed wastewater flows reflects an increase of 10%. Due to the increase wastewater demands the existing septic tank system may need to be expanded. Due to the location of the facility, connection to a gravity sewer system may be infeasible.

C. Storm Drainage System/Grading

The Koko Head Shooting Range is located within a crater. The existing runoff sheet flows down the sides to a retention/detention basin near the center of the crater. There are several headwalls and culverts that carry storm runoff from other areas in the crater under the roadways towards the retention/detention basin.

See Table 3 for the existing and proposed 10-year storm runoff analysis of the site. Stormwater runoff flow rates were calculated based on a general inspection of the site. Detailed calculations are presented in Appendix A, Table A5.

Table 3: Existing and Proposed Storm Runoff Summary

Drainage Basin	Area (AC)	Existing Flow (CFS)	Proposed Flow (CFS)
1	15	21.80	22.92
2	18	26.63	27.70
3	24	36.46	38.36
TOTAL	57	84.90	88.99

See Appendix for figure.

The proposed stormwater flow shows a slight increase in runoff of approximately 5%. The proposed drainage system will continue to

utilize surface sheet flow to the retention basin in the crater. The retention/detention basin will be expanded as necessary to accommodate the increased storm runoff. Existing drainage patterns will be preserved where practicable.

Best Management Practices

Construction: Use silt fences and controlled ingress/egress to prevent construction debris from migrating off-site.

Use temporary erosion control measures during construction and plant permanent landscaping as soon as finish grades are established.

Schedule mass grading to avoid the rainy season. Open no more than 15 contiguous acres for grading at a time.

Operations

Runoff from the parking lots and paved areas will be directed to grassed swales and concrete ditches.

The landscape maintenance department will continue to monitor the use of fertilizers, pesticides, and herbicides.

II. Infrastructure

A. Roads

The only access to the Koko Head Shooting Complex is from Kalaniana'ole Highway.

The minimum lane width will be 12 feet. Curbs and gutters along the roadways and parking areas will be included in selected areas to help divert drainage flows.

B. Parking

The existing parking lot for the complex includes 34 parking stalls. The proposed parking lot expansion will add approximately 68 additional parking stalls. In addition, accessibility to the shooting range facilities will be provided.

KOKO HEAD DISTRICT PARK

I. Utilities

A. Water System

1. Basis of Design

The following information is based on the State of Hawaii Board of Water Supply "Water System Standards, Volume 1", dated 1985.

2. Existing Supply

The project is located in a 170' Elevation Reservoir Service Area. The existing water service to the project is connected to an 8-inch main off Kaumakani Street. The water is distributed for domestic use at the gym, community center, arts and crafts building, maintenance building, shower facilities, and for irrigation use around the park. See Appendix for figure.

3. Domestic Water Demands

The calculated demands for domestic use are based on the average daily demands:

$$\begin{aligned} \text{Maximum Daily Demand} &= 1.5 \times \text{Average Daily Demand} \\ \text{Peal Hour Demand} &= 3.0 \times \text{Average Daily Demand} \end{aligned}$$

See Table 1 for the projected water demands. Detailed calculations are presented in Appendix A, Table A2.

Table 1: Existing and Proposed Water Demands

Area	Existing Demand (gpd)	Proposed Demand (gpd)
Gym	2,000	2,000
Community Center	500	500
Arts and Crafts	500	500
Maintenance Baseyard	1,000	1,000
Showers	200	200
Comfort Station (3)	N/A	3,000
Teen Center	N/A	1,000
Average Domestic Daily Demand	4,200	8,200
Irrigation	39,826	108,618
Total Facility Demand	44,026	116,818

Water source will be maintained from the existing system. Based on the proposed improvements, the domestic water demand is anticipated to increase to 8,200 gpm. The Board of Water Supply has indicated that there are no anticipated problems with additional water needs for the development, since irrigation will be done during non-peak hours.

4. Fire Flow Requirements

For Agricultural Land: 1000 GPM fire flow for 0.5 hour
For Single Family: 1000 GPM fire flow for one hour

Fire Hydrant Spacing

Access Roads: 700 feet.

Around Structures: 250 feet.

Parking Lots: 350 feet. This increased level of fire protection is recommended since "tailgate parties" increase the risk of fires in the parking lot.

Existing fire protection is provided through several fire hydrants located throughout the park.

5. On-Site Water Distribution System

Lateral sizes will be controlled by the fire protection requirements.

Distribution lines will be located under roads and paved areas for access, maintenance and protection with a minimum pipe cover of three feet.

The Koko Head District Park will continue to share the 4-inch compound water meter (#82129403) with the Koko Head Shooting Range.

B. Wastewater Collection System

1. Wastewater Basis of Design

The anticipated wastewater demand is based on the "Design Standards of the Department of Wastewater Management, Volume 1", dated July 1993, from the State of Hawaii, City and County of Honolulu, Department of Wastewater Management.

2. Existing Wastewater Facilities

Existing wastewater flows are collected via sewer system located on Kaumakani Street. All flows then enter the Hawaii Kai Collection System that leads to Hawaii Kai Wastewater Treatment Plant. HKWWTP is owned and operated by Hawaii-American Water Company (HAWC). See Appendix for figure.

3. Wastewater Demands

See Table 2 for the wastewater demands for the Koko Head District Park. Detailed calculations are presented in Appendix A, Table A4.

Table 2: Existing and Proposed Wastewater Demands

	Existing Flow (gpd)	Proposed Flow (gpd)
Domestic Water Demand	4,200	8,200
Average Domestic Water Demand	3,570	6,970
Design Maximum	34,350	51,350
Wet Weather Infiltration/Inflow	13,750	13,750
Peak Design Flow	48,100	65,100

The sewer system will maintain flows on the lower portions with modifications to the upper portions for the proposed development. HAWC has indicated that there are no anticipated problems with additional sewer demand based on the proposed development as long as the development does not exceed the previous demand of the Job Corps Development. Within the previous Job Corp site, there were approximately 25 structures. This new development will have four additional structures of sewer demand. The system should be adequate to accept the flows.

C. Storm Drainage System/Grading

The upper portion of the Koko Head Regional Park (formerly Job Corps Site) is for the most part, sheet flow drainage. There are several headwalls and culverts that carry storm runoff under the roadways.

There are also several diversion ditches located just below the Job Corps Site to divert storm water towards a lined ditch along the residential areas of KHRP. The lower areas of KHRP also sheet flows with several diversion ditches to protect the lower portions.

Stormwater runoff from the site enters an existing storm drainage system in the adjacent residential development.

A "Storm Drain Connection Permit" will be required to connect to any existing City owned storm drain system.

See Table 3 for the existing and proposed 10-year storm runoff analysis of the site. Stormwater runoff flow rates were calculated based on a general inspection of the site. Detailed calculations are presented in Appendix A, Table A6.

Table 3: Existing and Proposed Storm Runoff Summary

Drainage Basin	Area (AC)	Existing Flow (CFS)	Proposed Flow (CFS)
1	13.0	14.41	15.56
2	20.8	23.13	23.13
3	11.4	10.83	11.70
4	60.4	79.18	88.91
5	37.0	72.34	79.48
TOTAL	142.6	199.90	218.78

See Appendix for figure.

The proposed stormwater flow shows an increase in runoff of approximately 9%. The proposed drainage system will continue to utilize the existing sheet flow and drainage structures. Existing drainage patterns will be preserved where practicable. Where new facilities interfere with existing drainage structures such as grassed swales, the structures will be rerouted in such a way to preserve the drainage capability of the site.

Since the lined ditch protecting the residents was designed based on the previous Job Corps development, which had a greater area of impervious surface in comparison to the new development

Best Management Practices

Construction: Use silt fences and controlled ingress/egress to prevent construction debris from migrating off-site.

Use temporary erosion control measures during construction and plant permanent landscaping as soon as finish grades are established.

Schedule mass grading to avoid the rainy season. Open no more than 15 contiguous acres for grading at a time.

Operations

Runoff from the parking lots and paved areas will be directed to grassed swales and concrete ditches.

The landscape maintenance department will continue to monitor the use of fertilizers, pesticides, and herbicides.

II. Infrastructure

A. Roads

There are two access points to the Koko Head District Park. The first access point is from Kalaniana'ole Highway onto Koko Head Park Road. The second point of access is on Anapalau Street from the adjacent residential development.

The minimum lane width will be 12 feet. Curbs and gutters along the roadways and parking areas will be included in selected areas to help divert drainage flows.

Access roads and walkways will be provided throughout the park.

B. Parking

The existing parking facilities available include approximately 250 parking stalls. The proposed parking lot expansion will add approximately 280 additional stalls.

APPENDIX A

Table A1 - Projected Water Demand.

KOKO HEAD SHOOTING RANGE (WATER DEMAND)

Existing

	cap	gpd	gal/month	gpd	Note
Comfort Station	100	10	30,000	1,000	(Estimate based on usage)
Maintenance Facility	10	100	30,000	1,000	(Estimate based on usage)
Average Domestic Demand			60,000	2,000	(Average Day)
Max Domestic Demand				3,000	(Max Day = 1.5 x Ave. Day)
Peak Domestic Demand				6,000	(Peak Hour = 3 x Ave. Day)
Average Per Capita				18.18	
	acre	in/week	gal/month	gpd	Note
Irrigation	4.1	1	445,332	14,844	(Estimated Irrigated Area)
Facility Demand			445,332	14,844	
Existing Average Water Demand			505,332	16,844	

Projected

	cap	gpd	gal/month	gpd	Note
Comfort Station	100	10	30,000	1,000	(Estimate based on usage)
Maintenance Facility	10	100	30,000	1,000	(Estimate based on usage)
Caretaker's Cottage	2	400	24,000	800	(Estimate based on usage)
Average Domestic Demand			84,000	2,800	(Average Day)
Max Domestic Demand				4,200	(Max Day = 1.5 x Ave. Day)
Peak Domestic Demand				8,400	(Peak Hour = 3 x Ave. Day)
Average Per Capita				25.00	
	acre	in/week	gal/month	gpd	Note
Irrigation	6	1	651,705	21,724	(Proposed Irrigation Area)
Facility Demand			651,705	21,724	
Projected Average Water Demand			735,705	24,524	

Table A2 - Projected Water Demand.

KOKO HEAD DISTRICT PARK (WATER DEMAND)

Existing

	cap	gpd	gal/month	gpd	Note
Gym	200	10	60,000	2,000	(Estimate based on usage)
Community Center	50	10	15,000	500	(Estimate based on usage)
Arts and Crafts	50	10	15,000	500	(Estimate based on usage)
Maintenance Baseyard	10	100	30,000	1,000	(Estimate based on usage)
Showers	20	10	6,000	200	(Estimate based on usage)
Average Domestic Demand			126,000	4,200	(Average Day)
Max Domestic Demand				6,300	(Max Day = 1.5 x Ave. Day)
Peak Domestic Demand				12,600	(Peak Hour = 3 x Ave. Day)
Average Per Capita				12.73	
	acre	in/week			
Irrigation	11	1	1,194,793	39,826	(Estimated Irrigated Area)
Facility Demand			1,194,793	39,826	
Existing Average Water Demand			1,320,793	44,026	

Projected

	cap	gpd	gal/month	gpd	Note
Gym	200	10	60,000	2,000	(Estimate based on usage)
Community Center	50	10	15,000	500	(Estimate based on usage)
Arts and Crafts	50	10	15,000	500	(Estimate based on usage)
Maintenance Baseyard	10	100	30,000	1,000	(Estimate based on usage)
Showers	20	10	6,000	200	(Estimate based on usage)
Comfort Station (3 EA)	300	10	90,000	3,000	(Estimate based on usage)
Teen Center	100	10	30,000	1,000	(Estimate based on usage)
Average Domestic Demand			246,000	8,200	(Average Day)
Max Domestic Demand				12,300	(Max Day = 1.5 x Ave. Day)
Peak Domestic Demand				24,600	(Peak Hour = 3 x Ave. Day)
Average Per Capita				11.23	
	acre	in/week			
Irrigation	30	1	3,258,527	108,618	(Proposed Irrigation Area)
Facility Demand			3,258,527	108,618	
Projected Average Water Demand			3,504,527	116,818	

Table A3 - Projected Wastewater Design Flow.

KOKO HEAD SHOOTING RANGE (WASTEWATER DEMAND)

Existing

Domestic Water Demand	gal/day	
	2,000	
Wastewater Flow	gal/day	
Average	1,700	(85% of Domestic Water Demand)
Maximum	8,500	(5 times Average)
Dry Weather I/I	20,500	(5 gpcd for sewer above GW)
Design Average	22,200	(Average + Dry Weather I/I)
Design Maximum	29,000	(Maximum + Dry Weather I/I)
Wet Weather I/I	5,000	(1250 gad for sewer above GW - 4 acres)
Design Peak	34,000	(Design Maximum + Wet Weather I/I)

Projected

Domestic Water Demand	gal/day	
	2,800	
Wastewater Flow	gal/day	
Average	2,380	(85% of Domestic Water Demand)
Maximum	11,900	(5 times Average)
Dry Weather I/I	20,500	(5 gpcd for sewer above GW)
Design Average	22,880	(Average + Dry Weather I/I)
Design Maximum	32,400	(Maximum + Dry Weather I/I)
Wet Weather I/I	5,000	(1250 gad for sewer above GW - 4 acres)
Design Peak	37,400	(Design Maximum + Wet Weather I/I)

Table A4 - Projected Wastewater Design Flow.

KOKO HEAD DISTRICT PARK (WASTEWATER DEMAND)

Existing

	gal/day	
Domestic Water Demand	4,200	
Wastewater Flow		
Average	3,570	(85% of Domestic Water Demand)
Maximum	17,850	(5 times Average)
Dry Weather I/I	16,500	(5 gpcd for sewer above GW)
Design Average	20,070	(Average + Dry Weather I/I)
Design Maximum	34,350	(Maximum + Dry Weather I/I)
Wet Weather I/I	13,750	(1250 gad for sewer above GW - 11 acres)
Design Peak	48,100	(Design Maximum + Wet Weather I/I)

Projected

	gal/day	
Domestic Water Demand	8,200	
Wastewater Flow		
Average	6,970	(85% of Domestic Water Demand)
Maximum	34,850	(5 times Average)
Dry Weather I/I	16,500	(5 gpcd for sewer above GW)
Design Average	23,470	(Average + Dry Weather I/I)
Design Maximum	51,350	(Maximum + Dry Weather I/I)
Wet Weather I/I	13,750	(1250 gad for sewer above GW - 11 acres)
Design Peak	65,100	(Design Maximum + Wet Weather I/I)

Table A5 - Drainage Conditions

EXISTING CONDITIONS (KOKO HEAD SHOOTING RANGE)

Basin	Area acres	Csoil	Cpavt	%pavt Area(pavt)	Coverage	L feet	Elev feet	Slope	Tc min	I10 in/hr	I50 in/hr	Corr Fact	Int10 in/hr	Int50 in/hr	Q10 cfs	Q50 cfs
1	15.0	0.40	0.95	5%	0.75	1000	78	7.8%	20	2	2.8	1.7	3.4	4.76	21.80	30.52
2	18.0	0.40	0.95	2%	0.36	1600	238	14.9%	18	2	2.8	1.8	3.6	5.04	26.63	37.29
3	24.0	0.40	0.95	4%	0.96	1500	238	15.9%	16	2	2.8	1.8	3.6	5.04	36.46	51.05
Total	57.0				2.07 (Pavt)										84.90	118.85

PROPOSED CONDITIONS (KOKO HEAD SHOOTING RANGE)

Basin	Area acres	Csoil	Cpavt	%pavt Area(pavt)	Coverage	L feet	Elev feet	Slope	Tc min	I10 in/hr	I50 in/hr	Corr Fact	Int10 in/hr	Int50 in/hr	Q10 cfs	Q50 cfs
1	15.0	0.40	0.95	9%	1.35	1000	78	7.8%	20	2	2.8	1.7	3.4	4.76	22.92	32.09
2	18.0	0.40	0.95	5%	0.90	1600	238	14.9%	18	2	2.8	1.8	3.6	5.04	27.70	38.78
3	24.0	0.40	0.95	8%	1.92	1500	238	15.9%	16	2	2.8	1.8	3.6	5.04	38.36	53.71
Total	57.0				4.17 (Pavt)										88.99	124.58

Table A6 - Drainage Conditions

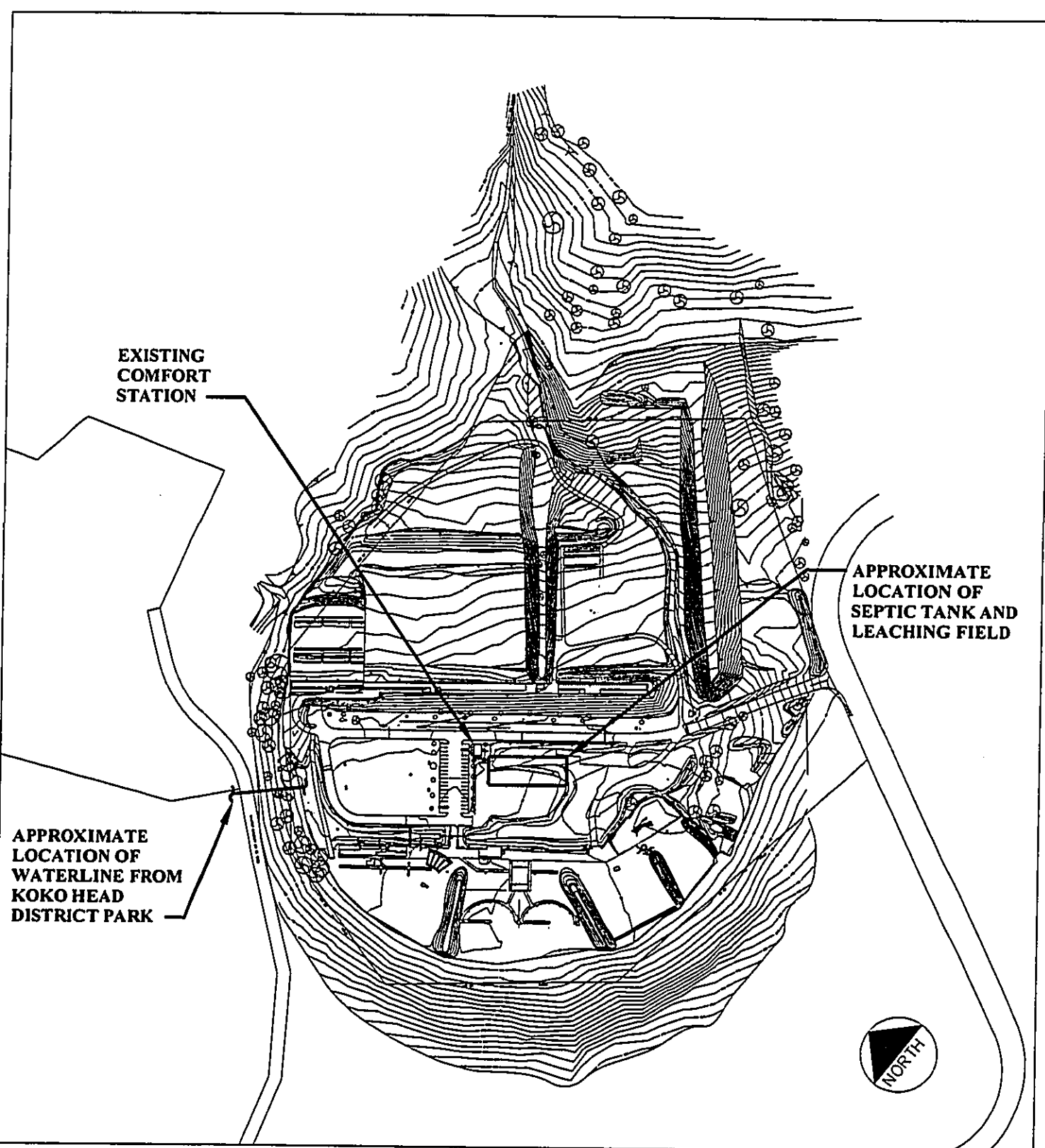
EXISTING CONDITIONS (KOKO HEAD DISTRICT PARK)

