August 15, 2001

TO: The Honorable Gilbert Agaran, Director
Department of Land and Natural Resources

SUBJECT: Acceptance of the Final Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion

With this memorandum, I accept the Final Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion, island of Hawaiʻi, as satisfactory fulfillment of the requirements of Chapter 343, Hawaiʻi Revised Statutes. The economic, social and environmental impacts, which will likely occur should this project be implemented, are adequately described in the statement. The analysis, together with the comments made by reviewers, provides useful information to policy makers and the public.

My acceptance of the statement is an affirmation of the adequacy of that statement under the applicable laws but does not constitute an endorsement of the proposed action.

I find that the mitigation measures discussed in the environmental impact statement will minimize the negative impacts of the project. Therefore, if this project is implemented, the Department of Land and Natural Resources and/or its agents should perform these or alternative and at least equally effective mitigation measures at the discretion of the permitting agencies. The mitigation measures identified in the environmental impact statement are listed in the attached document.

Attachment

c: Honorable Bruce S. Anderson, Ph.D., M.P.H.
   Office of Environmental Quality Control
Final Environmental Impact Statement
Hapuna Beach State Recreation Area Expansion
Lalamilo, South Kohala, Hawaii

Division of State Parks
Department of Land and Natural Resources
State of Hawaii
May 2001
Final Environmental Impact Statement
Hapuna Beach State
Recreation Area Expansion
Lalamilo, South Kohala, Hawaii

PROPOSING AGENCY:
Division of State Parks
Department of Land and Natural Resources
State of Hawaii

RESPONSIBLE OFFICIAL:
This environmental impact statement and all ancillary documents were prepared under my direction or supervision and the information submitted, to the best of my knowledge, fully addresses document content requirements as set forth in Section 11-200-17 and Section 11-200-18, Hawaii Administrative Rules.

GILBERT COLOMA-AGARAN
Chairperson
Board of Land and Natural Resources
May 22, 2001
Date

Prepared by:
Harrison Associates
In Association With:
Belt Collins Hawaii
and
Pedersen Planning Consultants
PREFACE

On June 23, 1996, a notice of availability for the Hapuna Beach State Recreation Area Expansion Draft Environmental Impact Statement was published in the Office of Environmental Quality Control's The Environmental Notice. During the public comment period, many letters were received commenting on and raising concern over the State Board of Land and Natural Resources' (BLNR) plan to acquire privately-held properties at Wailea Bay for the expansion of the State park.

Previously, on November 20, 1987, the BLNR ordered the Department of Land and Natural Resources (DLNR) to acquire the privately-held properties for park purposes. In 1994, the DLNR initially acquired two parcels adjacent to an existing public beach access easement near the center of Wailea Bay.

Between 1994 and 1997, the State made no further acquisitions and, as such, the Wailea Bay property owners expressed concern over the sequence of property acquisition and the lack of action to do so. In 1998, the private property owners requested the BLNR's 1987 Order be rescinded on the basis that the State has no funds to acquire their properties and that the Order clouds the title to their properties which in turn adversely affects their property values.

On June 5, 1998, in response to a property owners' petition for declaratory ruling and after hearing all arguments on the matter, the BLNR rescinded its 1987 Order, subject to the following conditions:

1. Rescission of BLNR's Order of November 20, 1987 does not invalidate the transfer of properties that have already been acquired by the State.

2. Rescission of BLNR's Order of November 20, 1987 shall not prohibit BLNR from taking action in the future to condemn Wailea properties, when funds become available for acquisition of these properties, and provided that any such action comply with Chapter 343, Hawaii Revised Statutes, addressing Environmental Impact Statements.

3. Rescission of BLNR's Order of November 20, 1987 shall be contingent upon recordation of the Unilateral Agreement and Declaration for each affected privately-owned property requiring the landowner to: A) restrict any development to conform to what is currently allowed today, and B) not seek zoning changes for a period of 15 years, with the 15-year term to commence on the date of the last such property covenant document is recorded.

4. Recordation of the Unilateral Agreement and Declaration shall be completed within one hundred and eighty (180) days of the date of BLNR's decision to rescind its November 1987 Order or 30 days from the acceptance of the Final Environmental Impact Statement (FEIS), whichever is later.
5. BLNR's rescission shall be null and void should the private property owners fail to complete recordation of the Unilateral Agreement and Declaration within one (1) year of the date of BLNR's decision to rescind its November 20, 1987 Order.

6. Property owners agree to not seek zoning changes prohibited by the Unilateral Agreement and Declaration during the period that the Unilateral Agreement and Declaration is being recorded.

7. The FEIS for expansion of Hapuna Beach State Recreation Area shall be amended to delete references to condemnation and/or to explain the resolution of the private property owners' concern regarding condemnation.

On June 5, 1998, the BLNR also accepted the Hapuna Beach State Recreation Area Master Plan and the FEIS (amended pre-final document), subject to the following conditions:

A. All references to the acquisition of private properties at Wailea shall be deleted from the FEIS and/or clarification added, and drawings modified to show the presence of privately-owned inholdings.

B. In the future, when specific areas of the park are actually slated for any undertaking that would impact historic sites, the archaeological inventory survey will be upgraded for the relevant impact area to address the Historic Preservation Division's comments.

C. The development of the Lalamilo Well shall not occur if it is unfeasible to carry out the park expansion development and unless the economic use of the brackish water system has been maximized.

D. No state funds shall be used for the development of the golf course proposed in the Draft EIS.
REVISIONS IN THE FINAL EIS

The Draft EIS was published in 1996 and during the public comment period a number of responses were received from public agencies, community organizations, and individuals. The comments ranged primarily from concerns over impacts on the use of the area by more people to costs of the proposed improvements. The most predominant concern related to the State's plan to acquire the remaining private properties at Wailea Bay. As provided in the preface of this document, the owners of the private properties at Wailea Bay came to an agreement with the State over the planned acquisition of the private lots.

The Final EIS incorporates the provisions of this agreement. It also includes other changes reflecting the comments received from the community during the public comment period. Below is a summary of the major changes in the Final EIS.

Revisions to document organization and format:

On the inside title page, a revision was made to the identification of the Chairperson for the State Board of Land and Natural Resources and an addition was made to describe the responsibility of the responsible official for the Final EIS.

Revisions to specific words:

All references to "handicapped persons" were revised to "persons with disabilities."

Revisions to the document text:

On page 1-3, Section 1.1.3 entitled, "Need for the Project," three paragraphs describing the DEIS/FEIS review process were deleted. The information in the deleted paragraphs is apparent in the current assessment procedures.

On page 2-34, Section 2.4.5 entitled, "Alternative to Wailea Lots Acquisition," the following two paragraphs were added:

Two private lots were acquired by the State in 1994, thereby adding 400 linear feet of beach frontage to an existing 30-foot-wide public access road reserve leading to the beach. A 40-foot-wide road reserve also runs the length of the beach fronting the private properties. Acquisition of the
remaining private lots behind Wailea Bay would be required to provide the maximum amount of open space, beach frontage and picnic area for park users.

If the private properties were not acquired, the park would have only limited direct physical and visual access to the shoreline that is important for establishing a coastal recreation environment. Although the 40-foot-wide road reserve lot provides open space over the length of the beach, shaded picnic amenities in this section of the park would be limited to 1.8 acres (the area of the two parcels that have been acquired) and the State Parks Division will only partially meet its development objectives for the area.

On page 3-46, Section 3.11.1.3 entitled “Potential Impacts – Project Cost,” modifications were made and are shown in the following two paragraphs:

The acquisition of private Wailea properties is not being considered at this time, and to date, no specific land acquisition cost has been determined for the properties. Should the Department of Land and Natural Resources consider purchase of the private properties in the future, an estimate of property value would be more appropriate at that time.

As a general indication of land cost, research was conducted on property values at the County Real Property Tax Office. The total value for the 19 properties behind Wailea amounted to about $14 to $16 million. Property improvement costs varied considerably but totaled approximately $3.0 to $3.5 million. These figures were based on assessments made in early 1996.

On page 5-4, Section 5.4 entitled, “Condemnation of Residential Lots at Wailea Bay,” the statement “Development of the park expansion will require the condemnation of 19 privately owned lots behind Wailea Bay.” was replaced by “Optimum development of the park expansion may require condemnation of 19 privately owned lots.”

Update on facility conditions and status of events:

On page 2-10, Section 2.2.2 entitled, “Golf Course,” the number of golf courses in West Hawaii was updated from 12 to 13.

On page 2-29, Table 2-1, revisions were made to update the preliminary schedule. Construction start-up for the park expansion is scheduled to begin in 2003 or 2004. Completion of the first two phases involving the expansion area’s basic infrastructure and initial ground and park improvements is scheduled for 2009.
On page 3-42, Section 3.11.1 entitled, "Economic Assessment," the amount of short tons of cargo handled at Kawaihae Harbor was updated from 730,000 in 1989 to 655,000 in 1993.

On page 3-80, Section 3.13.1.1 entitled, "Health Care - Existing Conditions," the completion date of the North Hawaii Community Hospital was updated.

On pages 3-83, 3-85 and on Figure 3-17, the name of the Kona Coast State Park was updated to Kekaha Kai State Park.

Revisions relating to the agreement between the Wailea private property owners and State of Hawaii

The Final EIS incorporates the agreement between the private property owners at Wailea and the State of Hawaii regarding the acquisition plan for the area. The preface of this document reviews the background of the agreement and provides a summary of the agreement (see attached Preface).

On page 1-1, Section 1.1.1 entitled "Purpose of Document," the following statement was added: "The proposed action does not include acquisition of privately owned parcels at Wailea Bay and this EIS does not address the proposed impacts of possible acquisition of these private lands."

On page 1-1, Section 1.1.2 entitled "General Project Description," the statement "... are 19 privately-owned lots which are proposed for acquisition..." was revised to state "... are 19 privately-owned lots which had previously been considered for acquisition..."

On page 1-3, Section 1.1.2 entitled "General Project Description," the phrase "not part of the proposed action and hence" was inserted in the following statement, "Acquisition of the private lots behind Wailea Bay is not included in the construction cost."

On page 1-7, Section 1.3 entitled, "Social Environment - Potential Impacts," a statement referring to the acquisition of private lots at Wailea Bay by the State was replaced by, "Also, as part of the expansion program, the State had considered purchasing the Wailea Bay lots. This action would displace a number of residents who are presently residing on the property, but possible acquisition is not part of the proposed action addressed in this FEIS."

On page 1-8, Section 1.3 entitled, "Social Environment - Proposed Mitigation Measures," the following statement was added: "The schedule for Wailea Bay
lot purchases is uncertain and this remains an unresolved issue and is a source of grave concern for the potentially affected residents.”

On page 1-11, Section 1.5 entitled, “Summary of Unresolved Issues,” the issue of condemnation of residential lots at Wailea Bay was removed.

On page 2-11, Section 2.3.1 entitled, “General Development Proposal,” the statement, “acquisition of beach lots at Wailea Bay,” was removed from the list of development elements in the park expansion plan.

On page 2-22, Section 2.3.10 entitled, “Wailea Bay Lots Acquisition,” was revised to reflect the agreement between the private property owners and the State.

On page 2-30, Section 2.4.3 entitled, “Alternative B: Expansion of the Park to Encompass 526 Acres (No Golf Course),” revisions were made to clearly indicate that this alternative does not include acquisition of the privately-owned parcels.

On page 2-39, Section 2.6.6.2 entitled, “Summary of Comparative Evaluation,” revisions were made to the evaluation of impacts from the proposed alternatives considering the acquisition of the privately-owned lots is not part of the current master plan. Table 2-2 which summarizes the evaluation was also revised to reflect the change.

On page 3-53, Section 3.11.2.2 entitled, “Community Attitudes and Concerns – Potential Impacts,” three paragraphs were added:

The uncertainty concerning the State’s acquisition of private properties proved stressful to some community residents, and, consequently, community members filed a petition for deletion of BLNR’s Order of November 1987. The petitioners based their request for a declaratory ruling on the grounds that: 1) the 1987 Order was nearly ten years old and the State had not acted on the Order, 2) the 1987 Order was in furtherance of appropriations which had lapsed, and no new funds had been appropriated, 3) BLNR had completed neither the planning nor the EIS and, as such, the 1987 Order was premature, 4) the 1987 Order was inconsistent with the State Recreation Functional Plan which calls for acquisition of undeveloped lands, and 5) the existence of the 1987 Order damages the petitioners by clouding title to and blighting the value of their properties.

The uncertainty was alleviated by the BLNR on June 5, 1998, when BLNR chose to rescind its November 1987 Order. At the time the Order was rescinded, an understanding was reached between BLNR and the landowners. The landowners understood that BLNR’s rescission did not preclude a future condemnation if funds become available, and that any future action to acquire by condemnation would
include the preparation and processing of an EIS to fully describe the impacts of condemnation. In addition, the landowners requested, and BLNR agreed to, the removal of all references to, and/or clarification of, the acquisition of private property in the pending Final EIS for expansion of the Hapuna Beach State Recreation Area.

In addition, BLNR desired to maintain the status quo of private property land use at Waiakea Bay, meaning that landowners should not be allowed to upzone their property so as to increase its value. To guarantee that this would not occur, BLNR asked for, and the landowners agreed to, the imposition of a 15-year covenant on their parcels that: 1) restricts development to conform to what is currently allowed today, and 2) prohibits zoning change for a period of 15 years. A Unilateral Agreement and Declaration was prepared and executed and recorded as a property covenant document.

On page 3-54, Section 3.11.2.2 entitled, "Community Attitudes and Concerns - Proposed Mitigation," the following paragraph was added:

The uncertainty of the acquisition of the Waiakea Bay private properties was alleviated by BLNR's action to rescind its 1987 Order. In the future, however, should funds for acquisition become available, BLNR will prepare and process an EIS to address the impact of acquisition of the private properties. Thus, the community will be apprised of any pending State action to acquire the properties.

Revisions clarifying the development of the golf course by a private interest:

On page 1-3, Section 1.1.2 entitled, "General Project Description," revisions were made to clarify that approximately $23.2 million of the approximately $40 million park expansion cost (in 1993 dollars) will be used for the golf course development and financed by a private investor-developer or other private interest.

On page 1-7, Section 1.3 entitled, "Summary of Potential Impacts and Mitigation Measures - Economic Environment," and on page 2-29, Section 2.4.2.4 entitled, "Public Resource Commitments," revisions were made to clarify that the golf course construction represented approximately 40 percent of the project construction budget and that it will be financed by a private interest.

On page 3-44, Table 3-9, revisions were made to indicate that the golf course management and maintenance staff may be filled by a private contractor under an agreement with the State.
On page 3-46 and 3-47 (Table 3-12), Section 3.11 entitled, "Project Cost," revisions were made to indicate that the operations/maintenance cost for the golf course would be financed by a private operator.

Revisions to Figures in the EIS:

Figure 2-2: Revisions were made to show that the privately-owned properties are not part of the park expansion area.

Figures 2-4, 2-11, 2-12, 2-13, 3-5, 3-6, 3-13, 3-15, and 3-16: Revisions were made to show that the privately owned properties are a separate area and not part of the park expansion plan.

Figure 3-8: A revision was made to show that the two private properties that were acquired by the State in 1994 are now part of the State land.
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<th>Definition</th>
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<tr>
<td>AAQS</td>
<td>Ambient Air Quality Standards</td>
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<tr>
<td>ALISH</td>
<td>Agricultural Lands of Importance to the State of Hawaii</td>
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<tr>
<td>AUY</td>
<td>Animal Unit Year</td>
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<td>BLNR</td>
<td>Board of Land and Natural Resources</td>
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<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>cfs</td>
<td>cubic feet per second</td>
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<tr>
<td>CZM</td>
<td>Coastal Zone Management</td>
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<tr>
<td>DEIS</td>
<td>Draft Environmental Impact Statement</td>
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<td>Division of Conservation and Resource Enhancement</td>
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<td>DOH</td>
<td>Department of Health</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>FEIS</td>
<td>Final Environmental Impact Statement</td>
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<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
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<td>FHWA</td>
<td>Federal Highways Administration</td>
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<tr>
<td>gpd</td>
<td>gallons per day</td>
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<td>HELCO</td>
<td>Hawaii Electric Light Company</td>
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<tr>
<td>KV</td>
<td>kilowatt</td>
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<td>Land Study Bureau</td>
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<td>Land Use Pattern Allocation Guide</td>
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<tr>
<td>mgd</td>
<td>million gallons per day</td>
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<td>WWTF</td>
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CHAPTER 1
INTRODUCTION AND SUMMARY

1.1 BACKGROUND

1.1.1 Purpose of Document

This Final Environmental Impact Statement (FEIS) has been prepared for the Division of State Parks (hereafter referred to as State Parks) in conjunction with the Land Division of the Department of Land and Natural Resources (DLNR), State of Hawaii for the expansion of an existing beach park at Hapuna Bay in South Kohala, Hawaii. The proposed action calls for the use of State land and funds which subjects the proposed action to Chapter 343, Hawaii Revised Statutes, and its administrative rules. The DLNR has determined that the proposed action will result in potential impacts which should be addressed in an EIS. The proposed action does not include acquisition of privately owned parcels at Wailea Bay and this FEIS does not address the potential impacts of the possible acquisition of these private lands.

The Governor of the State of Hawaii is the accepting authority for the FEIS. The Office of Environmental Quality Control (OEQC) will provide a recommendation to the Governor regarding the acceptability of the FEIS.

1.1.2 General Project Description

State Parks is proposing to expand its existing Hapuna Beach State Recreation Area (previously known as Hapuna Beach State Park) from 62 acres to approximately 846 acres. This expansion will include the area between Hapuna Bay and Puako Bay from the shoreline to a distance of approximately 5,080 feet inland. Traversing the mauka section of this area is the Queen Ka'ahumanu Highway, a State right-of-way serving the South Kohala coastal region. To the north of the property is the Mauna Kea Resort and to the south are the Puako Beach Lots community and Mauna Lani Resort (Figure 1-1). Behind Wailea Bay are 19 privately-owned lots which had previously been considered for acquisition by the State and inclusion within the park expansion area.

The existing park is located at Hapuna Bay and includes 62 acres of open land above the beach. Existing facilities include a concession, three picnic pavilions, three comfort stations, parking, and a mauka area containing six A-frame cabins, multi-purpose pavilion and two small comfort stations.

State Parks has identified long-term recreational needs for West Hawaii and opportunities to use and manage recreation resources at Hapuna. A master plan for expansion of the park has been prepared and calls for improvements to the year 2010. The expansion will consist of 784 additional acres of recreational facilities including picnic areas with comfort

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1 The spelling of "Wailea" also occurs as "Waialae." The spelling of Wailea in this document is consistent with the spelling provided in the 1990 State Comprehensive Outdoor Recreation Plan prepared by the Department of Land and Natural Resources, State of Hawaii.
stations, family and group camping areas, hiking trails and shoreline paths, parking areas, improved access to Wailea Bay, and an 18-hole public golf course. Construction of the park expansion is expected to cost approximately $40 million (1993 dollars) over the planning period. The portion of the park that is to be developed makai of the highway will cost approximately $23.2 million and will be financed by the State’s general obligation bond funds. The balance of the $40 million will be used to develop the golf course and is planned to be financed by private interests. The golf course may be constructed by a private investor-developer and operated by an independent contractor. The land would be leased to the golf course developer to provide additional government revenues.

Annual operations and maintenance costs of the park are expected to be $4.3 million by the year 2010 and $5.1 million by the year 2015. Approximately 53 percent of the cost would be for the golf course operations and maintenance which may be financed by a private operator.

1.1.3 Need for the Project

In 1990, on behalf of the State Parks, the Division of Water and Land Development (which has been reclassified to a branch of the Land Division) commissioned Harrison Associates to prepare a master plan for the expansion of the Hapuna Beach State Recreation Area. This plan was undertaken to update a 1970 master plan prepared by Charles Yoon & Associates, Inc. The earlier plan covered approximately 525 acres of State-owned land makai of the old Kawaihae-Puako Road. The updated plan is intended to recognize the rapid urbanization of West Hawaii since 1970 and to re-examine potential recreational opportunities at Hapuna.

Included also in the scope of work for the current plan is the task of demonstrating need for the park expansion. Pedersen Planning Consultants of the Big Island was retained to assess recreational needs with particular focus on West Hawaii (Appendix A).

In summary, the Pedersen study notes the shortage of sand beaches, camping sites, picnic areas, hiking trails, and affordable golf on the island. The available capacities, particularly at existing camping sites, hiking trails and golf courses with affordable green fees, are currently exceeded by demand. This demand is generated by a growing population of residents and visitors alike. According to the Pedersen study, expansion of the park will help meet the projected demand from facility shortages on the island as well as at the Hapuna site. The land use master plan for the Hapuna Beach State Recreation Area is described in Chapter 2 and provides the “proposed action” for this FEIS.

1.2 STATEMENT OF OBJECTIVES

South Kohala and North Kona Districts combine to form the fastest-growing region on the Island of Hawaii, and this growth is generating an increased demand for recreational amenities. Responsibility for meeting this demand is shared by the state and county governments. The county focuses on serving the island’s local communities, typically with beach parks, neighborhood parks, playgrounds, and botanical gardens. State Parks provides resource-oriented recreational opportunities and considers regional and islandwide outdoor recreational needs that are not offered by the county. In particular,
State Parks focuses on managing and conserving natural, cultural, scenic, coastal, and wildland resources while providing for the recreational needs of the public.

The concept of sustainability is incorporated in the project's planning process, particularly in the selection of suitable activities and uses for the proposed park expansion. A major consideration in the selection process is the harmonizing of the selected uses with the site's natural resources while being cognizant of any environmentally sensitive areas. Development will involve best management practices and water quality monitoring programs to assure that there are no detrimental effects to the environment. Planning and site selection will include assessment of development alternatives and compliance with State objectives that preserve and protect the region's natural resources.

During the operational stage of this project, efforts will be taken to promote public awareness and protection of the park's natural resources through informational and educational programs.

1.3 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

Impacts to the environment are expected to result from construction and operation of the Hapuna Beach State Recreation Area. Adverse impacts will be mitigated where possible and/or offset by benefits resulting from the project. The following identifies the expected short-term and long-term adverse impacts and recommended mitigation. Each of the mitigation measures summarized below is discussed in detail in Chapter 3.

PHYSICAL ENVIRONMENT

Potential Impacts

In the short-term during the project's construction phase, site clearing, grading, and landscaping will result in alterations to the existing landform and drainage patterns. New topsoil will be imported to provide a finish grade for the golf course.

In the long-term, when construction is completed, the arid, open, and sparsely vegetated setting of the project site will be transformed into a landscaped environment with green, dense pockets of vegetation. The new landscape will require fertilizer and pesticides for maintenance operations. The use of these applications could impact groundwater and result in coastal waters infiltration.

Proposed Mitigation Measures

Much of the golf course area will remain in its natural state; essentially only the tees, greens, and fairways will require site modification. This will eliminate the need for mass site grading and allow the developer to integrate the golf course design with the existing terrain.

Development of the park expansion will also involve selective clearing and grading for the most suitable picnic and camp sites within the park. They will be selected to take advantage of existing land forms, vegetation, and view vantage points.
The project contractor will employ dust control measures, noise suppressant devices on construction equipment, and best management practices on site preparation work to control erosion and sedimentation wherever necessary. The new drainage system for the property will be designed to accommodate net increase in surface runoff, and the new landscaping will include native or indigenous plants and an irrigation system to maintain green, healthy plants. These improved areas will reduce the flow of surface runoff and improve ground percolation and soil drainage.

No importation or exportation of soil, except topsoil for the golf course, will be required. The new topsoil will come from an approved source and will be contaminant-free.

NEARSHORE AND MARINE ENVIRONMENT

Potential Impacts

The proposed project will not involve any shoreline alteration. Thus, no impacts will result from direct modifications of the shoreline ecosystem.

There may be short-term impacts associated with project construction such as dust, erosion and sedimentation which may affect the nearshore areas. In the long-term, the park expansion will generate heavier use of the shoreline area.

Concerns have been raised regarding contamination of groundwater and/or offshore waters by fertilizers, herbicides, and pesticides applied on the golf course and park landscaping. With current low rainfall conditions and high evapotranspiration from turf in the area, groundwater recharge under normal conditions does not occur. Moreover, the groundwater in the area is brackish and will not be used for human consumption.

The inland location of the park landscaping and especially the mauka golf course site provides a large coastal buffer area for dilution and dispersion of lawn chemical applications in surface runoff to the marine waters.

Proposed Mitigation Measures

During construction, dust, erosion, and sedimentation control measures will be employed by the contractor. A Best Management Practice (BMP) plan will be implemented to insure that the contractor takes necessary precautions to protect environmentally sensitive areas. A water quality monitoring program, if necessary, could be implemented to verify the quality of the off-shoreline waters during construction.

Expansion of the park will include improved park management. Park managers, security personnel, caretakers and beach lifeguards will provide improved monitoring of park and beach activities and educational programs to enhance the enjoyment and preservation of park amenities and resources.

Areas that become too overburdened by park users will be subject to temporary or permanent park rules that restrict the area's access and use.
Although adverse impacts to groundwater and coastal waters are not anticipated from fertilizer and pesticide use, the use of adequate topsoil depths, appropriate amounts of lawn treatment applications, and well-managed irrigation procedures will provide added safeguards to reducing potential groundwater impacts and coastal water infiltration.

**FLORA AND FAUNA**

**Potential Impacts**

Existing vegetation will be selectively cleared in the proposed golf course site and park expansion area. Wildlife habitats will be impacted and will result in a change in fauna. No rare or endangered plant or wildlife species, however, are expected to be impacted.

**Proposed Mitigation Measures**

The development of the park expansion will involve the practice of selective clearing and grading. This is in line with the design objective of the park to integrate park improvements with the natural environment. The proposed golf course will also be designed to adapt to the terrain and minimize land alteration.

Existing vegetation will be replaced with new vegetation comprising, as much as possible, of native or indigenous plants. Chapter 103-24.6, HRS, mandates that any new or renovated landscaping for any building, housing, or other facility developed with State funds incorporate native Hawaiian plants, wherever and whenever possible.

The new vegetation, which will include an irrigation system, should draw back a large variety of the original fauna, especially in the bird species, once construction is completed. With vegetation in a more abundant and healthier state in the expansion area, fauna will be more abundant and may include new species. The remaining species should readily adapt to the vast lands that are located adjacent to the project area.

**HISTORIC SITES**

**Potential Impacts**

An archaeological survey was conducted on and immediately adjacent to the project area. A total of 164 sites were specifically identified within the existing park and expansion area. The proposed project will affect a number of these sites while the remainder would be left intact in the open undeveloped portions of the property.

**Proposed Mitigation Measures**

The archaeology consultant for the project has recommended various mitigation measures that would reduce or eliminate impacts to archaeological sites. These measures range from further data collection/recovery work to preservation and interpretative development. The recommendations of the archaeology consultant will be reviewed with the State Historic Preservation Division and implemented prior to construction so no significant archaeological features are adversely impacted.
ECONOMIC ENVIRONMENT

Potential Impacts

The proposed project will generate various beneficial effects including new jobs, increased personal income, and additional government revenues from user fees. Secondary impacts would include increased demand in supplies and materials that are used for operating and maintaining the park. The cost of these benefits are the project's short-term construction costs and long-term operating and maintenance costs. In the future, substantial funds may also be required to acquire private properties that occupy the oceanfront land at Wailea Bay.

Proposed Mitigation Measures

The construction of the proposed golf course, which represents approximately 40 percent of the project construction budget, is planned to be financed by the participation of a private developer with the State. This public-private sector arrangement would make the entire project more feasible.

Other means of keeping the cost of construction under control is scheduling. The project could be developed in phases and payment of project expenses could be done over an extended period to make the annual cost of the project more manageable.

In the future, land acquisition costs also could be spread over an extended period to reduce annual public expenses, and options, such as a lease back program, could be employed to help recover some of the land purchase cost.

SOCIAL ENVIRONMENT

Potential Impacts

Expansion of the existing park will open more land to recreation, benefitting Big Island residents. Bringing more people to the area could increase undesirable activities such as loitering, littering, trespassing, vandalism, and use of alcohol and drugs. These activities are of deep concern to area residents.

Also, as part of the expansion program, the State had considered purchasing the Wailea Bay lots. This action would displace a number of residents who are presently residing on the property, but possible acquisition is not part of the proposed action addressed in this EIS.

The proposed project will not involve the need to construct employee housing.

Proposed Mitigation Measures

The park expansion will bring an improvement in park management. An enlarged staff of park managers, security personnel, lifeguards and caretakers will monitor activities,
enforce park rules and regulations, and provide improved maintenance. Special programs on resource awareness will also be provided.

The schedule for the Wailea Bay lot purchases is uncertain and remains an unresolved issue as well as a source of grave concern for the potentially affected residents.

PUBLIC FACILITIES

Potential Impacts

The proposed park expansion will not directly result in a resident population increase that would burden public facilities such as schools, libraries, hospitals and playgrounds. Its benefits would be the expansion of the park’s existing capacity and, to some extent, the relief in pressure on the demand on other existing recreational facilities. The park expansion may require expanded services in police and fire protection.

Proposed Mitigation Measures

Security and fire protection services are being programmed as part of the park management plan. The plan calls for a staff of park managers, security personnel, and caretakers to provide improved public safety within the park grounds. Park personnel will offer information on park rules and regulations and park amenities and provide assistance in minor emergencies. If a major emergency occurs, the County police and fire departments will be summoned for assistance. New driveways within the park will improve access for law enforcement personnel and emergency vehicles. Landscaped areas that contain large lawns will act as fire breaks within the park expansion. Medical facilities in the region have undergone expansion and improvements to accommodate increased demand for health and medical care services.

ROAD AND TRAFFIC

Potential Impacts

Traffic will increase to substantial levels on Queen Ka'ahumanu Highway in the South Kohala District, but this is expected to be a function of regional growth and not the proposed action. A large number of projects have contributed to this growth, including new residential settlements in and around Kailua-Kona, development of public facilities including a landfill in Puuanahulu and a State park near Mahalua Bay, resort expansions on the South Kohala coast, additions to the Honokohau Small Boat Harbor, development of industrial uses in Kailua and near the Keahole Airport, and growth of Waimea town, the Kawaihaisi industrial/business district, and Waikoloa Village.

The impact that will be evident in the project area will be on Queen Ka'ahumanu Highway at the intersections of Hapuna Beach Road, Puako Spur Road and new golf course access drive. The turning movements at these intersections will experience longer delays.
Proposed Mitigation Measures

Although the project’s impact on the area traffic will be relatively small, mitigation measures would be necessary and may include signalization of the Hapuna Beach Road and Puako Spur Road intersections with Queen Kaʻahumanu Highway and channelization of Queen Kaʻahumanu Highway intersection with the proposed golf course access road. The timing and phasing of these improvements will depend on a number of factors relating to regional traffic growth, government highway design objectives, construction cost, and priority of other public improvement projects.

Utilities

Potential Impacts

The proposed park expansion will require the development of a potable well for domestic use and the rehabilitation of an existing brackish well in conjunction with development of two new brackish wells for golf course irrigation. The sustainable yield in the region is substantial and should be adequate for the projected usage.

Since no County sewage collection system is located in the project area, on-site individual wastewater disposal units will be required for the park and golf course facilities. Existing electricity and telephone services will be adequate to accommodate park expansion.

Proposed Mitigation Measures

A new well to supply water for the project will be developed in a proven well field on State-owned land above Hapuna. Test drilling will be initiated once property entitlements are obtained and construction funding is appropriated.

The use of seashore paspalum (thick grass turf) in the golf course fairways will minimize the need to use potable water and maximize the opportunity to use brackish water for irrigation. Seashore paspalum is a salt-tolerant species that has been successfully used on other golf courses in Hawaii.

A well-managed irrigation procedure will assure proper use of irrigation water and reduce potential salt accumulation on landscaped grounds.

An agreement with Mauna Kea Resort would allow the park to discharge some of its wastewater into the resort’s wastewater treatment facility. The results of this action may help reduce the demand and cost of wastewater disposal in the park’s individual disposal units.

The individual units will be located away from the shoreline and makai of any source of potable water.
NOISE

Potential Impacts

Construction and park-related activities will not generate significant noise effects on adjacent residential areas. Noise levels on Queen Ka'ahumanu Highway will increase, in part, due to the proposed park expansion, but primarily as a result of regional growth in West Hawaii.

Long-term noise would be generated during the operational phase from sources that are primarily passive recreational activities in the mauka land and active recreational activities in the coastal and nearshore areas.

Proposed Mitigation Measures

No mitigation measures will be required. Park activities will be located at far distances from Queen Ka'ahumanu Highway where noise levels will meet federally accepted noise levels for recreational use; residential populations located alongside the highway and adjacent to the park will not be exposed to traffic and recreational activity noise greater than the federally accepted level for residential dwelling exterior areas.

Construction noise will be mitigated by noise suppressant devices on heavy equipment and vehicles, and operations will be limited to daylight hours. Site preparation work will not involve blasting.

AIR QUALITY

Potential Impacts

The overall effect of fugitive dust and vehicular engine exhausts during construction is expected to be temporary and minimal. Once completed, the park expansion will have little direct impact on ambient air quality.

Carbon monoxide levels may increase as a result of the project, but would be due to primarily natural traffic growth in the West Hawaii region. Since it is anticipated that there will be infrequent overlapping of stagnant atmospheric conditions, minor vehicular queuing on the access roads, and dispersed peak traffic conditions in parking lots, pollutant concentrations greater than the State and national ambient air quality standards are unlikely.

Proposed Mitigation Measures

Fugitive dust associated with construction will be controlled, as needed, with water sprinkling or dust screens. Replanting, as soon as possible after site clearing and grading, will provide a more permanent protection. Construction equipment should be maintained in proper condition so fuel is efficiently burned and excessive emissions are minimized. No other mitigation measures will be necessary.
VISUAL CHARACTER

Potential Impacts

The visual character of the site will be transformed from an arid, sparsely vegetated setting to a developed, landscaped environment with greener, heartier vegetation. This is expected to be evident in the picnic and camping areas and in the golf course. Park structures will be low-profile and will not obstruct view plains toward the mountains and shoreline.

Proposed Mitigation Measures

The character of the expansion area will remain open and unobstructed by buildings or structures. Views from the highway to the shoreline and across the South Kohala plain will continue to be preserved. The color schemes of proposed park improvements will be compatible with the natural environment. Planned landscaping will include indigenous plant species that integrate with existing vegetation. Accordingly, no mitigation measures will be necessary.

1.4 SUMMARY OF ALTERNATIVES

Three expansion alternatives were considered for the Hapuna Beach State Recreation Area: (1) expansion of the park from 62 acres to 846 acres to include expansion of facilities at Waiea Bay (acquisition of private lands not included) and development of an 18-hole public golf course; (2) expansion of the park from 62 acres to 526 acres including expansion of facilities at Waiea Bay, but not development ma'uka of the Queen Ka'ahumanu Highway and no acquisition of private lands at Waiea Bay; and (3) no expansion, i.e., no improvements beyond the boundaries of the existing park.

After an evaluation of the alternatives in terms of State Parks objectives and anticipated environmental impacts, the first alternative to expand the park to 846 acres was selected as the proposed action of this FEIS.

1.5 SUMMARY OF UNRESOLVED ISSUES

The primary unresolved issues involving the proposed action are as follows:

- Required improvements for Queen Ka'ahumanu Highway and schedule for implementation.
- Availability and use of public funds for the park expansion.
- Availability of private developer to participate in construction and operation of the public golf course.
- Use of ceded land for the golf course.
- Availability of water from a proven source.

MAY 2001
1.6 SUMMARY OF COMPATIBILITY WITH LAND USE POLICIES AND PLANS

Development of the Hapuna Beach State Recreation Area is consistent with the State of Hawaii and County of Hawaii land use policies and plans. Chapter 4 reviews these policies and plans and their relationship with the proposed action.

1.7 NECESSARY APPROVALS AND PERMITS

The major land use approvals and permits required for the proposed action are listed below along with the status of each. Additionally, a number of other permits are required from the State and County in order for development to proceed. These permits are associated with construction and are usually obtained after the land use approvals are secured and when design is in its more advanced stage. These include: grading permit; building permit; outdoor lighting permit; sign permit; groundwater use approval; well construction/operation permit; and individual wastewater system approval.

<table>
<thead>
<tr>
<th>Required Approval and Permit</th>
<th>Approving Agency</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>Conservation District Use Permit</td>
<td>Board of Land and Natural Resources</td>
<td>To be filed</td>
</tr>
<tr>
<td>Special Management Area Use Permit</td>
<td>County Planning Commission</td>
<td>To be filed</td>
</tr>
<tr>
<td>Use Permit for Golf Course and for Park Improvements in Urban Classified Lands</td>
<td>County Planning Commission</td>
<td>To be filed</td>
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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES CONSIDERED

2.1 PROJECT OBJECTIVES

The primary goal of the Division of State Parks, Department of Land and Natural Resources (DLNR), is to provide resource-oriented recreational opportunities within the State of Hawaii. At the same time, it seeks to manage and conserve natural, cultural, scenic, coastal, and wildlife resources. Secondarily, the State agency strives to address regional outdoor recreation needs that are demanded by the general public but not offered by County agencies. The Department of Parks and Recreation, County of Hawaii, notably, has limited financial resources that do not permit it to develop larger regional facilities.

Considerable future demand from Big Island residents as well as from visitors is anticipated for various types of shoreline recreation in West Hawaii. The Hapuna Beach State Recreation Area Expansion is designed to partially meet those needs (Figures 2-1 and 2-2). It will encompass an area that currently contains significant natural, scenic, and cultural resources, including:

- White sand beaches at Hapuna and Waialea Bays,
- Swimming, bodysurfing, bodyboading, snorkeling, diving, and surfing areas,
- Abundant marine life at Waialea Bay,
- Archaeological features and historic trails,
- Spectacular views of Waialea and Hapuna Bays, and panoramic views of the South Kohala coastline,
- Potential overnight camping and picnicking areas, and
- An existing shoreline pathway.

State Parks also recognizes the shortage of affordable golf in West Hawaii. As described in Section 2.2.2, a public golf course would help fill a need in a highly recreation-oriented region.

Park management is also an important part of any park improvement program. Without such an operation, the park would quickly become unusable, and jeopardize the users’ enjoyment, safe use, and appreciation of the park’s amenities and resources.
2.2 PROJECT NEED

2.2.1 Existing Recreation in the Hapuna-Puako Area

A two-week survey of recreational activities along the Hapuna-Puako shoreline was conducted by Pedersen Planning Consultants in June 1992. The purpose was to inventory the activities in terms of type, location, and extent.

Results of the survey showed that roughly 70 percent of all recreation occurs along existing beaches and adjacent nearshore waters. Roughly three-fourths of these activities occurred at Hapuna Beach; the remainder took place at "Beach 68" and Wailea Beach. The following is a summary of the various activities observed at the different sections of the project area (see Figure 2-3).

Hapuna Beach

Sunbathing, swimming, and picnicking represent the more popular activities at Hapuna Beach, the largest sand beach in the Hapuna-Puako area. With the appearance of nearshore wave breaks, however, bodysurfing frequently becomes the primary activity.

Approximately 40 percent of all Hapuna Bay beachgoers are in the nearshore waters at any given time; the remaining 60 percent are on the sandy beach and other areas of the park. During the 1992 survey, an average of 66 persons were on the beach on a typical weekday; the average weekend day use was about 93 persons.

Secondary activities include volleyball, skimboarding, snorkeling/diving, and shore fishing. Shore fishing occurs most often along the north end of the beach. Volleyball is played either in the south or central beach sections, depending on the placement of the net by the concessionaire's lifeguards.

Boating rules and other user restrictions, based on the Statewide Ocean Recreation Management Plan, affect the types of activities in Hapuna Bay. An ingress/egress marine craft corridor, 50 yards in width, is located in the south section of the bay. In the nearshore waters of the bay, swimming and diving only are designated (Hawaii Administrative Rules, Title 13, Subtitle 11, Part 3, Chapter 256, Ocean Recreation Management Rules).

Recreational conflicts at Hapuna Beach are virtually non-existent. As a practice, concession lifeguards do not permit the use of surfboards, jet skis, or windsurfing equipment in the nearshore waters.

Mauka of the beach are landscaped picnic areas, picnic shelters, picnic tables, barbecue pits, pavilions, restrooms and showers, and a food concession. Picnicking is the primary activity in the landscaped portion of the park. Sunbathing is also very popular in the partially-shaded grassy areas. Persons using this area spend considerably less time, if any, in the water compared to individuals on the beach. Visitors tend to explore the park on the paved walkways for less than 30 minutes, return to their rental cars, and leave.
During the 1992 survey, an average of 48 persons per day used the picnic area during weekdays. On the weekends, participation in non-beach activities increased to 56 persons per day. The greatest amount of activity occurred between 12 noon and 3:00 pm; 78 persons were observed during this peak period.

**Beach 68**

This small beach is located between Hapuna Beach and Wailea Beach (see Figure 2-3). Use of the area is probably constrained by the regular presence of nude sunbathers and long-term campers. A small cove northwest of Beach 68 is good for swimming, particularly for families with younger children. The cove has a sandy bottom, is protected by reefs, and water depth near the shoreline does not exceed eight feet. Only one family was observed using the cove during the entire two-week survey period.

**Wailea Beach**

Wailea Beach is the second largest beach in the project area and is located between Hapuna Beach and Puako Boat Ramp. It is used for sunbathing, camping, picnicking, swimming, bodyboarding, bodysurfing, snorkeling/diving, and shore fishing. During the 1992 survey, the average use of the entire Wailea Beach was approximately 21 persons per day.

South Wailea Beach is enjoyed by both visitors and residents; swimming and snorkeling are popular activities. Overall, this beach receives considerably less use than Hapuna Beach, which is very likely the result of more difficult vehicular access, lack of restrooms, and limited parking. Peak use of South Wailea Beach occurs during the winter months when the bay is more frequently exposed to westerly and northwesterly swells. Such conditions generate favorable winter surf at several sites, including “67s Shorebreak,” “68s,” “Pitchers,” and “69s.” These are local names of surfing sites offshore from Wailea Bay. Excellent surf conditions in January and February 1991 attracted up to 30 to 40 surfers and bodyboarders during the weekend days (Clark, 1991).

In the northern half of Wailea Beach, activities include sunbathing (including nude sunbathing), swimming, and snorkeling. During the 1992 survey, a small number of people were tent camping on a long-term basis behind the northern half of the beach. Considerable alcoholic beverage consumption and possible illegal drug use occurred in the unimproved parking area. Users on the south half of the beach may have felt threatened or intimidated by these activities.

**South Hapuna Bay to Kanekanaka Point**

The shoreline and nearshore waters from Hapuna Beach to Kanekanaka Point provide sites for recreational fishing, hiking, camping, and cliff jumping.

Only limited fishing activity was observed during the June 1992 survey, which was conducted only during daytime hours. No more than 10 to 12 shore fishermen are expected to be found here during daytime or nighttime hours.
Cliff jumping occurs about 200 feet south of Hapuna Beach. Lifeguards caution swimmers who climb the high cliffs of the potential dangers. In general, the lifeguards permit local residents to participate in this activity but discourage visitors who are not familiar with ocean bottom and nearshore wave conditions.

Mauka of the shoreline are various jeep trails which are evidently used for off-road touring. Few users were observed during the daytime 1992 survey. Considerable trash and broken alcoholic beverage bottles suggest significant nighttime use. However, discussions with local fishermen confirm that such use is not related to fishing activities, but rather younger persons “hanging out,” relaxing, and frequently drinking along the shoreline.

Overnight camping is limited to a small number of light trucks and vans owned by “homeless persons” who park their vehicles at scenic points makai of the old Kawaihau-Puako Road. During the survey, it was observed that these overnight campers are, for the most part, transient and do not park their vehicles in the same location for more than three or four days. Several small campfire activities were observed at the more preferred camp sites.

**Kanekanaka Point to South Wailea Bay**

Evidence of shore fishing was observed along existing trails. Only one fisherman was observed during the entire two-week survey period. This limited use can be attributed to the Marine Life Conservation District designation which extends south from Kanekanaka Point to Wailea Point. Under this designation, only fishing for finfish with hook and line is permitted. Netting finfish is allowed with a permit over the sandy bottom areas. Otherwise, no other type of fishing or taking of marine life (e.g., corals) is allowed (Hawaii Administrative Rules, Title 13, Subtitle 4, Part I, Chapter 35, Wailea Bay Marine Life Conservation District, Hawaii).

One surfing site, known as Hapuna Point or “H-Point,” is located offshore from the north end of Kanekanaka Point. It is used by more experienced surfers from November through April when the offshore area is more frequently exposed to both westerly and northwesterly swells. Because of the distance to both Hapuna Beach and Wailea Beach, surfers typically enter and exit this surfing area over the rocks near Kanekanaka Point. Maneuvering in and out of this point during high surf conditions requires a higher level of skill and ocean awareness. A second surfing site called “67s” is situated at the north end of Wailea Bay.

Approximately three to four windsurfers regularly use the offshore waters of Wailea Bay, which is afforded considerable protection and provides good conditions for beginning windsurfers. Due to limited vehicular access, most windsurfers go to nearby Anaeho'omalu Bay.

**Ohai Cove**

This small cove, situated between Wailea Bay and Puako Bay and adjacent to Ohai Point, apparently receives little to no use by the general public. A private beach home is located immediately behind the cove and adjoining shoreline. During the 1992 survey, only one
temporarily moored recreational boat was observed in the cove during a weekend afternoon.

**Puako Bay**

A small boat launching facility is located at the northern end of Puako Bay. During the 1992 survey, an average of one launched and/or retrieved boat per day was observed during weekdays. On the weekend, the average number of launched and/or retrieved boats increased to two boats per day.

During other times of the year, usage is expected to vary and could be much more than the count taken during the Pedersen survey. According to the Boating and Ocean Recreation Division of the Department of Land and Natural Resources, on some weekends, the boating facility is in full use.

### 2.2.2 Future Demand

**Park Facilities**

A statewide survey of residents conducted for the 1990 State Comprehensive Outdoor Recreation Plan (SCORP) showed that going to the beach for swimming and sunbathing is the most popular weekend recreational activity and is number two overall, considering the weekdays. On the Big Island, this activity is the most popular on any day. According to the SCORP survey, most of the beachgoing occurs at developed beach parks that contain comfort stations. The survey revealed that the most popular beach and ocean recreation areas in the state are in Kohala and Kona of the Big Island.

Kohala and Kona, together, is one of the fastest population growing regions in the state and the demand for recreation has increased along with this growth. The West Hawaii area has a number of beautiful white sand beaches but the number is relatively limited compared to the neighbor islands. SCORP states that "with Hawaii County's rapidly growing resident and visitor population and limited number of beaches, congestion at certain beach parks is becoming a problem. The capacity analysis approach ... needs to be considered for areas such as Hapuna Beach Park ...", which is located on the Kohala coast.

As part of the master plan update for the Hapuna Beach State Recreation Area, a capacity analysis was conducted by Pedersen Planning Consultants (see Appendix B). The analysis concluded that Hapuna's existing recreational demand does not exceed the current space available. The projected demand, however, is anticipated to increase by the year 2010 and that it would place heavy pressure on existing facilities. Forecasts were calculated by multiplying projected resident and visitor populations with the 1989 rates of both weekday and weekend participation (SCORP, 1990).

The SCORP states that "facilities on the neighbor islands may not be used as heavily at the present time, but the projections indicate a significantly higher rate of growth in both resident populations and visitor counts for the neighbor islands, when compared to Oahu. Hence, neighbor island parks will experience similar pressures. The problem is apt to be
magnified on the Big Island, which has few sandy beaches and is expected to have the highest percentage increases in the number of residents and visitors."

The strategy that SCORP has developed to address the saturation problem of existing beach park capacities is: (1) to keep up with existing beach park maintenance, especially those that receive the heaviest usage; and (2) acquire additional beach park land and rights-of-way to remaining undeveloped shoreline areas.

Due to the current shortage of camping facilities, demand already exceeds availability. The current demand for camping is 30 persons per day during the weekday and 190 per day during the weekend. By the year 2010, availability of camping facilities is estimated to be 60 percent for group camping and 78 percent for family camping. Expansion of the park will accommodate current and projected year 2010 demands.

The demand for hiking in West Hawaii exceeds current availability—primarily because of visitor needs. Although the development of a shoreline trail would attract hikers and increase demand, new trails that are proposed in the expansion would be of sufficient size to accommodate the additional demand. An available capacity of 39 percent is projected for the year 2010.

**Golf Course**

Golf is always a high demand activity in resort concentrated areas. In West Hawaii, which extends from North Kohala to Ka Lae (South Point), there are 13 golf courses. These popular facilities, however, are all privately operated and have green fees that range from approximately $35 to $80 for island residents. Municipal or publicly operated golf courses with lower green fees, such as Hilo Municipal Golf Course, are unavailable in West Hawaii.

According to SCORP's survey of Big Island residents, about 20 percent of the respondents identified "barriers" to golf, tennis, and beach activities. These so-called barriers refer to anything that would prevent or discourage a person from engaging in a recreational activity. Such barriers would include lack of facilities, crowded facilities, high participation fee, poor conditions of facilities, etc.

A new public golf course would clearly meet a portion of the West Hawaii residents and visitor demand for affordable golf. Residents are expected to be the primary users. Assuming a continuation of 1989 residential recreational trends, a public course in Kohala has a potential market of 400 golfers on weekdays and 300 golfers on weekends. If, as expected, local residents use primarily this course rather than the privately-owned courses in Kohala, little remaining capacity would be available. (Private golf courses that offer special rates to resident golfers will not significantly compete with the public golf course unless special rates for resident golfers are available during all tee times. The amount of remaining capacity on the public course will be influenced, however, by the marketability of the course to local residents.)
2.3 DESCRIPTION OF THE PROPOSED ACTION

2.3.1 General Development Proposal

The Division of State Parks plans to incrementally expand its Hapuna Beach State Recreation Area from 62-acre to approximately 846 acres (Figure 2-4). Expansion is designed to meet the future recreational needs of the Big Island residents and West Hawaii visitor population. The following improvements would be developed to the year 2010:

- Improved access to beach and water activity areas;
- Family picnic areas and group picnic rental grounds;
- Family and group campgrounds;
- Coastal and inland hiking trails and footpaths between Hapuna Beach and Puako Bay;
- Park headquarters and maintenance bays yard;
- 18-hole public golf course;
- Vehicular access road and parking lots; and
- Water, wastewater, electrical and drainage systems.

Figure 2-4 illustrates the concept and location of these planned improvements.

2.3.2 Beach and Water Activity Areas

Hapuna Beach will continue to be the primary destination in the expanded park for activities such as swimming, snorkeling, nearshore scuba diving, ocean jumping, diving and body surfing. Wailea Beach is currently used for sunbathing, swimming, snorkeling, diving, bodyboarding, bodysurfing, and occasional surfing. It is expected to accommodate about 15 percent of future beach and water activity demand. The adjoining Beach 68 (see Figure 2-4) will be limited to sunbathing because it has only a small sand area.

2.3.3 Picnic Areas

Facilities for family or small group picnicking will be established behind Wailea Beach and Puako Bay and on Ohai Point. Picnic tables, barbecue facilities, comfort stations, and potable water fixtures will be provided. Comfort stations will be designed to meet Americans with Disabilities Act (ADA) standards. (During the project design stage, the State Commission on Persons with Disabilities will be consulted in regard to these standards.)

A group picnic rental area with three pavilions and a comfort station will be constructed makai of the old Kawaihae–Puako Road on a site overlooking Wailea Bay. Two of the pavilions will each accommodate about 50 persons; a third pavilion will handle up to 100 persons (see Figure 2-4). Each pavilion will contain kitchen facilities, lavatories, storage area and a stage.
2.3.4 Campgrounds

Twenty clusters of tent/recreational vehicle campsites will be developed mauka of the old Kawaihae-Puako Road to serve family-size groups (see Figure 2-4). Each cluster will accommodate up to 40 people and will consist of tent/recreational vehicle campsites, comfort stations, and shared cooking and eating facilities. Camping banks will also be designated to reserve selected sites for future expansion because tent camping is a popular activity among Big Island residents.

The development of three clustered cabin sites will serve large groups of various sizes (Figure 2-5). Each clustered site will contain five to eight cabins and accommodate a total of 80 to 128 people. Each cabin, which will meet ADA standards, will have a capacity to serve 16 persons. In total, clustered cabin sites will be able to accommodate about 380 persons.

The cabin sites will be situated around a large open play area, group dining pavilion, and events pavilion (Figures 2-6 and 2-7). The pavilions will support cooking and eating activities, daytime educational programs, and night-time events.

A family campground will be provided makai of the old Kawaihae-Puako Road between Hapuna Bay and Wailea Bay. It will consist of campsite clusters, each containing tent sites and a central cooking and eating area. Vehicular access and parking will be provided to each cluster and a meandering walkway will be provided for pedestrian access. Figures 2-8 and 2-9 illustrate the type of facilities to be provided.

2.3.5 Hiking Trails

Almost two miles of hiking trails will be developed along or near the shoreline, as well as along mauka-makai routes, to form a series of loop trails (see Figure 2-4). The coastal route will help implement a portion of the Ala Kahakai trail system. This system consists of about 50 miles of trails along approximately 35 miles of shoreline that extends from the Pu‘ukohola Heiau National Historic Site in Kawaihae to the old Kona Airport Park in Kailua-Kona. It is part of the State’s Na Ala Hele program, which seeks to preserve and maintain established trails and accesses and define mechanisms to add new ones.

The Ala Kahakai has been nominated as a national trail and, as a result, the National Parks Service is conducting a feasibility study to determine whether it qualifies. If the trail is designated a national status, the State Parks agency may be asked to cooperate with the federal agency to install uniform signages.

The proposed coastal trail in the Hapuna Beach State Recreation Area will generally follow existing routes. Portions of the trail may be rerouted to allow interpretation of early historic uses of the area. A 40' wide public road reserve behind Wailea Beach is available and will be incorporated in the shoreline trail. Mauka-makai routes will take advantage of scenic views and, when possible, follow existing trails and drainageways. These routes will also connect camping and picnicking activities to the shoreline.
Figure 2-4
Hapuna Beach State Recreation Area Expansion
MASTER PLAN
2-13
Figure 2-8
Hapuna Beach State Recreation Area Expansion
TYPICAL FAMILY CAMPSITE CLUSTER

0  40  80
SCALE IN FEET
Belt Collins Hawaii
2-18
Selected portions of the coastal and upland trails will be accessible to persons in wheelchairs. Shorter loop trails, which may be hampered by rough terrain, will be provided for persons who do not desire a long walk.

2.3.6 Golf Course

An 18-hole public golf course will be developed mauka of the Queen Ka'ahumanu Highway on an approximately 320-acre site (see Figure 2-4). The course, which will include a clubhouse, will be a par 72 that measures approximately 6,955 yards from the back tees. The overall configuration of the course will be a north-south orientation with two returning nines of golf holes.

In order to encourage local participation in golf and junior golf programs, the facility will feature a full-size driving range and training area. The training area, which will accommodate up to 50 players at a time, will include a full-service teaching facility. Both grass and all-weather tees will be provided. Other practice features will include target greens that simulate actual golf greens, practice bunkers, and chipping and putting greens.

2.3.7 Park Headquarters

A 3,000-square-foot headquarters building will be developed to house selected on-site park management personnel and serve as a check-in station for overnight campers. This facility will include an information counter, exhibition area, office space, storage space, conference room, and toilet facilities (Figure 2-10).

2.3.8 Maintenance Baseyard

The expanded park will contain a regional baseyard at the existing maintenance facility. It will include a new covered garage area for up to six maintenance vehicles and an adjacent paved area for equipment storage. The site will be expanded from 5,000 square feet to approximately one or two acres.

2.3.9 Site Access and Infrastructure

The existing park entrance (Hapuna Beach Road) and Puako Spur Road will provide two vehicular access points from the Queen Ka'ahumanu Highway to the expanded park. The old Kawaihae–Puako Road will be the primary corridor for vehicular traffic through the park site. It will be realigned and fully reconstructed to provide better access to the various areas of the park including the beaches, camping facilities, picnicking sites, and walking trails.

Additional parking will be provided throughout the area, including overflow parking at the existing Hapuna Beach site. The specific number of stalls will be determined during the project design stage. Some of the parking will be paved, especially where permanent facilities, such as organized group camps and picnic areas, are proposed. The parking at Wailea Bay will be located more than 300 feet from the shoreline to maintain the natural serenity of the area and to keep with the idea of a "walk-in" beach, however a drop-off point will be provided near the shoreline to accommodate individuals with physical
disabilities. The size of the parking will be commensurate with the capacity of the beach. A paved parking will also be provided at the south end of the park to provide access to the proposed picnic area at Ohai Point as well as to the south section of Wailea Bay. Other parking areas will be unimproved, especially where they serve informal access points, such as fishermen's walking paths.

Infrastructure will be required to service the expansion of the Hapuna Beach State Recreation Area. New wells and service lines will be developed for both domestic (potable) and irrigation (non-potable) uses, and new septic tanks will be provided for sewage disposal. Electrical and telephone facilities within the park and golf course sites will be connected to existing lines along Queen Ka'ahumanu Highway.

2.3.10 Wailea Bay Lots Acquisition

Expansion of the Hapuna Beach State Recreation Area may require the acquisition of 19 privately-owned parcels at Wailea Bay. Almost all of the parcels are occupied by residences. Access to these parcels is via a paved driveway within a 20' wide easement from the old Kawaihæ-Puako Road and over dirt roads. Within the beachfront community, the driveway transverses private parcels via designated roadway easements.

These parcels, which are located immediately behind Wailea Bay and in the middle of the park expansion area along the Hapuna-Puako coastline, may serve the public best if the area were developed for public park use. The land behind the Wailea Bay residential lots, when fully developed for park use, will have a better connection to the beach property and its ocean resources. Moreover, access to the beach will become less restrictive.

The State objective at Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea involving a mixture of land-based coastal recreation activities, such as picnicking, camping and relaxation, along with beach and near shore recreation activities.

As provided in the State Recreation Functional Plan, Policy 1-A(1), the State shall “acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreational use.” The policy's implementing action further provides that the State shall “acquire beaches in the following areas: (for Hawaii Island) Wailea Bay, Anaeho'omalu Bay to Ka'upulehu, and Kua Bay”.

On November 20, 1987, the BLNR authorized the DLNR to acquire the Wailea Beach Lots. Pursuant to this authorization, the DLNR initiated a condemnation action and eventually acquired two parcels of land at Wailea Bay (TMK: (3) 6-6-2: 6 and 7, totaling 1.8 acres at a cost of $3.8 million). Thereafter, DLNR, lacking funds, made no further effort to acquire private properties at Wailea Bay. The Wailea Bay landowners filed a Petition for Deletion of Order with the DLNR seeking a determination that the November 20, 1987 Order was invalid.

On June 5, 1998, in response to the landowners' concern and petition, the BLNR rescinded its Order of November 20, 1987 subject to the following conditions:
1. Rescission of BLNR’s Order of November 20, 1987 does not invalidate the transfer of properties that have already been acquired by the State.

2. Rescission of BLNR’s Order of November 20, 1987 shall not prohibit BLNR from taking action in the future to condemn Wailea properties, when funds become available for acquisition of these properties, and provided that any such action comply with Chapter 343, Hawaii Revised Statutes, addressing EISs.

3. Rescission of BLNR’s Order of November 20, 1987 shall be contingent upon recordation of the Unilateral Agreement and Declaration for each affected privately owned property requiring the landowner to: A) restrict any development to conform to what is currently allowed today, and B) not seek zoning changes for a period of 15 years, with the 15 year term to commence on the date of the last such property covenant document is recorded.

4. Recordation of the Unilateral Agreement and Declaration shall be completed within one hundred and eighty (180) days of the date of BLNR’s decision to rescind its November 1987 Order or 30 days from the acceptance of the Final EIS which ever is later.

5. BLNR’s rescission shall be null and void, should the landowners fail to complete recordation of the Unilateral Agreement and Declaration within one (1) year of the date of BLNR’s decision to rescind its November 20, 1987 Order.

6. Property owners agree to not seek zoning changes prohibited by the Unilateral Agreement and Declaration during the period that the Unilateral Agreement and Declaration is being recorded.

7. The Final EIS for expansion of Hapuna Beach State Recreation Area shall be amended to delete references to condemnation and/or to explain the resolution of the private landowners’ concern regarding condemnation.

Since funding for the acquisition will require a separate legislative action for the Hapuna Beach State Recreation Area Expansion improvements, budget estimates are not included with the project construction costs, and the acquisition of the private properties is not part of the proposed action at this time.

In the future, the State could explore alternatives to reducing the cost of acquisition. One possibility is to spread the cost over an extended period to transform a lump sum expense into an annual cost at a manageable level. Another option worth considering is a lease-back program whereby the State would lease the acquired properties back to the previous owners while awaiting development. The State could recover some of the acquisition cost during this period, and Wailea lot owners could continue to live on the properties until development plans are finalized. This option was suggested at a public information meeting and in a comment letter on the DEIS.
2.4 PROJECT ALTERNATIVES

2.4.1 Introduction

This section examines how the proposed action was selected among three alternatives. Public comments resulting from two presentations of a draft master plan to the community and from a preparation notice and draft of this EIS provided insights and experiences from Big Island residents, special interest groups, and various governmental agencies. This collection of information was used to identify the following alternatives.

- Alternative A: Expansion of the park at Hapuna and Wailea Bays and development of an 18-hole public golf course, a total of 846 acres (preferred alternative).

- Alternative B: Expansion of the park at Hapuna and Wailea Bays but no development of a golf course, a total of 526 acres.

- Alternative C: Continued use of existing 62-acre park at Hapuna Bay (no expansion).

These alternatives could be evaluated as a basis for additional alternatives and provide options for further plan refinement. For example, they could be target plans that are implemented in different degrees depending on financing and development priorities. In Alternative A, the golf course would be developed but only a portion of the makai park land below Queen Ka'ahumanu Highway would be constructed. In Alternative B, the lower area makai of the new Puako Road would be developed while the upper area (between Queen Ka'ahumanu Highway and Puako Road) would be reserved for future long-term development. The idea behind these alternatives is that it grasps the major portions of the potential development range at Hapuna and Wailea. None of the above alternatives include the acquisition of private property at Wailea Bay.

A description of the three alternatives’ general concepts, anticipated impacts, and associated public resource commitments is provided in the following sections.

2.4.2 Alternative A: Expansion of the Park to Encompass 846 Acres

2.4.2.1 General Concept

Alternative A entails the expansion of the existing park within undeveloped State lands from Hapuna Bay to Puako Bay and mauka of the Queen Ka'ahumanu Highway (Figure 2-11).

Expansion of the park to the south would, in part, incorporate Wailea Bay to offer additional beach and near shore water area for activities such as snorkeling and diving. These activities, including seasonal winter surfing, already occur at Wailea Bay. Under Alternative A, Wailea Beach would become more accessible, and activities could be monitored and managed. Primary beach access would be provided through State land.
The area between Hapuna and Wailea Bays would be developed for camping, picnicking, and hiking. An 18-hole public golf course would be constructed on approximately 320 acres mauka of Queen Ka'ahumanu Highway.

2.4.2.2 Project Benefits

Paved roads would improve access to the shoreline at Wailea Bay, where such activities as snorkeling, diving, shoreline fishing, surfing, and bodyboarding occur or could occur. Park improvements would disperse activities throughout the expansion area and help relieve pressure on Hapuna Beach.

An expanded recreation area would provide more facilities for picnicking, overnight camping, shoreline fishing, and hiking for Hawaii island residents. With existing camp sites in short supply, the proposed project would be particularly beneficial. The development will also increase public shoreline access and permit greater opportunities in recreational exploration of coastal areas.

Despite the influx of increased public use, the provision of park management through development of this alternative would better provide conservation measures on existing vegetation with regular maintenance and irrigation of selected areas. In addition, on-site park managers, lifeguards, and maintenance personnel would keep the park in good condition, safe, and accessible to the public. Safety measures, security provisions, and educational programs would assure an enjoyable recreational experience. The proposed park headquarters would be the staging area for these operations. On-site park management would also discourage vandalism and other illegal activities within the park and in the Wailea house lots area, as well as improve routine operations such as fire protection and trash collection.

Today, there are 13 golf courses in West Hawaii. All of the courses are privately constructed and operated. Nine are associated with resorts, two are stand-alone facilities, and two are part of a residential community. Of the 13 golf courses, 12 allow public play. A market study/financial analysis of golf course demand and feasibility was conducted by Pedersen Planning Consultants in 1995 and is included in Appendix A of this EIS.

In October 1996, a survey of West Hawaii golf course green fees was conducted. Green fees for resort golf courses vary depending on the player’s residence. Guests of accommodations at the resort golf courses pay in the $80 to $90 range. Guests from other resorts playing at the resort course pay a higher rate in the $90 to $170 range. Rates for neighbor island residents are lower with fees in the $40 to $80 range, and Big Island residents pay the lowest—about $35 to $80. The Kona Country Club has a reduced rate of $28 for kamaainas on its “mountain” course.

Non-resort golf courses have regular and kamaaina rates; the regular rates are in the $40 to $70 range, while kamaaina rates are about $35 to $55. The Waimea Country Club has a reduced rate of $24 for kamaainas on weekdays. The green fees for all of the resort and non-resort golf courses include the use of a golf cart which is mandatory.

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A number of golf courses are planned in West Hawaii. The one nearest to Hapuna is the Nansay project across Queen Ka'ahumanu Highway from the Mauna Lani Resort. It is designed to be a residential community containing six golf courses. Implementation of the project has stalled, however, and it is not known whether development will proceed at all.

Plans for a resort golf course near the Kona International Airport, a stand-alone golf course in South Kona, and a public golf course in Kealakehe have also been delayed.

Aside from the Kealakehe golf course, these planned facilities would be privately owned or sponsored. The Hapuna Beach State Recreation Area golf course will be a public facility and have green fees comparable to municipal rates. It will also offer players the option to walk rather than to use a golf cart.

The State is planning to be pro-active because it sees a need for a public golf course in West Hawaii where none currently exists. Although other planned golf courses in the region will offer public playing privileges, none will be comparable to the project's anticipated low green fee rates. Furthermore, many of the planned golf courses may not be built at all.

The green fee schedule for the Hapuna golf course would be in the $25 to $35 range. If carts are not used, the fee would be about $10 to $15 less. This fee range and the option of playing without a golf cart would represent a substantial savings for frequent players on fixed or limited income.

From revenues generated by the above fee rates, a private developer could run a viable public golf course operation through an arrangement with the State if State land was used under a lease. If anticipated levels of play and operational expenditures are realized, a self-sustaining investment with good growth potential can be realized within about four or five years of operation. A prospective golf course developer would also appreciate greater flexibility in its investment if the investor could maintain greater control over the initial golf course design and construction.

Expanded park opportunities makai of Queen Ka'ahumanu Highway will generate direct economic benefits of $4.3 million annually by the year 2005 (see Section 3.11.1). These benefits will be diminished by annual park maintenance costs of about $1.0 million. However, the secondary economic benefits of camping and beach activities will generate roughly $13.5 million per year.

2.4.2.3 Potential Adverse Impacts

The proposed expansion of Hapuna Beach State Recreation Area would lead to increased traffic along Queen Ka'ahumanu Highway. Greater traffic congestion would occur at the two park entrances and golf course entrance, primarily during weekend and holiday peak periods.

Increased vehicular traffic and park use would increase noise levels in the vicinity. These elevated noise levels would probably be most noticed by Wailea Bay homeowners. Correspondence and informal discussions with Wailea Bay residents indicate a concern
about the consequences of increased public use at Wailea Bay, e.g., uncontrolled public behavior and loss of privacy in the secluded residential enclave.

The development of picnicking and camping sites would eliminate habitat for some exotic birds that inhabit the grasslands between Hapuna and Wailea Bays. However, the loss in bird habitat would be offset by maintained grassed areas that provide more water and new habitat for other species. The migratory Pacific Golden Plover is one species attracted to such habitat.

2.4.2.4 Public Resource Commitments

Construction

The expansion of the park would require the expenditure of approximately $40 million over its plan implementation period. Roughly 60 percent of this would be for park improvements and the remainder would be for the golf course development. Funds for the golf course construction is expected to come from private interest or sponsorship in the project.

The DLNR proposes to construct the park expansion in four phases. The preliminary schedule as provided in the 1996 DEIS called for the first phase beginning in 1998 or 1999. Completion of the fourth and final phase was projected to occur in 2010. The current schedule (Table 2-1) shows construction of the first phase beginning in 2003 or 2004. Completion date for the first phase is expected in 2005. Completion of the entire project is scheduled for sometime after 2009.

Table 2-1 Preliminary Schedule

<table>
<thead>
<tr>
<th>MILESTONE</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES Acceptance and Land Use Permit Approvals</td>
<td>2001-02</td>
</tr>
<tr>
<td>Construction Design (Phase I)</td>
<td>2003</td>
</tr>
<tr>
<td>Construction Start-up</td>
<td>2003-04</td>
</tr>
<tr>
<td>Phase I Completion</td>
<td>2005</td>
</tr>
<tr>
<td>Phase II Completion</td>
<td>2009</td>
</tr>
<tr>
<td>Phase III Completion</td>
<td>Future</td>
</tr>
<tr>
<td>Phase IV Completion</td>
<td>Future</td>
</tr>
</tbody>
</table>

Note: This schedule updates a schedule that was included in the June 1996 DEIS for the project. Construction start-up in the 1996 schedule showed a date of 1998-99. The present table reflects the current status of the project. The completion date for the later phases of the current project is shown with an indefinite timeframe. This is to reflect the uncertainty of the schedule beyond 2009.
Program Management and Operation/Maintenance

Water safety, park security, and resource management requirements for this development alternative would increase the type and number of management and maintenance personnel at the park. It is estimated that the total program management and maintenance expenditures would cost the State of Hawaii about $2.4 million per year. Potential revenues from overnight camping fees of approximately $356,000 per year by 2015 would help absorb some of the annual park operations and maintenance costs. There is currently no charge for camping. Any fees collected for cabin rentals and concessions would go to the park's interpretive program.

The operations and maintenance of the proposed golf course would require an additional $2.7 million annually by the year 2015. If the golf course is managed, operated, and maintained by a private concessionaire, these costs could be borne entirely by the concessionaire through golf course revenues. The sum of these revenues could amount to $4.9 million annually.

2.4.3 Alternative B: Expansion of the Park to Encompass 526 Acres (No Golf Course)

2.4.3.1 General Concept

This project alternative is the same as Alternative A but does not include development of the golf course (Figure 2-12). As in Alternative A, Alternative B does not include acquisition of the private properties at Wailea Bay.

2.4.3.2 Project Benefits

Alternative B addresses most of the outdoor recreational demands that are needed for the area. It would include all project benefits that are outlined in Section 2.4.2.2, except for golf course benefits. Expanded opportunities for snorkeling/diving, overnight camping, picnicking, hiking, and shoreline fishing would be roughly one-third the total cost of Alternative A.

2.4.3.3 Potential Adverse Impacts

Potential adverse impacts associated with Alternative B would be almost identical to those summarized for Alternative A (see Section 2.4.2.3). The only exception would be that vehicular traffic impacts on Queen Ka'ahumanu Highway would be somewhat less with no golf course generated trips. Additionally, there would be less land alteration without the golf course and less use of irrigation water.

2.4.3.4 Public Resource Commitments

Approximately $23.3 million would be required to build the recreational sites, facilities, and supporting utility systems of Alternative B over the plan implementation period.
Program management, operations, and maintenance activities would annually require approximately $2.4 million. Overnight camping revenues of approximately $356,000 per year by 2015 would help offset anticipated operations and maintenance expenditures.

2.4.4 Alternative C: Continued Use of the Existing Park (No Action)

2.4.4.1 General Concept

Alternative C represents the "no action" option, or the continued use of the existing 62-acre park. This assumes that any future facilities would be built within the existing park, with no expansion of recreational facilities and activities south of Hapuna Bay (Figure 2-13) and no acquisition of properties at Waiea Bay.

2.4.4.2 Project Benefits

This option would not require a sizable expenditure of public funds and would permit the State of Hawaii to allocate resources to other urgent capital improvement projects and/or the maintenance of other existing programs.

While the demand for camping facilities exceeds availability, a two-week survey of recreational participation and a capacity analysis conducted by Pedersen Planning Consultants, in June 1992, suggest that the existing park has considerable land capacity to meet anticipated demand to at least the year 2010.

2.4.4.3 Adverse Impacts

Alternative C would not address the local demand in the South Kohala area for families, organized groups, and visitor camping facilities. Available camping facilities at Spencer Beach Park and other smaller County beach parks can accommodate about 79 persons. Existing demands are significantly greater than the capacity of these facilities. Without the development of more camping sites, the demand for this activity will continue to be unmet.

Increased demands for affordable public golf play would also go unmet. Reduced fees and promotions offered by private courses will absorb some of the needs. However, there is still considerable demand for a public course in Kohala that would offer more affordable rates throughout the day.

A growing demand for hiking opportunities in the Kohala area will continue to be suppressed by the shortage of more accessible and defined hiking trails.

2.4.4.4 Public Resource Commitments

The continued use of the present park would require no significant expenditure of public funds for the development of new facilities. Some funds would occasionally be required for renovation or replacement of existing facilities.

Although Hapuna Beach State Recreation Area Expansion has considerable available capacity to accommodate future recreational demands, significantly more park users in the
State facility could gradually increase demands for other recreational activities. Financial resources and manpower commitments may be required to enhance on-site park management.

2.4.5 Alternative to Wailea Lots Acquisition

Two private lots were acquired by the State in 1994, thereby adding 400 linear feet of beach frontage to an existing 30-foot-wide public access road reserve leading to the beach. A 40-foot-wide road reserve also runs the length of the beach fronting the private properties. Acquisition of the remaining private lots behind Wailea Bay would be required to provide the maximum amount of open space, beach frontage and picnic area for park users.

If the private properties were not acquired, the park would have only limited direct physical and visual access to the shoreline that is important for establishing a coastal recreation environment. Although the 40-foot-wide road reserve lot provides open space over the length of the beach, shaded picnic amenities in this section of the park would be limited to 1.8 acres (the area of the two parcels that have been acquired) and State Parks Division will only partially meet its development objectives for the area.

Considering that many of the privately-owned properties are developed and currently occupied, Wailea Bay residents strongly prefer to have their homes remain. They have been owners or residents for many years and have grown deeply attached to the area. Several residents have taken on a personal responsibility of maintaining and cleaning the beach.

If the homes were allowed to stay, the property taxes for the residential real estate would continue to be paid to the County. No residents and rental unit guests would be displaced.

Acquisition of the private lots by the State would entail an enormous cost. It would also entail a relocation program. Alternatively, these funds could be used for other improvements within the park or for higher priority public improvement projects or programs.

Some residents of Wailea indicated that they could co-exist with the park expansion and, as a benefit to the State, continue to maintain the beach area around their homes. The Wailea residents, however, may experience conflicts with park user traffic during peak periods such as weekends and holidays. Additionally, the once isolated, quiet beach at their doorsteps will be more heavily used. Having a large number of people at Wailea may generate social concerns by the private owners.

There is a prevalent feeling among the Wailea residents that the beach is very fragile and would not be able to accommodate heavy public usage. The shoreline is dynamic and changes from a medium size beach to a narrow sand strip and back to a medium size beach during the year. Residents feel that their physical presence will prevent uncontrolled use of the shoreline. One suggestion is to make Wailea a “walk-in” beach to accommodate only the serious beachgoers who are more appreciative of the bay’s natural resources and are willing to walk the extra distance to reach the shoreline resources.
In acknowledging the fragile nature of Wailea, Alternatives A and B of the park master plan are proposing to develop the bay as a walk-in beach. Beachgoers will be required to walk more than 400 feet to reach the shoreline. A special access and turnaround will be provided for equipment drop-off and persons with disabilities. Parking will be sized to control the number of people using the beach and picnic area.

2.4.6 Comparison of Project Alternatives

2.4.6.1 Criteria for Evaluation of Project Alternatives

An evaluation of the three alternatives was conducted by Belt Collins Hawaii to compare how the proposed alternatives would meet the Division of State Parks objectives and how they would impact the environment. A simple matrix was developed for the evaluation. The first section of this matrix lists the State Parks objectives which are described in detail in Chapter 1 of this document. The second section of the matrix consists of potential environmental impacts associated with the project.