Basin	Area acres	Csoil	Cpavt	%pavt Area(pavt)	Coverage	L feet	Elev feet	Slope	Tc min	I10 in/hr	I50 in/hr	Corr Fact	Int10 in/hr	Int150 in/hr	Q10 cfs	Q50 cfs
1	13.0	0.25	0.95	2%	0.26	3400	1000	29.4%	12.1	2	2.8	2.1	4.2	5.88	14.41	20.18
2	20.8	0.25	0.95	4%	0.83	3900	1025	26.3%	13.2	2	2.8	2.0	4.0	5.60	23.13	32.38
3	11.4	0.25	0.95	2%	0.23	2800	425	15.2%	17.5	2	2.8	1.8	3.6	5.04	10.83	15.17
4	60.4	0.25	0.95	5%	3.02	3000	1025	34.2%	10.6	2	2.8	2.3	4.6	6.44	79.18	110.86
5	37.0	0.25	0.95	25%	9.25	1400	600	42.9%	10.6	2	2.8	2.3	4.6	6.44	72.34	101.27
Total	142.6				13.59 (Pav't)										199.90	279.86
					129.01 (Grassed Area)											

PROPOSED CONDITIONS (KOKO HEAD DISTRICT PARK)

Basin	Area acres	Csoil	Cpavt	%pavt Area(pavt)	Coverage	L feet	Elev feet	Slope	Tc min	I10 in/hr	I50 in/hr	Corr Fact	Int10 in/hr	Int150 in/hr	Q10 cfs	Q50 cfs
1	13.0	0.25	0.95	5%	0.65	3400	1000	29.4%	12.1	2	2.8	2.1	4.2	5.88	15.56	21.79
2	20.8	0.25	0.95	4%	0.83	3900	1025	26.3%	13.2	2	2.8	2.0	4.0	5.60	23.13	32.38
3	11.4	0.25	0.95	5%	0.57	2800	425	15.2%	17.5	2	2.8	1.8	3.6	5.04	11.70	16.37
4	60.4	0.25	0.95	10%	6.04	3000	1025	34.2%	10.6	2	2.8	2.3	4.6	6.44	88.91	124.47
5	37.0	0.25	0.95	31%	11.47	1400	600	42.9%	10.6	2	2.8	2.3	4.6	6.44	79.48	111.28
Total	142.6				19.56 (Pav't)										218.78	306.29
					123.04 (Grassed Area)											

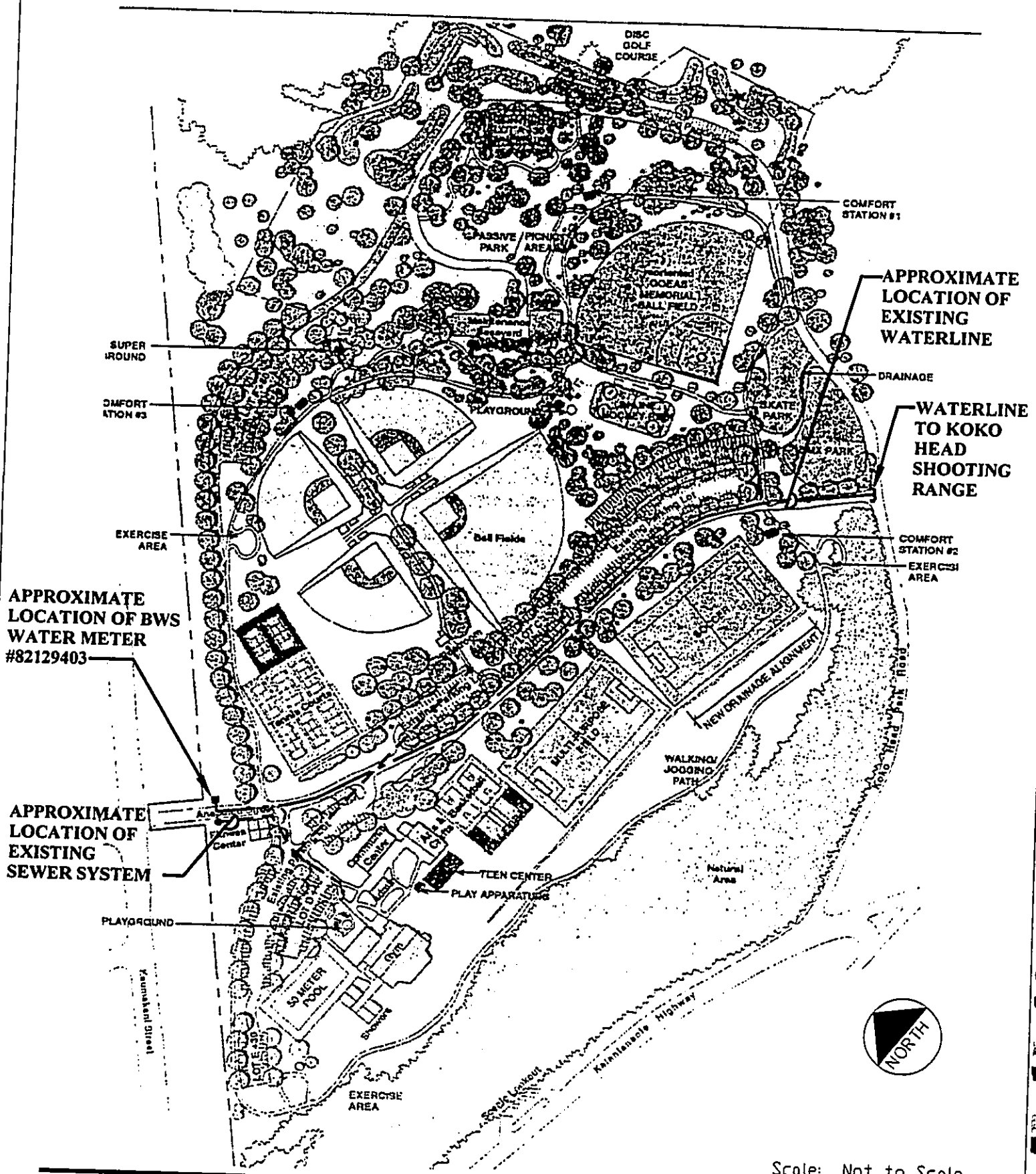
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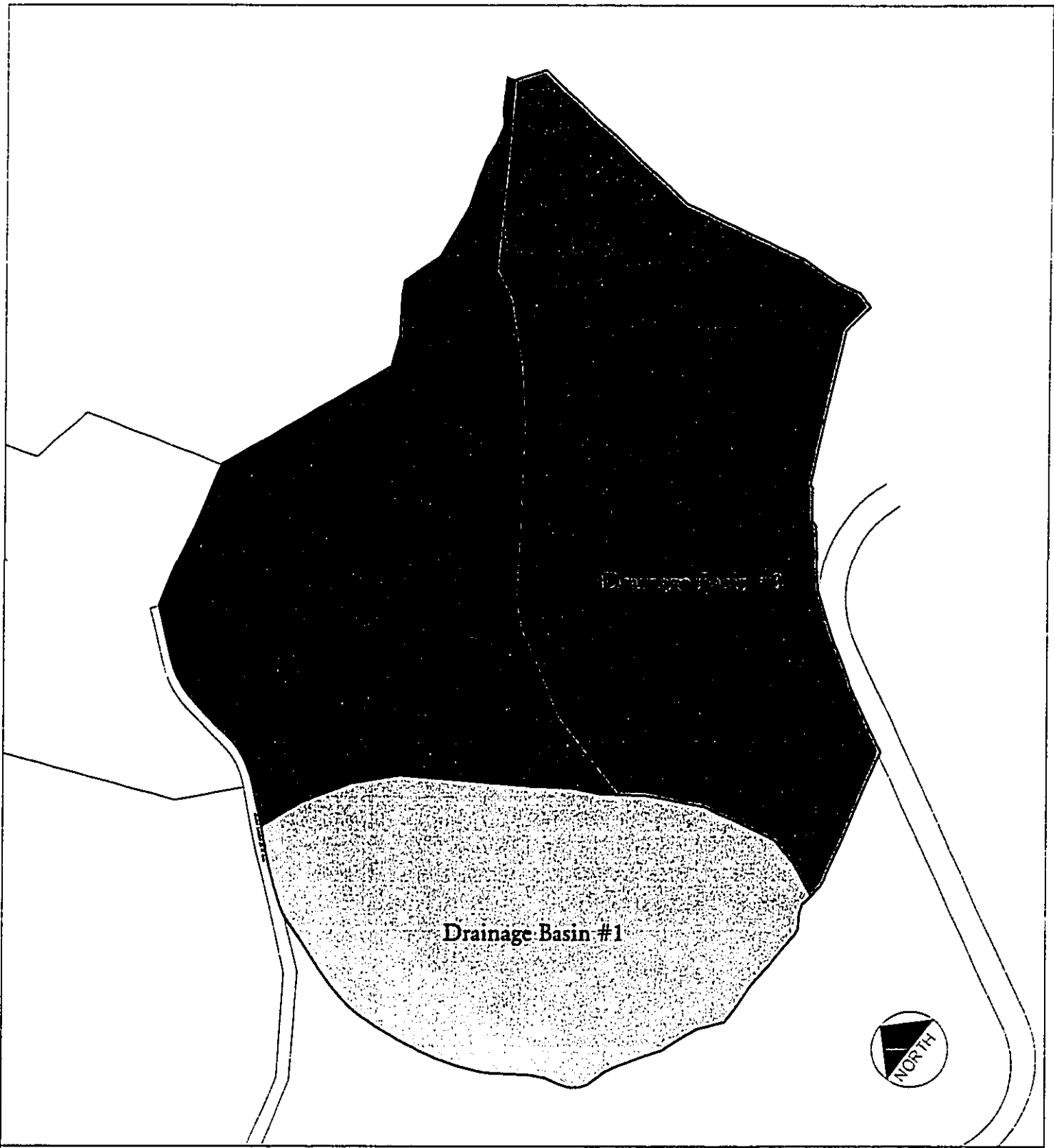
Koko Head
Shooting Range

Location of Water and
Wastewater Facilities



Koko Head District Park

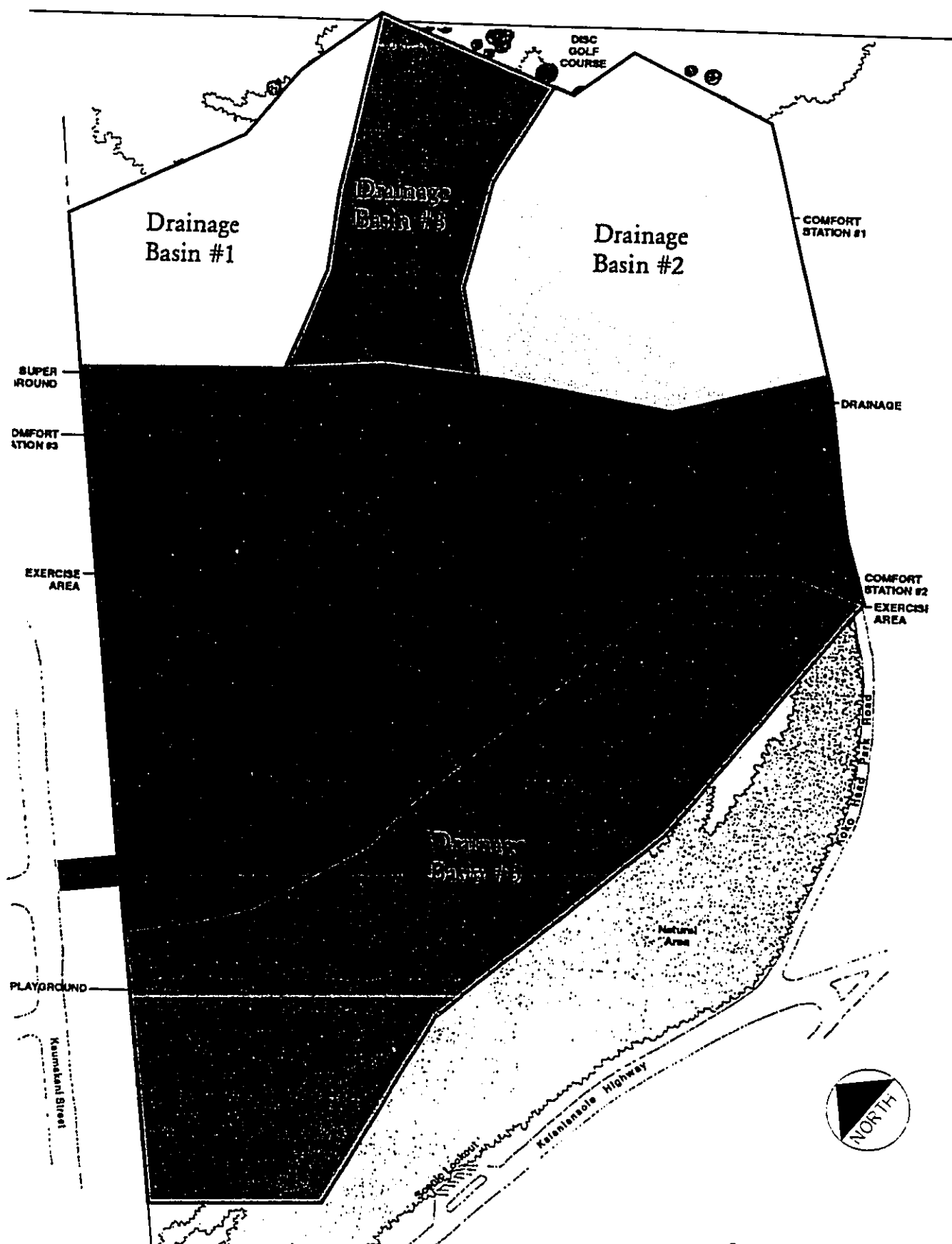
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 Location of Water and Wastewater Facilities



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Koko Head
Shooting Range

Drainage Areas



Koko Head District Park

Scale: Not to Scale
Drainage Areas

Koko Head District Park-Estimated Earthwork

Qty each	Area square feet	Depth feet	Slope Factor*	Cut %	Fill %	Excavation cubic yards	Embankment cubic yards	Notes
1	73500	4.0	1.10	0.85	0.15	11,199	1,797	
1	73500	3.0	1.10	0.85	0.35	6,423	3,144	
1	9800	2.0	1.10	1.00	0	878	-	
4	2700	5.0	1.10	1.00	0	605	-	
5	400	1.0	1.10	1.00	0	18	-	
6	42900	10.0	1.10	0.50	0.5	9,613	8,739	
7	122500	0.5	1.01	0.50	0.5	1,157	1,146	May need to expand perimeter edges
8	9000	7.0	1.10	0.05	0.95	141	2,438	2'ac*6"bc
9	27000	2.0	1.05	0.95	0.05	2,095	105	
10	9000	2.0	1.05	0.05	0.95	37	665	
11	12000	2.0	1.05	0.50	0.5	490	467	
12	9000	3.0	1.05	0.85	0.15	937	158	
13	18000	6.0	1.10	0.50	0.5	2,420	2,200	Assumed a tiered parking lot
14	12000	2.0	1.05	0.75	0.25	735	233	
15	18400	4.0	1.05	0.50	0.5	1,503	1,431	
16	122500	2.0	1.01	0.50	0.5	4,628	4,582	
17	441000	0.5	1.01	0.50	0.5	4,165	4,124	
Subtotal						47,045	31,229	
Contingency (25%)						11,781	7,807	
Estimated Earthwork Total**						59,000	40,000	

* Factor for cut and fill slopes (2h:1v)
** Estimated earthwork are for planning purposes only.

Koko Head Shooting Range-Estimated Earthwork

Qty each	Area square feet	Depth feet	Slope Factor*	Cut %	Fill %	Excavation cubic yards	Embankment cubic yards	Notes
1	112500	4.0	1.10	0.60	0.40	12,100	7,333	
2	105700	4.0	1.10	0.60	0.40	11,369	6,890	
3	78800	2.0	1.10	0.50	0.50	3,531	3,210	
4	22500	2.0	1.10	0.50	0.50	1,008	917	
5	26300	0.5	1.10	0.25	0.75	147	402	
6	1200	2.0	1.10	0.00	1.00	-	98	
Subtotal						28,156	18,850	
Contingency (25%)						7,039	4,713	
Estimated Earthwork Total**						36,000	24,000	

* Factor for cut and fill slopes (2h:1v)
** Estimated earthwork are for planning purposes only.

APPENDIX M

Acoustic Study for the Koko Head District Park Master Plan and Shooting Complex Safety Improvements

Y. Ebisu and Associates

July 2001

**ACOUSTIC STUDY FOR THE KOKO HEAD
DISTRICT PARK MASTER PLAN AND
SHOOTING COMPLEX SAFETY IMPROVEMENTS
HONOLULU, HAWAII**

Prepared for:

GROUP 70 INTERNATIONAL

Prepared by:

**Y. EBISU & ASSOCIATES
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JULY 2001

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CHAPTER I. SUMMARY

This noise study describes the potential noise impacts associated with the Master Plan for the Koko Head District Park and Shooting Complex adjacent to Hawaii Kai, on the Island of Oahu. Risks of possible noise impacts on park users and neighboring residents due to impulsive noise from the Koko Head Shooting Complex were evaluated. Risks of possible noise impacts on park neighbors from roadway traffic as well as activities in the park were evaluated. Noise mitigation measures were recommended as required.

The results of the noise study can be summarized as follows:

- Project-Related Traffic Noise. Existing and future traffic noise levels within the Koko Head District Park site are not expected to exceed 70 DNL, and the park site should remain in the "Compatible" and "Marginally Compatible" categories for "Neighborhood Park" use. Future traffic noise in the residential areas along Kaumakani and Anapalau Streets should not exceed the FHA/HUD standard of 65 DNL with or without the improvements proposed for the park. In addition, future traffic noise levels associated with users of the Koko Head Shooting Complex are not expected to alter traffic noise levels along Kalaniana'ole Highway. For these reasons, mitigation of future motor traffic noise associated with the Koko Head District Park and the Koko Head Shooting Complex should not be required.
- Noise Sources Within Koko Head District Park. The loudest noise sources within Koko Head District Park are anticipated to be lawn and park maintenance equipment. The majority of the new facilities planned at the Koko Head District Park should not cause adverse noise impacts and noise mitigation measures should not be required. These include the Picnic Areas, reoriented Goeas Memorial Ballfield, new Soccer and Multi-Purpose Fields, relocated Volleyball Court, relocated Skate Park, new In-line Hockey Skate Rink, relocated BMX Site, new Passive Park and Picnic Areas, new Disc Golf Course, and Walking Paths.
- Noise mitigation measures in the form of administrative controls and supervision are recommended if excessive noise from boisterous behavior occurs at the 50 Meter Pool and Playground within 250 feet of the residences. Risks of annoyance due to loud music from the Teen Center should be minimized by orienting the building's ventilation openings and doors away from the closest residents toward the northwest. In addition, administrative controls and supervision of the operating hours are recommended noise mitigation measures.
- The backboards at the new tennis courts should be constructed from concrete to minimize impact noise levels at the closest residences. Location of the backboards on the north side of the new courts would also help to reduce noise from the tennis courts at existing residents north of the tennis courts.

- Koko Head Shooting Complex. Impulsive noise from the shooting complex will continue to be the dominant noise source in the project area. The safety improvements to the complex are not expected to increase the maximum noise levels from the Shooting Complex. Administrative controls and scheduling of range operating times are the noise mitigation measures available for the Shooting Complex. Operation during the warmest time of the day and avoidance of early morning and late evening operating hours should minimize excessively loud noise in the surrounding communities due to adverse atmospheric conditions. In addition, because the audibility of the impulsive noise from the range cannot be eliminated, operation at night should be avoided.
- Construction Noise. Unavoidable, but temporary, noise impacts may occur during the construction period. Because noise from construction activities are predicted to be audible at adjoining properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels may not be practical in all cases. Compliance with DOH noise regulations and applicable construction curfew periods are recommended to minimize construction noise impacts.

CHAPTER II. STUDY OBJECTIVES AND METHODOLOGY

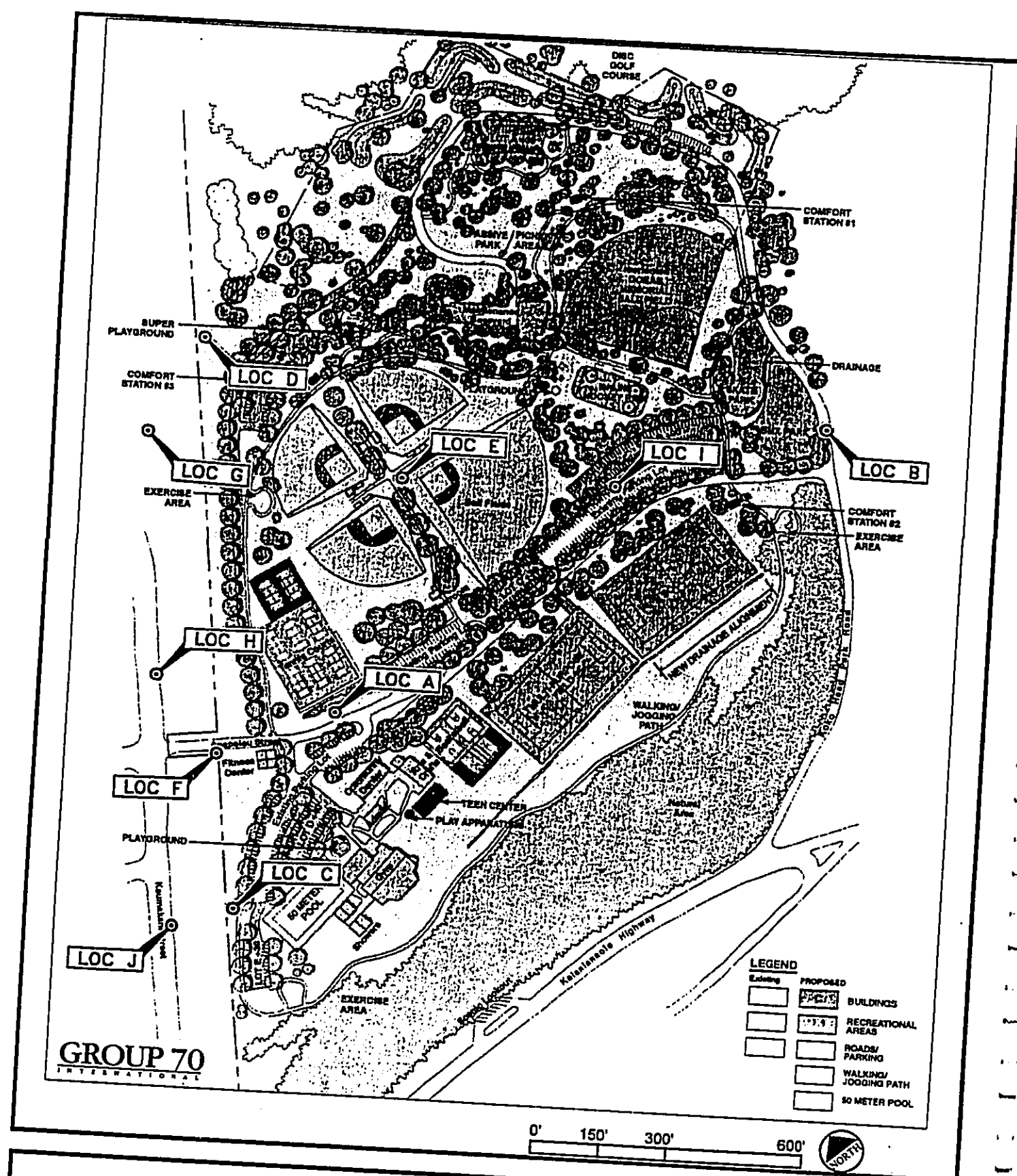
Study Objectives. The objectives of this study were to describe the existing and future acoustical environment in the vicinity of the Koko Head District Park and adjacent Shooting Complex, which are located in the Hawaii Kai area on the island of Oahu, Hawaii. Traffic noise level increases and impacts associated with the proposed park development were to be determined. Specific objectives were to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases. Recommendations for minimizing these noise impacts were also to be provided as required. In addition, assessments of possible noise impacts from impulsive noise from the adjacent shooting complex, on-site maintenance and recreational activities, and from short term construction noise at the project site were included in the noise study objectives.

Methodology. Existing background ambient noise levels were measured at ten locations within and adjacent to the Koko Head District Park site in June 2001 where shown in Figure 1. These measurements were used to describe the existing background ambient noise levels in the environs of the park, and to compare these levels with recommended noise levels for parks. Measurements of sound levels at the Kalani High School soccer field were also obtained. In addition, measurements of the impulsive sound levels from the Koko Head Shooting Complex east of the park, as well as the sound levels associated with activities at the existing tennis courts, baseball field, and skateboard facilities at the Koko Head District Park were also obtained.

Traffic noise measurements along the access roadways to and from the park were measured in June 2001. The traffic noise measurements were used to calibrate the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (Reference 1). The noise model was used as the primary method of calculating the existing and future traffic noise levels. Traffic data entered into the noise prediction model were: hourly traffic volumes, average vehicle speeds, estimates of traffic mix, and soft ground propagation loss factor. The traffic data and projections for the project (Reference 2) were the primary sources of data inputs to the model.

The future (CY 2010) traffic noise levels along the access roadways to the project sites were calculated for conditions with and without implementation of the Master Plan for the park and shooting complex. The predicted future traffic noise levels were compared with current noise abatement criteria to determine specific locations where noise abatement measures might be required.

Predictions of Noise Levels from On-Site Sources. Noise levels from planned activities (including construction and maintenance activities) at the project sites were also described using available sound level data. The potential noise levels from shouting and screaming, a gym scoreboard horn, and music from the Teen Center were



LOCATIONS OF NOISE MEASUREMENTS AT KOKO HEAD DISTRICT PARK

FIGURE 1

also described. Measures for minimizing risks of future adverse impacts from these on-site activities were also described as required. Measurements of impulsive noise from the shooting range were used to describe the relative intrusiveness of these noise events when compared to existing background ambient noise levels from other noise sources.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL or Ldn). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in Appendix B to this report.

Table 1, derived from Reference 3, presents current federal noise standards and acceptability criteria for residential land uses. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 2, which was extracted from Reference 4. As indicated in Figure 2, noise levels below 55 DNL are considered to be "Compatible" for "Neighborhood Parks", and levels above 70 DNL are considered to be "Incompatible" for "Neighborhood Parks." For single family residential uses, noise levels below 55 DNL are considered to be "Unconditionally Compatible," and those above 65 DNL are considered to be "Incompatible."

For the purposes of determining noise acceptability for funding assistance from federal agencies [Federal Housing Administration/Housing and Urban Development (FHA/HUD) and the Veterans' Administration (VA)], an exterior noise level of 65 DNL or lower is considered to be acceptable for residences. This standard is applied nationally by FHA/HUD (Reference 5). Because of the predominant use of naturally ventilated dwellings on Oahu, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 6, a lower level of 55 DNL is considered to be the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as DOD, FHA/HUD, and VA have selected 65 DNL as a more appropriate regulatory standard.

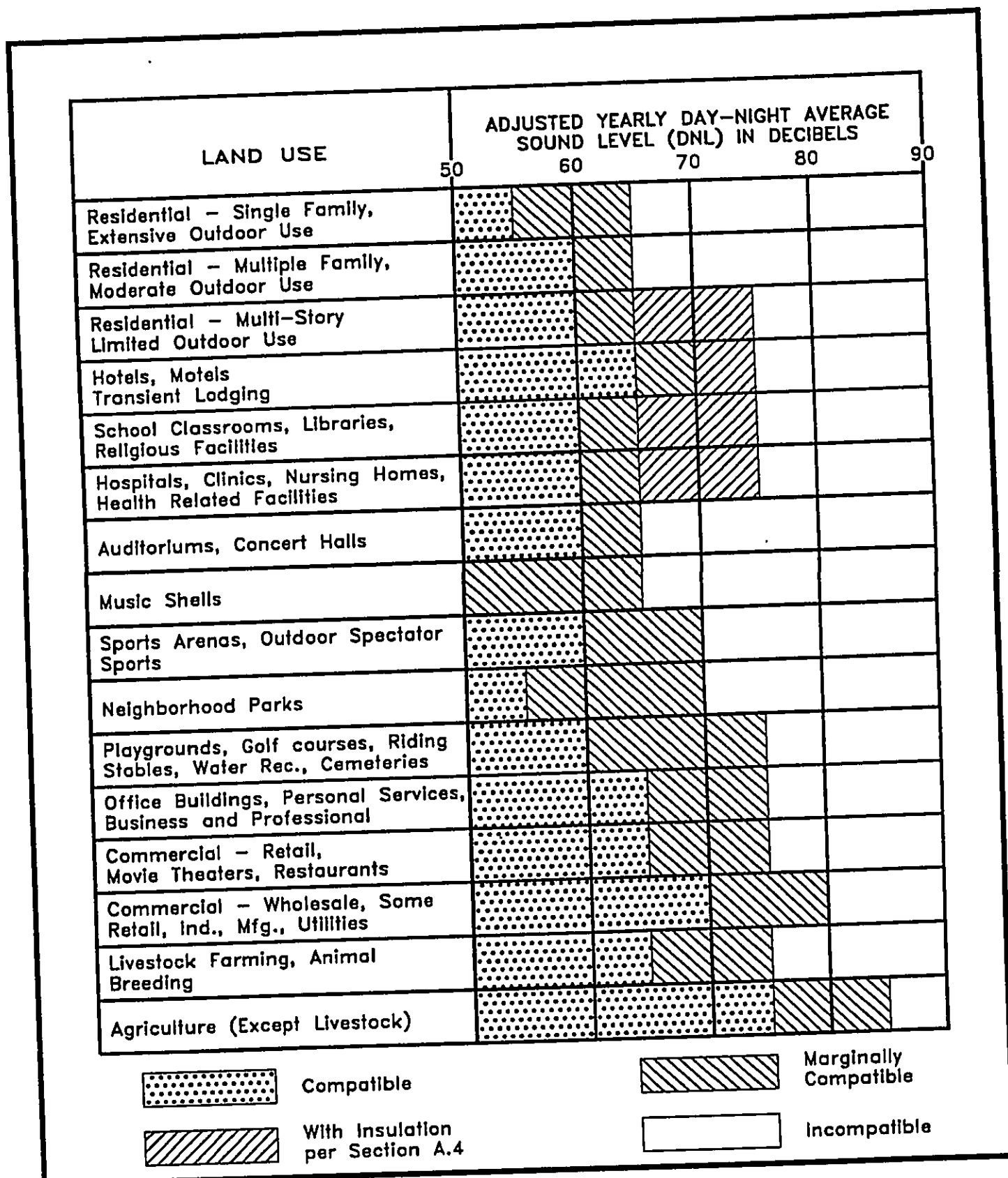
There are no local or federal noise standards for parks. State Department of Health (DOH) community noise rules (Reference 7) apply only to fixed mechanical equipment used in parks (pumps, fans, etc.) and not to firearms, play-field or other recreational activities, spectator or crowd noise, personal stereos, lawn maintenance equipment, etc. Noise during construction activities, however, are regulated by Reference 7 under a permit system. In general, compatible noise levels for neighborhood parks are similar to those for residences, and should be less stringent than those for residences when only daytime use of the parks is anticipated. The reason for this determination is that the DNL system incorporates a 10 dB penalty for

TABLE 1
EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY-NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY-NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
 (Source: American National Standards Institute S12.9-1998/Part 5)

FIGURE 2

nighttime noise events, which is appropriate for residences, where 24-hour occupancy is the norm. For parks where only daytime use is anticipated, the 10 dB penalty for nighttime noise is not required. For the purposes of this study, noise levels of 70 DNL to 55 DNL were considered to be "Marginally Compatible" for "Neighborhood Parks," with levels of 55 DNL or less being "Compatible."

State DOH noise regulations concerning stationary mechanical equipment are expressed in maximum allowable property line noise limits rather than DNL (see Reference 7). For agricultural or industrial lands, the allowable limits are 70 dBA for daytime and nighttime periods along the property boundaries. The daytime period is defined to be from 7:00 AM to 10:00 PM, and the nighttime period is considered to be the remaining hours by the DOH rules. For properties zoned for apartment, hotel, or business uses, the applicable DOH property line noise limits are 60 and 50 dBA during the daytime and nighttime periods, respectively. For single family residences, public and open spaces, and preservation zoned lands, the daytime and nighttime DOH limits are 55 and 45 dBA, respectively. These limits of 55 and 45 dBA apply to fixed mechanical equipment at the Koko Head District Park and Shooting Range Complex, which are zoned P-1. Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and agricultural/industrial lands equate to approximately 55, 60, and 76 DNL, respectively.

It should be noted that the noise compatibility guidelines and relationships to the DNL noise descriptor may not be applicable to impulsive noise sources such as firearms. The use of penalty factors (such as adding 8 to 12 dB to the measured sound levels or the use of C-Weighting filters) have been proposed. However, the relationships between the levels of impulsive noise and land use compatibility have not been as firmly established as have the relationships for non-impulsive noise levels (such as traffic and aircraft noise). The State DOH limits for impulsive sounds which exceed 120 impulses in any 20 minute period are 10 dB above the limits for non-impulsive sounds. If impulsive sounds do not exceed 120 impulses in any 20 minute time period, there are no regulatory limits on their sound levels under the State DOH regulations.

CHAPTER IV. EXISTING NOISE ENVIRONMENT

Project Site. Existing background ambient noise levels were measured at ten locations in the environs of the Koko Head District Park site (see Figure 1) during the three-day weekend of June 9 through 11, 2001. The results of the noise measurements are shown in Table 2 and Figures 3 through 14, where LAeq represents the A-Weighted, average sound level, LAm_{ax} represents the maximum A-Weighted sound level, and LAm_{in} represents the minimum A-Weighted sound level.

The impulsive sounds of firearms from the Koko Head Shooting Complex were the loudest events measured at the east side of the park complex. At the west end of the park and adjacent residential areas, local motor vehicle traffic and the activities on the tennis courts and baseball fields were the loudest noise sources. The impulsive noise from the shooting complex was audible at all locations in the park environs.

The impulsive noise levels of firearms from the Koko Head Shooting Complex are very high, and range between 60 to 105 dB (LAm_{ax}) at 180 feet behind the firing line of the rifle range. At Location "B" along Koko Head Park Road, the impulsive noise levels from the Shooting Complex ranged between 60 to 92 dB (LAm_{ax}). At the west end of the District Park near the single family residences, measured noise levels from the Shooting Complex ranged between 50 to 70 dB (LAm_{ax}). The existing residential area of Hawaii Kai west of the District Park currently benefit from some noise shielding effects from the ridge along Koko Head Park Road. At the Mariner's Ridge residential area, which is elevated above the Koko Head Shooting Complex and approximately 7,500 feet from the rifle range, measured noise levels from firearms generally ranged between 50 and 70 dB (LAm_{ax}), with some of the louder events exceeding 80 dB (LAm_{ax}).

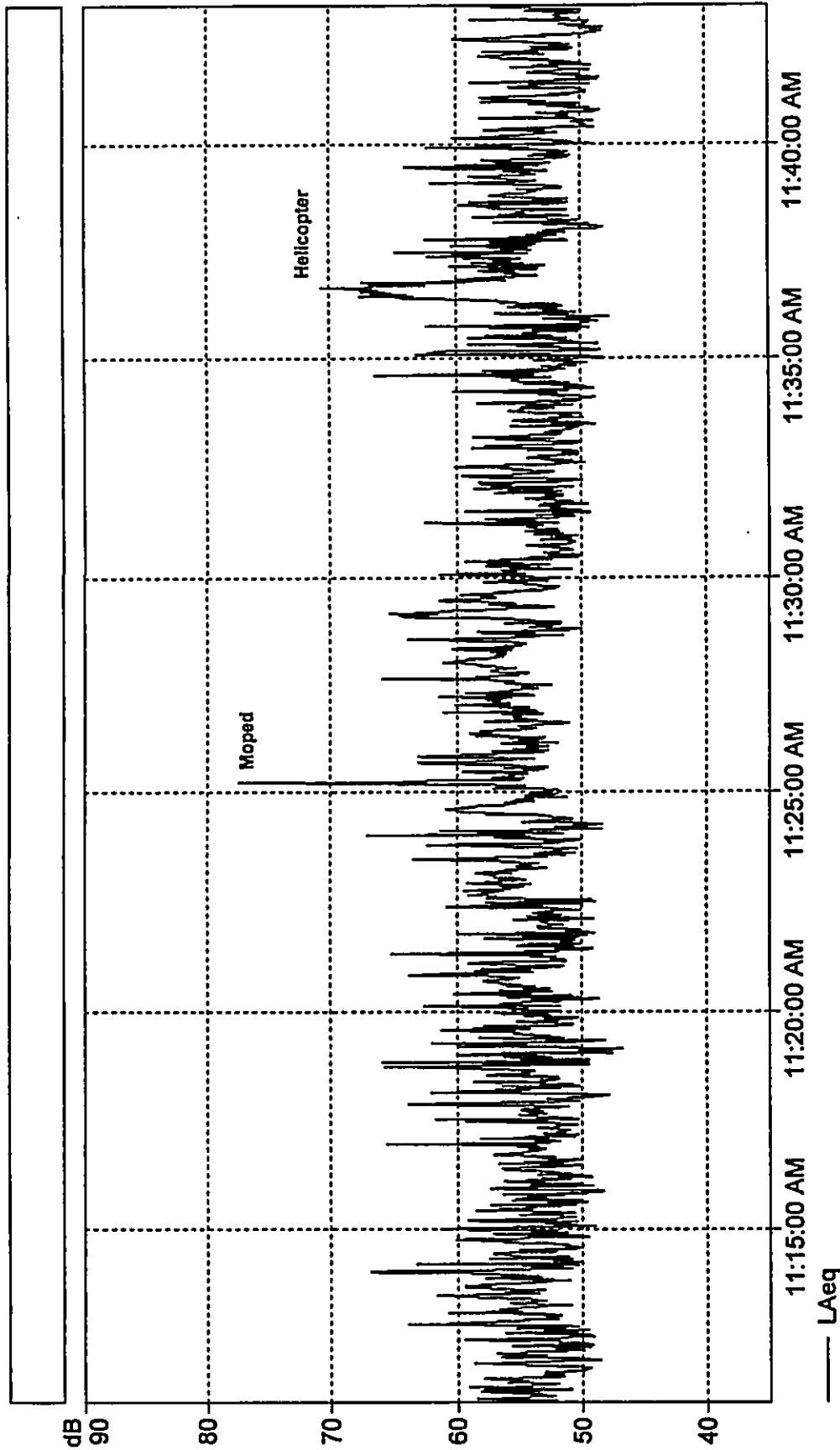
The existing background ambient noise levels on the Koko Head District Park site range from 60 to 65 DNL at the east side of the park closest to the Koko Head Shooting Complex, to 50 to 55 DNL at the west side of the park where existing single family residences are located. Existing background ambient noise levels range between the "Minimal Exposure, Unconditionally Acceptable" category and the "Moderate Exposure, Acceptable" category for noise sensitive land uses such as residential development (see Table 1). From Figure 2, existing noise levels are in the "Compatible" and "Marginally Compatible" categories for "Neighborhood Park" use. Because the existing levels of noise are considered to be acceptable for residential uses, and they should also be acceptable for "Neighborhood Park" use.