In the first section of the evaluation, a "yes" or "no" would be required to indicate whether the proposed alternative accomplishes the State Parks objectives (Table 2-2). In the second section, the alternative is rated in terms of the type and significance of impact expected on the environment (see rating scale below).

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Beneficial Effect</td>
<td>+2</td>
</tr>
<tr>
<td>Beneficial Effect; Not Significant</td>
<td>+1</td>
</tr>
<tr>
<td>Little or No Effect</td>
<td>0</td>
</tr>
<tr>
<td>Adverse Effect; Not Significant</td>
<td>-1</td>
</tr>
<tr>
<td>Significant Adverse Effect</td>
<td>-2</td>
</tr>
</tbody>
</table>

In determining the type and significance of impact, it was assumed that feasible mitigation measures would be applied. For example, during construction, site work is expected to generate dust. It is assumed that the contractor would employ dust control measures, including the use of dust screens, frequent water sprinkling on exposed dirt areas, and immediate landscaping when grading work is completed. Without mitigation measures, construction work would generate adverse dust effects on neighboring properties. With proper mitigation measures, adverse impacts would be minimized.

This evaluation helped determine the preferred alternative for the Hapuna Beach State Recreation Area. Moreover, it provides reviewers of this document with a better understanding of the project's objectives and impacts. The results of the evaluation are discussed in the following section. Reviewers are encouraged to make a similar evaluation during their review of this document.
Table 2-2  Evaluation Scores of Alternative Proposed Actions

<table>
<thead>
<tr>
<th>Evaluation Criteria: State Parks Objectives</th>
<th>Alternative A Park Expansion and Golf Course Development</th>
<th>Alternative B Park Expansion No Golf Course</th>
<th>Alternative C No Action (No Expansion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provides resource-oriented recreation opportunities?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>• Addresses demand for beach recreation, picnicking, camping, and hiking?</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>• Addresses demand for affordable golf?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>• Manages water safety, security, maintenance, and other park management issues?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Potential Impacts*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Short-term construction impacts: erosion, noise, air quality, water quality, hazardous materials/waste</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Drainage/flood impacts</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on groundwater quality</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on coastal water quality</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on marine biota</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on native and endangered species</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on significant cultural resources</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>• Visual impacts</td>
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<td>0</td>
</tr>
<tr>
<td>• Social impacts</td>
<td>+2</td>
<td>+1</td>
<td>0</td>
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<tr>
<td>• Economic impacts</td>
<td>+1</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Impacts on Public Services and Infrastructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Parks and recreation</td>
<td>+2</td>
<td>+1</td>
<td>-1</td>
</tr>
<tr>
<td>• Police, fire, and emergency services</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Roads and traffic</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Potable water supply and distribution</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>• Sewage disposal</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Solid waste disposal</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Electricity and telephone service</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on energy use and conservation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Impacts on adjacent homeowners</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* Assumes implementation of feasible mitigation measures
+2 = Significant beneficial impact
+1 = Beneficial impact, not significant
-1 = Adverse impact, not significant
-2 = Significant adverse impact

Note: None of the alternatives involve acquisition of private properties at Wailea Bay.
2.4.6.2 Summary of Comparative Evaluation

Table 2-2 presents the results of the evaluation. None of the alternatives include the acquisition of private property behind Wailea Bay.

Alternative A (park expansion and public golf course) meets all of the evaluation criteria for State Park objectives with the exception that full use of the property behind Wailea Bay will be limited, since acquisition of the private parcels at Wailea Bay is not being considered under the current proposal. Therefore, beach recreation and picnicking would be limited to the 30-foot-wide beach access road reserve, two parcels that the State has acquired, and the existing 40-foot-wide road reserve running the length of the beach.

Alternative A provides resource-oriented recreation opportunities with the development of limited access to the beach and shoreline areas, and the implementation of water safety and environmental awareness programs which are considered important public benefits.

Alternative B (park expansion only) will not meet the need for affordable golf in the region. All the other benefits associated with Alternative A would still be applicable.

Alternative C (no park expansion) will maintain the status quo of the existing park and will provide recreation opportunities only within it existing 62-acre area. It would not address future demand. There would be no affordable golf and no park headquarters to implement water safety and environmental awareness programs and improved park security.

In terms of potential environmental impacts, Alternative A would generate a number of significant beneficial effects which would offset a number of its adverse impacts. Overall, the net result would be on the positive side. Detailed discussions on these impacts are provided in the next chapter of this FEIS.

Alternative B would generate a number of beneficial effects but not as significant and not as many negative effects as Alternative A. This is primarily due to the elimination of the 18-hole golf course from the plan.

Finally, Alternative C maintains the present status of the existing park and thus would result in no new development. With no park expansion, no impacts, positive or negative, would be generated. It would, however, result in negative impacts on existing parks in the region when future demand for additional recreational activities must be met by existing West Hawaii facilities.

In summary, the alternatives were evaluated in terms of State Park objectives and potential environmental impacts. The purpose of the matrix was not to arrive at a sum score for each alternative and to compare the scores to determine the preferred plan. The matrix allowed the State Parks to identify the different alternatives and how they measured up to the agency objectives (see Table 2-2). Just as important, it allowed the State Parks to recognize the associated impacts that would be generated. This would assist the agency to identify potential mitigation measures for the project and to develop design or plan modifications, if necessary.
Alternative A met all of the State Parks objectives and would provide the most benefits to the community. On the other hand, it would also generate impacts to more aspects of the environment. Alternative B would not meet all of the State Park objectives but would have fewer environmental impacts. Alternative C, which proposes no action, would provide only limited benefits to the community and would have even fewer environmental impacts, if any.

The Division of State Parks selected Alternative A because it fulfills the recreational needs of the community as identified in Pedersen’s assessment study prepared for the State in 1992 (see Appendix A). These benefits would far outweigh the negative effects to the environment when mitigation measures are applied to reduce or minimize impacts. It should be noted, the recreational needs for this area will continue to grow and the demand for facilities will necessitate State or County action.
CHAPTER 3
EXISTING CONDITIONS, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

3.1 OVERVIEW OF THE ENVIRONMENTAL SETTING

The Hapuna Beach State Recreation Area is located in the South Kohala District on the west coast of the Island of Hawaii (Figure 3-1). It is situated within the Kohala Coast Resort Region, an area consisting of high quality resort developments such as the Mauna Kea Resort, Mauna Lani Resort, and Waikoloa Beach Resort, and recently the Hualalai and Kona Village Resort.

The project site sits on the shoreline between the Mauna Kea Resort and the Puako Beach Lots residential community. Hapuna Beach and Wailea Beach are the most notable shoreline landmarks in the area (Figure 3-2).

The Queen Ka'ahumanu Highway, a regional State right-of-way, traverses the park expansion area and physically divides the project site into an approximately 320-acre mauka section and 520-acre makai section. The eastern boundary of the mauka section was created to accommodate a planned golf course above the highway; no legal description has been established for the eastern boundary. The approximately 846-acre project site is owned by the State of Hawaii (TMK 6-6-01: portion of 2; 6-9-01: portion of 1; 6-2-02:1; and 6-6-02:2, 6, 7, 31, 32, 34, 35, 40, 41 and 42). Additionally, TMK 6-6-02: 39 is a transfer station site and TMK 6-6-02: 43 is a tank site. Both of these parcels are owned by the State, but are not part of the park expansion area.

Queen Ka'ahumanu Highway provides the primary access to the project site. It links Kailua-Kona, the largest population center in West Hawaii, with Kawaihae Harbor, a deep-draft commercial port. The highway also provides access to Kona International Airport, which accommodates both mainland and interisland flights, and Honokohau Harbor, a State-operated small boat harbor.

Waimea, South Kohala District's largest population and commercial center, is approximately 12-3/4 miles to the northeast of Hapuna. It is the headquarters of the Parker Ranch and home to small businesses catering to the region's farming/ranching community, local residents, and recently the island's visitor population. Other residential communities within commuting distance of the project site are Kawaihae Village, Waikoloa Village, Puako Beach Lots, Hawi, and Kapa'au.

Recreational and cultural resources in the vicinity include Anaeho'omalu Bay, Samuel Spencer Beach Park, Pu'ukohola Heiau National Historic Site, and in the adjacent North Kohala District, Lapakahi State Historic Park, Mahukona Beach, and Mahukona Boat Ramp. A small marina and boat ramp are also located in Kawaihae Harbor.
The park expansion area is predominantly undeveloped. It is barren and covered with sparse vegetation. The developed portion consists of the existing 62-acre beach park at Hapuna Bay (Figure 3-3), 19 privately-owned residential lots behind Wailea Beach, Hapuna Beach Road, Puako Spur Road, and the old Kawaihe-Puako Road. These facilities comprise less than 14 percent of the property.

Existing land uses adjacent to the Hapuna Beach State Recreation Area are diverse in type and intensity of use. They consist of resort projects, beachfront residential homes, and open undeveloped lands. Makai and to the north of Queen Kaʻahumanu Highway is the Mauna Kea Resort which includes the world-famous Mauna Kea Beach Hotel, an 18-hole golf course, and a number of resort-residential units. A second 18-hole golf course, a 10-lot residential subdivision, and a new 350-room hotel, named the Hapuna Beach Prince Hotel, have been added to the resort. These recent facilities are part of a major expansion program at the Mauna Kea Resort that began in 1992. A portion of the resort expansion extends mauka of the Queen Kaʻahumanu Highway into a 390-acre area that is long-term planned for approximately 550 resort-residential units.

To the south is the Puako Boat Ramp and Puako Beach Lots residential community, comprising of approximately 170 developed and undeveloped lots. In addition to single-family homes, the community includes a four-story residential condominium, a general store and two churches. Access to this community is provided by Puako Beach Road from Queen Kaʻahumanu Highway.

On an approximately 5-acre site adjacent to the Puako Boat Ramp within the park expansion area, the University of Hawaii at Hilo plans to establish a marine education and research field station. It will be operated as part of the Kalakaua Marine Education Center and serve students at UH-Hilo and the West Hawaii Educational Facility as well as those of the UH-Manoa through the Hawaii Institute of Marine Biology and School for Ocean and Earth Sciences and Technology. Planning funds have been granted for the project and the University is now in the process of defining the project scope and initiating the planning work.

Two other major master-planned resorts, Mauna Lani Resort and Waikoloa Beach Resort, are located farther to the south. These resorts contain planned multiple hotels and golf courses with a large number of residential units and commercial facilities. A major portion of these resorts have already been completed.

Mauka of the highway is a large tract of undeveloped land owned by the State of Hawaii. Occupying a portion of this land are the County's Lalamilo well system, Lalamilo Ventures, Inc's wind-generated power plant (identified as Lalamilo Wells Windfarm), and Hawaii Electric Light Co.'s (HELCO) Mauna Lani substation. The Lalamilo well system is a source of water for most of the Kohala Coast Resort Region.

Lalamilo Venture’s facility consists of 122 wind turbines that generate up to approximately 2.3 megawatts of electrical power (under ideal wind conditions). This power is sold to the County to energize its Lalamilo wells’ electrical system. Any remaining power is then sold to HELCO for its use.
To the south and mauka of the highway is Nansay Hawai‘i’s planned residential-recreational community which will contain six golf courses and more than 2,000 residential units. The schedule for development is not known at this time.

3.2 EXISTING RECREATIONAL AREAS AND FACILITIES

3.2.1 Hapuna Beach

The sand area of Hapuna Beach measures approximately 1,850 feet wide (approximately 1,200 feet fronts the project area) and 150 to 320 feet deep (from the water's edge to the vegetation line) during the summer months. It is the widest white sand beach on the island. During the winter months (usually from November through April), high surf often erodes the beach, leaving a depth of about 50 to 220 feet. The sand eventually returns during the summer months.

Existing facilities include landscaped lawns, concession and office building, three picnic pavilions, three comfort stations, outdoor showers, paved walkways, and an improved parking area (see figures 3-3 and 3-4).

The park provides a wide variety of beach recreational opportunities for such activities as swimming, snorkeling, and nearshore scuba diving. At the southern end of the beach, in the rocky area of the bay, ocean jumping and diving activities occur. During the winter months, high surf generates rideable waves for surfing; however, only body-type surfing is permitted at Hapuna (Clark, 1985). Net and pole fishing activities occur along the rocky shoreline.

Two professional lifeguards are on duty at Hapuna Beach from 9:00 am to 5:00 pm every day of the week. When the lifeguards are off-duty, beach users in the area generally make the emergency rescues themselves. An emergency telephone with a direct line to the County Fire Department via the Hilo Police Department dispatcher is available in the park. The nearest fire and rescue station is located on Queen Ka‘ahumanu Highway, about 2-1/4 miles from the beach.

Upslope of the beach facilities are six A-frame overnight cabins, a general pavilion, two small comfort stations, a caretaker's cottage, and a maintenance shop.

The cabins, each of which can accommodate up to four persons, have had considerable use since their initial construction in 1970.

Some of the cabins have been remodeled or reconstructed. The comfort stations will require some repair and/or replacement of plumbing and electrical fixtures.
3.2.2 Beach 68

"Beach 68" is a 150-foot-wide by 35-foot-deep beach that is accessible from the old Kawaihae-Puako Road (some residents indicate that "Beach 68" is "Beach 69"). Lava outcrops occupy a portion of the beach leaving a usable area of approximately 100 feet by 35 feet. On either side of the beach, the shoreline is lined by sea cliffs ranging in height from 35 to 50 feet above mean sea level.

The term "Beach 68" is derived from the number posted on a telephone pole along the old Kawaihae-Puako Road. Access to the beach is provided by a jeep trail from the old road. At the end of the jeep trail is a dirt parking area and a walking trail to the shoreline. Beach 68 is popular for nude sunbathing, overnight camping, and swimming, and adjoins a unique cove immediately to the northwest. There are no public facilities at this beach.

3.2.3 Wailea Beach

Wailea Beach (Beach 69) is smaller than Hapuna Beach, measuring approximately 1,400 feet wide and approximately 40 to 80 feet deep. At about the center of Wailea is a lava outcropping that reduces the sand area of the beach. During high surf and winter seasons, the beach is subject to sand loss and the depth of the beach is reduced to less than 40 feet. Offshore within the bay is the Wailea Bay Marine Life Conservation District as designated by the Department of Land and Natural Resources.

Wailea is a relatively quiet and secluded beach reached by an unimproved road from the old Kawaihae-Puako Road. An unpaved parking area is located at the end of the unimproved road and adjacent to the beach. There are no public facilities.

The big winter surf in the bay is excellent for surfers and bodysurfers. Swimming, snorkeling, and scuba diving are popular near the shore. Windsurfing and small-craft sailing are also popular activities.

Inshore waters of the bay feature a sandy bottom. The ruins of a former boat landing are still evident near Wailea Point at the south end of the bay. A number of private homes occupy an area behind the beach and above the adjacent cliffs and rocky shoreline.

3.2.4 Puako Boat Ramp

At the southern end of the project expansion area is a small boat ramp and dock that are used all year around. Provided by the State, the facility includes also a paved parking area for vehicles and trailers and a boat washdown area. There are no restrooms on the property.
3.3 TOPOGRAPHY, GEOLOGY, AND SOILS

3.3.1 Existing Conditions

3.3.1.1 Physiography

The park's existing and expanded area measures approximately 7,800 feet by 5,080 feet and encompasses approximately 846 acres (Figure 3-3). It rises from the shoreline to an elevation of about 320 feet. The average slope is approximately 4.5 percent.

The surface of the property is typically uneven, with minor knolls, small ravines, and gullies. Two major drainage channels traverse the site from east to west and ultimately connect with the shoreline at Hapuna and Wailea Bays. Other than the shoreline area, which will be described in detail in the following sections, there are no unique or dramatic landforms or features that make the property distinct.

3.3.1.2 Geology

Over centuries of geological formation, the project site has been subjected to basaltic lava flows and volcanic ash deposits from Mauna Kea. A study by Stearns and Macdonald classifies the volcanic rocks in the vicinity as part of the Hamakua Volcanic Series. The ash deposits covering the volcanic rock is believed to have resulted from earlier volcanic eruptions on Mauna Kea and from local tradewinds blowing ash southwesterly over the region (Harding Lawson Associates, 1991).

Field investigations by Harding Lawson Associates in 1991 identified primarily a'a lava on the site (see Appendix C). This finding contrasts with the generalized U.S. Soil Conservation Service mappings, which indicate the site is primarily underlain by pahoehoe lava and, secondarily, by a'a lava.

Harding Lawson further noted that over time, the a'a lava in most places weathered to form a very stony, sandy silt soil that varies in depth from 0 to 3 feet. Harding Lawson's investigation also found pockets of yellowish, weathered volcanic ash covering the a'a basalt in several road cuts and along the shoreline. The ash layer varied in depth from 1 to 4 feet and may be part of the Pahala ash deposit.

No significant geologic structures, such as faults, lava tubes, or collapsed lava flow structures, were found. Two caves, however, were discovered at the site: one along the shoreline between Hapuna Bay and Wailea Bay, and the other in a ravine in the southeastern section of the property. These caves appear to have been formed by erosion of the less-resistant clinker layer by wave action and surface water runoff. Additionally, in the same area along the shoreline, there is an arch rock structure measuring 15 to 20 feet high and 10 to 15 feet wide. It appears this structure was formed also by wave action.
3.3.1.3 Geologic Hazards

The Island of Hawaii is the youngest of the Hawaiian islands and the most active in volcanic activity. It is thus subject to volcanic eruption-related hazards. The project area is located in Zone 8, which is the eighth least-hazardous of 9 zones relative to lava flow hazards. As defined by Mullineaux, et al., Zone 8 is a large area on the lower flanks of Mauna Kea that has not been affected by lava flows for at least 10,000 years. Other related volcanic activities such as deposition of tephra (volcanic ash), pyroclastic surges (explosive eruptions), volcanic gases, ground fractures, subsidences, and collapsed features have not been significant occurrences in the project area during historical times (Harding Lawson Associates, 1991).

Earthquakes are also a geological occurrence that may affect the site. According to Harding Lawson, the greatest number of earthquakes on the island occur beneath the summits or near the rift zones of Kilauea and Mauna Loa. One of two major earthquakes to have occurred in West Hawaii was in August of 1951. It had a magnitude of 6.75 to 7.0 on the Richter scale and a Modified Mercalli intensity rating of approximately IV (Macdonald and Wentworth, 1952). This intensity level resembles the nondestructive ground motion felt by many people indoors. The other major quake in West Hawaii occurred in October of 1929, which had a magnitude of 6.5. The epicenter was identified to be located under Hualalai volcano, but its intensity level under the project area was not recorded.

For purposes of determining structural design requirements, the entire Island of Hawaii is in Seismic Zone 3 according to the Uniform Building Code and Hawaii County Building Code amendments. Thus, all new structures must be designed to resist forces that might be expected in Zone 3 areas. The proposed park improvements notably will not contain major building structures that could easily suffer major damages. There would be primarily ground improvements and low-profile structures.

3.3.1.4 Soil

With the exception of beach sand at Hapuna and Wailea Bays, the U.S. Soil Conservation Service classifies all soils on the property as Kawaihae extremely stony very fine sandy loam (KNC). This soil type is reported to average about 33 inches in depth.

Further, according to the U.S. Soil Conservation Service, the permeability of this soil is moderate, runoff is medium, and erosion hazard is moderate. Its Capability Classification is V7s, which indicates the soil has very severe limitations that make it unsuited to cultivation and suited more to pasture, range, woodland, or wildlife use. The subscript “s” indicates the limitation of the soil is due mainly to its shallow, droughty, or stony characteristics.

Harding Lawson Associates believes the existing surface soils represent a mixture of ash deposits and weathered clinker on basaltic a’a lava flow surfaces. In addition, these soils contain soluble sulfate concentrations that are capable of being detrimental to concrete (see Appendix C).
The University of Hawaii Land Study Bureau classifies Hapuna Beach as Land Type 327, Sands. Soils mauka of the beach are Land Type 93 Kawaihae soils series which is characterized as rocky, very well-drained, arid, and unsuitable for machine tills. Its Master Productivity Rating, which is an indicator of overall land productivity, is “E” on a scale ranging from “A” to “E.” An “E” rating signifies the land type is very poorly suited for agricultural use.

In terms of grazing use capacity, the project site is assigned to Class “e”, which designates lands with the lowest carrying capacity—more than 30 acres per Animal Unit Year (AUY), or estimated live beef gains of nine pounds or less per acre per year (U.S. Soil Conservation Service). Comparing this with Class “a,” the carrying capacity of the highest class is less than 2.5 acres per AUY or estimated live beef gains 110 lbs. per acre per year or greater.

The State Department of Agriculture does not have a designation for the project site on its Agricultural Lands of Importance to the State of Hawaii (ALISH) map. The State document includes identification of prime agricultural lands, unique agricultural lands, and other important agricultural lands.

3.3.2 Potential Impacts and Proposed Mitigation

The proposed action will result in alteration to the existing terrain and drainage patterns during the construction phase of the project. Site preparation will involve selective clearing and grading in the park expansion area. This is in line with the design objective of the park to integrate park improvements with the natural environment and to preserve resource-oriented recreational opportunities. Although the park expansion area will encompass approximately 526 acres below Queen Ka‘ahumanu Highway, less than one-third of the area will be actually improved. The remainder will be in open space and preserved in its natural state.

Similarly, the proposed golf course will be developed over selected areas of the mauka land. Less than 40 percent of the 320 acres above the highway will be converted to fairways, greens, and tees. The expanse of available land for the golf course allows the designer to work with the terrain and avoid substantial grading.

The impact on drainage will be reduced by the implementation of erosion and sedimentation control measures provided by the construction contractor. Best management practices will be employed and grading plans will be submitted to the county government for review and approval.

For grading of the site, no importation or exportation of soil will be needed. Importation of top soil for grass turf on the golf course, however, will be required. The soil will come from an approved source and will be contaminant free.
3.4 CLIMATE

3.4.1 Existing Conditions

Kawaihae of the South Kohala District is one of the Big Island’s driest areas. Average annual rainfall at the U.S. Weather Bureau’s Puako gauge near the project site is about nine inches. Most of this rainfall typically occurs during a short period in the October to April winter season. Intense storms or torrential rains are rare along the Kohala coast.

More than 90 percent of the days in the year are sunny and free of cloud cover. Low humidity levels (commonly under 40 percent) and cool breezes maintain a consistent level of comfort throughout the year.

The mean annual temperature is about 78°F, with relatively small daily and seasonal variations. Daytime highs above 90°F or nighttime lows below 63°F are rare. The mauka lands above the Queen Ka’ahumanu Highway are normally cooler during nighttime hours.

Airflow is most common onshore from mid-morning until just before sunset and offshore from early evening until the following morning. This diurnal pattern contrasts with the relatively constant northeast tradewinds prevalent in most other areas of the state. The average wind velocity is also less—7 to 8 miles per hour (mph) for the land-to-sea breeze, compared with 12 to 14 mph for the tradewinds. Under certain atmospheric conditions, gusty winds blowing through the saddle between the Kohala Mountains and Mauna Kea reach the shoreline. An observation by an area resident noted that winds during some periods average 35-45 mph and last from 15 minutes to days, weeks, and longer.

Hurricane season in Hawaii is generally from June to November. In the last 25 years, two major hurricanes (known in meteorological terms as tropical cyclones) have hit the Hawaiian Islands. Both took a path near or across the Island of Kauai. The other islands experienced the outer edge of the hurricanes which generated strong winds and heavy rain as well as high surf. The Island of Hawaii was fortunate to survive with minor, if any, effects from the storm.

3.4.2 Potential Impacts and Proposed Mitigation

The weather in the South Kohala coastal plain is generally mild but is subject to periods of high winds. Rainfall, though low on average throughout the year, can be very heavy during intense atmospheric disturbances. All park structures will be designed to meet building code requirements and include special structural provisions for adaptation to local conditions.

In the event that a hurricane is anticipated to occur near or through Hapuna, park personnel will implement evacuation procedures. This will be in addition to the State and County early warning systems that will go into effect.
For major structures, the architect may consider the use of hurricane clips and foundation anchors. Most of the other park facilities would be primarily ground improvements or park furniture and would receive only minor damage from the severe winds.

3.5 DRAINAGE

3.5.1 Existing Conditions

The project site is traversed by drainageways that originate from eight drainage basins. Some of these basins extend from the shoreline to well above the project site and range in size, above the Queen Ka'ahumanu Highway, from 40 acres to as large as 7,070 acres. The head of the largest basin is at about the 2,200-foot elevation in the South Kohala District highlands.

Drainage across three of the four roadways that traverse the project site is accommodated by culverts located beneath the road pavements. There are eight culverts beneath the Queen Ka'ahumanu Highway, two beneath the old Kawaihae-Puako Road, and two under the Puako Spur Road. These culverts (Figure 3-5), which are located within State rights-of-way, are maintained by the Department of Transportation. Drainage information for the culverts within the Queen Ka'ahumanu Highway are provided in Table 3-1.

Table 3-1 TR55 Runoff Quantities for the Basins (Mauka of Queen Ka'ahumanu Highway)

<table>
<thead>
<tr>
<th>Culvert</th>
<th>Total Basin Area (in acres)</th>
<th>Flow (in cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7,072.0</td>
<td>4,063</td>
</tr>
<tr>
<td>B</td>
<td>41.3</td>
<td>46</td>
</tr>
<tr>
<td>C</td>
<td>192.0</td>
<td>273</td>
</tr>
<tr>
<td>D</td>
<td>39.5</td>
<td>59</td>
</tr>
<tr>
<td>E</td>
<td>227.7</td>
<td>250</td>
</tr>
<tr>
<td>F</td>
<td>136.0</td>
<td>194</td>
</tr>
<tr>
<td>G</td>
<td>2,131.0</td>
<td>1,231</td>
</tr>
<tr>
<td>H</td>
<td>46.8</td>
<td>79</td>
</tr>
</tbody>
</table>

3.5.2 Potential Impacts and Proposed Mitigation

The proposed project will involve clearing, grubbing, grading, and landscaping. There will be new grass areas, park furniture, small building structures, access roads, and vehicular parking. Land alteration makai of the highway will be minimal with few site improvements. The proposed project will maintain existing terrain as much as possible, thus minimizing grading. Mauka of the highway, the golf course will require more earthwork to establish the grass fairways, greens and tees, although the design will rely on existing landforms wherever possible.
Development of access roads, paved parking areas and park structures will create impervious surfaces that will increase surface runoff. Compared to the overall site, the new impervious surfaces represent less than five percent of the project area. Overall, no net increase in normal runoff from the proposed improvements is expected. There should be, in fact, a decrease in runoff after the construction of the golf course. Experience has shown that project sites consisting of golf course development are capable of retaining water on the turf surface to allow improved conditions for ground percolation. Also, golf course designs include provisions for grassed swales, dry wells, ponds, and catchment basins to control runoff.

A runoff analysis was conducted on the project site’s pre-development and post-development conditions. Technical Release 55 Method, as provided in the U.S. Department of Agriculture, Soil Conservation Service’s manual, Urban Hydrology for Small Watersheds, was used in the runoff calculations and the results (showing no net increase in runoff) are shown below in Table 3-2.

### Table 3-2 Net Flow Over Project Area

<table>
<thead>
<tr>
<th>Culvert</th>
<th>Total Basin (acres)</th>
<th>Project Development Area (acres)</th>
<th>Pre-Developed Flow (cfs)</th>
<th>Post-Developed Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7,072.0</td>
<td>66.1</td>
<td>4,063</td>
<td>4,061</td>
</tr>
<tr>
<td>B</td>
<td>41.3</td>
<td>20.0</td>
<td>46</td>
<td>41</td>
</tr>
<tr>
<td>C</td>
<td>192.0</td>
<td>46.7</td>
<td>273</td>
<td>262</td>
</tr>
<tr>
<td>D</td>
<td>39.5</td>
<td>39.5</td>
<td>59</td>
<td>50</td>
</tr>
<tr>
<td>E</td>
<td>227.7</td>
<td>32.6</td>
<td>250</td>
<td>249</td>
</tr>
<tr>
<td>F</td>
<td>136.0</td>
<td>38.8</td>
<td>194</td>
<td>184</td>
</tr>
<tr>
<td>G</td>
<td>2,131.0</td>
<td>80.3</td>
<td>1,231</td>
<td>1,228</td>
</tr>
<tr>
<td>H</td>
<td>46.8</td>
<td>25.8</td>
<td>79</td>
<td>71</td>
</tr>
</tbody>
</table>

The proposed old Kawaihae–Puako Road realignment (to be known as Puako Road) will require new culverts for existing drainage to flow past the right-of-way. The new culverts have been preliminarily designed to accommodate at least 50-year storm flows, which is the current design standard for public roadways. For drainage areas that are larger than 100 acres, a special analysis was conducted to determine the drainage flow and its appropriate culvert size.

The two existing culverts, which traverse the current old Kawaihae–Puako Road, will be modified to accommodate the proposed Puako Road realignment. This modification will include lengthening of the culverts and construction of new headwalls (Figure 3-6). The size and design flow of all new culverts in the project area are presented in Table 3-3.
Figure 3-5
Hapuna Beach State Recreation Area Expansion
EXISTING DRAINAGE
3-17
Table 3-3  Culvert Size and Design Flow for Old Kawaihae-Puako Road Realignment

<table>
<thead>
<tr>
<th>Culvert</th>
<th>Status</th>
<th>Design Flow (cfs)</th>
<th>Culvert Size (inch)</th>
<th>Quantity of Culverts</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Proposed</td>
<td>40</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>J</td>
<td>Proposed</td>
<td>330</td>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>K</td>
<td>Proposed</td>
<td>120</td>
<td>54</td>
<td>1</td>
</tr>
<tr>
<td>L</td>
<td>Proposed</td>
<td>250</td>
<td>72</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>Proposed</td>
<td>170</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>Proposed</td>
<td>1,300</td>
<td>96</td>
<td>4</td>
</tr>
<tr>
<td>O</td>
<td>Proposed</td>
<td>50</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>P</td>
<td>Modification</td>
<td>–</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>Q</td>
<td>Modification</td>
<td>–</td>
<td>24</td>
<td>1</td>
</tr>
</tbody>
</table>

The property has been known to flood in the flat, low area behind Wailea Bay and empty into the bay resulting in murky waters. This condition provides a natural sedimentation basin for runoff which originates in the mauka land and eventually enter the bay. The proposed improvements will include culverts to accommodate surface runoff and prevent backwater flooding mauka of the new Puako Road as well as to avoid topovers at road crossings so continued access can be maintained.

In the adjoining property to the north, Mauna Kea Resort experienced a few serious floodings that caused property damage. It was determined that the culvert sizes in the highway above the resort were undersized for severe storms and in combination with other factors (inability of the existing ground to adequately absorb water and slope of ground) caused flooding and property damages. A diversion channel was designed and constructed to divert this potential flow above the resort into an adjacent gulch in the State park land. As one of the major gulches in this area, the gulch traverses the northern portion of the park property and connects with the shoreline at Hapuna Beach. The culvert beneath the Queen Ka‘ahumanu Highway serving this drainageway is more than adequate to accommodate the additional flow. It was constructed with the new segment of Queen Ka‘ahumanu Highway which used updated drainage design standards.

The grass lawns of the park and golf course areas will provide a form of flood control for the project. Grass surface treatment will slow the flow of water over the project site and improve surface runoff retention and ground absorption rate. For normal heavy flows, grass lawns will reduce the quantity of heavy sedimentation and murky runoff generated from various areas of the park. Sedimentation basins and other possible erosion control measures which are planned in the golf course and park area will help to reduce these impacts.

During construction of the Hapuna Beach State Recreation Area expansion, short-term erosion and sedimentation impacts are expected to occur. The actual site work involving earthmoving activity will occur only during a portion of the construction period. Only
about five to 15 acres makai of the highway are expected to be graded at any one time. The land alterations are anticipated to move from one area of the project site to another area as development on the park occurs.

Mauka of the highway, grading for the golf course will occur at one time. Site preparation, grading, and landscaping for each golf hole will be scheduled for completion at the same time.

The contractor for the project is expected to use necessary erosion and sedimentation control measures as part of the park and golf course construction. Approval of these measures will be required by the County Chief Engineer before any grading permit is issued.

3.6 HYDROLOGY AND WATER RESOURCES

3.6.1 Existing Conditions

Groundwater along the South Kohala coast occurs as a basal lens in hydraulic continuity with the ocean. Calculations of the total groundwater flow in the area have provided a probable range of three to seven million gallons per day per coastal mile (Bowles, 1974; Kanehiro and Peterson, 1977; and Nance, 1981). Near the shoreline, groundwater exists in a brackish quality, but landowners have drawn this water from the ground and have successfully used it for golf course irrigation (see Table 3-4). At distances of four or more miles inland of the shoreline, groundwater is of a potable quality. Wells consequently have been developed to supply the domestic water requirements for the coastal region.

Shoreline discharges of groundwater tend to concentrate at cracks and other small-scale, localized fissures. Shoreline discharges in the project area are known to take place at the south end of Hapuna Bay and are noticeable by a distinct temperature gradient and refraction of light. When the coastal waters are extremely calm, a surface layer of brackish groundwater is clearly evident.

3.6.2 Potential Impacts and Proposed Mitigation

The proposed project will require the development of wells for potable water and irrigation water. Potable water will serve the park facilities and golf course clubhouse. Irrigation water will serve the park landscaping and golf course grounds. The impacts from these uses are discussed in Section 3.12.2.1 of this document.

During operations of the expanded park and golf course, fertilizer and pesticide application will be used for ground maintenance. The active ingredients in the applications will have the potential to infiltrate deep into the ground and impact groundwater. Some of these ingredients could travel to the shoreline and impact the coastal ecosystem. These conditions, their potential impact, and proposed mitigation measures are addressed in Section 3.7.2.3.
**Table 3-4  Selected Water Well Data in the Vicinity of the Hapuna Beach State Recreation Area Expansion**

<table>
<thead>
<tr>
<th>Well Identification (Well Number)</th>
<th>Owner or User/Year Drilled/Type of Use</th>
<th>Ground Elevation (feet above MSL)</th>
<th>Static Water Level (feet above MSL)</th>
<th>Well Casing Diameter (Inches) / Depth (Feet)</th>
<th>Chlorides</th>
<th>Total Alkalinity</th>
<th>pH</th>
<th>Turbidity</th>
<th>Temperature</th>
<th>Conductivity (UMHOS/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5948-01 Hapuna Beach Park</td>
<td>State Parks 1970 Irrigation</td>
<td>244</td>
<td>2.6</td>
<td>10/266</td>
<td>420-430 ppm as CaCO₃</td>
<td>7.3</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>77°F</td>
</tr>
<tr>
<td>5949-01 Camp Drewes</td>
<td>USMC 1944 unused</td>
<td>90</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>6048-02 Mauna Kea Beach Hotel 1</td>
<td>Mauna Kea Beach Hotel 1963 Irrigation</td>
<td>340</td>
<td>4.5</td>
<td>10/ND (total depth drilled = 376 ft.)</td>
<td>550.0 ppm as CaCO₃</td>
<td>7.7</td>
<td>10</td>
<td>82.4°F</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>6049-01 Mauna Kea Beach Hotel 2</td>
<td>Mauna Kea Beach Hotel 1963 Irrigation</td>
<td>188</td>
<td>2.0</td>
<td>12/218</td>
<td>640 ppm as NaCl</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>6049-05 Ouli A</td>
<td>Olohana Corp. 1979 Irrigation</td>
<td>300</td>
<td>3.2</td>
<td>14/322</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

---

*MSL = Mean sea level

**ND = No Data

3.7 COASTAL AND MARINE ENVIRONMENT

3.7.1 Existing Conditions

The project expansion area has approximately 10,800 feet of shoreline, including 1,200, 1,000 and 150 feet of sandy beach at Hapuna, Wailea, and Beach 68, respectively. The remainder of the shoreline is rocky.

The nearshore waters are classified by the State Department of Health (DOH) as Class AA. According to Chapter 54 of the DOH's Administrative Rules, the objective of these waters is that they remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or action. Further, to the extent practicable, the wilderness character of this area shall be protected. No zones of mixing shall be permitted in this class.

It is also stated that the uses to be protected in these waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment.

In 1991, Marine Research Consultants conducted a marine environmental survey of the nearshore waters at Hapuna and Wailea to identify the existing physical, chemical, and biological characteristics of the area. The survey was also conducted to provide a base from which potential impacts generated by the proposed development onto the nearshore waters could be measured (Appendix D).

3.7.1.1 Physical Characteristics

The predominant physical feature of the project shoreline is the basaltic cliff of pahoehoe lava, interspersed with pockets of white calcareous sand areas at Hapuna Beach, Wailea Beach, and Beach 68.

The nearshore subtidal areas which do not front a sand beach are composed of basaltic boulders and sharp lava fingers. The seaward edge of these lava shoreline areas consists of either a relatively flat basaltic bench or vertical sea ledge of approximately three- to six-feet in depth.

The reef area is divided into three major zones: (1) a shallow nearshore zone characterized by a flat reef platform; (2) a mid-reef zone composed of irregular bottom topography characterized by extensive reef growth; and (3) a deep reef zone composed of dome-shaped elongated ridges of accumulated coral growth separated by sand channels. Such a zonation scheme is atypical of the West Hawaii area which is usually characterized by a deep reef slope.

The flat reef platform in the nearshore area is covered with a limestone veneer, along with scattered basaltic boulders that have entered the ocean after breaking off from the shoreline. Areas of sandy bottom are also common throughout this underwater zone. A dominant characteristic of the bench is extensive pitting by the bioerosional action of sea urchins. This characteristic is most pronounced in the inner areas of Wailea Bay. On the
other hand, the relatively barren nature of the inner areas of Puako Bay suggests it may have been recently affected by events that have increased siltation to the point that it has killed reef corals. In areas fronting sand beaches, for example, the most shoreward reef zones are essentially absent of coral. They have bottom structures consisting of expanses of white sand.

Between 80 and 160 feet of the shoreline, the reef platform changes from a flat bench to uneven hummocky surfaces separated by sand patches. Coral coverage increases gradually with distance from the shore.

Beyond the reef platform, bottom topography gradually slopes to abyssal depths. This is not characteristic of the rest of the South Kona to North Kohala bathymetry, which typically consists of a narrow nearshore reef bench and steep reef slope.

The outer reef area of the project site displays a rather unique structure. Extending seaward, the coral hummocks gradually change orientation from a random pattern to a series of elongated fingers with long axes perpendicular to the shoreline. At the 30- to 60-foot depth, the fingers have the appearance of elongated knolls or ridges that rise off the sea bottom by as much as 15 feet. They stretch out to 160 feet and are generally 30 to 50 feet wide. These elongated fingers are regularly spaced and are separated by channels of fine white sand. It appears these ridges were not composed of any underlying core of basalt, but were the result of bioaccumulation of calcium carbonate generated through an active reef building process.

3.7.1.2 Water Chemistry Analyses

An evaluation of the area’s nearshore water chemistry was conducted by Marine Research Consultants in March 1991 (see Appendix D). A total of 57 water samples were collected from five transect lines located offshore of the project area. The transects extended approximately 825 feet offshore and perpendicular to the shoreline. Three transects were in Hapuna Bay and the remainder were located in Wailea and Puako Bays. From the samples, an analysis of 13 water chemistry constituents were performed, including all parameters specified in the State Department of Health’s water quality standards.

Results of the analysis showed that several dissolved nutrients (nitrate [NO₃⁻], total nitrogen [TN], orthophosphate phosphorus [PO₄³⁻], and silica [Si]) displayed horizontal gradients with highest values closest to shore and lowest values at the most seaward sampling sites. Correspondingly, salinity was the lowest closest to the shoreline. These patterns indicate that groundwater is entering the marine environment near the shoreline and mixing with ocean water. It was especially evident at the southern end of Hapuna Bay, and least distinct in the center of the bay. Other water chemistry constituents that are not related to groundwater efflux (dissolved organic nitrogen [DON], dissolved organic phosphorus [DOP], and ammonium nitrogen [NH₄⁺]) do not display the steep gradient with respect to distance from the shoreline and further substantiate the presence of groundwater efflux.
Along with horizontal gradients in water chemistry constituents, there is also vertical stratification within the water column. Such stratification is the result of incomplete mixing of a low-density surface layer originating from groundwater and stream water overlying a layer of denser ocean water. Vertical stratification is evident from the nutrient (NO$_3^-$, PO$_4^{3-}$, and Si) concentrations measured in the surface and deep waters at various distances from the shoreline. Based on these measurements, the greatest differences between surface and deep water nutrient concentrations occur at the nearshore locations and decrease with increasing distances from the shoreline.

All water samples were analyzed and compared to DOH criteria for open coastal waters under "wet" conditions. Of these samplings, only NO$_3^-$ was found to exceed DOH criteria levels. This exceedance is attributed to the groundwater efflux occurring at the nearshore interface and are therefore part of a natural process.

While turbidity and chlorophyll levels did not exceed DOH criteria levels, they were noticeably higher at the southern end of Hapuna Bay. These elevated concentrations are possibly a result of planktonic populations that may be trapped within the corner of Hapuna Bay.

### 3.7.1.3 Biological Characteristics

An assessment of the benthic and reef fish community structure in the marine waters off the project area was conducted by Marine Research Consultants (see Appendix D). Nine transects were evaluated at three stations.

The study showed that the area's coral community structure differs substantially in each reef zone. The shallow reef bench is comprised of small encrustations of corals that can withstand the rigors of sediment, freshwater input, and water motion. The mid-depth reef is characterized by very large coral colonies of *P. lobata* which indicate the area is relatively protected from severe wave stress. The deep reef ridges appear to be composed of predominantly one species of coral (*P. compressa*). Notably, the coral cover of the hard sea bottom increases with depth while species diversity decreases.

The reef fish community structure at Hapuna is fairly typical of the communities found in other undisturbed Hawaiian reef environments, and is characterized by six general categories: juveniles, plantivorous damselfishes, herbivores, rubble-dwellers, swarming tetradonts, and surge-zone fishes (see Appendix D). The relative scarcity and timid behavior of some fish indicates that they have experienced predation and that the area has been subjected to fishing.

### 3.7.2 Potential Impacts and Proposed Mitigation

#### 3.7.2.1 Shoreline Modification and Surface Runoff

The absence of any plans by State Parks to modify the shoreline or nearshore environment eliminates the potential for direct alteration of the ecosystems, according to Marine Research Consultants. Stresses from natural forces that are factors in influencing community structure (e.g., freshwater and sediment input) may actually be reduced with
shoreline development. Secondary impacts associated with runoff of materials from the proposed development do not appear to present the potential for changes based on similar projects elsewhere. Construction and operation of park improvements and a golf course do not appear to present a potential for permanent adverse impact to the marine environment. Proper construction and management methods would eliminate impacts on the shoreline.

While significant alterations in marine waters are not expected from the proposed project, it is recommended that the present baseline survey serve as the initial increment in an ongoing monitoring program. The monitoring program should be designed to establish a preconstruction baseline of conditions in order to evaluate any changes that might occur during the construction and operational phases of the project. Such a monitoring program should also be designed so that if any environmental alterations are identified, mitigative measures can be applied prior to the degradation of the water quality and biotic community structure in the offshore areas.

3.7.2.2 Ciguatera

In Hawaii and other Pacific island areas, there have been sporadic outbreaks of ciguatera, a disease caused by the ingestion of a wide variety of coral reef fishes that contain toxins accumulated via the marine food chain. The source of the ciguatera toxin is a photosynthetic benthic dinoflagellate, Gambierdiscus toxicus.

When a benthic dinoflagellate was first identified as a source, it was hypothesized that any disruption of the marine environment that caused new surfaces to be exposed would trigger ciguatera outbreaks. Although there is circumstantial evidence of a relationship between dredging and ciguatera, definitive cause and effect relationships between environmental alteration and toxic outbreaks have not been verified. The proposed project will not disturb nearshore waters of the park land and thus would not create conditions that might result in ciguatera toxicity.

3.7.2.3 Fertilizer and Pesticides

In May 1991, Charles L. Murdoch, Ph.D. and Richard E. Green, Ph.D. assessed the potential environmental impacts of fertilizers and pesticides on the groundwater and nearshore waters of the project area (Appendix E).

The regular maintenance of the planned golf course will require significant quantities of fertilizers and pesticides to keep the fairways in lush, green, and generally healthy condition (in the remainder of the project, particularly in the park lands, minor quantities are expected to be used). The use of fertilizers and pesticides is the most common maintenance practice, and its application often raises questions regarding its effect on the environment. Fertilizers are normally applied to greens, tees and fairways, and only parts of the golf course roughs. The main components of fertilizers include nitrogen, phosphorus, and potassium. It is estimated that approximately 86 acres of the 200-acre golf course would be fertilized. Actual fertilization would occur every 2 weeks on the greens, every 3 weeks on the tees, every 8 weeks on the fairways, and every 12 weeks on
parts of the roughs. A total 14.6 tons of fertilizer may be applied to the golf course per year (Table 3-5).

Table 3-5  Approximate Fertilizer Use for an 18-Hole Golf Course in Hawaii

<table>
<thead>
<tr>
<th>Type of Turf</th>
<th>Area (acres)</th>
<th>Application Frequency (times per week)</th>
<th>Total Annual Application (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greens</td>
<td>3</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>Tees</td>
<td>3</td>
<td>3</td>
<td>1.15</td>
</tr>
<tr>
<td>Fairways</td>
<td>50</td>
<td>8</td>
<td>10.00</td>
</tr>
<tr>
<td>Roughs</td>
<td>30</td>
<td>12</td>
<td>2.60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
<td><strong>12</strong></td>
<td><strong>14.60</strong></td>
</tr>
</tbody>
</table>

Pesticides, which include herbicides, insecticides, and fungicides, would also be used on the golf course (Table 3-6). They are normally applied only in response to outbreaks of pests. Other than herbicides, few pesticides are applied regularly.

Irrigation influences the movement of soluble nitrogen fertilizers in soils. If excessive irrigation occurs after fertilization, the likelihood of runoff or leaching of nitrogen below the root zone increases.

Murdoch and Green's study concluded that the proposed park expansion and golf course would not result in any adverse impact to the project area's groundwater quality. With current low rainfall conditions and high evapotranspiration from turf in the area, groundwater recharge under normal conditions does not occur. Moreover, the groundwater in the area is brackish and will not be used for human consumption.

The proposed park expansion and golf course are also expected to have no adverse effect on the area's nearshore marine waters. In the unlikely event that lawn chemicals do leach to groundwater during winter rains, the dilution and dispersion that would occur during groundwater flow through the buffer area (3,200 feet wide) between the golf course and the shoreline would likely reduce the concentration of applied chemicals so no significant impact on nearshore marine waters would result.

Surface runoff of golf course turf management chemicals is also not expected to have any negative effect on the nearshore waters. The wide buffer area between the golf course and shoreline is intended to provide a large absorption field during periods of light to moderate showers. When heavy runoff occurs, it will be diluted by water originating mauka of the facility, further reducing the likelihood of significant concentrations of nitrate or pesticides reaching the ocean in runoff water.
Table 3-6  Approximate Pesticide Use for an 18-Hole Golf Course in Hawaii

<table>
<thead>
<tr>
<th>Turfgrass</th>
<th>Area (acres)</th>
<th>Chemical</th>
<th>Frequency (times/year)</th>
<th>Annual Total (lb/ai)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbicides:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greens</td>
<td>3</td>
<td>MSMA</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bensulide</td>
<td>2</td>
<td>72</td>
</tr>
<tr>
<td>Tees</td>
<td>3</td>
<td>MSMA</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trimec®</td>
<td>3</td>
<td>9 pints</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bensulide</td>
<td>2</td>
<td>72</td>
</tr>
<tr>
<td>Fairways</td>
<td>50</td>
<td>MSMA</td>
<td>6</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trimec®</td>
<td>3</td>
<td>19 gallons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>metribuzin</td>
<td>2</td>
<td>75</td>
</tr>
<tr>
<td>Roughs</td>
<td>30</td>
<td>MSMA</td>
<td>2</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>metribuzin</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Insecticides:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greens</td>
<td>3</td>
<td>chlorpyrifos</td>
<td>AN</td>
<td>18</td>
</tr>
<tr>
<td>Tees</td>
<td>3</td>
<td>chlorpyrifos</td>
<td>AN</td>
<td>18</td>
</tr>
<tr>
<td>Fairways</td>
<td>Spot Treatment</td>
<td>chlorpyrifos</td>
<td>AN</td>
<td>50</td>
</tr>
<tr>
<td>Fungicides:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greens</td>
<td>3</td>
<td>metalaxyl</td>
<td>AN</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>chlorothalonil</td>
<td>AN</td>
<td>72</td>
</tr>
<tr>
<td>Tees</td>
<td>3</td>
<td>metalaxyl</td>
<td>AN</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>chlorothalonil</td>
<td>AN</td>
<td>72</td>
</tr>
<tr>
<td>Fairways</td>
<td>Spot Treatment</td>
<td>chlorothalonil</td>
<td>AN</td>
<td>250</td>
</tr>
</tbody>
</table>

Notes:  lb = pounds  AN = as needed  ai = active ingredient

Although the Murdoch and Green study concluded that the proposed park expansion, including the golf course, is not expected to have any adverse impact on the area’s groundwater and nearshore water quality, mitigative measures could still be employed as additional precaution. The study suggested that well-managed irrigation will reduce the likelihood of groundwater recharge from turf irrigation. Also suggested was the use of adequate depth of surface or top soil on the golf course, use of slow-release nitrogen fertilizers, selection of pesticides that are effective against the pests but are not likely to move from the site of application, and implementation of integrated pest management. All of these management practices should be overseen by a well qualified golf course superintendent.
3.7.3 Natural Marine Hazards/Water Safety

3.7.3.1 Existing Conditions

3.7.3.1.1 Rocky Shoreline

The rocky portions of the shoreline can pose a danger to beachgoers who climb the rocks or walk too close to the rocky ledges. The area is frequently used by fishermen, hikers, explorers, and persons with a shoreline destination. An unimproved trail currently follows the makai property line, but it is not always clearly defined especially over rocky areas. Travelers wandering off the trail may place themselves in danger.

3.7.3.1.2 Rip Currents

Wave currents in Hapuna Bay are very active, especially during the winter months. Nearshore water conditions during this period tend to be ideal for rip currents, which occur when incoming sets of waves move large volumes of water into the bay area. As the overall volume of this water begins to build, it starts to flow laterally along the shoreline and subsequently out to sea. The outward rush of water is the danger that is posed on inexperienced swimmers, who tend to exhaust themselves in an attempt to swim back to shore against the current.

Shorebreaks of four feet or higher could also present a problem. Inexperienced swimmers could be unaware of the considerable downward force of water when it breaks on the beach. The heavy force could render a swimmer helpless after being shoved to the ocean bottom, suffering a loss of breath, and being disoriented.

Undertows are often associated with heavy shorebreaks on steeply sloped beaches. The backwash from a wave can pick up significant speed as it flows back into the ocean, and a swimmer would feel as if he or she is being pulled under the water as another wave is breaking over the swimmer.

3.7.3.1.3 High Surf/Storm Swells

The land mass of the Big Island and neighboring islands to the northwest provide substantial shielding from the North Pacific swells, limiting the direct wave exposure on Hapuna Bay to the sector of the bay bearing the 225 to 300 degrees direction. With this confined exposure, only relatively small segments of the northern swells, as well as the Kona storm waves, can reach the bay without significant loss of height and energy.

Data on actual waves off Hapuna are not available, but hindcasting and wave measurements done for the Ocean Thermal Energy Conversion (OTEC) cold water pipe testing program off Keahole Point provide information that is reasonably indicative of prevailing conditions. In reviewing the OTEC measurements, wave heights of less than two feet occurred 47 percent of the time, wave heights less than four feet occurred 94 percent of the time, and higher waves occurred 6 percent of the time. Wave periods were generally less than 12 seconds (Edward K. Noda and Associates, 1986). Conditions at Hapuna are
expected to be even calmer than Keahole Point, which has a wider exposure to both the north and south.

Storm waves approach Hapuna Bay on occasion in the winter and very infrequently in other seasons. The height and frequency of occurrence, as listed in previous studies of the Kona coast, are summarized in Table 3-7. North Pacific swells from the west-northwest are considerably more significant than Kona storm waves. Their expected heights for a given recurrence interval are greater, and their localized effects of refraction have more impact than for Kona storm waves.

Table 3-7 Summary of Storm Wave Heights and Frequencies of Occurrence – West Hawaii

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WNW Swells (Feet)</td>
<td>Kona Storm (Feet)</td>
<td>WNW Swells (Feet)</td>
</tr>
<tr>
<td>2</td>
<td>17.0</td>
<td>10.2</td>
<td>10 to 15</td>
</tr>
<tr>
<td>10</td>
<td>19.7</td>
<td>13.1</td>
<td>20 to 25</td>
</tr>
<tr>
<td>25</td>
<td>21.6</td>
<td>14.8</td>
<td>25 to 30</td>
</tr>
<tr>
<td>50</td>
<td>22.6</td>
<td>16.2</td>
<td>30 +</td>
</tr>
<tr>
<td>100</td>
<td>23.8</td>
<td>17.5</td>
<td></td>
</tr>
</tbody>
</table>

The high surf caused by winter storms poses a serious hazard at Hapuna Bay. As high surf strikes the beach, dangerous shorebreak waves and extremely fast flowing, shifting rip currents are generated, as described in the above section. Beach erosion also occurs, but buildings and structures located farther mauka are generally not damaged.

3.7.3.1.4 Tsunamis

Tsunami inundation is a potential hazard that has affected different parts of the Hawaii island shoreline. It is generated when an abrupt movement of the ocean floor displaces a large mass of water—such as when an earthquake occurs. It can originate from remote areas such as the Pacific Rim countries. Should that be the case, Hawaii's early warning system will provide ample warning to Hawaii's populace of any forthcoming tsunami.

Earthquakes have also occurred at closer range, especially around the Island of Hawaii itself. Rarely, however, are significant tsunamis generated as a result of a local quake.

The maximum recorded height reached by a tsunami in the Hawaiian Islands was 53 to 56 feet (Tilling et al., 1976). About 50 tsunamis have been reported around the state since the early nineteenth century (Macdonald et al., 1947).
In a report by Loomis (1976), tsunami inundation on Hawaii's shorelines were reported for 1946, 1952, 1957, 1960, and 1964. According to the Pacific Tsunami Warning Center of the National Weather Service, there were no major tsunamis after 1964 that caused property damages on the Big Island. Data on the nearest runup to the project site were recorded at Waiulaula Point and Kawaihae which are approximately 2.5 to 3 miles north of Hapuna Bay. At Waiaula Point, the highest inundation occurred in 1946, with a runup to the 10-foot elevation mean sea level (MSL). At Kawaihae, the highest inundation reached the 12-foot elevation.

The Flood Insurance Rate Map for the area, prepared by the Federal Emergency Management Agency (FEMA) shows a coastal high hazard area (Zone VE) along Hapuna Beach, Wailea Beach, and portions of the rocky shoreline. At Hapuna Beach, a 100-year coastal flood would extend approximately 100 feet inland and have a base flood elevation of about 8 feet (elevation based on the National Geodetic Vertical Datum of 1929). At Wailea Beach, a potential coastal flood would extend about 200 feet inland and have also an 8-foot base flood elevation. These coastal flood zones are below any proposed park structures and are not expected to result in any severe property damage. Existing residences behind Wailea Bay, however, may be subject to damage from tsunami inundation.

3.7.3.2 Potential Impacts and Proposed Mitigation

Although Hapuna is blessed with a beautiful beach, there are natural hazards that pose a threat to human life and safety. With increased use of the beach and rocky shoreline area, the frequency of accidents, mishaps or emergencies are expected to correspondingly increase.

With the operations of the park expansion, a safety awareness program will be implemented. Park personnel and lifeguards will provide assistance where they can, but a safety awareness program would also be beneficial. An information desk at the park headquarters can provide literature on park amenities as well as danger spots. Warning signs will be posted at hazardous areas, and for impending tsunamis, warning sirens will be sounded to notify park users to take necessary precautions. Necessary upgrades in the siren system may be required as development continues to occur in the South Kohala coastal region.

Mitigative measures could also be provided through design. Park features will be constructed to withstand natural hazards such as high surf and tsunami inundation. Park facility designs will comply with local building codes that incorporate hazardous condition considerations.

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1 Zone VE is defined as special flood hazard areas along coasts subject to inundation by a 100-year flood with additional hazards due to velocity (wave action). Mandatory flood insurance purchase requirements apply.
3.8  BIRDS AND WILDLIFE

3.8.1  Existing Conditions

A number of avifauna and feral mammal studies have been conducted in the South Kohala coastal area over the past 15 years. The closest study to the Hapuna Beach State Recreation Area was conducted in 1984 by biologist Phillip Bruner for the Hapuna Beach Prince Hotel property. Because the resort property is very similar to the project site in terms of vegetation, topography, landforms, and climate, the findings in the 1984 study are representative of the project site.

The most abundant species found mauka of the highway was the Japanese quail (Coturnix japonica). The extensive open grasslands provide a very suitable habitat for the quail. Also found were mourning doves (Zenaida macroura) and a single short-eared owl or pueo (Asio flammeus sandwichensis).

In the makai land below the highway, zebra dove (Geopelia striata), warbling silverbill (Lonchura malabarica), gray francolin (Francolinus pondicerianus), and spotted dove (Streptopelia chinensis) were common. The exposed offshore shelf of the rocky shoreline, particularly at low tide, is an important foraging site for the Pacific golden plover (Pluvialis fulva), wandering tattler (Heteroscelus incanus), and ruddy turnstone (Arenaria interpres). None of these species, however, were recorded during the survey.

The Indian mongoose (Herpestes auropunctatus) is the most common mammal in the area. Feral cats (Felis catus) have been recorded along the South Kohala coast, and the endangered Hawaiian hoary bat (Lasiurus cinereus semotus) has occurred on the Island of Hawaii and may frequent the coastal lands. None, however, have been sighted over the project area and none have been reported in the vicinity since a dead specimen was found several years ago on the grounds of The Royal Waikoloa site, about 5 miles from the park property. Most sightings of the hoary bat have been recorded in Hilo and in the relatively wet forests of the island's upland elevations.

3.8.2  Potential Impacts and Proposed Mitigation

The project area is a habitat for a wide range of species. With construction of the park expansion and golf course, the Pacific golden plover is expected to increase in numbers, especially on the short, grassy areas of the expanded park and golf course fairways. Other species expected to increase in numbers are the house sparrow (Passer domesticus), northern cardinal (Cardinalis cardinalis), common myna (Acridotheres tristis), and Japanese white-eye (Zosterops japonicus). These low-land urban species tend to favor the wetter habitats that are created by irrigated grass areas. Conversely, the proposed project is expected to decrease the population of gray francolin, Japanese quail (Coturnix japonica), zebra dove, and warbling silverbill.

Other wildlife species including mongoose and feral cats would stray away from the project site. The surrounding coastal plain and mauka land are similar in environmental characteristics as the park expansion site. These faunal species are very mobile and are expected to readily inhabit the vast undeveloped adjacent areas.

MAY 2001  FINAL  3-33
No mitigation of project impacts is required.

3.9 TERRESTRIAL FLORA

3.9.1 Existing Conditions

A botanical survey of the project site was conducted by Char & Associates from December 27 to 30, 1993 (Appendix F). The objective of the survey was to: (1) describe the major vegetation types; (2) inventory the flora; (3) search for threatened and endangered species, as well as rare and vulnerable plants; (4) identify areas of potential environmental problems or concerns resulting from development of the property; and (5) propose appropriate mitigation measures.

The survey used a walk-through method and involved four botanists. No detailed survey was conducted through improved or landscaped areas of existing park and residential areas. The survey was conducted during the rainy season; slight variations in the species inventory, especially in the weedy, annual plant variety, are anticipated in other seasons of the year.

The property can be classified by three general vegetation types. The first type, coastal groundcover, occurs behind the sand and cobble beaches and on rocky headlands. Species that were recorded in the area include buffel grass, alena, hairy merremia vines, Australian saltbush, bristly foxtail grass, 'ilima, West Indian beggar's tick, 'ihi, 'aha'ahea or 'aweoweo shrubs, kipukai or nena, and pa'u o hi'iaka. The predominant tree is the kiawe. Branches of this tree interlock with each other, forming a canopy cover greater than 60 percent of the area. Other tree species include ironwood, tree heliotrope, kou, and milo.

Grassland vegetation comprises the second vegetation type on the property. This area is generally characterized as wide open with low clumps of grass and scattered small trees. The predominant species, buffelgrass, covers approximately 50 to 60 percent of the property. The remainder of the area is barren with stony soil conditions. Widely scattered throughout the grassland are kiawe and other less predominant species including: 'uhaloa, 'ilima, hairy spurge, pa'u o hi'iaka, hairy merremia, fountain grass, swollen fingergrass, threadstem carpetweed, graceful spurge, Cuba jute, Chamaesyce hyssopifolia, pili grass, and Eragrostis atropoides.

Gulch vegetation comprises the third vegetation type. It includes species found in a particular large gulch near the southern boundary of the property. This gulch has some seeps and small pools of water. At the time of the survey, a few guppies were found in the pools. The makai segment of the gulch, which is known to dry out quickly, is covered by buffel grass, as are the other gulches on the property. In the seeps and small pool areas, the damp gulch bottom consists of woodiern, pteris, hairy sword fern, maiden-hair fern, kunu-niu or 'iwa'iwa, kilo'o'opus, Galinsoga parviflora, guava, pualele, cocklebur, and peppergrass.

A total of 73 species were inventoried on the property. Sixty-one are introduced or alien species, one is originally of Polynesian introduction, and 11 are native. Of the native
species, seven are indigenous and four are endemic. None of the plants are listed threatened or endangered, nor are they proposed or candidate for such status.

Although the endangered ko‘oloa‘ula (Abutilon menziesii) is known from the nearby Nansay Hawaii Puako property, none was found on the project site. Additionally, the candidate endangered pololei fern (Ophioglossum concinnum), which is known to occur on nearby lands at Pu‘u o Kohala and Mauna Lani Resort, has been reclassified to a common Ophioglossum polyphyllum complex. It has been removed from the U.S. Fish and Wildlife Service—Proposed Endangered Species List.

### 3.9.2 Potential Impacts and Proposed Mitigation

Construction will result in selective clearing of existing vegetation in the park expansion area and extensive but also selective clearing in the golf course area. In the park expansion area, clearing will only be required in the camp sites, picnic areas, headquarters, pedestrian paths, access roads, and parking areas. The vast majority of the expansion area will be maintained in its natural condition. Cleared areas will be re-landscaped with hearty new plants and furnished with an irrigation system.

Chapter 103-24.6, HRS, enacted by the Hawaii State Legislature in 1992, mandates that any new or renovated landscape for any building, housing, or other facility developed with State funds incorporate native Hawaiian plants wherever and whenever possible. The botanical study notes that the use of native plants on the property would take little effort. Native plants found in the area are already adapted to the local environment and require little water and maintenance. Some of these species, in addition to Polynesian introduced or Polynesian heritage plants, consist of pa‘u o Hi‘i‘iaka, milo, kou, ‘ulei, coconut, hau, beach morning-glory, and beach naupaka. Other species which may be incorporated with the park landscaping include williwili, pohinahina, a‘ali‘i, false sandalwood, ‘akia, and nahe.

The areas cleared for golf course construction will also be revegetated. There will be opportunities to use native plants on the fairways, roughs and grounds of the clubhouse. As part of the turf and golf clubhouse landscaping, an irrigation system will be installed.

### 3.10 CULTURAL RESOURCES

#### 3.10.1 Existing Conditions

Since 1990, Paul H. Rosendahl, Ph.D., Inc. has conducted a three-phased archaeological inventory survey of the project site (Appendix G). Phase I of the survey, undertaken in 1990, involved initial site identification field work. Phase II was conducted in 1992 and involved completion of the inventory-level field work at those sites which required additional evaluation and documentation. And finally, Phase III was completed in 1994 and involved analysis of all recovered cultural materials, including site and feature distributions, as well as a description and analysis of recovered portable cultural material and ecofacts remains.

---

1 A material or object not made by man but used by man.
The basic objectives of the inventory survey were: (1) to identify (find and locate) all sites and site complexes present within the project area; (2) to evaluate the potential general significance of all identified archaeological remains; (3) to determine the possible impacts of the proposed park expansion upon the identified remains; and (4) to define the general scope of subsequent data collection and/or other mitigation work that might be necessary or appropriate. All aspects of the inventory survey were conducted in accordance with the standards for inventory-level survey recommended by the State Historic Preservation Division (SHPD), Department of Land and Natural Resources.

A total of 259 sites and site complexes containing an estimated 627 component features were identified during the Phase I survey work (Figure 3-7). The features can be divided into an indigenous group and non-indigenous group. As inferred by PHRI’s data, the predominant functional activities represented in the indigenous group appeared to include temporary habitation, agriculture, long-term habitation, and transportation. Obviously, exploitation of the area’s marine resources, coupled with agricultural activity within gulch areas, while operating from both permanently occupied feature complexes as well as temporarily occupied sites, represented important activities for native Hawaiian occupants of the region.

In a historical documentary research report by Kepa Maly for Paul H. Rosendahl, a descriptive overview of settlement patterns and cultural practices in the Hapuna - Wailea area was provided (see Appendix G). The report presents a compilation of information from recently translated Hawaiian legends, Land Commission Award records and previous archaeological or ethnographic studies. It looks into the stories and legends surrounding the people connected with the place names of the project area.

There were several accounts specifically of Lalamilo and Puako whose lives together were legendary for finding the sacred lure that enabled Lalamilo to catch an endless supply of octopus.

The report indicated that recent archaeological studies provide evidence that the initial settlement in the Anaehoomalu to Hapuna area occurred as early as about 1200 A.D. These studies also tell us that fishing was an important occupation for residents in the coastal area and extensive agriculture was the main activity for residents in the upland areas. Many accounts tell of the trading of food resources between the upland families and coastal communities.

After the death of King Kamehameha I in 1819, American missionaries arrived in the Hawaiian Islands. Upon reaching the Big Island, missionary William Ellis described Puako as a “considerable village”. A number of years later, another Christian minister, Lorenzo Lyon, arrived on the island. He replaced Reverend Dwight Baldwin as minister at Waimea.

Around the 1840s, Lyon estimated the population of Kawaihæ-Puako to be approximately 734. In 1859, Lyon completed a church at Puako. Lyon described Puako as a place on the shore that is very much like Kawaihæ, but larger. It has a small harbor in which native vessels anchor. There are coconut groves that give the area a verdant aspect. There is, however, no food that is grown. People in the village instead make salt and catch
fish. These are exchanged for vegetables grown elsewhere. Later accounts tell that sweet potato patches were developed in the region.

After the Great Mahele, land ownership was opened not only to native Hawaiian commoners, but also to foreigners including business interests, primarily American. This set the stage for the full development of a variety of businesses, including Hawaii’s sugar industry. Interestingly, sugar was tried in the Puako area but without success. Later other crops were tried including alfalfa.

Although not described in the Kepa Maly report, Hapuna was also used for military exercise. Evidences of military training activity are found on the coastal plain. Today, Hapuna - Wailea is an undeveloped area which sits behind an active recreation area used by residents and visitors alike for shoreline and ocean activities.

At the conclusion of PHRI’s Phase I study, it was determined that none of the sites or features are considered extraordinarily significant. During the Phase II work, the number of identified sites on the property was reduced to 164 with an estimated 425 component features. This was the result of a re-investigation of the archaeological sites which showed that 13 of the original 259 sites were determined to be located outside of the project area, 30 were determined to be either wholly contemporary hunting blinds or other recreational-related features, and 95 were either not relocated, were re-investigated and determined not to be cultural features, or had been destroyed during the interval between Phase I and Phase II field survey works. Of the remaining 164 sites, 121 sites were originally identified in the Phase I field work, and 43 sites were newly identified and were recorded during the Phase II field survey work.

3.10.2 Study Findings and Recommendations

Of the 164 sites identified and recorded within the project site, eight are considered culturally significant and require some level of preservation and further study. The other 156 sites are assessed to be significant or potentially significant solely for information content. Documentation for 138 of the 156 sites is considered sufficient and no further archaeological data collection is warranted; the remaining 18 of the 156 sites are recommended for further data collection/recovery work. The eight sites that are considered culturally significant require additional data recovery work followed by some level of preservation with interpretive development. These sites consist of four coastal complex sites, three trails/trail segments and one modified outcrop.

Table 3-8 provides a summary of PHRI’s recommendations for the eight sites that require additional archaeological work. Of these sites, one will not be affected by development. Three others are historic trails that will be included in the park pedestrian pathway system. The remaining four sites located near the shoreline at Kanekanaka Point will be preserved as recommended.
Table 3-8  Summary of General Significance Assessments and Recommended General Treatments for Eight (8) Significant Sites

<table>
<thead>
<tr>
<th>Site No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>FDC</th>
<th>NFW</th>
<th>PID</th>
<th>PAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>19406</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>19410</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19413</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>19367</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>19368</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>19365</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19366</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19305</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General Significance Categories:

A = Important for information content, further data collection necessary (PHRI = research value)
X = Important for information content, no further data collection necessary (PHRI = research value, SHPO = not significant)
B = Excellent example of site type at local, region, island, State, or National level (PHRI = interpretive value); and
C = Culturally significant (PHRI = cultural value)

Recommended General Treatments:

FDC = Further data collection necessary (detailed recording, surface collection, and limited excavations, and possibly subsequent data recovery/mitigation excavations);
NFW = No further work of any kind necessary, sufficient data collected archaeological clearance recommended, no preservation potential;
PID = Preservation with some level of interpretive development recommended (including appropriate related data recovery work);
PAI = Preservation "as is," with no further work (and possible inclusion into landscaping), or possibly minimal further data collection necessary.

○ State Inventory of Historic Places (SIHP) numbers, SIHP numbers are five-digit numbers prefixed by 50-10-82 (50 = State of Hawaii; 10 = Island of Hawaii; 82 = USGS 7.5' series quad map [Pu‘u Hinau, Hawaii]).

○ Provisional assessment; definite assessment pending completion of further data collection.

PHRI’s recommended general treatments for the above sites will provide for the necessary mitigation of potential project impacts as well as establish appropriate preservation procedures for significant sites. Thus, the next phase of the archaeological work is the implementation of data recovery and recommended general treatments. This should be undertaken prior to any development on the property and should be coordinated with the SHPD.
Alternatively, State Parks Division will avoid impacts to significant sites by modifying plans during final design so no improvements are located near these culture features. Since all of the sites which have been specifically recommended for interpretative development are located near Kane'ekanaka Point, an archaeological preserve is proposed for the area. Interpretative signs, a connecting pathway to the different sites, and other provisions will be coordinated with the SHPD.

In a memorandum, dated August 29, 1996, SHPD indicated that it had reviewed the archaeological report prepared by PHRI and that revisions will be required. In a subsequent meeting on January 15, 1998, attended by State Parks Division, SHPD, PHRI, then DLNR-Water and Land Development Division and the project consultant, it was agreed that revisions would indeed be required for the study to meet minimal standards of an acceptable archaeological inventory survey.

In the spirit of moving forward with the project and with the resolution that the revisions will be made, it was agreed that PHRI's archaeological report could be used in a planning or environmental document (EIS or EA), but it would not be represented, at this time, as an acceptable or complete inventory survey report. It is noted that PHRI's present study does include, however, important information on the historic sites in the area and would be useful for planning purposes.

In the future, when specific areas are actually scheduled for development and such development could impact historic sites, the survey study will be upgraded for the relevant area and will address SHPD's previous comments. After the study is upgraded, mitigation measures will be undertaken as approved by SHPD.

Also, as part of the agreement, copies of the survey's field notes, maps, photographs, etc., would be provided to DLNR, and upon SHPD's request, these documents would be given to SHPD for its statewide inventory records. The public, consequently, would have access to these documents through SHPD's resource library.

3.11 SOCIOECONOMIC ENVIRONMENT

3.11.1 Economic Assessment

3.11.1.1 Overview

The South Kohala and North Kona Districts are part of the West Hawaii region that consists of a wide variety of economic activities, including tourism, agriculture, ranching, high technology ventures, support services, retail and wholesale enterprises, shipping, and construction. Of these, tourism is the largest industry in the state and its presence in the region is primarily due to the resort projects that have been developed in South Kohala since the 1960s.

Sugar production has closed down in the region and diversified agriculture, including coffee and macadamia nut production, has increased, as has the production of vegetable crops. Ranching continues to be an important industry, particularly in North and South Kohala, and high technology ventures, including astronomy on Mauna Kea and ocean
science and natural energy research at Keahole Point, are providing new opportunities in
the local economy.

Kailua-Kona is the commercial hub of West Hawaii. It is the region’s largest population
center with a population of more than 9,100 (1990 U.S. Census). Large retailers, business
offices, government satellite offices, and numerous support services mixed with resort
facilities make this a popular stopping point or destination for residents and visitors alike.
Waimea is the second largest town (pop. 5,900) in West Hawaii and is located at the
crossroads of the South Kohala, North Kohala, and Hamakua Districts. Originally an old
ranching village, it has become a mix of residential and commercial uses, business
enterprises, and public facilities.

Kawaihae Harbor is a deep-water port that provides facilities for shipping and cargo
transportation. In 1993, Kawaihae Harbor handled more than 655,000 short tons of cargo
(Data Book, 1995). The harbor receives and ships general cargo, including lava cinders,
petroleum product, and bulk fertilizers.

Tourism has developed into a major industry on the island. Since statehood and the
introduction of jet service to Keahole, West Hawaii has hosted an increasing number of
visitors. Kailua-Kona and its neighboring North Kona District have especially responded
by accelerating growth in visitor accommodations and facilities. This growth has fueled a
building boom that spread to South Kohala in the late 1970s. Today, Kailua-Kona, as a
visitor destination area, is joined by Keauhou, Hualalai, and Kaupulehu in North Kona,
and Mauna Kea Resort, Mauna Lani Resort, and Waikoloa Beach Resort in South Kohala.

Each of these resorts have or will have hotels, resort residential homes, golf courses, and
shopping villages.

3.11.1.2 Existing Conditions

Employment

Hapuna Beach State Recreation Area currently employs a staff of seven workers, including
three caretakers, two lifeguards, and two concessionaire attendants. The three park
caretaker positions are full-time State positions of which one is currently vacant. The
lifeguards and concessionaire attendants are on contract with the State.

Revenues

An economic and financial analysis was conducted on the park existing users as well as
for the proposed action by Pedersen Planning Consultants in April 1995 (see Appendix A).
It notes that existing cabin or shelter user fees are $15 per night. These fees have been
increased recently to $20 per night. Assuming an average occupancy rate of three cabins
per night, the park would generate about $21,500 in annual revenue.

From an economic perspective, there would be a direct benefit gained from the public’s
enjoyment of accessible shoreline and ocean recreation. Pedersen’s analysis attached a
dollar value to this benefit and combined it with revenues generated by user fees to arrive at a total direct annual benefit of $3.3 million.

Indirect economic benefits to the local economy, however, are more significant via consumer expenditures in the local and state economies. Almost every resident and visitor arriving at Hapuna Beach spends money for the purchase of gasoline, convenience food items or other prepared food brought to the beach. They may have also purchased recreational equipment for their outings. Overall, these purchases are estimated to generate currently about $10.3 million annually in the statewide economy.

3.11.1.3 Potential Impacts

The proposed project is expected to have little impact on the growth of visitor arrivals to West Hawaii or the growth of the regional economy, but would provide residents and visitors alike with a much needed recreational amenity. Through its indirect impacts, the proposed project would contribute more to the diversification of the local economy as well as enhance South Kohala and North Kona as a support area for regional population growth and visitor industry development.

Future Employment and Income

The proposed project will generate both short-term and long-term impacts in the community. Short-term impacts would include temporary employment in the construction industry, increased personal income, and increased tax revenues for the local government. Long-term impacts would include permanent employment for the park and golf course staff, increased personal income, and increased tax revenues.

Construction and operation of the proposed project will provide direct, indirect, and induced employment. During construction, direct employment would include the construction workers, while indirect employment would include jobs in companies supplying materials and services needed to construct the project. Induced employment would include the additional jobs created throughout the economy when construction employees and proprietors of supply companies spend their wages and salaries in the community. When indirect and induced employment are added to direct employment, the effect on the economy is magnified—for each job created or mobilized at the project site, one or more jobs are created elsewhere.