At the east side of the park site, impulse noise from the Koko Head Shooting Complex controls the existing background ambient noise level. Maximum levels of the louder firearms range between 85 to 92 dB (LAm_{ax}). During periods of no activity at the shooting complex, background ambient noise levels drop to levels (45 to 50 dBA) which are comparable to those at the west side of the park.

TABLE 2
SUMMARY OF NOISE MEASUREMENT RESULTS

LOCATION	DATE	TIME	A-WEIGHTED SOUND LEVELS			LOUDEST SOURCE(S)
			L _{Amax}	L _{Aeq}	L _{Amin}	
A	06/08/2001	11:30 AM	81	56	48	Moped, Helicopter, Voices
A	06/09/2001	09:30 AM	76	55	45	Firearms
B	06/09/2001	10:50 AM	93	69	41	Firearms
C	06/10/2001	09:40 AM	78	52	42	Firearms
D	06/10/2001	11:00 AM	74	51	39	Firearms, Helicopter
E	06/10/2001	11:40 AM	87	62	49	Aircraft, Voices
E	06/10/2001	12:20 PM	88	60	46	Firearms, Voices, Light Aircraft
F	06/10/2001	01:20 PM	82	57	44	Cars, Firearms, Helicopter
G	06/11/2001	10:10 AM	67	50	39	Cars, Firearms, Helicopter
H	06/11/2001	11:10 AM	83	57	42	Cars
I	06/11/2001	12:10 PM	82	57	42	Firearms
J	06/11/2001	01:20 PM	80	55	39	Buses, Cars, Dogs

110 FEET FROM CENTER OF DOUBLES TENNIS COURT



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "A" (6/08/01; 11:30 AM)

FIGURE
3

110 FEET FROM CENTER OF DOUBLES TENNIS COURT

170 FEET FROM CENTER OF DOUBLES TENNIS COURT (6 COURTS)

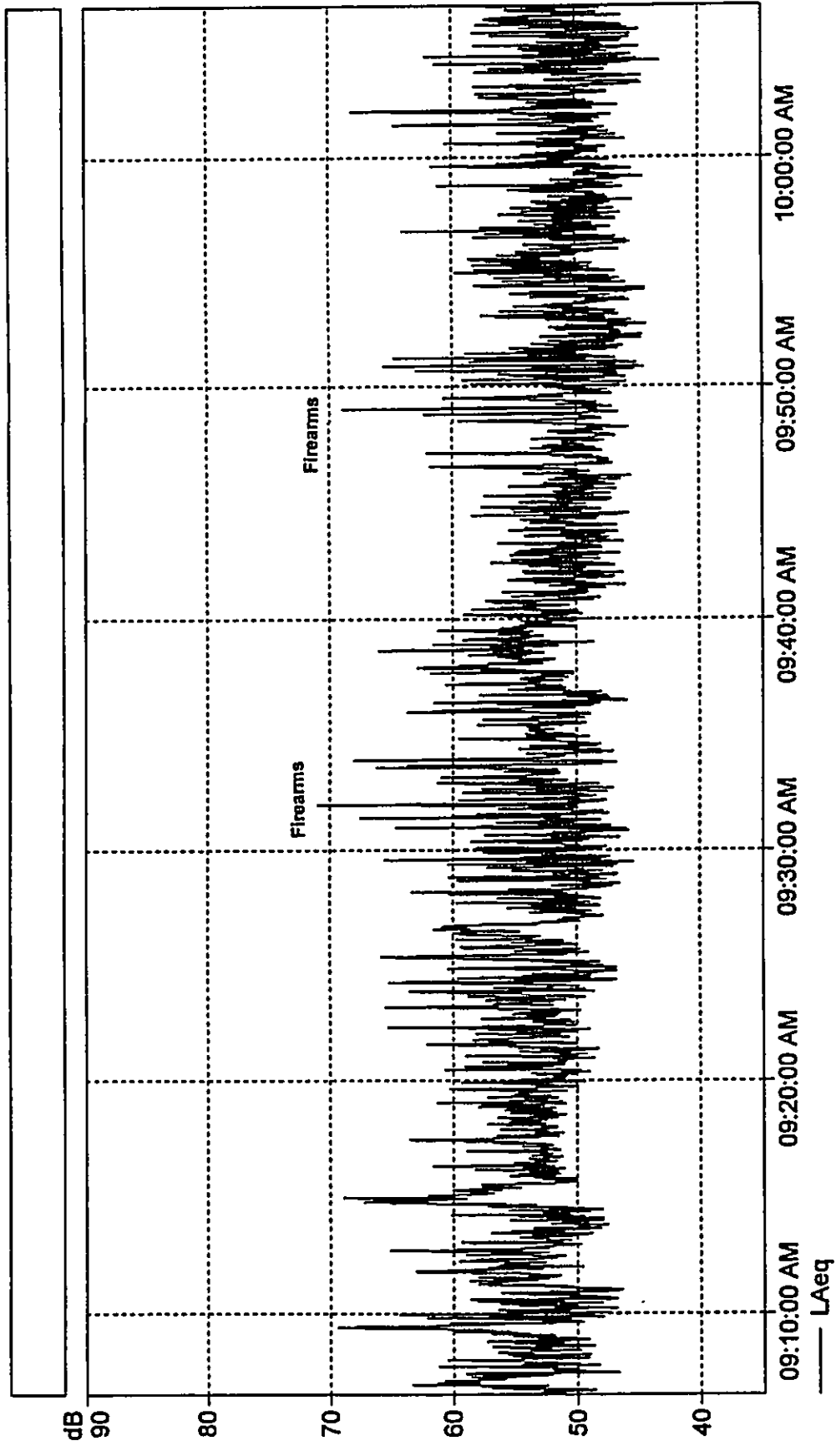
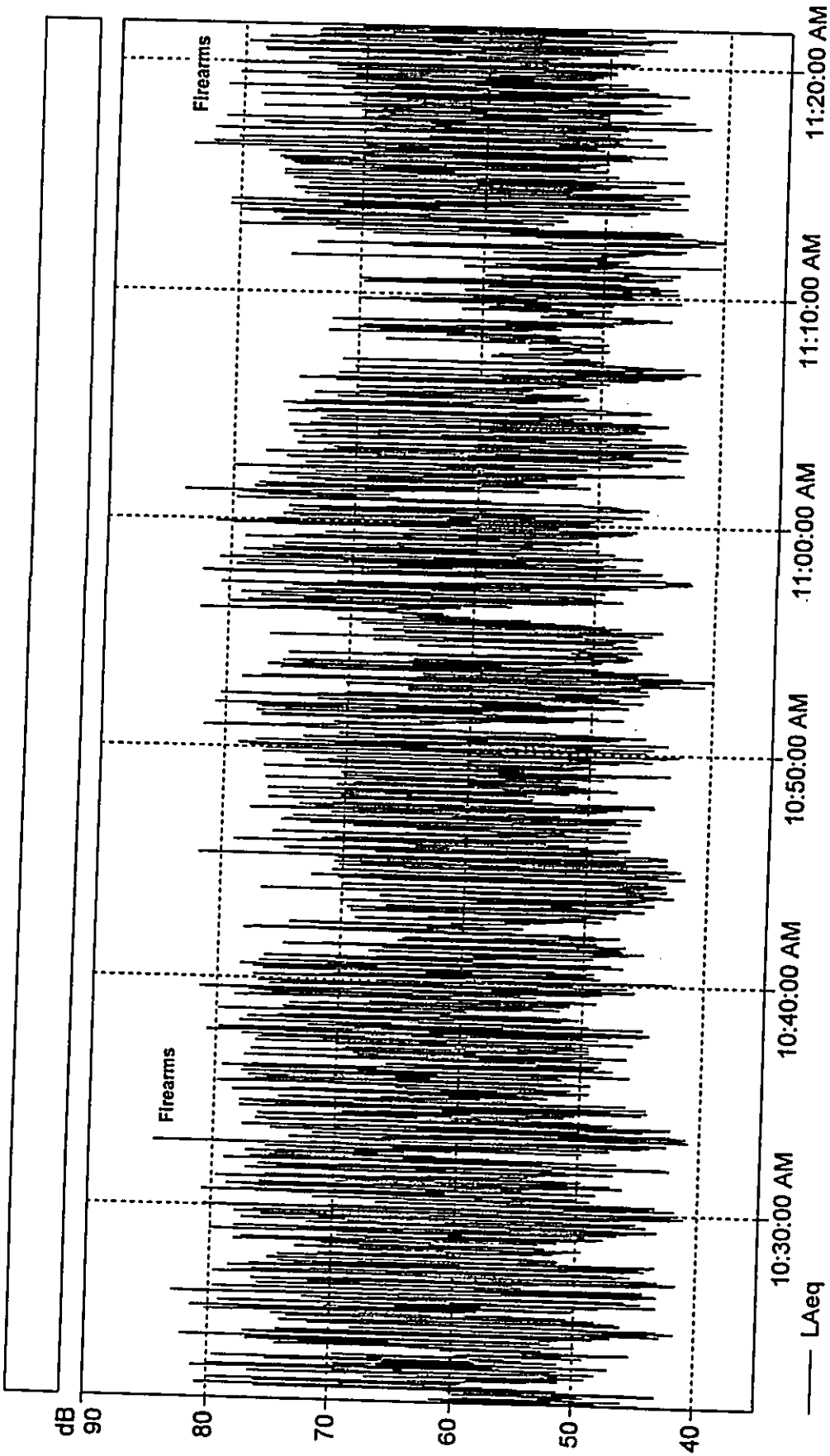


FIGURE
4

AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "A" (6/09/01; 9:30 AM)

651 FEET FROM CENTER OF FIRING RANGE

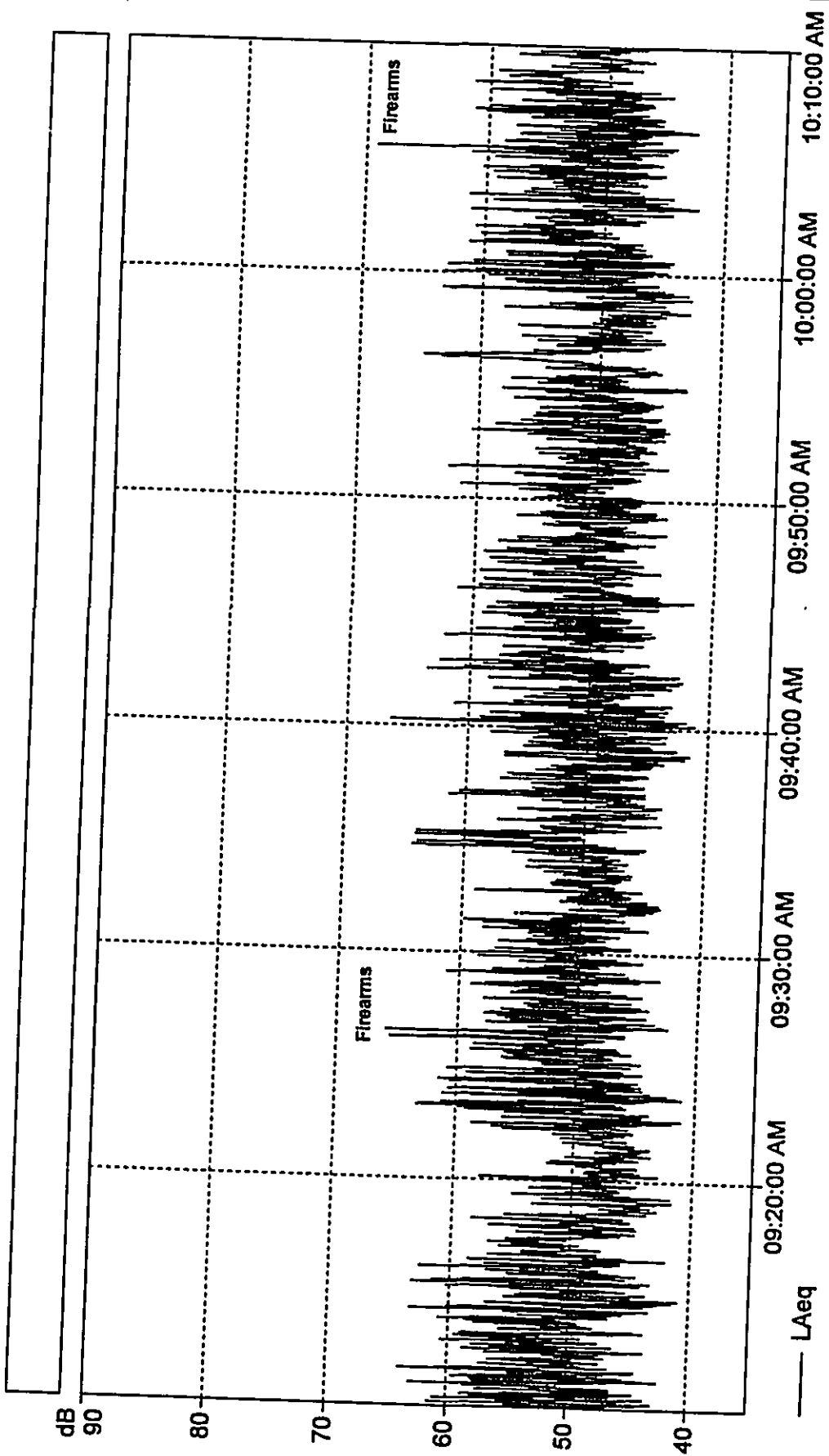


AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "B" (6/09/01; 10:50 AM)

FIGURE
5

1 2 3 4 5 6 7 8 9 10 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

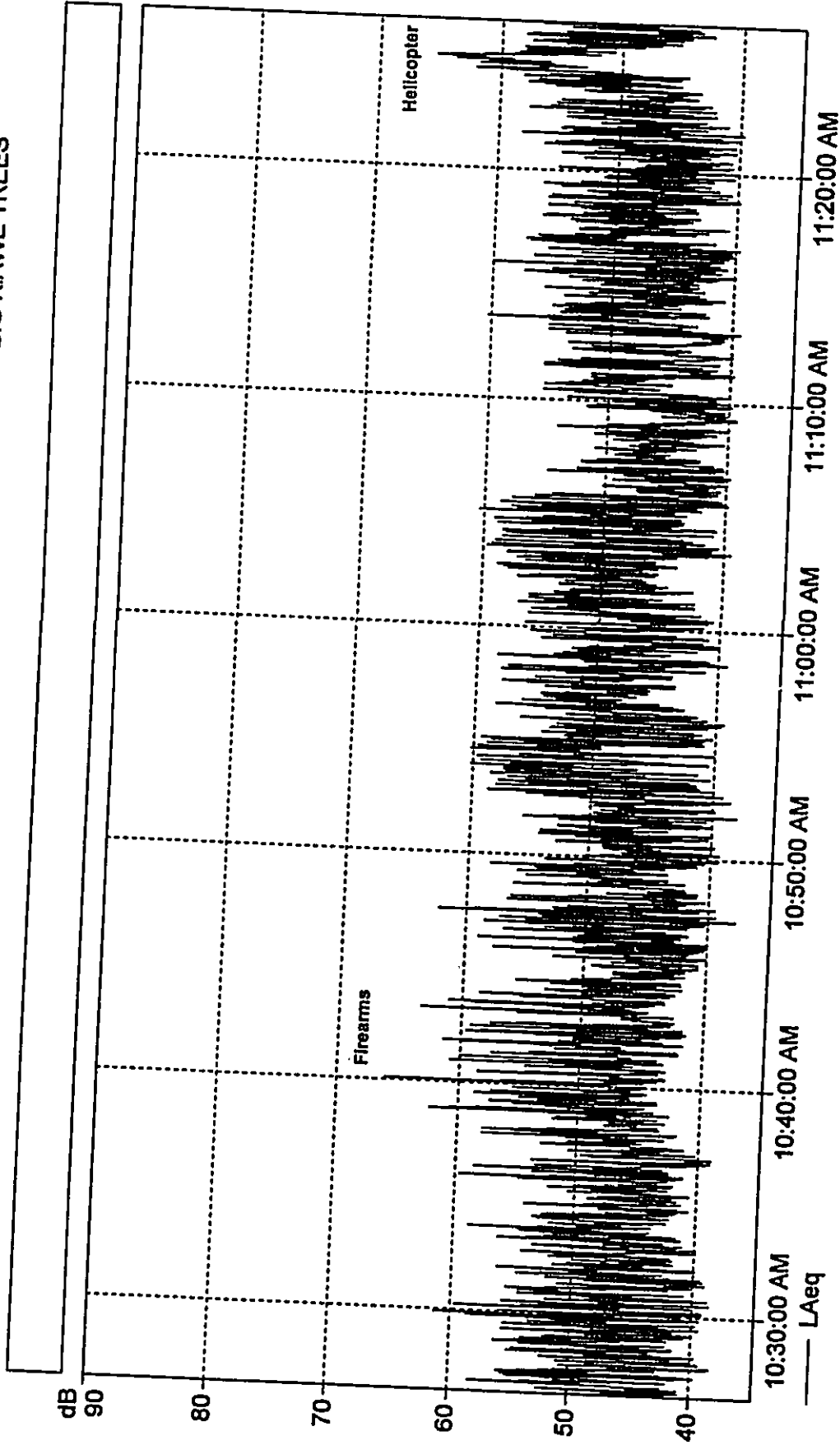
243 FEET FROM LIFE GUARD BUILDING MAKAI PARKING LOT FURTHEST CORNER FROM ENTRANCE



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "C" (6/10/01; 9:40 AM)

FIGURE
6

276 FEET FROM RIGHT CENTER FIELD OF BASEBALL FIELD #2 BETWEEN TWO BIG KIAWE TREES

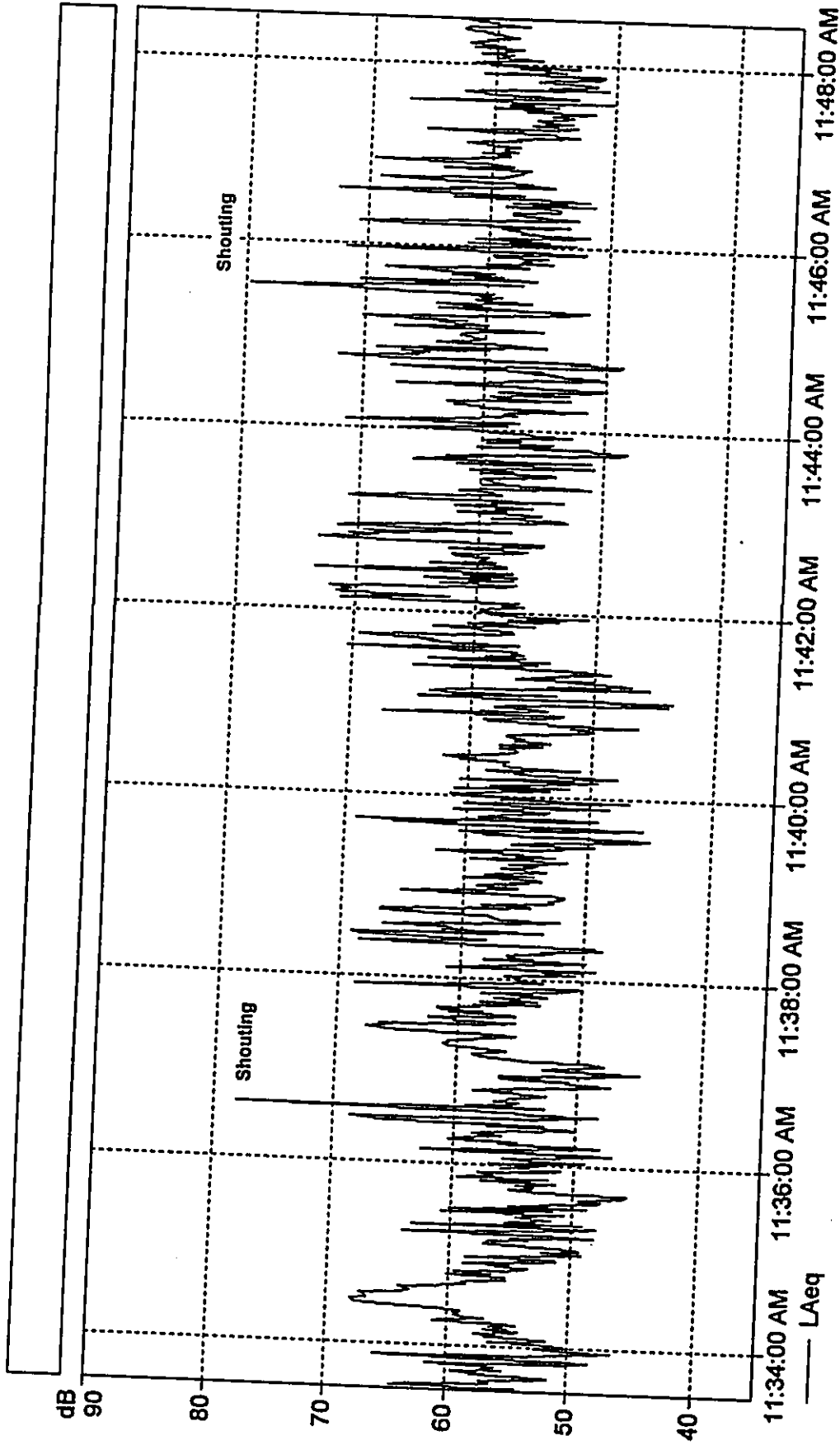


AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "D" (6/10/01; 11:00 AM)