It is anticipated that the proposed park improvements would require mobilization of approximately 25 to 28 jobs in the construction industry. Additionally, as indicated above, the multiplier effect would generate or impact about 40 to 44 other jobs in the local economy.

Labor income in the form of wages and salaries received by those filling the construction jobs represents personal income of up to approximately $18 to $20 million.

Long-term employment is expected to be generated during the operational stage of the park. The staff positions that are recommended by the planning consultants for the park
expansion include park managers, administration staff, and maintenance personnel, some of whom would be part-time. There would also be concessionaire attendants.

At the proposed golf course, the clubhouse will be staffed by a golf pro, pro shop personnel, restaurant employees, golf course grounds crew, and golf cart and golf bag handlers. A breakdown of the recommended park employees is provided in Table 3-9.

Table 3-9  Recommended Employment at Hapuna Beach State Recreation Area

<table>
<thead>
<tr>
<th>BEACH PARK</th>
<th>NUMBER OF POSITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Management:</td>
<td></td>
</tr>
<tr>
<td>Park Superintendent</td>
<td>1</td>
</tr>
<tr>
<td>Park Manager</td>
<td>3</td>
</tr>
<tr>
<td>Resources and Security Personnel*</td>
<td>8</td>
</tr>
<tr>
<td>Clerk</td>
<td>2</td>
</tr>
<tr>
<td>Water Safety Director</td>
<td>1</td>
</tr>
<tr>
<td>Lifeguard</td>
<td>3</td>
</tr>
<tr>
<td>Maintenance:</td>
<td></td>
</tr>
<tr>
<td>Park Maintenance Supervisor</td>
<td>1</td>
</tr>
<tr>
<td>Mechanic**</td>
<td>1</td>
</tr>
<tr>
<td>Carpenter**</td>
<td>1</td>
</tr>
<tr>
<td>Plumber**</td>
<td>1</td>
</tr>
<tr>
<td>Equipment Operator</td>
<td>1</td>
</tr>
<tr>
<td>Caretaker</td>
<td>8</td>
</tr>
<tr>
<td>GOLF COURSE</td>
<td></td>
</tr>
<tr>
<td>Management:</td>
<td></td>
</tr>
<tr>
<td>Golf Pro***</td>
<td>1</td>
</tr>
<tr>
<td>Assistant Golf Pro***</td>
<td>1</td>
</tr>
<tr>
<td>Office Administration***</td>
<td>3</td>
</tr>
<tr>
<td>Mechanic***</td>
<td>2</td>
</tr>
<tr>
<td>Cart Assistant***</td>
<td>2</td>
</tr>
<tr>
<td>Restaurant Staff***</td>
<td>10</td>
</tr>
<tr>
<td>Maintenance:</td>
<td></td>
</tr>
<tr>
<td>Golf Course Superintendent***</td>
<td>1</td>
</tr>
<tr>
<td>Assistant Superintendent***</td>
<td>1</td>
</tr>
<tr>
<td>Mechanic***</td>
<td>2</td>
</tr>
<tr>
<td>Groundskeepers***</td>
<td>16</td>
</tr>
</tbody>
</table>

* These positions are filled by park technicians and Division of Conservation and Resources Enforcement (DOCARE) personnel.
** These positions are filled by regional workers who will have responsibility for neighboring parks.
*** These positions may be filled by a private contractor under an agreement with the State.
The total income generated by employees of the Hapuna Beach State Recreational Area Expansion would be approximately $2.0 million annually by 2015 (Table 3-10).

Table 3-10 Annual Income of Expansion Park Employees by Year 2015

<table>
<thead>
<tr>
<th>Expansion</th>
<th>Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Expansion</td>
<td></td>
</tr>
<tr>
<td>Program Management</td>
<td>$617,000</td>
</tr>
<tr>
<td>Maintenance Staff</td>
<td>375,000</td>
</tr>
<tr>
<td>Golf Course</td>
<td></td>
</tr>
<tr>
<td>Pro Shop Management</td>
<td>455,000</td>
</tr>
<tr>
<td>Maintenance Staff</td>
<td>599,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$2,046,000</strong></td>
</tr>
</tbody>
</table>

**Future Tax Revenues**

Based on Tax Foundation of Hawaii data, it is estimated that about 13 percent of personal income is paid by Hawaii households to both State and County governments for general excise taxes on retail sales, fuel taxes, property taxes, and income taxes. Applying this percentage factor to the personal income generated by the project construction ($18 to $20 million), the result is about $2.3 to $2.6 million in tax revenues.

For income generated by long-term employment, the total personal income taxes paid to State and County governments is about $266,000.

**Future Park Revenues**

In Pedersen’s economic and financial analysis, a summary of the direct and indirect economic benefits to the Big Island economy is discussed and provided below (see also Table 3-11).

Table 3-11 Summary of Direct and Indirect Economic Benefits to the Big Island by Year 2015

<table>
<thead>
<tr>
<th>Park Expansion Activity</th>
<th>Direct Benefits</th>
<th>Indirect Benefits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camping</td>
<td>$356,000</td>
<td>$1,771,000</td>
<td>$2,127,000</td>
</tr>
<tr>
<td>Beach Activities</td>
<td>4,393,000</td>
<td>13,881,000</td>
<td>18,274,000</td>
</tr>
<tr>
<td>Golf Activities</td>
<td>4,948,000</td>
<td>2,246,000</td>
<td>7,194,000</td>
</tr>
<tr>
<td>Hiking</td>
<td>251,000</td>
<td></td>
<td>251,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$9,948,000</strong></td>
<td><strong>$17,898,000</strong></td>
<td><strong>$27,846,000</strong></td>
</tr>
</tbody>
</table>
Expanded camping opportunities available by the end of 2005 will generate about $286,000 in annual direct economic benefits to the Big Island economy. By 2015, camping benefits will increase to about $356,000. These benefits will result from tent camping user fees generated from beginning in 2005. Indirect benefits from the purchase of food, fuel, and equipment are expected to be greater than the direct benefits. Approximately $1.8 million by 2015 are expected to enter the Big Island economy from these indirect purchases.

Direct economic benefits from the golf course will be derived from green fees, golf cart rentals, driving range user fees, as well as food and beverage and golf supply purchases at the clubhouse. The cumulative direct benefits of these sales will represent about $4.9 million per year by the year 2015. Indirect economic benefits will include local retail sales for various types of golf equipment such as golf clubs, accessories, and clothing. Employment at the new golf course, which is a cost of the project, would also generate other retail and service expenditures within the Big Island economy. No local data are available to assess the significance of these secondary expenditures.

Present State law requires that 20 percent of direct revenues generated on ceded land be conveyed to and for use by the Office of Hawaiian Affairs. Tent or cabin user fees, concession revenues, golf course green fees, golf cart rentals, driving range user fees, as well as pro shop and restaurant sales, will be subject to the 20 percent take. This revenue was not included in the overall benefit and cost analysis of the project, which includes a number of direct and indirect economic benefits, as well as shadow pricing for non-user fee type activities.

Another direct economic benefit of the proposed project will be the enjoyed experience of scenic walks along the coastline. This benefit is assigned an economic value, or shadow price, of $2 per hiker. Based upon the anticipated number of users, hiking opportunities will provide direct benefits valued at about $250,000 in the year 2015.

Project Cost

Based on the construction schedule established in the 1996 DEIS for this project, the overall expansion of the Hapuna Beach State Recreation Area will require the expenditure of almost $40 million in capital expenditures ($16.6 million of which will be privately financed) over a 12- to 13-year construction period or an average of about $3.0 million per year. This expenditure includes the cost of funding the park improvements and golf course construction. Upon completion of all improvements, operations and maintenance expenditures will approximate $4.3 million per year by 2010 and $5.1 million by 2015. Approximately 53 percent of these expenditures would be for the golf course operations and maintenance which may be financed by a private operator. From 1998 through 2015, cumulative capital and operations/maintenance expenditures will be an estimated $77 million (Table 3-12).

The acquisition of private Wailea properties is not being considered at this time, and to date, no specific land acquisition cost has been determined for the properties. Should the Department of Land and Natural Resources consider purchase of the private properties in the future, an estimate of property value would be more appropriate at that time.
Table 3-12  Estimated Capital and Operations/Maintenance Costs Hapuna Beach Park Expansion 1993-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Capital Costs</th>
<th>Operations/ Maintenance Golf Course</th>
<th>Operations/ Maintenance Park Area</th>
<th>O/M Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<td>0</td>
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<tr>
<td>1995</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1996</td>
<td>0</td>
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<td>1997</td>
<td>0</td>
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<tr>
<td>1998</td>
<td>606,414</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>606,414</td>
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</tr>
<tr>
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<td>0</td>
<td>2,309,913</td>
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<tr>
<td>2002</td>
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<td>0</td>
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<tr>
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<td>1,680,079</td>
<td>1,680,079</td>
<td>6,695,542</td>
</tr>
<tr>
<td>2006</td>
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<td>1,738,881</td>
<td>1,738,881</td>
<td>6,929,886</td>
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<tr>
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<td>1,799,742</td>
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<td>7,172,432</td>
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<tr>
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<td>5,560,734</td>
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<td>2009</td>
<td>5,755,360</td>
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<td>1,927,929</td>
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<tr>
<td>2010</td>
<td>1,371,132</td>
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<td>2011</td>
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<tr>
<td>2012</td>
<td>0</td>
<td>2,419,045</td>
<td>2,137,529</td>
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<tr>
<td>2013</td>
<td>0</td>
<td>2,503,712</td>
<td>2,212,343</td>
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<td>2014</td>
<td>0</td>
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<td>2,289,775</td>
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<td>2015</td>
<td>0</td>
<td>2,682,038</td>
<td>2,369,917</td>
<td>5,051,955</td>
<td>5,051,955</td>
</tr>
</tbody>
</table>

$39,886,194*  $14,791,582**  $22,079,580  $36,871,161  $76,757,354

Note: 1993 dollars have been inflated at the rate of 3.5 percent/annum. The total cost indicated by the asterisk includes approximately $16.6 million that would be financed by a private interest(s). The total expenditure indicated by the double asterisk may be financed by a private operator.

As a general indication of land cost, research was conducted on property values at the County Real Property Tax Office. The total value for the 19 properties behind Wailea amounted to about $14 to $16 million. Property improvement costs varied considerably but totaled approximately $3.0 to $3.5 million. These figures were based on assessments made in early 1996.

Net Value of Proposed Project

The cumulative net present value of the project offers a significant positive generation of direct and indirect benefits to the local economy. Overall capital expenditures represent an expense of about $40 million. However, these expenditures will generate direct and indirect retail sales and service fees of about $22.8 million annually by 2015. Using shadow price assignments, it is believed that resident and visitor enjoyment has an additional value of almost $3.8 million per year.

Through the discounting of future benefits and operations/maintenance costs to 1993 dollars, the overall project will generate a positive contribution of about $221 million in cumulative project benefits during the 2001—2015 period (Table 3-13).

3.11.2 Community Attitudes and Concerns

3.11.2.1 Existing Conditions

The Hawaii Island community generally considers Hapuna Beach State Recreation Area as a valuable natural resource and recreation area. Its appreciation for this area was demonstrated in the late 1980s, when a controversial County ballot initiative asked voters whether or not a proposed resort should be built north of the park. Special interest groups on the Island of Hawaii continue to maintain and encourage greater public access to the shoreline. The concerns of these organizations have repeatedly been reflected in testimonies before the Hawaii County Planning Commission and the State Board of Land and Natural Resources (BLNR) on various development applications.

Within the expansion area behind Wailea Beach are homes occupied by part-time and full-time residents. Informal discussions and correspondences with these residents during preparation of the master plan and EIS indicate that the owners are concerned with the potential loss of their lots from future condemnation. They are also concerned about public safety, flooding, over use and maintenance of the area.

On November 20, 1987, the State BLNR authorized the DLNR to acquire all remaining private parcels at Wailea and to incorporate them into the expanded Hapuna Beach State Recreation Area (Figure 3-8). No timetable was set for this acquisition; the Division of State Parks indicated that acquisition would take place as funding becomes available. To date, DLNR has acquired two shoreline parcels for about $1.5 million.

On June 5, 1998 in response to the private landowners' concern and petition, the BLNR rescinded its Order of November 20, 1987 subject to conditions as described in the Preface of this document.
### Table 3-13  Net Present Value Analysis Hapuna Beach Park Expansion 1993-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Direct Benefits</th>
<th>Total Indirect Benefits</th>
<th>Total Benefits</th>
<th>Total Costs</th>
<th>Present Value of Annual Net Benefits</th>
<th>Accumulated Present Value of Annual Net Benefits</th>
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</thead>
<tbody>
<tr>
<td>1993</td>
<td>$3,092,535</td>
<td>$9,772,411</td>
<td>$12,864,946</td>
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<td>$12,864,946</td>
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<td>$9,914,010</td>
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<td>$13,234,499</td>
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<td>$252,708,743</td>
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<tr>
<td>2012</td>
<td>$8,594,522</td>
<td>$16,973,226</td>
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<td>$21,011,173</td>
<td>$273,719,917</td>
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<tr>
<td>2013</td>
<td>$9,303,501</td>
<td>$17,269,928</td>
<td>$26,573,429</td>
<td>$4,716,054</td>
<td>$21,857,375</td>
<td>$295,577,292</td>
</tr>
<tr>
<td>2014</td>
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<td>$17,583,712</td>
<td>$27,456,955</td>
<td>$4,881,116</td>
<td>$22,575,839</td>
<td>$318,153,131</td>
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<tr>
<td>2015</td>
<td>$9,947,212</td>
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<td>$5,051,955</td>
<td>$22,792,839</td>
<td>$340,945,970</td>
</tr>
</tbody>
</table>

**Note:** All annual benefits and costs include a 3.5% annual discount rate.

**Source:** Pedersen Planning Consultants, 1995.
In recent years, squatting has occurred in the north section of Wailea Beach, and considerable consumption of alcoholic beverages and possible illegal drug use have taken place in the existing parking area. Loud beach parties have been common during nighttime hours.

A number of Wailea residents feel threatened or intimidated by transient users. Associated with these activities have been sanitation problems. There have been cases of people entering unoccupied vacation homes without authorization. The lack of paved access to Wailea Beach has limited County police surveillance in the area; no police vehicles could safely and regularly access the existing dirt trail. In response, Wailea residents purchased and donated a 4-wheel drive vehicle to the County Police Department to facilitate access and surveillance of the beach.

A court decision relating to unencumbered State lands encouraged the Division of Conservation and Resource Enforcement (DOCARE) of DLNR to issue written notices and a related grace period to unauthorized transient beach users in November 1993. The County Police Department indicated that transient beach users have, for the most part, left the beach.

An issue that has been raised by a few members of the community is the use of ceded land for the proposed park expansion. The DLNR has confirmed that the State-owned portion of the park expansion area is ceded land. The State has taken the position that ceded land will not be sold or traded in exchange for other land. Any exception to this policy must be approved by the Chairperson of the Board of Land and Natural Resources. Furthermore, 20 percent of all revenues received from the use of State ceded land must be remitted to the Office of Hawaiian Affairs.

The DLNR has also determined that individuals residing on State land during and prior to development and who have developed a water collection infrastructure on the property have rights to the water. This issue of “gathering rights” is usually treated on a case by case basis.

3.11.2.2 Potential Impacts and Proposed Mitigation

Potential Impacts

Project informational meetings held in Waimea on August 4, 1992 and August 22, 1996, informal discussions with area property owners, and comment letters on the EIS Preparation Notice and Draft EIS indicate that residents are concerned about Wailea Beach’s capacity to accommodate increased use after the park expansion occurs.

Moreover, the residents anticipate increased litter and the need for increased beach maintenance.
Public concerns regarding illegal activities and transient use of Wailea Bay have been raised by residents in the community and have been recently addressed by DLNR and the Hawaii County Police Department. If Wailea residents observe a noticeable improvement in behavior at Wailea Beach, it is believed their concerns for public safety will diminish significantly.

Some residents have expressed concerns about potential fire hazards as a result of negligent camp fires. The area above the beach is relatively dry and susceptible to brush fire. There have been at least three in the last ten years. Fire protection measures and County services are discussed in Section 3.13.3.

It has also been pointed out that flooding occurs, although not often, and that further development might aggravate the condition. Existing runoff patterns, potential flood conditions, and proposed drainage improvements are discussed in Section 3.5.

A number of the Wailea property owners have expressed the long-term desire to co-exist with the park expansion. These owners feel their presence behind Wailea Bay would be compatible with park use. For the reasons provided in Chapter 2 of this EIS, the State has indicated, however, that the land is ultimately needed for the expansion of the park facilities.

Other Wailea Bay residents have indicated that there should be a "right to first refusal" in the acquisition process. Under this arrangement, any private properties offered for sale would be offered to the State first. In effect, it would allow the owners to continue to live on the property as long as they do not try to transfer their property to someone else. This would be a disadvantage, however, to the State. It would keep the State's hands tied and deny it the possibility of developing the site in the future when the land is needed. In some cases, the owners may not sell at all. This option would not give the State control over the park implementation process.

The uncertainty concerning the State's acquisition of private properties proved stressful to some community residents, and, consequently, community members filed a petition for deletion of BLNR's Order of November 1987. The petitioners based their request for a declaratory ruling on the grounds that: 1) the 1987 Order was nearly ten years old and the State had not acted on the Order, 2) the 1987 Order was in furtherance of appropriations which had lapsed, and no new funds had been appropriated, 3) BLNR had completed neither the planning nor the EIS and, as such, the 1987 Order was premature, 4) the 1987 Order was inconsistent with the State Recreation Functional Plan which calls for acquisition of undeveloped lands, and 5) the existence of the 1987 Order damages the petitioners by clouding title to and blighting the value of their properties.

The uncertainty was alleviated by the BLNR on June 5, 1998, when BLNR chose to rescind its November 1987 Order. At the time the Order was rescinded, an understanding was reached between BLNR and the landowners. The landowners understood that BLNR's rescission did not preclude a future condemnation if funds become available, and that any future action to acquire by condemnation would include the preparation and processing of an EIS to fully describe the impacts of condemnation. In addition, the landowners requested, and BLNR agreed to, the removal of all references to, and/or
clarification of, the acquisition of private property in the pending Final EIS for expansion of the Hapuna Beach State Recreation Area.

In addition, BLNR desired to maintain the status quo of private property land use at Wailea Bay, meaning that landowners should not be allowed to upzone their property so as to increase its value. To guarantee that this would not occur, BLNR asked for, and the landowners agreed to, the imposition of a 15-year covenant on their parcels that: 1) restricts development to conform to what is currently allowed today, and 2) prohibits zoning change for a period of 15 years. A Unilateral Agreement and Declaration was prepared and executed and recorded as a property covenant document.

**Proposed Mitigation**

Various management and onsite park staffing arrangements could be developed to ensure public safety, continued and improved maintenance, and conservation of natural resources. Specific recommendations that may be important to Wailea Bay include:

- Monitoring of beach activities by lifeguards (daytime only);
- Using DOCARE personnel to periodically patrol the park during daytime hours, monitoring user activities, advising park users, enforcing park rules, as well as coordinating emergency responses with the park's water safety director and County Fire and Police Departments;
- Preparing interpretative education materials on water safety, fire hazard precautions, and potential coastal and surface runoff flood conditions for park users; and
- Scheduling and performing regular preventative maintenance for all park facilities.

It is believed that implementation of these recommendations will significantly address Wailea residents' concerns for public safety, maintenance, and resource conservation. Night security may need to be provided if adverse night activities become evident in the park. Such security may involve periodic low-profile night patrols by park security personnel or the use of security lights and emergency telephones.

The uncertainty of the acquisition of the Wailea Bay private properties was alleviated by BLNR's action to rescind its 1987 Order. In the future, however, should funds for acquisition become available, BLNR will prepare and process an EIS to address the impact of acquisition of the private properties. Thus, the community will be apprised of any pending State action to acquire the properties.

During any future acquisition process, the State Parks Division will comply with Chapter 111, HRS, to assist persons who are displaced by the government's planned actions. Benefits provided by this program include, among others, relocation payment, replacement housing payment, and relocation assistance services. These payments and services are designed to assure that the relocation process offers needed assistance and reduce hardship to those affected as well as to reduce delays in the proposed project.
Details on the relocation plan will be provided by the State Parks Division during the first stages of project implementation.

3.12 INFRASTRUCTURE AND PUBLIC SERVICES/FACILITIES

3.12.1 Roads and Traffic

3.12.1.1 Existing Conditions

Access to the Hapuna Beach State Recreation Area is provided by Queen Ka‘ahumanu Highway, Hapuna Beach Road, and Puako Spur Road. The old Kawaihae-Puako Road traverses the interior of the property and connects Hapuna Beach Road and Puako Spur Road.

Queen Ka‘ahumanu Highway stretches approximately 33 miles across the South Kohala and North Kona Districts of West Hawaii and connects with the harbor community of Kawaihae and the major coastal town of Kailua-Kona. From Palani Street in Kailua-Kona, Queen Ka‘ahumanu Highway continues south another 2-1/2 miles until it merges with Kuakini Highway, a secondary regional right-of-way that leads to Keauhou and Honalo.

Queen Ka‘ahumanu Highway carries traffic that have direct origins and/or destinations at Keahole International Airport, Honokohau Small Boat Harbor, Kawaihae Harbor, Kailua-Kona, Mauna Kea Beach Resort, Mauna Lani Resort, Waikoloa Beach Resort, Waikoloa Village, Kona Village Resort, Kona Industrial Center, and Kaloko Industrial Center, among others. The two-lane, two-way State highway has a right-of-way width of approximately 350 feet. This wide dimension, especially at the park site and on points south, is intended to accommodate future widening. Each travel lane measures 12 feet across, and is accompanied by ten-foot-wide stabilized shoulders. The posted speed limit varies between 35 mph and 55 mph.

The State Department of Transportation (DOT) has been requiring new major developments to provide channelized intersections at access points along the highway.

The Hapuna Beach Road which was the original connector between the first completed segment of the Queen Ka‘ahumanu Highway and the old Kawaihae-Puako Road is now the permanent access to the existing Hapuna Beach State Recreation Area. It is a State road that has a 24-foot-wide, two-lane pavement within a 80-foot-wide right-of-way. The surface of the pavement is extensively worn.

The two-lane Puako Spur Road originates at the Queen Ka‘ahumanu Highway and extends southwest approximately three miles to the northern border of the Mauna Lani Resort. It converts from a State right-of-way to a County right-of-way at the old Kawaihae-Puako Road intersection. The County segment of the road, which has an 18-foot width, is known as the Puako Beach Road. Approximately 170 residential lots abut this road, about half of which are oceanfront. The residences of this area comprise the Puako Beach Lots residential community.
The old Kawaihae-Puako Road extends laterally across the project site at approximately the 80-foot elevation and is the original coastal road that provided access from Kawaihae to the Puako Beach Lots. Its pavement width varies from 10 to 16 feet. The Queen Ka‘ahumanu Highway and Puako Spur Road now provide access to the Puako area. As a result, the old Kawaihae-Puako Road is seldomly used and currently serves as access to the Wailea Beach residential lots, Wailea Beach, and Beach 68. Its condition is poor and requires resurfacing. The alignment is typical of old roads that were designed before the use of modern County standards.

A 20-foot-wide existing easement provides access over State land from the Kawaihae-Puako Road to the residential lots at Wailea Bay. A second easement is being established by the State to provide property owners access to the residential lots on the northern side of the bay.

3.12.1.2 Existing Traffic

Traffic counts on Queen Kaʻahumanu Highway-Hapuna Beach Road and Queen Kaʻahumanu Highway-Puako Spur Road intersections were taken by Pacific Planning & Engineering, Inc. (Appendix H) from 2:30 to 5:00 pm on January 25, 1994, and from 6:00 to 8:30 am on January 26, 1994 (Figure 3-9 shows the configuration of the laneage at the two intersections). These surveys coincide with the peak traffic volume periods that are available from the State DOT traffic data. The two intersections were analyzed because they represent critical legs of the roadway system and can indicate available roadway capacity to meet future demand. Figure 3-10 shows the traffic count results. Additionally, during the 1994 survey, the following traffic observations were made:

- Average speed on Queen Kaʻahumanu Highway around the project area ranged from 55 mph to 65 mph.
- Slow-moving heavy vehicles traveling along Queen Kaʻahumanu Highway used the shoulder to allow faster vehicles to pass.
- Vehicles along Queen Kaʻahumanu Highway usually arrive in platoons of three to seven vehicles.
- Mid-day observations of the Hapuna Beach park showed the parking lot to be approximately 75 percent full.

3.12.1.3 Projected Traffic Without the Proposed Project

Traffic projections without the proposed project were based on the following:

- Year 2020 land use data for the current update study of the Island of Hawaii Long-Range Highway Plan conducted by the State Department of Transportation. The forecasts from the study were not yet available at the time Pacific Planning & Engineering prepared its study, but land use data was made available for analytical purposes.
Figure 3-10
Hapuna Beach State Recreation Area Expansion
EXISTING PEAK HOUR TRAFFIC VOLUMES (1994)

LEGEND
Peak Hour Volumes
1234 Morning Traffic Volume
(1234) Afternoon Traffic Volume

• Year 2010 land use data from the original Island of Hawaii Long-Range Highway Plan completed in 1991.

• Year 2010 average daily traffic forecasts from the original Island of Hawaii Long-Range Highway Plan completed in 1991 for Queen Ka‘ahumanu Highway on sections adjacent to the project access points.

• 1994 State DOT traffic counts for Queen Ka‘ahumanu Highway. (Traffic counts are updated every two years; 1996 counts are to be taken later this year.)

• Directional and peak hour traffic factors derived from 1994 State DOT traffic counts.

• Trend analysis of State DOT counts on Queen Ka‘ahumanu Highway since 1976.

Traffic entering the Hapuna Beach Road intersection, without the proposed project, is expected to increase by 793 vehicles by 2010 and by 795 vehicles at the Puako Spur Road intersection by the same year. These figures represent an increase of approximately 98 percent over 15 years. Results of the projection are shown on Figure 3-11.

3.12.1.4 Projected Traffic With Project

Traffic projections with the proposed project were performed by adding the traffic associated with the planned Hapuna Beach State Recreation Area to the traffic projections without the project. The number of trips generated by the proposed project was based on:

• Rates from the ITE Trip Generation Report on golf courses,

• Trip rates derived from manual traffic counts on the recreational traffic in the area,

• Increased facility capacity of the proposed park expansion, and

• Total number of employees who would be working at the park headquarters.

The proposed project is estimated to contribute 161 vehicles during peak hour period at the Hapuna Beach Road intersection by 2010 and 151 vehicles at the Puako Spur Road intersection by the same year. This will increase the total traffic count entering the Hapuna Beach Road intersection to 1,765 vehicles and Puako Spur Road intersection to 1,764 vehicles by 2010. These increases represent a small gain (approximately 9 percent) over the projected traffic without the project. Figure 3-12 shows the projected traffic at the two intersections.

3.12.1.5 Traffic Analysis

Level of Service (LOS) traffic analyses were conducted for the Queen Ka‘ahumanu Highway—Hapuna Beach Road intersection, and the Queen Ka‘ahumanu Highway — Puako Spur Road intersection. The analyses were based on existing roadway geometrics and methods outlined in the Highway Capacity Manual (Special Report 209, 1985) for unsignalized intersections. The LOS for unsignalized intersections is determined by the
LEGEND
Peak Hour Volumes
1234 Morning Traffic Volume
(1234) Afternoon Traffic Volume


Figure 3-11
Hapuna Beach State Recreation Area Expansion
YEAR 2010 WITHOUT PROJECT - PEAK HOUR TRAFFIC VOLUMES
Figure 3-12
Hapuna Beach State Recreation Area Expansion
YEAR 2010 WITH PROJECT - PEAK HOUR TRAFFIC VOLUMES

LEGEND
Peak Hour Volumes
1234 Morning Traffic Volume
(1234) Afternoon Traffic Volume


NORTH Belt Collins Hawaii
amount of reserve capacity for each turning movement. The reserve capacity is the number of vehicles that could proceed through a conflicting traffic stream. The LOS for unsignalized intersections is classified into six categories ranging from little or no delays (LOS A) to extreme delays (LOS F). Table 3-14 describes each LOS in detail.

Table 3-15 presents the results of the traffic analyses in terms of LOS. In summary, traffic without the project by the year 2010 at the Hapuna Beach Road intersection is expected to operate with long delays or at LOS E. At the Puako Spur Road intersection, movements are expected to operate similarly with long delays (LOS E). The LOS for the two intersections is currently at D or better.

With the project, vehicular counts will be slightly greater than without the proposed project at the two intersections. Motorists exiting the planned golf course are expected to experience long delays (LOS E). Further analyses of the two intersections were undertaken to identify improvements to mitigate adverse traffic impacts. The first analysis assumed the State Department of Transportation would implement its plan to widened Queen Ka‘ahumanu Highway from two lanes to four lanes, with an interim program to provide passing lanes in each direction by 2004. Results of the analysis showed that the LOS for the intersection with and without the project would be the same as the LOS for the intersection without the highway widening improvements (Table 3-16).

The second analysis incorporated signalization with the four-lane Queen Ka‘ahumanu Highway at the two intersections. Results of this analysis, as provided in Table 3-17, showed that the LOS for the two intersections would improve to C or better from E or F, with or without the project by the Year 2004. Thus, signalization would significantly improve the flow of traffic through the intersections.

3.12.1.6 Study Conclusions

Based on findings in the 2010 Traffic Impact Assessment Report for Hapuna Beach State Recreation Area Expansion (Pacific Planning & Engineering, February 1995), the proposed project will not have a significant impact on roadway systems in the area. By 2010, when the proposed Hapuna Beach State Recreation Area Expansion is completed, traffic flow on Queen Ka‘ahumanu Highway and the two intersections will be at levels that may warrant improvements, with or without the project. In other words, the proposed project will only slightly increase the number of vehicles on the roadways and thus, is not the major reason for the growth in traffic in the area.

The planned expansion of Queen Ka‘ahumanu Highway from two to four lanes, as set forth by the State Department of Transportation (DOT), is not expected to significantly mitigate projected traffic impacts. With signalization at the Queen Ka‘ahumanu Highway-Puako Spur Road and Queen Ka‘ahumanu Highway-Hapuna Beach Road, a significant improvement in the flow of traffic is expected. Additionally, full channelization with exclusive left-turn lanes and acceleration and deceleration lanes at the proposed golf course access road/Queen Ka‘ahumanu Highway intersection would further improve traffic flow. These alternatives, however, are not in the State DOT’s plans and implementation of these alternatives would require DOT approval.
### Table 3-14  Descriptions of Levels of Service (LOS) for Unsignalized Intersections

<table>
<thead>
<tr>
<th>LOS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS A</td>
<td>Free flow conditions</td>
</tr>
<tr>
<td>LOS B</td>
<td>Stable flow; presence of other users in the traffic stream begins to be noticeable</td>
</tr>
<tr>
<td>LOS C</td>
<td>Stable flow; operation of individual users becomes significantly affected by interaction with others in the traffic stream</td>
</tr>
<tr>
<td>LOS D</td>
<td>High density but stable flow</td>
</tr>
<tr>
<td>LOS E</td>
<td>Operating conditions at or near capacity</td>
</tr>
<tr>
<td>LOS F</td>
<td>Forced or breakdown flow; amount of traffic approaching a point exceeds the amount which can traverse the point</td>
</tr>
</tbody>
</table>

### Table 3-15  Unsignalized Intersection Analysis of Two Intersections

<table>
<thead>
<tr>
<th>Roadway and Turn Movements</th>
<th>1994 Existing</th>
<th>2010 Without Project</th>
<th>2010 With Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection of Queen Ka‘ahumanu Highway and Hapuna Beach Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hapuna Beach Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound</td>
<td>LT</td>
<td>B (D)</td>
<td>E (E)</td>
</tr>
<tr>
<td></td>
<td>RT</td>
<td>A (A)</td>
<td>B (C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (F)</td>
<td>B (C)</td>
</tr>
<tr>
<td>Queen Ka‘ahumanu Highway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>LT</td>
<td>A (A)</td>
<td>A (A)</td>
</tr>
<tr>
<td>Intersection of Queen Ka‘ahumanu Highway and Puako Spur Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puako Spur Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound</td>
<td>LT/TH</td>
<td>B (D)</td>
<td>E (E)</td>
</tr>
<tr>
<td></td>
<td>RT</td>
<td>A (A)</td>
<td>B (C)</td>
</tr>
<tr>
<td></td>
<td>LT/TH/RT</td>
<td>A (A)</td>
<td>E (E)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (F)</td>
<td>B (C)</td>
</tr>
<tr>
<td>Westbound</td>
<td>LT/TH/RT</td>
<td>A (A)</td>
<td>E (E)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (F)</td>
<td>B (C)</td>
</tr>
<tr>
<td>Queen Ka‘ahumanu Highway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>LT</td>
<td>A (A)</td>
<td>A (A)</td>
</tr>
<tr>
<td>Southbound</td>
<td>LT</td>
<td>A (A)</td>
<td>A (A)</td>
</tr>
<tr>
<td>Intersection of Queen Ka‘ahumanu Highway and Golf Course Access Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golf Course Access Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westbound</td>
<td>LT/RT</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Queen Ka‘ahumanu Highway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southbound</td>
<td>LT</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Notes:
- AM - Morning Peak Period
- PM - Afternoon Peak Period
- LT - Left Turn
- RT - Right Turn
- TH - Through

MAY 2001
### Table 3-16  Unsigned Intersection Analysis with 4-Lane Queen Ka’ahumanu Highway

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2004 Without Project</th>
<th>2004 With Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway and Turn Movements</td>
<td>AM (PM)</td>
<td>AM (PM)</td>
</tr>
<tr>
<td><strong>Intersection of Queen Ka’ahumanu Highway and Hapuna Beach Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hapuna Beach Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound</td>
<td>LT</td>
<td>E (F)</td>
</tr>
<tr>
<td></td>
<td>RT</td>
<td>A (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B (D)</td>
</tr>
<tr>
<td>Queen Ka’ahumanu Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>LT</td>
<td>D (E)</td>
</tr>
<tr>
<td><strong>Intersection of Queen Ka’ahumanu Highway and Puako Spur Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puako Spur Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound</td>
<td>LT/TH/RT</td>
<td>F (F)</td>
</tr>
<tr>
<td></td>
<td>LT/TH/RT</td>
<td>F (F)</td>
</tr>
<tr>
<td></td>
<td>RT</td>
<td>B (D)</td>
</tr>
<tr>
<td></td>
<td>RT</td>
<td>B (D)</td>
</tr>
<tr>
<td></td>
<td>LT/TH/RT</td>
<td>E (B)</td>
</tr>
<tr>
<td></td>
<td>LT/TH/RT</td>
<td>E (B)</td>
</tr>
<tr>
<td>Westbound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LT</td>
<td>D (E)</td>
</tr>
<tr>
<td></td>
<td>LT</td>
<td>D (E)</td>
</tr>
<tr>
<td>Queen Ka’ahumanu Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>LT</td>
<td>D (E)</td>
</tr>
<tr>
<td>Southbound</td>
<td>LT</td>
<td>D (D)</td>
</tr>
<tr>
<td><strong>Intersection of Queen Ka’ahumanu Highway and Golf Course Access Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golf Course Access Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westbound</td>
<td>LT/RT</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (E)</td>
</tr>
<tr>
<td>Queen Ka’ahumanu Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southbound</td>
<td>LT</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E (E)</td>
</tr>
</tbody>
</table>

**Notes:**
- AM - Morning Peak Period
- (PM) - Afternoon Peak Period
- LT - Left Turn
- RT - Right Turn
- TH - Through
Table 3-17  Signalized Intersection Analysis

<table>
<thead>
<tr>
<th>Project</th>
<th>2010 With Project AM/PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen Kaʻahumanu Highway with Puako Spur Road</td>
<td></td>
</tr>
<tr>
<td>Queen Kaʻahumanu Highway Northbound Approach</td>
<td>B (B)</td>
</tr>
<tr>
<td>Queen Kaʻahumanu Highway Southbound Approach</td>
<td>A (B)</td>
</tr>
<tr>
<td>Puako Road Eastbound Approach</td>
<td>C (C)</td>
</tr>
<tr>
<td>Puako Road Westbound Approach</td>
<td>C (C)</td>
</tr>
<tr>
<td>Puako Road Overall Intersection</td>
<td>B (B)</td>
</tr>
<tr>
<td>Puako Road Ave. Delay per Vehicle (seconds)</td>
<td>5.72 (8.35)</td>
</tr>
<tr>
<td>Puako Road Volume/Capacity</td>
<td>0.55 (0.56)</td>
</tr>
<tr>
<td>Queen Kaʻahumanu Highway with Hapuna Beach Road</td>
<td></td>
</tr>
<tr>
<td>Queen Kaʻahumanu Highway Northbound Approach</td>
<td>A (A)</td>
</tr>
<tr>
<td>Queen Kaʻahumanu Highway Southbound Approach</td>
<td>B (B)</td>
</tr>
<tr>
<td>Hapuna Beach Road Eastbound</td>
<td>C (C)</td>
</tr>
<tr>
<td>Hapuna Beach Road Overall Intersection</td>
<td>B (B)</td>
</tr>
<tr>
<td>Hapuna Beach Road Ave. Delay per Vehicle (seconds)</td>
<td>9.32 (9.57)</td>
</tr>
<tr>
<td>Hapuna Beach Road Volume/Capacity</td>
<td>0.47 (0.52)</td>
</tr>
</tbody>
</table>

Since the State’s planned expansion of Queen Kaʻahumanu Highway is part of a long-range plan, possible short-term traffic mitigation measures may be considered and are identified below:

- Full shuttle service between the resorts in South Kohala and the airport;
- Coordination of opening hours amongst the different South Kohala-North Kona businesses and public facilities; and
- Carpooling or ridesharing for employees.

These measures are designed to be coordinated with other development projects in the region to produce an effective solution. Implementation of these measures would be a relatively inexpensive way of reducing traffic impact on roadways until permanent improvements are implemented.

3.12.1.7 Summary

In summary, traffic without the project by the year 2010 at the Hapuna Beach Road intersection is expected to flow quite smoothly except for one turning movement. This movement, which consists of the Hapuna Beach Road traffic turning left onto Queen Kaʻahumanu Highway, will experience long delays or LOS E during the peak hour of the
day. This peak period generally occurs from 2:00 pm to 4:30 pm. Similarly, at the Puako Spur Road intersection, traffic on Queen Ka‘ahumanu Highway will flow with few delays, but left turn movements from the Puako Spur Road onto the highway and through movements across the highway will experience long delays or LOS E during peak periods. The LOS for the two intersections is currently at “A,” with left turn movements onto the highway at “D”.

Traffic with the project at the two intersections will be slightly higher than the traffic without the project by 2010. Overall, traffic flows will have few delays, as LOS A or B is projected. However, the left turn movements from the Hapuna Beach Road and Puako Spur Road onto Queen Ka‘ahumanu Highway will experience very long delays (LOS F). Exiting traffic from the new golf course access road also will experience long delays (LOS E) during the peak period.

**Improvement Analysis**

While the number of vehicles generated by the proposed project is relatively small, the future traffic conditions on Queen Ka‘ahumanu Highway, which takes into account regional growth, will be such that the turning movements out of the project roadways will incur delays, particularly during the afternoon peak period. A major issue in previous forecasting studies was the potential need to widen Queen Ka‘ahumanu Highway. While the results of these studies indicate that future widening of the highway will be needed, widening was not projected to be necessary before or during the year 2010.

Based on the *Highway Capacity Manual* Special Report 209 (Transportation Research Board National Research Council, 1985) and the assumption of an ideal capacity of 2,800 vehicles per hour (vph), the two-lane Queen Ka‘ahumanu Highway (at a projected future volume of 1,625 vph) will operate at LOS D during the afternoon peak period with the project. The only movement that would deteriorate below LOS D and would require mitigation is the left turn movement out of the project area. With signalization, the intersection traffic flow would improve dramatically; all movements would operate at LOS C or better (see Table 3-20).

**Conclusions and Recommendations**

The proposed Hapuna Beach State Recreation Area Expansion project will not have a significant impact on traffic in the project area. Traffic on Queen Ka‘ahumanu Highway will continue to increase as a result of population growth in the region. The proposed project will generate approximately 316 vehicles through the two park access roads during the afternoon peak-hour period. This addition represents less than ten percent of the total traffic in the area for the year 2010. By that year, Queen Ka‘ahumanu Highway is expected to operate at LOS D. Motorists entering and exiting the project access roads will experience long to very long delays (LOS E to F). Similar traffic conditions are expected to be experienced at other intersections along the highway.

The traffic forecasts are based on future land uses as provided in the year 2020 update study to the State Department of Transportation’s Island of Hawaii Long Range Highway Plan. The original study called for the expansion of Queen Ka‘ahumanu Highway to a
four-lane divided highway with possible frontage roads. Updated traffic projections, however, show a reduction in traffic volumes. This may be a reflection of less anticipated development in the region and the current sluggish economic situation on the island. Additionally, some major projects are now excluded in the 2020 update study. Thus, the forecast for 2010 is much lower than previous traffic forecasts and highway improvements hence would be less urgently needed.

To improve access to and from the proposed park expansion area, the following have been recommended by the traffic consultant. These improvements should be considered in light of the growth in the region and its contribution to the overall traffic increase on the local highways.

- Signalize the intersections of Hapuna Beach Road and Puako Spur Road with Queen Ka‘ahumanu Highway at a time when traffic controls are warranted. This would not necessarily be tied to the improvements in the park expansion but to the growth in traffic generated by the regional population. If signalized, the intersections will operate at LOS B during the afternoon peak period, and even better during lower traffic volume hours.

- For the intersection at Queen Ka‘ahumanu Highway and the golf course access road, provide a fully channelized intersection with exclusive left turn lanes and acceleration and deceleration lanes.

### 3.12.2 Utilities

#### 3.12.2.1 Water

**Existing Conditions**

A 12-inch water transmission line is located along Queen Ka‘ahumanu Highway and Puako Spur Road. The transmission line along Puako Spur road is available to serve the Hapuna Beach State Recreation Area. The source of this water is the County's Lalamilo water system that consists of four wells (total 3.9 million gallons per day (mgd) maximum day capacity), four storage tanks (0.1 mg, 0.5 mg, 1.0 mg, and 1.0 mg), and a 17,000-foot transmission line (12-inch diameter and 18-inch diameter) that connects the wells at the 1,100 to 1,200-foot elevation in the Lalamilo Land Tract to the transmission line along the Queen Ka‘ahumanu Highway (Figure 3-13).

The Hapuna Beach State Recreation Area is serviced by the County system at the property's north entrance road. A pressure reducing valve is located along Queen Ka‘ahumanu Highway, and a meter box is located at the entrance to the parking area along the old Kawaihau-Puako Road. Lateral lines from the system connect with the existing caretaker's residence, overnight cabin facilities, comfort stations, and food concession building. In 1996, potable water demand at the State park was 15,000 gallons per day (gpd) on weekdays and 57,000 gpd on weekends.
A brackish well located above the beach park and in the proposed golf course site, currently provides irrigation water to the park facilities via a distribution line across Queen Ka‘ahumanu Highway. The Division of State Parks drilled and developed the well in 1970, and its water, which has a chloride content of 420 to 430 parts per million, is good only for irrigation. Current usage is about 5,000 gpd which is limited by the size of its connecting water tank.

**Potential Impacts and Proposed Mitigation**

The proposed park improvements will generate an average daily water demand of approximately 28,800 gpd on weekdays and 52,650 gpd on weekends. The demand will be generated from the proposed golf clubhouse, beach park area, camping sites, picnic areas, and park support facilities. Beach and camping activities would be the largest users, accounting for a combined 75 percent of the water demand.

The Lalamilo water system presently cannot accommodate the proposed park expansion. The County’s allocation from this system is currently fully utilized. The other allocations are to the Mauna Kea Resort and Mauna Lani Resort, which shared in the financing of the system’s initial development. Thus, the proposed park expansion will require development of a new well in the existing Lalamilo well field with a connection to the County system at one of the existing wells. The water quality of this source does not require a water treatment facility.

In the park area, a new 6-inch water line will be required along the proposed old Kawaihane-Puako Road realignment to connect the two existing 12-inch transmission mains along the park’s north entrance road and Puako Spur Road. The approximately 7,000-foot line would be an extension of the Lalamilo water system (Figure 3-14).

There is a perception in the community of insufficient water in the South Kohala region. The County has often notified Waimea residents of drought conditions and requested them to undertake water conservation practices. Notably, Waimea is served by a surface water system that is more susceptible to variations in the region’s weather, compared to the steady, reliable, long-term recharging conditions of the area’s groundwater network. Waimea depends on the surface water system because wells are more difficult to develop at high elevations. Wells are much easier to develop at Lalamilo, which has a lower elevation of 1,200 feet.

Information on groundwater in South Kohala is generally scarce and not precise. There is one study, however, that provides an overview of existing hydrological conditions in the region. In a December 1991 draft of the Hawaii County Water Use and Development Plan prepared for the Department of Water Supply, it was estimated that the South Kohala groundwater aquifer, which comprises the Waimea and ‘Anaeho‘omalu hydrological sectors, has a sustainable yield of 54 mgd. This aquifer includes the areas of Waimea, Kawaihane, Waikoloa, Puako, the South Kohala resorts, and the west slopes of Mauna Kea

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3 The Lalamilo water system was developed jointly by the State of Hawaii, Mauna Kea Properties, Inc., and Mauna Loa Land, Inc. (predecessor to Mauna Lani Resort, Inc.) to accommodate future water needs of the two South Kohala Resorts and adjacent lands.
CHAPTER THREE

HAPUNA BEACH STATE RECREATION AREA EXPANSION
FINAL ENVIRONMENTAL IMPACT STATEMENT

and northwest slopes of Mauna Loa. Since this sustainable yield is an estimate, its reliability is subject to further data support and documentation.

From 1995 records compiled by the State Commission on Water Resource Management, the current usage in the region is about 6.3 mgd. This amount is well within the limits of the region’s sustainable yield.

Still, the best available hydrological information for the project area is the data records from the existing potable wells at the 1,200-foot elevation of the La‘amilo land tract. These wells have been the most successful and have provided the best feasible option for additional source development in South Kohala. Each of the three largest wells in this field is capable of producing approximately 1.4 mgd.

Even better hydrological information would come from the results of test drilling for the potable water. Test drilling, however, is usually done when a project is in the latter stages of planning and in the project design phase. It would be premature to incur the high cost of test drilling a well during the present stage in the absence of entitlements for the park improvements.

In addition to the potable water that will be required for domestic use, irrigation water will be required for the landscaping in the expanded park grounds and golf course fairways. The irrigation requirements are estimated to be 650,000 gpd. Ninety-two percent of this demand, or approximately 600,000 gpd, would be for the fairway links.

To meet this demand, a rehabilitation of the existing brackish well (elevation 224 feet) and development of two new wells within the golf course will be undertaken. It is anticipated that additional wells at this elevation would produce similar results. Open reservoirs, which also will be located within the golf course and designed as part of the landscape features, will serve as storage for the irrigation water. The irrigation system will be maintained by the golf course operator.

Operating additional irrigation wells in this area would create a drawdown in the groundwater that could affect the production of the other wells in the immediate vicinity. The risk of this occurring, however, may be minimized if the new well is developed more than 1,000 feet from the existing wells. The current concept plan shows the new wells with at least that distance. Irrigation wells of other property owners in the vicinity are located more than 1,000 feet from the project well (the nearest is Mauna Kea Resort’s well, which is more than 4,000 feet from Hapuna’s well).

Furthermore, there is a potential for drawdowns to pull saltwater into the pumping site and affect the quality of irrigation water. If the salinity level is too high, there may be an adverse effect on the park’s proposed landscaped areas. As provided in the Murdoch and Green study (Appendix E), control of water use rate according to climatic elements (solar irradiation, temperature, relative humidity and wind speed) and the use of an appropriate type of soil and grass are some of the measures that could be used to reduce the impact of salt content in irrigation water. Periodic site flushing with potable water would also be beneficial.
As an alternative, better quality water could be obtained at higher elevations within the same State land tract; however transmission of the water to the project site would then be a consideration.

3.12.2.2 Sewer

Existing Conditions

There is no public sewage collection system in the South Kohala District. Existing sewer systems consist of cesspools, septic tanks, and private collection and treatment facilities. At the existing park site, septic tanks or cesspools accommodate the present concession, comfort stations, and caretaker's residence. Drainage from the outdoor showers flow onto grass and beach areas.

Potential Impacts and Proposed Mitigation

The proposed park expansion and golf clubhouse are expected to generate approximately 18,000 gpd of wastewater flow on weekdays and 33,250 gpd on weekends. Approximately 45 percent of this flow will be generated by beachgoers.

The majority of the wastewater flow from the park expansion will be disposed primarily into individual wastewater disposal units such as septic tanks.

Existing disposal units will be upgraded to current Department of Health standards. When a public sewer collection system becomes available in the area, the park wastewater disposal system will be redesigned to connect with the new County system.

Individual disposal units will be installed away from the shoreline, most of them 1,000 feet or more from the ocean and on high ground, where percolation to ground water would occur over a longer period of time. The golf clubhouse wastewater disposal unit will be located more than 3,000 feet from the shoreline. Adverse impact to the marine waters is not anticipated.

Additionally, a preliminary agreement has been made with the adjacent Mauna Kea Resort that will allow the State to convey up to 8,000 gpd of wastewater to the resort's wastewater treatment facility (WWTF). The flow will be transported to the WWTF via a new 6-inch line developed by the park (Figure 3-15).

3.12.2.3 Solid Waste Collection

Existing Conditions

Refuse is collected daily by State employees and deposited at the Puako transfer station on the southern boundary of the Hapuna Beach State Recreation Area Expansion site. County trucks then haul the garbage to the Pu‘u‘anahulu landfill which replaced the Kealakehe landfill in October 1993. The 300-acre County site, which contains 150 acres for landfill purposes, currently serves 12 transfer stations and an area that extends from Laupahoehoe on the north coast to Kapa‘au in North Kohala and Waiohinu at South Point.
Potential Impacts and Proposed Mitigation

It is estimated that park users will generate approximately 2,500 pounds of garbage per day, and the golf course and clubhouse facilities will generate approximately 900 pounds per day. All solid waste from the proposed Hapuna Beach State Recreation Area Expansion will be taken to the Pu‘uanahulu landfill which initially was projected to have a life of about 150 years if it served only West Hawaii. If Hilo’s landfill operation is transferred to West Hawaii, the life of the Pu‘uanahulu facility would be reduced to approximately 70 years.

In conformance with the State goals for recycling solid waste under the general provisions of Chapter 342G, HRS, State Parks will establish for Hapuna Beach State Recreation Area a recycling program involving separate receptacles or collection bins for cans and bottles. The contents of these bins will be delivered to a recycling contractor. The rest of the trash will be taken to the nearest County landfill at Pu‘uanahulu. Grass and other landscape cuttings, particularly from the golf course, will be collected, composted, and then recycled as a soil conditioner.

3.12.2.4 Electrical Service

Existing Conditions

Hawaii Electric Light Co., Inc.’s (HELCO) electrical transmission system on the Big Island consists primarily of 69 kilovolt (KV) lines, but two areas—Puna and North Kohala—are served by lines with 34.5 KV capacity. Most areas on the island have a looped system that allows an alternate feed to the user when storms or accidents damage a section of a transmission line.

With a 69-KV line connecting the Waikoloa substation with the Waimea-Kawaihae line, a looped service is provided to the South Kohala District. This significantly increases the reliability of service to the coastal areas. Since the proposed Hapuna Beach State Recreation Area lies adjacent to this looped service, power outages are expected to be rare.

An overhead 12.47 KV, 3-phase transmission line runs along the Queen Ka’ahumanu Highway, Hapuna Beach State Recreation Area north entrance road, and old Kawaihae–Puako Road (Figure 3-16). A substation in Kawaihae and above the Puako Spur Road (Mauna Lani Substation) connects into this loop system. Service lines from the transmission line hook up with facilities within the park, including the caretaker’s residence, park maintenance building, and A-frame cabin facilities. A service line is available at the concession, but no connection has been made.

Several power plants across the island feed into this utility system; the nearest are the Waimea and Keahole plants. Both plants presently use diesel fuel for power generation.

To accommodate increased demands in the region, HELCO is planning to expand its Keahole plant from 30 megawatts to 88 megawatts.
Plans are also being proposed by a private enterprise to construct a power and desalination plant in Kawaihae. The proposed 58-megawatt plant would provide the needed electrical power to serve the Department of Hawaiian Home Lands' planned residential community above Kawaihae.

**Potential Impacts and Proposed Mitigation**

The estimated power requirement for the proposed park expansion is 495 kilowatts (KW) per day. Electrical service will be required for buildings and limited outdoor lighting in the park area and parking lot.

Overhead utility lines will be installed to service the beach and park recreational areas, and underground lines will be provided to service the golf course and golf clubhouse.

The projected electrical power consumption for the project is based on current usage. It does not take into account energy conserving design features that could be incorporated into the project, such as waste heat recovery from air conditioning and refrigeration, solar water heating, natural ventilation and lighting, wind-powered generators for deep water supply wells, or on-site photo-voltaic systems. The feasibility of these and other methods may be considered at the time the new park facilities are in the design phase.

3.12.2.5 Telephone

**Existing Conditions**

Verizon Hawaii currently provides telephone service to the project site from the Queen Ka'ahumanu Highway and Hapuna Beach State Recreation Area north entrance road. The telephone line extends along the old Kawaihae–Puako Road and Puako Beach Road to serve the Waikua Beach house lots and Puako Beach Lots. A telephone substation along Queen Ka'ahumanu Highway near Waiaulaula Gulch connects the telephone system with the other regions of the island.

Telephone service in the existing park currently serves the caretaker's residence, park concession, and two public booths in the parking lot.

**Potential Impacts and Proposed Mitigation**

The proposed expansion will require new lines in the makai section of the park to serve the park headquarters and other new facilities. They will be installed on poles along the makai side of Queen Ka'ahumanu Highway and underground within the park site itself. The golf clubhouse and maintenance facilities will be connected with the Queen Ka'ahumanu Highway telephone line by a new underground service line.

A request for the expanded service will be made to the telephone company during the project design stage.
3.13 PUBLIC SERVICES AND FACILITIES

3.13.1 Health Care

3.13.1.1 Existing Conditions

West Hawaii has four health care and emergency facilities which provide a range of medical services. Two State-operated hospitals serve the Kohala area—the Kohala Hospital in Kapa‘au and the Honokaa Hospital in Honokaa. The Kohala Hospital is primarily a long-term care institution which also offers 24-hour emergency care service. Staffed by five physicians, the facility has 8 acute-care beds and 18 long-term care beds. To accommodate increased demand for additional beds, Kohala Hospital is planning to add a new 20-bed wing to its facility. Financing has been obtained for planning, and construction will begin when funding becomes available.

There are 30 beds in the Honokaa Hospital, 22 for acute-care patients and 8 for long-term care. The hospital is staffed by 11 physicians and is equipped with laboratories, x-ray facilities, and ambulance service. Neither the Kohala Hospital nor the Honokaa Hospital is equipped to provide full patient services, and Honokaa is considered primarily an acute-care facility.

The State-operated Kona Hospital is a full-service health care center located in Kealakekua, about 41 miles south from Hapuna Bay. It has 53 acute-care beds, 22 beds for long-term care, and an active staff of 55 physicians. The hospital is currently in an expansion program that will provide additional beds, new medical equipment and renovation of existing facilities to meet the growing demand for medical services in the region. Funding has already been appropriated for this expansion program.

In Waimea, the private Lucy Henriques Medical Center provides outpatient health care, including emergency room, laboratory, and radiology services. Currently, seven physicians staff the 24-hour emergency care facility. The North Hawaii Community Hospital opened a few years ago on the grounds of the Lucy Henriques site. The new 50-bed complex provides in-patient acute health care services.

3.13.1.2 Potential Impacts and Proposed Mitigation

There is a diversity of medical facilities in the region. Most of the medical centers are undergoing expansion and/or renovation to improve their quality and increase their capability to accommodate medical service demand in the area.

Hapuna Beach State Recreation Area visitors will be able to seek medical care at the Lucy Henriques Medical Center and new North Hawaii Community Hospital in Waimea, which are about 13 miles from the project site, or at any of the other hospitals in the Kohala and North Kona Districts.
3.13.2 Police Protection

3.13.2.1 Existing Conditions

Police service for the South Kohala District, which includes Waimea, Kawaihae, South Kohala coast and Waikoloa Village, is headquartered in Waimea. A staff of 23 officers and 4 administrative personnel operate from the 24-hour station.

Other stations are at Kapa'au in North Kohala and Kealakehe near Kailua-Kona. Both the Waimea and Kapa'au police stations are of relatively recent construction, and both have room for additional staff.

Office space is also located in the Kohala Coast Fire Station for police use. On-duty officers generally use the satellite office, which is located on Queen Ka'ahumanu Highway, to write reports, make bookings, and conduct interviews. They can remain on their beats longer without needing to return to headquarters. No permanent staff occupies the satellite office.

3.13.2.2 Potential Impacts and Proposed Mitigation

The proposed park expansion will generate a need for increased police service coverage in the Hapuna Bay and Wailea Bay areas. Routine patrols within the park, however, are not planned at this time. It is anticipated that County police services will be provided on an emergency or on-call basis.

During weekends and holidays, vehicular traffic in and out of the Hapuna Beach State Recreation Area will reach higher levels. With the increase in traffic along Queen Ka'ahumanu Highway, additional police service may be required for traffic-related matters.

Demands on County police services will be partially offset by on-site services provided by the park and golf course security personnel. Park managers and/or DOCARE security personnel, in addition to enforcing park rules, would be available to render emergency help or to call park headquarters for police assistance.

3.13.3 Fire Protection and Emergency Services

3.13.3.1 Existing Conditions

The South Kohala Fire Station on Queen Ka'ahumanu Highway currently serves the Kawaihae-South Kohala coastal area. The station is equipped with a fire engine, tanker truck and medic unit, and is staffed by a 24-hour crew of six firefighters and a paramedic who is qualified to provide advance life support service. Located 2-1/4 miles from the project site, the station can immediately respond to emergency calls at Hapuna.

Others stations in the region include the Waimea station, which has a full crew on duty 24 hours a day, and the Waikoloa Village Fire and Emergency Medical Interim Facility, which provides fire protection and basic life support emergency aid. Although the Waimea
station is located the farthest, it can respond to calls along the Kohala coast in about 20 to 25 minutes. Additional engines can be dispatched from North Kohala, if needed.

3.13.3.2 Potential Impacts and Proposed Mitigation

The proposed park expansion will result in a need for increased fire protection in the Hapuna-Wailea area of South Kohala. Increased overnight camping and camp fires, as well as daytime outdoor barbecues, may increase the potential for brush fires.

The Hapuna Beach State Recreation Area could institute park rules for camp fires and outdoor barbecues to encourage safe practice and make people mindful of potential hazards. The South Kohala Fire Station can respond to park area calls within a five-minute period. Roads and driveways within the park will be improved with the park expansion program; thus, the interior sections of the park will be more accessible to firefighting equipment. Improved areas of the park that contain large grass lawns will also act as possible fire breaks.

Hapuna beach also has an emergency phone with a direct 911 line to the police dispatch in Hilo. If needed, additional emergency phones could be installed within the park. All fire/emergency-related calls are routed also to the Hilo dispatcher who dispatches the distress call to the nearest fire station.

3.13.4 Harbors and Boat Ramps

3.13.4.1 Existing Conditions

Kawaihae Harbor, the only deep-water harbor in West Hawaii, is primarily used by interisland barges. It serves also as a recreational harbor. There are over 50 small boat moorings adjacent to the deep draft section of the port. Notably, the State and Corps of Engineers have plans to enlarge the moorings section to accommodate another 320 boats.

Honokohau Small Boat Harbor near Kailua-Kona serves commercial, charter, and recreational fishing and sail boats. There are currently over 250 small boat moorings at the facility and one small-boat launch ramp.

At Puako Bay, the State provides for public use a boat ramp, parking, and boat washdown area. Another boat ramp operated by the State is located in Mahukona.

3.13.4.2 Potential Impacts and Proposed Mitigation

Increased use of the expanded Hapuna Beach State Recreation Area would not increase the use of the Puako boat ramp. The activities in the park will be tied to the use of campgrounds, beach facilities, and a golf course. If the park expansion plan generates greater interest in boating and water sports, additional parking could be provided at the boat ramp site.
3.13.5 Parks and Recreation

Unless otherwise noted, the data presented in this section have been provided by Pedersen Planning Consultants in its Economic and Financial Analyses Hapuna Beach State Recreation Area Expansion, dated April 1995 (Appendix A).

3.13.5.1 Existing Conditions

**County Beach Parks**

There are 10 County of Hawaii beach parks in West Hawaii. According to the County of Hawaii, Department of Parks and Recreation, Kahaluu, White (Magic) Sands, and Spencer Beach Parks served almost 3,000 people per day in fiscal year 1992. Sunbathing was the predominant activity.

Hale Halawai Beach Park and Pahohoe Beach Park are located in Kailua-Kona and are popular with residents and visitors alike.

Significantly less activity occurs at Hookena Beach Park and Miloli’i Beach Park in South Kona. Use of Ho’okena Beach Park is increasing as a growing number of West Hawaii residents continue to seek less-crowded environments. Miloli’i is almost exclusively used by residents of Miloli’i village.

Spencer Beach Park in Kawaihae allows overnight tent camping and can accommodate approximately 68 persons. In addition, campsites are available at County beach parks at Mahukona, Kapa’a, Keokea, and Ho’okena, which on a combined basis can provide camping for 79 persons.

**State Parks**

Aside from Hapuna Beach, there are three other state beach parks in West Hawaii—Old Kona Airport, Kekaha Kai (Kona Coast), and Kealakekua Bay (Figure 3-17). The first two state beaches serve more than 1,900 people per day. A limited number of visitors and residents use Kealakekua Bay, which has also been designated as a State Marine Life Conservation District.

**Old Kona Airport State Recreation Area**

The 104-acre Old Kona Airport State Recreation Area includes a large community pavilion, two small picnic complexes, two restroom facilities, 15 picnic sites, and portions of the former airport runway that provides vehicular access and parking. Some 34 acres on the south end of the Old Kona Airport site are leased by the State to the County of Hawaii for its Kailua Park facilities.

Approximately 384,000 persons visit the park annually. Deducting the roughly 80,000 people who participated in County sports and cultural programs and informal activities over the year, the Old Kona Airport conceivably attracts as many as 304,000 persons per year or 833 people per day.
Figure 3-17
Hapuna Beach State Recreation Area Expansion
COASTAL RECREATIONAL OPPORTUNITIES, COUNTY OF HAWAII
The actual number of persons visiting the shoreline areas of the park are expected to be less than those visiting the park. Visual observations at the less-developed beach and shoreline areas suggest a limited use—less than 100 persons per day. Snorkeling and diving are popular at Pawai Bay, at the north end of the State Recreation Area. Limited shoreline fishing, picnicking, and sunbathing occur on the remainder of the Old Kona Airport's 1.5-mile shoreline. Local park caretakers say that the new Kekaha Kai (Kona Coast) State Park has caused a noticeable decline in the use of the Old Kona Airport.

Kekaha Kai (Kona Coast) State Park

Kaʻelehuluihulu Beach is located approximately ten miles north of Kailua-Kona. The shoreline extends approximately 1,000 feet immediately south of Mahalaula Bay. Facilities consist of 22 picnic tables, 10 portable toilets, and parking for about 70 vehicles.

The primary activity at Kaʻelehuluihulu Beach appears to be sunbathing. The presence of an extensive white sand beach relatively close to Kailua-Kona is believed to be the reason for its significant use. The State Park caretaker reports that park users are probably 50 percent visitors and 50 percent residents. Other activities include some shoreline fishing, skinboading, and bodyboarding.

Public response to the opening of this park to vehicular traffic in April 1992 was enormous. According to the State Park caretaker, peak usage has been over 1,000 vehicles per day. Sporadic vehicular counts conducted from May 7 through June 15, 1992, revealed that weekday attendance is more typically 150 to 350 cars, while weekend attendance ranges from 300 to 725 vehicles per day. Assuming that each car carries an average of two persons, Kaʻelehuluihulu Beach is already attracting approximately 700 people on weekdays and 1,450 people on weekend days.

3.13.5.2 Potential Impacts and Proposed Mitigation

The anticipated trends clearly indicate that an expanded Hapuna Beach State Recreation Area will continue to be a primary recreational attraction for both residents and visitors. West Hawai‘i has four State Recreation Areas (including Hapuna) and three of them are popular beach parks. If Hapuna is expanded, none of these parks will match the diversity of available recreational opportunities. With expanded recreational opportunities at Hapuna, crowding would be minimized at nearby beach parks.

3.14 AIR QUALITY

3.14.1 Existing Conditions

Air quality is measured or characterized by comparing ambient air concentrations of specific pollutants (carbon monoxide, nitrogen dioxide, sulfur dioxide, particulates, lead, and ozone) to state and national ambient air quality standards (AAQS). In Hawai‘i, national AAQS are generally met. The state is therefore in “attainment” with national standards. For local compliance, State AAQS have also been met, with only some pollutant concentrations exceeding the carbon monoxide standard. This is primarily the result of
heavy traffic volumes on major roadways which occur in Honolulu but generally not on the Island of Hawaii.

On the Big Island, the worst air pollution episodes have been due to the infrequent and unpredictable volcanic eruptions. While volcanic emissions are somewhat variable and have not been fully characterized, visibility is affected by the presence of fine particulates generated directly from volcanic activity as well as secondarily from forest or brush fires caused by lava flows. Substantial increases in the ambient concentrations of mercury and sulfur dioxide also have occurred as a result of volcanic eruptions.

3.14.2 Potential Impacts and Proposed Mitigation

In the short term, the only direct adverse air quality impact that would result from the proposed park expansion would be the emission of fugitive dust during site preparation and construction.

Construction activity involving heavy earthmoving equipment traversing unpaved surfaces will generate fugitive dust. State of Hawaii regulations stipulate that control measures should be employed to reduce fugitive dust emission. The effective wetting down of exposed soil areas is a measure that can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures that could be implemented include good housekeeping on the job site and paving or landscaping of bare soil areas as quickly as possible. This is especially advantageous for the project area which can easily generate dust under windy conditions.

Heavy construction equipment via engine exhaust will also emit air pollutants. However, the number and use of equipment will be minimal and short-term and will result in little impact to the existing air quality.

The project's long-term impacts on air quality are also expected to be minimal. No large stationary sources, such as manufacturing/industrial activities, County public works, or large agricultural burning operations, are associated with the project. Emissions from automotive traffic will be minimal and are not expected to exceed State or national ambient air quality standards. During the weekends and special events or holidays, traffic levels will be elevated in the parking areas for short periods of time. Generation of pollutant levels greater than the State carbon monoxide standard is possible under certain stagnant atmospheric conditions but is not likely.

Camp fires and open pit barbecues will emit particulate matter into the atmosphere but will not have a significant effect on the overall air quality of the area. In summary, no significant short-term or long-term adverse effects on air quality are expected as a result of the proposed action. During construction, fugitive dust will be generated but should be controlled as required by State regulations.

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* Less than ten percent of the vehicles projected at the intersections of Puako Spur Road-Queen Ka'ahumanu Highway and Hapuna Beach Road-Queen Ka'ahumanu are projected to be due to park use.
3.15 

NOISE

3.15.1 

Overview

The Federal Highways Administration (FHWA) has developed noise abatement criteria for various areas of activity. For recreational areas, such as Hapuna Beach State Recreation Area, FHWA's criteria includes a maximum hourly sound equivalent (Leq) of 67 decibels (db) and a maximum sound level of 70 db that can be exceeded ten percent of the time (L_{10}) (either Leq or L_{10} can be use on a project, but not both).

Another unit of measure, the Day-Night Sound Level (Ldn), is commonly used for measuring environmental noise and for relating the acceptability of the noise environment for various land uses. It represents the 24-hour average sound level for an average day, with nighttime noise levels (10:00 pm to 7:00 am) increased by 10 db prior to computation of the 24-hour average. Federal agencies such as Housing and Urban Development (HUD), Department of Transportation, and EPA consider 65 db Ldn to be an acceptable exterior noise level in residential areas. The 65 db Ldn level is used as a federal regulatory threshold for determining the necessity for special noise abatement measures when federal funding is requested. A future goal of 55 db Ldn is recognized by these agencies, however, this lower level has not been adopted for regulatory purposes due to economic and technical feasibility considerations. In Hawaii, no state or local standard for a 24-hour averaged noise level has been established.

3.15.2 

Existing Conditions

Ambient noises in the Hapuna Beach State Recreation Area are generated by vehicular traffic, park users, surf breaking on the shoreline, and foliage rustling in the wind. The nearest off-site populations subject to any one of these noises include the private residences located within the park (along Wailea Bay), Puako Bay residences located approximately 500 feet to the south, and residences located in the adjacent Mauna Kea Resort, approximately 1,300 feet to the north.

The greatest noise levels in the Hapuna Beach State Recreation Area occur from traffic along Queen Ka‘ahumanu Highway. Based on the Updated Acoustic Study of The Proposed South Kohala Resort (Y. Ebisu & Associates, June 1987) for the Draft Environmental Impact Statement South Kohala Resort (Belt Collins & Associates, September 1987), noise levels along the highway are less than 72 db Ldn. With increasing distance from the highway, traffic noise significantly decreases. At a distance of approximately 200 feet from Queen Ka‘ahumanu Highway, noise levels are estimated to be less than 60 db Ldn.

5 The South Kohala Resort has been integrated with the Mauna Kea Beach Hotel Resort and is now referred to as the Mauna Kea Resort.

6 A noise level of 72 db Ldn was projected at the edge of the highway for the 1998 year. This noise level was based upon noise measurements obtained in 1984 and natural growth projections established in 1987. Because natural growth projections in 1987 were greater than those today, the 72 db Ldn predicted for 1998 should overestimate existing 1995 noise levels.
Other man-made sources of noise include the vehicles entering and leaving the park and the activities of park users. Noises created by these sources have not been quantified; however, they have not been identified as being noticeable to on-site park users, especially during weekends and holidays when park use is heaviest.

3.15.3 Potential Impacts and Proposed Mitigation

The potential noises associated with the proposed park expansion will vary between the construction and operational phases. In either phase, the extent of potential noise impacts is expected to be minimal because of the lack of occupational and limited residential populations in close proximity to the proposed expansion activities. However, because some of the Wailea beachfront residents are concerned over possible negative effects of increased traffic and noise created by the increased use of Wailea Beach, potential noise impacts have been evaluated.

Construction Noise

Construction noise will be generated primarily by heavy earth-moving equipment, including bulldozers, dump trucks, scrapers, and back hoes. Installation of utilities and landscaping will produce lower noise levels. No significant noise-generating activities such as blasting are planned.

Depending upon the type and quantity of equipment used, construction noise levels of approximately 90 to 70 db are expected to occur approximately 50 to 500 feet, respectively, from the source. These noise levels will decrease significantly with increasing distance from the source—a 6 db decrease is generally exhibited with each doubling of the distance between the source and the location at which the noise is audible. The relationship between noise levels and distance is mathematically described in the following “inverse square law” equation.

\[ L_2 = L_1 - 10 \log\left(\frac{r_2}{r_1}\right)^2, \text{ where} \]
\[ L_1 = \text{sound pressure level (db) at a distance } r_1, \text{ and} \]
\[ L_2 = \text{sound pressure level at distance } r_2. \]

The greatest noise is expected to occur during golf course construction. However, this noise will not create adverse impacts because adjoining lands are uninhabited. The nearest residential community is approximately 1,300 feet from the golf course site, well outside of the 500-foot radius where construction noises of approximately 70 dBA would be audible. Applying the general relationship between noise levels and distance (the inverse square law) at 1,300 feet from the site, construction would generate a noise level of 62 db. Because construction would occur only in the daytime, the federally-accepted exterior noise level of 65 db Ldn for residential areas is not expected to be exceeded.

While construction noises are not expected to exceed established noise criteria, mitigation measures will be taken, nonetheless, to lessen the potential of noise impacts to the

\[ L_1 = 70 \text{ db}; \ L_2 = \text{sound pressure level at } R_2; \ R_1 = 500 \text{ feet}; \ R_2 = 1,300 \text{ feet. Therefore, } L_2 = 70 \text{ db} - 10 \log (1,300/500)^2 = 62 \text{ db}. \]
adjacent sparsely populated communities. Such mitigation measures will include: (1) use of properly muffled equipment on the job site; and (2) compliance with the State of Hawaii Department of Health construction noise regulations, curfews, and permit procedures.

**Noise During Park and Golf Course Operations**

Noise will be generated by golf course maintenance activities (e.g., lawn mowers, sprinklers), vehicular traffic within the park, and park users (beach users, campers, picnickers, and fisherman). Because of the nature of these sources and the lack of nearby populations, noise levels are expected to be minimal and their impacts negligible. Noise during night hours carries over a longer distance and may impact adjacent residences. Camping and picnicking areas are planned in clusters and are separated by large open spaces. None of the overnight or group picnic facilities are planned nearer than 700 feet from any residences. Potentially significant noise will result from the increase in vehicular traffic on Queen Ka'ahumanu Highway and is, therefore, further discussed herein.

Potential noise levels associated with vehicular traffic have been evaluated with the use of the *Updated Acoustic Study of the Proposed South Kohala Resort* (Y. Ebisu & Associates, June 1987) and the *2010 Traffic Impact Assessment Report for Hapuna Beach State Recreation Area Expansion* (Pacific Planning & Engineering, Inc., February 1995) (Appendix H). The September 1987 study indicated that a noise level of 72 Ldn would be expected along Queen Ka'ahumanu Highway in 1998, after full development of the adjacent Mauna Kea Resort. The 72 db Ldn noise level projection was based upon the presence of 23,110 vehicles per day (vpd) along the segment of highway between Mauna Kea Beach Hotel and Hapuna Beach Prince Hotel entrance roads, approximately 3,200 feet north of the Hapuna Beach Road intersection.

The more recent February 1995 traffic projections indicate that the total number of vehicles projected along the highway in 2010 will be less than the projected traffic that resulted in the 72 db Ldn noise level estimate. Both the September 1987 and February 1995 figures reflect their own project projections along with regional growth projections established at the time the respective studies were performed. The decrease in vpd from the September 1987 study to the February 1995 study is believed to be due to the slowdown in actual growth and growth projections for the West Hawaii region. Based on these projections, noise levels along the highway in 2010 are expected to be less than 72 db Ldn.

Audible highway noise will be even less than 72 db Ldn because populations, e.g., park users and residences, will be located away from the highway. As demonstrated in the September 1987 study, noise levels of 72 db Ldn alongside the highway would be perceived as 60 db Ldn approximately 200 feet from the highway. With obstructions, such as elevated terrain, noise levels will be further attenuated.

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8 The February 1995 traffic study indicated that 18,120 vpd, excluding vehicles associated with the proposed park expansion, would be expected during the 2010 year. With the addition of project related vehicular traffic, 21,006 vpd are projected upon completion of the Hapuna Beach State Recreation Area expansion activities in the year 2010. Vehicles associated with the proposed park expansion were estimated by assuming that the peak hour vehicle counts, obtained from the February 1992 traffic study, occur for a period of four hours per day and that the remaining hours are characterized by 50% of the peak hour vehicle count: 2,686 vpd = (222 vph x 4 h/day) + 222 vph x 0.50 x 18 h/day.
Planned park uses will occur no closer than 350 feet from the highway and outside the range where noise levels may be greater than 60 db Ldn. Existing residences within the adjacent Mauna Kea Resort are located approximately 120 feet from the highway and outside the 100-foot range where noise levels could exceed 65 db Ldn. For Wailea beachfront residences, located more than 2,500 feet from the highway, noise levels will be significantly less than 65 db Ldn. Therefore, vehicular traffic noise resulting from the proposed park expansion will not exceed the federally-accepted level of 65 Ldn for exterior residential areas or FHWA’s hourly Leq of 67 db or the L10 of 70 db. Besides providing a 350-foot buffer zone between the highway and noise sensitive park developments such as camping sites, no other noise mitigation measures are planned.

3.16 VIEWS

3.16.1 Existing Conditions

The primary views from the Queen Ka’ahumanu Highway are of the Kohala coast, South Kohala District plains, Kohala Mountains, Mauna Kea, and Hualalai. The sheer size of these views dwarf the significance of any other view in the region.

From the central portion in the makai section of the property, the highway and mauka land are visible, and from the uppermost portion of the property looking makai, almost the entire project site can be seen. The most aesthetically pleasing view of the project site is the lateral shoreline vistas.

3.16.2 Potential Impacts and Proposed Mitigation

When the proposed project is completed, the appearance of the area will be changed. What was once a brownish barren landscape with sparse vegetation in the central and mauka lands and dense green vegetation near the shoreline, will be a slightly altered landform with green lawns and landscaped trees and shrubs in the mauka area above the highway, and pockets of regenerated vegetation and landscaped areas in the makai area where the proposed campgrounds, picnic areas, and beach park facilities will be located.

The change in the makai land will be subtle because the improvements are intended to blend with the surrounding environment. It should be noted the majority of the makai property will not be altered and thus remain in its natural state.

The proposed improvements will consist primarily of landscape lawns and plant areas, park furniture, and a few small structures that are designed to fit into the low-profile character of the land. The park headquarters, overnight cabins, campground amenities, and picnic shelters will be conducive of a park setting and no buildings will be higher than one story. The park improvements will not interfere with any viewplains from the highway to the ocean, nor with views from the shoreline to the highway and upland plains.

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9 Based on projections provided in the Updated Acoustic Study of The Proposed South Kohala Resort (Y. Ebisu & Associates, June 1987) for 23,110 vpd. In this case, attenuation of noise due to elevated terrain is reflected in the noise projections.
CHAPTER 4
CONSISTENCY WITH LAND USE PLANS, POLICIES, AND CONTROLS

4.1 HAWAII STATE PLAN

The Hawaii State Plan (Chapter 226, HRS, 1995) consists of a series of broad goals, objectives, and policies that serve as guidelines for the growth and development of the State. In general, the expansion of the Hapuna Beach State Recreation Area is consistent with the intent of the Hawaii State Plan. Below is a discussion of the project's relationship to the State Plan's specific goals, objectives, policies, and implementing actions.

4.1.1 Overall Themes, Goals, Objectives, and Policies

Section 226-4—State Goal

In order to guarantee, for present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:

(2) 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.

The proposed project is consistent with the goals of the State Plan. It will provide a much-needed public recreational facility that combines active recreational opportunities with passive leisure amenities. To a large extent, it will allow patrons and visitors alike to appreciate the natural resources of the area. Moreover, it will assure the long-term protection of special natural features and sensitive coastal resources. The intrinsic beauty of the site and surrounding areas will be preserved by the permanent designation of the property in open space.

Section 226-11—Objectives and Policies for the Physical Environment—Land-Based, Shoreline, and Marine Resources

(a) 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:

- Prudent use of Hawaii's land-based, shoreline, and marine resources.
- Effective protection of Hawaii'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:

- Exercise an overall conservation ethic in the use of Hawaii's natural resources.
- Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
- Take into account the physical attributes of areas when planning and designing activities and facilities.
- Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.
- Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.
- Pursue compatible relationships among activities, facilities, and natural resources.
- Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

The preparation of this FEIS is part of a review process mandated by State law. It provides a vehicle for the community to obtain information and offer input on the proposed project. The FEIS discloses information on soils, drainage, plants, animals, agricultural potential, historic sites, natural hazards, noise, air quality, traffic, utilities, and socio-economic conditions, and provides descriptions of anticipated impacts. The FEIS also provides possible mitigation measures to reduce or remove any negative project impacts that may be generated.

Overall, the project minimizes the impact on the area's natural resources by appropriate management practices. Park facilities will be selectively sited to avoid or minimize environmental effects on sensitive coastal areas. The park enables residents and visitors to appreciate the natural outdoor setting. The park's design philosophy, notably, preserves as much of the existing natural landscape as possible for public enjoyment.

Section 226-12—Objective and Policies for the Physical Environment—Scenic, Natural Beauty, and Historic Resources

(a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.
(b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:

- Promote the preservation and restoration of significant natural and historic resources.
- Provide incentives to maintain and enhance historic, cultural, and scenic amenities.
- Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
- Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.
- Encourage the design of developments and activities that complement the natural beauty of the islands.

The preservation of the site's natural beauty and inherent cultural/historic value was considered in the planning process. There will be only minimal alteration to land near the shoreline and in culturally rich areas, and development within the expansion area will be low-key. Coastal views will be preserved.

The fairways of the golf course will be integrated with the existing topography. Earthwork will be minimized and many "rough" or border areas abutting the fairways will be left natural and unaltered.

Significant cultural resources will be identified and appropriate mitigation will be carried out in consultation with the State Historic Preservation Division.

Section 226-13—Objectives and Policies for the Physical Environment—Land, Air, and Water Quality

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

- Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
- Greater public awareness and appreciation of Hawaii's environmental resources.

(b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:

- Promote the proper management of Hawaii's land and water resources.
- Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

- Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.

- Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.

- Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.

- Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures, and visitors.

The proposed project will not have significant adverse impacts on air and water quality. Activities will not generate significant amounts of air pollutants. Construction-related dust and emissions will be short-term and mitigation measures would minimize potential impacts.

Surface and marine waters would not be significantly impacted as a result of the proposed improvements. The components of fertilizer and pesticides on the new golf course would remain near the surface of the ground and would not penetrate to groundwater and subsequently drift to marine waters. Furthermore, the golf course is located more than 2,800 feet from the shoreline.

Brackish water from on-site wells will be used for irrigation of the park landscaping and golf course fairways. Potable water will be conserved and used only at visitor facilities within the park and at the golf course clubhouse and maintenance facility.

The proposed project is subject to natural hazards such as flooding, tsunami inundation, hurricanes and earthquakes, but property damage would be minimal because most of the site will remain in open space.

The proposed landscape treatment in the park and golf course and the new drainage system are expected to result in no more than a zero net gain in runoff from the property. The use of swales and on-site drainage basins or dry wells would control surface runoff and reduce the dangers of flooding downstream of the project site.

Section 226-14—Objective and Policies for Facility Systems—In General

(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.
(b) To achieve the general facility systems objective, it shall be the policy of this State to:

- Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

- Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

- Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.

- Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.

The proposed project is part of the State's long-range plan for the Island of Hawaii's park system. Expansion would meet growing recreational needs in the region over the next 10 to 15 years. Improvements will be developed in phases to accommodate the incremental growth in user demand as well as to phase the cost of construction to match the availability of funds. Incremental development also provides opportunities to be flexible and to make plan revisions and updates as needed.

**Section 226-23—Objective and Policies for Socio-Cultural Advancement—Leisure**

(a) 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:

- Foster and preserve Hawaii's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.

- Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.

- Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.

- Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.

- Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.
Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.

Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawaii's people.

Assure adequate access to significant natural and cultural resources in public ownership.

The Hapuna Beach State Recreation Area Expansion will provide for the increased recreational needs of the community. It will improve access to significant natural and cultural resources and increases the diversity of recreational opportunities in the area. The expansion is intended to enhance the enjoyment of recreational experiences through new and improved facilities, educational programs, stronger safety measures, tighter security provisions and upgraded maintenance operations.

4.2 STATE FUNCTIONAL PLANS

The State Functional Plans are intended to provide more detail to the Hawaii State Plan in fourteen specific areas of concern—agriculture, conservation lands, education, higher education, employment, energy, health, historic preservation, housing, human services, recreation, tourism, transportation, and water resource development. As defined in Chapter 226, Hawaii Revised Statutes, a functional plan sets forth "the policies, programs and projects designed to implement the objectives of a specific field of activity when such activity or program is proposed, administered, or funded by an agency of the State." These plans have been reviewed to determine their relationship to the proposed Hapuna Beach State Recreation Area project, and a discussion summarizing their relationship is provided below.

4.2.1 State Agriculture Functional Plan

The State Agriculture Functional Plan sets forth the policies, programs, and measures for implementing the agricultural and agricultural-related objectives, policies and priority guidelines contained in the Hawaii State Plan.

Policy H(2) of the State Agriculture Functional Plan states "conserve and protect important agricultural lands in accordance with the Hawaii State Constitution". The project site consists of sparse vegetation on rocky soil unsuitable for cultivation. The area below the highway is designated primarily in the Conservation District and is not classified as Prime, Unique or Other Important Agricultural Land according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) Map No. H-15. Although, the area above the highway is designated in the Agricultural District by the State Land Use Commission, it is not classified on the ALISH map as important agricultural land.

4.2.2 State Conservation Lands Functional Plan

Completed in 1991, the State Conservation Lands Functional Plan provides a management program that allows judicious use of the State's natural resources. It provides a framework
for the protection and preservation of the state's pristine lands and shorelines. The following objectives, policies and implementing actions of the functional plan are directly relevant to the proposed park expansion. Although they are directed to State and County agencies, private industries can offer cooperation and compliance in specific policy areas.

**Objective IIC:**  
*Enhancement of natural resources.*

**Policy IIC(2):**  
*Expand and enhance outdoor recreation opportunities and other resource uses.*

**Implementing Action:**  
*Upgrade and enhance the State's outdoor recreational infrastructure of roads, trails, and shelters.*

**Implementing Action:**  
*Expand nature trail system.*

The proposed project will provide a diversity of recreational opportunities including swimming, camping, picnicking, hiking, fishing and sunbathing. A natural trail system will be an integral part of the proposed park improvements.

**Objective IID:**  
*Appropriate development of natural resources.*

**Policy IID(1):**  
*Develop and expand resources to protect natural shorelines and wilderness recreational areas.*

**Implementing Action:**  
*Acquire undeveloped shoreline properties.*

Acquisition of private residential lots behind Wailea Beach will not be undertaken at this time. Although most of these lots are developed, their future acquisition would be key to providing additional open space adjacent to the beach.

**Objective IIIA:**  
*Expansion and promotion of a public conservation ethic through education.*

**Policy IIIA(1):**  
*Develop and implement conservation education programs for the general public and visitors.*

**Implementing Action:**  
*Develop and implement ongoing environmental education and information programs to address subjects such as litter, vandalism, poaching, anchor damage of coral, depletion of recreational fisheries, and destruction of native upland ecosystems.*

Information will be available at park headquarters on operating hours, recreational opportunities and facilities, park rules and regulations, safety provisions, and resource conservation.
Policy IIIA(2): Develop and implement information and educational programs directed toward specific areas and users of lands and natural resources.

Implementing Action: Develop a public education program on beach park use for users of limited ocean and shoreline recreation resources and facilities.

As described above, the Hapuna Beach State Recreation Area Expansion will provide information on park use as well as information on the need to preserve environmentally sensitive areas.

4.2.3 State Education Functional Plan

The State Education Functional Plan contains policies and strategies of the Department of Education (DOE). It is not applicable to the Hapuna Beach State Recreation Area Expansion.

4.2.4 State Employment Functional Plan

The intent of this plan is to “guide employment, training, and human resources services in Hawaii”. Its major focus is on education and preparation for employment, followed by recommendations for meeting current and anticipated labor shortages as well as improving the quality of the workplace for workers. It does not directly relate to the proposed park expansion.

4.2.5 State Energy Functional Plan

The objectives of the State Energy Functional Plan are to achieve dependable, efficient and economical statewide energy systems capable of supporting the needs of the people, and achieve increased energy self-sufficiency. These relate both to overall land use planning and to specific building design and equipment selection decisions. While specific building designs have not been completed for the proposed project, final design will adhere to energy conservation standards, wherever practicable.

4.2.6 State Higher Education Functional Plan

There are no policies or implementing actions in this functional plan that directly relate to the proposed project.

4.2.7 State Health Functional Plan

The State Health Functional Plan focuses primarily on changing the State’s role in public health from that of individual health care provider to one of advocacy and a catalyst for public and private sector efforts. Several of the plan’s implementing actions relate to the Department of Health permit/approval processes which the proposed project is subject to. These include the review of private wastewater treatment systems; discharges to air and surface water/ground water; treatment and disposal of solid wastes; new sources of
drinking water; and air conditioning and mechanical ventilation systems for buildings that are used by the public. These topics and their relationship to the proposed project are discussed in various sections of this EIS.

4.2.8 State Historic Preservation Functional Plan

The State Historic Preservation Functional Plan endorses enhanced public support of historic preservation, creates preservation priorities and parameters, evaluates the relationship of development to the preservation of history, explores community interest and involvement with the remnants of its past, and determines the outcome of developing a Statewide History Center. The proposed park expansion will be developed to conform with these objectives.

4.2.9 State Housing Functional Plan

The objectives, policies and implementing actions of this functional plan do not directly relate to the proposed Hapuna Beach State Recreation Area Expansion project.

4.2.10 State Human Services Functional Plan

These State objectives and policies do not relate directly to the proposed Hapuna Beach State Recreation Area project.

4.2.11 State Recreation Functional Plan

The State Recreation Functional Plan (SRFP) calls for acquiring or preserving lands of recreational value, providing adequate recreation facilities and programs, and assuring public access to recreation areas. The State Comprehensive Outdoor Recreation Plan (SCORP), completed in 1990, provides the technical basis and planning assumptions used to develop the SRFP.

The SRFP identifies six issue areas and proposes strategies for addressing those issue areas. Below are relevant policies and implementing actions of the SRFP which are directly related to the proposed Hapuna Beach State Recreation Area Expansion.

Objective I-A: Address the problem of saturation of the capacity of beach parks and nearshore waters.

Policy I-A(1): Acquire additional beach parkland and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreational use.

Implementing Action: Acquire beaches in the following areas: (For Hawaii Island) Wailea Bay, 'Anaeho'omalu Bay to Ka'upulehu, and Kua Bay.

The SRFP indicated that beachfront properties suitable for park use need to be acquired before they are developed or become unavailable due to high land costs. The SRFP specifically identifies Wailea Bay.
Objective I-B: 
Reduce the incidence of ocean recreation accidents.

Policy I-B(1): 
Increase support for water safety programs.

Implementing Action: 
Provide lifeguard services at State beach parks, with top priority given to heavily used areas with hazardous conditions.

Two lifeguards are stationed at Hapuna Beach. Additional safety programs are being planned as part of the proposed expansion.

Objective II-A(1): 
Plan, develop, and promote recreational activities and facilities in mauka and other areas to provide a wide range of alternatives.

Policy II-A (3): 
Proceed with planning, acquisition, and development of trails.

Implementing Action: 
Plan and develop the following demonstration and priority trails identified by the Na Ala Hele Program: (On the Island of Hawaii) Kohala Ditch Trail, Humuula Trail via Ookala, and Ala Kahakai (Kawaihae to Kailua-Kona)

The Ala Kahakai will be incorporated with other trails in the expanded Hapuna Beach State Recreation Area.

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.

Implementing Action: 
Provide opportunities for golf at reasonable cost by planning new municipal courses and by assuring that privately developed courses have provision for play by residents at “kamaaina rates.”

The proposed public golf course is intended to achieve the above objective, policy and implementing action.

Objective III-D: 
Acquire, develop, and manage additional public accessways.

Policy III-D(1): 
Give priority to acquiring public access to selected shoreline and mauka recreation areas.

Implementing Action: 
Identify top priority lands that should be acquired and provide means of funding for acquisition (e.g., Land Bank).

The proposed project is in compliance with the intent of the above policy by its proposed preservation in perpetuity of designated open space and public accesses to the shoreline.

Implementing Action: Construct secondary roads, vehicular parking, comfort stations, and signs at selected public accessways, as appropriate.

The proposed expansion of the Hapuna Beach State Recreation Area and its proposed improvements achieve this policy and implementing action.

Objective IV-A: Promote a conservation ethic in the use of Hawaii's recreational resources.

Policy IV-A(1): Emphasize an educational approach, in coordination with enforcement efforts, to promote environmental awareness.

Implementing Action: Promote and coordinate the development and implementation of environmental education and information programs to address subjects such as litter, vandalism, poaching, anchor damage of coral, depletion of recreational fisheries, and destruction of native ecosystems.

Park personnel in the expanded facility will not only enforce rules and regulations but promote conservation of park resources.

Objective IV-B: Prevent degradation of the marine environment.

Policy IV-B(1): Enhance water quality to provide high-quality ocean recreation opportunities.

Implementing Action: Regularly monitor the water quality at key ocean recreation sites.

In 1991, consultants Charles Murdoch and Richard Green assessed the potential environmental effects of fertilizers and pesticides on surface and shoreline waters of the project site, as well as on the area's groundwater. The study concluded that the proposed expansion is not expected to adversely impact nearshore water quality.

Objective V-A: Properly maintain existing parks and recreation areas.

Policy V-A(1): Improve the maintenance of existing parks.

Implementing Action: Establish preventive maintenance programs in the State and County recreation agencies.

Implementing Action: Increase funding and staffing for maintenance of State and County parks and recreation facilities.

Operations and maintenance resources, including preventive maintenance programs, will be included with the proposed expansion.
4.2.12 State Tourism Functional Plan

The State Tourism Functional Plan serves as a guide in helping organize the various sectors of government and private industry toward achieving statewide objectives on tourism development.

One of the relevant objectives of the tourism functional plan with respect to the proposed project is Objective II: Development and maintenance of well-designed visitor facilities and related developments which are sensitive to the environment, sensitive to neighboring communities and activities, and adequately serviced by infrastructure and support services.

The proposed project is intended to provide expanded recreational opportunities to both residents and visitors in an environmentally compatible way. Adequate infrastructure and support services will be provided to serve the expanded park.

4.2.13 State Transportation Functional Plan

The overall objective of the plan is to provide for the efficient, safe, and convenient movement of people and goods. Transportation issues are addressed in the traffic analysis section of this document. The project is consistent with State transportation goals.

4.2.14 State Water Resources Development Functional Plan

This functional plan is directed primarily at State operations and, to some extent, to private industry. The plan presents general objectives and policies for the management of potable water supply, floodplains, agricultural water, and estuarine environments that could be considered relevant to this project. The project is consistent with this functional plan.

4.3 STATE LAND USE LAW

The lands encompassed in the project area are classified by the State Land Use District Boundaries Map, No. H-15, as Conservation, Agricultural and Urban. Most of the land makai of the Queen Kaʻahumanu Highway is in the Conservation District. The Wailea Beach Lots, Puako boat ramp, and a small area on the northern boundary of Hapuna Beach are in the Urban District. The undeveloped land above the highway is classified as Agricultural (see Figure 4-1).

In the most recent State Land Use District Five-Year Boundary Review, which began in 1990 and concluded in 1992, the Office of State Planning (OSP) recommended three areas within the project site for land use district reclassification. The first consisted of an Urban to Conservation District reclassification of a 6.3-acre strip of land behind Wailea and Puako Bays. This strip would provide an area needed for beach and shoreline recreation.
On the northern boundary of the project site, a 5.69-acre parcel was proposed for reclassification from Urban to Conservation. According to the OSP report, in 1951, when the Territory of Hawaii first set aside land at Hapuna Bay for park purposes, it did not have title to the 5-acre property (this land belonged to the Parker Ranch estate). The State land use district boundaries were not drawn until 1964, and since that land belonged to the ranch, it was left in the Urban District. Shortly after the boundary was drawn, the ranch donated the 5-acre parcel to the County. In 1966, the County then dedicated the land to the State. Unfortunately, the district boundary line was not amended at the same time to include the 5-acre site within the Conservation District.

The third area recommended for reclassification (Agricultural to Conservation) was a 9.61-acre parcel located on the eastern boundary of the existing park along the Queen Ka'ahumanu Highway. The Agricultural classification was established prior to the construction of the highway and is now a remnant piece makai of the right-of-way in the Conservation District.

Notably, the current State Land Use District Boundaries Map, No. H-15, shows the third area as already being in the Conservation District. In a confirmation by the State Land Use Commission, the district boundary was corrected on May 24, 1985 to abut the makai side of the highway.

The portion of the park expansion which is located in the Conservation District is consistent with the objectives of the State designated area. The district is further divided into subzones including a Protective Subzone, Limited Subzone, Resource Subzone, General Subzone and Special Subzone. The project site is located primarily within the Resource Subzone. There is also a small area near the southern boundary of the property which is located in the General Subzone.

The objective of the Resource Subzone is to develop, with proper management, areas to ensure sustained use of their natural resources. These areas include lands necessary for providing future parkland and lands presently used for national, state, county and private parks. They also include lands suitable for outdoor recreational uses such as hunting, fishing, hiking, camping, and picnicking. The General Subzone has a similar but broader objective than the Resource Zone.

Mauka of the highway, the proposed golf course will be located in the Agricultural District which permits such recreation facilities, provided the land is not classified with an "A" or "B" soil rating by the Land Study Bureau (LSB). Review of current LSB soil maps shows that the soil in this area is classified "E".

4.4 WEST HAWAII REGIONAL PLAN

In 1989, the Office of State Planning prepared the West Hawaii Regional Plan. In the plan, four "Resort Destination Nodes" where resort development should be confined were identified.
• Mauna Kea Resort Node
• Mauna Lani/Waikoloa Resort Node
• Kaupulehu/Kona Village/Kukio Resort Node
• Keahole-Konaou Resort Node

The Hapuna Beach State Recreation Area Expansion is located between the Mauna Kea Resort and Mauna Lani/Waikoloa Resort Nodes. The following strategies and actions recommended in the West Hawaii Regional Plan relate directly to the proposed project:

• Recognize and protect scenic areas, natural landmarks, open space, and viewsheds as amenities that improve the quality of life for Hawaii’s residents, support the visitor industry and influence land use patterns.

• Identify and protect scenic areas and open space areas that enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources.

• Implement recommendations from government agencies that high value coastal recreation sites be protected from conflicting uses.

• Evaluate the potential impact of land use proposals on the visual quality of the landscape, including view plane and open space considerations.

• Protect the views afforded from the Queen Ka'ahumanu Highway and from the shoreline.

• Protect the open space in West Hawaii through a variety of mechanisms, including the use of land use designations and conservation easements.

4.5 HAWAII COUNTY GENERAL PLAN

The Hawaii County General Plan (as amended in November 1989) contains statements of development objectives, standards, and principles of the most desirable land uses within the county; the most desirable densities of population; a system of principal rights-of-way; and general locations of public facilities, utilities, and public housing projects. These objectives, standards, and principles deal with the long-range comprehensive physical development of the island in 13 component areas.

The Recreation component of the General Plan relates most directly to the proposed improvements at Hapuna Beach State Recreation Area. The facilities and programs being planned for the park expansion are intended to meet the growing recreational needs of the island residents.

Another component of the County General Plan is the Land Use Pattern Allocation Guide (LUPAG) Map. This plan element, which indicates the general location and size of desired land uses, seeks to attain a well-balanced land use pattern on the island that is capable of meeting the various future needs of the county.
The LUPAG Map for South Kohala designates the project site as Open Area. The County recognizes Hapuna as a major water-oriented recreation area for the island and sees the site being used for park or open space use. Other much smaller LUPAG classifications are designated on the property including Low Density Urban Development, Medium Density Urban Development, and Resort. These designations comprise less than five percent of the park expansion site and are intended to reflect existing as well as potential uses given the available resources of the area.

4.6 HAWAII COUNTY ZONING

Unplanned and Open are the predominant zoning districts in the park site. Other zoning districts (comprising less than ten percent of the site) reflect existing or County General Plan LUPAG land uses. In particular, there are CV-10 Village Commercial, RS-15 Single Family Residential, V-1.25 Resort-Hotel, and A-1a Agricultural. Given the minor size of these districts, especially the V-1.25 and CV-10 zones, it is believed they are intended for very small or modest vacation facilities.

The County zoning districts are underlain by State Conservation and Urban District designations. Thus, the major portion of the park site, which is in the Conservation District, is subject to the Conservation District Rules and Regulations as administered by the State Board of Land and Natural Resources. The portion of the park that is in the Urban District is subject to County zoning regulations. Park use is a permitted use in the Open and A-1a zones but is subject to a County Use Permit for improvements in the RS-15, V-1.25 and CV-10 zones.

The proposed golf course is located entirely within the County Unplanned zone, which is underlain by the State Agricultural District. A golf course is a permitted use in the State Agricultural District but is subject to a Use Permit that is issued by the County Planning Commission.

4.7 HAWAII COASTAL ZONE MANAGEMENT PROGRAM

The Hawaii Coastal Zone Management (CZM) Act 188, SLH 1977, which became Chapter 205A, Hawaii Revised Statutes, establishes specific objectives and policies in seven broad categories, discussed below.

4.7.1 Recreational Resources

The proposed State park improvements will offer a diversity of recreational activities, which are consistent with the policies and objectives of the CZM. Expansion of the park is part of a master planned statewide park system to serve the growing recreational needs of the people of Hawaii.

4.7.2 Historic Resources

Based on archaeological surveys conducted by Paul H. Rosenthal, Ph.D., Inc., the State will undertake data recovery, establish archaeological preserves, and provide interpretative programs, as required. These actions are consistent with CZM policies and objectives.
4.7.3 **Scenic and Open Space Resources**

The proposed project will involve primarily land improvements that do not consist of significant structural features. There will be areas of lush lawns above the highway and clusters of rejuvenated vegetation in the makai area below the highway. Structures will be one-story in height and conducive of a park setting. The proposed golf course will have a one- or two-story clubhouse and a one-story golf maintenance building. These structures will be designed to integrate with the terrain.

The proposed structures within the park area will be well spaced and surrounded by open land. View corridors through the park land will be preserved. Motorists on Queen Ka'ahumanu Highway will continue to have unobstructed views of the ocean, shoreline, Kohala uplands and distant Kohala, Mauna Kea and Hualalai mountains. The proposed expansion will maintain scenic and open space resources in compliance with CZM policies and objectives.

4.7.4 **Coastal Ecosystems**

No buildings or structural improvements will be located on the shoreline or beach section of the project site. These areas will be kept in their natural condition. Mauka-makai accesses to the beaches and portions of some lateral accesses or trails in the shoreline area, however, will be upgraded.

4.7.5 **Economic Uses**

The provision of park amenities to visitors is expected to enhance their stay on the island and strengthen South Kohala’s appeal as a visitor destination area.

4.7.6 **Coastal Hazards**

The proposed improvements will be located primarily inland of the shoreline and in the open mauka area of the property. Coastal hazards, such as tsunami inundation and storm waves, would not significantly impact planned park facilities.

Also, the proposed project is being designed to assure there will be no overall net gain in surface runoff from the site. A system of drywells and/or sedimentation basins are planned to be installed.

4.7.7 **Managing Development**

This Environmental Impact Statement is a tool for communicating to the public during the early planning stage the potential impacts of the proposed project. It is intended to facilitate public participation in the project’s planning and review process.

4.7.8 **Public Participation**

The objective and corresponding policies of “Public Participation” relate to stimulating public awareness, education, and participation in coastal management. Part of the
function of the proposed park headquarters is to provide information on the park’s natural resources. Other information would include proper treatment of environmentally sensitive areas as well as public safety measures.

In addition, the EIS provides for public notification, public comments, and community input in the decision process regarding the proposed activities and associated impacts.

4.7.9 Beach Protection

The policies of this objective relate to the protection of beaches for public use and recreation. The proposed park expansion will include physical improvements that are located essentially away from the shoreline where no coastal and offshore waters would be directly impacted.

4.7.10 Marine Resources

The objective and corresponding policies of “Marine Resources” relate to implementing the State’s ocean resources management plan. The proposed project is a land-based development that will not directly affect the ocean resources. Its improvements, however, will provide greater access to the shoreline which is viewed as a positive public benefit.

Materials that would be available at the park headquarters would include information on Hapuna’s ocean and shoreline resources and on proper resource management.

4.8 COUNTY SPECIAL MANAGEMENT AREA GUIDELINES

The portion of the project site located makai of the Queen Ka‘ahumanu Highway is situated in the Special Management Area (SMA), and therefore is subject to the SMA Rules and Regulations of the County of Hawaii. The relationship of the proposed project to the SMA Guidelines, as provided in the Hawaii County Planning Commission’s Rules of Practice and Procedures, Rule No. 9 is addressed below. Providing the general framework for the County’s SMA guidelines are the objectives and policies of the State’s Coastal Zone Management Program.

SMA Guideline A.1. This guideline seeks to minimize dredging, filling or alteration to any body of water.

No surface or marine waters will be directly affected by the proposed improvements.

SMA Guidelines A.2 & A.3. These guidelines seek to minimize the reduction in size of any beaches and of the availability of access to the shoreline and other recreational areas due to development.

The proposed project is designed to improve access to beaches and recreational areas. It will not reduce the size of Hapuna and Wailea beaches.
SMA Guideline A.4. This guideline seeks to minimize any development that would substantially interface with or detract from the line of sight toward the sea from the State highway nearest to the coast.

The proposed park expansion will involve primarily ground improvements; structural improvements will be minimal and unobstructive to existing lines of sight.

SMA Guideline A.5. This guideline seeks to minimize any development that would adversely affect the quality of existing water features, wildlife habitats and existing/potential agricultural lands.

Groundwater and marine waters will not be impacted by the proposed project. Unique wildlife habitats and existing/potential agricultural lands do not occupy the property.

SMA Guidelines B.1, B.2 & B.3. These guidelines state that no development shall be approved unless it demonstrates no potential significant adverse environmental effects, except that such adverse effects are minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interest, and are found consistent with Chapter 205A, HRS, the Hawaii County General Plan, the Hawaii County Zoning and Subdivision Codes, and other applicable ordinances.

The proposed project will meet an increasing recreational need in the region and will not have a significant adverse effect on the environment. It will be consistent with the public policies, laws, rules, and regulations of the State of Hawaii and County of Hawaii.

SMA Guidelines C.1 & C.2. These guidelines seek to ensure access to beaches, recreation areas, and natural reserves, and to ensure that adequate recreation and wildlife preserves are maintained.

Expansion of the park is consistent with these guidelines.

SMA Guideline C.3. This guideline seeks to minimize the impacts from solid and liquid waste treatment, disposition, and management on the SMA.

The proposed project will dispose of solid and liquid waste at appropriate facilities in accordance with State and County regulations.

SMA Guideline C.4. This guideline seeks to minimize adverse impacts resulting from alterations to existing landforms and vegetation.

The proposed improvements will result in minimal adverse effects on existing landform and vegetation. Mitigation measures will include selective areas of earthwork and grading as well as relandscaping with native or indigenous plants.

SMA Guideline C.5. This guideline seeks to minimize adverse environmental or ecological impacts due to the project.
The proposed project will not result in significant adverse impacts on the environment that cannot be mitigated.

SMA Guideline C.6. This guideline states that the proposed project must be consistent with the General Plan.

As described in Section 4.5 of this Environmental Impact Statement, the proposed project is consistent with the Hawaii County General Plan.
CHAPTER 5
TOPICAL ISSUES

5.1 RELATIONSHIP BETWEEN SHORT-TERM USES AND MAINTENANCE OF LONG-TERM PRODUCTIVITY

The Hapuna Beach State Recreation Area Expansion site possesses a number of physical attributes that make it desirable for park development. These attributes include accessible beach and shoreline resources, spectacular ocean and mountain views, relatively flat useable terrain, and warm climate. The special studies performed as part of this EIS have also determined that the proposed project is compatible with the existing natural environment and overall, will enhance the use and appearance, as well, of the Hapuna-Wailea area.

During the site analysis stage of the EIS preparation, it was determined that there would be no short-term exploitation of resources that could generate long-term negative consequences. Overall, the proposed park expansion will have long-term positive effects that would benefit future generations. The principal long-term benefits would include the productive use of land presently not in use, the provision of recreational facilities to serve West Hawaii residents and visitors, and the provision of economic and social benefits.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Development of the proposed project will result in the irreversible and irretrievable commitment of certain natural, human and fiscal resources. Major resource commitments will include the land on which the project is to be developed, as well as monies for project construction, construction materials, manpower, and energy.

A significant portion of the property will remain as open space, so the commitment of land is partially mitigated.

5.3 PROBABLE ADVERSE EFFECTS THAT CANNOT BE AVOIDED AND OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

The State Parks Division of the Department of Land and Natural Resources has long envisioned a regional park for the West Hawaii area. The Hapuna Beach State Recreation Area Expansion was planned to serve the anticipated regional resident population and visitor growth over the next 10 to 15 years. Demand studies have shown a 17 percent increase in the use of existing facilities in just five years. This growth is projected to increase by another 17 percent over the next ten years.

The master plan for the Hapuna Beach State Recreation Area Expansion is described in Chapter 2 and the cost of the proposed improvements is estimated to be about $40 million. Approximately 40 percent of this cost would be financed by a private developer. The balance or government cost is expected to be spread over a number of years during the phased construction period of the project. It is far outweighed by the benefit of the park that is intended to serve the public for generations to come.
5.4 UNRESOLVED ISSUES

Various issues have been raised during the preliminary meetings and earlier correspondence with the community. Notably, the outcome to some of these issues cannot be known in detail until final design or development actually occurs. It is expected, however, that all of the issues can be resolved without undue difficulty through mitigation measures.

The following are the primary issues that remain unresolved.

**Transportation Improvements**

When the park expansion and golf course are completed and in operation, traffic volumes will increase and traffic congestion will occur on Queen Ka'ahumanu Highway around the project site. The need for improvements to the highway and its intersections which serve the Hapuna Beach State Recreation Area Expansion is a function of projected regional growth and not the proposed park expansion. It is expected that the exact design for any improvements to the highway and when they will be necessary is not immediately known. These improvements will be determined by governmental entities with jurisdiction over the right-of-way, which for Queen Ka'ahumanu Highway is the State Department of Transportation.

After reviewing the DEIS for this project, the State DOT indicated in a memorandum to Governor Benjamin Cayetano, dated August 12, 1996, its preference for improvements to the Queen Ka'ahumanu Highway. In its response, the State DLNR offered that it will work with DOT to provide necessary highway improvements at the appropriate time and seek ways to share in the expense of the required improvements.

**Availability and Use of Public Funding**

The long-term development schedule for this project calls for continued funding from the State to fully complete the proposed expansion. In recent years, State spending has exceeded revenues, resulting in budget cutbacks. Monies for new capital improvement projects will be under close scrutiny to determine if they fit into the State's high priority programs and projects.

The construction of a public golf course has previously raised questions from the community on the appropriateness of public use of state funds. Current plans now call for use of a private-interest sponsorship in developing the golf course (see next section).

Implementation of the master plan for the Hapuna Beach Recreation Area Expansion will be dependent on government priorities and availability of public funds. The master plan will serve as a guide for public officials to improve the Hapuna-Wailea area for recreational use. The needs of the community and the demand for other public improvement projects and programs must be considered in light of available financial resources.
Private Interest Sponsorship of the Proposed Golf Course

Funding for the golf course construction will require approximately 40 percent of the park expansion development budget. Having a private developer sponsor the construction of the golf course will provide a significant savings to the State. As the feasibility study by Pedersen Planning Consultants demonstrates, a golf course developed and operated by a private entity can be a viable venture within four to five years of opening. A joint venture between the State and private interest will require careful negotiations to assure that both parties benefit from the arrangement.

Initiation of a business plan by the State or the private developer would be one of the first steps toward arranging a private interest sponsorship of the golf course development. This process could begin after the project's EIS review and acceptance stage.

Ceded Lands

The lands encompassed by the proposed park expansion (except the private parcels located behind Wailea Bay and the two recently acquired State parcels) are ceded lands. Similar to the discussion above regarding the use of public lands for non-traditional public purpose, such as golf course, the State must be prepared to justify the development of such a facility on ceded land. The Department of Land and Natural Resources has policies that define the use and allowable transactions that can be undertaken on these lands. Although the State will abide by these policies, there will still be questions on whether other uses would be more appropriate.

This FEIS has evaluated alternatives and determined appropriate land uses for the project site. It considered current land use policies for the area, community needs, and suitable development sites. It assessed the sustainability of the site's natural resources in association with the proposed use. The proposed master plan is the result of an extensive land planning process.

Water Supply

Water for domestic and irrigation uses is expected to come from known sources. The potable source has been identified as the ground water that currently feeds the Lalamiño wells at the 1,200-foot elevation above the project site. The irrigation source is the groundwater beneath the lands immediately mauka of Queen Kaʻahumanu Highway which extends north and also serves the irrigation wells for the adjacent Hapuna Beach Prince Hotel Golf Course. Although these sources are proven, they do not guarantee success in new wells that are developed in the area. Until further field investigations and test drillings occur, a final determination on the availability of water will not be known.

Test drilling for these wells is expected to occur after all entitlements are secured for the proposed project. Funding will be immediately sought from the State Legislature, and testing will commence soon thereafter as an initial stage of the project development.
Condemnation of Residential Lots at Wailea Bay

Optimum development of the park expansion may require condemnation of 19 privately owned lots. Owners of these lots question the necessity of this acquisition when abundant land is already incorporated in the park master plan. Additionally, if the State were to pursue this plan, it would require increased public expenditure at a time when funds are scarce.

Fortunately, as a mid-range plan for the development of the area, land acquisition could be delayed until financial conditions improve. Because the acquisition cost would be high, the State will look at alternatives to reduce the cost of acquisition. One option would be to spread the cost over a number of years to make the expense more manageable. Another option would include a lease back program that would enable the State to recover some of the acquisition cost.
CHAPTER 6
CONSULTED PARTIES AND COMMENTS ON THE
EIS PREPARATION NOTICE

The notice of availability of the EIS Preparation Notice for the Hapuna Beach State Recreation Area was published in the Office of Environmental Quality Control (OEQC) Bulletin on October 23, 1993. The following agencies, organizations and individuals were sent a copy of the EIS Preparation Notice and Environmental Assessment. These documents described the proposed project and its anticipated impacts. Those who were sent the notice were asked to comment on the project. Everyone believed to have an interest in the project or who requested consulted party status was included in the mailing. Those who responded with comments on the EIS Preparation Notice are indicated by an (x) mark. Those who responded but indicated they had no comments are identified by an (n) mark.

Federal Agencies

U.S. Army Corps of Engineer, Pacific Ocean Division
U.S. Coast Guard, 14th Coast Guard District
U.S. Engineer District, Department of Army (x)
U.S. Department of Interior, Geological Survey (n)
Fish and Wildlife Service, Pacific Islands Office
National Marine Fisheries Service, Pacific Area Office (x)
National Park Service
Soil Conservation Service, Department of Agriculture (x)
Water Resources Division, Department of the Interior

State Agencies

Department of Agriculture
Division of Aquatic Resources, Department of Land and Natural Resources (x)
Department of Budget and Finance
Division of Boating & Ocean Recreation, Department of Land and Natural Resources (n)
Department of Business, Economic Development & Tourism (x)
Department of Education
Department of Hawaiian Home Lands (x)
Environmental Center, University of Hawaii
Department of Health (x)
Division of Conservation & Resource Enforcement, Department of Land and Natural Resources
Division of Forestry and Wildlife, Department of Land and Natural Resources
Land Use Commission (x)
Na Ala Hele Program, Division of Forestry & Wildlife (x)
Office of Hawaiian Affairs
State Historic Preservation Division, Department of Land and Natural Resources (x)
State Public Works Engineer, Department of Accounting and General Services (n)
CHAPTER SIX

HAPUNA BEACH STATE RECREATION AREA EXPANSION
FINAL ENVIRONMENTAL IMPACT STATEMENT

Office of State Planning (x)
Department of Transportation (x)
Department of Transportation, Hawaii District Office
University of Hawaii at Hilo
Water Resources Research Center, University of Hawaii

County Agencies

Mayor of Hawaii County
Civil Defense Agency (x)
Fire Department
Office of Housing and Community Development
Parks and Recreation Department (x)
Planning Department (x)
Police Department
Public Works Department (x)
Water Supply Department (x)

County Council

Councilman James Y. Arakaki
Councilwoman Keiko Bonk-Abramson
Councilman Keola Childs (x)
Councilman Brian J. De Lima
Councilman Takashi Domingo
Councilwoman Helene H. Hale
Councilman Jim Rath (x)
Councilman Robert F. Rosehill
Councilman Spencer K. Schutte

State Legislators

Senator Andrew Levin
Senator Richard M. Matsuura
Senator Malama Solomon
Representative Jerry L. Chang
Representative Robert N. Herkes
Representative Virginia Isbell
Representative Harvey S. Tajiri
Representative Dwight Y. Takamine
Representative Larry S. Tanakoma

Private Parties

John & Ann Alkire (x)
Tom Beach
Laura C. Beckvold (x)
John Clark

6-2 FINAL MAY 2001
Miss Fantasia Flor
Susan K. Gilbert, M.D.
Ron Gordon
David T. Hosbein (x)
Dr. & Mrs. David J. Hosbein (x)
John Hosbein (x)
Lisa M. Hosbein, MD (x)
Cyndee K. Irvine
Marc Kinoshita
John J. Lowrey (x)
Mike Lowrey (x)
Hugh Montgomery
Benjamin Moore (x)
Patricia S. O’Kieffe (x)
George H. Robertson (x)
Richard R. Schulze, Atty (x)
Charlotte Marjorie Bond Scott
Lynn Sullivan
Richard R. Treadwell (x)
Patricia Tummons (x)
J. Curtis Tyler, III (x)
Roy A. Vitousek III, Atty. (Waiea lot owners rep.) (x)
Al Weinert (x)
Les Wishard
Elizabeth T. Wray (x)
Christopher Yuen

Community Organizations

American Lung Association of Hawaii
Greenpeace Hawaii
Hale Kea Farms (x)
Hapuna Beach Services
Hawaii Island Environmental Council (x)
Hawaii Leeward Planning Conference (x)
Hilton Hawaiian Village
Kohala Coast Resort Association (x)
Kona Family YMCA
Kona Hawaiian Civic Club (x)
Kona-Kohala Chamber of Commerce
Life of the Land, Big Island Chapter
Mauna Lani Resort, Manager of Environmental Affairs
NAOHCC HI District Council
Na Ala Hele Hawaii Island Advisory Council
National Association of Hawaiian Civic Clubs
National Land Committee, Ka Lahui Hawaii (x)
PASH
PBR Hawaii

MAY 2001  FINAL  6-3
Puako Community Association (x)
Sea Grant Extension Service
Sierra Club, Moku Loa Group
The West Hawaii Sierra Club
Waimea Community Association (x)
Waimea Hawaiian Civic Club
Waimea-Kawaihae Community Association
West Hawaii Today

Utility Companies

Hawaii Electric Light Company, Inc.
November 16, 1993

Ms. Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Rutka:

Thank you for the opportunity to review and comment on the Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project, Hawaii. The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. The information provided does not identify any specific activities involving work in waters of the U.S. Therefore, a DA permit is not required at this time. However, as specific detailed plans become available, the applicant should continue to consult with our Operations Division at 438-9250 and refer to file number MP94-018.

b. The basic flood and tsunami information provided on pages 6 and 8 is correct; however, a more detailed flood hazard analysis will be required once detailed plans have been completed. Please coordinate with Ms. Jessie Godinich of our Planning Division at 438-2831.

Sincerely,

Kinh Chueng, P.E.
Director of Engineering

Mr. Kinh Chueng, P.E.
Director of Engineering
Department of the Army
U.S. Engineering District, Honolulu
Fort Shafter, Hawaii 96854-5440

Dear Mr. Chueng:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 16, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (EOEC) within the next two or three months. At that time, we will send you a copy for review.

Should you have any questions, please contact Chief Engineer Manabu Tagomori of the Water and Land Branch at 587-0230.

Aloha,

Sheri Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Harrison Associates
December 3, 1993

Mr. Susan Rukka
Belt Collins & Associates
600 Ale Moana Boulevard
Honolulu, Hawaii 96813

Dear Mr. Rukka:

Subject: Waikiki Beach State Recreation Area Expansion Project.
Environmental Impact Statement Preparation Notice (EISPAN), South
Kahala, Hawaii

We are in receipt of the subject EISPAN. We regret that due to prior
commitments, we do not have the staff with time to become involved in
reviewing the EISPAN.

We are returning the EISPAN to your office for your future use.

Sincerely,

[Signature]

District Chief
Ms. Susan G. Rutka
Belt Collins and Associates
450 Ala Moana Blvd.
Honolulu, Hawaii 96813-3406

Dear Ms. Rutka:

Thank you for your request to review the Hapuna Beach State Recreation Area Expansion Project Environmental Impact Statement (EIS) Preparation Notice. I trust that the draft EIS will include a description of the intertidal and subtidal algal resources within the project area, and if there are any endangered or threatened species found in the adjacent waters. We are especially interested in the presence of threatened green turtles (Chelonia mydas) in this area.

I can be reached at the following address and telephone number:

National Marine Fisheries Service
Pacific Area Office
2570 Dole Street
Honolulu, Hawaii 96822-2396

(808) 943-8098 FAX (808) 949-7400

I look forward to receiving the draft EIS for review.

Sincerely,

Eugene T. Nitta
Protected Species Program Coordinator

Mr. Eugene T. Nitta
Coordinating Protected Species Program
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii 96822-2396

Dear Mr. Nitta:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 29, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Mandel of the Project Development Section at 587-0227.

Sincerely,

[Signature]

MENABU TAKOMI
Chief Engineer

cc: Sherri Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Harrison Associates
Ma Susan S. Huska
Belt Collins & Associates
630 Ali Maua Boulevard
Honolulu, Hawaii 96813-5408

Dear Ms. Huska:

Subject: Wauna Beach State Recreation Area Expansion Project
Environmental Impact Statement (EIS) Preparation Notice

We have completed our review of the (DSS) Preparations and have the following comments:

Substantial increases in demand for irrigation water for the landscaping and golf course are obviously expected. This area is very close to exceeding the sustainable yield of the aquifer, the EIS should show how to review of all other groundwater extraction plans.

Irrigation with brackish water is leading to soil accumulation on soil surfaces in some irrigated areas near the proposed project site. This is proving to be a significant challenge to grounds maintenance operations. The EIS should indicate what steps are proposed to mitigate this growing problem.

The existing drainage system is infrequently pressed into service because of the low annual rainfall. This system is however, usually damaged during rain storms which cause severe gulley erosion. The development of the drainage areas into impervious structures such as parking lots and buildings will increase the intensity of runoff related gulley erosion. The EIS should describe the preventative and mitigative measures proposed in the development.

We appreciate the opportunity to provide comments. Should you have any questions, please contact Mr. Michael C. Cukin at (808) 641-2006.

Sincerely,

K. HANNAH K. CHATTAL
State Conservationist
cc: Mr. Gary Kau, Team Leader, Kamehameha Schools Office.

"To lead the way in helping our customers conserve, sustain, and enhance Hawaii’s natural resources through efficient service of the highest quality."

Mr. Kenneth Kaneshiro
State Conservationist
Natural Resources Conservation Service
United States Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850-0001

Dear Mr. Kaneshiro:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins Associates, dated December 14, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Chief Engineer Manabu Tagomori of the Water and Land Branch at 567-0230.

Aloha,

Shawn K. Smith, State Parks Division
Susan A. Sekal, Belt Collins Hawaii
W. semanas, Harrison Associates
December 1, 1993

Ms. Susan S. Rutka
Reli Collins & Associates
682 Ala Moana Boulevard
Honolulu, HI 96813

Dear Ms. Rutka:

In response to your letter of October 29, 1993 regarding the Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project, we appreciate this early opportunity to offer our comments.

We suggest the forthcoming EIS discuss in detail potential short-term and long-term impacts related to construction activities (e.g., golf course, parking, runoff, etc.) and the effects that may have direct adverse effects on fish and wildlife resources, especially in the estuarine waters of the Hauula Bay Marine Life Conservation District and the Kona Bay/Puako Reef Marine Fisheries Management Area. Any proposed activities or improvements that would occur seaward of the high water line should be described in detail in the Draft EIS (DEIS).

The disposal of sewage and wastewater from the golf course and park facilities with the potential of nutrient loading of marine waters, along with associated hazards to human health and safety should be addressed.

Although it may not be possible to identify specific impacts at this time, the DEIS should project impacts, propose specific means for averting or minimizing adverse effects to the aquatic environment, and suggest possible mitigation measures to prevent damage to natural resources. We will provide additional comments when detailed information describing the proposed activities becomes available in the DEIS.

The proposed construction and expansion of the recreational area are expected to improve and enhance public recreational opportunities and enjoyment of the park.

Yours truly,

HARRY M. SAKUDA
Administrator

cc: OCEA

Mr. William Devick, Acting Administrator
Division of Aquatic Resources
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Devick:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Reli Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section at 587-0227.

Sincerely,

HARU TAKOMORI
Chief Engineer

cc: Shari Samuels, State Parks Division
Susan A. Sekal, Reli Collins Hawaii
Warren Harrison, Harrison Associates
Ms. Susan Rutka
Beal Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Rutka:

Subject: Hapuna Beach State Recreation Area
Expansion Project Environmental Impact Statement Preparation Notice

Thank you for the subject statement that was enclosed with your letter dated October 29, 1993.

We do not wish to be a consulted party during the EIS process.

Very truly yours,

[Signature]
David R. Parsons
Administrator
November 8, 1993

Mr. Susan S. Ruthe
Belt Collins & Associates
600 Ala Moana Boulevard, 1st Floor
Honolulu, Hawaii 96813-6406

Dear Mr. Ruthe:

The Department of Business, Economic Development & Tourism is pleased to submit the enclosed comments on the Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project.

The comments were provided by the Land Use Commission. Questions regarding these comments may be directed to Esther Ueda, LUC Executive Officer, at 887-3828.

Thank you for the opportunity to comment.

Sincerely,

Muhi Hanawaladin

Enclosure
Ms. Susan S. Rutka
BELT COLLINS & ASSOCIATES
640 Ala Moana Blvd., First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Rutka:

Subject: Napuna Beach State Recreation Area Expansion

Thank you for providing a copy of the environmental impact statement (EIS) preparation notice for the subject project.

The Department of Hawaiian Home Lands (DHHL) has jurisdiction over Hawaiian home lands at Kawaihae and Waimea in the South Kohala District where the expanded recreation facilities are proposed. Please include the DHHL as a consulted party during the EIS process.

Should you have any questions, please call Don Henderson of our Planning Office at 586-3337.

Warm aloha,

[Signature]

HLD: BM:JC:ssy/2324L.5

The Honorable Kali Watson
Chairperson
Hawaiian Homes Commission
Department of Hawaiian Home Lands
P.O. Box 1079
Honolulu, Hawaii 96805

Dear Mr. Watson:

Environmental Impact Statement
Proposed Expansion Project
Napuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Napuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Chief Engineer Manabu Tagomori of the Water and Land Branch at 586-0230.

Aloha,

[Signature]

Michael D. Wilson

cc: Sheri Samuel, State Parks Division
Suzan A. Sabal, Belt Collins Hawaii
Wesley Harrison, Harrison Associates
November 18, 1993

Ms. Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Rutka:

Subject: Environmental Impact Statement Preparation Notice

Hayama Beach State Recreation Area Expansion Project
South Kohala, Hawaii

We have received your letter regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hayama project. We are writing to inform you that we have been consulted as part of the project process.

Thank you for allowing us to review and comment on the subject project. We do not have any comments to offer at this time, however, we would like to be a consulted party throughout the remainder of the Environmental Impact Statement process.

Very truly yours,

John C. Levin, M.D.
Director of Health

The Honorable Lawrence H. Miike, M.D.
Director
Department of Health
P.O. Box 3378
Hilo, Hawaii 96720

Dear Mr. Miike:

Environmental Impact Statement
Proposed Expansion Project
Hayama Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 18, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hayama project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

We thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comments.

Should you have any questions, please contact Chief Engineer Manabu Tagomori of the Water and Land Branch at 587-0238.

Aloha,

Michael D. Wilson

cc: Shervi Stanulis, State Parks Division
Susan A. Siegel, Belt Collins Hawaii
Warren Harison, Harrison Associates
November 5, 1993

SUBJECT: Director's Referral No. 93-315-H
Environmental Impact Statement Preparation Notice (EISPN) for the Napuna Beach State Recreation Area Expansion Project

We have reviewed the EISPN for the subject Napuna Beach State Recreation Area Expansion project, and have the following comments:

1) We confirm that the proposed 937-acre project area, as shown on Figure 3 of the EISPN, is located within the State Land Use Conservation, Agricultural, and Urban Districts.

2) We suggest that the draft EIS include a map showing the project's boundary in relation to the State Land Use Districts.

We have no further comments to offer at this time.

EU-B5:th
Dear Ms. Butka:

NE: BIS Preparation Notice for Hapuna Beach State Recreation Area Expansion Project

The Division of Forestry and Wildlife (DOFW), Na Ala Hele Program, has an inherent interest in the Ala Edakai. Please include us as a party to be consulted in the BIS process.

Very truly yours,

RODNEY T. OSHIRO
Na Ala Hele - Hawaii

Mr. Rodney T. Oshiro
Na Ala Hele Program
Division of Forestry and Wildlife
Department of Land and Natural Resources
P.O. Box 4849
Hilo, Hawaii 96720-0849

Dear Mr. Oshiro:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 16, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monde of the Project Development Section in Honolulu at 587-0227.

Sincerely,

MANABU TAGOMORI
Chief Engineer

cc: Sherri Samuel, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Harrison Associates
December 7, 1993

Ms. Susan S. Ruta
Belt Collins & Associates
680 Ala Moana Boulevard, 1st Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Ruta:

SUBJECT: Review of Environmental Impact Statement (EIS) Preparation Notice, Hapuna Beach State Recreation Expansion Project, Launui (Hapuna), South Kohala

Thank you for submitting (received October 29, 1993) the subject notice for our review. Our office cannot properly comment to the notice until we have reviewed the archeological inventory survey report for the project. To date, our office has not received such a report. We anticipate you will be submitting such a document to us at some future date as part of the EIS. We will provide you with our comments at that time.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

LOG NO: 9726
DOC NO: 93113d07
cc: K. Looke
W. Andrews
J. Nelson

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 7, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. We apologize for the delay in this response. The proposed project has undergone a development schedule refinement.

An archaeological inventory survey of the project area was conducted by Paul H. Rosenfeld, Ph.D., Inc. (PHRO) a few years ago and a report was completed in February 1994. A copy of the report will be submitted to you for review and will be included also in the Draft EIS.

Thank you for your comment on the Preparation Notice and we look forward to hearing from you on the Draft EIS.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section at 587-0227.

cc: Sherri Samuels, State Parks Division
Susan A. Sikes, Belt Collins Hawaii
Warren Harrison, Harrison Associates

MANABE TAGOMORI
Chief Engineer
Belt Collins and Associates
680 Ala Moana Boulevard
First Floor
Honolulu, Hawaii 96813-5406
Attention: Ms. Susan Rutka

Gentlemen:

Subject: Napuna Beach State Recreation Area Expansion
Napuna-Piski, South Kohala, Hawaii
EIS Preparation Notice

Thank you for the opportunity to review the subject document. We have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 886-0488.

Very truly yours,

[Signature]

GORDON WATANABE
State Public Works Engineer

RY: jk
November 17, 1993

Ms. Susan S. Ruksa
Belt Collins and Associates
600 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-3406

Dear Ms. Ruksa:

Subject: Hapuna Beach State Recreation Area Expansion Project
Environmental Impact Statement (EIS) Preparation Notice

We have reviewed the Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project and have the following comments:

A relevant Coastal Zone Management policy is to: "Promote water quantity and quality planning and management practices which reflect the importance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards."

The project proposes to use herbicides and pesticides in its maintenance program. In addition to runoff, there is a strong potential for leaching and transporting of these substances into the coastal water given the porosity of the soils in West Hawaii. Therefore, we recommend that they not be used or, if so, only sparingly to avoid adverse environmental and ecological impacts. A coordinated plan for pesticide/herbicide application, as well as monitoring any impacts to water quality, should be considered.

We appreciate very much the opportunity to review the document. If you have any questions, please contact Hamili Lao at 587-2883.

Sincerely,

[Signature]

Harold S. Masumoto
Director

The Honorable Gregory Pal
Director
Office of State Planning
P.O. Box 3540
Honolulu, Hawaii 96813-3540

Mr. Ruksa:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 17, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Chief Engineer Manabu Tagouri of the Water and Land Branch at 587-0230.

Aloha,

[Signature]

Michael R. Wilson

cc: Sherril Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Harrison Associates
Ms. Susan S. Rukka
Bob Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Rukka:

Subject: Environmental Impact Statement Preparation Notice (EISPN) – Hawaii Beach State Recreation Area Expansion Project

We have the following comments on the proposed Hawaii Beach State Recreation Area Expansion Project:

1. The future widening of the Queen Kaahumanu Highway will require adequate highway setbacks.

2. The proposed Waimea-Kawainui Road will tie into Queen Kaahumanu Highway at an interchange. The alignment and location have yet to be determined. Additional highway right-of-way will be required at this interchange location.

3. Interim access to Queen Kaahumanu Highway will require a fully channelized intersection with left-turn storage and acceleration/deceleration lanes. The number of accesses should be kept to a minimum.

4. Required roadway improvements must be provided at no cost to the State Department of Transportation. Plans for construction work within the State highway right-of-way must be submitted for our review and approval.

5. A Traffic Impact Analysis Report should be prepared and submitted for our review.

We appreciate the opportunity to provide comments.

Sincerely,

Rex D. Johnson
Director of Transportation
Ms. Susan S. Rutka  
Belt Collins & Associates,  
680 Ala Moana Boulevard, First Floor  
Honolulu, Hawaii 96813-5406

Dear Ms. Rutka:

Subject: Haupu Beach State Recreation Area Expansion Project  
Environmental Impact Statement (EIS) Preparation Notice

We have the following comments on the proposed Haupu Beach State Recreation Area Expansion Project:

1. A Traffic Impact Analysis Report (TIAR) should be submitted for our review and approval.

2. The proposed expansion should provide for the future Waimea-Kahului road which will tie into Queen Kaahumanu Highway at an interchange. Additional rights-of-way at the interchange location and setbacks to allow for future roadway widening may be required. This should be coordinated with our Highways Division.

3. Interim access to Queen Kaahumanu Highway will be allowed at full channelized intersections with left-turn storage, deceleration and acceleration lanes. Access plans must be coordinated with our Highways Division.

4. Required improvements to our highway system shall be provided at no cost to the State Department of Transportation. Plans for construction work within the State highway right-of-way must be submitted for our review and approval.

We appreciate the opportunity to provide comments.

Sincerely,

Rex D. Johnson
Director of Transportation

The Honorable Kuri Hayashiha, Executive Director  
Department of Transportation  
809 Punchbowl Street  
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashiha:

Environmental Impact Statement  
Proposed Expansion Project  
Haupu Beach State Recreation Area  
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Haupu project and apologize for the delay in this response. The proposed project has undergone a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Chief Engineer Masahiro Okazaki of the Water and Land Branch at 808-354-3030.

Aloha,

Michael D. Wilson  
Assistant Director

cc: Sheryl Samuel, State Parks Division  
Sue Sakai, Belt Collins Hawaii  
Warren Harrison, Harrison Associates
November 5, 1993

Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, HI  96813-9458

HAPUNA BEACH STATE RECREATION AREA EXPANSION PROJECT--EIS/P

Thank you for the advance opportunity for input on the proposed project. Listed are areas of interest and concerns for the project area:

Natural Hazards

Hazards that have affected the proposed project area include:
1. Runaway fires
2. Effects of tropical cyclones (surf, wind)
3. Dust storms
4. Winter storms (surf)
5. Tsunamis
6. Pests (rodents, jellyfish, flies)

The present setup of Hapuna beach park has made securing the park during hazard periods so very convenient and easy.

It is hoped that expansion ideas will maintain this type of planning. Thank you.

HARRY KIM, ADMINISTRATOR

Mr. Harry Kim, Administrator
Civil Defense Agency
County of Hawaii
920 Uluakal Streeet
Hilo, Hawaii 96720

Dear Mr. Kim:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 5, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Marden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

OMARU TAOMIURI
Chief Engineer

C: Sherri Semalu, State Parks Division
Susan A. Sakal, Belt Collins Hawaii
Warren Harrison, Harrison Associates
November 26, 1993

Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, HI 96813-3406

Subject: Hapuna Beach State Recreation Area Expansion Project
Environmental Impact Statement Preparation Notice

Dear Ms Rutka:

We have no comments to offer on the preparation notice and would like to remain a consulted party during the EIS process.

Thank you.

Sincerely,

George Yoshida
Director

Mr. George Yoshida, Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720-4652

Dear Mr. Yoshida:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 26, 1993 regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Menden of the Project Development Section in Honolulu at 587-0237.

Sincerely,

MANABU TAGOMORI
Chief Engineer

cc: Sherri Samuel, State Parks Division
Susan A. Solak, Belt Collins Hawaii
Warren Harrison, Harrison Associates
November 26, 1993

The Honorable John Waiheʻe
Governor, State of Hawaiʻi
State Office Building
222 South King Street, Suite 400
Honolulu, HI 96813

Dear Governor Waiheʻe,

Environmental Impact Statement (EIS) Preparation Notice
Hapuna Beach State Recreation Area Expansion Project

We have reviewed the above-referenced EIS Preparation Notice for the proposed Hapuna Beach State Recreation Area expansion project and provide the following comments:

1. The Draft EIS should discuss any impacts that the project may have on the private properties fronting Waiakea Bay.
2. Discussion on acquisition of private properties should be included in the Draft EIS.
3. There are approximately 19 existing and planned golf courses in the South Kohala District. The DEIS should include discussions on these golf courses.
4. The Draft EIS should include a section on the relationship of the project to the state and county policies and plans.
5. Final technical reports such as Archaeological Survey, Botanical Survey, Traffic Impact Analysis and others should be included in the Draft EIS.

Thank you for the opportunity to provide comments on the Draft EIS for the Hapuna Beach State Recreation expansion project. Should you have any questions, please feel free to contact Alice Kawahara of this office at 961-8280.

Sincerely,

Virginia Godstein
Planning Director

AKIRA
NIIHA

XCI: Mr. Edward Lau, DLNR-DOHA
Ms. Susan S. Rutha, GCA
Ms. Virginia Goldstein, Director
Planning Department
County of Hawaii
25 Asa'apu Pl., Room 109
Kailua, Hawaii 96732

Dear Ms. Goldstein,

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter, dated November 26, 1993, regarding the Environmental Impact Statement (EIS) Preparatory Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

MAMU TAGOMORI
Chief Engineer

Cc: Sherri Samuel, State Parks Division
Susan A. Sakai, Ball Collins Hawaii
Warren Harrison, Harrison Associates
November 18, 1993

Belt Collins & Associates
660 Ala Moana Blvd.
Honolulu, HI 96813-5404

SUBJECT: Papohaku Beach State Recreation Area Expansion Project
EOE Preparation Notice
Location: Oluu & Lalamilo, South Kohala, HI

We support the planned improvements to the park area and would be willing
to transfer title of Puuka Road to the State where it is within the park
boundaries. Portions of the project are in flood zones V, A and Ar this
includes two flood channels as well as the tsunami zone.

Galen Koba, Acting Division Chief
Engineerin Division

cc: Environmental Division

Environmental Impact Statement
Proposed Expansion Project
Papohaku Beach State Recreation Area
South Kohala, Hawaii

Mr. Donna F. Kiyosaki
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720-4252

Dear Mr. Kiyosaki:

We acknowledge the receipt of your letter to Belt Collins & Associates, dated
November 18, 1993, regarding the Environmental Impact Statement (EIS) Preparation
Notice for the Papohaku project and apologize for the delay in this response. The proposed
project has undergone a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to
file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the
next two or three months. At this time, we will send you also a copy for review and
comments.

Should you have any questions, please contact Mr. Andrew Mundon of the Project
Development Section in Honolulu at 587-0227.

Sincerely,

Marin Tadomo
Chief Engineer

cc: Sheri Samuels, State Parks Division
    Susan A. Sekal, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
November 5, 1993

Ms. Susan S. Rutka
Belt Collins & Associates
660 Ala Moana Boulevard, First Floor
Honolulu, HI 96813-5406

HAPUNA BEACH STATE RECREATION AREA EXPANSION PROJECT
ENVIRONMENTAL IMPACT STATEMENT (EIS) PREPARATION NOTICE

We have reviewed the subject EIS.

Please be informed that water is limited to existing services.

Furthermore, the Department's existing water system facilities cannot support the proposed park expansion at this time. Extensive improvements and additions, including source, storage, transmission, booster pump and distribution facilities must be constructed. Currently, sufficient funding is not available and no time schedule is set.

Should you have any questions, please contact our Water Resources and Planning Section.

[Signature]
Manager
WA

... Water brings progress...
November 22, 1993

Ms. Sue Rutka
Belt Collins Hawaii
680 Ai Moana Boulevard, First Floor
Honolulu, HI 96813

RE: Hapuna Beach State Recreation Area Expansion Project

Dear Sue:

Thank you for the copy of the EISPN regarding the Hapuna Project. Please add my name, and that of Councilmember Nelson Roselle, to your list of County Councilmembers, as well as E. Ma'u Na Alii Hele and People's Advocacy for Trails Hawaii (P.A.T.H.) to your list of non-profit groups to be consulted.

While I am glad that the DLNR has decided to proceed with planning for these Hapuna lands, I am very uncomfortable with the proposed project moving into the EIS preparation stage when there have been (to my recollection) no public informational meetings regarding the proposed land uses.

I think DLNR and Belt Collins should halt the EIS Preparation Process until the public has reviewed and modified the proposed land use plan for which the study is to be done. Public scoping and information meetings should be held in Waimea and Kona as soon as possible.

I think it would be very wise to gather public input on the ideas to be studied before a great deal of time and money is spent on something that may not have much support, or that the public may wish to be modified to an extent significant enough to require another EIS later.

Personally, I am very concerned about the proposal for development of a public golf course on the state land immediately makua of the Queen Kaahumanu highway. I question whether that is appropriate or even desirable in the face of the clutch of golf courses proposed in this vicinity by Nensay Hawaii (makua and south) which all will have substantial public play privileges.

Should the state wish to plan a public golf course for residents of West Hawaii, I would think a site closer to the population centers would make more sense, especially when these nearby courses will have public play privileges. However, I can think of a lot more important recreational facilities for our youth, and I'll bet other residents would like to have something to say about that, too.

I'd like to see DLNR throw it open to the public for ideas about how to use - or not use - the makua lands, while also reviewing the makaui site expansion concept. Maybe a regional amphitheater or special sports stadium and bike/runner raceway would be a better fit for the makua lands?

Let's put this project on hold, and get the public involved first! Please see what you can do to help bring this about. I would be pleased to assist in any way I can; please feel free to call me (322-3646) with any comments or questions.

Sincerely,

Keola Childs
Councilmember

cc: Keith Ahe, Director, DLNR
The Honorable Keola Chilu
Councilman
Hawaii County Council
23 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Childs:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 22, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. We apologize for the delay in this response. The proposed project has been undergoing development schedule refinement.

We appreciate your interest in the project and will add Councilmember Joan Bey and People's Advocacy for Trails Hawaii (PATH) to our list of consulted parties. E mau na ala Holes has already been sent a copy of the EIS preparation notice.

We agree with you that the public needs to be involved in planning the expansion of Hapuna. For your information, initial input on the master plan was received at a public informational meeting held on August 4, 1992 in Waimea. The preliminary master plan presented at the meeting was revised, based on many of the comments/questions received. The plan is still in draft form, pending receipt of comments on the Draft EIS. Both the EIS process and review of the Conservation District Use Application for the park expansion offer opportunities for further public participation.

Thank you for your interest. We look forward to your continuing guidance to help our department meet West Hawaii's outdoor recreation needs.

Michael D. Wilson

The Honorable Keola Chilu
Page 2

Should you have any questions, please contact Chief Engineer Manabu Togosho of the Water and Land Branch in Honolulu at 587-0230.

Aloha,

cc: Sherri Samuels, State Parks Division
Susan A. Sakal, Belt Collins Hawaii
Warren Harrison, Harrison Associates

Michael D. Wilson
November 19, 1993

Ms. Susan Butka
Belt Collins and Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Butka:

I am in receipt of your letter, dated October 29, 1993, regarding the Hapuna Beach State Recreation Area Expansion Project EIS preparation Notice.

I have a concern on why another Golf Course is submitting an Environmental Impact Statement when Hawaii County has to date, 29 approved golf courses and have not been built and 6 of those 29 ace in that area.

Please respond to this concern at your earliest convenience. Your attention to this matter is greatly appreciated.

With best regards,

Jim Rath
COUNCILMAN

---

The Honorable Jim Rath
Hawaii County Council
25 Anapuni Street
Hilo, Hawaii 96720

Dear Mr. Rath:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 19, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. We apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Your concern about the need for golf courses in Hawaii County will be addressed in both the environmental impact statement and the master plan being prepared for the proposed project. When our department prepared the 1999 State Recreation Functional Plan and the accompanying State Comprehensive Outdoor Recreation Plan (SCOOP), one of the needs identified in West Hawai'i was a municipal-type golf course. The proposed Hapuna course is intended to help fill that need.

Thank you for your interest. We look forward to your review of the Draft EIS, which is expected to be distributed within the next two or three months.

Should you have any questions, please contact Chief Engineer Manabu Tagenori of the Water and Land Branch in Honolulu at 587-0230.

Aloha,

Michael D. Wilson

C:

Sherri Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Wesley Harrison, Harrison Associates
December 1, 1993

Ms. Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Ms. Rutka,

Thank you for your letter of November 2. We appreciate the opportunity to comment on the Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project.

First, it is not clear from the EISP whether the State intends to proceed with the condemnation of any additional privately owned parcels in the Waalea Bay Beach Lots, in accordance with the existing 1988 decision authorizing the DLNR to proceed with the acquisition of all privately owned parcels at Waalea Bay. We would like to request that as part of the environmental assessment process the State make a determination of whether it intends to proceed with condemnation of additional private properties. We feel this is relevant in assessing the range of potential impacts from the proposed expansion.

As residents of Waalea Bay we cherish the unique and fragile beauty of the beach and surrounding area, hence the following concerns and questions about the impact of the proposed development on this pristine environment.

1. We feel that the scope of the current proposal will create more usage than a beach of Waalea's size and fragility can handle. Even at the current levels of use the area suffers from onshore and offshore litter, contamination by human excrement, destruction of the kiawe trees by campfire builders. How many parking slots are planned in the vicinity of Waalea and how many people are expected to use the beach during peak times? Given the current degradation of the environment we do not feel the area is capable of withstanding development of this magnitude without irreversible damage. We recommend a greatly modified, "walk-in" park to protect the fragile bay and beach.

2. Would there be adequate maintenance and enforcement personnel? What does the annual $1.1 million dollar budget include? Currently the lack of proper supervision is leading to the gradual destruction of the natural environment. In addition, the beach is the site for much illegal behavior - drunks and drug dealers make people afraid to bring their families to Waalea. What assurances do we have that the State would be able to afford to maintain and supervise a project of this size?

3. It appears that the restrooms for the beach at Waalea would be located dangerously close to the flood plain just to the south of the 4WD access road. Every few years this stream runs heavily, flooding the adjacent land and carrying so much debris into the water that the bay is murky for weeks. To place the toilet facilities near this flood plain puts the bay at risk to raw sewage pollution.

4. Would the group picnic rental area directly behind the houseslots include barbeques? We are concerned that any open fires would put our homes and lives at risk and create a smoky environment on the beach. Most of the year, winds are off-shore, at times gusting at 30-60 mph. In such conditions even the
Judicious use of fire is dangerous; in one big fire beachgoers had to be evacuated by boat. Perhaps using areas like the Kanekana Point for fire would ensure that most stray fires blow quickly out to sea.

5. We are also concerned that the proximity of the proposed beach parking to the beach and our homes would create unnecessary noise and exhaust fumes.

6. It is difficult to tell from the plans whether any of the development would be visible from the beach. What provisions have been made to ensure that the capital improvements and planned structures would have the least impact on the visual beauty of the area? We feel that traditional Hawaiian structures and materials would be the most compatible with the natural environment, as opposed to the standard cinderblock las, etc.

7. Are there any provisions to protect the Kahwa trees on the beach? We feel that the beach would suffer severe erosion if the trees were removed. Also, the shade of the trees is enjoyed by many on the beach, especially the old and the young.

8. How would the bay be protected from the runoff of golf course fertilization and irrigation?

9. It is unclear from the plan how people using the parking lot and restrooms at the southern end of Wailea would get to the beach.

We thank you for giving us the opportunity to comment on the EISPN and look forward to participating in the planning process. To date, the residents of Wailea have been the primary caretakers of Wailea: removing litter, putting out fires, calling the

Sincerely,

John Alkire

Ann Alkire

DLNR, Department of Sanitation, Fire Department, and Police when hazardous conditions have arisen, even rescuing distressed swimmers. As good neighbors and taxpayers we ask that the State respect the privacy and integrity of the Wailea residents, particularly with regard to density and the capacity of the area. We in turn look forward to working as partners with the State, contributing our efforts and resources to make this project a model effort in the State of Hawaii of the preservation of a priceless natural resource.
Mr. John & Mrs. Ann Aikire
P.O. Box 44416
Kawaihae, Hawaii 96743

Dear Mr. & Mrs. Aikire:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waiula. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

[Signature]

MANABU TAGOMONI
Chief Engineer

cc: Sherri Samuel, State Parks Division
    Susan A. Sibral, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
December 1, 1993
four pages incl cover

RE: EISPN Hapuna Beach State Recreation Area Expansion Project

The public meeting, held several months ago in Waiman, regarding the expansion of Hapuna Beach Park was well attended by residents from Kona, Hilo, North and South Kohala and Puako/Waialea. How can we get you to Waiman. We cannot afford what your plan proposes (the public meeting of a few short months ago proposed a $15 million expenditure, and now we are at $25.2 million). We are wary of the years of asking for minimal beach area improvements that are finally responded to with such grandiosity that we are stunned into disbelief. In these recessionary times the State proposes an expenditure in excess of $25 million. We privately adopt/fund our public school classrooms on the Big Island because they do not have materials, the classrooms themselves are horribly overcrowded and understaffed, we volunteer our time to clean up our highways, we donate time and money to build our own hospital, and the list goes on. There isn’t a person on this island that would not beg the State to spend these extraordinary funds on our schools. Waialea/Puako residents offered to privately raise funds throughout the County to make beach park improvements that we have needed for years, and the offer fell on deaf ears. There is no doubt in anyone’s mind that the improvements needed at Waialea/Hapuna over the next five years could be addressed with less than three million dollars. We do not speak from ignorance, as we did considerable research on this matter. We feel helpless when dealing with so many departmental and political agendas that seem to have little to do with what the actual needs and desires are.

There was a clear consensus from that meeting that the public wants:

1. The State to make prudent use of the taxpayers hard earned funds. We do not want the State to build a $25.2 million park; when less than a tenth of that is needed now and for the foreseeable future. The Plan can certainly be used as a guide over time, with periodic reassessment of the needs at later dates.

2. Waialea beach park on this fragile bay, to be a walk-in park. This could effectively be achieved now with very little expenditure. Grade and chip seal the existing access. Grade and chip seal a parking area several hundred yards inland from the beach. Provide a turnaround area, posted No Parking. For a car to drop off family members and gear at the beach before parking the car in the parking area. Provide some sanitation facilities, with high standard waste water facilities (and upgrade Hapuna’s cesspool), between the parking area and the beach. Provide picnic tables and safe barbecue areas on the condominium parcels at the beach. Provide and service several large trash barrels on site. Simple landscaping consisting of naupaka lined access and parking area, and other aroid/palm plantings and palms sited at sanitation facilities and picnic areas. The beach itself is naturally landscaped with huge old kawelo that provide privacy and preserve the pristine quality of the beach so cherished by all who visit. Ask the police to include the beach access area in their daily patrols. Some simple camping facilities between Hapuna and Waialea could serve both beaches.

3. Rather than trying to concentrate all activity at Hapuna/Waialea, make use of other immediately adjacent shoreline areas frequented and enjoyed by all of us. In Puako alone, the State owns oceanfront properties that suffer from the same neglect as Waialea currently does. Couldn’t those lots be partially cleared, sanitation facilities installed, picnic areas, small chip sealed parking areas, etc to provide for the much desired use of the Puako snorkeling areas. Puako has very different, but much desired, coastal use by snorkelers, divers, small children and their families, and currently is only served by narrow accesses and no sanitation facilities. Puako has over two miles of developed coastline that the public needs proper access and facilities for, and the State already owns land there that would be easily and economically upgradeable for use by the public.

Additionally, we request answers to the following questions:

1. "Urbanization of West Hawaii has mandated a re-examination of the potential for expansion of Hapuna... It is my understanding that the report, and very costly, acquisition of Mahouta significantly reduced the demand on Hapuna and surrounding beach areas. This information came from within the State Dept of Parks and Recreation. Is this information not accurate? Does this not reduce the justification for such a grandiose plan at Hapuna/Waialea?"
2. There is mention of an incremental development of the park in six phases. May we please know what those phases are and the relevant/expected timetable for each of them?