FIGURE
7

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
1616 WEST 10TH AVENUE
DENVER, COLORADO 80202

111 FEET BEHIND HOME PLATE (FIELD #4) MEN'S SOFTBALL GAME



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION 'E' (6/10/01; 11:40 AM)

FIGURE
8

111 FEET BEHIND HOME PLATE (FIELD #4) SECOND MEN'S GAME

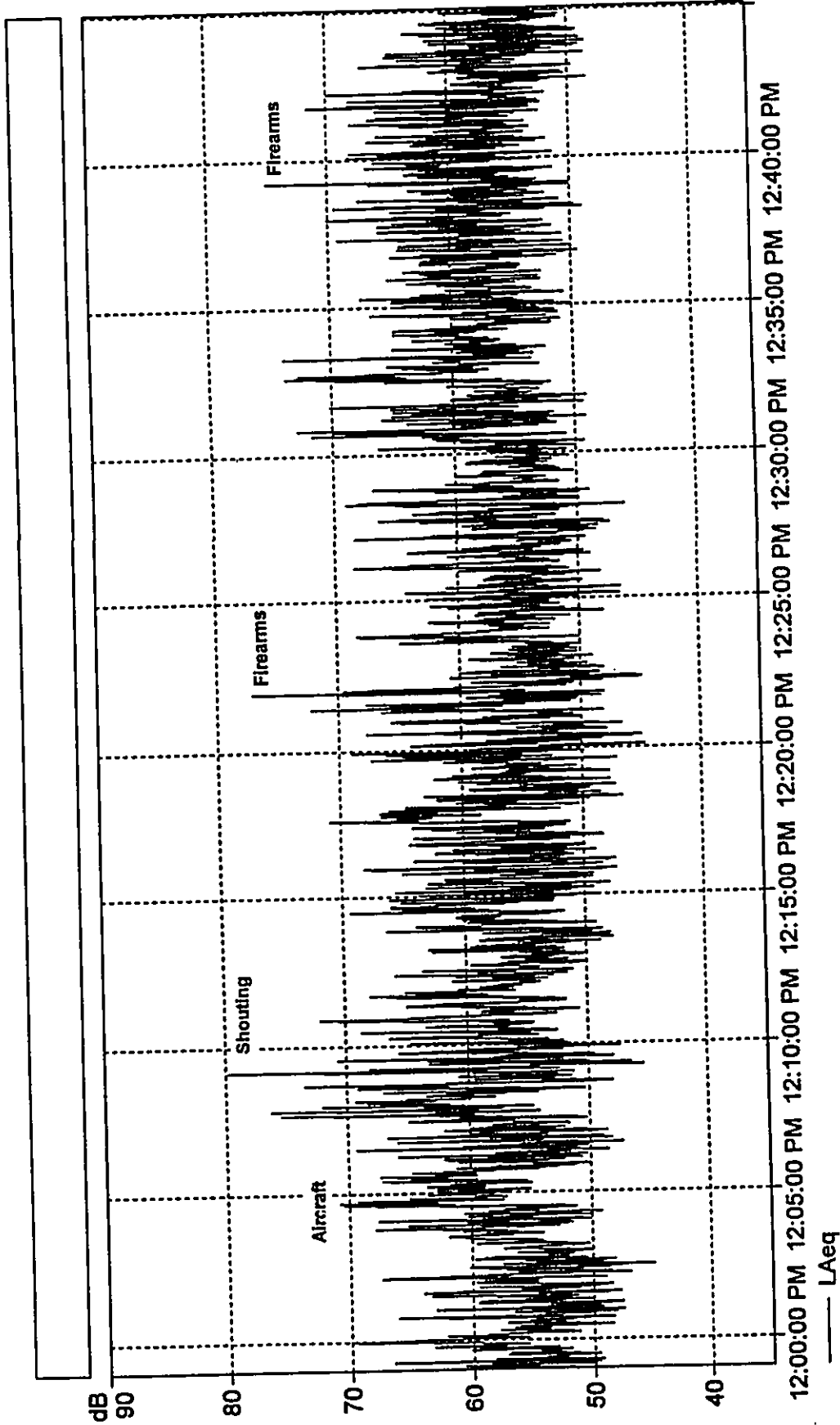
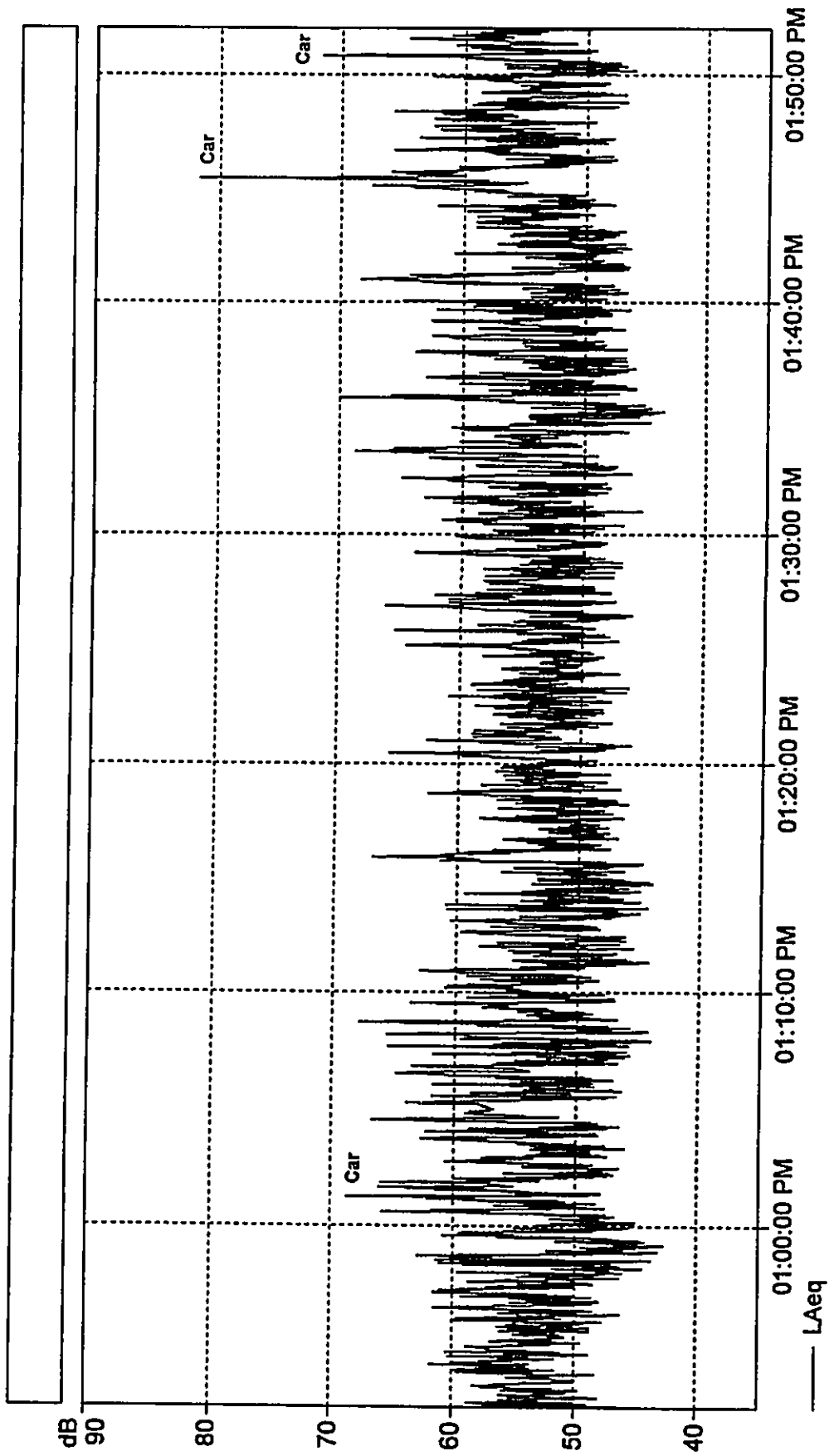


FIGURE
9

AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION 'E' (6/10/01; 12:20 PM)

12:00:00 PM 12:05:00 PM 12:10:00 PM 12:15:00 PM 12:20:00 PM 12:25:00 PM 12:30:00 PM 12:35:00 PM 12:40:00 PM

ENTRANCE TO PARK MAKAI SIDEWALK OF YELLOW SPEED BUMP



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "F" (6/10/01; 1:20 PM)

FIGURE
10

RIGHT SIDEWALK ON KEKUPUA ST 165 FEET FROM KEKUPUA ST AND KAUMAKANI ST

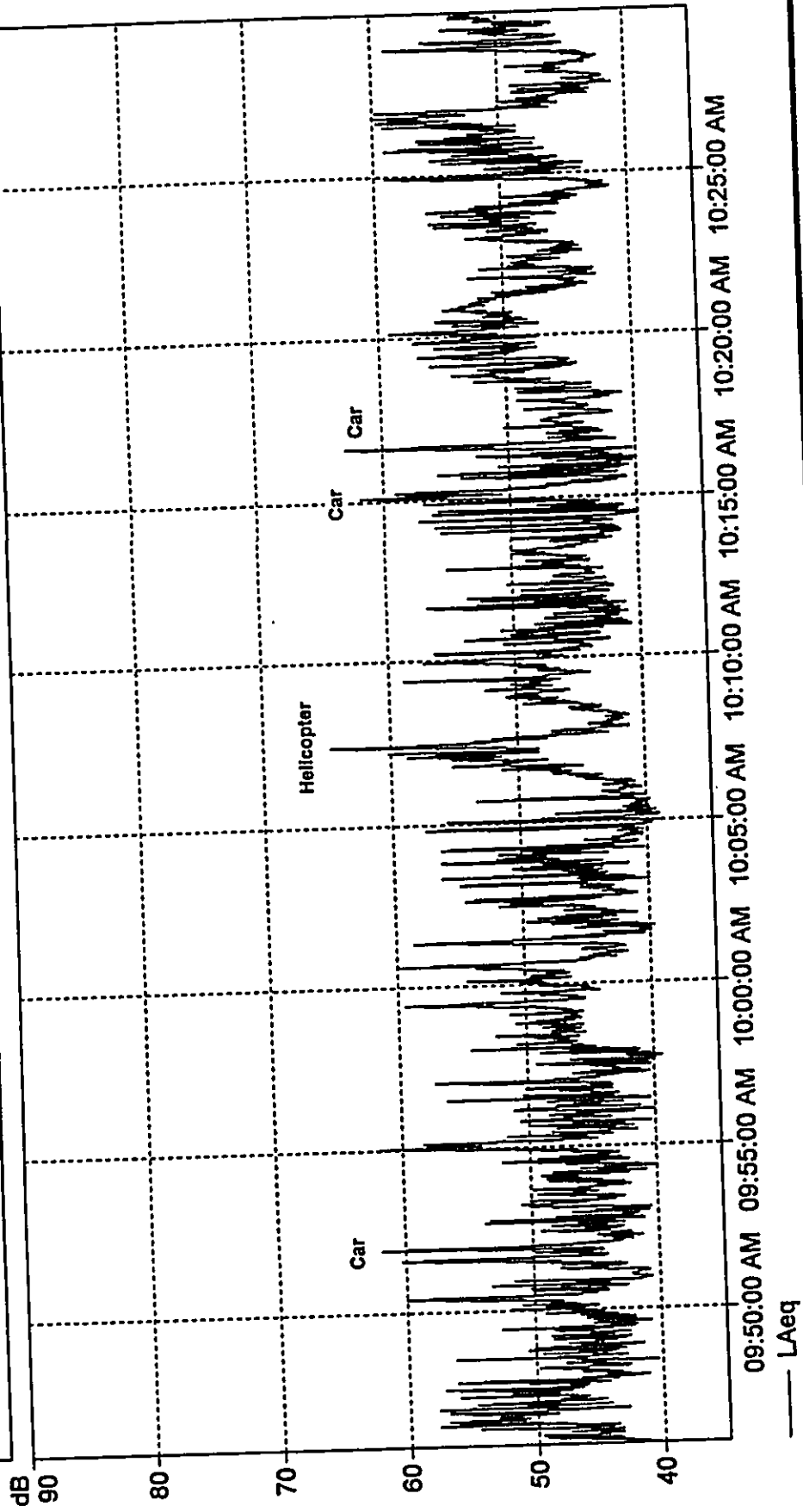
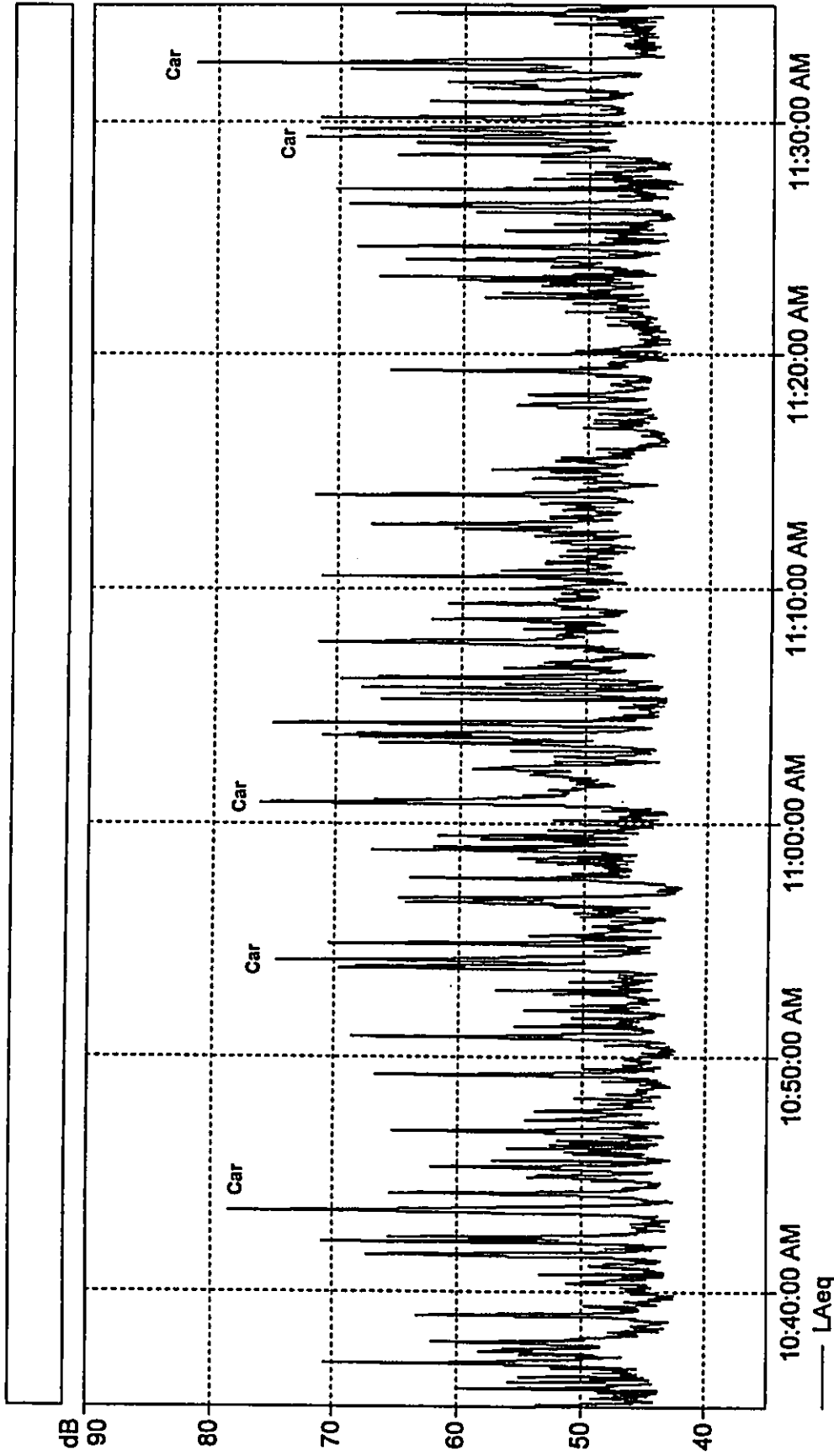


FIGURE 11

AVERAGE SOUND LEVEL VS. TIME MEASURED AT LOCATION "G" (6/11/01; 10:10 AM)