3. The estimate of 2400 persons per day at the Hapuna Park. It seems wise to plan for the future, but we appear to be quite far from that reality now. Could we please have, now, what we have been asking for decades (see Items 1 and 2 in the first section of this letter), rather than what we clearly do not need, cannot afford?

4. You recommend that the golf course be operated and maintained by a private contractor. May we respectfully submit that that land be leased to a private developer, on fair market value terms, and built-out, maintained and operated by a private contractor, as well? The State has not proven itself to be a wise and fiscally responsible developer.

5. The $25.2 million over seven years, mentioned as costs to build out this Park expansion. What is the general breakdown of those costs? There must be a breakdown somewhere, may we please have a copy?

6. Bill Pate has assured several persons directly, including owners in Wailea, that the State cannot afford to, and therefore will not purchase more than the two properties it has condemned. This is reassuring, but it is time for the owners to have a written revision of the order to acquire any additional privately held parcels in Wailea. Would you please provide written confirmation of this?

7. “Through increased recreational participation, economic benefits will be created through on-site food concession sales and regional fuel, food and sporting goods sales.” Are you asking the taxpayers to foot a $25.2 million plus bill, as it always is more than the State estimates, for the “benefit” of selling food, fuel and sporting goods?

8. It is not too late to reassess the entire plan and its relevance, the proposed budget and funds allocation for this project. There is no hurry to implement a plan of this magnitude. Over and over again, at the public meeting, people asked for minimal improvements of what we have to meet the current and future needs, and that great care be exercised in preserving the fragile beach area environment. $25.2 million dollars is an extraordinary sum of money, being allocated to a project that far exceeds the need now or in the near future, when, by anyone’s definition it is so desperately needed in other areas. If the children of this State do not begin receiving good fundamental education, or the people of this State do not have the advantage of affordable housing, then you may as well spend that $25.2 million on prisons, because that is the time tested outcome of disenfranchising a generation. Keep in mind that $25.2 million is just the amount mentioned for this particular beach park project. Mahalua acquisition alone cost multimillions, to say nothing of other acquisitions completed, or in the works. We do understand the need for beautiful beach parks, and the need for public access, but it appears all sense of proportion has been lost here.

Sincerely,

[Signature]

Laura C. Beckvold
P.O. Box 1775
Kamuela, HI 96743

cc Governor John Waihee and Lynn Waihee
Mayor Steven Yamashiro
Charles Taguchi, DOE
Representative Larry Tanimoto
Ies Biddle, Board of Education
President William Clinton
Ms. Laura C. Beckwith
P.O. Box 1775
Kamuela, Hawaii 96743

Dear Ms. Beckwith:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waiakea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Marden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

Manabu Tagomori
CIVL Engineer

Cc: Sherri Samuels, State Parks Division
    Susan A. Sabal, Belt Collins Hawai‘i
    Warren Harrison, Harrison Associates
DAVID T. HOBBS
RECEIVED
17 JUN 92 A 3 29
BELT COLLINS & ASSOCIATES
480 ALA MOANA BLVD.
HONOLULU, HAWAII 96813-5406

November 23, 1993

To Whom It May Concern:

I have reviewed your Environmental Impact Statement regarding the Kapiolani Beach Park Project and, as a landowner at Wailea Bay, wanted to clarify a few points which were brought up in the Statement.

First of all, the only mention of landowners at Wailea Bay is on page 5, paragraph 4: "Several private homes are present behind the beach and along the cliffs and rocky shoreline at the north and south ends." The homes mentioned are identified as approximately 13 to 15 homes situated around the bay and corresponding number of homeowners (many of whom are listed under the "Individuals" section of page 13 of your Statement). I do not know exactly how many homes and homeowners there are, but I'm sure you can obtain such information from the Wailea Bay Homeowners Association. Furthermore, on your rough schematic depicting park expansion, Wailea Bay, none of the existing homes are shown or delineated. Although this seems to indicate that the park planners might wish that there were no landowners at Wailea, in fact there are and many of them have been landowners since long before the 1976 "master plan" for the Kapiolani Beach Recreation Area was drawn up.

This apparent oversight regarding the Wailea landowners is particularly conspicuous because the State of Hawaii will clearly need to work with these landowners in further developing the park. I say "work with" because the stated budget for the park of $25.2 million (pp 1) is probably not enough to buy out the existing landowners (if that is the state's plan) which means the only feasible way the state can achieve their plan is by constructing the park around the landowners. This situation of the public and private interests working together is becoming the successful model for many such developments throughout the country. After all, the landowners are also members of the public, and in America most all members of the public are also landowners (specifically homeowners).

Given the sensible necessity of coexisting in harmony I sincerely hope that the State of Hawaii will refrain from battling against the Wailea Bay landowners. The landowners have existed peacefully with the public users of the beach for many years (and even decades prior to the Kapiolani Beach Expansion Plan) and I see no reason why this situation cannot continue if the resources are managed properly.

Regarding the proper management of the beach resources I would also like to point out that Wailea Beach is significantly different than is currently indicated in your Statement (pp 5, paragraph 4), and significantly different than neighboring Kapiolani Beach. You state that the beach is "about 1700 feet in length" with a width that varies seasonally from "about 40 to 80 feet." Both of these reports tend to gloss over various factors: the beach is actually split in two by a lava outcrop on which most beachgoers park and in front of which there is no beach. This area varies approximately 200-300 feet from your 1700 feet total); in only one or two quite narrow places (60-100 feet wide) is the beach actually 80 feet in depth; and in the winter, when sea levels are running, almost the entire usable portion of the beach shrinks to less than 20 feet in depth (unless you don't mind having your beach towels and blankets swept out to sea). Unlike Kapiolani, which is a much longer and wider beach, Wailea is extremely small and quite fragile.

Given the realities of the small size and delicate condition of Wailea Beach it is abundantly clear that it cannot accommodate a lot of beachgoers at one time. This fact should be kept in mind when determining the number of parking spaces which are to be provided when the park is developed. Using Kapiolani parking as a yardstick, if even a quarter as many spaces are provided at Wailea the beach will likely be overpopulated and permanently damaged.

There are many other specific issues which the park planners should be aware of as they refine their plans and the Wailea Bay landowners are providing a lot of pertinent information and assistance in helping to assure that the park which is built best serves the needs of all involved: the public, the land and marine environment of the beach, and the landowners.

Sincerely,

David Hobbs
Mr. David T. Hoshino
431 West Channel Road
Santa Monica, California 90402

Dear Mr. Hoshino:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Bel Collin & Associates, dated November 23, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waialea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two to three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Munden of the Project Development Section in Honolulu at (808) 587-0247.

Sincerely,

Mayabu Taguchi
Chief Engineer

Cc: Sherri Samuel, State Parks Division
    Susan A. Suh, Bel Collin Hawaii
    Warren Harrison, Harrison Associates
Thank you for the Hapuna Beach State Recreation Area Expansion Project EIS Preparation Notice.

Our family owns a lot at Waiakea Bay. My father, Dr. RT Trask, purchased lots in 1939 and 1942. We have loved and enjoyed the beach place ever since. Unfortunately, my sister's lot was taken by the state this year along with Norioko Scott's three lots. It is sad and frightening to experience the power of the state. We feel that the right to hold property is the most basic right, and we are right to say that it is a right not a privilege.

Now that the state has confiscated these lots, I think we must try to get along together. To continue to work is the way of the future and hopefully, we will work here.

At a meeting held in Kona, Hawaii, by the Department of Land and Natural Resources on August 4th, 1992, the department had come to realize through public questioning, that the public didn't want a commercial-style beach like Hapuna, but preferred the family-style, low-key beach that Waiakea presently is; an alternative-style beach. The beach-goers enjoy the unencumbered conditions, the shade of the tree-fringe, and the general non-commercial atmosphere including the small houses hidden in the trees.

Waiakea Bay beach is a small, narrow beach fringed by kawa trees and with a lave outcropping in the center. Page 5, paragraph 4 of your report states "...the width of the beach seasonally varies from about 40 to 80 feet." I find this inaccurate even on a summer's day one may walk in the water to go around a kawa tree at high tide, I'm also enclosing three photos of the north end of the beach at Christmas-time, 1991. This happened to be a winter when the sand did not completely wash out to sea exposing the black boulders beneath, but it was a winter when the sea went into the shower room of the 1920's cottage in photo 134 and allowed a little sunbathing on a patch of sand close to the house. The public certainly realizes this is not a year-round beach. It is a fragile beach.

Because of the fragility of the beach, because of the desire of the public for an alternative-style beach, because of the trend to work with the private sector, I think the planning of the beach project should be done thoughtfully and carefully. Being a north-end property owner and, therefore, more familiar with the lay of the land, I will comment on the planning in this area:

1. Parking far from the beach is a good idea. The parking at Waiakea Bay should be at least as far away as it is at Hapuna.
2. The parking area should be landscaped with trees to provide shade as well as a windbreak at the end of the parking area. There are no protective hills as at Hapuna and the south end of Waiakea.
3. Access paths from the parking area to the beach should be landscaped with shrubs for beauty, soil preservation, and to serve as a windbreak.
4. The car family campground between Kamakahoa Point and the Puake Road is too large. With approximately 75 family sites, I think you are impacting the area. I think the campground should be moved closer to Hapuna as that is the beach that can handle crowds. Good access paths from the campsites to Hapuna beach are necessary.
5. Campfires should not be allowed. There have been three destructive fires in recent memory, changing the kawa forest into moonscape. The grass is back, but not the trees.
6. With the planned density, caretakers would be necessary at both Hapuna and Waiakea. Over-nighters would make a night patrol necessary.
7. Because of the fragility of Waiakea Bay, it would be difficult to preserve the marine life; conservation district located there, limiting the access through a specific number of parking spaces would be important. Further, a gate at the Puake access road posted "no trespassing and closing hours" would make night access and vandalism difficult.
8. The private houses on Waiakea Bay are not pictured on your map. On page 5, paragraph 4, it is stated that "Several private homes are present behind the beach and along the cliffs..." This is a mistake. There are about 15 and 20 houses.

Thank you for inviting our comments, I do hope we can work together, and that together we will be able to preserve this unique and lovely beach the way the citizens have requested; as a quiet, tree-fringed family beach.

Sincerely yours,
Dr. and Mrs. D.J. Hoolein
STATES OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
WATER AND LAND DEVELOPMENT
P.O. BOX 208
HONOLULU, HAWAII

Mr. & Mrs. D.J. Hosheln
511 West Main Street
Grass Valley, California 95945

Dear Mr. & Mrs. Hosheln:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belz Collins & Associates regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Wailea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Munden of the Project Development Section in Honolulu at (808) 587-0227.

Sincerely,

[Signature]

MANABU TAGOMORI
Chief Engineer

cc: Sherri Samuel, State Parks Division
    Susan A. Sakai, Belz Collins Hawaii
    Warren Harrison, Harrison Associates
Dear Mr. Horshin,

I am a private landowner at Wailea Bay and wish to comment on the Hapuna Beach State Recreation Area Expansion Project. My three immediate concerns regarding your report are (1) the lack of attention to the private landowners (2) the amount the project will cost and (3) the width of the beach at Wailea Bay.

Private landowners own a large majority of the beach front property and MUST be considered in this plan. With many private homes within the proposed boundaries of the park the landowners have a vested interest in the future of the bay. I believe that with cooperation between the state and the landowners a mutually acceptable plan can be created. I do not feel that any more of the private land needs to be condemned in order to create a successful park at Wailea Bay.

On page one of the report it states that $25.2 will be required to complete this project over seven years. This figure is too low. If the state were to follow your plan all private land at Wailea Bay would need to be condemned and I am confident this figure alone would exceed $25.2. The time and effort spent condemning all the private land at Wailea Bay would be better directed in communicating and working with the landowners to create a park plan.

In your report it states that the width of the beach is 35 feet wide. This estimate is too high. During the winter the beach is reduced to mostly rock making it very difficult to use. During the summer months the beach reaches 35 feet in depth only in certain places, and even then only at low tide.

Thank you for the opportunity to respond to this report and I am confident that the state and private landowners can work together to design the park.

Sincerely,

John Horshin

Mr. John Horshin
1632 19th Street NW
Apartment 7
Washington, DC 20009

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 21, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologies for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Wailea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at (808) 587-0227.

Sincerely,

SHIRLI TAGOMARI
Chief Engineer

cc: Sherri Samuel, State Parks Division
    Susan A. Belski, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
November 23, 1993

Susan S. Rutka
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-0406

Dear Ms. Rutka,

I have read the Hapuna Beach State Recreation Area Expansion Project Environmental Impact Statement Notice which was sent to my parents, Dr. and Mrs. David J. Hosbein. My siblings and I are extremely interested in this project as we are the owners of one of the beach lots at the northern end of Wailea Bay. We have enjoyed the natural beauty of Wailea Bay for many years.

In considering the Recreation Area Expansion Project it is very important to accurately evaluate the size of the Wailea Bay beach. The Environmental Impact Statement Notice states on page five that the width of the Wailea Bay beach "seasonally varies from about 40 to 80 feet." In actuality the beach seasonally varies from zero to about 60 feet. Even in the summer, high tide often reaches up to the kiauea trees. In the winter much of the sand washes out to sea and at high tide the remaining sand is frequently under water.

A beach as small and fragile as the Wailea Bay beach obviously cannot handle the same types of crowds as Hapuna Beach. Therefore it is important that the size of the parking lot is consistent with the capacity of the beach. A smaller parking lot set back from the beach would create a walk-in beach and would preserve the rustic natural setting at Wailea Bay.

Sincerely,

Lisa Hosbein

Lisa M. Hosbein, M.D.
St. George Medical Center
6620 Coyle Avenue, Suite 416
Camarillo, California 93010

Dear Dr. Hosbein:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 23, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

We are aware that the beach seasonally varies from zero to about 60 feet, and that in the summer high tide often reaches up to the kiauea trees. In the winter much of the sand washes out to sea and at high tide the remaining sand is frequently underwater.

We agree that a beach as small and fragile as Wailea Bay cannot handle the same types of crowds as Hapuna Beach. Therefore it is important that the size of the parking lot is consistent with the capacity of the beach. A smaller parking lot set back from the beach would create a walk-in beach and would preserve the rustic natural setting at Wailea Bay.

Sincerely,

MANABU TAKOMI
Chief Engineer

cc: Shari Samuels, State Parks Division
Sue A. Sakai, Belt Collins Hawaii
Wenner Harrison, Harrison Associates
Dear Mr. Ruther,

Thank you for your letter and enclosure.

1. Possibly you have a detailed topographical map which indicates the flood zone and stream bed. It is apparent some of us have seen at least twice since it was flooded. The flood water flooded a little from the stream at the bank right way clear to the south west end of the park. The airport is not at the highway some but on the flood water is contained at main road and the road sections and parking space marks of the condemned lots.

2. The present access to the property and property to the northwest part of the land appears to be the best address. This is a temporary access existing in 1965. We have referred a permanent access (via the state plane for the area.)

3. The accident has been under the threat of condemnation since 1974. It would be helpful if the state could settle one and put it on the map for the area of that land.

4. Flood from campus and surrounding areas have wiped out the campus, street, and particularly heavy trees are those planted by the residents.

5. Perhaps the state provides for the beach area with excursion service, to become a dump, if there are no students living here, to put up the beach, it should be a mess, too.

We would be happy to discuss this concern with anyone you would.

Sincerely,

John J. Lowery
Mike's Services
Building - Lumber - Consulting
P.O. Box 6
Kutztown, PA 19530
Ph: 666-7157

RECEIVED
11-30-93

Mike's Services
P.O. Box 6
Kutztown, PA 19530
Ph: 666-7157

To: Mike Lowrey

Thank you for sending me a copy of the EIS preliminary notice. Here are some comments that I have:

1. Flooding although infrequent is substantial in volume and needs to be addressed.

2. The proposed parking density capacity will have a direct impact on beach quality. What is the proposed volume?

3. I would like to request that as part of the EIS the state make a determination of whether it intends to proceed with condemnation of additional private properties. This would seem quite relevant to your planning process.

Mahalo,
Mike Lowrey

Mr. Mike Lowrey
Mike's Services
P.O. Box 9
Kutztown, PA 19570

Dear Mr. Lowrey:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 30, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waiakea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monken of the Project Development Section in Honolulu at 587-0227.

Sincerely,

(Monken's signature)

Sherry Sauvola, State Parks Division
Susan A. Sabah, Belt Collins Hawaii
Warren Harrison, Harrison Associates
Ms Susan Rutka  
Belt Collins & Associates  
680 Ala Moana Boulevard, First Floor  
Honolulu, HI 96813-5408

Dear Ms Rutka,

RE: Kona Bay State Recreation Area EIS

I received your EIS Preparation Notice for the Kona Bay EIS and wish to inform you that I would like to be a consultant party during the EIS process. Thank you for granting me a site extension for this notification.

As you know I have extensive files about the area under consideration, especially the Kahaluu Bay and Puako Bay areas. I have information about the history of the area and of alternative uses of the land that will be helpful to consultants charged with gathering information for the EIS. I have also had many years experience, living on the beach at Kahaluu as I do, with the users and cappers in the area. The information I have compiled on weather and ocean conditions and on the recreational desirability of various areas should be helpful to your consultants.

There is widespread concern among users about the proposed access to the Kahaluu area. I am concerned that the State take a diligent role in expanding on the public's existing rights of access.

I am also concerned that the alternatives to the proposed State lease of the park include other parcels for uses as much as the alternatives I have presented to the DLNR for many years. Please have your consultants discuss these with me.

Sincerely,

[Signature]
Senitia Moore

cc: Andrew Hoonan
6. There is absolutely no mention of the fact that the sizeable percentage of state land carries ongoing archeological and cultural obligations as part of ceded lands.

7. The RISEP statement of no negative effect on water quality from pesticide and fertilizer runoff dismisses in a cursory manner a highly controversial issue deserving of greater attention.

8. No current or projected need for a public golf course exists. South Kohala is amply supplied with golf courses, both extant and planned. (Six more are planned for Puako alone.) If public, as opposed to private, courses are claimed to be needed, a current private course should be (proportionately) condemned to permit (affordable?) public access. As it stands, acres of irrigated arid desert land are grossly underutilized, and constitute a criminal waste of a scarce natural resource in a chronic drought area.

Thank you for the opportunity to provide this written comment. I look forward to your response as well as the draft EIS.

Very truly yours,

Benjamin Moore

Mr. Benjamin Moore
P.O. Box 985
Kamehame, Hawaii 96743

Dear Mr. Moore:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 6, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Menden of the Project Development Section in Honolulu at 587-2227.

Sincerely,

Makari Tagomori
Chief Engineer

C: Sherri Samuels, State Parks Division
    Susan A. Sakai, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
Susan S. Rutka
Bell Collins and Associates
by Fax 808-538-7819

December 1, 1993

two pages incl cover

Re: Waikoloa/Belch Beach Park Expansion

After looking at the Waipuna Beach State Recreation Area Expansion Project, EIS Prep Notice, I find myself appalled at the disproportionate amount of monies being requested for this project versus community needs.

The estimated costs to build and maintain the improvements specified in this proposal glue to a short-term memory of the asbestos removal costs at the Capitol, which began in 1981 at a promised $47 million cost to the taxpayer and after several promised new cost ceilings were reached at $66.5 million. Just a few short months ago, we were told at a public meeting for the Waipuna expansion, that the cost would be $15 million, a figure we found staggering, and just short time later the figure has escalated to $25.2 million. On this issue alone, I question the feasibility or the wisdom of this project.

Even at the present cost being quoted, how is it possible to rationalize an expenditure of this magnitude, when so many other projects are more urgent, such as: school facilities for Waimea and Waikoloa; and the long promised Waimea bypass road.

I believe the State considering the expenditure of $25.2 million on an expansion of a State beach park when we are unable to afford to put our children in decent classrooms is reprehensible. As it is now, our students are in substandard and/or portable classrooms. High school students from Waimea and Waikoloa are being bused all the way to Honokaa, and we do not have enough teachers for the students currently enrolled. The justification we have been given for the State does not have the funds.

The homeowners in Wailea have been active for years in seeking to upgrade the access and provide amenities for the public at Wailea. They have met with disinterest from the State. Unfortunately, because the State has never done any of these things, nor allowed the private property owners to do so, the beach is currently being abused by people. It is, as the Waimea police will readily confirm, essentially an open toilet, a place for drug deals, and drunkenness, all of which is preventing the public's use and enjoyment of this very special place. There is no dispute about the need for improvements to preserve and enhance the beach areas on this and other islands. The proposed project as it stands now is not the answer, to the contrary, the proposed project is a negligent waste of the taxpayers money.

Please provide a good standard access road, parking, comfort stations, picnic spots on the beach, and some camping areas between the beaches. Please preserve Wailea as a walk-in beach as the public has requested to protect this fragile bay, and provide for a beach experience different from that of Waipuna. This is what is needed, and asked for by the public, and can be accomplished for a fraction of the present plan's budget, in a fraction of the time.

Thank you for your time and consideration in this matter.

Sincerely,

Patricia S. O'Kieffe
P. O. Box 1596
Kamuela, HI 96743

cc: Governor John Waihee and Lynn Waihee
    Mayor Steven Yamashiro
    Speaker of the House Joe Suck: Charles Taguchi, DOE
    Representative Larry Tamamoto
    Representative Calvin Say, Chairman of House Finance
Ms. Patricia S. O'Keffe  
P.O. Box 1596  
Kamuela, Hawaii 96743

Dear Ms. O'Keffe:

Environmental Impact Statement  
Proposed Expansion Project  
Hapuna Beach State Recreation Area  
South Kohala, Hawaii

We acknowledge the receipt of your letter to Bob Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Council (OEQC) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Menden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

[Signature]

MANABU TAGOMO
Chief Engineer

cc: Sherry Samuelo, State Parks Division  
Susan A. Sakai, Bob Collins Hawaii  
Warren Harrison, Harrison Associates
George H. Robertson
November 30, 1993

Mr. George H. Robertson
P.O. Box 4905
Kailua, Hawaii 96743

Dear Mr. Robertson:

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 30, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waiakea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEOQ) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

Makaru Tagomi
Chief Engineer

Cc: Sheri Samuels, State Parks Division
    Susan A. Stas, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
December 17, 1993

Re: Draft EIS, Hapuna Beach State Recreation Area Expansion Project

Mr. Richard P. Schulze, Attorney at Law
P.O. Box 795
Kamuela, Hawaii 96743

Dear Mr. Schulze:

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 17, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

MARKO TAGOMO
Chief Engineer

cc: Sherif Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Harrison Associates
Mr. Richard R. Treadwell
P.O. Box 1017
Ran, California 90457

Dear Mr. Treadwell:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 24, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Hapuna. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at (808) 587-0237.

Sincerely,

[Signature]

Chief Engineer

cc: Sheri Samuels, State Parks Division
    Susan A. Sakai, Belt Collins Hawaii
    Warren Watanabe, Harrison Associates
The state has no particular reason to defer to any wish for privacy or exclusivity on the part of the private landowners in the area.

For this reason, I would suggest that the development of the Hapuna Beach State Recreation Area fully exploit all opportunities available for public access to the entire length of Waiakea Beach-Beach 69, including the government road reserve. This road should be well marked and public access over it should be encouraged.

In addition, I would like to be sure you are aware of, and take consideration of, the fact that even where the shoreline is rocky, public access is secured. Toward the southern end of Waiakea Bay, for example, a wide seawall was built in 1987. A condition of the permit for that wall ensures lateral access along and on the seawall.

As to the proposed golf course: I am concerned that the development of yet another golf course along Queen Ke'ahumanu Highway will go far toward destroying what remains of the natural character of the landscape. In addition, the construction of a golf course could have direct and dire impacts to lands downslope on the aukai side of the highway -- the same land that is proposed for expanded recreational use. Floodways might require enlarging, thus reducing the usable areas downslope. In addition, compaction of the earth for the golf course could increase runoff and nutrient loading of the nearshore waters.

In short, I fear that the plans for Hapuna Beach Recreation Area may not be as firm as I believe they should be in affirming the public's right to access the entire beach along Waiakea Bay. The 60-foot road reserve is government property, and I would remind you that it lies well inside the certified shoreline.

Please utilize this roadway by making access over it part of the official plans for the proposed recreation area.

Sincerely,

[Signature]

Patricia Tummons

[Name]
Ms. Patricia Tummona
187-C Hokulani Street
Hilo, Hawaii 96720

Dear Ms. Tummona:

Environmental Impact Statement
Proposed Expansion Project
Hayama Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 9, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hayama project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Munden of the Project Development Section in Honolulu at 587-2227.

Sincerely,

Brown Tagomori
Chief Engineer

cc: Sherri Samuels, State Parks Division
    Susan A. Sakai, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
November 22, 1993

Edward Lau
Division of Water and Land Development
DEPARTMENT OF LAND AND NATURAL RESOURCES
1151 Punchbowl Street
Honolulu, Hawaii 96813

VIA TELEFAX 1-808-587-0283

Subject: BISN Preparation Notice (BISPN) for Hapuna Beach State Recreation Area Expansion South Kohala, Hawaii Island

Dear Mr. Lau:

The subject document has been reviewed by me in some detail. While I support the concept of expanding and improving the public park facilities at Hapuna Beach and the adjoining South Kohala coastline, I share some reservations about the "public golf course" planned on the makaha side of Queen Kaahumanu Highway. I offer the following observations, questions, and comments on this proposal:

1. A number of golf courses are already planned for the South Kohala area, and it is my understanding that substantial public play privileges will be available to none, if not all, of these. Why is the state proposing to use public lands for this purpose? Further, when were public informational hearings held to obtain citizen input and agreement for pursuing this aspect of the project?

2. The BISPN does not state whether these lands are ceded lands. If they are, and I strongly suspect they are, then what place does your agency have to consult with the Office of Hawaiian Affairs regarding this proposal, and at what point in the land use process will they be consulted. The BISPN does not show OHA as one of the parties to be consulted, please explain this apparent omission.

3. The BISPN states that the proposed golf course will be operated and maintained by private industry. If this is so, please explain what provisions will be included in that contract to protect any existing traditional and customary rights afforded to and protected by the state constitution.

4. Since the Hawaii State Supreme Court has made it very clear that disputes concerning management of ceded lands and rights of native estates must be resolved before development takes place, please explain the agency's plans to manage these lands and safeguard the native rights as well as those of the general public. What will be the limits for the management regulations and procedures?

5. Given the apparent lack of opportunity for public input on this proposed golf course, I believe any further preparation of the BISPN should be delayed until such time as well-publicized public hearings are held for the residents of West Hawaii. I suggest meetings be held in at least two locations in West Hawaii at times and places convenient to the users of the park facilities so the residents of Kohala can provide meaningful input. In this way, the state will avoid spending valuable time and money to study a project that may not have much local public support.

Mr. Edward Lau
November 22, 1993
Page Two

6. The BISPN does not refer to or provide any information about the Ala Kahakai trail or its proposed designation as a national trail nor do the maps indicate the location of this trail. It is my understanding that, at least, parts of this ancient trail are still present in the subject area. Please provide further information regarding this important resource.

7. Mention is made in the BISPN of developing water wells in the maka'a lands for irrigation of the golf course. What plans does the agency have to address the issue of water rights and how will the water be shared between the private developer and the general public, including Native Hawaiians?

8. Two hundred fifty-five (255) archeological sites have been noted in the subject area, and the BISPN indicates that, with the exception of two sites, all the others are significant for informational purposes only. Does this imply that only those two will be preserved? Who determines the significance of these sites and which will be destroyed? To what extent will local kupuna and residents be consulted for their knowledge and expertise of the area and possibly these sites?

9. There is a footnote in the BISPN indicating that approximately 150 acres or individuals were committed during preparation of the master plan, and that a public information meeting was held for this master plan. What was the basis for consulting these selected few? If such information is available, please provide information on the date, time, and place of that meeting, the extent of the presentation, and the number of attendees from the public sector.

10. Since the BISPN indicates that the proposed golf course will be public, how will the fact that it will be maintained and operated by a private developer impact the use by the public? Additionally, what state monies will be needed to develop, operate, and maintain this golf course? Is the state planning to develop the site or use monies from the private sector? If the latter, how will the developer be chosen, and to what extent will any of the subject lands be disposed of to make tax, sale, easement, royalties, etc.?

11. With respect to the private land now located at Wailes, does the state have any plans to acquire those as part of the park? If so, how, and when will that happen? Is condemnation likely to have to occur? The BISPN refers to "Beach 69." Is this adjacent to or synonymous with "Beach 69"?

Thank you for this opportunity to respond to the subject BISPN. If you have any questions about this letter, or if I can be of further help, please call me. I look forward to hearing from you soon regarding my inquiries.

Sincerely,

J. Curtis Tyler, III

cc: Susan S. Ruka, Bob Collins & Associates
Mr. J. Curtis Tyler, III
P.O. Box 9012
Kailua-Kona, Hawaii 96745-9012

Dear Mr. Tyler:

Hapuna Beach State Recreation Area Expansion Project

This is in reference to your letter of March 29, 1995. We apologize for the long delay in responding to your letter dated November 22, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. The issues you have identified will be addressed in the Draft EIS. The document will provide more detailed information than what was included in the preparation notice. For example, copies of the archaeological inventory report and golf course feasibility study will be presented in the appendix for review.

We agree with you that the public needs to be involved in planning the expansion of Hapuna. For your information, initial input on the master plan was received at a public informational meeting held on August 4, 1992 in Waimea. Enclosed is a list of the comments and questions received. The preliminary master plan presented at the meeting was revised, based on many of these comments/questions. The plan is now in pre-final form, pending receipt of comments on the Draft EIS. The Draft EIS is scheduled to be published in the ORGC Bulletin shortly. Both the EIS process and review of the Conservation District Use Application (CDUA) for the park expansion offer opportunities for public participation.

Thank you for your interest. We look forward to your continuing guidance to help our department meet West Hawaii's outdoor recreation needs.

Should you have any questions, please contact Mr. Edward Lau of the Project Development Branch in Honolulu at 587-0527.

Sincerely,

[Signature]

Makarui Tagomi
Monarch Chief Engineer

Enclosure

cc: [List of names and addresses]
December 1, 1993

Belt Collins & Associates
Susan S. Rutke
680 Ala Moana Boulevard
First Floor
Honolulu, Hawaii 96813-5406

Re: Napuna Beach State Recreation Area Expansion Project, Environmental Impact Statement (EIS) Preparation Notice

Dear Ms. Rutke:

This office represents several Wailea Bay landowners. On behalf of our clients I would like to submit the following comments with respect to the proposed Napuna Beach State Recreation Area Expansion Project EIS Preparation Notice and request to be a consulted party during the EIS process.

The proposed Master Plan for the project does not indicate whether the State intends to condemn any additional private properties at Wailea Bay. Clearly this should be specified by the State if the full range of environmental impacts is going to be identified and evaluated in this process. The State should specify which properties, if any, it intends to condemn, a time table for condemnation, and some exposition of the criteria utilized by the State in determining which properties, if any, are to be condemned.

As you are aware, Wailea Bay is in a marine life conservation district. It is a somewhat fragile marine environment which deserves a greater degree of protection than the larger Napuna Beach area. The EIS prep notice does not contain any assessment of the "carrying capacity" of Wailea Beach nor does it contain a description of steps to be taken by the "developer" to ensure that the beach is not "over utilized." Obviously there are concerns of sanitation, overcrowding, inappropriate mix of activities, pollution, and excess fishing pressure on the area which may be resulting from the proposed recreational area expansion.

Wailua residents are also concerned respecting the risks of fire, flooding resulting from modified drainage following golf course development, security, and public and private access concerns. These issues should be dealt with very thoroughly in the Environmental Impact Statement process.

Unfortunately it appears that topography and environmental conditions have not been adequately considered for many components of the proposed recreational area expansion. Several of the sites identified for picnicking, group picnic rental, and camping may not be appropriate for those purposes. Significant landscaping would be required in order to reduce dust and wind and to make these proposed areas more usable. This activity would result in additional environmental impacts including earth moving, landscaping requirements, water demands, potential wind-blown dust, etc.

Of course there are also potential impacts relating to golf courses construction and use of herbicides, pesticides, and fertilizers. Obviously, care should be taken to develop the proposed public golf course in an environmentally sensitive manner as possible. Additionally, there is concern as to the water demand for the proposed golf course given the limited water resources apparently available in this area.

I would like to thank you for the opportunity to comment on the prep notice and I look forward to being a consulted party in the EIS process.

If you have any questions or require additional information please call me at 331-3346 or 339-3811.

Very truly yours,

[Signature]

Roy A. Vitousek III
for

CADES SCHUTTE FLEMMING & WRIGHT

RAW/bah
Mr. Roy Vitousek III
Cades Schutte Fleming & Wright
Hualalai Center, Suite B-303
75-170 Hualalai Road
Kailua-Kona, Hawaii 96740

Dear Mr. Vitousek:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Bilt Collins & Associates, dated December 1, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Wailes. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Morden of the Project Development Section in Honolulu at 808-2227.

Sincerely,

MANABU TAGOMORI
Chief Engineer

cc: Sherri Samuel, State Parks Division
    Susan A. Sakai, Bilt Collins Hawaii
    Warren Harrison, Harrison Associates
November 28, 1973

Dalt Collins and Associates
200 Ala Moana Blvd.
First Floor
Honolulu, HI 96813-5406

Attn: Susan S. Rutha

Regarding: Preparation Report (EIS)
Mauna Kea State Recreation Area Expansion Project

As a resident of Wailea Bay since 1951, I would like to make the following comments.

Since the State has condemned certain properties in Wailea Bay, it is imperative for me to know whether the State plans to condemn additional parcels in the Wailea Bay Beach Lots. I am 63 years of age and I feel that for me to plan my remaining years, that as a citizen and tax-payer of this State I be afforded this information. Since the 1972 decision to authorize the DLNR to proceed with acquisition, it is only fair to the property owners for the State to make a determination of whether it intends to proceed with condemnation of additional private properties. This should be part of the environmental assessment.

I disagree with the proposed site for the planned public parking lot and restroom facilities shown to be on the southern part of the plan. Is the plan to have access thru and or in front of peoples' homes? I believe it would make more sense to leave it where the present public access has been established. The reason being, that is where the properties have been condemned and acquired. The public has been using this access for all the years and is used to that entrance. The terrain is more suited to this use.

Wailea is a walk-in beach. However, the restrictions and laws of no fires and no over-night camping have never been adhered to or enforced. There were fires have destroyed part of the area over the last 8 years. Two of these fires by illegal camp fires. Sanitation has been a major problem over the years. Many years ago there was an outbreak of hepatitis. I feel the enforcement of laws and regulations must be addressed.

The parking spaces must be consistent with the ability of the beach to accommodate the number of people. The small size of the beach is shown in your report. It should be noted also that over the years the amount of beach has shrunk drastically.

I am concerned also about the use of this marine reserve in regards to excessive fishing, motor boating, over-night boating, anchoring, etc. The bay is so well protected from rough seas, jet skis, etc. Naturally the traditional EIS information regarding sewage, water, fertilization, and irrigation with the proposed golf course.

As a resident and taxpayer for many years, I look forward to Wailea Bay being upgraded with a nice park, restroom facilities and proper parking. The size of improvements must be in keeping with the size of the bay. Enforcement of the laws and regulations is an absolute necessity. The State must be notified of whether they plan to proceed with the acquisition of private parcels. These issues must be addressed to maintain an environmental balance for this pristine area, with the public need for additional beach facilities, as well as the property owners.

Thank you.

Yours Truly,

Al Vanwert
40 Wailea
83 Wailea Bay
Kamuela, HI 96743
Mr. Al Welnert
Box 2680
#3 Wailua Bay
Kamuela, Hawaii 96743

Dear Mr. Welnert:

Environmental Impact Statement
Proposed Expansion Project
Hayuma Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Beth Collins & Associates, dated November 28, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hayuma project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Wailua. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monson of the Project Development Section in Honolulu at 587-0227.

Sincerely,

Mamoru Taguchi
Chief Engineer

cc: Sherri Samuel, State Parks Division
    Susan A. Sakal, Beth Collins Hawaii
    Warren Harrison, Harrison Associates
Ms. Elizabeth T. Wray
16 Emerson Street
Brookline, Massachusetts 02145

Dear Ms. Wray:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Bel Collins & Associates, dated November 23, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Wailes. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two or three months. At that time, we will send you an updated copy for review and comment.

Should you have any questions, please contact Ms. Andrew Menden of the Project Development Section in Honolulu at (808) 587-0227.

Sincerely yours,

[Signature]

MANNABU TAOCHI
Chief Engineer

cc: Sherri Samuel, State Parks Division
     Susan A. Sakai, Bel Collins Hawaii
     Warren Herron, Harfen Associates

Att: Susan S. Rutka

Dear friends,

I have received your Environmental Impact Statement Preparation Notice for the Hapuna Beach State Recreation Area Expansion Project. I have several questions and comments regarding issues that should be addressed in the EIS.

I am one of the property owners whose property at Wailea Bay has been threatened by the State of Hawaii. It is not clear from the drawings that the new Master Plan if other private property at Wailea Bay is to be taken by the State. Certainly, this would be a factor in the environmental impact of the park.

A related issue is the parking lot and restrooms indicated on the north side of the expanded park. It is not clear from the drawings how people would get from this area to the beach; most of the obstructions adjacent to this area are lava rock. I suggest that it would be better to have the parking lot and restroom facilities consolidated in the area made of the center of Wailea Bay, at some distance from the water.

As you are aware, the beach at Wailea Bay is very small and fragile. To preserve the beach, only a limited number of visitors should be allowed to use it at one time. For this reason, the number of parking spaces available should be limited, also the campsites and picnic facilities. Perhaps additional facilities should be added at Hapuna beach itself, as it is a much larger beach and can accommodate more than twice the number of people that can be accommodated at Wailea.

When considering the impact of the park on this fragile and delicate environment, you should assess the effect of increased fishing in the bay, a Marine Life Conservation District, where already the number of fish is much smaller than it was several years ago.

Also, you must take into consideration the impact of increased sewage disposal, and the proposed golf course fertilization and irrigation.

Please send me a copy of the Draft Environmental Impact Statement when it is prepared. Thank you.

Sincerely yours,

Elizabeth T. Wray

Elizabeth T. Wray (Sr., Joe 3 Jr.)
Dear Ms. Rutka:

I am in receipt of your letter requesting comments for the EIS for the proposed Hapuna State Park Expansion Plan.

Please except these hastily drafted remarks in my attempt to meet your deadline. I have not thoroughly investigated all the categories addressed in your environmental report and would hope to have the chance to do so prior to the plan's final approval.

As a resident of Wailea Bay my comments are more appropriately addressed to that particular environment.

1. You indicate that Wailea Bay has a white sand beach of about 1700 feet in length, only 150 less than Hapuna Beach. I do not know of your linear figures are accurate but the concept suggested is false. Hapuna Beach is wide and unobstructed with a sandy bottom. Wailea is overgrown with sharp kahoe trees, lots of rock outcroppings and a partially rock and coral bottom. It is a very narrow beach and is extremely limited as to the number of human beings it can reasonably hold without damage to the environment or the people themselves.

2. Hapuna Beach has much more wave action inshore. In fact, it has waves breaking on the beach which aid in the movement of waste, debris, etc. from within the bay. A littoral current (or rip) is created with any wave action which tends to move old water out and new water in there. A wonderful cleansing action.

On the other hand, Wailea Bay does not have this type of wave action. Wailea is a very still bay protected by an outer reef and two points. The wave action occurs outside the bay off the two points and never enters the bay itself - there is no littoral current or cleansing activity.

3. After hurricane Iniki we experienced torrential rains which produced an inundation of mud in the bay. It took 6 months for the bay to clear. The improvements planned for the park expansion will only add to the run-off and waste that will continue to inundate a bay that has the potential for stagnation. I am hopeful this will be given serious consideration as to limitations on usage, flood control, and waste disposal.

a. Certain areas of Wailea Bay have been designated high risk flood zones by the A.C.E.; we need to study the impact and/or enhancement of the flooding potential presented by the park development.

b. I know nothing about run-off from golf courses - but, I read that the fertilizer can affect the quality of the ocean's ecology.

4. SURF

Hapuna is a beach break over a sandy bottom and much easier to patrol. It's a short swim to the victim and rapidly cited from the beach. Wailea is a point break - 500 to 1000 yards from shore over a shallow coral reef - a much more dangerous and difficult place to patrol.

The new park will add surfing pressure in greater numbers - the risk of injury will rise exponentially. Making Wailea Bay inaccessible or difficult to reach (i.e. a longer walk from the parking area) will help to limit the numbers.

5. VEGETATION

Kahoe is dense on Wailea Beach - it serves an important purpose. It is home to the wild life there, provides shade, and holds the beach intact from tidal action. It provides a natural boundary and limits the number of users on the beach. I am hopeful the existing kahoe trees will remain untouched.
6. BIRDS
The March 1978 study by Ernest Kosaka is accurate. I can attest that all those birds mentioned are still in existence in good numbers. I am fearful as to what will happen to the Grey and Black Francolins when the park is in place. It is a delicious game bird and will probably be eaten to extinction in no time. The cardinals still make their homes in the koa trees.

7. HUMAN BEINGS
I am certainly hopeful your report will consider the impact on those human residents who live around the bay. The DLNR still has a resolution in place since 1958 to acquire all the residences around Waimea Bay. We certainly would like to know if we will be displaced by this plan. I would suggest that we act as a buffer to the public's domination of an ecologically sensitive area and should be allowed to remain to continue to provide it.

8. A public parking lot is proposed along the easement/boundaries provided as access to meet the residences around Waimea Bay. It is difficult to see the need for such a facility. Access to the beach from that lot will be difficult and generally across private property.

9. FIRE
Nothing is mentioned about fire potential and the extreme high risk of fire in the Waimea area. During my time in Waimea I have experienced 3 major fires all of which caused residential damage and numerous smaller ones. All of the above were created by campers/beach goers.

The strong NE (offshore) trade winds in this area push fires rapidly from manoa to makai. A park with additional camp grounds will only enhance the potential for fire. This should be of major concern to everyone.

Thank you for keeping us informed.

Sincerely,

Bill White

Bill White

Mr. Bill White
Hale Kea Farms
P.O. Box 1337
Kamuela, Hawaii 96743

Dear Mr. White:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 18, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS, including the impact of the park expansion on the private landowners at Waimea. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQ) within the next two or three months. At that time, we will send you also a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Munden of the Project Development Section in Honolulu at 808-0227.

Sincerely,

MANABU TAGOMORI
Chief Engineer

Cc:  Sherri Samuels, State Parks Division
     Susan A. Sakai, Belt Collins Hawaii
     Warren Harrison, Harrison Associates
Ms. Susan Rutke
Belt Collins & Associates
900 Ala Moana Boulevard, First Floor
Honolulu, HI 80813-5408

Dear Ms. Rutke,

Re: Napuna Beach State Recreation Area Expansion Project -- EIS Preparation Notice

We received the notice on preparation of the Environmental Impact Statement for the Napuna Beach Park Expansion. We wish to be a consulted party during the EIS process.

Our group is made up of 10 community organizations; all concerned with coastal issues and use, as well as several individuals. Between us we have extensive knowledge about the swimming, diving, boating and fishing (both commercial and family) in the immediate area. Some of us have knowledge of historic and cultural resources.

At earlier meetings about the Napuna plans our group asked that the amount of land designated for the marine science center for the UH be increased back to its original designation of 40 acres. We still feel the 5-acre designation is not enough.

Public access is another big issue with us. We seek to be included on any preliminary discussions on public and fishing access.

In light of the increasing interest in non-tourism we believe that the lands made of the highway might best be kept open for future recreational opportunities rather than committed to another golf course. However, it is probably wise within the EIS process to conduct a non-developer initiated review of the effects of a coastal golf course for the intrinsic values.

Please let us know if any of our resources can be helpful to the EIS consultants.

Hanaa na kine kei.

Toni Whithington
Susan S. Rukta
Belt Collins & Associates
660 Ala Moana Blvd.
Honolulu HI 96813

November 19, 1993

Dear Susan,

I have just returned from mainland conferences and vacation and so I am a bit tardy in responding to your letter. Hawaii Leeward Planning Conference wants to be a consulted party on the EIS for the Hauula Beach State Recreation Area Expansion Project.

In reading the material that you sent to me, I do not notice plans for active recreation areas such as volleyball and possibly softball. I think these types of areas are needed in your group picnic areas. Thank you for including us.

Sincerely,

Mr. Peter L’Orange
President

Environmental Impact Statement
Proposed Expansion Project
Hauula Beach State Recreation Area
South Kohala, Hawaii

Mr. H. Peter L’Orange, President
Hawaii Leeward Planning Conference
P.O. Box 635
Hauula, Hawaii 96716

Dear Mr. L’Orange:

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 19, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hauula project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Munden of the Project Development Section in Honolulu at 587-0027.

Sincerely,

Makalu Tagomori
Chief Engineer

cc: Sherri Samuels, State Parks Division
    Susan S. Rukta, Belt Collins Hawaii
    Warren Harrison, Harrison Associates
Re: PREPARATION NOTICE (EIS) FOR HAPUNA BEACH STATE RECREATION AREA EXPANSION PROJECT

Dear Sue:

Thank you for the preparation notice and for the opportunity to review the document.

In August 1992, at a public informational meeting in Waimea, several items not listed in this notice were mentioned. We assume these will be part of the environmental impact statement.

The issues are: water safety and conservation programs; public shoreline access; land acquisition of Waialea; fire prevention program; special recreational needs for the elderly and handicapped; and interpretive programs.

We welcome the opportunity to participate in the planning for the expansion of Hapuna Beach State Recreation Area.

Sincerely,

William F. Mielke
President

cc: the Kohala Coast Resort Association, Board of Directors

Mr. William F. Mielke, President
Kohala Coast Resort Association
Kona Box 5300
Kohala Coast, Hawaii 96743

Dear Mr. Mielke:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated November 4, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologies for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified will be addressed in the forthcoming Draft EIS. We expect to file the Draft EIS with the State Office of Environmental Quality Control (OEQC) within the next two to three months. At that time, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monken of the Project Development Section in Honolulu at 587-0227.

Sincerely,

MAHASU TAGOMORI
Chief Engineer

CC: Sherri Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Walter Harrison, Harrison Associates
November 22, 1991

Edward Lau
Department of Land and Natural Resources
Division of Water and Land Development
1151 Punchbowl Street
Honolulu, HI 96813

Subject: PREPARATION NOTICE
HIGH BEACH STATE RECREATION AREA EXPANSION PROJECT

Dear Mr. Lau:

On behalf of the Kona Hawaiian Civic Club, we would like to relay our deep concern in regards to the Kona State Recreation Area Expansion Project and respectfully request that the Kona Hawaiian Civic Club, the Kona Hawaiian Civic Club, and the National Association of Hawaiian Civic Clubs be added to your list of non-profit groups to be consulted (Address: provided at the end of this letter).

While we are very glad that the DNR has decided to proceed with plans to develop the Kona State Recreation Area including a 62-acre park in South Kona, there are some areas of concern:

1. An 18-hole public golf course is planned for development on State land. We understand that DNR, Kona, has also proposed a golf course in the same vicinity. And, are these State lands coveted lands? If so, has the Office of Hawaiian Affairs (OHA) been consulted in the initial planning?

It has been stated in the OHA Bulletin (12/85) that Mr. will be developed in public lands to provide irrigation water for the proposed golf course and park. Are the lands where the will be dug coveted lands? If so, how will you address the water rights? The native tenant rights?

2. Has the DNR done an archaeological and historical site survey of the area? If this has been done, please forward any information you may have on this. It is stated in the OHA Bulletin, November 8, 1993, that some less significant archaeological sites will be eliminated. Our understanding is that there are 250 archaeological sites identified in the subject area. Who has determined what is significant and what is not?

Edward Lau
November 22, 1991
Page Two

It is also stated that trails will provide opportunities for interpreting both historical and natural resources. What trails are these? Has the Puu Kua Hula been consulted in the plans for this expansion?

There has not been, to our knowledge, any public informational meetings on the proposed land uses for the Kona State Lands. We do not understand how the EIS Preparation process can be initiated without public input. In light of the critical questions being asked, we urge that public informational meetings be held in Kona and Waimea as soon as possible, before any further action or study is undertaken, or before any more funds are expended. Areas of concern to be addressed at a public informational meeting would also be what is planned for the north side of the expansion.

Thank you for the opportunity to respond to the Preparation Notice. We look forward to your earliest response.

Sincerely yours,

Edward Lau
Kona Hawaiian Civic Club

cc: Hal Collin-Kona
H. K. Bruce Ktpler, President, National Association of Hawaiian Civic Clubs
Rex Hathaway, President, KHDCC, HI District Council
Mabel Tolentino, Vice President, Waimea Hawaiian Civic Club

Address:
H. K. Bruce Ktpler, President, National Association of Hawaiian Civic Clubs
814 Bishop Street, #800
Honolulu, HI 96813

Rex Hathaway, President
KHDCC HI District Council
141 Phillip Street
Hilo, HI 96720

Mabel Tolentino, Vice President
Waimea Hawaiian Civic Club
P.O. Box 293
Kamuela, HI 96743

P.O. Box 4998, Kailua-Kona, Hawaii 96745

Kona Hawaiian Civic Club

Edward Lau
November 22, 1991
Page Two
Dear Ms. Rutka,

Thank you very much for sending a copy of the EIS for Hapuna Beach State Recreation Project.
At this time the Hapuna Community Association is not prepared to comment. We would like to be a consulted party during the process. Please address all correspondence to Peter Merriman at the above address. Thank you very much.

Sincerely,

[Signature]

cc: Sherri Samuels, State Parks Division

Suzan A. Sakai, Belt Collins Hawaii

Warren Herrson, Harrison Associates
November 23, 1993

Honorable John Waihe'e
Governor, State of Hawaii
c/o Office of Environmental Quality Control
220 South King Street, Suite 4009
Honolulu, Hawaii 96813

Department of Land and Natural Resources
Division of Water and Land Development
1151 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Mr. Edward Lau

Gentlemen:

Hā'ena Beach State Recreation Area Expansion Project

Kālahui Hawai'i objects the destruction of archaeological sites as stated in the OEQC Bulletin dated November 8, 1993.

We request that you provide the same study of archaeological sites as have been done in the past.

We also request that you continue the study of trails. Will they affect the park expansion project?

Sincerely yours,

(K.M.) Clara L. Kahale
Chair, National Land Committee

cc: Kia'auna M. Trask
Re: 90-2200, "Division of Water and Land Development"
Ms. Lelomama DeMate
President
Kona Hawaiian Civic Club
P.O. Box 4918
Kailua-Kona, Hawaii 96745

Dear Ms. DeMate:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter, dated November 22, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. We apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

The issues you have identified, including the use of ceded land for the proposed project, the involvement of the Office of Hawaiian Affairs in the planning process, and the development of an 18-hole golf course on State land, will be addressed in the Draft EIS, and we have added the Waimea Hawaiian Civic Club and the National Association of Hawaiian Civic Clubs to our list of parties to be consulted.

For your information, initial input on the master plan was received at a public informational meeting held on August 4, 1992 in Waimea. A representative of the Office of Hawaiian Affairs was invited to attend the meeting. The preliminary master plan presented at the meeting was revised, based on many of the comments and questions received. The plan is still in draft form, pending receipt of comments on the Draft EIS. Both the EIS process and review of the Conservation District Use Application for the park expansion offer opportunities for further public participation.

An archaeological inventory survey of the project area was conducted by Paul H. Rosenbleth, Ph.D., Inc. (PHRI). The tentative decision to eliminate certain sites was based on site significance assessments and treatment recommendations by the archaeologist. A copy of the 1994 survey report will be included in the Draft EIS.
November 22, 1993

Honorable John Waihe'e
Governor, State of Hawai'i
c/o Office Environmental Quality Control
220 South King Street, Suite 4009
Honolulu, Hawai'i 96813

Department of Land and Natural Resources
Division of Water and Land Development
1151 Punchbowl Street
Honolulu, Hawai'i 96813

Attention: Mr. Edward Lau

Dear Mr. Lau:

We, the Hapuna Beach State Recreation Area Recreation Committee, object to the destruction of archaeological sites as stated in the USMC Bulletin dated November 9, 1993. We request that the Hawaiian Islands Division of Water and Land Development investigation be halted and that Mr. Waihe'e be informed that these sites are being investigated. We also request that a complete list of all archaeological sites be compiled.

Sincerely yours,

Clare L. Kakali'i
Chairman, National Land Committee

cc: State of Hawai'i
      Division of Water and Land Development

November 22, 1993

Mrs. Clara L. Kakali'i, Chair
National Land Committee
Ke Labui Hawaii
P.O. Box 1256
Pahoa, Hawaii 96778

Dear Mrs. Kakali'i:

We acknowledge the receipt of your letter dated November 22, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project. We apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

An archaeological inventory survey of the project area was conducted by Paul H. Rosenfeld, Ph.D., Inc. (PHRU) a few years ago and a report completed in 1994. The tentative decision to eliminate certain sites was based on site significance assessments and treatment recommendations by the archaeologist. A copy of the survey report will be included in the Draft EIS.

The PHRU study also included a survey of trails in the project area. These trails will either be preserved in place and/or incorporated into the trail complex being planned for the park. The stormwater drainage for the park will be part of the Ala Kahakai network that has been designated as Hawaii Island's demonstration trail by the State's Statewide Park program.

Thank you for your interest in this project. When the Draft EIS is completed, we will send you a copy for review and comment.
Dear Ms. Rutka,

Thank you very much for sending a copy of the EIS for Hapuna Beach State Recreation Project. At this time, the Pukui Community Association is not prepared to comment. We would like to be a consulted party during the process. Please address all future correspondence to Peter Merriman at the above address. Thank you very much.

Sincerely,

[Signature]

(Phone number: 808-885-6822)

cc: K. K. Smith, W. H. Keilman, J. H. Holman

---

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
WATER QUALITY MANAGEMENT
WAIKIKI TOWER, 3800 KOA STREET
HONOLULU, HI 96815

MAY 24, 1995

Mr. Peter Merriman, President
Puako Community Association
P.O. Box 4433
Kawaihae, Hawaii 96743

Dear Mr. Merriman:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Monden of the Project Development Section in Honolulu at 587-0237.

Sincerely,

[Signature]

MANABU TAGOCHI
Chief Engineer

cc: Sheryl Samuels, State Parks Division
Susan A. Sakai, Belt Collins Hawaii
Warren Harrison, Hardin Associates
December 14, 1993

Susan S. Ruska
Belt Collins & Associates
680 Ala Moana Blvd.
Honolulu, Hawaii 96813-5406

Subject: Hapuna Beach State Recreation Area Expansion Project

Dear Susan:

The Waimea Community Association would like to be a consulted party during the EIS process for the above-named Project.

We have no comments at this time but would appreciate the opportunity to participate at any point in the development and review process. Perhaps a presentation of the Preliminary Plan to the Waimea Community Association could be scheduled.

Thank you for the invitation to participate in this important public project.

Sincerely,

Azu Summers, Chairman
Waimea Community Assoc. Planning Committee

Mr. Azu Summers, Chairman
Waimea Community Association
P.O. Box 685
Kamuela, Hawaii 96743

Dear Mr. Summers:

Environmental Impact Statement
Proposed Expansion Project
Hapuna Beach State Recreation Area
South Kohala, Hawaii

We acknowledge the receipt of your letter to Belt Collins & Associates, dated December 14, 1993, regarding the Environmental Impact Statement (EIS) Preparation Notice for the Hapuna project and apologize for the delay in this response. The proposed project has been undergoing a development schedule refinement.

Thank you for your interest in the project. When the Draft EIS is completed, we will send you a copy for review and comment.

Should you have any questions, please contact Mr. Andrew Menden of the Project Development Section in Honolulu at 587-0227.

Sincerely,

[Signature]

MANABU TAGOMORI
Chief Engineer

Cc: Sherri Samuels, State Parks Division
Susan A. Sakal, Belt Collins Hawai'i
Warren Harrison, Harrison Associates
CHAPTER 7
CONSULTED PARTIES AND THOSE WHO PARTICIPATED IN THE PREPARATION OF THE FINAL EIS

The announcement of the availability of the Draft Environmental Impact Statement (DEIS) for the proposed Hapuna Beach State Recreation Area Expansion was published in The Environmental Notice by the Office of Environmental Quality Control on June 23, 1996. The agencies, organizations, and individuals listed below were sent copies of the DEIS with a request for comments on the project. Those believed to have an interest in the project or requested consulted party status were also mailed a copy of the document. Parties who replied with comments are marked with an asterisk (*) and copies of their letters are reproduced herein. Parties that replied with "no comment" statements are marked with a dash line (--)..

If the comments on the project were substantive and required a response, copies of the response letters are presented on the following pages. Those who responded in writing on their own (a copy of the DEIS was not sent to them) are indicated by a plus sign (+) at the end of their name. Those who submitted substantive comments after the extended August 30, 1996 deadline are indicated with two asterisks (**); copies of their letters and the State's response are included in this chapter.

Federal Agencies

- U.S. Environmental Protection Agency
- U.S. Army Support Command Hawaii
- Department of the Interior, Fish and Wildlife Services
- * Department of the Interior, Geological Survey
- * Department of the Navy, Naval Base Pearl Harbor
- National Marine Fisheries Service, Pacific Area Office
- National Resources Conservation Service
- * U.S. Army Corps of Engineers
- U.S. Coast Guard

State Agencies

* Office of Environmental Quality Control
  Department of Agriculture
  -- Department of Accounting and General Services
  -- Department of Business, Economic Development & Tourism
  -- Department of Business, Economic Development & Tourism, State Energy Office
* Department of Defense
* Department of Hawaiian Home Lands
* Department of Health
* Department of Land and Natural Resources
* Department of Land and Natural Resources, State Historic Preservation Division
* Housing Finance and Development Corporation, Department of Budget & Finance
* Department of Transportation
  Na'Ala Hele Program, Division of Forestry & Wildlife
  Office of State Planning
* State Commission on Persons with Disabilities
* State Land Use Commission

**County of Hawaii**

* Planning Department
  Department of Parks and Recreation
  Department of Public Works
  Department of Research and Development
* Department of Water Supply
  University of Hawaii-Hilo Campus Library
  Civil Defense Agency

**University of Hawaii**

* Environmental Center
* Marine Programs
  Water Resources Research Center

**Libraries**

  State Main Library
  State Archives
  Legislative Reference Bureau
  University of Hawaii, Hamilton Library
  Department of Business, Economic Development & Tourism Library

**Regional Libraries**

  Kaimuki Regional Library
  Kaneohe Regional Library
  Pearl City Regional Library
  Hilo Regional Library
  Kahului Regional Library
  Kauai Regional Library

**Hawaii Island Libraries**

  Bond Memorial (Kohala) Library
  Holualoa Public Library
  Kailua-Kona Public Library
  Kealakekua Public Library
  Thelma Parker Memorial Library
Non-Government Agencies

American Lung Association
Hawaii Electric Light Co. Inc.
* Office of Hawaiian Affairs

State Legislators

Senator Malama Solomon
Representative David Tarnes
Representative Virginia Isbell

County Council

* Councilman Keola Childs
  Councilman Jim Rath
  Councilman John Ray

News Media

Honolulu Star Bulletin
Honolulu Advertiser
Hawaii Tribune Herald
West Hawaii Today

Community Organizations

E Mau Na Ala Hele
Hale Kea Farms
Hawaii Island Environmental Council
* Hawaii Leeward Planning Conference
* Hui Lihikai +
  Kohala Coast Resort Association
  Kona Hawaiian Civil Club
  National Association of Hawaiian Civic Clubs
  National Land Committee, Ka Lahui Hawaii
  People’s Advocacy for Trails Hawaii (PATH)
  Puako Community Association
  Waimea Community Association
  Waimea Hawaiian Civic Club
* Waimea Property Owner’s Association (2 letters) +

Private Parties

* John & Ann Alkire
* Anonymous +
  Laura C. Beckvold
* John Broussard +
* Andrew Condrey +
* David T. Hosbein
* Dr. & Mrs. David J. Hosbein
* John Hosbein
* Lisa M. Hosbein, MD
* John J. Lowrey
* Mike Lowrey
  Mauna Kea Properties, Inc.
* Gregory R. Mooers +
* Benjamin Moore
* Ana Nawahine-Kahoopii +
* Patricia S. O'Kieffe
  Palekiki Ranch, Inc.
* Kelly Pomeroy +
* Morage Rice +
  George H. Robertson
  Richard R. Schulze
* Zanga Schutte +
* Mary Hugh Scott +
* Allan S. Treadwell, MD +
* Richard R. Treadwell
* Patricia Tummons
  J. Curtis Tyler III
* H. Visser +
* Roy A. Vitousek, III
  Al Weinert
* Arthur von Wiesenberger +
  Elizabeth T. Wray
* Marcia S. Yardley +

**Fill-In Form**

* Carla Beard +
** Martha M. Black +
* Richard M. Devine +
* Holley K. Fredrickson +
* Dorothy N. Gulbransen +
* Deborah Harkins +
* Frederick Jones +
* Helen J. Thomas Maddock +
* Herbert McKelvy +
* Andrew L. Morgan & wife +
** Leon T. Thevenin +
* Constance A. Treadwell +

7-4 Final MAY 2001
United States Department of the Interior

Mr. Gary Gill
State of Hawaii
Office of Environmental Quality Control
220 South King St., Fourth Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Draft Environmental Impact Statement

We have received the Draft Environmental Impact Statement (DEIS). We regret that because of prior commitments we are unable to review the DEIS within the 45-day deadline.

Enclosed is the DEIS which is being returned to your office for your future use.

Sincerely,

William Meyer
District Chief

Enc.

cc: Mr. Andy Monda, Department of Land & Natural Resources
Mr. Glen Koyama, Bell Collins Hawaii Ltd.

Mr. William Meyer, District Chief
U.S. Geological Survey
Water Resources Division
U.S. Department of the Interior
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

Dear Mr. Meyer:

Environmental Impact Statement (EIS)

Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of June 27, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

Although you were unable to comment on the Draft EIS, we appreciate your effort to review the document.

Sincerely,

Andrew M. Monden
Chief Engineer

AM:ck
OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Bell Collins Hawaii
State Parks Division, DLNR
DEPARTMENT OF THE NAVY

Governer:
Attn: Mr. Gary Gill
State of Hawaii
c/o Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, HI 96813

Dear Mr. Gill:

Subj: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE HAPAUNA BEACH STATE RECREATION AREA EXPANSION, LALALINO, SOUTH KOHALA, HAWAII OF JUNE 1996

Thank you for the opportunity to review the DEIS for Hapauna Beach State Recreation Area Expansion, Lalalino, South Kohala, Hawaii of June 1996.

The Navy has no comments to offer at this time and appreciates the opportunity to participate in your review process.

The Navy's point of contact is Mr. Stanford Yuen at 474-0439.

Sincerely,

[Signature]

Copy to:
Mr. Andy Hondo
Division of State Parks
c/o Land Division
State of Hawaii
1151 Punchbowl Street, Room 221
Honolulu, HI 96813

Mr. Glen Koyama
Bilt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, HI 96813

Mr. Stanford B. C. Yuen, P.E.
Naval Base Pearl Harbor
Department of the Navy
P.O. Box 110
Pearl Harbor, Hawaii 96850-5020

11010
Ser N4 (23)6321

May 31, 1996

ENVIRONMENTAL IMPACT STATEMENT (EIS)
Proposed Hapauna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 1, 1996, regarding the Draft Environmental Impact Statement (DEIS) for the Hapauna Beach State Recreation Area Expansion project.

We appreciate the time and effort you took to review the DEIS.

Sincerely,

[Signature]

ANDREW M. MONDEN
Chief Engineer

AMA-1K
C. Warren Harrison, Harrison Associates
Glen Koyama, Bilt Collins Hawaii
State Parks Division, DLNR
August 9, 1996

Governor of the State of Hawaii

To Mr. Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Dear Governor Cayetano:

Subject: Draft Environmental Impact Statement (DEIS) - Hapuna Beach State Recreation Area Expansion, South Kohala, Hawaii

We have reviewed the above mentioned document and have no comments to submit at this time.

We thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

cc: Mr. Andy Menden, Division of State Parks, Department of Land and Natural Resources, 1151 Punchbowl Street, Room 221, Honolulu, Hawaii 96813
Mr. Glen Koyama, Belt Collins Hawaii Ltd., 680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Mr. Kenneth M. Kaneshiro
State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
P.O. Box 5004
Honolulu, Hawaii 96850-0001

Dear Mr. Kaneshiro:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 9, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

We appreciate your time and effort for reviewing the DEIS.

Aloha,

MICHAEL D. WILSON

cc: OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
Planning and Operations Division

July 5, 1996

Mr. Gary Gill
Office of Environmental Quality Control
State of Hawaii
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion, South Kohala, Hawaii. The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act:

a. Based on the information provided, a DA permit will not be required for the project. However, if the applicant proposes future activities in or near jurisdictional waters, consultation will need to take place with our Operations Branch to determine if a DA permit may be required (438-9258; extension 14). Please refer to file number 960000278 for future inquiries.

b. The flood information provided on pages 3-34 of the DEIS is correct.

Sincerely,

Lawrence O. Murakoa, P.E.
Acting Chief, Planning and Operations Division

Mr. Lawrence O. Murakoa, P.E.
Acting Chief
Planning and Operations Division
Corps of Engineers, Pacific Ocean Division
Department of the Army
Fort Shafter, Hawaii 96858-5440

Dear Mr. Murakoa:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 5, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project. We acknowledge your comments on the Draft EIS and will include your letter in the appendices of the final EIS.

Sincerely,

ANDREW M. MUNDEK
Chief Engineer

OEQC
Warren Harrison, Harrison Associates
Glei Kauai, Belt Collins Hawaii
State Parks Division, DLNR.
Mr. Michael Wilson, Chair  
Department of Land and Natural Resources  
P.O. Box 221  
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion, South Kohala, Hawaii

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

1. Some new golf courses in Hawaii have conditions which require substantial "public play" rates and use privileges. Please survey existing and proposed golf courses in West Hawaii to determine whether the demand for affordable golf can be met by existing and approved private golf courses.

2. To meet the irrigation water requirement for the proposed golf course, an existing brackish water well will be rehabilitated and two new wells will be developed. How much water will be extracted from the new wells? What is the quality of the water? What is the sustainable yield of the underlying aquifer?

3. Most of the lands encompassed by the proposed park expansion are ceded lands. Please consult with the Office of Hawaiian Affairs regarding the use of ceded lands for the proposed recreation area expansion.

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

Sincerely,

Guy Gill  
Director

cc: Belt Collins

---

Honororable Guy Gill, Director  
Office of Environmental Quality Control  
State of Hawaii  
220 South King Street, Fourth Floor  
Honolulu, Hawaii 96813

Dear Mr. Gill:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of August 30, 1996, to the Department of Land and Natural Resources regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

1. Existing West Hawaii golf courses which offer public playing privileges have kamaaina rates that vary between $35 and $45 for Big Island residents and $35 and $55 for neighbor island residents. There are no exceptions to this, one golf course located north of Waimea and one that is south of Kohala-Kona offer kamaaina rates in the mid to high $20 range. The Hapuna Beach State Recreation Area's proposed golf course is expected to offer rates that are below the typical West Hawaii kamaaina rates. We anticipate a strong demand for golf at this fee level which will be near the rate charged by Hilo's municipal golf course. As you may know, West Hawaii does not have a public golf course.

2. At least about 650,000 gallons per day of brackish water will be drawn from the on-site wells. The third well serves as a back-up source for the first two wells. Information on the sustainable yield in this particular coastal area is scarce and generally not available because of a limited informational base. A draft copy of the Hawaii County Water Use and Development Plan, dated December 1991, indicates, however, there are approximately 54 million gallons per day of sustainable yield in the South Kohala region. As a whole, this is more than adequate to serve the long-term demand for this area. The current usage in the region is about 6.3 mgd (1995 State Water Commission records).
3. We have received comments from the Office of Hawaiian Affairs as well as from some residents of the community regarding ceded lands. Our response has been that DLNR confirmed that almost all of the park expansion area is ceded land and that the State is proposing improvements for public benefit and use. Additionally, the State’s position on ceded lands is that it will not sell or trade ceded land in exchange for other land. Any exception to this policy will be first approved by the Chairperson of the Board of Land and Natural Resources. Furthermore, 20 percent of all revenues received from the use of ceded land will be remitted to the Office of Hawaiian Affairs.

We trust our response adequately addresses your concerns.

Aloha,

MICHAEL D. WILSON

cc: Warren Harris, Harrison Associates
    Glen Kuyum, Belt Collier Hawaii
    State Parks Division, DLNR
TO:  The Honorable Benjamin J. Cayetano  
Governor, State of Hawaii

THROUGH:  Mr. Gary Gill, Director  
Office of Environmental Quality Control

SUBJECT:  Napuna Beach State Recreation Area Expansion 
South Kohala, Hawaii  
Draft Environmental Impact Statement

Thank you for the opportunity to review the subject document. The proposed project will have no immediate impact on our facilities. Therefore, we have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yamauchi of the Public Works Division at 586-9488.

[Signature]
State Controller

To:
Honorable Sam Caliño, State Comptroller  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Hilo, Hawaii 96720

Dear Mr. Caliño:

Environmental Impact Statement (EIS) 
Proposed Napuna Beach State Recreation Area Expansion 
South Kohala, Hawaii

Thank you for your letter of July 22, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement (DEIS) for the Napuna Beach State Recreation Area Expansion project.

We appreciate your time and effort for reviewing the DEIS.

[Signature]
Michael D. Wilson

cc: OEQC  
Warren Harrison, Harrison Associates  
Gina Koyama, Bob Collins Hawaii  
State Parks Division, DLNR
July 25, 1996

TO: Governor, State of Hawaii
C/o Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

ATTENTION: Mr. Gary Gill

FROM: Roy C. Prince, Sr.
Vice Director of Civil Defense

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS): HAPUNA BEACH STATE RECREATION AREA EXPANSION

State Civil Defense (SCD) appreciates this opportunity to comment on the DEIS submitted by the Division of State Parks, Land Division, on Hapuna Beach State Recreation Area Expansion, Kohala, District of South Kohala, Island and State of Hawaii; THK 6-6-01:por. of 2; 6-9-01:por. of 1; 6-2-1:1; 6-6-01: 1 to 4, 6, 7, 10, 17 to 32, 34, 35, and 39 to 43.

We do not have negative comments specifically directed at the DEIS. However, the proposed project area requires four (4) sirens and siren support infrastructure. Currently, the proposed area is covered by a single, automated, mechanical siren. SCD proposes that the developer purchase and install four (4) electronic sirens to include replacement and relocation of the existing siren and adding three (3) more sirens as the development of the recreation project area progresses. The existing mechanical siren should be replaced with an electronic, solar powered, 121 dB omnidirectional siren. To provide better coverage, this replacement siren should be relocated to another location in the existing parking lot. SCD also proposes that a second electronic, solar powered, 121 dB omnidirectional siren be purchased and installed near the rest rooms at the proposed "Group Picnic Rentals" area. The 121 dB sirens require a 250-foot radius in which there are no residential buildings. Two other electronic, solar powered sirens with specialized siren arrays should be purchased and installed in the proposed golf course area as indicated in Figure 2-4, "Hapuna Beach Recreational Area Expansion Master Plan." Just as fire hydrants, underground/overhead utilities, roads and streets, sidewalks, water and drainage systems are planned as integral parts of planned developments, so must emergency warning systems be planned for the safety and well-being of workers and guests/users when an impending or actual event threatens the area.

CHAPTER 3, "EXISTING CONDITIONS, ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES," Section 3.3, "TOPOGRAPHY, GEOLOGY, AND SOILS." Subsection 3.3.1, "Existing Conditions," sub-subsection 3.3.1.1. "Physiography," describes the typically uneven surface of the property, with minor knolls, small valleys and gullies and an average slope of 4.5 percent and elevations from the shore line to approximately 100 feet. While sub-subsection 3.3.1.3, "Geologic Hazards," addresses the volcanic and seismic hazards and Section 3.4, "CLIMATE," Subsection 3.4.1, "Existing Conditions," addresses rainfall and wind conditions. Additionally, Section 3.7, "COASTAL AND MARINE ENVIRONMENT," Subsections 3.7.1, "Existing Conditions," sub-subsections 3.7.1.1, and 3.7.1.1.4 addresses "High Staff/Storm Swells" and "Echamals," respectively. However, the impact of tropical cyclones/hurricane force winds (to include terrain amplification) and the inundation resulting from both storm driven waves and the torrential rainfall associated with such storms need to be addressed and evaluated. Facilities within the project area must be favorably aligned, designed and constructed to mitigate against and withstand these conditions of the project elevations. These structures could then be evaluated and surveyed for use as public shelters in disasters.

Our SCD planners and technicians are available to discuss this further if there is a requirement. Please have your staff call Mr. Hei Hishihara of my staff at 733-4300.

Enc.

b/c: Bilt Collins Hawaii, Ltd.
Attn: Mr. Glen Keypna

Governor, State of Hawaii
July 26, 1996
Page 2
Mr. Roy C. Price, Sr.
Vice Director of Civil Defense
Office of the Director of Civil Defense
State of Hawaii
3999 Diamond Head Road
Honolulu, Hawaii 96816-4493

Dear Mr. Price:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your memorandum of July 25, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

We acknowledge your recommendation for new and replacement sirens and siren support infrastructure for Hapuna and will consult with you on the final installation requirements during the project design stage.

With respect to tropical cyclones, hurricanes, storm driven waves and torrential rainfall, we will address and evaluate the effects of these natural forces, especially on the proposed park structures, in the Final EIS.

We trust our response adequately addresses your concerns.

Michael D. Wilson

CC: OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
MEMORANDUM

TO: The Honorable Gary Gill, Director
   Office of Environmental Quality Control

FROM: Kail Watson, Chairman
   Hawaiian Homes Commission

SUBJECT: Waikoloa Beach State Recreation Area Expansion

The Department of Hawaiian Homelands (DOHEL) anticipates significant growth on Hawaiian homelands at Kawaihae, Laimilo and Wai`ula. We support the proposed project which will increase recreational opportunities in the South Kohala region.

Thank you for the opportunity to review and comment. If you have any questions, please call Joe Chu of our Planning Office at 386-3828.

4O9O013

C: DLNR (State Parks)
   Bilt Collins Hawaii, Ltd.

Honorable Kail Watson, Chairperson
Hawaiian Homes Commission
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96804

Dear Mr. Watson:

Environmental Impact Statement (EIS)
Proposed Waikoloa Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your memorandum of August 8, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement (DEIS) for the Waikoloa Beach State Recreation Area Expansion project.

We appreciate your time and effort for reviewing the DEIS and your expressed support of the proposed park expansion.

Aloha,

MICHAEL D. WILSON

c: OEQC
   Warren Harbison, Harbison Associates
   Glen Koyama, Bilt Collins Hawaii
   State Parks Division, DLNR
The Honorable Benjamin Cayetano  
August 26, 1996  
Page 2  

TO:  
The Honorable Benjamin Cayetano  
Governor, State of Hawaii  
c/o Director, Office of Environmental Quality Control  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813  

FROM:  
Laurence Mike  
Director of Health  

SUBJECT: Draft Environmental Impact Statement  
Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii  

THK: 6-6-01: por. of 2; 6-9-01: por. of 1; 6-2-02: 1; 6-6-01: various  

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer:  

Wastewater  

The project proposes to use State land and funds for the expansion of an existing bench park at Hapuna Bay in South Kohala, Hawaii.  

The subject project is located in both a critical wastewater disposal area (CWDA) with five (5) acres of wastewater and noncritical wastewater disposal area as determined by the Hawaii Wastewater Advisory Committee. However, as these are public facilities, new cesspools will not be allowed as a means of wastewater disposal (Section 11-62-71.1(6)).  

There is no public sewage collection system in the South Kohala District. The expanded park facilities are to be partially served (8000 gpd) by a new sewer line between the project site and the Mauna Kea Resort Wastewater Treatment Facility. We recommend that the agreement to utilize the treatment facilities of Mauna Kea Resort be expanded to handle additional flows from the proposed park. Of particular concern are wastewater flows from areas such as the main park area, concessions, and organized group camping facilities. Existing cesspools may be required to be upgraded and when public sewers become available, connection will be required.  