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

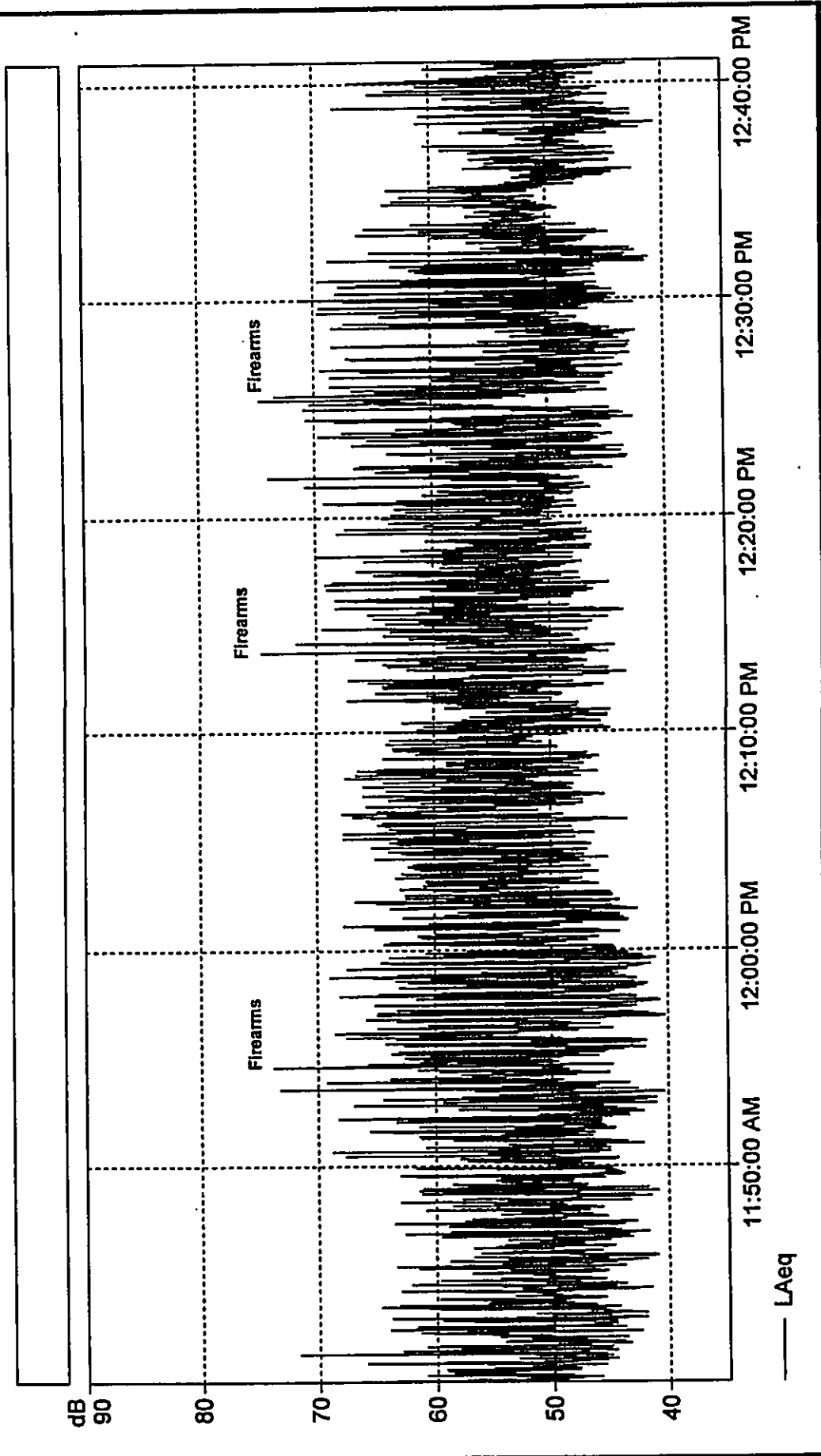
153 FEET MAUKA OF ENTRANCE TO KOKO HEAD DISTRICT PARK



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "H" (6/11/01; 11:10 AM)

FIGURE
12

114 FEET FROM SKATEBOARDING & BICYCLE MOTORCROSS TRACK

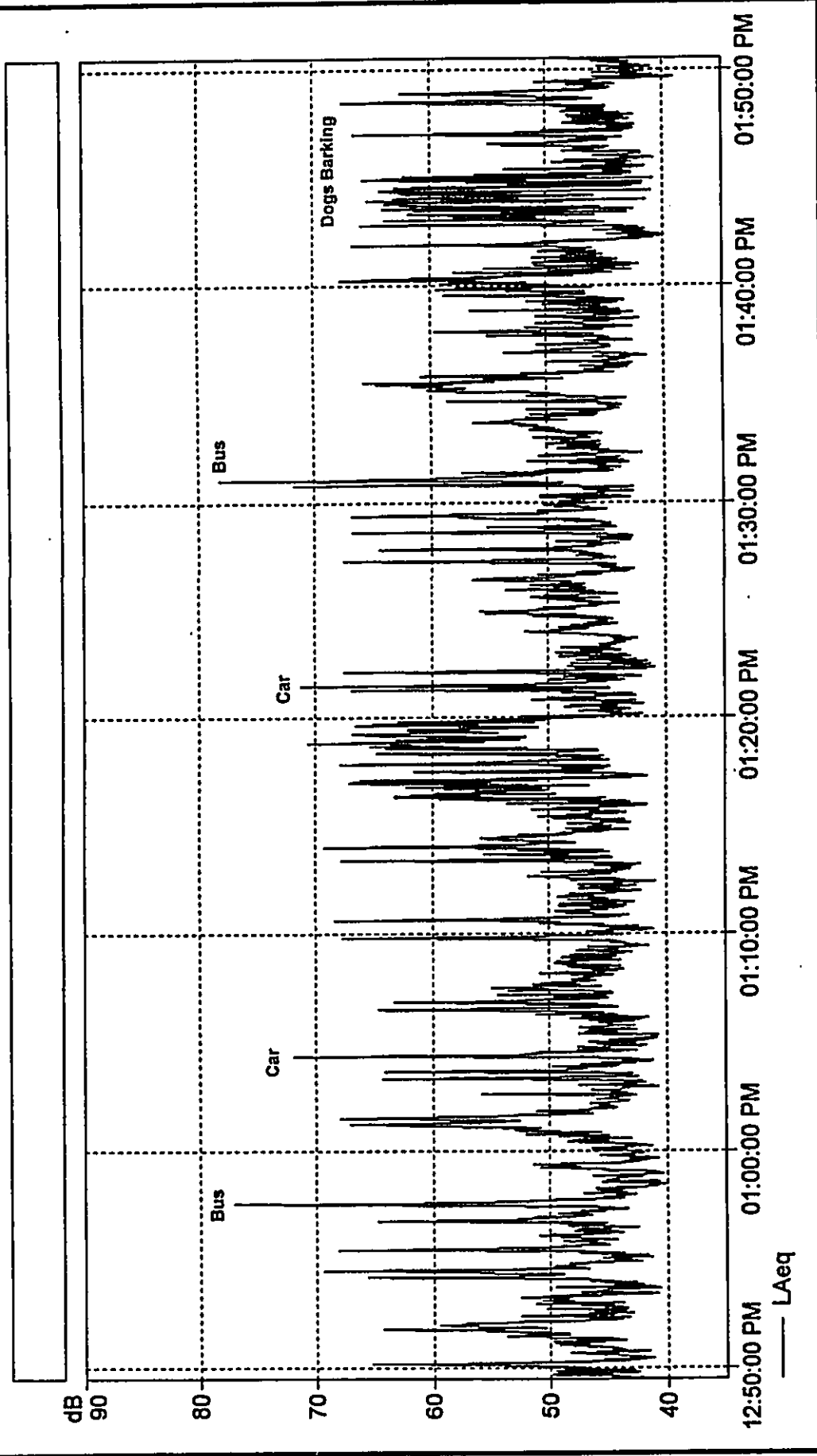


AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "I" (6/11/01; 12:10 PM)

FIGURE
13

114 FEET FROM SKATEBOARDING & BICYCLE MOTORCROSS TRACK

156 FEET MAKAI FROM INTERSECTION OF KAUHAKO ST & KAUMAKANI ST



AVERAGE SOUND LEVEL VS. TIME MEASURED AT
LOCATION "J" (6/11/01; 1:20 PM)

FIGURE
14

Normal voice communication was possible throughout the proposed park site at talker-to-listener distances of at least 10 feet. Shouting or the use of raised voice levels were not required to communicate in the proposed park. This is consistent with the determination that existing background ambient noise levels within the proposed park site are probably acceptable for its intended use.

During periods of very low traffic flow on Kaumakani and Anapalau Streets, average background ambient noise levels are less than 45 dBA during the daytime and less than 40 dBA during the nighttime. Maximum sound levels of 50 to 55 dBA were recorded from birds in the project area. Typical maximum noise levels from transiting helicopters and other aircraft ranged from 65 to 70 dBA.

Traffic Noise. Kaumakani and Anapalau Streets in Hawaii Kai are the primary access roadways to the Koko Head District Park. Existing traffic noise levels along these two access roadways range between 55 to 60 DNL along their Rights-of-Way. Maximum noise levels from cars and buses along Kaumakani Street range between 65 and 80 dBA.

Along Lunalilo Home Road and Kalaniana'ole Highway, existing traffic noise levels are 10 to 15 DNL units higher than the traffic noise levels along Kaumakani and Anapalau Streets. This is due to the higher traffic volumes and higher average vehicle speeds on Lunalilo Home Road and Kalaniana'ole Highway. Existing traffic noise levels along Kalaniana'ole Highway and Lunalilo Home Road currently exceed the FHA/HUD standard of 65 DNL at 50 feet setback from the roadways' centerlines. These higher noise levels are the result of traffic which are not associated with the Koko Head District Park or Shooting Complex.

CHAPTER V. DESCRIPTION OF FUTURE NOISE LEVELS

General. Existing background noise levels on the project site are expected to increase following project build-out in CY 2010 due to the addition of new recreational activities and facilities at the park, the increase in local traffic on the proposed park's entrance and circulation roads, and increased maintenance activities at the park. Total noise levels at the proposed park site should remain between 50 and 65 DNL, and continue to be in the "Compatible" and "Marginally Compatible" categories for neighborhood parks.

Motor Vehicle Traffic Noise. The Year 2010 was used to describe the future traffic noise levels along the access roadways to the project site, and to evaluate possible traffic noise impacts resulting from project traffic along these roadways. Predictions of future traffic noise levels were made using the traffic volume assignments of Reference 2 for CY 2010 with and without the project. The future projections of project plus non-project traffic and noise levels along the roadways which would service the project are shown in Appendix C and Table 3 for the PM peak hour of traffic in CY 2010.

As indicated in Table 3, future traffic noise levels along Anapalau and Kaumakani Streets are not expected to increase by CY 2010 if the Koko Head District Park Master Plan is not implemented. With the implementation of the Master Plan, future traffic noise levels along Anapalau and Kaumakani Streets are expected to increase by approximately 1.2 to 4.6 DNL above existing noise levels, and primarily due to project traffic (see Table 3). Traffic noise levels should not exceed the FHA/HUD standard of 65 DNL along these two roadways with or without the implementation of the Master Plan.

Along Lunalilo Home Road and Kalaniana'ole Highway, future traffic noise levels are expected to increase by 0.3 to 0.4 DNL units with or without implementation of the Master Plan. Project-related traffic is not expected to influence future traffic noise levels along Lunalilo Home Road or Kalaniana'ole Highway. Future traffic noise levels along these two high volume roadways are expected to remain above the FHA/HUD standard of 65 DNL at 50 feet from the centerlines of these two roadways.

Impulsive Noise from Shooting Complex. The proposed safety improvements at the Shooting Complex are not expected to increase the maximum noise levels from the Shooting Complex. The addition of the CMU walls along the sides of the rifle range may increase reverberation (or echo) effects, which will tend to stretch (or lengthen) the impulses from the rifle range. Future increases in range activities will tend to increase the average noise exposure levels in the community as measured by the DNL descriptor. A two fold increase of range usage is required to increase the DNL exposure levels by 3 DNL units, while a three fold increase is required to increase the DNL exposure levels by 5 DNL units. As long as nighttime (between 10:00 PM to 7:00

TABLE 3

**CALCULATIONS OF PROJECT AND NON-PROJECT
TRAFFIC NOISE CONTRIBUTIONS (CY 2010)
(PM OR WEEKEND PEAK HOURS)**

<u>STREET SECTION</u>	<u>NOISE LEVEL INCREASE DUE TO NON-PROJECT TRAFFIC</u>	<u>PROJECT TRAFFIC</u>
Anapalau St. - East End	0.0	4.6
Anapalau St. - W. of Kaumakani	0.0	3.5
Kaumakani St. - N. of Anapalau	0.0	2.7
Kaumakani St. - S. of Anapalau	0.0	2.6
Lunalilo Hm. Rd. - N. of Anapalau	0.2	0.2
Lunalilo Hm. Rd. - N. of Kalanianaole	0.2	0.2
Kalanianaole Hwy. - W. of Lunalilo Hf	0.3	0.1
Kalanianaole Hwy. - E. of Lunalilo HR	0.4	0.0
Kalanianaole Hwy. - E. of KH Park Rc	0.4	0.0

AM) use of the Shooting Complex does not occur, relatively large increases in activity levels at the Shooting Complex are required to cause a significant increase in DNL levels associated with firearms noise.

Because the noise from the Koko Head Shooting Complex will remain audible for the foreseeable future with or without the range safety improvements, the potential for complaints regarding noise from the complex will continue. Although State DOH noise rules do not apply to the impulsive noise from the shooting complex, the noise levels from the shooting complex at measurement Locations C, D, and F (adjacent to the existing residences) were compared with the applicable DOH daytime noise limits for residences. By Reference 7, the DOH daytime noise limit for impulsive noise is 10 dBA higher than the 55 dBA limit for non-impulsive noise, or 65 dBA, at residences. In addition, each impulse is treated as an event with 1-second duration, and for residential areas, 120 impulses greater than 65 dBA are allowed in any 20-minute interval under current DOH rules. At measurement Location C, firearms noise (using the Fast Meter Response Characteristic, or LAmax) exceeded 65 dBA 30 times during the worst 20 minute interval. At Location D, firearms noise (using the Fast Meter Response Characteristic, or LAmax) exceeded 65 dBA 21 times during the worst 20 minute interval. And at Location F, firearms noise (using the Fast Meter Response Characteristic, or LAmax) exceeded 65 dBA 22 times during the worst 20 minute interval. The conclusion from the noise measurement data that was obtained at these three locations was that the impulsive noise from the Koko Head Shooting Complex did not exceed the allowable daytime limit of 120 impulsive noise events greater than 65 dB (LAmax) during any 20 minute period. Therefore, it was concluded the noise from the Koko Head Shooting Complex does not exceed the DOH noise limits for impulsive sources at the closest residences.

Park Noise Sources. Gasoline powered lawn maintenance equipment, such as lawnmowers, leaf blowers, and weedwackers will probably be the loudest intermittent noise sources associated with the park development. The noise levels of these equipment range between 65 to 75 dBA at 50 feet, but the frequency of use of these maintenance equipment is expected to be low. Although these equipment may be intermittently audible above the existing background ambient noise levels, they are not uncommon in urban areas, are used during the daytime hours, and should not cause severe noise impacts.

Due to the relatively large buffer distances between existing residences and the proposed Soccer and Multi-Purpose Fields, the noise levels from the two playing fields should not exceed 70 dBA or the range of existing noise levels measured at Locations C and F (see Figures 6 and 10). Figure 15 depicts the results of sound level measurements during a soccer game at Kalani High School, with the noise levels associated with shouting slightly exceeding 70 dB (LAeq) and 78 dB (LAmax). Expected sound levels at Locations C and F during similar activities at the proposed new playing fields should be similar to or less than the levels shown in Figure 15 due to the larger buffer

531 FEET FROM CENTER OF SOCCER FIELD KOKO HEAD OF KALANI HIGH SCHOOL

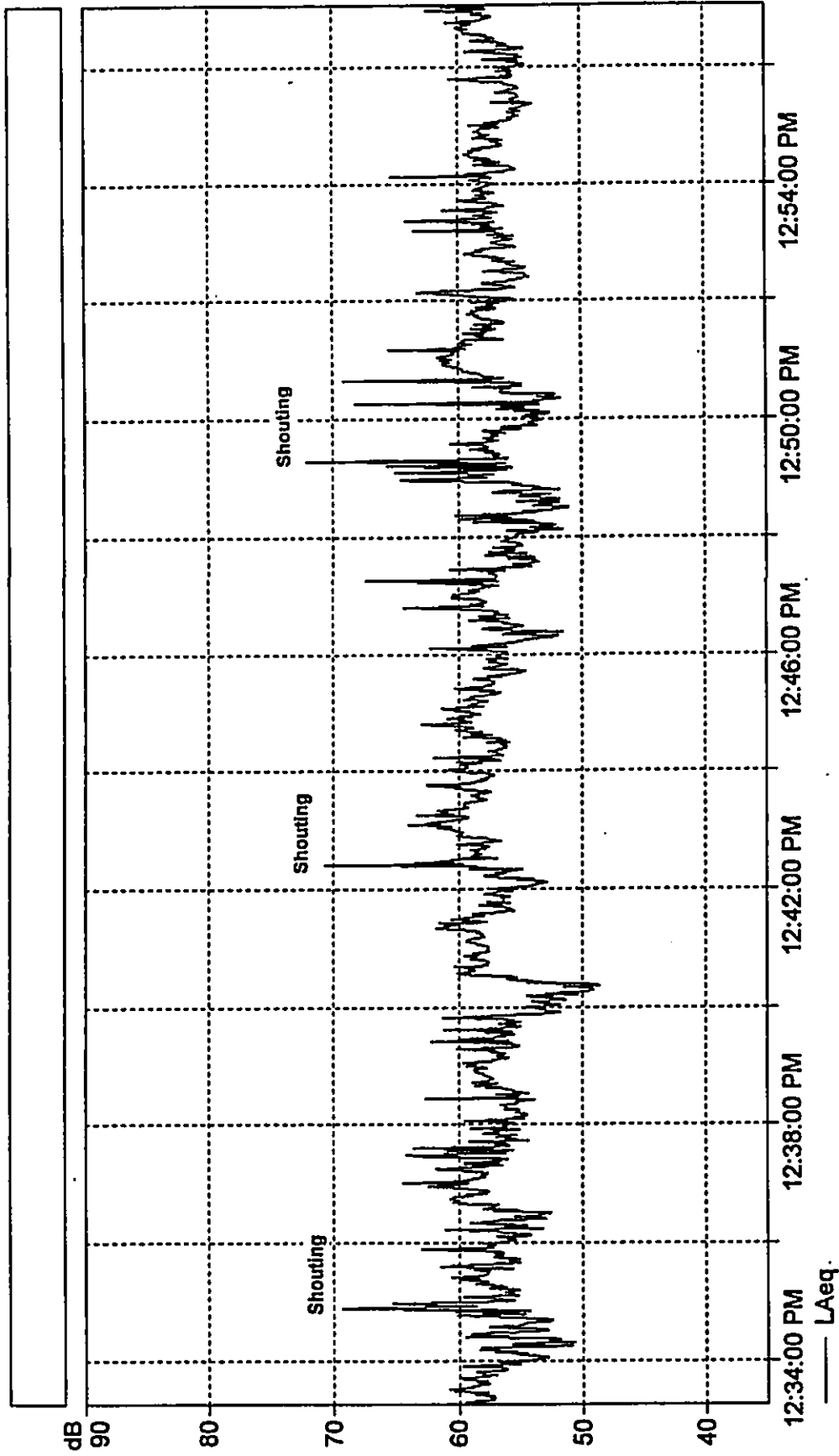


FIGURE
15

AVERAGE SOUND LEVEL VS. TIME MEASURED AT
KALANI HIGH SCHOOL SOCCER FIELD

12 34 00 PM 12 38 00 PM 12 42 00 PM 12 46 00 PM 12 50 00 PM 12 54 00 PM

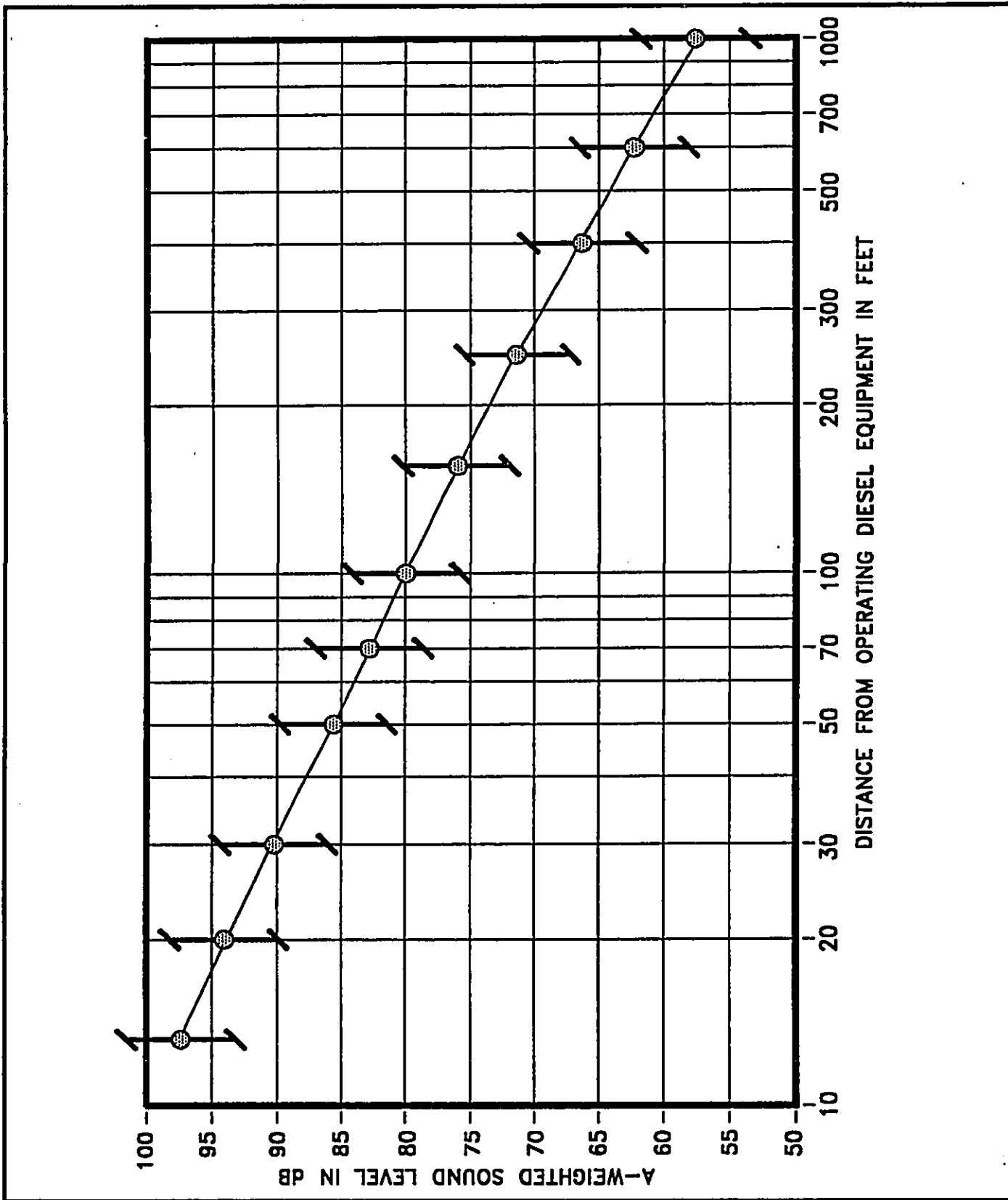
distances of 600 to 1,200 feet available at the Koko Head District Park. For these reasons, adverse noise impacts are not expected from the proposed Multi-Purpose and Soccer Fields.

The future noise levels from the baseball fields and tennis courts should be similar to existing noise levels. Risks of adverse noise impacts from these facilities should be low, since buffer distances between these facilities at the existing residences west of the park will remain the same, and the noise levels from these activities were not unusually high. The impact noise from the new tennis backboards, however, may be audible at the nearest neighbors to the west. Relatively large buffer distances (greater than 1,000 feet) are provided between the closest residences and the Skate Park, BMX Park, In-Line Hockey State Rink, and Goeas Memorial Ballfield, and the noise from these facilities will probably be inaudible at the closest residence.

The 50-Meter Swimming Pool may represent the highest risk of adverse noise impacts if yelling, screaming, and other boisterous activities are allowed to occur on a regular basis. Maximum sound levels of 64 to 79 dB (LAmax) at 100 feet from the west corner of the pool (and at the nearest residence) could occur if administrative controls are not implemented. The potential noise level of 79 dB (LAmax) from shouting and screaming is approximately 10 dB higher than measured background noise levels at Location C. Similar considerations apply to the Playground area located approximately 250 feet east of the residences who are west of the park. Maximum noise levels from shouting and screaming could range from 55 to 70 dB (LAmax), and may be audible at the residences closest to the Playground area.

Potential noise levels from the Gym and Teen Center range between 55 to 70 dB (LAeq). If the gym is used for organized basketball games, the loudest source inside the Gym would be a scoreboard horn, which is capable of generating sound levels of 95 to 97 dB (LAmax) inside the gym. The potential sound level from the gym horn is 65 to 70 dB (LAmax) at the closest residence near measurement Location C. Crowd noise from the gym would probably be 5 to 10 dB less (say 55 to 60 dB) than the gym horn. The sound of loud music or live bands at the Teen Center could result in sound levels of 55 to 65 dB (LAmax) at the closest residences west of the Teen Center. These sound levels, while they are not significantly higher than existing daytime background ambient noise levels, may annoy some residents, particularly if the noise occurs during the late evening or nighttime hours.

Construction Noise. Audible construction noise will be unavoidable during the construction of the new facilities and infrastructure at the Koko Head District Park. Typical levels of noise during the noisier phases of construction activity are shown in Figure 16. At the upper end of the noise level ranges depicted in Figure 16 are the construction noise levels during the noisier earthwork phase. At the existing residences along Kaumakani Street west of the park site, where background ambient noise levels range between 45 to 60 dBA, the louder construction activities such as site



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 16

100 90 80 70 60 50 40 30 20 10

preparation and other earthwork activities which occur near the east end of the park site may be audible and range between 50 to 62 dBA. The quieter construction activities during building erection and landscaping may not be audible.

Noise during construction activities in the Koko Head Shooting Complex will be less audible due to the larger buffer distances to existing residences and the noise shielding effects of the ridge at Koko Head Park Road. Only the louder earthwork activities (grading, rock breaking, etc.) will probably be audible at the residences along Kaumakani Street.

CHAPTER VI. POTENTIAL NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Motor Vehicle Traffic Noise. Existing and future traffic noise levels within the Koko Head District Park site are not expected to exceed 70 DNL, and the park site should remain in the "Compatible" and "Marginally Compatible" categories for "Neighborhood Park" use. Future traffic noise by CY 2010 in the residential areas along Kaumakani and Anapalau Streets should not exceed the FHA/HUD standard of 65 DNL with or without the improvements proposed for the park. Traffic noise levels along Lunalilo Home Road and Kalaniana'ole Highway are not expected to increase with or without the project. In addition, future traffic noise levels associated with users of the Koko Head Shooting Complex are not expected to alter traffic noise levels along Kalaniana'ole Highway. For these reasons, mitigation of future motor traffic noise associated with the Koko Head District Park and the Koko Head Shooting Complex should not be required.

Shooting Complex. Administrative controls and scheduling of range operating times are the noise mitigation measures available for the Shooting Complex. Operation during the warmest time of the day and avoidance of early morning and late evening operating hours should minimize excessively loud noise in the surrounding communities due to adverse atmospheric conditions. In addition, because the audibility of the impulsive noise from the range cannot be eliminated, operation at night should be avoided.

Park Noise Sources. Fixed and continuously operating machinery may be located near the 50 Meter Pool, Gym, and Teen Center facilities on the park site. The noise levels from these new machinery sources will be subject to regulation under the State DOH noise rules (Reference 7). The other potential new noise sources at the park site such as the lawn and park maintenance equipment are not regulated by the DOH under Reference 7, because they are not fixed equipment. These noise sources are similar to those used in residential areas on Oahu during daylight hours, and are intermittent noise sources, and special noise mitigation measures should not be necessary at the proposed Koko Head District Park.

The majority of the new facilities planned at the Koko Head District Park should not cause adverse noise impacts and noise mitigation measures should not be required. These include the Picnic Areas, reoriented Goeas Memorial Ballfield, new Soccer and Multi-Purpose Fields, relocated Volleyball Court, relocated Skate Park, new In-line Hockey Skate Rink, relocated BMX Site, new Passive Park and Picnic Areas, new Disc Golf Course, and Walking Paths.

Noise mitigation measures in the form of administrative controls and supervision are recommended if excessive noise from boisterous behavior occurs at the 50 Meter Pool and Playground within 250 feet of the residences. Risks of annoyance due to loud music from the Teen Center should be minimized by orienting the building's ventilation openings and doors away from the closest residents toward the northwest. In addition,

administrative controls and supervision of the operating hours are recommended noise mitigation measures.

The backboards at the new tennis courts should be constructed from concrete to minimize impact noise levels at the closest residences. Location of the backboards on the north side of the new courts would also help to reduce noise from the tennis courts at existing residents north of the tennis courts.

Construction Noise. Mitigation of construction noise to inaudible levels may not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 FT distance), and due to the exterior nature of the work (earth moving, trenching, concrete pouring, hammering, etc.). However, the following noise mitigation measures should be implemented if determined to be feasible:

- The use of properly muffled construction equipment should be required on the job site.
- The incorporation of State Department of Health construction noise limits and curfew times during the construction phases of this project is another noise mitigation measure which is normally used. Figure 17 depicts the allowed hours of construction under the DOH permit procedures.

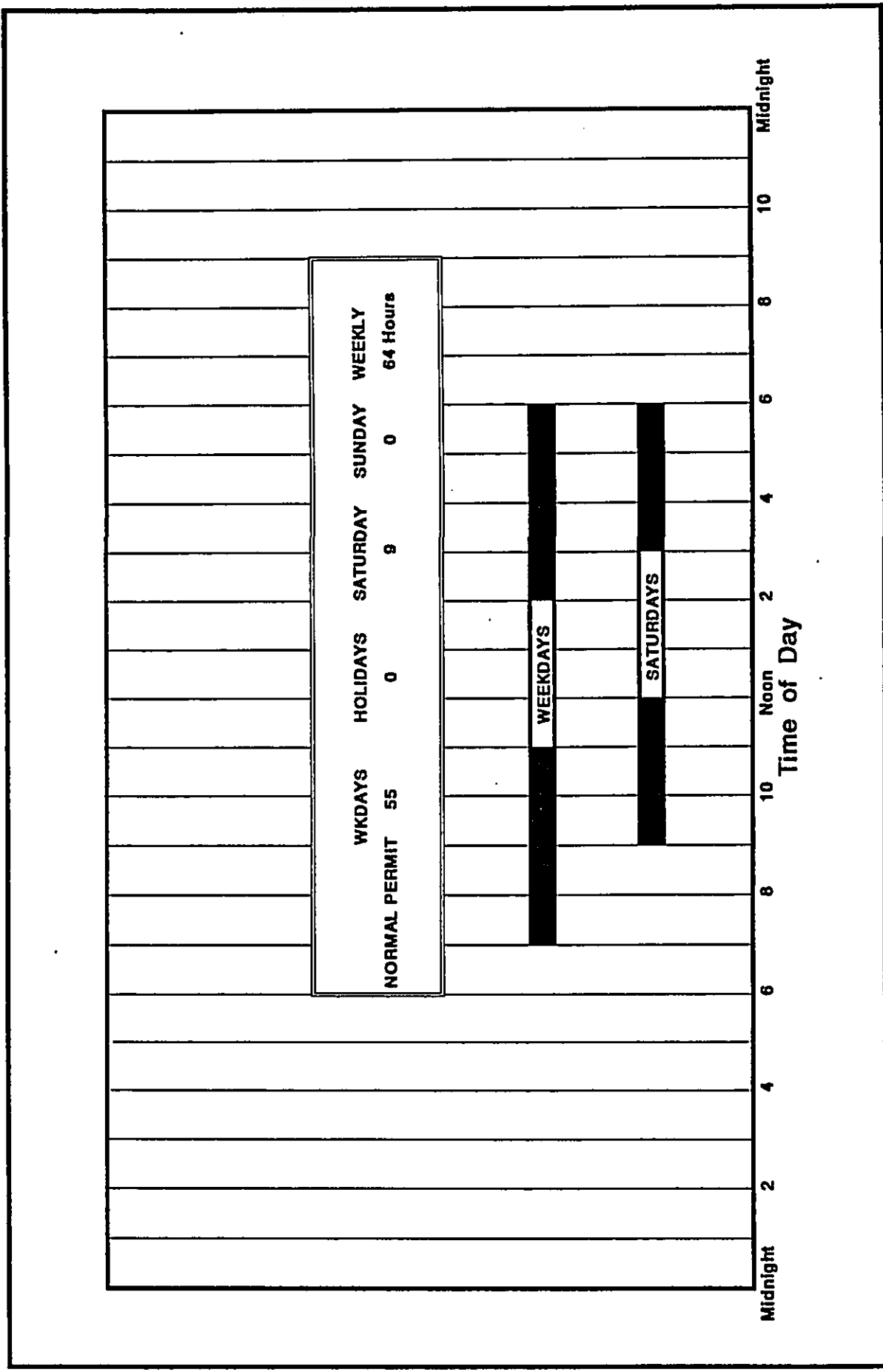


FIGURE 17

AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

10 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 10

APPENDIX A. REFERENCES

- (1) "FHWA Traffic Noise Model User's Guide;" FHWA-PD-96-009, DOT-VNTSC-FHWA-98-1, Federal Highway Administration; Washington, D.C.; January 1998 and Version 1.1 Addendum dated September 2000.
- (2) Traffic Data and Forecasts for the Koko Head District Park Project from Phillip Rowell; July 13, 2001.
- (3) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.
- (4) American National Standard: "Quantities and Procedures for Description and Measurement of Environmental Sound - Part 5: Sound Level Descriptors for Determination of Compatible Land Use;" ANSI S12.9-1998/Part 5; Acoustical Society of America.
- (5) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.
- (6) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency (EPA 550/9-74-004); March 1974.
- (7) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the L_{Cdn} with the L_{Adn}.

Although not included in the tables, it is also recommended that "L_{pn}" and "L_{epn}" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, L_{eq} is designated the "equivalent sound level". For L_d, L_n, and L_{dn}, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (L_{pn} was found to be 75 dB. L_{pn} = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I
A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

<u>TERM</u>	<u>SYMBOL</u>
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) ⁽¹⁾	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

**TABLE II
RECOMMENDED DESCRIPTOR LIST**

<u>TERM</u>	<u>A-WEIGHTING</u>	<u>ALTERNATIVE⁽¹⁾ A-WEIGHTING</u>	<u>OTHER⁽²⁾ WEIGHTING</u>	<u>UNWEIGHTED</u>
1. Sound (Pressure) ⁽³⁾ Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level ⁽⁴⁾ Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine.

APPENDIX C-1

**SUMMARY OF EXISTING (2001) AND FUTURE (2010)
TRAFFIC VOLUMES (VPH) DURING WEEKDAY PM AND WEEKEND PEAK HOURS**

ROADWAY LANES	***** CY 2001 *****		CY 2010 (W/O PROJ.)		CY 2010(WITH PROJ.)	
	PM VPH	WEEKEND	PM VPH	WEEKEND	PM VPH	WEEKEND
Anapalau St. - East End (EB)	84	41	84	41	127	133
Anapalau St. - East End (WB)	63	57	63	57	138	149
Two-Way	147	98	147	98	265	282
Anapalau St. - W. of Kaumakani (EB)	14	22	14	22	26	48
Anapalau St. - W. of Kaumakani (WB)	27	38	27	38	60	79
Two-Way	41	60	41	60	86	127
Kaumakani St. - N. of Anapalau (NB)	44	31	44	31	60	51
Kaumakani St. - N. of Anapalau (SB)	61	34	61	34	77	70
Two-Way	105	65	105	65	137	121
Kaumakani St. - S. of Anapalau (NB)	55	36	55	36	70	66
Kaumakani St. - S. of Anapalau (SB)	38	39	38	39	64	70
Two-Way	93	75	93	75	134	136
Lunalilo Hm. Rd. - N. of Anapalau (NB)	499	389	518	399	530	414
Lunalilo Hm. Rd. - N. of Anapalau (SB)	283	545	294	565	306	591
Two-Way	782	934	812	964	836	1,005
Lunalilo Hm. Rd. - N. of Kalaniana'ole (NB)	586	427	611	443	621	463
Lunalilo Hm. Rd. - N. of Kalaniana'ole (SB)	422	573	438	597	477	644
Two-Way	1,008	1,000	1,049	1,040	1,098	1,107
Kalaniana'ole Hwy. - W. of Lunalilo HR (EB)	1,120	1,061	1,191	1,141	1,199	1,156
Kalaniana'ole Hwy. - W. of Lunalilo HR (WB)	916	1,046	974	1,109	1,002	1,143
Two-Way	2,036	2,107	2,165	2,250	2,201	2,299
Kalaniana'ole Hwy. - E. of Lunalilo HR (EB)	514	663	564	728	564	728
Kalaniana'ole Hwy. - E. of Lunalilo HR (WB)	499	483	544	523	546	527
Two-Way	1,013	1,146	1,108	1,251	1,110	1,255
Kalaniana'ole Hwy. - E. of KH Park Rd. (EB)	493	680	543	742	546	747
Kalaniana'ole Hwy. - E. of KH Park Rd. (WB)	498	482	543	522	545	527
Two-Way	991	1,162	1,086	1,264	1,091	1,274

APPENDIX N

**Preliminary Design Concepts
For the Proposed Park Elements
of the
Koko Head District Park Master Plan**

Working Notes & Reference Materials

APPENDIX N

Preliminary Design Concepts for the Proposed Park Elements of the Koko Head District Park Master Plan

Working Notes and Reference Materials

The following notes and reference materials are intended to provide additional details regarding the proposed projects for the Koko Head District Park Master Plan.

The information reflects cumulative input gathered from community charrettes, recreational facility reference guidelines, and discussions with City staff. The information was used for general planning purposes in developing the Koko Head District Park Master Plan. It is expected that specifics will be developed during the design phase.

Picnic

The community wants to convert the old Job Corps site into a passive park for quiet enjoyment. The site offers scenic views which are considered for placement of picnic areas. Parking will be located in areas where it will not interrupt the picnic view plane. The community generally brings their own grills for picnic activities. Charcoal pits should be provided for proper refuse. Picnic facilities will also be added in the lower park to support the soccer fields and baseball fields. An estimated 50 picnic tables and benches and 5 charcoal pits will be provided.

Baseball

Goeas field is to be expanded to a regulation sized baseball field: 310' down right field and 360' down center field. Storage rooms are planned for the lower ballfields, however these facilities are too detailed to be shown on a conceptual master plan. Night lights are to be added to Goeas field. Baseball night lights are approximately 90' high.

Soccer

A regulation soccer field measuring 225' x 360' maximum, 195' x 330' minimum is planned. These figures are based on architectural standards. Lights and bleachers should be added to the soccer field, however no further discussions were held regarding the type and size of lights and bleachers.

Multi-Purpose Field

The multi-purpose field should be the same size as the soccer field. This size will accommodate football play, as a standard football field measures 160' x 300'. The multi-purpose field is also intended to support overflow parking. An access way should be provided which connects the multi-purpose field to the main park road.

Volleyball

There is an existing volleyball court adjacent to the basketball courts. To make room for the new multi-purpose field, the volleyball court needs to be relocated. The existing

volleyball court will be demolished and a new court will be added for volleyball and other uses. The existing volleyball court should be replaced with a mixed-use basketball/volleyball court instead of two volleyball courts.

In-Line Hockey

A permanent full size in-line hockey rink with a dasherboard system for youth hockey leagues is planned. A full size rink measures 185' x 85'. The footprint should measure 200' x 100' to include space for rink entrance and benches for players. A Pro4000 Border Patrol permanent in-line hockey rink was used on Maui.

Skateboard park

A half acre for a skateboarding park that is rectangular in size, with length longer than width is planned. It will include obstacles, curves and dips for skate boarders.

Tennis

Two new tennis courts with practice backboards are planned to be added as an extension of the existing courts.

Pool

Install a standard olympic size 50 meter swimming pool without diving boards is planned. Access to existing shower and locker room facilities will be provided. Use of the pool is envisioned for competition, aquatic recreation and safety instruction.

BMX

The BMX field should be at least one acre with its perimeters fenced with four foot high chain links. No trees are to be within the field. Existing trees should be moved along the roadside to create a buffer between the road and the BMX field. The field also needs an entrance and access to the adjacent parking lot. Specific drainage and design will be coordinated with the local BMX organization.