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."  

Should you have any questions on this matter, please contact Ms. Lori Keilwitz of the Wastewater Branch at 586-4294.  

Solid Waste  

The DEIS estimates the volume of refuse that will be generated as a result of the park expansion, but does not address reduction or recycling efforts. The Integrated Solid Waste Management Act of 1991 formally establishes a solid waste reduction goal for the state of 50% by the year 2000. Any new development should identify, and commit to the opportunity to divert recyclable materials from traditional disposal. The increase in refuse generated within the park will include glass and aluminum beverage containers which could be segregated by separate collection bins.  

The golf course will generate increased ground trimming as a portion of the waste stream, and these should be composted, rather than handled as waste. The Department of Health's "Guidelines Applicable to Golf Courses in Hawaii," guideline number 4, encourages composting and reuse of greenwastes as a soil conditioner. Also, the guideline suggests that locally produced compost and soil amendments should be used whenever available. Guidelines are enclosed.  

Should you have any questions on this matter, please contact Ms. Carrie McCabe of the Office of Solid Waste Management at 586-4249.  

Enc.  

cc: Belt Collins Hawaii Ltd.  
DLNR  
OSMR  
WMB
GUIDELINES APPLICABLE TO GOLF COURSES IN HAWAII

In order to assure that environmental quality is protected, preserved and enhanced, the Department of Health (DOH) recommends the following for all golf courses in Hawaii. The owner/operator must also comply with all applicable DOH rules.

1. Baseline groundwater quality and, if appropriate, coastal water quality should be established.

2. The owner/operator should establish a groundwater and, if appropriate, coastal water monitoring plan. The groundwater and coastal water monitoring plans should minimally describe the following components:
   a. A routine monitoring schedule of at least once every six (6) months for the first three (3) years of operation and once a year thereafter, or more frequently in the event that the monitoring data indicates a need for more frequent monitoring.
   b. Compounds which should be tested. Include compounds associated with fertilizers, biocides, and effluent irrigation. These data should be permanently retained by the golf course and submitted periodically to the State DOH and the Planning Department of the county in which the golf course is being proposed. These data should be provided both in detail and in summary format and should relate to the baseline data and to adverse impact levels.
   c. If the monitoring data indicate increased levels of a contaminant associated with golf course maintenance activities that pose, or may pose, a threat to public health or the environment, the owner should immediately inform the State Department of Health and the County Planning Department. Subsequently, the owner must mitigate any adverse effects caused by the contamination.

3. If a wastewater treatment works with effluent reuse becomes the choice of wastewater disposal, then the owner/operator and all subsequent owners should develop and adhere to a wastewater reuse plan which should incorporate the provisions of the Department of Health's Guidelines for the Treatment and Use of Reclaimed Water, developed by the Wastewater Branch and dated November 22, 1993. A copy of the guidelines may be obtained by contacting the Wastewater Branch at 586-4294.

4. Above ground storage tanks for storing petroleum products for fueling golf carts, maintenance vehicles, and emergency power generators should be used rather than underground storage tanks (USTs). USTs may pose a potential risk to the groundwater and should not be encouraged.

5. Buildings designed to house fertilizers and biocides should be screened to a height sufficient to contain a catastrophic leak of any fluid containers. It is also recommended that the floor of this room be made waterproof so that all leaks can be contained within the structure in order to facilitate a cleanup.

6. A golf course maintenance plan should be prepared and implemented with regards to the use of fertilizers and biocides as well as an irrigation schedule. This maintenance plan should be based on operational practices that would minimize or prevent environmental pollution, including, but not limited, to, practices that are taught at the certification school of the National Association of Golf Course Superintendents.

7. Every effort should be made to minimize the amount of noise from golf course maintenance activities. Essential maintenance activities (e.g., mowing of greens and fairways) should be conducted at times that do not disturb nearby residents.

8. Solid waste should be managed in a manner that does not create a nuisance. Whenever possible, composting of green wastes for subsequent use as a soil conditioner or mulching material is encouraged. The composting and reuse should beconfined to the golf course property to eliminate the necessity for offsite transport of the raw or processed material. In addition, during construction the developer should utilize locally-produced compost and soil amendments whenever available.

9. Pesticides and other agricultural chemicals should be applied in a manner that prevents the offsite drift of spray material. The State Department of Agriculture should be consulted in this regard.

10. To avoid soil runoff during construction, the developer should consult with the U.S. Department of Agriculture, Soil Conservation Service to assure that best management practices are utilized.

If there are any questions regarding the guidelines recommended above, please contact the Environmental Planning Office at 586-4317. We appreciate your cooperation in preserving and protecting environmental quality in Hawaii.
Contact People at the Department of Health for Information Regarding the Guidance for Golf Course Development in Hawaii

<table>
<thead>
<tr>
<th>Subject</th>
<th>Contact Person/Phone No.</th>
</tr>
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<tbody>
<tr>
<td>2. Drainage Drywells</td>
<td>Chauncey Hsu—Safe Drinking Water Branch 586-4266</td>
</tr>
<tr>
<td>4. NPDES Permit</td>
<td>Dennis Lau—Clean Water Branch 586-4209</td>
</tr>
<tr>
<td>5. Maintenance Plan</td>
<td>Chauncey Hsu—Safe Drinking Water Branch 586-4266</td>
</tr>
<tr>
<td>6. Wastewater Reuse Plan</td>
<td>Harold Fau—Wastewater Branch 586-4209</td>
</tr>
<tr>
<td>7. Composting Green Waste</td>
<td>John Harder—Office of Solid Waste Management 586-4240</td>
</tr>
<tr>
<td>8. Noise from Maintenance Activities</td>
<td>Jerry Haruno—Noise &amp; Radiation Branch 586-4700</td>
</tr>
</tbody>
</table>

Other Contact People

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<th>Contact Person/Phone No.</th>
</tr>
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<tbody>
<tr>
<td>1. Runoff During Construction</td>
<td>U.S. Department of Agriculture, Soil Conservation Services 541-2600</td>
</tr>
<tr>
<td>2. The Application of Pesticides &amp; Other Agricultural Chemicals</td>
<td>State Department of Agriculture 973-9403</td>
</tr>
</tbody>
</table>

Honorable Lawrence Mika, Director
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96810

To Mr. Mike:

Environmental Impact Statement (EIS)
Proposed Haena Beach State Recreation Area Expansion
South Kauai, Hawaii

Thank you for your memorandum of August 25, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement for the Haena Beach State Recreation Area Expansion project.

Wastewater

In compliance with Section 11-62-31.1(d) of the Department of Health's Administrative Rules, we will not install cesspools to service the park expansion. Instead, we will provide septic tanks that meet the department standards. Meanwhile, we will upgrade, if required, existing cesspools and connect with a public sewer system when one becomes available in the area.

Solid Waste

In compliance with the Integrated Solid Waste Management Act of 1991, the State Parks Division will provide separate receptacles for cans and bottles for recycling purposes. The rest of the trash will be taken to the nearest County landfill. Grass and other landscape cuttings, particularly in the golf course area, will be collected and then composted and recycled as soil conditioners.
MEMORANDUM

TO:  GARY GILL
       Office of Environmental Quality Control

FROM:  DON HIBBARD, Administrator
       Historic Preservation Division

SUBJECT:  Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion, La'aulo, South Kohala, Hawaii Island

       TMIC: 6-6-1; pen 2; 6-6-1-1; pen 1; 6-6-2-1; 6-6-2-1 to 4, 6, 7, 10, 17 to 22, 34, 35, and 39 to 43

Our office is currently reviewing the Phase I and II archaeological reports prepared by Paul H. Rosenfeld, Inc. (PHRI) for compliance with Chapter 6E-8, HED for this proposed project. Until our office has approved all of the archaeological consultant reports no land alteration should be allowed to take place.

PM/JK

CC:  Andy Modlen, Division of State Parks
     Glen Koyama, Belt Collins Hawaii Ltd.
     Lu'lu Makie, Office of Hawaiian Affairs

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii  96813

Dear Mr. Hibbard:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your memorandum of August 2, 1996, to the Office of Environmental Quality Control (EQC) regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

Our Division of State Parks has also received a memorandum from you dated August 29, 1996, which provides an updated review of Paul H. Rosenfeld, Ph.D., Inc.'s (PHRI) current archaeological report. A representative from PHRI will respond to your comments and fulfill all necessary State Historic Preservation Division requirements for an acceptable inventory survey for the subject property.

Sincerely,  

ANDREW M. MINDEN
Chief Engineer

AM:ek

c:  ORQC
     Walter Harrison, Harrison Associates
     Glen Koyama, Belt Collins Hawaii
     State Parks Division, DLNR.
TO:      The Honorable Benjamin J. Cayetano  
         Governor, State of Hawaii  
         c/o Office of Environmental Quality Control  
FROM:   Roy S. Oshiro  
         Executive Director  
SUBJECT: Draft Environmental Impact Statement (EIS) for Hapuna  
         Beach State Recreation Area Expansion  

We have reviewed the subject EIS and note that proposed park  
expansion will require the acquisition of 18 privately-owned  
parcels behind Wailea Bay.  

As HFDC has oversight responsibility for statewide relocation  
progress pursuant to Chapter 111, HRS, we ask that you submit a  
copy of the relocation plan for our review.  

Thank you for the opportunity to comment.  

cc:      DLNR, State Parks Division  
         Belt Collins Hawaii Ltd.  
         L. Wood, HFDC  

August 5, 1996  

Mr. Roy S. Oshiro, Executive Director  
Housing Finance and Development Corporation  
Department of Budget and Finance, State of Hawaii  
677 Queen Street, Suite 300  
Honolulu, Hawaii  96813  

Dear Mr. Oshiro:  

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii  

Thank you for your memorandum of August 5, 1996, to the Office of Environmental Quality  
Control (OEQC) regarding the Draft Environmental Impact Statement for the Hapuna  
Beach State Recreation Area Expansion project.  

We will comply with Chapter 111, HRS, and submit for your review a relocation plan prior to any  
acquisition of the privately-owned parcels at Wailea Bay.  

Aloha,  

MICHAEL D. WILSON  

cc:      OEQC  
         Warren Harrison, Harrison Associates  
         Glen Koyana, Belt Collins Hawaii  
         State Parks Division, DLNR.
TO:       THE HONORABLE BENJAMIN J. CAYETANO, GOVERNOR
          STATE OF HAWAI'I
          C/O OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM:     KAZU HAYASHIDA
          DIRECTOR OF TRANSPORTATION

SUBJECT:           HAPUNA BEACH STATE RECREATION AREA EXPANSION
          DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
          TMIC: 6-6-01: POR 2; 6-6-01: POR 1; 6-2-2: 1; 6-6-2: 1-4,
          6, 7, 10, 17-33, 34, 35, AND 39-43

Thank you for your transmital requesting our comments on the subject DEIS.

Our comments are as follows:

1. The Island of Hawaii Long Range Highway Plan recommends the widening of Queen Kuhio Highway. Additional rights-of-way or setbacks may be required and should be coordinated with our Highways Division.

2. The alignment of the proposed Waiakea Bypass Road through the subject area should be coordinated with our Highways Division.

3. The existing channelized intersections with the Hapuna Beach Road and Puko Spur Road will require traffic signals. The developer should monitor and coordinate with our Highways Division when the traffic signals would be warranted.

4. The developer will be required to provide a fully channelized intersection with traffic signals for the proposed new golf course access road. The developer should be required to monitor and coordinate with our Highways Division when the traffic signals are warranted.

5. These improvements should be at no cost to the State.

6. Plans for any construction work within the State highway right-of-way must be submitted for our review and approval.

We appreciate the opportunity to provide comments.

cc: Mr. Andy Monden, Division of State Parks c/o Land Division
    Mr. Glenn Koyama, Belt Collins Hawaii Ltd.
Honorable Kazu Hayashi, Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii  96813-5097

Dear Mr. Hayashi:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your memorandum of August 12, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

Our plans for park expansion have been prepared to accommodate widening of the Queen Kaahumanu Highway and development of the new Waimea-Kawaihae Bypass Road. If and when these highway improvements occur, the park expansion will not be negatively affected. As requested, further refinements to our plan will be coordinated with the Highways Division of your department.

As indicated in the DEIS, traffic lights will be needed at the Queen Kaahumanu Highway intersections of Hapuna Beach Road and Punakoa Road some time in the future. We will work with the Highways Division on the appropriate timing for the traffic lights installation. We will also work with that office on the timing and installation of a channelized intersection with traffic signals for the golf course entry road.

Cost sharing will be sought from the Highways Division on the development of the intersection improvements. Much of the traffic on Queen Kaahumanu Highway already exists generated by growth in the region. Traffic will continue to increase due to overall development in West Hawaii, and the DOT should assume some of the cost of the highway intersection improvements.

Mr. Kazu Hayashi, Director  
Page 2  
DEC - 3 1996

We will submit plans for approval to the Highways Division for any construction work within the State highway right-of-way.

We trust our response adequately addresses your concerns.

Aloha,

Michael O. Wilson

OEQC  
W. Harrison, Harrison Associates  
Glen K. Ryma, Beth Collins, Hawaii  
State Parks Division, OHA.
Attention: Mr. Glen Koyama

Subject: Hapuna Beach State Recreation Area Expansion

Mr. Koyama,

I have received and reviewed the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion. Specific areas that are required to be accessible include: at least 5% of picnic tables and barbecue facilities per site; all comfort stations and public; and employee restrooms; provision, at least one outdoor shower per building; one of each cluster of outdoor showers per site; public; pavilions and associated facilities; public telephones; parking facilities; facilities; and storage and stage. Other areas or elements such as the golf course building would also be required, however, the course itself has only recommendations at this time. Although we want to maintain the integrity of all historic places or sites, recommend that, as much as is possible, provide access to these areas (including beaches and fishing areas) under the guidance of the State Historic Preservation Office.

For the Park Headquarters, public areas and indoor common use areas, e.g., lounge or meeting rooms, are required to be accessible. Employee work spaces need only be designed so one can approach, enter, and exit. Example: office of the Head Park Ranger need only be designed with an accessible door and hardware, however, maneuvering within the space, storage, etc., need not be accessible. This principle also applies to the maintenance yard.

If you have any questions, feel free to call me.

Sincerely,

Ben Gerope
Facility Access Coordinator

Mr. Ben Gerope
Facility Access Coordinator
State of Hawaii
Commission on Persons with Disabilities
919 Ala Moana Boulevard, Room 101
Honolulu, Hawaii 96814

Dear Mr. Gerope:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 30, 1996, and your comments on the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

When the proposed project proceeds to the design stage, the State Land Division will work with your office to comply with the Americans with Disabilities Act and provide appropriate facilities for the disabled.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

AM ck
C: Warren Harrison, Harrison Associates
Glen Koyama, Baltic Collins Hawaii
State Parks Division, DLNR.
The Honorable Benjamin J. Cayetano  
Governor, State of Hawaii 
500 S. King Street, Fourth Floor  
Honolulu, Hawaii 96813  

Dear Governor Cayetano:

Subject: Kealakekua Bay State Recreation Area Expansion - Draft Environmental Impact Statement (June 1996)

We have reviewed the subject Draft Environmental Impact Statement (DEIS), received by our office on June 25, 1996, and have the following comments to offer:

1) We confirm that the following parcels of land, identified by the following tax map keys, are within the respective State Land Use Districts:

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<tr>
<td>6-2-11: 02</td>
<td>Conservation</td>
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</tr>
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</table>

2) Clarification should be provided as to whether or not Tax: 6-6-02: 05 is included in the Kealakekua Bay State Recreation Area Expansion.

We understand that Tax: 6-6-02: 05 is a private residential lot located behind Kailua Beach.

In the event that Tax: 6-6-02: 05 is determined to be included in the Kealakekua Bay State Park Expansion, the parcel is within the State Land Use Urban District.

3) We confirm that the Office of Planning (formerly Office of State Planning) included a recommendation to recategorize a portion of the existing Kealakekua Bay State Park from the Urban District to the Conservation District in its State Land Use District Boundary Review - Hawai'i report, completed pursuant to HRS §205-18.

To date, the Office of Planning has not filed a petition for district boundary amendment for said recommendation.

4) Further, we confirm that the Office of Planning included a recommendation to categorize a portion of Tax: 6-6-02: 40 and 41 (approximately 9.61 acres adjacent to Queen Kapiolani Highway) from the Agricultural District to the Conservation District.

However, review of our records show that the area in question is already within the State Land Use Conservation District. On May 8, 1995, a request was made to the Agricultural/Conservation District Boundary to have the Conservation District Boundary about the South (western) side of Queen Kapiolani Highway.

5) We note that the Kāne'ohe portion of the Mānuka Point area, located immediately northeast of the Kealakekua Bay Park Expansion was the subject of a Commission approval (LUC Docket No. 884-574/Mānuka Point, Inc.) On May 8, 1995, the Commission approved reclassification of approximately 317 acres from the Agricultural District to the Urban District for residential, recreational, and golf course uses. The Commission also made approximately 82 acres subject to Incremental Distingcting.

On December 3, 1994, the Commission approved reclassification of the approximately 82 acres, for residential use.

We have no further comments to offer at this time.
The Honorable Benjamin J. Cayetano
July 16, 1996
Page 3

Thank you for the opportunity to provide comments on the DEIS.

If you have any questions in regards to this matter, please feel free to contact me or Leo Asuncion of my staff at 567-3622.

Sincerely,

[Signature]

ESTHER UEDE
Executive Officer

Cc: DBEDT (Dir. Ref. No. 96-243-R)
Mr. Andy Munden, Division of State Parke
Mr. Glen Koyama, Bait Collins Hawaii, Ltd.

Ms. Esther Ueda, Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804-2359

Dear Ms. Ueda:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 16, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project. Below is our response to your comments.

1) We acknowledge your confirmation of the subject parcels.

2) Parcel 5 of TMK 6-6-02 is a private parcel, but the State is planning to acquire the property and include it as part of the park master plan.

3) We acknowledge your confirmation of the recommended Urban to Conservation District reclassification for a portion of the existing Hapuna Beach State Recreation Area.

4) We will include the corrected Agricultural/Conservation District Boundary abutting the makai side of Queen Kojima Highway in the Final EIS.

5) The Urban District classification for the maula Mauna Kea Resort area is reflected on Figure 4-1 of the Draft EIS.
August 4, 1996

Mr. Glen Koyama
Haleiwa Beach Park Planning
420 Ali Moana Boulevard, First Floor
Honolulu, HI 96813

Dear Mr. Koyama:

Hapuna Beach State Recreation Area Expansion
Draft Environmental Impact Statement

We have received the draft EIS for this project and have the following comments:

1. The DEIS includes discussion of several issues raised during our review of the EISPS for this project with the exception of concern number 5 relating to the proposed UH Hilo-Pau Hana Field Station Kalakaua Marine Education Center.

2. State Parks proposes to purchase the existing residential lots and improvements immediately mauka of Waiale Bay in what appears to be a move to minimize conflicts between public and private purposes. Similar thought/discussion should be presented on the relationship and impacts of the proposed park expansion and the Education Center.

Thank you for the opportunity to comment. Should you have any questions, please feel free to contact Rodney Nakano or Alice Kawahs of my staff at 961-8288.

Sincerely,

Virginia Goldstein
Planning Director

Mr. Virginia Goldstein, Planning Director
County of Hawaii
25 Aupuni Street, Room 109
Hilo, Hawaii 96720-4252

Dear Ms. Goldstein:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 4, 1996, regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

In Section 3.2 of the DEIS, we discussed the proposed University of Hawaii-Hilo facility at Puaela. The new facility will be ocean-research oriented and operated as part of the Kalakaua Marine Education Center. Since the project is in its conceptual stage, specific information on proposed facilities is not known.

Considering the nature of the facility and its location at the isolated southern end of the project site, the State Parks Division does not anticipate any conflicts of use or interference with access and views. From the marine center standpoint, low-profile uses near the facility are not expected to disturb the center’s research or educational activities.

We trust our response adequately addresses your concerns.

Sincerely,

Andrew M. Monden
Chief Engineer

AMrk
C: Warren Harrison, Harrison Associates
Glen Koyama, Haleiwa Beach State Park Division, DLNR
Dear Mr. Pavao:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 1, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

We are planning to develop a new well at the approximately 1,200-foot elevation of the Lelumulo land tract. This well site is situated in a proven well field which has already produced four successful wells. Existing transmission lines from the well field to the Queen Kaahumanu Highway right-of-way will be used to convey potable water for domestic purposes to the proposed park expansion.

Construction plans and design calculations will be submitted to the State Department of Land and Natural Resources and to your department for review and approval before construction begins.

We trust our response adequately addresses your concerns.

Sincerely,

[Signature]

ANDREW M. MONDEN
Chief Engineer

AM:rk
cc: OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
The Division of State Parks proposes expansion of the existing Hapuna Beach State Recreation Area in South Kohala, Hawaii from 62 acres to 846 acres. The enlarged park will extend from Hapuna Bay to Puako Bay and from the shoreline to the 320-foot elevation approximately 1,000 feet south of Queen Kaahumanu Highway. The park expansion will include numerous outdoor recreational facilities to implement the 1990 State Comprehensive Outdoor Recreation Plan objectives and to accommodate the projected demand in the South Kohala area. Planned improvements include camping and picnic sites for families and groups, parking and vehicular access to the shoreline, pedestrian trails and shoreline accesses, a park headquarters, maintenance facilities, and a 18-hole public golf course to be located south of the highway. The expansion will require acquisition by the state of 18 privately owned parcels currently occupied by past- and full-time residences. The schedule for acquisition will depend on availability of funds from the State Legislature.

This review was completed with the assistance of George Curtis, UH Hilo; Terry Hunt, Archaeology; and Tom Hawley and Paul Kowallis of the Environmental Center.

The Hapuna Beach State Recreation Area expansion comprises a firm commitment on the part of the State to enhance outdoor recreation opportunities for residents and visitors. Hapuna Beach already is a popular outdoor recreation venue and we concur with efforts to augment its use sensibly. We also applaud the State's intent to provide amenities aimed primarily at residents, and we agree that many features of the proposed expansion work toward the satisfaction of Big Island recreational demands. However, there are several issues which lack adequate discussion in the draft EIS, and others which need to be clarified in the final document. We have outlined these below for your information.

**Water**

Establishment of an adequate water supply for both the park improvements and the proposed golf course is acknowledged to be one of the major issues of the proposed project. Water supply issues generally are significant on the Big Island's Kona Coast and will likely be exacerbated by continuing development. Merely acknowledging such difficulties, however, is insufficient. This draft EIS needs to provide substantive information as to how such issues will be resolved for purposes of the proposed action.

According to the draft EIS, potable water for improvements made at Queen Kaahumanu Highway will be drawn from the existing Lelalilo water system. The document acknowledges that acquisition of water from this source will require the development of a new well, because the current system already is at capacity. However, the draft EIS lacks any sustained discussion of the feasibility of this option. Has the Lelalilo system been analyzed with a view toward further extraction? What is the sustainable yield of this system? What future development in the area is likely to seek water from this system? In the absence of such analyses, it is premature to assume that existing sources will meet project demand.
Considerably more information must be included in the final EIS in order to permit an informed consideration of the proposed project's potable water needs.

Irrigation water for the proposed golf course on the maku side of Queen Kaahumanu Highway is an equally important issue. The draft EIS proposes use of brackish water for golf course irrigation and states that "... rehabilitation of the existing brackish water well and development of two new wells within the golf course will be undertaken." (p. 3-75). Though the draft EIS estimates that golf course irrigation will require 650,000 gallons of water per day, no indication is given as to whether the source of this brackish water can sustain such usage. What is the sustainable yield of the proposed source, and to what degree will the proposed drawdown affect water chloride content? What other users currently draw from the proposed source? Have any studies been conducted on behalf of the two new wells proposed for golf course irrigation? Given the extent of project planning thus far, it is not unreasonable to expect that such data could be acquired. This information must be included in the final EIS.

Due to the lack of adequate water resource information, there is little assurance that water provisions for the project area are viable. Such a circumstance not only hinders ill for successful project completion, but also makes political assessment and evaluation of the project more difficult. With regard to information on water resources, this draft EIS fails to meet requirements of Chapter 343, Hawaii Revised Statutes, which states that the applicant shall make such information available at the earliest practicable time." These shortcomings are underscored by remarks included in the draft EIS from the U.S. Department of Agriculture's Soil Conservation Service (Chapter 6) to the effect that the Hapuna Beach Area "... is very close to exceeding the sustainable yield of the aquifer." The County of Hawaii Department of Water Supply also noted the need for additional water infrastructure to service the proposed project. At the very least, such water resource information should be included in the final EIS. In fact, if the omitted details are likely to alter analysis of the project's environmental merit, then the document ought to be revised and resubmitted before continuing further with the process. Only then can the public and project planners be assured of timely and adequate information with which to assess and implement the proposed action.

Project Alternatives

The draft EIS offers three alternative actions for the Hapuna Beach State Recreation Area expansion. Alternative A (the preferred alternative), encompasses improvements makai of Queen Kaahumanu Highway and development of a public golf course on the maku side of Queen Kaahumanu Highway and development of a public golf course in the South Kohala District (Chapter 6). As further pointed out by a Big Island County Council member, many of these golf courses will provide for substantial public play privileges.

Given these considerations, we question the applicant's statement that the need for affordable golf in the region will not be satisfied in the absence of alternative A. It seems that future development already planned for the Hapuna Beach Area could easily meet this demand. The importance of recognizing this is underscored by both the size of the proposed action and by community concerns regarding the size and scope of the Hapuna Beach Improvements. As a projected cost of $40 million (page 1-3), the preferred alternative represents a substantial public expenditure to fulfill needs which will likely be met by the private sector. As suggested by one of our reviewers, since the probability of building the golf course is low, it may be more realistic to analyze the project without it.
Area residents have voiced opposition to the proposed improvements for similar reasons. As one commenter noted, prior requests for small-scale improvements at the Waikiki Beach site were unanswered for years, only to be subsequently addressed by the current proposal which seems unworkable, prohibitively expensive, and out of proportion to the needs of the region. In light of regional concerns, it would be appropriate for the State to reconsider the alternatives contained in the draft EIS with a view toward economics, demand for the project, and public input.

Condemnation of Waikiki Bay Lots

In concert with comment letters contained in the draft EIS which suggest that it is incumbent upon the State to preserve shoreline access, we concur with the State's effort to acquire beachfront property for the proposed action. Further, we agree with the opinion expressed in the draft EIS that the Waikiki Bay lots "...would serve the public best if this area were developed for public park use" (page 2-23). Nevertheless, there are some elements of the condemnation issue which require clarification in the final EIS.

Our reviewers point out that despite the importance of condemnation to the proposed action, it receives disproportionately small consideration in the draft EIS. As recognized in the document, the plan to acquire the Waikiki Bay lots remains an unresolved issue, because it lacks a definite timetable and because this portion of the proposed action still requires funding from the Legislature. Indeed, the $40 million proposed cost of the Waikiki Beach expansion does not include the cost of acquiring the lots, nor does the draft EIS attempt to estimate how much funding acquisition will require. The economic analysis with regard to this portion of the project makes very precise claims based on incomplete and imprecise data. Given these circumstances, we urge planners of the proposed action to devise an alternative to the Waikiki Beach improvements that does not include acquisition of these lots. Such an alternative is even more important when considering the State's current fiscal limitations. In short, it does not seem certain that acquisition of the lots at Waikiki Bay will in fact occur, a circumstance which warrants formulation of a project alternative which reflects this possibility.

Apart from whether acquisition does or does not occur, we find some of the language contained in the draft EIS confusing. Page 3-58 of the document mentions concerns of Waikiki Bay residents regarding park safety and the potential increase in illicit activities at the park which might accompany expansion. Irrespective of the substance of these concerns, we are unsure about the use of the term "resident" in this context. Given that the proposed action calls for relocation of people living in the expansion area, such language suggests the possibility that some residents in the area may be allowed to stay, while others are forced to move. Though we recognize that the paragraph in question most likely refers to the incremental nature of the proposed expansion, we would nevertheless appreciate a clarification.

Omissions

For the sake of completeness, this draft EIS ought to explore two additional items in greater detail. First, the adjacent planned Waikiki Kalakaua Marine Education Center is omitted from most maps and descriptions. Aside from a brief reference stating that planning funds have been granted for this facility and some pictorial maps in Section 2, the document substantially ignores the project. Certainly in terms of utilities, access, and usage, these State projects will have some interaction. As stipulated in Section 11-500-17, Hawaii Administrative Rules, "...the interrelationships and cumulative environmental impacts of the proposed action and other related projects shall be discussed."

Second, the detailed archaeological section fails to include any discussion of Laposki State Historical Park which lies just a few miles away. This park contains well preserved examples of the stone walls found in the project area.
Thank you for the opportunity to comment.

Sincerely,

[Signature]

John T. Harrison
Environmental Coordinator

CC: OEQC
    Roger Fujioka
    Holt Collins Hawaii, Inc.
    George Curtis
    Terry Hone
    Tom Hawley
    Paul Berkowitz

Mr. John T. Havison, Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawai'i 96822

Dear Mr. Havison:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawai'i

Thank you for your letter of August 30, 1996, regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

Water

Information on groundwater in South Kohala is scarce and not precise, particularly because there is a lack of available hydrological data. A December 1991 draft of the Hawaii County Water Use and Development Plan prepared for the Department of Water Supply, County of Hawaii estimated the groundwater aquifer in South Kohala, which comprises the Waimea and Anahoomalu hydrological sectors, has a sustainable yield of 54 mgd. This aquifer includes the areas of Waimea, Kawaihae, Waikoloa, Puako, South Kohala resorts, and west slopes of Mauna Kea and northwest slopes of Mauna Loa. The current usage in this area is about 6.3 mgd (1993 State Water Commission records) which indicates that there is still a large reserve of water in the region.

The best available hydrological information for the project area is the data compiled from the existing potable wells at the 1,200-foot elevation of the Lahainaluna land tract. These wells have been the most successful and have provided the best feasible option for additional source development in South Kohala. Each of the three largest wells in this area is capable of producing approximately 1.4 million gallons per day.

Better hydrological information for the project would come from test drilling for potable water. Test drilling, however, is typically done when a project is in the latter stages of planning and in the design process. It would be pressure to incur the high costs of test drilling a well during the present phase in the absence of entitlements for the park improvements.
Irrigation water is currently obtained from a breakwall well (Elevation 244') above Queen Kaahumanu Highway. It is anticipated that additional wells at this elevation would produce similar results. As an alternative, better quality water may be obtained at higher elevations within the same State land tract, however transmission of the water to the project site would then become a consideration. Use of higher quality water may be an advantage if excessive use of sources of water at lower elevations results in higher potential of salt water intrusion.

Project Alternatives

The Draft Environmental Impact Statement (Appendix B) includes a market study of public golf courses demand in the project area. The DEIS also notes that other planned golf courses in the region are delaying implementation and may not move forward at all. Therefore, to be conservative, the DEIS does not consider planned golf courses in its analysis unless they are under construction.

Existing West Hawaii golf courses which offer public playing privileges have kamaaina rates that vary between $35 and $45 for big Island residents and $33 and $35 for neighbor island residents. There are two exceptions to this: one golf course located north of Wainae and one that is south of Keahu-Kona offer kamaaina rates in the mid to high $20 range. The Hapuna Beach State Recreation Area's proposed golf course is expected to offer rates that are below the typical West Hawaii kamaaina rates. We anticipate a strong demand for golf at this fee level which will be nearer the rate charged by Hilo's municipal golf course. As you may know, West Hawaii does not have a public golf course.

The estimated cost of $40 million covers improvements for the entire park expansion. Approximately 60 percent of this cost is projected for the golf course construction. In Section 2.4.2 of the DEIS, we indicated the possibility of a joint sponsorship of the project with a private developer. This arrangement would have the developer bear the entire construction cost of the golf course so that saving the State substantial money. The developer in return would get a majority of the revenues from the golf course operation and a favorable lease on the property.

The proposed project is part of a medium-range master plan calling for improvements to the Hapuna Beach State Recreation Area over a 12 to 15-year period. This development program will be dependent upon funding by the State Legislature and priorities of other public improvement projects. The proposed plan, hence, is only a blueprint or guide for development of the Hapuna area, and the State legislators and administrators will make a final determination on implementation.

Condensation of Wailea Lots

One reason we did not estimate property values at Wailea during the DEIS preparation process was that real estate values had and were expected to vary considerably over the years.
Governor of the State of Hawaii
C/o Office of Environmental Quality Control
State of Hawaii
220 S. King Street, Fourth Floor
Honolulu, HI 96813
Attn. Mr. Gary Gill

Dear Mr. Gill:

I have only briefly perused the "Draft Environmental Impact Statement: Hapuna Beach State Recreation Area Expansion, Kohala, South Kohala, Hawaii" dated June 1996.

My principal concern is that the DEIS does not adequately address the "Proposed UH Hilo Punku Field Station of the Kohala Marine Education Center". Reference is made to this Station occupying only five acres of land, whereas the UH Board of Regents has requested a lease for a total of twenty acres to fully develop the facility. BLNR approval is pending more detailed plans from the University. Substantial community support exists for the UH to build this facility, and such development would be inconsistent with proposed park use. If the total acreage is awarded to the University, modifications to park plans and environmental impacts would likely be required. If park development precludes the University from full use of the twenty acres, then there will be direct impacts on the State Plans for both Education and Higher Education.

I am also concerned about environmental impacts of developing the park. This reef area is one of the most pristine and healthy reefs in Hawaii. The DEIS proposes insufficient controls, monitoring, and mitigation for sediment runoff generated by construction and maintenance of such parcels as the golf course. To my knowledge, no nearshore construction projects of this scope in Hawaii have had acceptable impacts on the adjacent marine waters. If this project is to advance, more stringent requirements on the developer must be designed and enforced.

Thank you for this opportunity to comment.

Sincerely,

Sherwood Maynard, Ph.D.
Director, Marine Option Program

Mr. Sherwood Maynard, Ph.D., Director
Marine Option Program
School of Ocean and Earth Science and Technology
University of Hawaii at Manoa
1000 Pope Road, M3B 229
Honolulu, Hawaii 96822

Dear Dr. Maynard:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 31, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

At this time, this DEIS is being prepared, as are the plans for the Kohala Marine Education Center. No specific development plans are available, and no property line was defined. In the spirit of cooperation, the Land Division and the University will maintain an open line of communication with the University as it defines its program and site requirements for the new center.

In our DEIS, we considered the possible location and extent of the marine studies facility at Pukuu Bay. We are assuming that when development plans are completed and details of the marine facility are known, the University will prepare its own EA or EIS. At that time, we will be pleased to review the University's document and provide input and comments.

Section 4.4.2 of the Draft EIS discusses the proposed project and its overall location in lieu of the shelf area. Section 3.5.2 discusses the anticipated impacts from project-generated runoff and the State's intent to comply with relevant regulations to provide mitigative measures. These regulations must be met if any permits are issued for the proposed project.
August 05, 1996

Governor of the State of Hawaii
C/O Office of Environmental Quality Control
229 S. King St., Fourth Floor
Honolulu, HI 96813

Dear Sir:

Thank you for the opportunity to review the Draft Environmental Impact Statement, Hapuna Beach Park, State Recreation Area Expansion, Kailua-Kona, Hawaii. The Land and Natural Resources Division has reviewed the plan and prepared the attached report. Please contact me, or Linda K. Delaney, the Land and Natural Resources Division Office (594-1930), or Luis A. Marques (594-1755), should you have any questions on this matter.

Sincerely yours,

Marsha Ross
Deputy Administrator

[In enclosure]
features of the Hawaiian culture that the development of additional facilities including an 18-hole golf course may generate public outcry and may further the perception of lack of sensitivity of state agencies to the cultural heritage of Native Hawaiians.

3. The expansion area is part of a low rainfall ecosystem comprising rugged landscapes, young, shallow, coarse-textured, steep, highly erodible soils, and scanty vegetation (mostly grasses and shrubs). This ecosystem is one of high fragility with several potential hazards (i.e., soil erosion, waterlogging and/or salinity) if earth-moving operations take place and the present soil-water balance is disrupted by growing intense nutrient-driven and high water-demand species such as turfgrass. Table 1 in Appendix B of the DEIS indicates that about 14,600 kg of nitrogen (N) will be applied annually to 86 acres of golf course but fails to indicate how much of this amount will be actually removed by turfgrass. Without this information, it is virtually impossible to ascertain a N balance after fertilization, plant uptake, and leaching losses. Because of the high likelihood of leaching losses in coarse-textured soils, additional baseline information is required, particularly for the area where the golf course will be located. Data on soil physical properties determining water and pollutant movement within and out the soil profile plus some kind of simulation of sediment and pollutant transport and loading through the soil profile are needed to forecast potential land degradation, underground water contamination, and shoreline pollution.

4. The Office of Hawaiian Affairs has serious concerns about the rationale, or lack of it, of the proposal to develop an 18-golf course in this part of the island known for having a high density of golf courses. Recent accounts indicate that "South Kohala, which now has seven courses, will continue to lead all Big Island districts with 19 courses if each planned course was completed." The development of a golf course in a densely recreational but otherwise sparsely populated area raises serious concerns about local land use policies solely driven by supply and demand.

In view of the above, OHA unequivocally opposes the proposed expansion of the Hapuna Beach State Park. There are serious concerns associated with the expansion that warrants a careful and thorough re-examination of the DEIS. Areas of concern are the planning and use of ceded lands for revenue and profit without consultation with Native Hawaiians, potential land degradation, and disturbance of highly significant archeological sites.

* 1995 Bobby Comard's article entitled "4 courses added to county list" published in West Hawaii Today.
Mr. Martha Ross  
DEC 5-3 1996

The State Historic Preservation Division (SHPD) is presently reviewing the study prepared by  
P. H. Rossenbush, Ph.D., Inc. PHIR will work with SHPD to meet its informational and  
migratory measures requirements and consider any specific concerns received from your office  
as well as the Kona Hawaiian Civic Club, National Association of Hawaiian Civic Clubs, National  
Land Committee (Ku Lahui Hawai'i), Waimanalo Hawaiian Civic Club, Na Alii Kula Hawaiian  
Island Advisory Council, Kamehameha Schools, and Kealakekua Kula Group. All  
of these organizations were sent copies of the Draft EIS.  

The new golf course will modify a barren sparsely vegetated area into a lush landscaped  
environment that will improve the visual and ecological character of the area. It will also preserve  
the area's open space. When properly constructed and maintained, the turf grass will  
reduce soil erosion and waterlogging. The potential of increased salinity from irrigation  
will be mitigated by the use of lower salinity water, improved soil conditioning,  
and periodic turf grading by the maintenance crew.

Dr. Charles Murdoch and Dr. Richard Green have conducted a number of studies in South Kohala  
as well as West Hawai'i. From their experience and training, they have concluded that it is very  
unlikely that nitrogen enrichment of the coastal waters will occur. The site's location in the  
region and from the shoreline, topography, geology, soil condition, irrigation practices, rainfall,  
water evaporative characteristics, ground-water condition, and beaching actions were all  
considered in the assessment. Murdoch and Green have indicated that the 3,200 feet buffer area  
between the water boundary of the proposed golf course and the nearest shoreline will be  
advantageous in causing dispersion and dilution of nutrients and other chemicals which may occur  
periodically during periods of high rainfall. It should be noted that groundwater beneath the  
project site will not be used for domestic use. If it were, then, according to Murdoch and Green,  
a more detailed analysis would be required.

For precautionary measures, Murdoch and Green have suggested careful irrigation management to  
reduce the likelihood of adverse impacts from irrigation of the turf. Use of slow-release nitrogen  
formulas, and use of adequate surface soil depth is also suggested. A well qualified golf  
course superintendent be employed who is capable of good golf course management.

Although there are a number of existing and planned golf courses in West Hawai'i, there are no  
public courses. Such a facility would provide a much needed amenity to this side of the island.  
Green fees at the new golf course would be affordable providing lower fees than the private golf  
course fees. This would be particularly beneficial to fixed-income residents, retirees, and junior  
golfers.

Ms. Martha Ross  
DEC 5-3 1996

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawai'i  

Thank you for your letter of August 5, 1996, to the Office of Environmental Quality Control  
(EQOC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach  
State Recreation Area Expansion Project.

Section 3.11.2.1 of the DEIS indicates that the State-owned portion of the park expansion area is  
ceded land and that 20 percent of all revenues derived from the use of this land must be  
reimbursed to the Office of Hawaiian Affairs. The State's proposal to expand the Hapuna Beach State  
Recreation Area is intended to provide new facilities for the residents and visitors of West Hawai'i.  
In this regard, the State is fulfilling its responsibility of meeting the recreational needs of its  
people.

An EIS Preparation Notice was sent to the Office of Hawaiian Affairs as well as the Kona  
Hawaiian Civic Club and Kealakekua Bay during the preliminary Draft EIS consultation process,  
but no response was received from your office. With the availability of the Draft EIS, we are able  
to furnish detailed information on the project to allow you to provide insightful comments. The  
proposed park expansion will continue to be presented for public review during the permitting  
process which includes additional meetings and public hearings.

Judge Herity made the ruling because the question came up as to the State's right to sell ceded  
lands. He reiterated the present condition, where the State does not own ceded lands but holds  
them in trust and should be liable for damages for the breach of its fiduciary duties. The proposed  
project is being planned for the benefit and use of the public. As stated above, the project will  
continue to be presented for public review during the permitting process.
Ms. Martha Ross
Page 3
OEJC 3 1996

We thank you for your comments regarding the DEIS.

Aloha,

MICHAEL D. WILSON

cc: OEJC
Warren Harrison, Harrison Associates
Glen Koyama, Biki Collins Hawaii
State Parks Division, DLNR
July 1, 1996

Benjamin J. Cayetano, Governor
State of Hawaii
c/o O.E.Q.C.
250 S. King Street, 4th Floor
Honolulu, HI 96813

Re: Draft E.I.S. - Hapuna Beach State Recreation Area Expansion

Dear Governor Cayetano:

I have had the chance to briefly review the draft environmental impact statement for the above referenced project, and inasmuch as the document is largely intended to generate public discussion on the project concept, more than the adequacy of the document as an E.I.S., I would like to offer the following preliminary comments on the proposed project:

1. Of the two "Alternatives" suggested, I strongly favor Alternative B, which does not include development of the state lands on the south side of Queen Kapiolani Hwy. I would oppose the use of state resources to fund or otherwise sponsor the development of a public golf course in this area, due to:

(i) significant private investor interest in developing additional golf courses within several miles of this site, including courses that, by zoning condition, will require substantial "public play" rates and use privileges, (Kuaa - Puako);

(ii) the likelihood that the devestion of public lands in the same vicinity will undermine the viability of those other courses being developed;

(iii) the clearly evident lack of sufficient quality and quantity of subsurface water for irrigation purposes on additional golf courses beyond those privately planned;

2. Although the makai 500 acre park concept is generally good, the parking lots should be pulled back toward Puako Road, to provide for a longer walk-in approach and a near-natural ambience throughout this "walk-in zone." Of course, paved, handicapped-accessible pathways would be required; key pathways should be largely tree-shaded with indigenous trees.

This alternate approach (literally and figuratively) would serve several specific purposes:

(i) in recognition of the higher "fragility" of the shore-side waters and reef within targeted bay, versus the waters and ocean bottom fronting Hapuna Beach, the user public would approach the beach and bay with a different attitude than for an "all purpose" beach park like neighboring Hapuna Beach.

(ii) the user public would have to expend greater effort to get to the narrower, shorter beach and more fragile ocean resources, and thus the user count would be necessarily lower as it should be for such a location.

(iii) this model of near-natural coastal recreational development would provide a much-needed alternative to the generic, all-purpose approach provided at most large beach parks. Thematically, it would provide an excellent ocean-flange transition to the natural park environments being conceptualized for the Mahia-Maminiwalli "six mile" state coastal park, and presumably to be later brought forth for the Kohala coastal area.

Given its proximity to Hapuna and the eventual Marine Research Center next to the Puako boat ramp, as well as its fine winter surf and potential for fishery development, this section of the master-planned area should be viewed as more of an "coastal adventure/education center" than just another "beach park."

Benjamin J. Cayetano, Governor
Hapuna Beach State Recreation Area Expansion D.E.I.S.
July 1, 1996
Hawaii island residents (and visitors) are hungry for access to and use of "low key" coastal areas which are improved with basic sanitation and shelter facilities in a clean, modestly vegetated environment. I think most of us care less about "parks" than we do about these other elements.

3. I concur with the concept of buying out the 18 private properties to make the whole thing work. However, the relatively high cost militates toward some form of compromise, so I suggest that the state do the following:

- Condense the improved properties in "increments" of 3 - 5 at a time, and as each is acquired, immediately re-sell a 20-year leasehold interest in the lots which are needed the soonest, and a 30-year lease in the others; of course, lots needed immediately would not be leased out. Septic tank/leach field systems should be installed by lessees of properties using cesspools.

- Rationale: a 20 - 30 year lease of these homes would provide a return of roughly 50% of the condemned fee simple value, if the lease rents are nominal; this would save the state many millions. A phased or incremental condemnation plan would also halt speculative increases in property values of the remaining lots.

- Also, the park will take at least five years to be otherwise developed; the transitional period will go by very quickly. In addition, some measure of site security will be provided by the property users during the "build-up" phase.

4. The "Wailea Beach" section of this master-planned complex should be managed by one or two kahō, given the nature of resources involved here.

Sincerely,

Kealoa Childef
Councillor, 7th District
The Honorable Keola Chida
Page 2
OFFICE 3-1995

For Wailea, we share your idea of a walk-in beach. We recognize the beach as very dynamic and that it can dramatically change in size depending on the season. Therefore, its use by the public would also change depending on the condition of the shoreline. We do not visualize Wailea as being similarly used like Hapuna Beach.

3. We appreciate your suggestions on the means in which the State could recover some of the cost in acquiring the private properties at Wailea. We will include your suggestions in the Final EIS.

4. The park expansion will require an increase in park staff and establishment of a headquarters building. As identified in the Draft EIS, park managers, groundskeepers, lifeguards, and security personnel are recommended positions for the park. Specific as well as general staff assignments would be made to cover Wailea Bay.

We thank you for your comments and suggestions regarding the DEIS.

Aloha,

MICHAEL D. WILSON

cc: O'JOC
Warren Harrison, Harrison Associates
Glen Kooyan, Bih Collins Hawaii
State Parks Division, DLNR
Governor of the State of Hawaii  
c/o Office of Environmental Quality Control  
State of Hawaii  
Attention: Mr. Gary Gill  
220 S. King St., Fourth Floor  
Honolulu, HI 96813

Dear Mr. Gill:

Hawaii Leeward Planning Conference has reviewed the draft environmental impact statement for Hapuna Beach State Recreation Area Expansion. We feel the draft document adequately addresses our concerns and have nothing to add.

Thank you for the opportunity of reviewing this document.

Very truly yours,

H. Peter L'Orange  
President

cc: Division of State Parks  
c/o Land Division  
State of Hawaii  
Attention: Mr. Andy Monden  
Bell Collins Hawaii Ltd.  
Attention: Mr. Glen Koyama

Mr. H. Peter L'Orange, President  
Hawaii Leeward Planning Conference  
P.O. Box 835  
Kailua-Kona, Hawaii 96745-0835

Dear Mr. L'Orange:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of July 10, 1996, regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project. We appreciate your review of the Draft EIS and are pleased to hear you are satisfied with the way the document has addressed your concerns.

Sincerely,

Andrew M. Monden  
Chief Engineer

AM:ek  
c: OEQC  
Warren Harrison, Harrison Associates  
Glen Koyama, Bell Collins Hawaii  
State Parks Division, DLNR
Mr. Richard Boyd, Chairman  
Hui Limihi  
P.O. Box 76  
Hawai, Hawaii 96719  

Dear Mr. Boyd:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii  

Thank you for your letter of August 30, 1996, regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

The proposed project will draw more people to the Hapuna Beach State Recreation Area, but the expanded facilities and additional shoreline areas are expected to disperse the park users and visitors over the entire park and minimize overburdening individual areas.

Expansion of the Hapuna Beach State Recreation Area is a higher priority at this time than the development of a park or coastal amenity on the Kealakekua Point of North Kohala. The Hapuna property, to a large extent, is expected to fill the recreational demand for the North and South Kohala Districts for the next ten to fifteen years. Since future funding may be limited, we would like to focus our resources on our existing park with its excellent white sand beaches and wide popularity among residents. Hapuna has been demonstrated to be a popular beach which we would like to improve and direct our resources. Additionally, since Hapuna already has existing infrastructure, we would not need to expend as much on initial improvements.

We appreciate your comments on the Draft EIS.

Sincerely,

Andrew M. Monden  
Chief Engineer

AM 70  
c: OEQC  
Warren Harrison, Harrison Associates  
Glen Kiyama, Bob Collins Hawaii  
State Parks Division, DLNR.
July 24, 1996

Governor of the State of Hawaii

c/o Office of Environmental Quality Control
State of Hawaii, 220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813
Contact: Mr. Gary Gill

RE: Hapuna Beach Park Expansion Plan

To Whom It May Concern:

Please be advised that I am a tax paying homeowner at Wailea Bay and president of the Wailea Property Owners Association.

I wish to address your draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion.

1. General Environmental Issues

A) Your report suggests that Wailea Bay and Beach are both about 75% of the size of Hapuna Beach. This is erroneous. Wailea Bay is a much smaller and more delicate water reserve. It cannot handle the capacity which you suggest. In fact, the depth and length measurements are about half the size your report indicates. The existing kahawai trees, which would shade, protect, and prevent beach erosion, will be removed. The existing beach is quite narrow and cannot handle the numbers you suggest. This analysis should be revised and revised.

B) Wailea Bay is subject to rain water flooding. The river washes in numerous times each year and further paving and grading will exacerbate the flooding conditions. If the private homes are removed, the bay will be turned into a mud bath.

C) Wailea should be a limited use park which encourages walk-on traffic and discourages vehicular usage. Ingress and egress points already exist at either end of the bay and proposed park property. This would then allow the Parks Department to open and close access efficiently as it saw fit. The private homes in the middle could act as a buffer to undeveloped areas, flooding, and fire.

2. Revenues and Expenses

A) To purchase 18 lots around Wailea Bay today would exceed $40 million dollars and double the cost of the park development.

B) To displace homeowners would cost the county over $200,000 in property tax revenues who have paid their taxes and paid their taxes. Many would probably relocate outside the State. Many of the residents are also business owners and employers who generate other income and excise revenues.

C) The property owners have been true stewards of the site. They continue to maintain and protect the beach as well as beautify the environment at no cost to the State or County.

D) The property owners have brought power and water to the area at no cost to the County or State, and have aided the police in terms of security and vehicular appropriation.

E) A proposal to enhance the existing access, parking, and enforcement at their expense has fallen on deaf ears.

F) Is the expenditure of $40,000 million to purchase property which already does not impede the use of the beach or surrounding area justified? It would seem from the appearance of other parks, in West Hawaii (North, Kona, Spencer, etc.), that funds are needed desperately to improve and maintain existing facilities closer to serviceable populations (i.e., North and South Kona).
3. Private and Public Co-Existence

It has been demonstrated in numerous instances that private property can co-exist within public lands. In this case, we have the perfect blend:

A) The public already has existing access and full rights to the beach and ocean at no cost.

B) The private property does not hinder or impede the use of the beach, the ocean, or the surrounding property.

C) The private property owners actually enhance the environment via landscaping, flood control, fire prevention, and security.

D) The revenues derived from the private lands and owners help to defray the cost to maintain the parks and build the facilities.

It is recommended that the provision for condemnation of private property be deleted from the study plan. Such inappropriate use of taxpayers’ funds could generate a major public backlash which might jeopardize the entire park plan approval.

Sincerely,

[Signature]
William T. White, III
President
Wailea Property Owners Association

cc: Division of State Parks, Land Division
Contact: Mr. Andy Wondka
Mr. William T. White, III

The proposed project is not expected to contribute to flooding. Safeguards will prevent or, at least, reduce the amount of project-generated runoff. Section 3.5.2 of the Draft EIS describes the resulting effect of landscaped lawns and golf course turf on surface runoff and the improved ground penetration that results from upgraded soil conditions. It also describes State Parks' plans to install drywells around the parking areas to collect stormwater runoff. When the private parcels at Walla Beach are converted to park improvements, the plan for site preparation and landscaping will be subject to County Department of Public Works review and approval.

Additionally, the State Department of Health is expected to require a National Pollutant Discharge Elimination System (NPDES) Stormwater Runoff Permit which requires the developer to prepare a Best Management Practices (BMP) Plan. This plan calls for an erosion and sedimentation control program and other surface runoff control measures to be implemented during project construction.

Our concept plan shows controlled vehicular access to the beach. We are locating the parking areas more than 420 feet from the shoreline and promoting the idea of a "walk-in" beach. Like other planned improvements at Walla, vehicular accesses will be improved or upgraded. These new accesses may be controlled during periods of natural hazards.

Park personnel will be increased with the expansion of the park and, with County agencies, provide needed emergency services such as fire protection, medical assistance, and security surveillance.

2. Revenues and Expenses

The private property owners have been an important asset to Walla Beach. Their contributions and value to the park are deeply appreciated, but the long-term value of the beach to the community must also be considered.

It is acknowledged that the acquisition of all of the lots at one time will be expensive, but an extended timetable for purchase will make the acquisition more affordable. Additionally, the cost of the project seems to stand out in the Draft EIS, but it should be noted that the benefits as described in Sections 3.2 and 3.11 of the DEIS are very positive and worth considering.

3. Private and Public Co-Existence

The State's objective for Walla is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.
The private properties at Waike Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the maka'ka land and beach land with its ocean resources.

As described above, access will be better with the park expansion and could be controlled in times of natural hazard.

Although property tax revenues will be lost from the removal of private homes and properties at Waike, user fees and economic effects will generate substantial direct and secondary benefits for the project. As described in Section 3.11.1 of the DEIS, approximately $27.8 million per year by 2015 would be accrued. Operations and maintenance costs would total approximately $5.1 million, thus providing an annual net benefit of $22.7 million per year. These numbers don't even tall of the additional jobs that would be created in the local economy.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

抄送:
OEQC
Warten Harrison, Harrison Associates
Glen Kayama, Belt Collins Hawaii
State Parks Division, DLNR.
August 26, 1996

Land Division
Department of Land and Natural Resources
1131 Punchbowl Street, Room 211
Honolulu, Hawaii 96813

ATTENTION: Andy Munden

RE: Comment on EIS Draft/Hearing on Hapuna State Park Expansion

Please be advised that I attended the recent hearing and presentation regarding the EIS Draft for the proposed Hapuna State Park Expansion in Waimea on August 22, 1996. Congratulations, the program was very well facilitated.

What I heard from the Belt Collins presentation and the peoples' comments at the meeting was that the increase in pedestrian and vehicular traffic will be so great that the limited shoreline will be tremendously overburdened. Basically, you are planning to create too large of an attraction. (i.e., Too many camping and picnic spots, too many roads and parking lots.) You should consider spreading your parks out across West Hawaii's coastline in smaller increments which would then accommodate a greater public and more communities rather than one giant regional traffic jam.

Please consider a fourth option: A smaller, kinder, gentler park.

Basically, this would be to use the existing property as it is. With the addition of a few strategically placed loss, outhouse containers, and law enforcement personnel, the entire area could remain a pristine spot for all members of the general public. This would then reduce the cost of construction leaving funds available for other similar parks to be created along the coast on other State land.

Lastly, the purchase of any private property appears to be an inappropriate use of valuable State funds. It is also apparent that private and public landowners can co-exist in a mutually beneficial mode.

Sincerely,

William T. White, III
President

cc: Governor Cayetano
Mike Wilson, Chairperson Board of Land and Natural Resources
Charles Yuen, Board of Land and Natural Resources - Hilo
Malama Solomon, Senator
David Tarnas, Representative
Alvin Koyama, Belt Collins
Susan Ratka, Belt Collins
Ralph Nagata, State Parks and Recreation
Mr. William T. White, III
President
Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Dear Mr. White:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 26, 1996, regarding the proposed Hapuna Beach State Recreation Area Expansion project.

Expansion of the existing park will draw more people and traffic to the area, but we do not anticipate a tremendous overburdening of the beach and shoreline area. There will be a number of other recreational opportunities in the park expansion to disperse human activity.

Overall, the park expansion will be a low-profile development (maybe small, kind and gentle in nature) involving less than 28 percent of the area below the highway for such uses as picnicking, camping, and beach and shoreline recreation. The rest of the land will remain in its natural condition.

The use of public funds to acquire private property for a public park is not unusual. If the acquisition is for a public purpose, the State can exercise its power of eminent domain.

The State's objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The need to acquire the private lots at Wailea is established in the State Recreation Functional Plan. The private properties at Wailea Bay are situated in the middle of the proposed park expansion. These properties would serve the public best if they were developed for park use. The makua park land would have a better connection to the beach land and its ocean resources if the private parcels were converted to open use and provided unobstructed access and visual corridors between the two areas.

We appreciate your response on the proposed project.

Sincerely,

Andrew M. Monden
Chief Engineer

Attn: Governor's Office
Warren Harrison, Harrison Associates
Glen Keppel, Brit Collins
State Parks Division, DLNR
TO WHOM IT MAY CONCERN,

Thank you for giving us the opportunity to respond to the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion dated June 1996.

As residents of Wailea Bay we appreciate its unique and fragile beauty. We remain concerned that development of the magnitude proposed could irreparably damage this pristine environment and deprive future generations of the enjoyment of this irreplaceable natural treasure. At the same time, we support development of limited public improvements such as improved public access, sanitary facilities and the infrastructure necessary to provide better maintenance and enforcement.

Following are our questions and concerns about the proposed project's impact on Wailea Bay:

1. We are pleased that the plan calls for a low-impact walk-in park at Wailea and hope that this will preserve the character of the beach. We believe a low impact park at Wailea would provide families with an alternative to the more intensive park use at Hapuna. We feel that having one main public access will best accomplish this objective, allowing visitors to pick the degree of isolation they choose based on how far they care to walk. It will also enhance law enforcement, sanitation and lifeguarding. Since the shape of the beach and lagoon make it difficult to find a vantage point from which the entire beach can be seen, keeping the main focus of activity in one area will better allow lifeguards and care takers to safeguard the public and enforce the rules pertaining to a marine sanctuary.

2. Density and capacity measurements need to be reassessed. Section 3.2.3 describes Wailea Beach as "measuring approximately 1,400 feet wide and approximately 40 to 80 feet deep", and bases projections on the capacity of the beach on these numbers. It is unclear whether capacity calculations make accommodation for the kaholo on the beach, which create a unique environment and offer all visitors an environment that cooler and more private experience than other beaches. We feel that these measurements greatly overstate the size and capacity of the beach and agree with the written comment that "a more accurate measurement could be about 850 feet."

3. Enforcement and sanitation issues must be addressed first. It is important that a full-time, live-in enforcement position be funded prior to development, which will increase use and abuse of the beach. Wailea continues to be degraded by lawless and thoughtless users, intoxicated individuals, drug users and loud parties day and night for an unsafe environment. The beach is used as a lave and polluted by litter. There has been several recent petty thefts. DLNR enforcement agent Mr. Rufus Kainpule has made a major positive contribution to law enforcement, public safety and sanitation at Wailea, volunteering countless hours of service at the beach. Funding his efforts to allow for a consistent presence at Wailea is critical.

4. We object to the portion of the plan that contemplates condemnation of our home and all other privately owned parcels fronting Wailea Bay, and feel that and is not necessary or appropriate. The thought of our family home being condemned by the state continues to be stressful and we do not view it as an opportunity to relocate or redevelop for other purposes. In our opinion the State is not currently authorized to condemn these properties and the draft EIS does not adequately address the environmental and social impact of condemning private property. We question both the need for the condemnation and the cost. The private lots do not limit public use and enjoyment of the beach, since the private properties are set back from the beach and separated from the shorelines by the 40 foot of State access road. As residents we continue to work cooperatively with the public to maintain a public and sanitation of Wailea Bay. We note that the cost of condemnation is in addition to the already anticipated expenditure of approximately $40 million for the park expansion and feel that State monies could be better spent elsewhere.

5. Drainage and runoff issues need to be carefully and more fully addressed. The more gaining walk of the bay the more risk of runoff into the bay instead of precipitation. It is important that additional runoff caused by development and paving will be adequately controlled by site planning and dry wells and not wash into the bay. If the proposed golf course were built, the bay would also be vulnerable to runoff of agricultural fertilizers and nutrients.

6. Golf Course Development - We question the need for another golf course in this area and the accompanying destruction of the natural landscape. Potential runoff of agricultural fertilizers endangers poses a direct threat to life in the marine sanctuary.
We thank you for the opportunity to comment on the draft EIS during the public review period and look forward to the development of a plan which will protect and preserve the natural beauty of Wailea for generations to come.

Sincerely,

John Albrecht
M. Albrecht

cc: Division of State Parks, Mr. Andy Mondon
Bell Collin Hawaii Ltd., Mr. Glen Koyama

Mr. John Albrecht
Mrs. Ann Albrecht
P.O. Box 44416
Kailua, Hawaii 96743

Dear Mr. and Mrs. Albrecht:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 16, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

1. As you mentioned, Wailea Bay will have one main access at the central northern section of the beach. A secondary access will be provided at the beach’s southern end. It is not the State’s desire to restrict access to any public beach. Adequate access as provided in our master plan will allow park personnel to easily reach Wailea Bay and provide necessary maintenance and security services as well as water safety operations. In view of possible beach oversaturation, controls may be warranted to protect the natural resources of the area. The concept that was suggested by several area residents is the provision of a “walk-in” beach. This concept is currently embraced in our master plan. It shows the proposed parking for Wailea at a distance from the beach.

2. The beach capacity analysis, conducted by Pederson Planning Consultants, was one form of analysis used to provide an update of current and potential use of Wailea. It was not used to determine a target population of beach users. The analysis, along with field observations, information from residents, and a literature review, provided a comprehensive assessment of the area. From this assessment, we have found the beach to be generally undersaturated. It could be due to a number of factors such as the condition of the beach access, quality of the beach, lack of facilities, general knowledge of the beach’s existence, and the quality of the overall beach atmosphere. The proposed park improvements are designed to improve on some, if not all, of these conditions.
3. As described above, the proposed Waipuna Beach State Recreation Area expansion comes better access and increased staffing to improve maintenance, security, and water safety operations at Waipuna. These services could further be enhanced with public educational programs on resource awareness and management and training sessions conducted at the new park headquarters.

4. The State’s objectives for Waipuna is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping and relaxation, along with beach and nearshore recreation activities.

The private properties at Waipuna Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauka land and beach land with its ocean resources.

As stated in the State Recreation Functional Plans, Policy 1-4(1), the State shall “acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use.” The policy of this plan specifically provides that the State shall acquire beaches in the following areas: (a) for the Big Island Waipuna Bay, Anaholokai Bay to Kahuku; and (b) for Kauai’s Bay. To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

Acquisition is not scheduled to occur in one phase. As development progresses over a 12- to 13-year period, acquisition will take place over this extended period thereby reducing the acquisition expense to a reasonable and affordable level. We believe the proposed park expansion improvements will have a more far-reaching benefit to the community than the apparent short-term costs related to construction and land acquisition.

5. A detailed drainage study was conducted by Belt Collins Hawaii in 1992. Results of that study were presented in the Draft EIS and reviewed by the County Department of Public Works. During the forthcoming project design stage, construction plans including grading, erosion and sedimentation control and detailed drainage plans will be submitted to the County for final review and approval. County approval will require drainage improvements to accommodate runoff from project improvements. One of the requirements will state that no net increase in runoff shall result from development of the property. Additionally, the State Department of Health is required to require that a National Pollutant Discharge Elimination System (NPDES) Stormwater Permit which requires the developer to prepare a Best Management Practices (BMP) Plan. This plan calls for an erosion and sediment control program and other surface runoff control measures to be implemented during project construction.

In a study by Charles Murdock and Richard Green (Appendix E of the EIS), it was concluded that use of fertilizers, herbicides and pesticides on the proposed golf course, which is located more than 3,000 feet from the ocean, is not expected to result in any adverse impact on the quality of either groundwater or nearby shoreline waters.

6. We do not view the development of a golf course as a degrading element to the natural landscape. It may alter the visual character of the site, but it would clearly enhance the landscape. The proposed golf course will provide a lush, green vegetative appearance on an area that presently is barren and sparsely vegetated. The existing condition, in fact, presents a greater threat of dust storms during windy periods and severe erosion after heavy rainfall. Additionally, a dry landscape with deadwood and unheathy vegetation is a ready source for brush fire.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MUNDO
Chief Engineer

AM
C: OEOC
Warren Harrison, Harrison Associates
Glen Kawana, Belt Collins Hawaii
State Parks Division, DLNR

Mr. and Mrs. Alkire
Page 3
DSC 3 1996
July 23, 1996

Governor of the State of Hawaii
c/o Office of Environmental Quality Control
State of Hawaii, 220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813

Attention: Mr. Gary Gill

RE: Hapuna Beach Park Expansion Plan

Dear Sir:

I am aware of your plan to expand the Hapuna Beach Park to Wailea Bay.

I go to Hapuna Beach and Wailea Bay all the time. There is a big difference between the two locations. Hapuna is big, lots of folks, good volleyball, all sand beach break, and all the State Beach amenities. Wailea is small, local, a preserve, trees, good snorkeling, laid-back, fast tubular waves over a shallow reef.

Why not leave 'Beach 69' as it is. Keep it remote and make people walk in. That way, those who will respect the area will come and it won't be ruined by overuse. A few outhouses, showers, and water dispensers would be good, but that's all we need.

Why spend millions of dollars to buy out the homes there. They give the area a good feeling. I see people taking the beach and cleaning it up. It's cleaner than Hapuna.

Spend the money on education, highways, bikeways, and the existing parks. North Kona Beach Park needs good outhouses, water, security and a better road.

Keep Wailea small; please don't spend my hard earned tax dollars unwisely.

Aloha,

Anonymous

Dear Sir or Madam:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 23, 1996, to the Office of Environmental Quality Control (OEQC), regarding the proposed Hapuna Beach State Recreation Area Expansion project.

As you may know, Waitea Bay is one of the fastest growing regions on the island, and as a result, there is an associated strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

The State's objective for Wailea is to provide opportunities for park users to appreciate a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mainland and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall "acquire additional beach park land and rights-of-way to containing undeveloped shoreline to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beach areas in the following areas: (for the Big Island) Wailea Bay, Anaehoomalu Bay to Ka'upulehu, and Keau Bay". To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.
Anonymous
Page 2
DC 3 996

Our plans show that Wailea will be developed as a walk-in beach. Parking will be located away from the shoreline and beachgoers would have to walk more than 400 feet to the water. For the convenience of the public, a comfort station will be provided near the parking area. We do not intend to develop Wailea like Hapuna Beach. Wailea will continue to be a scaled-back, low-key recreational site within the park expansion area.

We appreciate your thoughts and comments on the proposed project.

Sincerely,

[Signature]
ANDREW M. MONDEN
Chief Engineer

AMS
C: DLNR
Warren Harrison, Harrison Associates
Glen Keauna, Bell Collins Hawaii
State Parks Division, DLNR.
Dear Mr. Mondan,

I would like to make the following comments regarding the proposed Hapuna Beach project:

1. While I am in favor of long-range planning, I think it should be made clear that this is very long-range planning. Considering the State's financial situation, it should be obvious that this proposal cannot be implemented anywhere in the near future, and the final EIS should make that explicitly clear.

2. On the other hand, some of the funds currently being expended toward carrying out this proposal should be spent instead in improving conditions in and around the subject area, especially the beaches. We need heightened security, regular and thorough cleanup procedures, more (and more adequate) restrooms, and a general upgrading of all the existing facilities.

3. I am also opposed to the proposed condemnation. For one thing, such a procedure seems unnecessary. I lived for several years in the North Cascades National Park Recreation Area, where there were many private homes and other properties which the Park Service wished to acquire. The policy was simple: "right to first refusal" one. That approach has been working, slowly but surely. As properties come up for sale, the Park Service has been able to acquire them for a relatively modest purchase of funds. I see no reason why the State could not adopt such a policy in this case and avoid a lot of bitterness by doing so.

4. The golf course needs little comment. I'm sure it was originally proposed at a very different time under very different conditions. Even the most cursory study of golf course viability and feasibility on the Big Island will demonstrate that this portion of the proposal is totally impractical, if not actually illogical.

I hope the above will be of some help in your final formulation of plans for an important and fragile area of the Hawaiian Islands.

John A. Broussard
59-148 Olowalu Road
Kamuela HI 96743
080-1033

Mr. John A. Broussard
59-148 Olowalu Road
Kamuela, Hawaii 96743

Dear Mr. Broussard:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 28, 1996, regarding the proposed Hapuna Beach State Recreation Area Expansion project.

1. The DEIS states that the proposed project would be developed in phases over a 12 to 13 year period. The park expansion plan will serve as a development guide for the Hapuna Beach State Recreation Area, and implementation will be subject to funding by the State. Although funding appears to be tight at the moment, conditions may improve dramatically in the next 2 to 3 years, at which time the State would like to be in the position to implement plans that have already been approved.

2. When funding becomes available, improvements will be made to existing maintenance and security at the park.

3. Implementation of improvement plans at Waikoloa may be more dependent on when the areas around the bay are opened to the public than the North Cascades National Park Recreation Area. The private parcels are situated directly behind the bay and the State's plan depends on the coastal land having direct and unobstructed access to the beach. We will, however, identify in the Final EIS the "right to first refusal" as an alternative procedure for land acquisition by the State.

4. Although there are a number of existing and planned golf courses in West Hawaii, there are no public courses. Such a facility would provide a much-needed amenity to this side of the island. Green fees at the new golf course would be affordable providing lower fees than the private golf course fees. This would be particularly beneficial to fixed-income residents, retirees, and junior golfers.
Dear Mr. Monden:

I am writing to register my comments regarding the EIS for Hapuna State Beach Park expansion plans. I have been a resident of the Hapuna Beach area since 1981. I would like to encourage you to find ways to expand the State Park in such a manner as to retain the natural beauty and resources of the area.

I strongly believe that major Hapuna-style development of Waikoloa Beach would be a mistake. I believe that lower-scale development would some-what compromise improved access and appropriate sanitation facilities should serve both visitors and residents alike. Therefore, I would support a low-scale project.

I have strong concerns that significant damage would be done by such a decision. I opposed the board's resolution. Thank you for reading my comments.

Sincerely,

[Signature]

ANDREW M. MONDEN
Chief Engineer

cc: Warren Harrison, Harrison Associates
Glen Koyama, Belt Collin Hawaii
State Parks Division, DLNR
July 20, 1994

Mr. Chris Forden
1422 Ala Moana Blvd., #1444
Honolulu, HI 96814

Re: Final Environmental Impact Statement for Hapuna Beach State Recreation Area Expansion

Dear Mr. Forden,

I appreciate having the opportunity to review the EIS statement regarding the Hapuna Beach Expansion. For over five years my family has owned several lots at the north end of Wailea Bay and we are interested in seeing the park developed here. However, I believe we need to develop a few impact wall in the park behind Wailea. This is the most sensible solution given the fragile nature of the beaches and the EIS and should allow the public to enjoy the unique beauty of this beach without destroying it through overuse or neglect.

According to the Master Plan, the site could be developed into a small parking lot and residences would be prohibited near the beach, which is a major concern. I asked the EIS to more directly address the issue of the planned parking lot and specifically the number of cars it would accommodate. I couldn't find any mention of additional information regarding these planned developments. I assure you I will continue my efforts to promote a sustainable development plan.

Wailea Bay, Lot Acquisition

The most disturbing aspect of the EIS is the private development at Wailea Bay in the ongoing efforts to market the lands for sale. As a resident of the area, I believe it is the best way to develop the park at Wailea, and I support the State's current position that the land should be used as a part of the State. However, I am concerned that the selection of the private owners is not in the best interest of the property. The EIS failed to provide adequate information to detail what the State plans for the area, including the availability of water and the adoption of conservation measures. The private owners have been asked to invest $15 million (pp 2-56), and many of the remaining properties have been sold, which might not accommodate the State's plan for $20 million dollars.

As this wise and protective use of limited State funds and taxpayers' money? The EIS states that "funding for the acquisition will require a separate legislative action" and consequently "budget estimates are not included with the project cost estimates." If the State is to act intelligently, it should be clear what it is intelligent to do.

In summary, the State has a plan, but the EIS should be a comprehensive plan that includes all the necessary information for the public to make an informed decision.

Respectfully yours,

David T. Hossein

132 West Channel Road
San Diego, CA 92102

J00723.2073
Mr. David T. Hossein
413 West Chautauqua
Santa Monica, California 90402

Dear Mr. Hossein:

Environmental Impact Statement (EIS)
Proposed Halemau Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 29, 1996, and your comments on the Draft Environmental Impact Statement for the Halemau Beach State Recreation Area Expansion project. Below is our response to your comments in the order they were presented in your letter.

Developing the Park around Waiakea: A "Walk-in" Park

The Halemau Beach State Recreation Area Master Plan is a conceptual plan showing proposed land uses and locations. During the upcoming project design stage, the number and layout of parking stalls will be determined. It is expected the number of stalls will be designed to reflect Waiakea Beach's size and anticipated use and will be located in an area away from the shoreline to promote a "walk-in" beach theme. This stage of the project occurs after the EIS review process and generally during the permitting stage.

Waiakea Bay Lot Acquisitions

The State intends to acquire the rest of the private parcels at Waiakea Bay as provided in the Halemau Beach State Recreation Area Master Plan. An acquisition schedule has not yet been established because it will depend on the pace of development at the park, approval of acquisition funds by the State Legislature, and release of those funds by the Governor. Notably, funding for the acquisition may come from a separate source rather than the regular State CIP budget, such as a special acquisition fund. Timing of the funding would depend on current State priorities. The cost of the land purchases will be based on real estate values at the time of acquisition.

Although the cost of the project seems to stand out in the Draft EIS, the benefits, as described in Sections 2.2 and 3.11 of the document, are very positive and worth considering. The decision on what projects are more important or have a higher priority than others will be determined by legislators and administrators who are in office at the time the funds are approved and expended.
The proposed Mauna Beach State Recreational Area Expansion Master Plan provides the State administration with an item for its "wish list" of public improvement projects. It is a fact of life that not all projects will be implemented on this list and that some will be implemented faster than others depending on State priorities at this time.

We do not consider the advance acquisition of the two private parcels as wasteful or creating lost opportunities for Phase II of the park development. Land acquisition and construction are coordinated and timed to provide the most practical means of project implementation. A major factor affecting implementation is the availability of funds for park improvements and land acquisitions. Park improvement funds will come from the State's regular CIP budget, while land acquisition monies may come from a separate fund associated with a specific land acquisition legislation. If this is the case, each will involve a separate review and approval process and may affect the project's overall development schedule.

Public and Private Cooperation

The State's objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the musaka land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(1): the State shall "acquire additional beach park and rights-of-way to remediating undeveloped shorelines, or acquire additional access to developed shorelines to provide increased capacity for future public recreation use". The policy's implementing action specifically provides that the State shall "acquire beach access in the following areas: (for the Big Island) Wailea Bay, Anahola Bay, and Kau Bay." The State is authorized to acquire lands for public purposes under government power of eminent domain.

The cherished beauty of this land as enhanced by the private owners should be shared with the public. The proposed project will improve the opportunities for access to the site and offer greater appreciation of the area's natural resources. Park improvements will include management operations such as maintenance and security which have been major concerns of the neighborhood. We believe these improvements will have a more far-reaching benefit to the residents of Hawaii than the apparent short-term costs related to construction and land acquisition.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

AMek
c: Warren Harrison, Harrison Associates
Glen Koyama, Real Estate Hawaii
State Parks Division, DLNR
511 West Main Street
Grass Valley, CA 95945
July 22, 1996

Golf Course Hawaii Ltd.
800 Ala Moana Blvd., 1st Floor
Honolulu, Hawaii 96813

To: Mr. Glen Kaye

Dear Sir:

I was disheartened to see the Draft Environmental Impact Statement for Hapuna Beach State Recreation Area Expansion proposing acquisition of all privately held lots at Wailea Bay.