Super playground

The super playground concept envisions a large playscape that can accommodate 150 kids in active play at a time. The playscape can consist of a number of components connected through mazes, platforms, ramps and climbers. Examples of components found in playscapes on the mainland include caves, ships, towers, castles and slides. The trend has been to include the community in designing, building and funding the projects making each playscape unique.

At Koko Head District Park, space should be provided to accommodate a super playground similar to those on the Big Island and at Hickam Air Force Base. Community leadership and partnership is encouraged.

Disc Golf Course

A 9 hole disc golf course is to be located along the outer perimeter of the old Job Corps site. The course is intentionally located across Koko Head Park Road for safety purposes.

The course requires 9 tee pads and 9 baskets. Equipment cost estimates according to local disc association members range from: \$9,000 - \$20,000. No landscaping is required. The existing trees and topography adds to the challenge of the game.

A preliminary course was designed in consultation with a disc association member. A survey of the site and samples of mainland courses were also used to determine a general course layout. Assumptions include avoiding the existing historic quonset hut and installing a barrier and warning sign near the ridge overlooking the adjacent shooting range. The general layout of the 9 hole course was designed to include scenic tees, challenging terrain, tree hazards and a mix of fairways:

<u>Hole No.</u>	<u>Distance in Feet</u>	<u>Par</u>	<u>Description</u>
1	180	3	Into stiff wind
2	240	3	Around road
3	192	3	Wind dies
4	315	5	Long hole, crosses gully, between trees
5	266	4	Two finger righty
6	250	4	Two finger righty. Beautiful ocean view.
7	256	4	Righty backhand
8	320	5	Long fairway
9	203	3	No wind. Back to parking lot

Actual course should be developed with local disc association.

Walking and Jogging Path

Construct a 6' to 8' wide concrete bi-directional walking and jogging path around the perimeter of the active park. Ensure ADA accessibility and provide access to water fountains. The walking path should be at least a mile long for recreational users. The walkway should be an interconnected pathway system. Safety should be given to multiple users, particularly if in-line skating and cycling should be allowed on the pathway. The pathway is intended primarily for walkers and joggers.

Teen Center

Construct a new indoor recreational facility for teens which is to include space to hold dances, a lounge area, video arcades and vending machines with sufficient air circulation. The size of the center should be similar in size to the existing arts and crafts building. About 80' x 40'. The facility is assumed to be single story.

Restroom Facilities

A total of 3 new restroom facilities with 4 stalls for women and 2 stalls for men are to be phased into the park. The first is to be located at Goeas Baseball field. The second is to be located between soccer and BMX field. The third is to be located by the super playground.

Access road

Construct a new road to access the new passive picnic areas. This road is to veer left from the entrance, skirting the tennis courts and winding its way to meet the old Job Corps road. The road is to handle two way traffic. Also, repave existing Job Corps road.

Bike Racks

Bicycle racks are to be added to the park. The general standard provision of bicycle parking at recreational areas in other states is 10% of auto spaces. Approximately 30 bicycle parking racks were proposed in the Master Plan based on the 280 existing parking stalls. 3 sets of bicycle racks which hold 8-10 bicycles each, appropriating a 2'x6' space for bike racks with a 5' accessibility space for each rack system was also proposed. Bike racks are to be located in visible areas, accommodate U-shaped locks, allows for security of frame and wheels, and is securely anchored.

Maintenance Base Yard

Relocate the maintenance base yard to the vacant area west of the new access road and south of the proposed disc golf course in order to provide additional picnic space in the center of the District Park.

Playgrounds

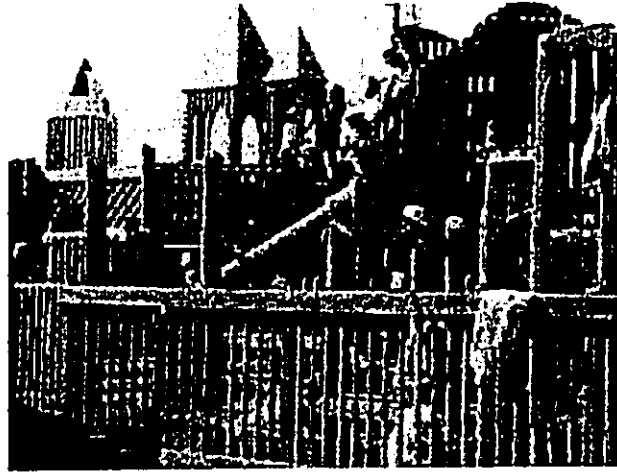
There was a proposal to add a tiny tot lot for children under five years of age in the administrative courtyard area and an elementary school playground for children five years and older between the existing gymnasium and the new parking lot. Playgrounds should avoid being located near the main entrance and ditch for safety purposes.

Local Resources and Contact Information

BMX:	Terrence Gomez
Disc Golf:	Pamela Martin
In-Line Hockey:	Tim Temple
Hockey Rink Systems:	Border Patrol, Inc.
Goeas Field:	Carl Makino, Hawaii Kai Baseball League
Bike Standards:	Chris Sayers, City Bicycle Coordinator

Kids' Kingdom

And the children played happily ever after



Some of the 2500 volunteers building the Alamogordo Kids' Kingdom, November 1995. (photo, John Douglass)

Kids' Kingdom is the first community built playscape in the State of New Mexico. It is a nonprofit, all volunteer project that constructed a unique, extraordinary and free playscape for all children. The dream was inspired by Alamogordo resident John Douglass. He recruited the core volunteers needed to form the organization that made the dream a reality. Two years of dedication by the committee, twelve months of fund raising and volunteer recruitment afforded Kids' Kingdom success. The playscape was built in the fall of 1995 with a little over 2,500 volunteers and \$120,000 in funding. The total value of the project is estimated at \$500,000 - \$700,000.

Although no playscape has the design, the artwork, and the workmanship like Alamogordo Kids' Kingdom, the innovation behind the project comes from the architectural firm of Leathers & Associates. Based in Ithaca, New York, Robert Leathers specializes in community built playscapes. Over 1,000 projects have been successfully completed across the country and across the world. Their success rate is 95%. Their formula has proven itself again and again.

Some of the major components in the playground are a Space Station, a Pirate Ship, Human Head, and a Toddler Tree House. All of the components are connected through various mazes, platforms, slides, ramps and climbers. Even the young-at-heart are able to enjoy the playscape and/or retrieve their children.

Beautiful craftsmanship and artwork are combined throughout the park. The desert plant area features a wall mural with art and local history, attractions, as well as the plant and animal life of the surrounding Tularosa Basin and Sacramento Mountain Range. Picnic tables and benches are abundant in the the plant area and surrounding the playground. Additionally, the playscape meets the Americans with Disabilities Act standards.

Design of the Structure

The centerpiece of the playground is a wooden play structure measuring sixty by one hundred twenty feet, constructed primarily of treated lumber and utility poles. It incorporates a Castle with a sandbox "moat," a suspension bridge, a tree fort, a "dinosaur slide," a "pirate ship," a circular slide, a "soft climber," a "cargo net," and a mirror maze. The Castle is linked to the rest of the structure by a ring bridge, a horizontal ladder, a chain bridge, a rubber bridge, and a "spider web." The larger piece of the structure contains a "lighthouse" tower, "The Statue of Liberty," a playhouse, an alligator tunnel slide, a tube slide and a small amphitheater for storytelling.

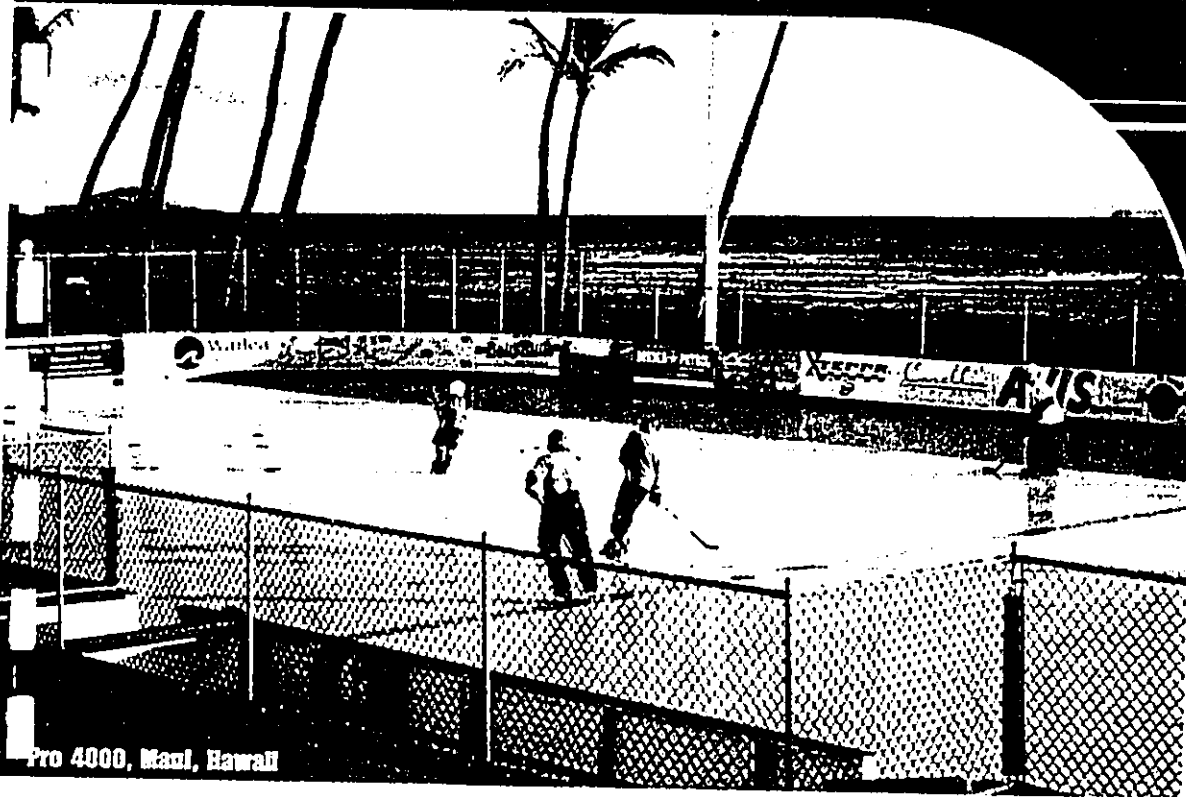
The remainder of the playground features freestanding swingsets, tot swings, animals on springs, low rings, and a tire swing. There is a wheelchair-accessible path through and around the play structure. The entire playground will be covered with a wood fiber play surface that doesn't mark clothing like ground rubber tires, and is biodegradable. An integral part of the playground is comfortable seating nearby for grownups supervising kids. The design is in full compliance with Consumer Product Safety Commission and Americans With Disabilities Act guidelines.

According to the architects, Robert S. Leathers and Associates of Ithaca, NY, the playground will accommodate up to 150 kids in active play at a time. Unlike that of many playgrounds, the design of this playground does not segregate kids by age, but allows children to explore and find what is most interesting to them. In fact, kids from Clark and Johnson schools met with the architects in May to put their ideas into the playground design.

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Pro 4000, Maui, Hawaii

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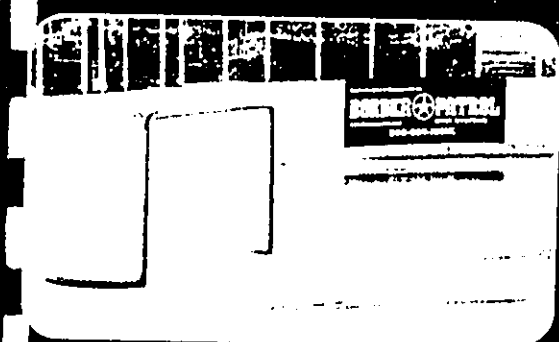
- 4-1/2 INCH WIDE STEEL FRAME SYSTEM ANCHORS IN A CONCRETE BASE ON A CONCRETE OR ASPHALT SURFACE
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Bill Berghoff, General Manager of Sportsplex USA, Pewee, CA

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Fax #	523-5874	Fax #	7274		

- SKATE TRACK -

Design

The greatest mistake cities make is simply pouring concrete and expecting skaters to use it.

The location and design of your skatepark will have a great effect on the total cost of your facility and how much use it gets.

By observing the skaters in action and *allowing the local skaters to work closely with the skatepark designer*, your finished park will be a well-planned, low-maintenance design that will experience heavy use and provide thousands of recreational hours for valued members of your community each year.

The designer must have park building experience and should work very closely with local skaters.

Fencing to protect spectators helps maintain landscape. Builders should make sure the perimeter of the park is oversized, providing adequate walking and skating areas between the fence and the park.

DESIGN is the most important part of the whole process. People will return to the park and use the facilities if it is designed well. Your park should consist of the following:

1. Separate beginner area--this should be between 5,000 sq.ft. and 8,000 sq.ft. consisting of street style obstacles and mini ramps. It is very important to separate beginners from advanced skaters.
2. Medium to advanced style street area--this should be between 8,000 sq. ft. and 10,000 sq. ft. consisting of street obstacles mimicking public areas.
3. Various ramps--this area should be between 1,500 sq. ft. and 4,000 sq. ft. consisting of mini ramps, spine ramps and bowls. The ramps are between 4 ft. and 8 ft. tall.
4. Vertical ramp--this area should be between 1,500 sq. ft. and 2,500 sq. ft. This is usually a single ramp that is between 11-12 ft. tall; 24-40 ft. wide and 50 ft. long.

(The greatest population will be in the beginner area and the medium to advanced street area.)

The Sport
Disc Golf
 of the Future

Rolf Frei became a disc golf legend when he brought 52 friends to play in the World's Biggest Disc Golf Weekend in 1992.



Disc golf combines a favorite modern pastime—disc throwing—with one of the world's great games—golf. Players count how many "strokes" (throws) it takes to get from the tee to the hole, which may be a tree, post, or official Disc Pole Hole.™

Players commonly use special golf discs designed for drives, approach shots, and putts (drivers can fly over 200 yards!), but any disc may be used. Most golf discs cost \$7-\$8, making disc golf a very affordable game.

Disc golf is affordable for parks departments, too. A deluxe 18-hole course costs less to install than a basketball or tennis court, and the disc golf course will hold up to 72 people at once. Since disc golf courses usually run through and around trees (and up and down hills) they work best in areas that can't be used for baseball, soccer, or playgrounds. Disc golf courses don't destroy trees, and they don't require any special maintenance.

It's easy to see why thousands of new players take up disc golf every year. It's a fun, healthful family game, and an 18-hole round generally takes less than two hours to play. Schools are teaching disc golf now, too; some have even set up their own courses.

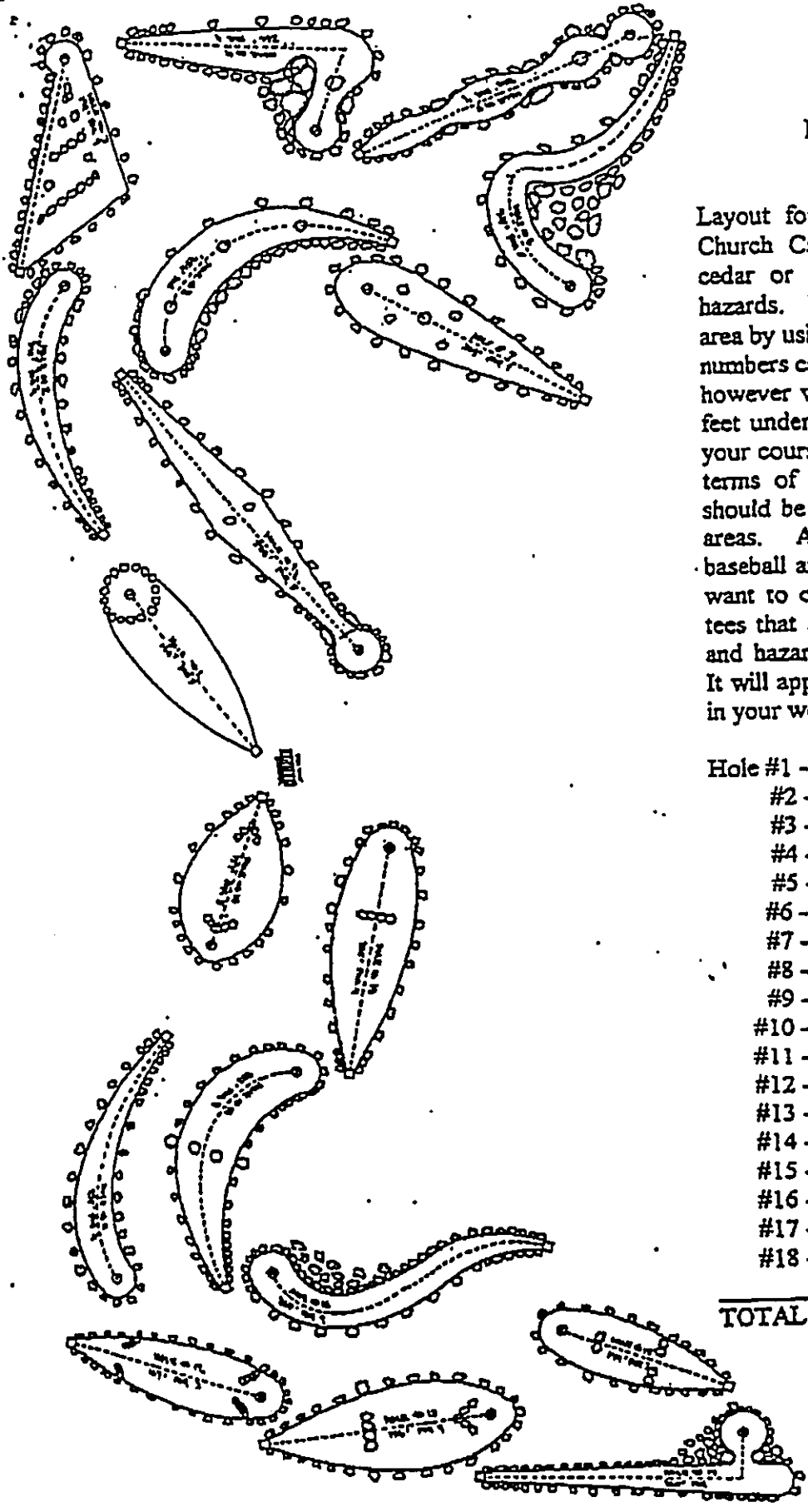
It's time for you to try disc golf . . .
 it may be the *sport* of your future!



A Swiss class in a "throw for all"



Ernie Gangloff shows the putting form of a top professional.



**POSSIBLE LAYOUT FOR
DISC GLOF COURSE**

Layout for a typical Park Camp Ground, Church Camp, YMCA Camp. It utilizes cedar or pine volunteer trees or artificial hazards. It can also be used in a wooded area by using existing trees as hazards. Hole numbers can be changed as well as distances, however we recommend not exceeding 450 feet under any circumstances. If you want your course to be poplar, make it difficult in terms of hazards not distance. No holes should be over water, streets or highly used areas. Avoid bike ways, jogging tracks, baseball and football fields. If you feel you want to cater to the elite, provide optional tees that are longer. This course has holes and hazards that require skill, not strength. It will appeal to all ages. You can find them in your woods if you look hard.

	PAR	PRO-PAR
Hole #1 - 180	3	2
#2 - 240	3	3
#3 - 192	3	2
#4 - 266	4	3
#5 - 250	4	3
#6 - 315	5	3
#7 - 203	3	2
#8 - 256	4	3
#9 - 320	5	3
#10 - 137	2	2
#11 - 235	3	2
#12 - 167	2	2
#13 - 186	3	2
#14 - 260	4	2
#15 - 144	2	2
#16 - 265	4	2
#17 - 233	3	2
#18 - 205	3	2
TOTAL 4054	70	42