As has been repeated many times, Wailea is a fragile beach which can only accommodate a limited number of people. For a quarter of the year the big surf, the narrowness of the beach, and often, the lack of wind, make the beach unsuitable for families and swimming. Spending millions of dollars for complete control of this fragile strip is a waste of tax-payers' money. To get more for the money by allowing more beach-goers, would endanger that delicate environment.

The acquisition of more private lots would not increase the narrow beach. The four lots condemned in the early 1980's, provide a large area, possibly for planting, and increased access. The state owns all the land to Queen Kamehameha Highway, meaning unlimited access for a parking lot (hopefully with limited parking spaces to limit the number of beach-goers) and restrooms. (For details of Wailea plans, please refer to my letter of November 11, 1993). The 10-20 home owners are an asset to the beach. They provide a greenbelt and maintain it. Besides their right to own property, they also pay taxes. Should the state condemn our properties, the taxpayers would lose income and gain a tax burden.

A partnership between the state and the private sector would be the most sensible, the most honorable, and the most cost-effective plan. There is a public-private relationship with the resort hotels and the proposed golf course, why not with the private home-owners?

Speaking of the golf course, under "alternatives", there is 1, 2, and 3, but no 4. I suggest a 4th alternative, and that is: "expansion of the park to include an 18 hole public golf course." The heart of the park, Hapuna Beach, is already in place, though it is actually about 1/2 larger then pictured on your maps. All beaches are public and a large part of Hapuna Beach continues in In Front of the Hapuna Prince Hotel. Therefore, the next important addition is the proposed golf course.

Thank you for inviting comments. I do hope you recognize the value of a government-private sector relationship, both ecologically and morally; the fragility and small size of Wailea Beach; and the asset of the private owners.

Sincerely yours

Dr. and Mrs. D.J. Hoobin

Dr. and Mrs. D.J. Hoobin

---

Dr. and Mrs. D. J. Hoobin
511 West Main Street
Grass Valley, California 95945

Dear Dr. and Mrs. Hoobin:

Environmental Impact Statement (EIS)
Proposed Wailea Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 22, 1996, regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

We acknowledge that Wailea is a dynamic and fragile beach which changes in size and character during the year. For this reason, no structures or ground improvements are planned directly on the shoreline. The number of parking stalls will be designed to reflect the beach's size and anticipated use and will be located at a distance from the shoreline to discourage the erosion of a "walk-in" beach. Provisions, however, will be made to comply with the Americans with Disabilities Act (ADA) standards that provide drop-off areas and other facilities for handicapped persons.

Although the sand area of Wailea Beach may be limited in size at times, the bay itself and the adjoining shoreline are a wealth of natural, cultural, and scenic resources that are appreciated by more than just beach users. This area offers the public an abundance of recreational, historical, visual, and educational experiences.

The State's objective for Wailea is to provide opportunities for park users to appreciate a coastal setting direct physical and visual access to the sea. This could allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauka land and beach land with its ocean resources.
As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall "acquire additional beach park land and rights-of-way to remaining underdeveloped shorelines to provide increased capacity for future public recreation use." The action policy of this plan specifically provides that the State shall "acquire beaches in the following areas: (for the Big Island) Waiakea Bay, Anaehoomalu Bay to Kaupulehu, and Kua Bay." To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

We acknowledge that the private property owners at Waiakea Bay have been an important asset to the area. Their contributions and value to the beach are deeply appreciated, but the long-term value of the area to the community must also be considered. The land's cherished beauty as embraced by the private owners should be shared with others. We believe the proposed project will improve the opportunities for access to the site and offer greater appreciation for the area's natural resources. Park improvements will also include management operations such as maintenance and security which have been major neighborhood concerns. We also believe these improvements will have a more far-reaching benefit to the residents of Hawaii than the apparent loss of revenues from property taxes on the private parcels.

The current EIS review process provides a means for public input on the proposed project. In subsequent phases, the State will proceed through the permitting process where public hearings will be held and additional opportunities for public input are offered. During the operational stage of the project, park administrators will be available to receive resident concerns on park management and security and to discuss program ideas with the community.

A public golf course is proposed in Alternative A and is a part of the preferred master plan for the Hapuna Beach State Recreation Area Expansion. It will be constructed within the project's anticipated 12- to 13-year development timeframe.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

cc: Warren Harrison, Harrison Associates
    Glen Koyama, Bob Collins Hawaii
    State Parks Division, DLNR
August 6, 1996

John Hobstein
1756 Columbia Rd, NW #400
Washington, DC 20009

Mr. Gary Gill
Office of Environmental Quality Control
State of Hawaii
250 S. King Street, 4th Floor
Honolulu, HI 96813

Dear Mr. Gill:

I am a property owner at Waialua Bay and wish to comment on the Environmental Impact Statement dated July 7, 1996, regarding the Hapuna Beach State Recreation Area Expansion. This plan is of great interest to my family, as shown by our letters regarding this plan and our recent letters in response to the 10th version of the EIS. I want you to know that the State of Hawaii has adopted a "walk-in" beach as the appropriate way to develop Waialua Bay. However, I do not see the need to purchase 18 privately owned lots at Waialua Bay in the best interests of the public, as only 4% of the acres of the project would be purchased by the State, which is not enough to achieve the objectives of the State's acquisition. Therefore, I will address only one of the limitations of the State of Hawaii in the private land purchase at Waialua Bay in this letter.

Waialua Bay is currently enjoyed by the public, but lacks access, sanitation, and parking facilities needed to maintain the beauty and health of the beach. The State of Hawaii's primary objective should be to provide these services in a short time frame, cost-effectively, and in a manner that meets the needs of the State. The only solution would be for the State to purchase the land for the beach and the facilities that are needed.

The only argument for buying the 18 lots would be that if the purchase would meet all the requirements for the State to purchase the land, which is the case, and the land would be used in the way the State intends. However, it is not clear if the State would actually use the land for this purpose.

I do not see how the public suffers from lack of necessary facilities at the beach. The beach is open to the public, and the problem can be remedied quickly and at much less expense than the EIS currently calls for by creating a plan that provides the necessary land use for the State of Hawaii in the future.

Sincerely,

John Hobstein

Mr. John Hobstein
1756 Columbia Rd, NW #400
Washington, DC 20009

Dear Mr. Hobstein:

Thank you for your letter of August 6, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement (EIS) for the Hapuna Beach State Recreation Area Expansion project.

The proposed improvements at Hapuna Beach State Recreation Area are part of a medium-range development plan for the area. Improvements are programmed to occur over a 12- to 15-year period by the year 2010.

The private land at Waialua is located in an area that will provide a direct connection between the main section of Hapuna where parking and camping are proposed and the shoreline area where the beach and ocean activities are planned. State Parks envisions this area to be entirely in where the beach and ocean activities are planned. State Parks envisions this area to be entirely in

It is acknowledged that acquisition of the private lots will be costly, but acquisition will occur gradually over the 12- to 15-year development period. We would hope that this would make the cost of the project more manageable. There is also the possibility of implementing a lease-back plan that would allow the State to recover some of the purchase cost while the properties await development.

The proposed master plan for Hapuna is being prepared to provide a medium-range development guide for improvements at Hapuna. Giving priority to other public improvement projects will be in the hands of our State Legislature which has control over public policy and funding.
Mr. John Hosbein

Page 2 of 2

The Legislature will ultimately decide if more monies should be steered to education, crime prevention, capital improvement projects, and social services.

The EIS review process provides a means for public input on the proposed project. In subsequent phases, the State will proceed through the permitting process which will include public hearings and additional opportunities for public input. During the operational stage of the project, the community will be invited to offer suggestions on park programs and improvements.

We appreciate the time and effort it took for you to review the DEIS and your expressed support of the proposed park expansion.

Sincerely,

ANDREW M. MONDIE
Chief Engineer

cc: GECO
    Warren Harrison, Harrison Associates
    Glen Koyama, Bott Collins Hawaii
    State Parks Division, DLNR
Dear Sir:

In the Environmental Impact Statement of the proposed Hapuna Beach Expansion Project, acquiring private lots is one of the steps in the project. Please reconsider this step. As your map shows, the state already owns hundreds of acres of adjacent land made to the private lots. There is plenty of space for developing picnic areas and public facilities on this state land. As the map also shows, there is a large area for access to the beach without acquiring additional private lands. Yet acquiring these lots would free several million dollars which could be used to develop and maintain public facilities and picnic areas.

There are definite advantages to the presence of private homes adjacent to this public beach. The private homeowners have a strong commitment to maintaining the beach as a natural, beautiful, clean and safe recreation area. This is exactly what the public and the state also want for Wailea Bay. The homeowners have day to day contact with the beach and are in an optimal position to monitor and follow-up on problems which may arise on the beach. The presence of private homeowners adjacent to the beach will greatly enhance the long-term preservation and maintenance of the beach at no cost to the public.

Sincerely yours,

Lisa Hosheln

Lisa Hosheln, M.D.
1562 Response Road, #3112
Sacramento, California 95815

Dear Dr. Hosheln:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 24, 1996, regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

The State's objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and shoreline recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauka land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 14(1), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beaches in the following areas: (for the Big Island) Waimea Bay, Anaehoomalu Bay to Ka'upulehu, and Kua Bay". To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

The private property owners at Waimea Bay have been an important asset to the area. Their contributions and value to the beach are deeply appreciated, but the long-term value of the area to the community must also be considered. The land's cherished beauty as embraced by the private owners should be shared with others. We believe the proposed project will improve the opportunities for access to the site and offer greater appreciation for the area's natural resources. Park improvements will also include management operations such as maintenance and security which have been major neighborhood concerns.
We also believe these improvements will have a more far-reaching benefit than the apparent short-term costs related to construction and land acquisition.

We trust our response adequately addresses your concerns.

Sincerely,

Andrew M. Monden
Chief Engineer

AM:ck

Warren Hirono, Hirono Associates
Glen Kayano, Biol Cellists Hawaii
State Parks Division, DLNR
July 30, 1996

Governor of the State of Hawaii
ca Office of Environmental Quality Control
State of Hawaii, 320 S. King Street, 4th floor
Honolulu, Hawaii 96813
Contact: Mr. Gary Gill

Re: Draft Environmental Impact Statement for the Hayuna Beach State Recreation Area Expansion, Lahaina, South Kona, Hawaii, June 1996

To Whom it may concern:

For four generations our family has enjoyed and taken care of various parcels adjoining Wailea Bay. The coconut palm collection from around the world was planted by my grandfather starting in the early 1930's. It is recognized as one of the most complete collections of coconuts in existence. We do not view the potential condemnation of our properties "as an opportunity to relocate or to realign for other purposes" as stated on page 3-57.

Wailea Bay is a very special and fragile environment. We do not believe the severity of climate is fully appreciated in the E.I.S. On page 3-14, 15 it is stated "cool breeze maintain a consistent level of comfort throughout the year." This is correct in the shade close to the water. However, as soon as you get back from the water it is hot, dry, and desolate. The E.I.S. also speaks of "gentle winds blowing through the jungle reaching the shoreline." These winds average 25-45 mph and have been recorded as high as 70mph. They can blow for 15 minutes to days, weeks and even months on end. If this weather condition is not given serious consideration any facilities eventually built simply will not work. Historically, every 10 to 15 years brings a locally heavy rain which creates runoff into the bay. The river in the middle of the bay would surely fill a ten to twelve foot volume in my recollection. The location on the north end of the bay is much smaller, at probably four feet.

We would suggest there is a need for beaches like Wailea to stay just the way they are. Many families do not mind a short walk to enjoy a relaxed "off the beaten track" day at the beach. To cram 1,417 people into a marine wildlife sanctuary is not stated on page A-39. It is not in the best interest of anyone.

We believe Wailea can be improved with parking, restrooms, and appropriate monitoring without condemning any other private property. We would like to request that the State look at the financial reality of the situation and withdraw this cloud over our heads of some possible future condemnation. It is unfair to long-term residents to have to live with this uncertainty.

Sincerely,
Mike, Katie, Chester, Emma Lowery

Mr. Mike Lowery and Family
Dr. and Mrs. John Lowery
P.O. Box 6002
Kailua-Kona, Hawaii 96740

Dear Mr. Lowery and Family and Dr. and Mrs. John Lowery:

Environmental Impact Statement (EIS)
Proposed Hayuna Beach State Recreation Area Expansion
South Kona, Hawaii

Thank you for your letter of July 30, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement for the Hayuna Beach State Recreation Area Expansion project.

We will describe in the Final EIS that weather conditions in South Kona can vary from mild to extreme and last from a few hours to several weeks. The new park structures will be designed to meet building code requirements and include special structural provisions for adaptation to local conditions. It is noted that heavy rain can generate runoff that flows into the bay. Accordingly, a drainage study was conducted to assess the runoff conditions on the property and recommendations were made on necessary drainage improvements. The County Public Works Department will be responsible for approving all drainage and flood control measures for the property during the project's design stage.

The beach capacity analysis, prepared by Peterson Planning Consultants, was conducted for the fullest size of the beach to determine its potential use. We recognize that the beach varies in size during the year. In the winter when the surf is heaviest, the beach is smallest. Consequently, beachgoers would patronize other beaches where space is available. Our intent in conducting this capacity analysis was to obtain an idea of the current and potential use of the beach. It was not intended to determine a target population of beach users. The analysis along with field observations, information from residents, and literature review provided a comprehensive assessment of the area.

From the study, we found the beach to be generally undervisited. This could be due to a number of factors such as the condition of the beach access, quality of the beach, lack of facilities, general knowledge of the beach's existence and the quality of the overall beach atmosphere. The proposed park improvements are designed to improve on some, if not all, of these conditions.
The State's objective for Wai'anae is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and shoreline recreation activities.

The private properties at Wai'anae Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the makai land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A[1], the State shall "acquire additional beach park and rights-of-way to remaining undeveloped shorelines, or acquire additional access to developed shorelines to provide increased capacity for future public recreation use". The policy's implementing actions specifically provide that the State shall "acquire beaches in the following areas: (for the Big Island) Waikoulu Bay, Anahimauanau Bay to Ka'uipala, and Koa Bay". The State is authorized to acquire lands for public purposes under government power of eminent domain.

It is acknowledged that acquisition of the private lots would be costly but acquisition would occur gradually over a 12 to 13 year period. We believe this would make the cost more manageable to the State. There is also the possibility of implementing a lease-back plan that would allow the State to recover some of the purchase cost while the properties await development.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDIEI
Chief Engineer

c: OEQC
Warren Harrison, Harbors Associates
Glen Koyama, Bell Collins Hawaii
State Parks Division, DLNR
August 22, 1996

Department of Land and Natural Resources
State Parks

Re: Draft Environmental Assessment
Hapuna Beach State Park

Dear Sirs or Madams:

I have reviewed the Draft EA for the proposed expansion of the Hapuna Beach State Park. I have the following concerns. I know that this is a long range plan and certain elements may take many years to realize, but it should still be a viable and realistic plan.

I am very concerned with the element of the plan that asserts that the State will acquire the private ocean front homes at Waiakea Bay. This is an unfounded assertion by the State that makes no financial or land use sense at this time and will only continue to grow more absurd as the years pass and the value of these homes and property appreciate. There are countless better ways to use tens of millions of our tax dollars than to buy out million dollar properties to a shoreline that the public already owns and has unrestricted access to.

The State has miles of ocean front property in West Hawaii that either has no access or limited four-wheel drive access. Access and maintenance of these properties is a far wiser use of our limited resources. There is no evidence that the existing homes or their use has impaired any coastal resources. The time to purchase these properties, if the State so desired, was decades ago or not in the future. To continue to leave this element as part of the Hapuna Beach Plan is not sound planning and does a disservice to the public as a whole and to these property owners in particular.

If the State were to spend over a hundred million dollars to acquire these homes, what would they do with them? Tear them down or use them as camping cabins? Will the proposed uses of the lands behind the beach be hindered or enhanced by the change in use of these parcels? Is it good planning to develop a plan with such an unrealistic element at such a critical area within the plan? Since the State does not pay real property taxes how will the County and its taxpayers replace the millions of dollars of lost property taxes over the next 20 years?

Planning for the future is admirable, but the plans need to be feasible and reflect sound fiscal as well as land use policies, the inclusion of this element in the plan is frivolous. I ask that in your review of this plan that you eliminate this concept now and forever.

Sincerely,

Mr. Gregory R. Mooers
Mooers Enterprises
P.O. Box 1101
Kamuela, Hawaii 96743

Dear Mr. Mooers:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 22, 1996, regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

The State's objective for Waiakea is to provide opportunities for park users to appreciate the coastal setting directly physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Waiakea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the moku land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beachfront in the following areas (for the Big Island) Waiakea Bay, Anaehoomalu Bay to Kua'ipaluhia, and Kua Bay". To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

We acknowledge that the cost of acquiring the private lots at Waiakea will be substantial; however, efforts will be made to minimize the expense during the project implementation stage. Some ideas that we have developed or have come from the community include the acquisition of properties in increments to spread the purchase cost over time (as well as to hold acquisition costs down during inflationary periods) and the arrangement of a lease-back plan that would allow the State to recover some of the purchase cost while the properties await development.
Mr. Gregory R. Moors  
Page 2  
DEC 3 1995

We anticipate the loss of property tax revenues from the acquisition of the private properties, but the gain in qualitative project benefits would be significant. Providing expanded park amenities will help to meet the growing recreational demand for new camping sites, picnic grounds, adventure trails and other leisure activities. This is part of the State's Comprehensive Outdoor Recreation Plan objectives which also identify Hāna as a major recreation area for West Hawai‘i. Appendix A of the DEIS provides a financial analysis of the project and how the proposed project would be economically feasible.

We trust our response adequately addresses your concerns.

Sincerely,  
ANDREW M. MONDIEI  
Chief Engineer

cc: Warren Harrison, Harrison Associates  
Glen Kosyama, Belt Collins Hawai‘i  
State Parks Division, DLNR
Dear Mr. Harrison,

May I suggest that you contact Richard Burton at 6624 Thomas Dr., North Highland, Calif. 95660, Phone (916) 335-3399. He took over the late Congressman Philip Burton and his wife's work on the Golden Gate National Park, in San Francisco, Calif., and he expanded the recreational preservation to include the entire Monterey Coast.

The Hapuna preservation only needs to focus on shore-line amenities and safety, north and south from State Park 31. To design an oasis away from the shore-line in a hostile environment, away from the water and sea breezes, should be left to Disney Inc.

It is necessary that I ask you to officially list Benjamin B. Moore as a consulted party. For the past ten years I have been unable to read or write with the assistance from another person. My disability is cause for special consideration to my comments forwarded under separate cover. Additionally, I am the oldest surviving resident of Wailea Bay (since 1941) and resided there for the last 25 years. During that time I stood for the safety of children and youth activities, being a former chief life guard for Southern California beaches. (see enclosed). The undersigned invites further inquiry.

Benjamin B. Moore
P.O. Box 676
Kauai, HI 96743

cc: Richard Burton
Governor's Quality Control Office

A Non-Profit Corporation dedicated to demonstrating West Hawai‘i Leadership in the "Pacific Century"
Draft maps show a Beach 68 with no reference to Beach 69. The title caption Beach 68 (3.11) is intended to record a pseudo reference that the innocent and uninformed would accept as legitimate. It was a subtle political influence of the land owners to eliminate the legality of Beach 69. "same resident location" gives substance to a lie. There never was a Beach 68 and reality prevails on all beaches today. Such instances give prominence space suggesting that you are repeating past mistakes of history. The privileged few or the government collusion can alter the cultural relationship of Beach 69 in the minds of Big Islanders.

To see what happens, read Dr. Starhawk's research, "Dreaming in the Dark." Ph.D.

Governor of the State of Hawaii

C/O Office of Environmental Quality Control
220 S. King Street, fourth floor
Honolulu, HI 96813

It is either a compliment to a participant's wisdom or to render him ineffective to expect a definitive report in a 45 day review. The Wailea and Puako Bay lots are in a natural recreational area right or wrong. Failure of a strong boundary commitment that "took them in" (protecting them with life tenancy) enabled them to encroach on public rights.

The Wailea Taxpayers Association is now a formidable influence using Orange County political savvy of Irvine heir, William T. White III. Their easy political chicanery influenced the Hepuna "Expansion" to withdraw their enclave to be dealt with in 2010.

Your draft accepts a boundary to Puako Bay which repeats the mistake that caused the present problem. The natural recreational appropriate land use requires a strong boundary commitment to Puako Point (owners protected by life tenancy). We can mitigate past mistakes by developing parcel 31 as the park hub. Designating the 40 foot road reserve through the subdivision to the main beach. The land owners were essentially given control of Wailea Beach by the present design and the draft supports it. Without public rights as the premise for design = wealth and power will spread it's lethal influence as "Fiat Accompli." The main beach southern section of Wailea Bay Known E-2
as Beach 69 (handed to) and governed by the will of lot owners undermines youngsters of all ages and contributes to their delinquency.

The draft indirectly allows William T. White III to abuse kai'ali'i proclivity to a sea shore experience of their mental development by discovery and exploration. They understand natures classroom close to the waters edge and its ever changing solace. Their little tent and campfire dreams shape the world to come. This is a "trade off" of basic youth social activities traditionally and culturally part of the main beach. The lot owners have their enclave, but why allow them to psychologically create behavior patterns and attitudes that alienates and erodes the youngsters faith in government? Failure to preserve children's dreams as the premise of the recreational design, outlined above, scatters and confuses youngsters.

In conclusion the astute document ostensibly meets all the EIS requirements without "standing for children." History has taught children the right way to be close to the sea shore and they expect their parents to stand for their rights to use Beach 69 as they did. Weakening of children's attitude is a weakening of their character. Such objective circumstances conveyed by the draft unintentionally creates attitudes in correlation to social problems.

cc: Mr. Gary Gill
Andrew Monden
Bell Collins Hawaii Ltd.
Glen Hayama

Excluded From The Hapuna EIS?

The design now implemented by the Hapuna Committee was politically influenced to restrict public use of Waiakea Bay "Beach 69." The design actually uses parcel 31 to isolate the southern exposed historic access, instead of incorporating it into the park expansion. This restriction essentially limits the use of the main sandy beach fronting the subdivision.

The design thereby relocates the traditional cultural family social activities enjoyed for generations to a less desirable location. Over the past the public has forged a bond with "Beach 69" making it an important part of the foundation of our social activities. The park must have access through parcel 31 (instead of the subdivision) for balanced park design and community stability.
"Setting Up" Children To Fail

This attached ruling conflicts with the principles of our new Governor Ben Cayetano and is incompatible with his record of correcting past mistakes regardless of politics.

Governor Cayetano would never have approved of such blind political patronage at any time, and certainly not against children. This blanket ruling overtly eliminates family cultural recreational use by associating it inundates with illegal homeless activities. This "edict" was one of a series of alleged strategies of sub-division developer William T. White III's cozy political chicanery, which arrogantly influenced the Hapuna Committee.

Pre-School keiki's historically prepare for their formal education in Hawaii by instinctively discovering environmental harmony in beach camp-outs. Children are inherently equipped for mental development and "Beach 69" Wailea Bay has been their classroom for generations. This natural affinity development is a required sequence to formal education, and for Government to interfere deters the bottom of social intolerance. Government may not stand for children but standing in the way of families who do, "sets children up" to fail. Without esteem around an overnight campfire at "Mile 9 beach, they identify with wrong things.

It is the ruthless selfishness of the privileged few that object to overnight campout experiences at the expense of lowering the goals of children’s morals, and willingness to learn and weaken their resistance to lurking temptations.

"Beach 69" Wailea Bay has been recognized for generations by Big Island families and the International Youth Hostel as the safest, cleanest, and friendliest overnight beach camping in the islands, and it is unconsolable that their campfire could be put out by one man's elitism.

Let the Governor stand up for children and revoke this ludicrous ruling against future generations and launch a thorough investigation of the Hapuna recreational tragedy.
To Whom It May Concern:

This is to inform you that the area commonly known as Beach 69, Beach 80, and/or Waimea Bay is a portion of the government lands of Lualualei, South Shore, Hawaii, further identified as parcel 51 of Tax Map Key 6-6-31, and is owned by the State of Hawaii.

Anyone placing any structures on said land or occupying, camping and/or residing on said land without the written authorization of the Board of Land and Natural Resources is in violation of Chapter 171, Hawaii Revised Statutes, and shall be subject to a fine of up to $100 per day, plus damages for administrative costs incurred by the Department of Land and Natural Resources and for physical damage.

Notice to Vacate is hereby given to all persons occupying, camping and/or residing on said lands and that you must vacate said lands immediately and remove all personal belongings placed thereon.

Any and all persons found occupying, camping and/or residing on said lands after 4:00 a.m., June 10, 1993, shall be subject to a fine up to $100 per day plus administrative costs for violations of the provisions of Chapter 171, Hawaii Revised Statutes.

Further, any and all fixtures, equipment, structures, vehicles and personal belongings placed, maintained and/or found on said lands after 4:00 a.m., June 10, 1993, shall be considered abandoned and shall be disposed of at the State of Hawaii at the former owner's cost and expense.


WILLIAM M. EATI
Chairman
Board of Land and Natural Resources

De facto sandy beach camping at Waimea Bay has been the established pre-school DISCOVERY AND EXPLORATION LEARNING on which formal education can build.

Our state yielded to the GREEDY INFLUENCE of the Waimea speculators to kill the cultural balance of education and the social progress of our community.

Exhibit

A preschool student taught to have a willingness for discovery does more for education than money.

By allowing the destruction of our freedom to explore, our children are being deprived of learning the values on which education can be built. DLNR declares historic camping experience for adults at Waimea Bay a crime.

Nature teaches grand lessons. Without education at survival is for the lucky ones. The de facto (generations old) family camping at Waimea Beach 69 has been a Big Island cultural pre-school mount development that equips each child with a basic core level that blends all ethnic backgrounds equally into the educational system.
The Honorable John Waihee
Governor, State of Hawaii
255 S. Beretania Street
Honolulu, HI 96813

Dear Governor Waihee,

Thank you for your invitation to the King of Norway remembering his 25th year of marriage. It helped to make my subsequent yearly phone call a good one. His nostalgic words expressed hope to find again the seclusion and privacy that he had for the three weeks he was here with me. He said that he would like to once again visit Wailea Bay and experience the freedom of walking the shoreline particularly to show his family the area (there) where around the campfire his marriage began—never to end.

Preservation of our traditional and cultural historically significant campsites at Wailea and Puako Bay is the purpose of the beautification route. (See the enclosed.) It will draw new tourists and bring old ones back. It has 99% community support, and yet the few people in your administration act according to their personal position—favoring special interests. It is not their fault, but as Governor it is your obligation to point out their divided vision and short-sightedness. Political conformity and staff loyalties have come under the subtle influence of your liaison, Mr. George Robertson, using the “million-a-month” Irvine fortune and the “foolish” Wishard land enclave. Mr. John Kepper joined this special interest for power resulting in altering off the Wailea subdivision and encroaching on public rights. (See Mr. Kepper’s letter enclosed.) From here the overt plans spread into a complex scheme that will adversely affect not only education and tourism, but the standards and values of life in the Hawaiian Islands.

Hopefully,

Benjamin Moore

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Benjamin Moore
Benjamin Moore Foundation

Land Management Div. of DLNR

March 31, 1996

Attention: Eric Leshog

Dear Mr. Leshog,

We are certainly willing to help you and the Governor meet his budgetary constraints. Your letter of 3-13-96 therefore has been passed to subcontractors Environmental Group, Inc., part of Horizon
Hawaii Company and the State Litter Control Office with a thirty day contractual termination. I assume this is to sever their educational program in order to save the state $55,000 per week! See "thank you"
public praise and state regulations snatched.

It was fifty years ago, I helped Keemah Road finish building his cottage while on furlough and rent
(WNNS) in 1941. During those years, I worked with state forestry developing communities of flora
and fauna for seedlings that were endangered. These tasks were covered with a BOCA
official channel seen. It was as perilous a way of helping the new nearby neighbors climatic camp fire feet. A
DLNR (edit) instructed by inventors, made outright sampling a crime. Their insurance's, owners, fees,
and political savvy inferred a wrongful use of "scenic domain" (just a public good). It was the result of
an inventor plan to separate "their" enclosure and control "their" beach. Their political power report
reached all levels of the Hawaii Master Plan Committee. (An alternate plan that would have served
the public interest was condemned prior to being submitted). It was alleged that political favoritism was a "flat
accepted" by malfeasance involving (45) seven million dollars in special interests.

"Teaching your kids the ways of the world requires the proper classroom" (taken from a national
lores poll). Generations of pre-school children have discovered and explored for mental
development that equipped each child with a basic core knowledge giving each one equal educational
opportunity. Participation by the public in physical and biological endangered species preservation, taught
its basic lesson of survival, our children are being disinterested to whom to obey and what to do with their time. Children are our future and their
camping experiences at Wailea Beach 69 is not only the foundation of education, but forms an early
obedience to moral and spiritual values.

It is with all the above remaining to my 85 years, to question the blindness of the DLNR's "administrative APPRAISAL of the quality of life a crime. Because of the action of state officials,
all healthy and educational activities for all ages have ceased at Wailea Bay and in their place, all ages
are now exposed to drugs and illnesses. An estimate of our deficit has been set at $3 million dollars insubstantial totals. Wailea Beach 69 built an international reputation of Hawaii's Aloha and it has been
effectively transformed into an imported enterprize.

The writer leaves further inquiry and until then, am I to be excused into utterance also?

Benjamin Moore

Governor Cayetano, Mean Young, William Papi, Mike Wilson
THANK YOU

AMBASSADORS OF ALOHA

For making Wailea Bay safe
For looking out for each other
For self-governing yourselves
For volunteering drug free
For being an example to each other
For "mothering" Mother Nature
For seeking naturescape freedom
For informing the public too
For a welcome to Wailea Bay
For the peace and hope of spiritual repose
Forever in the sky
a thank you for finding yourselves as themselves - created equal.

Beach 69 Crime Stoppers
PROOF OF PARADISE

Hawaii's National Scenic Shore Line Drive would be a renewal of tourism public relations. A panorama with access to cultural Aloha between the grand lobbies of luxury hotels. Advertising at its Best.
COVER PAGE

These maps are to show the advantages of flood lots located next door to the proposed acquisition to Hapuna. It was submitted in mid 1992 as a long-range alternative. This lot holds the key to having unification. It met every general information survey requirement: environmentally matched to cultural traditions with direct savings of $3 million, an indirect savings of expenditure of $4 million for a total savings in excess of $7 million dollars (see fiscal '93-94 report).

The Hapuna committee yielded to the division of Wailea Beach 69 which was overtly planned and influenced by landowners. Every government agency was influenced by them. The attorney general, Edwin P. Watson, filed ex parte under pressure from the land owners to finalize the acquisition they wanted prior to any investigation of the alternative. The Attorney General used ex parte to lepione the prima facie use of HRS 101-29 (1) 2 and 3, also the Planning Department and E.I.S. This acquisition was announced by the State as "expanding" Hapuna which had been delayed since legislature approval in 1972. This announcement was intentionally stated to mislead the public into believing that DNR was finally following the legislative mandate. In fact, it established subdivision sovereignty.

Hawaii's future quality of life depends on the ability of the public to demand the reutilization of Wailea Beach 69 historically for home and rest. A fire of hot coals with fish laid thereon (see color photos of traditional land use).

A fine place for feasting if only one is poor enough to appreciate it.

* With both the State Government officials and the Wailea lot owners sitting together on the same side of the judiciary facing the public on the opposite side, wrongly used "eminent domain" to meet their special interests rather than public interests. An investigation will support the allegation of misuse of public service.
1970-1983 RECREATIONAL TRAGEDY

10,000 Acre Regional Preserve—
shooting to 780 acres—
Developed slowly for Developers.

Great Michi Land
Rights to Hapuna corrected
Hundreds of 10's of thousands
Selling rights to Hospitable Wales Bay.

The ruling ALL included the
area under the Law of the
Russian Empire.

Later the trails were crossed,
offshoots from old village
connections ended at Waikiai
campgrounds with two beach
ponds and ample forewood.

The present road into Wales
Bay followed the historic Ohia
Trail to its farthest extension
of land (Reef). It has been
documented outside the pre-History
Wales Log to state land.

For the survey to avoid the highly
concentrated historic sites in the
oldest, most frequented Big
Island communities raises
questions that should be
addressed.

Revised 1-1-84
General Information Survey
Exhibit 11
Mr. Benjamin B. Moore
Benjamin Moore Foundation
P.O. Box 666
Kamuela, Hawaii 96743

Dear Mr. Moore:

Final Environmental Impact Statement for the Proposed Hapuna Beach State Recreation Area Expansion

The Division of State Parks has completed its revisions to the Final Environmental Impact Statement (EIS) for the proposed Hapuna Beach State Recreation Area Expansion, and anticipates publication of this document in June 2001. In preparing for publication, the Department staff and the consultant reviewed all comment letters with the Office of Environmental Quality Control (OEQC) and found that in addition to your letter of August 26, 1996, OEQC had received additional attachments that staff and the consultant had not received. We are, therefore, responding to your park-related comments expressed in the attachments to your letter.

Land Acquisition for Park Purposes

The Division of State Parks purchased the two parcels at the northern end of Wailea Bay - the Scott-Bond parcel and the Wray parcel - because these adjacent parcels, together, provide the widest beach frontage for public access and use. It should be noted that the Scott-Bond parcel was purchased for $1,425,000, and the Wray parcel for $90,000. The total cost to the State was $2,400,000.

You have suggested that the park be expanded to include Pu'uko Point. Extension of the park to Pu'uko Point would require additional studies of resources and values to be protected, and if appropriate for acquisition, additional funding.

Public Access

The public access will be provided in a number of ways, however the park plan does not include the scenic shoreline drive you have suggested. Instead, the plan calls for a system of internal park roads, unimproved roads, and trails, such as those shown on the attached Master Plan drawing. For example, fishermen and hikers, will be able to drive out onto Kekaha Kai State Park and then hike to Pu'uko Point on an improved park road (shown in orange on the attached plan drawing) park at designated areas. Park users will then able to fish from the shore, or hike on coastal trails (highlighted in blue on the attached plan drawing).

Benjamin B. Moore

Public access to Wailea Beach will be located within parcel 31, as you have suggested, and across the former Scott-Bond and Wray parcels. The attached plan drawing shows the location of the Wailea Beach access, highlighted in green.

Shoreline Amenities and Public Safety

You indicated that Hapuna preservation should focus on shoreline amenities and safety. The Division of State Parks will construct a comfort station at the former Scott-Bond property to provide basic park amenities. In addition, the emergency road access gate will be replaced and beach users will park along the mauka side of the former Scott-Bond parcel and walk through the parcel to access the beach. Beach users will now have toilets, running water, an emergency telephone, and parking with a designated Ada (ADA) parking space at Wailea Beach.

Family and Group Camping

You note that camping provides an essential childhood experience. The park plan designates areas for family campsites with comfort stations and for group camping facilities. Family and group campsites will be connected to Wailea Beach and Bay by roads and trails, and families and organized groups will be able to enjoy the walk to the beach, and fully explore Wailea Beach and Bay.

Interpretive and Marine Education Programs

You have also noted that exploring and learning from nature is an essential childhood experience and that Wailea Beach and Bay can offer such experiences. The Division of State Parks is considering offering interpretive and marine education programs at Wailea Beach and Bay and at other State Park sites along the Kona-Kohala coast, such as Mahai'ula at Kahakuloa State Park, and perhaps at Kolekole Bay in the future. Wailea Beach seems particularly well suited to marine education because Wailea Bay has been designated as a Marine Life Conservation District, and public access is relatively easy.

Reach 68 vs. Beach 69

It is our understanding that the source of the term "Beach 68" is the telephone pole located along the Kawaihau-Pu'uko Road. We realize that the term "Beach 69" is also in use, and that the public recognizes this term as well. Our explanation in the text was for the purpose of accurately and fully disclosing information about this beach.

EIS 45-Day Review Periods

You indicated that the Draft EIS 45-day review period was not an adequate time period for reviewing this document. The Hapuna Draft EIS was a substantial document that may have taken more than seven weeks to review, however, the 45-day EIS review period is set out in Chapter 343, Hawaii Revised Statutes, and in the Department of Health Administrative Rule Title 11, Chapter 200, and both the reviewer and the proposing agency must comply with the statute and rule.
Benjamin B. Moore
Page 3

Over the years, you have been a kind and generous ambassador of goodwill at Wailea and have often assisted State Parks as a volunteer in maintaining this area. You have taught us the benefits of your philosophy of "mothering" mother nature at Wailea Beach. We sincerely appreciate all that you have done to make Wailea Beach a comfortable family beach to be enjoyed by all who visit the area. We hope to continue your good work. We will keep you informed of our progress at Wailea. Again, many thanks for your comments and for your volunteer work.

Sincerely,

Andrew M. Monden
Chief Engineer

Attachment: Master Plan Drawing
August 13, 1996

Governor of the State of Hawaii
c/o Office of Environmental Quality Control
State of Hawaii
220 King Street 4th floor
Honolulu, Hawaii 96813

Subject: ES / Kapuna Beach State Recreation Area Expansion
South Kohala Hawaii Island

Mr. Gayle

I have several concerns and questions re: the project:

1) Two hundred and fifty nine archaeological sites have been noted. The survey was done by the infamous Paul Rosendahl an alleged archeologist. His "work" is well known among the Kanaka Maoli Community. We have worked with him in North Kohala and it took our Kapuna and several other knowledgeable Kanaka Maoli people months to redo his survey. Mr. Rosendahl missed an entire village complex spanning acres of land designated for development. He also missed a magnificent navigational Heiva, the only one known to exist at this time. It is still functional and is used by the Polynesian Voyaging Society and other groups of navigators. His sacrificial treatment of the graves of our ancestors in Mahi is another outrage we had to tolerate as a people. He is paid millions of dollars to decimate the culture of the Indigenous Peoples of these islands. If not for our Kapuna these sites would be lost to us. Mr. Rosendahl's miserable track record is testimony to his total incompetence. How do you regulate these alleged professionals? The State dept. of Historical Preservation has no mechanisms in place to monitor the conduct of these "archaeologists". In essence the State of Hawaii has allowed Paul Rosendahl and others like him to run roughshod over the Hawaiian People. He is not even required to have a license to do it! Why didn't the State of Hawaii consult with the Hawaiian People re: the choice of a suitable archeologist to conduct this survey? SHAME ON YOU FOR HIRING HIM.

Is there a plan in place for local Kapuna and others to "survey" Mr. Rosendahl's work? The ES states that only two of the sites are to be preserved. That is outrageous!

Since the State of Hawaii refuses to monitor the work of Mr. Rosendahl, then it is the burden of the community to police him.

A community board of Kapuna / cultural experts needs to be convened immediately to review / correct Mr. Rosendahl's "work". They also need to receive compensation since essentially they are doing the work that the State of Hawaii is responsible for.

2) The planned golf course is scheduled to be put on ceded lands. How do you justify this? Have you consulted with the Office of Hawaiian Affairs? Why not? How do you propose to protect the traditional and customary rights of the Kanaka Maoli of the lands within these projects boundaries? Why has this issue been omitted from this study?

3) The ES mentions the development of water wells, with no mention of the water rights of the Kanaka Maoli People. How do you plan to address this issue?

4) How do you justify spending this amount of money when we have so many other more urgent needs, such as replacing our classrooms, cleaning up our environment, cleaning up corruption in public office, taking care of our poor and needy etc. etc. etc. I for one resent the implementation of such poorly conceived projects in our current economic crisis.

5) If this plan is allowed to develop as outlined in this ES you will be violating the rights of the Kanaka Maoli Peoples, rights that are protected by the Hawaiian State Constitution, as well as statutory, case and International law. How do you account for the omission of these rights in this ES? How do you propose to remedy this issue?

In closing, I would like to point out that it is common knowledge that the overthrow of the Hawaiian Nation in 1893 was illegal, this has been recognized by your own government in the Apology Bill - (Public Law 103-150). At the "time and that time after that time that have been implemented by your government and violated by your government, to this day. As public officials you are personally responsible to MAINTAIN THE INTEGRITY OF THE LAWS YOU CREATE AND WORK WITHIN. As a Kanaka Maoli woman I resent the CONTINUOUS abuse of our rights. I am tired of feeling public officials who are in office to uphold the law, and never do when it concerns the protection of the rights of the Kanaka Maoli People. And to add insult to injury I have to pay for these abuses in tax dollars.

I advise that you stop any further action on this project, don't waste any more of our precious natural resources or hard earned money.

Mahalo

Ana Nawahine-Kahoopii
CC: Paul Rosendahl
Div. of State Parks
Hana, Maui Hawaii
Ms. Ana Nawahine-Kahoopii
P.O. Box 1395
Kapa‘a, Hawaii 96755

Dear Ms. Nawahine-Kahoopii:  

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of August 13, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

The archaeological survey for the project area is included in the DEIS which has been distributed to the public including the Office of Hawaiian Affairs, Kona Hawaiian Civic Club, National Association of Hawaiian Civic Clubs, National Land Committee (Ku Lahi Hawaii), Waimea Hawaiian Civic Club, Na Ali Hee Hawaiian Island Advisory Council, Lahaina Historic District, Sierra Club (Ko‘olaupoko Group), and local libraries. The State Historic Preservation Division (SHPD) is currently reviewing the archaeological study and will make comments or recommendations, if any, on mitigation measures, monitoring work during construction, as well as preservation or interpretive development. If you have concerns about the survey, you may contact SHPD and review your thoughts with that agency which has the responsibility of approving the study.

The Office of Hawaiian Affairs is aware of the project expansion plan. In August of this year, a representative of that office attended a public informational meeting on the project. The cultural lands question was not specifically discussed at the public gathering but is addressed in Section 3.11.2 of the DEIS.

In Section 3.11.2 of the DEIS, we indicated the State will respect water rights of those who have resided prior to and during the development of the park and who have developed water collection infrastructure on the property. Additionally, all access rights will be maintained. The proposed park does not intend to disurb or remove existing accesses through the area.

Sincerely,

Andrew M. Monden  
Chief Engineer

AM-9602
OEQC
Warren Harrison, Harrison Associates  
Glen Koyama, Belt Collins Hawaii  
State Parks Division, DLNR
August 21, 1996

Governor of the State of Hawaii
Office of Environmental Quality Control
State of Hawaii, 220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813
Contact: Mr. Gary Gill

RE: Hapuna Beach Park Expansion Plan

To Whom It May Concern:

Thank you for the opportunity to address the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion, June 1996.

I am greatly concerned about the proposed $30,880,195 in capital costs. This amount, according to the EIS Draft is based on 1993 dollars, including an inflation rate of 3.5% per annum. This proposal, without any improvement yet having taken place, already reflects a 66% increase over the $25,000,000 that was the projected cost in 1993.

I question the State’s choice to provide funding of an estimated $16,595,750 to build an additional golf course at a time when fiscal cutbacks have made the private sector feel it necessary to supplement State funds for our children’s basic classroom needs through the Support Our Schools program, known as SOS.

Recently the State told us that they would have to pull back from their financial commitment to the state insurance program, Quest, which was started in 1990 and was supposed to make insurance available to everyone. In July Governor Cayetano, in referring to the Quest program, quoted as saying, “That’s a lot of money. You could dream a lot of dreams, but the reality is we cannot do everything we wanted to do.” In light of the Governor’s remarks and the insurance dilemma facing residents of Hawaii it would seem that the choice to budget more than $39 million, as suggested by the EIS draft, is unrealistic. In addition to $39 million the EIS Draft suggests that approximately $35 million more will be necessary for operations and maintenance which would increase the projected cost to $76,757,357 by the year 2015.

It would appear that even that projected cost is inaccurate as the EIS Draft estimate does not appear to include any costs for purchase of the 18 privately owned lots at Wailea though they are shown as part of the Expansion Plan. For the State to make it’s intent to purchase these properties public in the EIS Draft without disclosing a cost is capricious and further misrepresents the true financial burden that this plan would be to the taxpayers.

It is distressing to those of us who love Hapuna and Wailea to know that our beaches are being scarred for today due to lack of financial commitment by the State. The State has consistently refused written offers by the Wailea Property Association to install, at their own expense, sanitation and parking facilities at Wailea. At present beach-goers are finding both their health and safety increasingly more at risk due to lack of basic improvements. If the State is unable to maintain and keep Wailea clean and safe today how will they manage to do so in the future?

The latest Draft shows that maintenance costs are expected to run between $1.5 and $5 million annually. If the State does fund such an expenditure will it be at the cost of our education system. Will Wailea never have a High School because the State decided it was more important to have another golf course instead? Will we risk getting Hepatitis from swimming in unsanitary waters while finding ourselves uninsured because the State is spending more on Parks than they are on our insurance crisis?

Let’s be realistic about our choices; which is more important, health care and education or another golf course and a dramatically expanded Beach Park? When will the State honor the commitments it has already made to the people and children of Hawaii instead of spending our tax dollars on studies for unrealistic dreams for which there is no funding in sight. As the Governor says; “You can dream a lot of dreams but the reality is you can’t do everything."

Sincerely,

Patricia S. O’Kieffe
Ms. Patricia S. O’Kieff
P.O. Box 1599
Kaaawa, Hawaii 96733

Dear Ms. O’Kieff:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 21, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.

We believe the State’s tight financial situation will soon be over and the State will again begin addressing its commitments. In the near future, we hope to move forward with the planned park expansion to meet the continuing demand for additional park space. West Hawaii, as you may know, is one of the fastest growing regions in the State, and the proposed improvements will help meet the residents’ demand for more recreational opportunities.

Development of the park expansion is part of a medium-range plan that would be implemented over a 12 to 15 year period. The project’s estimated construction cost would be spread over this period which should make the project expenses a little more manageable. Additionally, there is a possibility that the golf course portion of the project would be co-sponsored with a private interest which could reduce the cost of development by more than 50 percent.

We acknowledge the large expense that will be required to acquire the private lots at Wailea and are prepared to implement this process on an as-needed basis. Establishing a value on these lots now would be meaningless considering acquisition is not scheduled for several years and that property values have the potential to vary significantly over this period.

Efforts will be definitely made to minimize the acquisition cost during the project implementation stage. Some ideas that have come from our consultants as well as from the community include the acquisition of properties in increments to spread the purchase cost over time (as well as to hold the cost down during inflationary periods) and the arrangement of a lease-back plan that would allow the State to recover some of the purchase cost while the properties await development.

Wailea Beach is not considered an official state park. It is state-owned land which we maintain as the property owner. Thus, the provision of parking and assistance facilities is not a prerequisite of a non-park state property. Once Wailea is included in the Hapuna Beach State Recreation Area, it becomes an official state park and will contain the necessary facilities to accommodate park users.

The master plan for the Hapuna Beach State Recreation Area expansion will serve as a medium-range development guide for the area. Implementation will be dependent on a number of factors including existing government policies, public programs, current State priorities and State Legislative appropriations.

We trust our response adequately addresses your concerns.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

AC: OEQC

Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
Andy Monden
DLNR, Land Division
1151 Punchbowl St., Room 227
Honolulu 808-586-0313

Re: DEIS for the Hapuna Beach State Recreation Area Expansion

Dear Mr. Monden,

I am opposed to the expansion of the Hapuna Beach State Park.

The greatest shortcoming of this DEIS is its failure to consider any recreational option other than golf for the mauna project area. This is puzzling because:

1. The greatest shortcoming of this DEIS is its failure to consider any recreational option other than golf for the mauna project area. This is puzzling because:

2. Though separated by the highway, the mauna project area is close enough to the shore that it should be oriented toward beach and ocean activities. There are few, many places that a golf course can be located, but beaches of the quality of Hapuna are almost nonexistent on this island, and any development associated with such a scarce and valuable resource should be designed to maximize enjoyment of its unique features. Golfer wishing to play by the ocean can make use of the many supervisor opportunities-including affordable ones-at existing facilities at the resort. It is not the State's responsibility to provide low-cost near-shore golf at all tee times and all seasons of the year.

3. In fact, it doesn't appear that the State needs to get involved in golf development at all. There are no existing need for additional affordable golf in this area, and the proposed course would only benefit the private facilities that are offering affordable play at this present time. The course at Waikoloa Village, which is situated within the nearest population center of any size, and very accessible to the second nearest—offers greens fee plus cart for $33. In fact, many of the public courses charge up to $25, or they can play for that price anytime after 1 pm. This is a desirable professional course with very reasonable fees year-round, yet it has capacity that is going begging. Why does the DEIS not address the economic impacts a public course would have on the Waikoloa Village course and the Waimea County Club, not the more expensive courses serving area residents? How can the glowing financial analysis of golf course benefits not point out that much of the income generated by the public facility would be diverted from other

4. There is no reason to assume a shortage of affordable golf in the future, either. There are many other existing and proposed golf facilities in the region. The County can require a more desirable and affordable play may be needed to meet future demand. This is not arbitrary. It is rare that the golf course is subject to a variety of impact fees and other requirements to meet public needs. In fact, the county is burdened by its zoning code from granting any rezoning unless there is a compelling public interest in doing so. A number of other governmental documents recreate this theme that private development does not serve the public interest. Affordable golf is not an unmitigated burden to resort owners. It represents an additional source of income and helps them to use their facilities most efficiently. In some cases, usage of a golf course is less important a consideration in its existence than its role in enhancing surrounding property values.

5. The Waikoloa Village project, which requires no water development or other capital investment to become functional, and doesn't have to pay 20% to OHA, is having already, how can we have any confidence that the proposed new course would be financially viable? Why was the payment to OHA left out of the financial analysis?

6. The discussion of water resources doesn't mention the total capacity of the aquifer or the demand upon it. One of the assertions made at the public meeting I attended was that the entire capacity of the aquifer is already spoken for. If this is the case, then withdrawal of additional 650,000 gpd probably cannot be accomplished without a permit, even if only breathtaking water is taken. In addition, the estimate of water usage for the golf course is based on the assumption of 1.5 gpm per car, which is not realistic, and has never been tested in Hawaii. If anything has been overlooked in the calculations, the water need—based on what all the other courses in the area consume—would be almost half a billion gallons greater than indicated.

7. What there is a shortage of is affordable group camping facilities and other overnight accommodations. I would recommend using the mauna project area for this purpose. A characteristic of group facilities that has been overlooked in the DEIS is noise. Church and cultural groups will account for a significant portion of the demand for such facilities, and music, singing and dancing are very likely to be a central part of their activities. Other groups will include noise-generating recreational activities as well. This represents a very real potential for disturbing other park users. Moving the organizational campgrounds above the highway would help solve this problem. It would also allow two or three such facilities, which I believe there is a great need for. This would have far more effect in drawing people to the big island from elsewhere in the State—and from out of state—than one more golf course, no matter what the rates. And it would leave more room below the highway to space out the campgrounds or to put in more campgrounds or cabins in the future, if that seems warranted.
It would be desirable to have a pedestrian connection between the two sections of the park. Perhaps bicyclists and electric car users could also be accommodated; to give easier access for those who use the highway, keeping in mind that such a road would be modified by using the existing tunnels for the new electrical conduits that are planned to go under the highway. Would it be feasible to adopt any of the drainage solutions for this purpose?

Conclusion: Because there is so little sound rationale for the golf course portion of this proposal, and so much public concern over it, we wonder if its inclusion might point to a hidden agenda. Is someone hoping on eventually putting condos on State land that are in the golf course, with some more or less affordable housing somewhere else to make it sound like a public benefit? Or is the owner of the properties to the north and south aspiring for this because it would enhance the property values? Even if there is no such motive, isn't it possible that if the golf course is not able to make a go of it financially, the State would decide to allow condos to be built around it as a way of bail it out?

If the answers to these questions are yes, would the State be willing to make a binding commitment that if there is a golf course, the nearby parcels will not be made available for housing? Or if the land is made available for housing, all units on and near the golf course must be truly and permanently affordable?

I would briefly like to comment on several other aspects of the DEIS. First, I believe that the plan should definitely include acquisition of the private properties around Waimea Bay, but that does not have to happen in the near future. A compromise I suggested at the meeting in Waimanalo was to allow owners to sell to the State but retain a lifetime interest. They would get to live there for the rest of their lives, which would make the whole thing more palatable to many of them, and it would cost the State less than buying the land outright. It would also allow owners to improve their properties as much as they want without increasing the price the State would have to pay. Otherwise, the State should prohibit owners from adding significantly to the value of their properties unless there are extraordinary circumstances. Another possibility would be to give the State right of first refusal whenever a property is about to change ownership.

Secondly, I think the DEIS would be more about the State’s long-range park development plans and how this element fits into them. There is room for a linear park that links up all the public beaches and provides for shoreliners users to spread out and thus diffuse impacts.

The State Legislature has passed resolutions to protect the forward North Kohala coastline from development in the future. For instance, in addition to the aim, acquisition of certain parcels should be undertaken. I’m sure the same is true for the south. I would much rather see money put into permanently protecting coastal lands outside of the resort nodes than to spilling up facilities on lands already owned by the State. The time to acquire undevelopable lands is now, while they are still available. Later, when there are fewer good prospects for acquisition, all of the money will have to be put into appropriately protecting and refurbishing what we already have. Twenty years ago, there were only a few shacks at Waimea Bay. The private land could have been acquired then relatively cheaply, if only we had been sufficiently foresighted.

If we spend a lot of money on developing existing public lands, instead of acquiring new lands, we will simply be stimulating usage, and thus increasing demand, with nowhere to expand in the future. The DEIS should consider the option of deferring park expansion within State lands and conserving funds instead to increasing the number of developable park lands to meet future needs on a much longer-term basis.

Regardless of what happens with this proposal right now, park planners should begin discussions with DOT for realignment of the planned (and minimal) “Waimea-Kawainui Connector Road” to come down the south side of the State land above the highway, rather than the north side. If that doesn’t make sense to use all the southbound traffic through the park area. People going to the park from Waimea will be adequately served with such a realignment, and those going to the park and then south of that can use the existing road. All others will be better served if they can avoid adding to congestion as the park approaches, and park users will have a better experience if through traffic is minimized.

It is proposed to string a new electric line halfway across the project area. Although this would be an addition to the existing line along the highway, its visual impacts are of concern to a park. Was an analysis done comparing the costs of undergrounding vs putting in new poles? If so, how were aesthetic values weighted? Please include a cost comparison in the EIS.

No mention is made of fire hydrants. What is the plan for this important bit of infrastructure?

There is no reason why the baseyard should be near the ocean or the park users. It should be hidden in the woods section, and the maile section should be kept as open, accessible and aesthetically pleasing as possible.

The conference room should have an outside door, so it can be used for interpretive programs for the public, and possibly for organizational use. (How can I arrange to be consulted about other design considerations I have in mind when the appropriate time comes?)

According to Section 2.4.2.4, fees from cabin rentals and concessions would go to the park’s interpretive programs. Is there some legal requirement for this? I support interpretive programs (in fact, I suggest we add amenities), but this seems rather inflexible. With two superintendent and some rangers, plus the possibility of volunteer
help with interpretation, how much more is needed for this function? If any of those funds can be made available for acquisition of future park lands, that should have a high priority, even if the amounts seem smaller compared to the need. This is so important, that I implore those responsible for making the rules and the allocations to rise above politics, kuleana, "turf", and encourage all to work toward this end.

Thank you for extending the deadlines for comments. I was unaware of the DEIS in time to respond by the original date.

Sincerely,

Kelly Pomeroy

cc: OEQC
Glen Koyama, Bets Collins

Mr. Kelly Pomeroy
59-148 Olomana Road
Kamuela, Hawaii 96743

Dear Mr. Pomeroy:

Environmental Impact Statement (EIS)
 Proposed Hapuna Beach State Recreation Area Expansion
 South Kohala, Hawaii

Thank you for your letter of August 28, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

1) We do not want to draw a definitive conclusion from the community meeting that there is no support for a golf course at Hapuna. Only a few people spoke against the golf course proposal. Also, the meeting attendees represent a small number and limited segment of area residents who obviously do not comprise a consensus of the community. Studies in our DEIS show there is a need for a public golf course in West Hawaii where none currently exists.

2) We do not agree with the statement that the highway provides a similar experience as the area east of the highway or that there will still be a sense of connectivity between the mailea land and beach land. The highway is a strong barrier especially when there is no direct access between the two areas. For this reason, the proposed golf course would not make sense in the area proposed in the highway could be developed for uses which are related to the beach area.

3) Appendix B of the DEIS presents data that an affordable public golf course in Kohala has a potential market for some 400 golfers per day on the weekends and 300 golfers on the weekdays. The proposed public course is expected to have green fees comparable to the municipal courses in Hilo. This rate is more than the Hawaiian rates offered at private courses and should attract some of the pent-up demand for affordable golf in the region.

4) We anticipate the new public golf course will have little impact on existing resort golf courses. The resort courses are unique and have their own characteristics and appeal. Public golf courses are popular with certain sectors of the community that do not mind playing a particular course over and over again. This sector of the community is generally comprised of retirees, and limited-income residents as well as junior golfers.
The State cannot depend on future golf course plans by private developers. There are too many uncertainties which could affect implementation. The State would have to take a proactive role to assure the needs of the community are met in a timely manner.

5) Our financial analysis (Appendix A of the DEIS) discusses the conditions which would make the proposed public golf course viable. The use of a private developer in partnership with the State and the establishment of a reasonable green fee schedule would be major factors in the project’s feasibility. Also, revenues from ceded land were not included in the financial analysis because the issue of ceded land payments is being reviewed by our government. In any event, payment of ceded land revenues will abide by state policies as established by the State administration and legislature.

6) The attention you are referencing may be the wells that are currently operating. The supply from these wells is already spoken for, but the area in the Kohala region is enormous and has a sustainable yield of over 54 MGD. It is more than adequate to serve the region’s current and future demands. Possibly, it is the development of this source that is presently limiting the supply. The proposed park expansion involves the development of a new well in a proven well field at the 1,200-foot elevation of the Lalambo land tract. The proposed golf course will use the new on-site wells to supplement an existing well to draw brackish water beneath the site as its source for irrigation.

7) Your suggestion for group camping above the highway is an interesting concept and would have merit as a solution to isolate from the rest of the park noise generated by this activity. We do not believe, however, that people engaged in this activity would enjoy the experience of a beach park if they were separated by a major highway and located more than 3,000 feet from the shoreline. It should be noted it is important to have direct and unobstructed access from the campsites to the beach especially when children (with chaperones) travel between these areas.

The golf course is designed to use the developable portion of the project site. The remaining areas are in gullies and ravines and are not desirable for homes. These lands have never been planned for or are being considered for residential development. Moreover, the State does not feel there is a need to show its interest in the area with a binding agreement. The State’s interest is already reflected in the 1995 State Plan, State Recreation Functional Plan, and State land use law.

We appreciate hearing another perspective on how the private properties behind Wailea can be acquired. This would be included in the final EIS as an alternative measure for implementation. As you may know, the 1990 State Recreation Functional Plan provides general guidelines for acquiring new public lands based on interviews with community leaders, agencies, and various resource persons. The functional plan specifically recommends Wailea, among others, as additional lands for acquisition.
July 23, 1996

Governor of the State of Hawai'i

c/o Office of Environmental Quality Control
State of Hawaii, 220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813

Attention: Mr. Gary Gill

RE: Hapuna Beach Park Expansion Plan

Dear Sir:

I am aware of your plan to expand the Hapuna Park to 'Beach 69'.

Please do not use my hard earned tax dollars to buy additional property we do not need. I can get to Wailea Bay just fine without any hassle.

All we need is a couple of lues, showers, picnic tables and barbecues and it will be the best place on the Big Island.

I bet there's a lot of folks who would live there at no charge just to pick-up and dump the opa'a.

Please re-think your $40 million dollar plan, and use that money for education, roads, and for places that really need it.

Aloha,

be: Susan Rutka

Ms. Morige Rico
Kamuela, Hawaii 96743

Dear Ms. Rico:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 23, 1996, to the Office of Environmental Quality Control (OEOLC), regarding the proposed Hapuna Beach State Recreation Area Expansion project.

As you may know, Waimea is one of the fastest growing regions on the island, and as a result, there is an associated strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

The State's objective for Waimea is to provide opportunities for park users to appreciate in a coastal setting, direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the existing land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(I), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beach property in the following areas" (for the Big Island) Wailea Bay, Anaeho'omalu Bay to Ku'upulehu, and Koa Bay. To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.
Ms. Morgan Rice  
DC 3 1996

Development of the park expansion is part of a medium-range plan which would be implemented over a 12 to 15 year period. The project's estimated construction cost would be spread over this period which should make the expense a little more manageable. Additionally, the State is exploring the possibility of joint-sponsoring the development of the proposed golf course with a private interest which should decrease the public cost of the project.

We appreciate your comments on the proposed park expansion.

Sincerely,

Andrew H. Munden
Chief Engineer

AM-ek  
c. GHQC
Waron Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawai'i  
State Parks Division, DLNR
July 23, 1996

Governor of the State of Hawaii  
Office of Environmental Quality Control  
State of Hawaii, 220 S. King Street, Fourth Floor  
Honolulu, Hawaii 96813  
Attention: Ms. Gary Gill

RE: Hapuna Beach Park Expansion Plan

Dear Sir:

I am aware of your plan to expand the Hapuna Park to 'Beach 69'.

Please do not use my hard earned tax dollars to buy additional property we do not need. I can get to Wailea Bay just fine with no hassle.

All we need is a couple of Trails, showers, picnic tables and barbecues and it will be the best place on the Big Island.

I bet there's a lot of folks who would live there at no charge just to pick-up and dump the opala.

Please re-think your $40 million dollar plan, and use that money for education, roads, and for places that really need it.

Aloha,

[Signature]

cc: SUSAN HUTKA

Ms. Zanya Schotte  
Kamuela, Hawaii 96743

Dear Ms. Schotte:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of July 23, 1996, to the Office of Environmental Quality Control (OEQC), regarding the proposed Hapuna Beach State Recreation Area Expansion project.

As you may know, West Hawaii is one of the fastest growing regions on the island, and as a result, there is an associated strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for expansion because of their popularity, accessibility, location, and existing infrastructure.

The State's objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauna land and beach land and its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The actions policy of this plan specifically provides that the State shall "acquire beaches in the following areas (for the Big Island) Wailea Bay, Anaeho'omalu Bay to Ka'upulehu, and Kua Bay". To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.
Development of the park expansion is part of a medium-range plan which would be implemented over a 12 to 13 year period. The project's estimated construction cost would be spread over this period which should make the expense a little more manageable. Additionally, the State is exploring the possibility of joint-sponsoring the development of the proposed golf course with a private interest which should decrease the public cost of the project.

We appreciate your comments on the proposed park expansion.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

cc: OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Dept Collis Hawaii
State Parks Division, DLNR
August 20, 1996

Governor of the State of Hawaii
c/o Office of Environmental Quality Control
State of Hawaii, 220 South King St., Fourth Floor
Honolulu, Hawaii 96813

Contact: Mr. Gary Gilchrist

Re: Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion, Kamuela, South Kohala, Hawaii, June 1996

Dear Sir:

Thank you for giving me the opportunity to respond to the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion dated June, 1996.

As a landowner of Wailea Bay, I appreciate its unique beauty. I am concerned that development of the expansions discussed could irreversibly damage the environment of the area. I also believe support development of limited public improvements such as access, restroom facilities, and area maintenance.

Please consider the following regarding the proposed project’s impact on Wailea Bay:

- Would not a single access to this low-impact walk-in park best serve the needs of visitors, law enforcement, and lifeguards?
- Density and capacity measurements need to be reassessed. These measurements greatly overstate the size and capacity of the area.
- Enforcement and sanitation must be addressed. It is important that a full-time, live-in enforcement position be funded prior to development.
- I object to the portion of the plan that contemplates condemnation of our home and all privately owned parcels fronting Wailea Bay, and feel that it is not necessary or appropriate.

Drainage and runoff issues need to be carefully and more fully addressed.

I question the need for another golf course in the area and the accompanying destruction of the natural landscape.

Thank you for the opportunity to comment on the EIS draft. I look forward to the development of a plan which will protect and preserve the natural beauty of Wailea for years to come.

Sincerely,

Mary Hugh Scott
Ms. Mary Hugh Scott
P.O. Box A
Aspen, Colorado 81611

Dear Ms. Scott:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 20, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

A single primary access is being planned for Waiakea Beach. This access will approach the beach from the northern central section of the bay and include a parking area and comfort stations. A secondary access will be provided to approach the lengthy beach from the southern side of the bay. The distance between these accesses is approximately 875 feet. Notably, the secondary access will need more access to the picnic grounds around Ohalo Cove and Puako Bay.

Our description of Hapuna and Waiakea Beaches are provided in Section 3.2 of the DEIS and includes estimates of the beach dimensions in the summer as well as the high surf or winter months. The sources of these measurements are aerial photographs, U.S. Geological Survey Maps, and observations of Waiakea Beach residents.

Our estimates of the capacity of the beach is taken from the projected largest beach size in an effort to estimate the potential full use of the area. This information would provide a useful tool for planning further improvements.

An increase in park staff and establishment of a headquarters building will be included with the park expansion. As identified in the DEIS, park managers, groundskeepers, lifeguards, and security personnel are recommended for the park. Specific as well as general staff assignments would be made to serve Waiakea Bay.

West Hawaii is one of the fastest growing regions on the island, and as a result, there is an associated increasing demand for recreational facilities. Hapuna and Waiakea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

Ms. Mary Hugh Scott
P.O. Box A
Aspen, Colorado 81611

The State's objective for Waiakea is to provide opportunities for park users to appreciate in a coastal setting a direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping and relaxation, along with beach and nearshore recreation activities. The private properties at Waiakea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauna land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(4), the State will "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use." The action policy of this plan specifically provides that the State will "acquire reaching in the following areas (for the Big Island) Waiakea Bay, Nana'ahua Bay to Kalapana, and Kea Bay." To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

Regarding your concerns on drainage, in Section 3.5 of the Draft DEIS, we have discussed in detail the characteristics of the site's surface runoff, anticipated project-generated impacts, and possible mitigation measures.

Existing golf courses in the area are resort-oriented and privately operated. Green fees are relatively high and public play is controlled by a priority system. The proposed golf course will be a public facility with lower green fees. As you may know, there are no public courses in West Hawaii.

The new golf course is expected to enhance the area's visual environment. The site is presently occupied by dry vegetation and dead wood (a potential source for brush fire). In the proposed plan, a large portion of the existing vegetation would be replaced by healthy and landscape vegetation that will be regularly irrigated and maintained. Indigenous trees compatible with the surrounding environment will be used as much as possible. Additionally, all existing major drainage and ravines will be respected and essentially kept intact. The new golf course should reduce the flow of surface runoff and consequently reduce potential downstream flooding. All view corridors to the ocean and mountains will be preserved.

We thank you for your comments and suggestions regarding the DEIS.

Sincerely,

Andrew M. Mendi
Chief Engineer

OEQC
Warren Hardison, Harrison Associates
Glen Koyano, Bellevue, Hawaii
State Parks Division, DLNR
Mr. Gary Gill
Office of Environmental Quality Control
State of Hawaii
320 S. King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

As a third-generation property owner at Wailea Bay, I appreciate the chance to review and respond to the Draft Environmental Impact Statement for the proposed Napua Beach Park expansion.

Given the fact that I have a full-time job, it was virtually impossible to digest in detail such an overwhelming sheet of paper; however, several key points seem to be reiterated time and again and seem to be concerns shared by all interested parties:

1) COST

Cost is, of course, of paramount importance. It seems that the projected cost of the proposal in its most full-blown incarnation has risen from an original estimate of approximately $135 million to a more recent estimate of over $44 million. If we were to continue to extrapolate these figures, throw in a few extra percentage points for inflation, and then add the cost of acquiring private property, the final sum could more realistically approach twice the given amount; a staggering amount of public funds in any budget. Remember, too, the ongoing cost of maintaining such a park, including extra law enforcement officers, caretakers, and basic maintenance costs such as water and trash removal, and the cost goes even higher.

As a taxpayer in the State of Hawaii, I am both shocked and dismayed that such an inordinate percentage of public funding would be squandered needlessly, leaving schools, public health and safety, and other community issues to go begging. It is especially ironic to realize that such costs are even being contemplated when the existing park... without a similar expenditure of public funds... has considerable land capacity to meet anticipated demand to at least the year 2010." (EIS, p.2-30)

It would seem at best irresponsible and at worst knowingly negligent for elected public servants to ignore the more urgent, and, frankly, more essential needs of the community in such a huge expenditure of tax dollars.

2) WAILEA BAY

Wailea Bay can be recognized by anyone who visits as an extremely fragile locale. It does not take an Environmental Impact Study to realize that opening the beach to an inordinate number of visitors would be unwise and would destroy the very nature of the environment it was undertaken to protect. In the rush to develop a park it would be tragic if such a pristine and delicately beautiful beach were to become unclean and unsafe from overuse.

The beach has essentially been a walk-in park for decades and has managed to survive fairly well, despite these devastating fires. Ivo sparked by careless campers is a risk that certainly needs to be considered when evaluating increased use. This is, in fact, the most demonstrative environmental impact study one could imagine -- decades of walk-in use -- and has illustrated ample the immediate needs for such a contemplated park, specifically: improved sanitation, caretaking, and law enforcement, all of which can be achieved without tremendous expenditure of acquisition of private lots. Clearly a low-impact walk-in park would be the most logical, low-cost, environmentally protective and acceptable option for all involved.

3) GOLF COURSE

Does anyone believe we really need another golf course?

Wailea Bay runs the risk of being loved to death. Only thoughtful, careful decision making will prevent that from happening, with honest, open-handed cooperation among all parties, public or private.

Sincerely,

Allan S. Treadwell
Dear Dr. Treadwell:

Environmental Impact Statement (EIS)
Proposed Haena Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 1, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement for the Haena Beach State Recreation Area Expansion project.

Cost

The proposed park expansion will be developed in four increments over a 12 to 13 year period. The $40 million construction cost includes an inflation factor so if it were discounted to today's cost, the price tag for the proposed improvements would be much less.

Wailes Bay

Although the existing park still has some residual capacity, during the peak summer periods, the park is quite full. The proposed park expansion will provide new recreational opportunities for the area, especially camping facilities that are lacking in the North/South Kohala Districts.

Care will be taken to protect Wailes Beach from overcrowding. The master plan has been revised to show parking away from the beach so Wailes would be a "walk-in" facility. In the final design, parking would be sized to limit the number of stalls available for beachgoers. With park expansion, park staffing will be improved to provide adequate maintenance and security.
Dr. Allan S. Treadwell  
Page 2  
Ala 3 1996

Golf Course

The proposed golf course will be a public facility. Such a facility presently does not exist on the west side of the Island. Other golf courses in West Hawaii are of the privately-owned or "resort" type which have greens fees that are $5 to $15 more (even with kamakai rates) than the anticipated fees of the proposed public course. For golfers who are on a limited budget, a public golf course will be a welcome amenity.

The environmental review process, as provided in Chapter 343, HRS, offers opportunities for public input at two stages during the EIS preparation: once during the "preparation notification" phase and once during the Draft EIS stage. The State also held two public informational meetings on the project. The last meeting was held in Waimea on August 23, 1996.

Additional public input will be received during the permitting stage when the State applies for a Conservation District Use Permit and Special Management Area Use Permit. During the operational stage of the project, the community will be invited to offer suggestions on park programs and improvements.

We trust our response adequately addresses your concerns.

Sincerely,

Andrew M. Monden  
Chief Engineer

AM rek

C: ORR  
W. H. Harrison, Harrison Associates  
Glen Koyama, Belt Collins Hawaii  
State Parks Division, DLNR
Governor of the State of Hawaii  
a/c Office of Environmental Quality Control,  
State of Hawaii, 220 S. King St., Fourth Floor  
Honolulu, Hawaii 96813  

Attn: Mr. Gary Giff  
Mr. Draft Environmental Impact Statement  
for the Hapuna Beach State Recreation  
Area Expansion, Waikoloa, South Kohala,  
Hawaii, June 1996  

Sir:  
The above-cited document, in addition to a mind-numbing amount of information relating to the proposed expansion of Hapuna Beach State Park, contains many letters from concerned members of the public as well as from the owners of private property at Waikoloa which point out again that any extensive development of the Waikoloa area, including the acquisition of the private properties, there would have an extremely negative impact, financially for the State and environmentally for the land and beach.  

The above DEIS itself states that, quote, "a two-week survey of recreational participation and a capacity analysis—suggest that the existing park has considerable land capacity to meet anticipated demand to at least the year 2000." Given this fact, the State can afford to move cautiously and deliberately in coming to a decision regarding the development of the Waikoloa area.  

In its desire and intent to make the beach at Waikoloa more easily accessible to the public, the State should make paramount in its decision the size and fragility of this beach. All parking and other public facilities should be placed at least one quarter-mile of the beach making Waikoloa a "walk-in" beach.  

The situation at Waikoloa presents an ideal opportunity to employ the concept of the public and private interests working together for the common good and to the benefit of both parties. The State should work with the private property owners at Waikoloa to develop a plan which would achieve the objectives of the Hapuna Beach State Recreation Area Expansion Project without the condemnation of additional private property.  

I appreciate the opportunity of presenting these comments and suggestions and request that I continue to be a concerned party.  

cc: Div. of State Parks, a/c Land Div.  
State of Hawaii  
Mr. Andy Nomoto  
West Coast Land Ltd.  
Attn: Mr. Glen Sugano  

Yours truly,  

Richard R. Treadwell,  
Trustee of the Richard T. Treadwell Trusts  

Mr. Richard R. Treadwell  
Trustee of the Richard T. Treadwell Trusts  
P.O. Box 1017  
Ross, California 94957  

Dear Mr. Treadwell:  

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii  

Thank you for your letter of July 25, 1996, to the Office of Environmental Quality Control (OEQC) regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project.  

The development of the Hapuna Beach State Recreation Area Expansion will occur gradually over a 12 to 13 year period. During this time, it is anticipated the park expansion plan will undergo modification and/or enhancement to adjust to changing conditions.  

The State’s objective for Waikoloa is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.  

The private properties at Waikoloa Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauna land and beach land with its ocean resources.  

As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall “acquire additional beach park and rights-of-way to remaining undeveloped shorelines, or acquire additional access to developed shorelines to provide increased capacity for future public recreation use.” The policy’s implementing action specifically provides that the State shall “acquire beaches in the following areas: (for the Big Island) Waikoloa Bay, Azara’omulu Bay to Kuaupolu, and Kua Bay.” The State is authorized to acquire lands for public purposes under government power of eminent domain.
Mr. Richard R. Treadwell  
Page 2  
DEC 3 1995

We acknowledge that Waimea is a dynamic and fragile beach which changes in size and character during the year. For this reason, no structures or ground improvements are planned directly on the shoreline. The number of parking stalls will be designed to reflect the beach’s size and anticipated use and will be located at a distance (though not one-quarter-mile) from the shoreline to encourage the theme of a “walk-in” beach. Provision, however, will be made to comply with the Americans with Disabilities Act (ADA) standards that provide drop-off areas and other facilities for handicapped persons.

The current EIS review process provides a means for public input on the proposed project. In subsequent phases, the State will proceed through the permitting process where public hearings will be held and additional opportunities for public input are offered. During the operational stage of the project, park administrators will be available to receive resident concerns on park management and security and to discuss program ideas with the community.

We trust our response adequately addresses your concerns.

Sincerely,

Andrew Monden  
Chief Engineer

AS:ck  
c: GEQC  
W. Harris, Harrisons,  
Glen Koyama, DLNR,  
State Parks Division, DLNR.
Dear Sir or Madam:

Re: Draft DEIS for Hapuna Beach State Recreation Area Expansion

I would like to offer the following comments on this document:

A. Inclusion of Golf Course

The preferred alternative involves construction and operation of a golf course on state land residue of Queen Ka'ahumanu Highway. I do not believe that information provided in the document supports the decision to develop a golf course. Rather, it would appear, from what is available in this document, that this would greatly add to the cost of the project, while benefiting only two classes of people (those who own, operate, or work for the golf course concessionaires, and (b) those who want more golf courses on the island). (See Appendix A, page 6.)

Moreover, the draft DEIS does not address at all the matter of how the proposed golf course would be in line with the State's Recreation Act with regard to the existing public recreational facilities. Should the DEIS acknowledge this potential conflict, it would add little to the project.

B. Costs

Chapter 2 of the DEIS presents a discussion of the three alternatives considered. This includes a discussion of the costs. Alternative A, to the extent of $6 million, going to park improvements and $26 million for the golf course.

In discussion of Alternative B, however, which is the park improvements without the golf course, the cost is placed at $33.3 million. There is no explanation of why the park improvements are so much more than the costs provided in the discussion of Alternative A. Comparing the two maps (figures 2-41 and 2-42), I see no difference whatsoever in the park improvements proposed for Alternative A and Alternative B.

From this passage, it would appear that the cost differential between Alternative A and Alternative B is in the order of $61.7 million, whereas it would appear from all other information in the DEIS (including Table 2-6 in Appendix A) that the real differential cost is between $24 million and $27 million.

C. Water Use

Missing from this DEIS is any hydrological study that supports the all-up flood study (as 3.2.2.1) of water demands. The only mention of this issue occurs in one paragraph in Appendix C (Hawaiian Conservation, by Stanley Kenton, Associated). What are the characteristics of the aquifer systems from which both the fresh water and the irrigation water are to be derived? Can the support development of extensive water systems be justified? The initial use, according to the DEIS, is 15,000 gpd on weekdays and 57,000 gpd on weekends. The proposed park improvements, it goes on to say, "will generate an average daily water demand of approximately 28,000 gpd on weekdays and 52,000 gpd on weekends." It is in addition to existing use? I suppose so, but would like to see specific hydraulic maps for park use (exclusive of golf course) included in the final report.

The report also states that the DEIS has not been able to meet the number of persons interested in natural resources. For this, the DEIS needs to estimate what the impact on the state's water demand of the golf course would be. As it is, the DEIS does not allow such comparisons.

D. Recreation Impacts

The DEIS states that no negative impact on water quality or potential adverse impact on the proposed development. Yet in no discussion of what effects chemical applications on the golf course might have on the underground springs or other natural water flows that apparently lack the area (according to the Department of Agriculture report, presented, these springs, springs, and other flows near the proposed site would not be affected by the proposed development). There is no discussion of what effects chemical runoffs from the golf course might have on the aquatic life. There is also no discussion of the potential for water quality not adversely affected by the proposed development.

E. Public Use

The DEIS states that the public use of the proposed golf course would not be affected by the proposed development. Yet in the discussion of the proposed public use, there is no discussion of the potential for water quality not adversely affected by the proposed development.

F. Public Use

The DEIS states that the public use of the proposed golf course will not be affected by the proposed development. Yet in the discussion of the proposed public use, there is no discussion of the potential for water quality not adversely affected by the proposed development.

G. Public Use

The DEIS states that the public use of the proposed golf course will not be affected by the proposed development. Yet in the discussion of the proposed public use, there is no discussion of the potential for water quality not adversely affected by the proposed development.
It may be years, if ever, before the state gets enough money to purchase these holdings. In the meantime, however, the state should and must exploit fully what resources it has – including state public roads. This will allow full utilization of a beach that is now, for all intents and purposes, one of the best private beaches in the state of Hawaii. The DEIS should be revised to indicate the full extent of public holdings in and along the private tracts (including roads, covenants, and rights). It should include a plan to incorporate these holdings in an overall public access component.

Elsewhere in the state (e.g., Lanikai, Kahala, Kailua, Hauula, Kailua), private residential areas have co-existed in harmony with public beach users for years. There is no reason to believe that such harmony could not be obtained in the southern end of Waikiki as well. Indeed, there is every right to expect it. Yet so long as extra special consideration is given to the privacy rights of these landowners, the public will come up short. This is an outrageous premise, and must not be allowed to stand.

Thank you for your consideration of my comments.

Yours truly,

[Signature]

[Name]

Mr. Patrick Tummons
187-C Hokulani Street
Hilo, Hawaii 96720

Dear Mr. Tummons:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of August 4, 1996, to the State Land Division regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion project. Our response to your comments is as follows:

Inclusion of Golf Course

There is only one public golf course on the island, located in Hilo over 70 miles from the Kohala coast. As described in the Pedersen Planning Consultants study (Appendix B of DEIS), there is a strong demand for a public golf course in West Hawaii based on a per capita analysis and interviews with people in the industry. Acknowledging the population growth trends in the Kona and Kohala Districts, this demand for a public golf course will continue to increase.

Construction of the golf course will require substantial funding. As described in the DEIS, the alternative of having a private developer involved in the golf course construction would provide significant savings to the State. Furthermore, Pedersen’s feasibility study demonstrates that a golf course developed and operated by a private entity could be a viable venture within four or five years of opening.

We are aware of the planned golf courses in West Hawaii and the recent slowdown in golf course development. From our experience in this region, we believe the slowdown is due to economic, marketing, political, and environmental factors, as well as government processing requirements. No one reason is responsible for this latest trend. Some of these planned courses may not be built at all.
Although the development of privately-funded golf courses has slowed in recent years, there is still a need for at least one public golf course on the west side. With more and more people on fixed incomes residing in the region and looking for affordable golf, the need for a public course becomes more evident. With rates of $5 to $15 per round less than privately-owned golf courses with kamaaina rates, the savings on public courses would be significant, especially when a golfer plays four to six times a month. The proposed public golf course would give golfers the option of playing without a cart which would result in a green fee of about $15. The Waimea Country Club and Mauna Hawaii Country Club require players to use a cart and therefore pay a higher fee.

Opening of a public course in West Hawaii may also encourage individuals who normally would not take up the sport to participate in the recreation if it were affordable. Although the facility may serve only a small portion of the population, like any other recreational amenity (such as County rifle range, hiking trails, camping sites), it will be part of a package of recreational opportunities to serve the various needs of our community.

An immediate benefit of the golf course is the direct employment generated and user fees or revenues that are collected. Also beneficial are the secondary effects accrued when the golf course purchases goods and services to maintain its operations and when golf course employees spend their income in the local community. As provided in the Pederson study, this would result in an added benefit of $5.2 million per year to the state's economy by the year 2015.

It should be noted the benefits of a golf course are not only economic. A well-maintained facility will provide a lush green environment that would enhance the visual and ecological character of the area. It would also preserve the area in permanent open space. These long-term benefits do not have any monetary value, but they do provide visual and psychological comfort.

Costs

Development of Alternative A includes the cost of off-site infrastructure. This is required whether the entire property or only a portion of the property is developed. Thus, Alternative B which comprises only a portion of Alternative A, namely the park area, would still require extensive off-site improvements such as water, sewer, highway improvements, telephone, and electricity.

Water Use

Information on groundwater in South Kohala is scarce and not precise, particularly because there is a lack of available hydrological data. A December 1991 draft of the Hawaii County Water Use and Development Plan prepared for the Department of Water Supply, County of Hawaii estimated that the groundwater aquifer in South Kohala, which comprises the Waimea and Anaehoomalu hydrological sectors, has a sustainable yield of 5 mgd. This aquifer includes the areas of Waimea, Waikoloa, Puako, South Kohala resorts, and west slopes of Mauna Kea and northwest slopes of Mauna Loa. The current usage in this area is about 6.3 mgd (1995 State Water Commission records) which indicates that there is still a large reserve of water in the region.

The best available hydrological information for the project area is the data compiled from the existing water wells at the 1,200-foot elevation of the Lamanu area that have been the most successful and have provided the best feasible option for additional source development in South Kohala. Each of these three largest wells in this area is capable of producing approximately 3.4 million gallons per day.

Better hydrological information for the project would come from test drilling for potable water. Test drilling, however, is typically done when a project is in the latter stages of planning and in the design process. It would be premature to incur the high costs of test drilling a well during the present phase in the absence of necessities for the park improvements.

Irrigation water is currently obtained from a trucked well (Elevation 244') above Queen Kaahumanu Highway. It is anticipated that additional wells at this elevation would produce similar results. As an alternative, better quality water may be obtained at higher elevations within the same State land tract, however transportation of the water to the project site would then become a consideration. Use of higher quality water may be an advantage if excessive use of sources of water at lower elevations invite higher potential of salt water intrusion.

We estimate that demand for potable water at the new club facility would be approximately 13,000 gallons per day (gpd), and approximately 19,500 gpd for the proposed park expansion during the peak days of the week. Approximately 600,000 gpd of irrigation water would be required for the golf course landscaping and 50,000 gpd for the park landscaping.

Nearshore Impacts

The Murdoch and Green study has indicated that chemical applications from fertilizers, herbicides, and pesticides would be significantly used. Most of the Ms. chemicals stick to the highest surface layers of the soil. Those that do penetrate are unlikely to get deep enough to enter any springs, especially at the golf course site which is located more than 3,100 feet from the shoreline.

The reference study cited by Murdoch and Green, entitled "Evaluation of the Impact of Agricultural Chemicals on Shoreline Waters by Movement in Groundwater," was prepared in 1981. This study indicated that the shoreline at the project site is topographically similar in characteristics to the coastline from Kawaihae to points south of Anaehoomalu Bay. What should be noted, however, is that the proposed golf course will be located more than 3,100 feet from the water. The adjacent Mauna Kea Beach Hotel golf course is situated on the shoreline and its impacts on the coastal waters would be immediately noticed if they occurred; according to the study, there have been no impacts.
Full Public Use

As long as private parties own the Waiale Beach lots, they are entitled to all property rights and considerations. Once these properties are placed under the control of the State, the public will have full use of the land. Information on State-owned lands and public easements and access are described in Sections 3.1, 3.2, and 3.12.1 of the Draft EIS.

We trust our response adequately addresses your concern.

Sincerely,

Andrew M. Monden
Chief Engineer

cc: Warren Harrison, Harrison Associates
    Glen Kewyu, Belt Collins Hawaii
    State Parks Division, DLNR
July 23, 1996

Governor of the State of Hawaii
c/o Office of Environmental Quality Control
State of Hawaii, 220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813

Attention: Mr. Gary Gill

RE: Hapuna Beach Park
Expansion Plan

Dear Sir:

I am aware of your plan to expand the Hapuna Beach Park to Wailea Bay.

I go to Hapuna Beach and Wailea Bay all the time. There is a big difference between the two locations. Hapuna is big, lots of folks, good volleyball, all sand beach break, and all the State Beach amenities. Wailea is small, local, a preserve, trees, good snorkeling, laid-back, fast tubular waves over a shallow reef.

Why not leave Hapuna 69 as it is. Keep it remote and make people walk in. That way, those who will respect the area will come and it won't be ruined by over use. A few basins, showers, and outhouse dispensers would be good, but that's all we need.

Why spend millions of dollars to buy out the homes there. They give the area a good feeling. I see people raking the beach and clearing it up. It's cleaner than Hapuna.

Spend the money on education, highways, bikeways, and the existing parks. North Kona Beach Park needs good fencing, water, security and a better road.

Keep Wailea small, please don't spend my hard earned tax dollars unwisely.

Aloha,

Susan Harka

Ms. H. Vissor
Kahului, Hawaii 96733

Dear Ms. Vissor:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for your letter of July 23, 1996, to the Office of Environmental Quality Control (OEQC), regarding the proposed Hapuna Beach State Recreation Area Expansion.

As you may know, West Hawaii is one of the fastest growing regions on the island, and as a result, there is an associated strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

The State’s objective for Wailea is to provide opportunities for park users to appreciate a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauna land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-4(A), the State shall “acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use.” The action policy of this plan specifically provides that the State shall “acquire beaches in the following areas: (for the Big Island) Wailea Bay, Anahulu/Oaulu Bay to Kailua, and Kina Bay.” To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

Our plans show that Wailea will be developed as a walk-in beach. Parking will be located away from the shoreline and beachgoers would have to walk more than 400 feet to the water. For the convenience of the public, a comfort station will be provided near the parking area.
We do not intend to develop Wailea like Hapuna Beach. Wailea will continue to be a scaled-back, low-key recreational site within the park expansion area.

We appreciate your thoughts and comments on the proposed project.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

AMek
c: GEQC
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
August 6, 1996

Land Division
Department of Land and Natural Resources
1151 Punchbowl St., Rm. 227
Honolulu, Hawaii 96813

ATTENTION: Andy Monden

Re: Comment on Draft Environmental Impact Statement
Hapuna Beach State Recreation Area Expansion
Wailea, South Kohala, Hawaii

This office represents several property owners in the Wailea Bay area affected by the State's proposed Hapuna Beach State Recreation Area Expansion. The scope of our representation includes the property owners' concern over the State's apparent intention to condemn private properties for public purpose.

These property owners' consistent position has been that the November 30, 1987 "authorization" from the Board of Land and Natural Resources to acquire private properties in Wailea Bay area is stale, outdated, and no longer serves as valid authorization to condemn private property. The property owners did not have adequate notice of the Board's intention to consider condemnation and have not been given a meaningful opportunity to be heard.

Further, the Draft EIS does not adequately assess the impacts of taking private properties. The Draft EIS does not assess the impacts on families involved, many of whom have owned those properties for generations. The displacement of residents deserves more careful assessment under the requirements of Hawaii Revised Statutes, Chapter 141. It is also inappropriate for the environmental assessment to be performed nearly nine (9) years after the purported governmental action authorizing condemnation.

Yours truly,

[Signature]

RAV/bah
cc: Belt Collins Hawaii
Governor, State of Hawaii
Office of Environmental Quality Control
Roy A. Vitousek III, Esq.
Cades Schutts Fleming & Wright
Hualalai Center
75-170 Hualalai Road, Suite B-303
Kailua-Kona, Hawaii 96740-1737

Dear Mr. Vitousek:

Environmental Impact Statement (EIS) Proposed Hapuna Beach State Recreation Area Expansion South Kohala, Hawaii

Thank you for your letter of August 6, 1994, to the State Land Division regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

The Board of Land and Natural Resources' authorization to acquire private properties in Waikoa Bay is binding until the Board rules otherwise. Board meetings are advertised in the daily newspaper and open to the general public.

Section 3.11.2.2 of the DEIS identifies the possible effects of land acquisition including property values changes and potential stress that may be experienced by property owners at Waikoa. This stress particularly would involve the anxiety of not knowing the State's land acquisition schedule. Other property owners may view the land acquisition as an opportunity to relocate or reinvest from the transaction proceedings.

The State Housing Finance and Development Corporation (HFD) has indicated that a relocation plan should be submitted to the agency for review. In accordance with Chapter 111, HRS, we will prepare and submit a relocation plan to HFD prior to parcel acquisition at Waikoa. A basic concept of the relocation will be described in the Final EIS and details will be provided in the final document to be submitted to and reviewed by the HFD.

Preparation of a master plan for Hapuna was authorized in 1990 prior to the preparation of the current EIS. With higher priority public programs moving forward, the Hapuna project was placed on an extended schedule. The acquisition of the parcels is part of a 12 to 13 year development program for the area. Acquisition will probably proceed at a moderate pace as funding becomes available.

We trust our response adequately addresses your concern.

Sincerely,

ANDREW M. MONDIE
Chief Engineer

A4Teck:
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collin Hawaii
State Parks Division, DLNR.
August 7, 1996
Page 2

The private lots around Wailea Bay should not be purchased. Such a condemnation represents an enormous expenditure of taxpayer dollars. It also displaces property owners who enhance Wailea Bay with landscaping which reduces the effects of high winds on the beach, provide flood control, fire prevention, and security.

In my opinion, the plan needs to be revised to protect and not develop Wailea Bay. Wailea Bay should continue to be a limited use park where walk-in access minimizes the effects of vehicles. Low impact will provide an environment that offers family recreation, solitude and a place to truly savor the natural beauty of Hawaii.

Sincerely,

Arthur von Wiesenberger
Mr. Arthur von Wiesenberger  
P.O. Box 5658  
Santa Barbara, California  93150

Dear Mr. von Wiesenberger:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of August 7, 1996, to the Office of Environmental Quality Control (OEQC), regarding the Draft Environmental Impact Statement (DEIS) for the Hapuna Beach State Recreation Area Expansion project.

As you may know, West Hawai‘i is one of the fastest growing regions on the island, and as a result, there is a strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

The State's objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauka land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-4(1), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beaches in the following areas: (for the Big Island) Wailea Bay, Anah‘o‘omalu Bay to Kāpā‘oli, and Kea Bay". To implement this policy, the State is authorized to acquire lands for public purposes under its eminent domain.
Dear Mr. Yarley:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii

Thank you for your letter of July 23, 1996, to the Office of Environmental Quality Control (OEQC), regarding the proposed Hapuna Beach State Recreation Area Expansion project.

As you may know, West Hawai‘i is one of the fastest growing regions on the island, and as a result, there is an associated strong demand for recreational facilities. Hapuna and Wailea Beaches are particularly suitable for improvement because of their popularity, accessibility, location and existing infrastructure.

The State’s objective for Wailea is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailea Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mauka land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(1), the State shall “acquire additional beach park land and rights-of-way to remaining undeveloped shorelands to provide increased capacity for future public recreation use.” The action policy of this plan specifically provides that the State shall “acquire beaches in the following areas: (for the Big Island) Wailea Bay, Anaeho’omalu Bay to Ke‘eku Point, and Kua Bay.” To implement this policy, the State is authorized to acquire lands for public purposes under its government power of eminent domain.

Sincerely,

[Signature]  
Marcia S. Yardley
Development of the park expansion is part of a medium-range plan which would be implemented over a 12- to 13-year period. The project's estimated construction cost would be spread over this period which should make the expense a little more manageable. Additionally, the State is exploring the possibility of joint-sponsoring the development of the proposed golf course with a private interest which should decrease the public cost of the project.

We appreciate your comments on the proposed park expansion.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

AM ok

c: OEQC
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
Environmental Impact Statement (EIS)

Thank you for submitting your public comments in the form of your letter regarding the

Proposed Hulihee Palace Expansion Project.

We appreciate having your thoughts and concerns on the project.

Sincerely,

ANDREW A. M. MONSEN
Chief Engineer

Attn: Warren Harada, Harrison Associates

Glen Koyama, et al., Collier Kneale

Suarez, Johnson, Smith, & Koyama,
Public Comment Mail-in Form
Hapuna Beach State Recreation Area Expansion

This form offers a convenient way for you to provide comments regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion. Write your comments, fold the form, staple or tape, stamp, and mail by August 30, 1996 to Belt Collins Hawaii, 680 Ala Moana Boulevard, First Floor, Honolulu, Hawaii 96813; Attn: Glen Koyama.

Dear Ms. Black,

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

The proposal that was presented at the meeting in Waimea is a medium-range development plan for the expansion of the Hapuna Beach State Recreation Area. Funding for the project will be sought from the State Legislature over a 12 to 13 year period. By stretching implementation of the project over this length of time, the cost of development would be more manageable. Additionally, as an option for implementation, the State may joint-sponsor the golf course development with a private interest. This would substantially reduce the expense of the project construction.

We appreciate hearing your thoughts and concerns on the project.

Sincerely,

Andrew M. Monden
Chief Engineer

Ms. Martha M. Black
4846-I Kilauea Avenue
Honolulu, Hawaii 96816

Dear Ms. Black:

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

The proposal that was presented at the meeting in Waimea is a medium-range development plan for the expansion of the Hapuna Beach State Recreation Area. Funding for the project will be sought from the State Legislature over a 12 to 13 year period. By stretching implementation of the project over this length of time, the cost of development would be more manageable. Additionally, as an option for implementation, the State may joint-sponsor the golf course development with a private interest. This would substantially reduce the expense of the project construction.

We appreciate hearing your thoughts and concerns on the project.

Sincerely,

Andrew M. Monden
Chief Engineer

Address:
Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
Public Comment Mail-in Form
Hapuna Beach State Recreation Area Expansion

This form offers a convenient way for you to provide comments regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion. Write your comments, fold the form, staple or tape, stamp, and mail by August 30, 1996 to Belt Collins Hawaii, 689 Ala Moana Boulevard, First Floor, Honolulu, Hawaii 96813; Attn: Glen Koyama.

THE ACQUISITION OF THE 19 PRIVATELY OWNED LOTS AT WAIKA'I BEACH IS TOTALLY UNACCEPTABLE.

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Signed: RC Deve
Date: 7/24/96

Name and address (please print): Richard M. Deve

Mr. Richard M. Deve
P.O. Box 455
Hilo, Hawaii 96721

Dear Mr. Devine:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion plan.

We appreciate hearing your thoughts on the project.

Sincerely,

Andrew M. Monden
Chief Engineer

c: Warren Harrison, Harrison Associates
   Glen Koyama, Belt Collins Hawaii
   State Parks Division, DLNR
 Public Comment Mail-in Form
Hapuna Beach State Recreation Area Expansion

This form offers a convenient way for you to provide comments regarding the Draft Environmental Impact Statement for the Hapuna Beach State Recreation Area Expansion. Write your comments, fold the form, staple or tape, stamp, and mail by August 30, 1996 to Bell Collins Hawaii, 580 Ala Moana Boulevard, First Floor, Honolulu, Hawaii 96813; Attn: Glen Koyama.

Ms. Holly K. Fredrickson
P.O. Box 4554
Kamehameha Hwy
Kailua, HI 96743

Dear Ms. Fredrickson:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion plan.

We appreciate hearing your thoughts on the project.

Sincerely,
Andrew M. Monden
ANDREW M. MONDEN
Chief Engineer

Attn:
Warren Harrison, Harrison Associates
Glen Koyama, Bell Collins Hawaii
State Parks Division, DLNR.
Public Comment Mail-in Form
Hapuna Beach State Recreation Area Expansion

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The proposed expansion is excessive, extravagant, ill-conceived and most unintentionally, given the current impacts of a poor economy, severe state and county budget cutbacks and consequent reduction in necessary services such as police, ambulance and park maintenance/supervision, among others, this choice of alternatives by DSP and UDOS is both irresponsible and unacceptable.

While improvements at Hapuna to date have increased conflict and convenience by park users, there has also been a clear increase in criminal and offensive activity. It is not a safe park. If the improved areas cannot be managed adequately now, how can the areas be managed responsibly? Police and ambulance services in West Hawaii have never been consistently adequate and reliable.

Current problems have reduced the public use in the last several years and it seems that recovery to a fully adequate level will take considerable time and funding.

Of the existing public parks on the Big Island, I know of none which can boast high safety, cleanliness and adequate supervision by park and other staff. Without a better demonstration by DSP showing that it can manage its current better better, I cannot assume it could do so with one which would increase over 13-fold.

I submit, therefore, that on further action be taken on expansion of Hapuna. Rather, improving management of the present park should be of first priority.

Impact, why not explore such an effort a novel project. There would be much which could be learned and the credibility of the responsible state agencies enhanced significantly.

Signed: __________________
Date: August 22, 1996

Dorothy N. Gubrudson

Name and address (please print):
Dorothy N. Gubrudson
276 Ulua 3rd
Honolulu, HI 96821-2134

Ms. Dorothy N. Gubrudson
276 Ulua Street
Honolulu, Hawaii 96821-2134
Dear Ms. Gubrudson:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

We acknowledge your concerns regarding the management and maintenance conditions at the existing park. In response, we will look at ways to improve those conditions. We believe the State's tight financial situation will soon be over and the maintenance and security at the park will improve. Additionally, we hope, in the near future, to move forward with the planned park expansion and meet the continuing demand for more park space. West Hawaii, as you may know, is one of the fastest growing regions in the state in terms of population. The proposed improvements are intended to meet the residents' demand for more recreational opportunities.

With the expansion of the existing park, management, maintenance and security staffing will also increase. Section 3.11.1 of the Draft EIS provides an estimate of park personnel that would be required. Funding for this staff is expected to be included in the State's regular operating budget when CIP funds are requested and approved for the construction of the park improvements.

We appreciate your thoughts and concerns on the proposed project.

Sincerely,

Andrew M. Monden
Chief Engineer

AMM

C Warren Harrison, Harrison Associates
Glen Koyama, Belt Collins Hawaii
State Parks Division, DLNR
I VOTE FOR NO ACTION on the Hapuna - Wailea Beach Expansion Plan!

I found it interesting that in your general project description you say there are "18 privately-owned lots which are proposed for acquisition by the State". Privately-owned lots!!! How convenient, but these are million dollar homes which generate a minimum $20,000 in county tax revenue, each year. In addition, there are thousands and thousands of dollars paid to the State. annually, in the form of income tax and general excise tax by these owners! It would cost the taxpayers at least $40 million to purchase these homes and another $20 million to destroy them...what a horrible, horrible idea!

- camping parks are needed all over the Island
- better access & facilities are needed to ALL existing West Hawaii beaches
- have golf development costs been studied?
- have adequate fishery studies been done?
- the boat ramp use is inaccurate in the EIS...it is used much more heavily in the winter, not summer.
- don't condemn any private property!
- how can the State manage a huge park like that, when they can't manage what they have now?
- Resolve the issue of the homeowners first
- The picnic and camping areas get too much wind
- The state spent 2.8 million for the 2 properties already condemned and have done nothing.
- Prefer minimal impact park with health, sanitation and safety as primary concerns
- Work with the owners, provide security to the owners.
- The $50,000 per year taxes that the owners pay are not a resource!
- Traffic study needed for additional cars per day coming on to Puako Road
- Impact on the Puako Community of the extra cars and people could be very detrimental.
- Count of fish and impact on the turtles needed
- Priority should be completion of other parks
- Leave it as it is and make it safe and sanitary, take care of what is there
- Ceded lands and the 20% to OHA was not mentioned in the EIS
- Spend our tax dollars on EDUCATION!

Deborah Harkins
P.O. Box 2599
Kamuela, HI 96743
808-885-6922
8/29/94

Ms. Deborah Harkins, Administrative Assistant, envi@hawaii.gov

Dear Ms. Harkins:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for resuming our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project. We have consolidated your comments by topics and are providing our response accordingly.

Wailea Lot Acquisition

- I found it interesting that in your general project description you say there are 18 privately-owned lots which are proposed for acquisition by the State. Privately-owned lots!!! How convenient, but these are million dollar homes which generate a minimum $30,000 in county tax revenue, each year. In addition, there are thousands and thousands of dollars paid to the State. annually, in the form of income tax and general excise tax by these owners! It would cost the taxpayers at least $40 million to purchase these homes and another $20 million to destroy them...what a horrible, horrible idea!

- The $50,000 per year taxes that the owners pay are a resource!
- The state spent 2.8 million for the 2 properties already condemned and have done nothing.
- Spend our tax dollars on EDUCATION!
- Speed our tax dollars on EDUCATION!
- Resolve the issue of the homeowners first.
- Don't condemn any private land!
- Work with the owners, provide security to the owners.

We acknowledge the cost of acquiring the private lots at Wailea will be substantial (including secondary costs such as lost government revenues from property taxes), however, efforts definitely will be made to minimize the expense during project implementation. An announcement of our intentions to purchase the private parcels was made in 1987.
Interestingly, in recent years, many owners at Wailes have continued to make improvements as well as construct large homes.

Immediate acquisition of these lots after the announcement would have been desirable to keep the cost down, but funding was limited at the time and only two parcels were acquired. Acquisition of the remainder of the properties should coincide with the development of the park expansion, but ultimately will be dependent more on funding allocations from the State Legislature and its priorities on other programs such as education and crime prevention.

The State's objective for Wailes is to provide opportunities for park users to appreciate in a coastal setting direct physical and visual access to the sea. This would allow a mixture of land-based coastal recreation activities, such as picnicking, camping, and relaxation, along with beach and nearshore recreation activities.

The private properties at Wailes Bay are located within the proposed park expansion. These properties would serve the public best if they were converted to open space for park use and allow a better connection between the mokua land and beach land with its ocean resources.

As stated in the State Recreation Functional Plan, Policy 1-A(3), the State shall "acquire additional beach park land and rights-of-way to remaining undeveloped shorelines to provide increased capacity for future public recreation use". The action policy of this plan specifically provides that the State shall "acquire beaches in the following areas: (for the Big Island) Wailes Bay, Anaholo Mala Bay to Ka'upulehu, and Kona Bay". To implement this policy, the State is authorized to acquire land for public purposes under its governmental power of eminent domain.

Recreational Priorities
- Camping parks are needed all over the island.
- Better access & facilities are needed to ALL existing West Hawai'i beaches.
- Priority should be completion of other parks.

We concur that more camping parks and beach access are needed around the island, but the Hapuna Beach State Recreation Area is a suitable site for immediate improvements considering its popularity, excellent white sand beaches, existing infrastructure, and ideal location.

Existing Park and Proposed Expansion
- How can the State manage a huge park like that, when they (sic) can't manage what they have now?
- Leave it as it is and make it safe and sanitary, take care of what is there.
- Prefer minimal impact park with health, sanitation and safety as primary concerns.
- The picnic and camping areas get too much wood.

We acknowledge your concerns regarding the current management and maintenance conditions of the existing park. In response, we are looking at ways to improve those conditions. We believe the State's tight financial situation will soon be over and maintenance and security conditions at the park will improve.

In the near future, we hope to move forward with the planned park expansion to meet the continuing demand for additional park space. West Hawai'i, as you may know, is one of the fastest growing regions in the state, and the proposed improvements will help meet the residents' demand for more recreational opportunities.

Activities in the park expansion will be quite spread out. Most of the areas will be in their natural condition. Less than 28 percent of the park area below the highway will contain picnic, camping, parking, access driveway, and beach land activities.

Staffing will be increased to maintain the expanded park grounds and provide security. From the park headquarters, safety and awareness programs will be offered on water activities, hiking, and camp fires.

We have sized the proposed picnic and camp areas, as much as possible, in the protected enclaves of the park terrain. In the Final design, landscape treatment will be provided, where necessary, to establish wind breaks. Existing activity areas will also be evaluated for additional landscaping treatment, if necessary.

Special Studies
- Have golf development costs been studied?
- How adequate fishing studies been done?
- Count of fish and impact on the turtles needed.
- The boat ramp use is inaccurate in the EIS . . . it is used much more heavily.

A feasibility study for the proposed golf course was conducted by Pederson Planning Consultants and a baseline assessment of the marine environment including a description of the coastal sea life was performed by Marine Research Consultants. Both studies are included in the appendices of the EIR.

We appreciate your input as well as others from area residents on the extent of the boat ramp usage. We are evaluating the comments from the community and will make revisions, if necessary, in the Final EIS.
Traffic

- Impact on the Puna Community of the extra cars and people could be very detrimental.
- Traffic study needed for additional cars per day coming on to Pauka Road

A traffic study was conducted by Pacific Planning & Engineering, Inc. and their assessment of traffic conditions and suggestions of possible mitigative measures are presented in Section 3.12.1 of the DEIS.

Others:

- In the EIS, the state has measured the beach inaccurately...and probably in the summer, not winter.
- Creded lands and the 20% to OHA was not mentioned in the EIS.

Our description of Hapuna and Waikaa Beaches in Section 3.3 of the DEIS includes estimates of the beach dimensions for conditions that would occur in the summer as well as in the high surf or winter seasons.

Section 3.11.2.1 of the DEIS provides a discussion of ceded lands and the 20 percent revenue requirement for the Office of Hawaiian Affairs.

We appreciate your thoughts and concerns on the proposed project.

Sincerely,

ANDREW M. MONDEN
Chief Engineer

cc: Warren Harrison, Harrison Associates
    Glen Kiyama, Bell Collins Hawaii
    State Parks Division, DLNR
Public Comment Mail-in Form
Hapuna Beach State Recreation Area Expansion

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Mr. Frederick Jones
72 Pakuko Beach Drive
Kamuela, Hawaii 96743

Dear Mr. Jones:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

The availability of the Draft Environmental Impact Statement (DEIS) was announced in the June 22, 1996 issue of The Environmental Notice. This notice is published semi-monthly by the State Office of Environmental Quality Control. Copies of the DEIS were distributed to your State and County representatives and to your local libraries including the Hilo Regional Library, Bond Memorial (Kohala) Library, Hokuho Public Library, Kailua-Naalehu Public Library, Kealakekua Public Library, and Volcano Park Memorial Library.

In August of this year, we held a public meeting to discuss the DEIS and informed the audience that the deadline for the public comment period had been extended an additional three weeks.

We are assuming the property that was referred to you is the private beach lots at Waiakea. The State does not plan to purchase these beachfront properties and later sell them to developers for hotel and residential development. As provided in the park master plan, the State is proposing to develop picnic areas around the bay to improve public use of the coastal lands in association with the ocean resources. This is a medium-range plan that would be implemented over a 12 to 13 year period.
Ms. Frances Anes

Oct. 2, 1999

We appreciate having your thoughts and concerns on the project.

Sincerely,

Andrew M. Monden
Chief Engineer

Addie: Wilson, Hanham, Associates
600 South Park Drive
Sacramento, CA 95811
Public Comment Mail-In Form
Hapuna Beach State Recreation Area Expansion

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I OBJECT TO THE CAVALIER MANNER IN WHICH THIS IS BEING HANDLED!

Additional camping facilities are desirable and needed but considerable thought must be given to the problems that may be created for all.

The Park Community is already stressed by physical restrictions we already face. Please and camping areas close to Kona community increases the hazards at fire. Because of the extremely heavy winds we experience, witness the effects of the.

July 1, 1987 Fire!

One surely must consider both physical and financial.

I'm wondering why the State feels it can take this on-storm. It is not able to meet its commitments as it is. The article in the Wall Street Journal certainly is justified! Article dated June 7, 1996. Here on this plan now more proof of breathing exercises.

I WISH TO BE INFORMED OF FUTURE MEETINGS.

Signed: [Signature]
Date: [Date]

Name and address (please print):

HELEN J. THOMAS MADDOCK
58 Puako Beach Drive
Kona, Hawaii 96745

THE WALL STREET JOURNAL
MARKETPLACE

TRAVEL

Hawaii's Allure for Tourists Has Faded, And Some Say State Has Itself to Blame

By Joe Carter

While many vacation spots open in the U.S. are booming, there's trouble in Paradise. Tourists to Hawaii are rising only modestly, and experts say the state's share of the national market is falling. Once the tourist dollar to the islands was a competitive travel haven that pulled tourists from the U.S. and other areas, now it attracts fewer and fewer. And the future, Hawaii may be turned into a tourist market budget by 1998.

"This is a state that has not come to grips with the fact that tourism is their industry," says Joe Bremner, editor of Travel Holiday magazine, a frequent visitor to Hawaii. "It's the place to go to, the place to see." Hawaii, with a "superior" rating from the Department of Tourism, has the second-largest tourist market budget by state, after New York. The Hawaii market budget is "all over the map," says Bremner. "The state spends money on travel, which is not apparent to the average tourist. It's a very competitive market budget by state."

A rash of new tourist destinations have taken the island's market by storm, including the Hawaiian Islands and the U.S. Virgin Islands, which have been "no-go" areas in the past. New developments such as the Disney World in Orlando, the Walt Disney World in Los Angeles, and the Disneyland in California, along with the "superior" rating, is how Hawaii is marketed. But the state has not been able to capitalize on these new opportunities.

Hawaii's allure as a tourist destination has fallen. In 1990, Hawaii had the highest percentage of tourists in the U.S., with 10.2%. In 1995, Hawaii had the lowest percentage of tourists in the U.S., with 8.5%. This is a drastic decline, but Hawaii has not been able to maintain its attractiveness to tourists.

Hawaii has been a "no-go" area in the past, but now it is becoming a "superior" destination. The state has invested heavily in tourism, but the results have not been as expected. Hawaii has invested in new tourist destinations, but the state has not been able to capitalize on these new opportunities.

In conclusion, Hawaii's allure has faded, and some say the state has itself to blame. The state has invested heavily in tourism, but the results have not been as expected. Hawaii has invested in new tourist destinations, but the state has not been able to capitalize on these new opportunities.
Attraction Of Hawaii Has Faded

(Excerpt from Page 1)

"At the time we started, the hotel industry was making all kinds of money," says state Sen. Joe Takata, who chairs the Senate's tourism committee. "Now we need to re-evaluate that." The state is proposing a 10-cent tax on every room for five years, initially to help fund Hawaii's tourism development. The state has not increased the tax since 1984, when it raised the rate from 5 cents to 7 cents. The state will keep 25 percent of the tax for general use, General Fund funding until 2023. About 10 percent, the state estimates, will go to the Tourism Development Council, which will fund tourism marketing and initiatives.

Dear Ms. Maddock:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment in-full form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

The threat of a brush fire from increased firewood collection and camping activities in the expanded park is expected to be minimized by the removal of dry vegetation and deadwood and its replacement with green healthy plants and picnic areas that are regularly irrigated and maintained. Figure 2-9 of the Draft EIS shows a concept plan of circular concrete pads for family huts. These special park features, which will be located at all new family camp sites, are designed to minimize the hazard of fire.

Safely as you describe it, "security", from potential fire hazard will be served by improved fire protection services that are planned with the increased and improved access ways within the park. From these improvements, the County Fire Department would be better able to service emergency calls.

We believe the State's tight financial situation will soon be over and the State will again be addressing its commitments to the public. In the near future, we hope to move forward with the proposed improvements that will help meet the residents' demand for more recreational opportunities.
Ms. Helen J. Thomas Maddock
Page 2
DEC 3 1996

We appreciate hearing your thoughts and concerns on the project. We will notify you of further
State Parks' public meetings, if any, for this project.

Sincerely,

Andrew M. Ikeda
ANDREW M. MUNDIEN
Chief Engineer

AM:ck
cc: Warren Harrison, Harrison Associates
    Glen Koyama, Brit Collins Hawaii
    State Parks Division, DLNR
Public Comment Mail-in Form  
Hapuna Beach State Recreation Area Expansion  

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Mr. Himbert McKevey  
P.O. Box 384506  
Waikoloa, Hawaii 96738  

Dear Mr. McKevey:

Environmental Impact Statement (EIS)  
Proposed Hapuna Beach State Recreation Area Expansion  
South Kohala, Hawaii  

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion plan.

We appreciate your input on the proposed project.

Sincerely,

Andrew M. Monda  
Chief Engineer

AM-96  
c: Warren Harrison, Harrison Associates  
Glen Koyama, Belt Collins Hawaii  
State Parks Division, DLNR
Public Comment Mail-in Form
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Dr. and Mrs. Andrew L. Morgan
48 Puako Beach Drive
Kamuela, Hawaii 96743

Dear Dr. and Mrs. Morgan:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

With expansion of the park, there will be an increase in park management and maintenance staff. This would mean improved security and upgraded safety programs. Included in the park master plan is the development of a new well at the 1,200-foot elevation of the Lanimala land tract. This well is anticipated to provide the needed potable water supply for the expanded park’s domestic uses.

Funding will be sought for the project in the next few years after planning and permitting are completed. Depending on implementation of other public improvement projects, the State will develop the park in increments over a 12 to 13 year period, allowing the cost of the project to be more manageable. The plan also calls for a possible co-sponsorship of the golf course project with a private interest which could significantly reduce the State’s share of the park expansion cost by more than 50 percent.

Although there are a number of existing and proposed golf courses in West Hawaii, there are no public golf courses. Such a facility would provide a much needed amenity to the west side. We look forward to having a facility that offers green fee rates that are lower than the private golf courses, including those with kamaaina rates.

The proposed park will install septic tanks that will meet Department of Health standards. Additionally, preliminary arrangements have been made with the adjacent Mauna Kea Resort to connect and convey an allocated maximum amount of sewage to the resort’s wastewater treatment facility. We anticipate that the new golf clubhouse, potentially one of the park’s target generators of sewage, will initially connect with the private collection system.
Notices on the August 23, 1993 meeting in Wailua were sent by mail to a number of State and County agencies, community organizations and area residents. Additionally, two issues of The Environmental Notice, published by the Office of Environmental Quality Control, announced the availability of the Draft EIS to the public. The comment period deadline for the environmental document was originally August 7, 1993, but was extended to August 30th. A copy of the Final EIS will be sent to you for your information.

We trust our response adequately addresses your concerns.

Sincerely,

[Signature]
ANDREW M. MONDEN
Chief Engineer

cc: Warren Harrison, Harrison Associates
    Glen Koyama, Bali Coppes Hawaii
    State Parks Division, DLNR
Public Comment Mail-in Form
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[Handwritten text]

I received the form on 9-14-96. No problem any way to regulate on 2-30-96. We may as for anyone in Hapa. Stopping.

2. Don't want to see this area become a golf course. This is what we want. Keep it clean. Keep it quiet. Let's keep it a park.

3. Forget about having a hotel here. This is a recreation area. Let's keep it a recreation area. Let's keep it a park.

4. There is a need here to be developed. Hotels, condominiums (yes) apartments for those people who can't make good money. This can be a clean, beautiful place at the cost. It is the way we can make the best money.

5. I agree with you. I think we should do it. My name is [handwritten].

Signed: [handwritten]
Date: [handwritten]

Name and address (please print): [handwritten]

Dear Mr. Thervesin:

Environmental Impact Statement (EIS)
Proposed Hapuna Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapuna Beach State Recreation Area Expansion project.

The proposed park expansion is a medium-range plan that is intended to meet the growing recreational needs of the region. During the plan's 12 to 15 year implementation period, there is a potential for obstacles such as funding shortages and priority shifts, but we hope not to lose sight of the overall development objectives for the area.

The State is planning to develop a new hotel at the approximately 1200-foot elevation of the Lasalita land tract to supply water to the park facilities and golf clubhouse. On-site brackish wells will be developed for landscape irrigation. We anticipate these wells will be adequate to serve the park's water requirements. Use of North Kohala water for the Hapuna Beach State Recreation Area Expansion will have too many uncertainties and raises too many questions for the State to move forward with the project.

We acknowledge the cost of acquiring the private lots at Wailea will be substantial; however, efforts definitely will be made to minimize the expense during project implementation. An announcement of our intentions to purchase the private parcels was made in 1987. Interestingly, in recent years, many owners at Wailea have continued to make improvements as well as construct large homes. Immediate acquisition of these lots after the announcement would have been desirable to keep the costs down, but funding was limited at the time and only two parcels were acquired. Acquisition of the remainder of the properties should coincide with the development of the park expansion, but will be dependent on appropriations from the State Legislature.
We do not believe there is a strong enough demand for an extension in South Keahola. In the present plan, extra left turns might be accommodated for this concept.

We would improve the existing off road to Waiala Beach Park but it would not be enough to accommodate emergency vehicles and fire trucks. For this purpose, a smoother road might be necessary. It would also be slightly wider to accommodate two-way traffic.

We appreciate your concerns and input on the proposed project.

Sincerely,

[Signature]
ANDREW M. LANGFORD
Chief Engineer

[Name]
Family History

Let me start by giving you a brief synopsis of the history of my family in the Islands, a history of which I am very proud. My great, great grandparents, Nicholas and Caroline Greenwell, arrived in Hawaii in the 1850's, so it is a relatively long history.

Their grandchildren, Geradine Beatrice Treadwell, my grandmother, making me, my brothers and cousin, the fifth generation of this Hawaiian lineage. My grandfather, Richard T. Treadwell, a Texas by birth, became a doctor and was the tradition in his family, and came here in the 1920's to be the doctor for the sugar plantation of North Kohala. For the next 20 years he devoted his attention, his energy, and his love to the people for whom he cared, and it is said that these were the happiest years of his life. During these years and my grandmother married and had three children, Beth, Richard and Florence. In the 1930's they acquired the property at Waiakea Bay, which at the time was accessible only by boat or by foot. They would come in with supplies from Kahaluu and spend time enjoying the beauty and solitude of Waiakea. Gradually they added a couple of bedrooms to the existing fisherman's cottage to accommodate the family, and a telephone so the doctor could be reached. In August 1941 my grandparents moved to California where Gradually completed a one-year post-graduate program at Stanford University Medical School. With the war going on, he established his medical practice in San Luis Obispo, California. However, they kept their cottage at Waiakea. To this day I am deeply moved by the many memories of the family that occasionally met in Kohala who still speak so glowingly and respectfully of Dr. Treadwell, because he touched all of their lives. There were many of them as his memorial service in 1988 at St. Augustine's in Kapa'a where he is buried alongside Tsera and her parents.

The relationship of the family to the Islands remained central to their hearts and families. Instead of a weekly visit to Waiakea they now visited yearly, and were even more appreciative of Hawaii's charms. Their son, Richard, my father, bought my mother to Waiakea on their honeymoon. Our connection to the place took root in the next generation as, through the years, they brought their children, my brothers and me, on annual trips so we could grow up enjoying Waiakea Bay and knowing our Hawaiian heritage.

My cousins' families would do the same, and sometimes we would meet here, playing in the waves and the sand. On these trips we would visit the many relatives and friends so dear to my father and his parents.

Leaving Waiakea is a very painful thought for us. It is not simply a matter of relocating to a new vacation spot or reinventing these memories elsewhere. We can not replace the emotional and historic meaning of this place in our lives. We grew up here and our sense of connectedness to Waiakea Bay spans not only our lifetimes but that of generations before.

Relationship to the Land

My generation, the current owners of the Treadwell property at Waiakea, continues to have the same respect for the land that my grandparents did. Through their example and our own, we have deep commitments to the preservation of this fragile yet delicate beach. We use it respectfully and encourage others to do the same.

As the family has grown and as the members of my generation desire our children to also pursue of the traditions we have at Waiakea, we have added more houses on
our property, one owned by the Richard R. Treadwell family and the other owned by the Florence Treadwell Honobin family. They are single family houses built primarily for each family to use as we have used the original house over the years. For me, as an architect by profession, the opportunity to plan a house in Wailea was an opportunity to illustrate our essential conservation bent. I took very seriously my responsibility to design the new house appropriately with respect to the landscape, both in terms of the appearance of the structure itself and its impact (or lack thereof) on the beach. A main objective was to be as unobtrusive as reasonably possible. By sitting the house back from the beach and introducing plantings that would help to screen the house from the beach, I approached the development of this lot from a low impact point of view. Taking advantage of the depth of the lot, the narrow side of the house faces the beach and much of the house is recessed back, invisible to beach users. The natural wood siding also helps the house blend with rather than stand out from its setting. Much of Wailea development whether old or new has been approached in this manner. And I would argue that it is because of this respectful and unobtrusive use of the land rather than despite it, that the greater Wailea environment has remained intact and preserved.

Many people come to use this beach and for various reasons, its unique layout and topography provide a variety of experiences not available in most "planned" park environments. It therefore makes sense, and here we renew with the DEIS, that it be developed not as an intense use park like Hapunia, but as something similar to what has been occurring there for years - a limited use park. A critical aspect of the development of the park is the installation of rest facilities. Another critical issue is regular enforcement of the no-camping rule. With these two changes alone, a much safer park can be achieved quickly with little monetary expenditure by the state, and with minimal disruption to the fragile beach environment. We have expressed and continue to express an interest as private property owners to work with the state in achieving these objectives.

cc Richard R. Treadwell 
David T. Honobin

Mr. Constance A. Treadwell
853 Vallejo Street
San Francisco, CA 94113

Dear Mr. Treadwell:

Environmental Impact Statement (EIS)

Proposed Hapunia Beach State Recreation Area Expansion
South Kohala, Hawaii

Thank you for returning our public comment mail-in form and offering your comments regarding the proposed Hapunia Beach State Recreation Area Expansion project.

Your family history was most interesting and your personal connection to the land was deeply felt. We concur that Wailea Bay is a special place and deserves careful consideration. We have taken needed steps to ensure that planning of this area will preserve all that is precious and unique.

The very beauty and charm of Wailea that you cherish and hold dear is the very same beauty and charm that the State wishes to offer to the people of Hawaii. It is a resource that has wide public appeal and is considered a regional treasure. We would like to share this treasure with the rest of the state.

Wailea is being planned as a walk-in beach, and a comfort station is proposed for the convenience of beachgoers. Future security personnel will make routine checks of Wailea beach to assure no camping activities occur in the area. According to our current plans, no camping sites will be allowed near the bay. These activities are planned above Kukualiku Point between Wailea and Hapunia Bay.

We appreciate your concerns and input on the proposed project.

Sincerely,

ANDREW M. MONTDEN
Chief Engineer

cc Warren Harrison, Harrison Associates
Glen Koyama, Belta Collins Hawaii
State Parks Division, DLNR.
CHAPTER 8
PUBLIC INPUT FROM COMMUNITY INFORMATIONAL MEETINGS

On August 4, 1992, the State Parks Division held a public informational meeting in Waimea to present the proposed Hapuna Beach State Recreation Area Expansion Master Plan. The presentation covered the physical elements of the proposed project. After the presentation, comments and questions were received by the State officials and their consultants. A summary of the comments and questions is provided at the end of this section.

Since that initial meeting in Waimea, the master plan has undergone modification and a Draft Environmental Impact Statement has been completed. On August 22, 1996, State Parks held a second public informational meeting in Waimea to brief the community on the updated plan and Draft Environmental Impact Statement findings. The meeting was conducted by a facilitator and was attended by 34 people. Comments and questions of clarifications from the audience were received and recorded. A summary of the meeting agenda and public input is presented in a group memory report following the notes of the first meeting.

It was also announced at the second meeting that the deadline for the Draft EIS comments was extended from August 7 to August 30, 1996. Members of the audience were also told that if they had additional comments on the project after the meeting, they could mail in the comment form (which were available at the rear of the meeting room) to the State by the end of August. Returned copies of the mail-in forms along with the State's response are provided in Chapter 7 of this EIS. The meeting began at 6:30 pm and concluded at approximately 9:00 pm.
A. Project Schedule, Phasing, and Funding:
   1. What is the project schedule?
   2. Phases of development; can parts of it be developed without infrastructure? Which ones first?
   3. Where is the money going to come from?
   4. Instead of using funds to condemn property, use it for facilities instead.

B. Park Plan/Facilities:
   1. Locations of restrooms?
   3. People like grassy areas (e.g., Mauna Lani).
   4. Camping areas should be closer to the beach at Hapuna. Put camping at the site of the existing A-frames.
   5. Preserve the kiawe trees at Wailea.
   6. Use composting toilets.
   7. The trail on the north side of the park needs to be cleaned, widened, and signed. During winter months, this trail provides access to the north end of beach.
   8. Include the north end of the beach fronting the Mauna Kea Resort property as part of the park master plan. Concern that the beach not become a private enclave of the hotel.

C. Park Capacity:
   1. What is the physical capacity of this area?
   2. What is the projected park use? How many people? Peak?
   3. What is "recreation demand"?
   4. During the winter, the sand in the north part of Wailea beach disappears because of high surf, so this is a "part-time" beach.
D. Park Management and Operations:

1. Priority should be given to enforcing existing laws and rules at Hapuna/Wailea to make it safer for the public.
2. Should have interpretive programs at parks.
3. Should provide different uses at different parks.
4. What kind of water safety program will there be at Hapuna/Wailea?
5. Keep Hapuna and Wailea separate; these are two different kinds of places.
6. The State needs to manage uses to retain the Wailea ambience and Hapuna environment.

E. Golf Course:

1. How will the golf course be managed?
2. Concern about water quality degradation due to pesticides, etc.
3. Golf course can serve as a “fire break.”
4. Instead of having two municipal courses in West Hawaii, combine the two ideas into one. Where? Hapuna or Kona?
5. Private courses all have public play requirements. Why spend money for this course if golf is already available at reasonable cost?
6. Need to have a “bio-rational” golf course that does not require toxic chemicals.
7. Need to distinguish between private courses that allow public play and municipal courses. Difference in affordability and required use of carts.

F. Land Use:

1. What are the land use designations for the site?
2. Is this use of the land appropriate?
   • Hawaiian lands.
   • Land ownership?
   • Ceded lands/OHA
3. Rezone all land to Conservation to prevent commercial uses (CV 10).
G. **Wastewater System:**

1. Puako is a critical wastewater disposal area. Can Mauna Kea Resort extend its wastewater system to Puako?

2. Water Quality needs to be protected.

3. Cost of wastewater system?

4. Individual wastewater systems; what are these? Are septic tanks sufficient to protect the bay?

5. What will the Mauna Kea Resort sewage treatment plant serve?

6. Sewage treatment plant leach field (golf course in Kona).

H. **Hazards:**

1. Need to address flood hazards. Flood zones; effect on picnic areas?

2. High winds.

3. Fire hazard—the risk is increased.

I. **UH Marine Science Education Center:**

1. Five acres are not enough.

2. Not necessary for all facilities to have ocean frontage—only the ocean dependent facilities. Others (classrooms, visitor accommodations, etc.) can be located further mauka.

J. **Other Comments/Questions:**

1. Get input from Hilo/Kona folks; Hapuna is a regional/islandwide resource.

2. Location of bypass road?

3. Need to set priorities for water use.
Department of Land & Natural Resources  
Hapuna Beach State Recreation Area Expansion  
Public Information Meeting  
August 22, 1996  
University of Hawai‘i Extension Service Meeting Room, State Office Complex, Waimea, Hawai‘i  
6:30 p.m.-9:00 p.m.  

GROUP MEMORY  

WELCOME/INTRODUCTIONS  
The meeting began with a welcome by Ralston Nagata, Administrator of the Department of Land And Natural Resources (DLNR) Parks Division. He thanked community members for attending the meeting and introduced Andrew Monden and Dennis Imada, DLNR Engineers, consultants Warren and Linda Harrison of Harrison Associates, and Sue Sakai and Glen Koyama of Belt Collins Hawaii.

The meeting facilitator, Alice Paet-AhSing, was introduced. She welcomed community members to the meeting. Ms. Paet-AhSing of Resolutions Hawaii serves on the Judiciary’s Center for Alternative Dispute Resolution (CADR) panel of mediators and facilitators. She explained that a request was made to have a neutral party assist in the process and management of the meeting. She clearly expressed that the meeting was a public informational meeting and not a public hearing, and that it was not the intent to arrive at any decisions on any aspects of the plan.

Michael Luke Aitken and Jay Ah Sing, served as the group’s recorders. Their role was to assist in the recording of comments on the proposed expansion project and DEIS. Community members were tasked with the responsibility for making sure that their comments were summarized and captured accurately. The group memory will provide the State and their consultants a record of the community’s comments, and the concerns identified will be addressed in the EIS. The group memory of the meeting’s proceedings will serve as a documentation of public input and will be appended to the final EIS.

PRESENTATIONS  
Warren Harrison of Harrison Associates provided an historical overview and background of the project.

Sue Sakai of Belt Collins Hawai‘i presented a graphic rendering of the project conceptual plan and described the various elements of the project.
Ms. Sakai reported information on the tentative schedule for construction and plan implementation. She explained that in accordance with EIS requirements, three alternatives are included in the DEIS. She added that the alternatives could be modified to include or exclude any specific element(s) of the proposed plan. The three alternatives are:

- Development of all elements of the plan, including the golf course, located mauka of the highway and camping and picnic areas, hiking trails, road improvements and parking makai of the highway, as well as acquisition of private properties at Wailea Bay.
- All elements makai of the highway, excluding the golf course.
- No action, continued use of existing facilities, no expansion.

Glen Koyama of Belt Collins Hawaii summarized the DEIS findings. He discussed what benefits might result, as well as types of impacts and corresponding mitigation measures.

PUBLIC COMMENTS
Community members were asked if there were any questions about information that had been presented. Clarifying questions were responded to. Responses were made by G. Koyama unless otherwise noted. Community members were also asked to identify any other issues that need to be included in the EIS. The facilitator expressed that comments were welcomed.

- The Hapuna Beach State Recreation Area Expansion plan should be an economically sound plan and the EIS should include a fiscal analysis. It is important to insure that public funds are used efficiently. I would like to know that any element of the plan that is implemented is weighed for best use of public funds. The plan needs to be a real plan.

- I do not feel that the golf course is feasible. There are costs associated with development of a water well. It is questionable as to whether reasonable rates can be charged and have play at the course remain attractive.

- The EIS needs to include a study of a projected operating budget for the proposed expansion plan once it is completed. We need to know that operation and maintenance aspects are included in determining feasibility.

- Who owns the land within the proposed expansion? Response: Most of the land is state owned, with the exception of private lots fronting the beach and various utility and access easements.

- Why buy out the private landowners adjacent to the beach? A cost analysis and an assessment to determine the feasibility of land acquisition should be factored
into the expansion plan and included in the EIS. Have funds been allocated for the acquisition?
Response: The private landowners are located where it currently prevents the State from developing a continuous shoreline park with unobstructed view and physical access to the beach. A cost analysis on the land acquisition was not factored into the plan. Acquisition was a state policy objective. The State’s functional plan policy indicates that the State shall acquire beach land to meet recreational demand, take advantage of shoreline resources and to have free, unobstructed access to the beach. Funds are not presently allocated for acquisition.

- Where are the walking and biking trails within the park plan?
Community members were directed to the map that was presented and Sue Sakai pointed out the walking paths and hiking trails. She noted that the historical sites would be incorporated throughout. She stated that while the trails were not available to bikers, the roads in the area would certainly be.

- Are we constrained to the three alternatives described, or will other alternatives be considered?
Response: Sue Sakai explained that the three alternatives presented were developed to comply with basic requirements for an EIS. She expressed that there is the flexibility to modify any of the alternatives and other alternatives and options will be considered.

- It is absurd to acquire lands and operate wells to support water needs for the park. The golf course will require an enormous cost to maintain and is not economically feasible without associated residential development.

- Without a good fiscal analysis, the plan could go awry. Let's have a plan that is based on good fiscal planning.

- Will utilities be underground within the park?
Response: Yes.

- How is the waste water/sewage system planned?
Response: Comfort stations will have individual septic systems. The main golf club house will be served by a central septic tank, but more likely by a connection to Mauna Kea Resort’s western treatment facility.

- The cost of acquiring the privately owned parcels should be part of the financial analysis of the project.
• The state park has been planned to accommodate a regional demand. This is a state park, there should be public informational meetings held throughout the state (i.e., in Hilo and Kona as well as in Waimea).

• Areas for group activities (e.g., volleyball) and other recreation for campers/picnickers are needed. Why not acquire mauka lands instead?

• Perhaps we should be selling some of the land to finance this project rather than making it more costly by purchasing the private parcels.

• It seems that the extremely large cost for development of this project would be better spent developing better access and sanitation facilities at beach parks all along the coast.

• There should be some discussion in the EIS about the use of ceded lands for a potentially profit-making activity such as the proposed golf course.

• Was a study of future golf course use and demand trends on the Big Island included on the DEIS? Was the Waimea Country Club included in this study? The study needs to take into account the way rates and thus availability fluctuates on a seasonal basis on this island.

  Response: A study was done and is included in the DEIS.

• The analysis of the frequency of public use of the Puako boat ramp is clearly inaccurate. The methodology of the analysis was based on much too small a time period of study. As a result, the reported use is a gross underestimate.

• The size of Wailea Beach depicted on the map presented seems exaggerated. The beach could not possibly accommodate a thousand or so people daily.

  Response: The measurements used in drawing the map were taken from an aerial photograph. While the size of the beach does fluctuate seasonally, the DLNR’s intention is to look at the potential for the beach.

• Will the trees along the beach be removed?

  Response: There will be no changes to the beach and structures will not be built on or near the beach. Parking will be located more than 400 feet mauka of the beach. As planned, this is a walk-in beach, except for a drop-off loop for the physically challenged and recreational equipment drop-offs.

• Will the infrastructure be built first? At what point will private property be acquired?

  Response: Infrastructure will be built first, projected in 1998-1999. Acquisition will be timed to fit with the rest of the construction schedule and as funds are made available.
• I would like to see private residences remain privately owned; however, if they are acquired by the State, I want an assurance that the structures are removed and not left to deteriorate and invite vandalism.

• The usage study done in 1992 was a two-week survey that took place in the month of June. The results stated that 92 people per weekend is expected. These figures do not seem to be a reliable base for projection.
  Response: More current studies have been done, resulting in about 1050 people at Hapuna during peak hour, and 180 people at Wailea by the year 2010.

• Creating picnic areas at such a cost for few people seem way out of proportion.
  Response: The plan considers demand and need for picnic areas based on use projections for the whole park through the year 2010. The size of the picnic area is reasonable with projected use.

• Some private lands at Wailea Bay have already been acquired by the State in 1985 at a substantial cost ($700,000 to $2.8 million). Is it essential to the development of the park that more be acquired, or only desirable?

• The privately owned parcels should not be condemned. They should only be acquired if freely offered for sale.

• Is acquisition a done deal?
  Sue Sakai: Acquisition is contingent on the availability of funds.

• Allowing the present residents who own the lots at Wailea to live in their homes, should be a condition of acquisition. That would soften the blow and reduce acquisition costs.

• Funds for acquisition could be better spent elsewhere. These funds should be used to develop the Kona Coast State Park, to relieve the current stress of close to a thousand people per day on a busy weekend.

• If the privately owned parcels are condemned, there should be assurance that the project is completed in a timely manner. I do not want to see the acquired properties sit vacant and open to vandalism.

• I would like more details on the archaeological sites within the project.
  Sue Sakai: Response: Determinations on significance is based on the eligibility of a site to be placed on the National Registry of historic places.

• Why not defer the Hapuna-Puako road improvement until after the acquisition issue is resolved?

August 22, 1996

Hapuna Beach State Recreation Area Expansion
• The areas set aside for picnicking are too windy for that use much of the time.

• Where does the pressure to buy out the private landowners come from? Where did that plan originate? Response: It's one aspect of BLNR's policy for the area.

• The park expansion could go forward independently of the private land acquisition process.

• Incremental development of the park should continue. We need more recreational areas on the Big Island.

• An analysis of the possible expansion scenarios is needed. We need to compare the scenario of working with the landowners with the scenario of buying them out, to see which actually serves the public better, especially given the present fiscal constraints.

• A possible alternative to consider would be to make minimal improvements to have at least access, maintain sanitation, and not allow camping.

• Plans that have been proposed for other golf courses on the island need to be included in this plan's study on golf course feasibility.

• What kinds of camping are being considered? Sue Sakai: All types of camping are being considered, e.g., camp areas for fishermen, campgrounds to accommodate tents, and large group camping areas.

• The potential loss of property taxes presently being paid by the private landowners at Wailea Bay needs to be considered and weighed when determining the merits and downside of this plan.

• Water is a critical issue. Substantial yield for this coast has already been allocated. Water resources to support the park's needs and long range availability of those resources need to be considered.

• Landscaping should be designed with hardy plants that require minimal water (xeriscape species) and resistant to damage imposed by heavy winds.

• Historically, within the proposed expansion area, there has not been evidence of much habitation. This is an important clue to the suitability of the area for intensive public use.
• I would like to see a pavilion for dancing added to the plan. A dance pavilion should be designed and planned in a way that music and sounds that would come from the pavilion are somehow buffered by placement of the structure, or with hedges or barriers for noise abatement.

• Will the final EIS treat the concerns any differently than the DEIS?
  Facilitator: If new information or comments are received, they will be addressed in the EIS.

• In addition to the three alternatives presented, an alternative should be included that considers the concept of a public-private partnership, where the State works with the private landowners to achieve needed access.

• If private landowners are allowed to remain, privacy and security must be considered.

• If development is to be incremental, it should be done only in the context of a larger, long-term plan in order to get the best use of funds and resources.

• Safety and maintenance should be at a higher standard and priority than is presently the case at state parks.

• The State should look at the situation at the old Kona Airport Park for guidelines on to how to deal with private homeowners located within the park.

• Will there be a park ambassador for Hapuna?

• The community should be involved in managing and maintaining state parks. Such a program or mechanism should be developed as part of the park's maintenance plan.

• A traffic study needs to be done for Puako Beach Road to assess the impact from the additional traffic on the Puako community.

• Are there any unimproved private lots fronting Waialea Bay? The growth potential of the area must be considered as part of the plan and planning process.

• Air pollution near the Hapuna Prince under-pass should be addressed if it impacts the park in any way. Its source should be identified in order to ensure that the park development does not create a similar condition.

• What is the relative priority of the plans for Hapuna expansion versus the development of Kona Coast State Park? This information should be discussed somewhere, perhaps in an executive summary, in the EIS.

August 22, 1996
• Will the development of this expansion affect or delay the development or improvement plans for other Big Island state parks?

• The projected increase in fishing with the proposed expansion, and impact to fish and honu (turtle) populations in the area, need to be included in the EIS.

• The EIS should consider and include a discussion on the historical connections and living history associated with the private landowners at Waialea Bay. The State should take the time to talk with the private landowners who may face condemnation.

• A discussion on ethnography and cultural impacts should be included in the EIS. Oral histories and the meaning and correct spelling of place names should be verified and corrected if necessary.

• The area planned for the golf course should be planned for additional campground instead.

• Access within the park should give preference to bicyclists and pedestrians over vehicles, to minimize vehicle and traffic impacts to the park.

• I prefer the no action, or less action alternative. There should be less camping, less parking, and reduced access, thus reducing impacts.

• When planning for the Kona Coast State Park, the advisory committee discussed ways to minimize impacts, and one recommendation was to leave the road as is and have minimal road improvements to maintain safety. The unimproved road would serve as a deterrent to many vehicles, and would control access to the beach.

• Golf is a family activity and not exclusionary.

• I support no expansion. We don’t need more roads. We need areas that are safe, sanitary, and usable as they are now. We need to maximize human resources to insure appropriate uses of this area. There should not be any spear fishing or cross netting. There should be more focus on enforcement and control over drinking and drug use.

• Representative Tarnas stated that he would find it difficult to request state funds for acquisition of the lots at Waialea.

• Need to project if the income generated by golf course usage will pay for maintaining the course. The 20% to OHA should also be considered.
• Will there be other income generated by the park to cover maintenance costs?

• There should be a community advisory committee for this project in place before any development proceeds.

• Are there any plans to link Hapuna State Park with Spencer Beach Park? Miloli‘i is over-crowded. Are other areas being explored for community parks? This should be discussed in the EIS.

• Remember, the area is dry and a fire hazard.

• As a landowner, I support the idea of working with the State to cooperatively address the impacts of this park expansion. The community would like to be a part of the planning and development process.

• We do need additional recreational areas. We need to keep it simple, work together, and cooperate.

• The DLNR should consistently and continually seek community input and cooperation in both their decision making and implementation actions.

NEXT STEPS
Community members were reminded that the EIS is being finalized and that any additional comments must be submitted by August 30, 1996. Comment sheets were made available and community members were encouraged to take a few to share with neighbors and other community members who may not have been able to participate in this meeting.

ADJOURNMENT
With no further comments, the meeting ended at 9:00 p.m.
Hapuna Beach State Recreation Area Expansion
Public Information Meeting
August 22, 1996
University of Hawai‘i Extension Service Meeting Room
State Office Complex, Waimea, Hawai‘i

ATTENDEES

Robert L. Bates Bates Commercial Group
L.C. Beckvold Kamuela, Hawaii
John Broussard Kawaihae, Hawai‘i
Anne E. Field-Gomes Waimea Community Association
Lynn Flores Waimea Hawaiian Civic Club
L. Lee Mu Go Kamuela, Hawaii
David B. Gomes Waimea Community Association
Deborah D. Harkins Kamuela, Hawaii
Marni Herskes Kona Kohala Chamber of Commerce
David Hosbein Santa Monica, California
Barbara Kopra Kamuela, Hawaii
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Peter L’Orange Hawaii Leeward Planning Conference
Mike Lowrey Kurtistown, Hawaii
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Greg Mooers Moopers Enterprise
Benjamin Moore Kamuela, Hawaii
Patricia O’Kieffe Kamuela, Hawaii
Rodney T. Oshiro DLNR/DOFAW Na Ala Hele
Braley Pastoniro Kamuela, Hawaii
Ann Peterson Peoples Advocacy for Trails Hawaii
Kelly Pomeroy Kawaihae, Hawaii
George Robertson Kawaihae, Hawaii
Phyllis Sellens Phyllis Sellers & Company
Amy Soma Kamuela, Hawaii
Charles K. Supe DLNR Parks Division
David ‘Tarnas State Representative
Mabel K. Tolutino Waimea Hawaiian Civic Club
Constance Treadwell San Francisco, California
Randy Vitousek Cades Schute
Barbara Wagstaff Kamuela, Hawaii
M/M William White Kamuela, Hawaii
Bob Withans Kawaihae, Hawaii

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CHAPTER 9
ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS EIS

The environmental impact statement was prepared for the Department of Land and Natural Resources, Division of State Parks by Harrison Associates in association with Belt Collins Hawaii and Pedersen Planning Consultants with input provided by subconsultants. The following were involved:

**Harrison Associates**

Warren M. Harrison Principal in Charge

**Belt Collins Hawaii**

Joe Vierra Principal in Charge
Susan A. Sakai Project Manager
Glen T. Koyama Senior Planner
Lesley A. Matsumoto Environmental Scientist
Sarah Young Environmental Scientist
Maria Stephens Planner
Royden Ishii Civil Engineer
Todd Yonamine Jr. Civil Engineer
Amy Yamakawa Graphic Designer
Paul McDonald Word Processor, Editor
Millie Litsey Word Processor

**Pedersen Planning Consultants**

Jim Pedersen Principal in Charge

**Subconsultants**

Char & Associates
Charles L. Murdoch & Richard E. Green Harding Lawson Associates
Marine Research Consultants
Pacific Planning & Engineering, Inc.
Paul H. Rosendahl, Ph.D., Inc.
Ronald N. S. Ho & Associates
Tom Nance Water Resource Engineering
John Clark, Ocean Resource Consultant

Botanical survey
Fertilizer and pesticide impact study
Soil study
Marine environmental study
Traffic analyses
Archaeological inventory survey
Electrical requirements
Water and irrigation requirements
Ocean recreation survey
CHAPTER 10
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_____ (December 1991) Hawaii County Water Use and Development Plan (Plan Revision Draft).

_____ (September 1984) Kawaihae-Puako Zone Map, June 1986, and North & South Kohala Districts Zone Map.

_____ (no date) Special Management Area Rules and Regulations.


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_______ (September 1985) *Compilation of Air Pollution Emission Factors, Volume II: Mobile Sources.*

APPENDICES
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A. Economic and Financial Analyses, Hapuna Beach State Recreation Area Expansion
B. Recreational Demand and Capacity Analysis, Hapuna Beach Recreation Area
C. Geotechnical Consultation, Hapuna Beach State Recreation Area Expansion
D. Baseline Assessment of the Maine Environment in the Vicinity of Hapuna Beach Recreation Area, South Kohala, Hawaii
E. Assessment of the Environmental Impact of Fertilizers and Pesticides on the Proposed Golf Course of the Hapuna Beach State Recreation Area Expansion, South Kohala, Hawaii
F. Botanical Survey, Hapuna Beach State Recreation Area Expansion
G. Phased Archaeological Inventory Survey, Hapuna Beach State Recreation Area Expansion Project, Phase III - Data Analyses and Final Report
H. 2010 Traffic Impact Assessment Report for Hapuna Beach State Recreation Area Expansion
APPENDIX A

Economic and Financial Analyses
Hapuna Beach State Recreation Area Expansion
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CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND AND PURPOSE

A prefinal draft master plan for the proposed expansion of Hapuna Beach State Recreation Area was prepared in December, 1993, for the State Department of Land and Natural Resources by its consultant, Harrison Associates. The plan recommends the incorporation of an additional 900 acres of undeveloped State land to the park and the development of expanded beach, camping, picnicking, hiking, golf, and environmental education opportunities (Figure 1-1).

This report is a technical appendix to an environmental impact statement that has been prepared for the proposed expansion of Hapuna Beach State Recreation Area. It has been prepared to address the following considerations:

1. What is the amount of economic benefits and costs that would be generated by the development of increased recreational opportunities and facilities at an expanded Hapuna Beach State Recreation Area?

2. Since the proposed golf course represents the most expensive aspect of the proposed park expansion, what is the economic feasibility of a private concessionaire developing and/or operating the proposed golf course?

3. What development and operation assumptions must be made to make the cost for a round of golf marketable to resident players and more affordable than other nearby private courses?

1.2 SCOPE AND PROJECT APPROACH

The economic and financial analyses made in this report represent a part of the overall master planning of a proposed expansion of Hapuna Beach State Recreation Area. The anticipated economic impact of the proposed park expansion is evaluated through the use of economic analyses. In contrast, the feasibility of golf course development and operations by a private concessionaire is examined via a more conventional financial analysis.

An economic analysis differs from a typical financial analysis. An economic analyses widens the perspective from the private investor to the regional society affected. For example, the proposed park expansion will be partly or completely financed by the State of Hawaii, and used by local residents and visitors to the Island of Hawaii. An economic analysis of this expansion would consider the development cost and economic benefits of the expansion to the State of Hawaii. Capital expenditures are fully accounted for in the year they occur since society incurs the debt the year of the expenditure. Unlike typical financial analysis, social opportunities such as increased recreational opportunities are assigned “shadow prices” to calculate their value as a benefit to the State of Hawaii.
The financial analysis made to evaluate private concessionaire opportunities determines capital costs that are amortized over the "life" of the golf course project, during an assumed loan period, if debt financed. Only private market values are used to calculate anticipated project benefits and costs.

Economic and financial analyses both require upon an initial market analysis that evaluates existing demands, competition, and marketability. Fortunately, the master plan for the proposed park expansion includes specific recreational demand forecasts and related use assumptions for various recreational activities. The forecasts were used and supplemented by other information and assumptions concerning local user fees for selected activities and estimated secondary expenditures.

1.3 CONSULTATION

The preparation of this report involved coordination with and the cooperation of representatives from the Hawaii County Department of Parks and Recreation; National Golf Foundation; Hawaii Golf Association; Nelson & Wright, golf course architects; as well as operators and maintenance representatives of public and private golf courses on the Island of Hawaii.
CHAPTER TWO
MARKET ANALYSIS

2.1 INTRODUCTION

The following market analysis uses a conventional approach that merges evaluations of both supply and demand.

Recreational opportunities at existing shoreline areas are identified and evaluated. This analysis is an abbreviated version of a similar evaluation presented in the park expansion master plan.

Available forecasts of future recreational demand for an expanded Hapuna Beach State Recreation Area are presented which take into account the relative attraction of other shoreline recreational opportunities on the Island of Hawaii. Consequently, these forecasts represent the prospective recreational demand at the expanded park.

Recreational demand forecasts are subsequently applied to the economic analysis (Chapter Three) as an important "base" number for the calculation of regional benefits. Similarly, golf course demands are used in the determination of potential revenues for the proposed golf course operation (Chapter Four).

Another important factor affecting the future marketability and financial feasibility of an expansion of the Hapuna Beach State Recreation Area is the potential imposition of user fees. Selected activities from the range of recreational opportunities proposed for the park are examined.

2.2 SHORELINE RECREATION AREAS ON THE ISLAND OF HAWAII

The Island of Hawaii contains approximately 266 miles of coastline; much of the Island's coast is used for shoreline recreation. The majority of shoreline recreation takes place at 15 public beach parks operated and maintained by the County of Hawaii. In addition, there are three regional State recreation areas located along the West Hawaii coast (Figure 2-1).

The majority of shoreline recreation occurs in the vicinity of Hilo and Kailua-Kona where more public beach parks and recreation areas are located. West Hawaii is blessed with more accessible white sand beaches, more opportunities for diverse shoreline recreational activities, and more favorable nearshore water conditions during most of the year. The Kohala area offers significant shoreline recreational opportunities for both residents and visitors at Hapuna Beach State Recreation Area, Puako Bay and Spencer Beach Park.

2.3 PARTICIPATION IN SHORELINE RECREATION

Residents and visitors alike participate in a wide range of shoreline recreational activities. Along Big Island beaches, sunbathing, picnicking, and overnight camping are the more popular activities.
Within the nearshore waters, bodyboarding, swimming, bodysurfing, snorkeling, diving, shoreline fishing, windsurfing, board surfing, canoe paddling and kayaking are common activities.

Recreation participation data for Hawaii residents and visitors was obtained through surveys conducted in 1989. The resident and visitor surveys were part of the 1990 State Comprehensive Outdoor Recreation Plan (SCORP).

2.3.1 Big Island Residents

SCORP survey data indicate that roughly seven percent of Big Island residents participate in beach-related activities such as sunbathing, swimming and/or picnicking during the weekend. During the week, daily participation in these activities drops to about one percent. Roughly 20 percent of these beach related activities take place in the Kohala area.

Over two percent of Big Island residents engage in bodysurfing and/or bodyboarding on weekends; less than one percent on weekdays. Roughly 25 percent of the weekend this activity takes place in the Kohala area, e.g. Hapuna. During the week, survey results suggest that about 14 percent of bodysurfers use the Kohala area.

SCORP survey results indicate that less than one percent (0.9%) of all Big Island residents go camping on weekends. Few engage in this activity during the week. Roughly 80 percent of all camping by residents occurs along the shoreline. About 20 percent of the camping occurs in the Kohala area, e.g. Spencer Beach Park.

While not always a shoreline activity, the SCORP survey indicated that less than one percent (0.7 %) of residents engage in golf during the week. However, average daily participation doubles during weekend days. It is interesting to note that less than 10 percent of participating golfers play in the Kohala area during the weekends. On weekdays, over 25 percent of participating golfers play courses in the Kohala area.

SCORP survey results suggest that a significantly smaller number of Big Island residents engage in other shoreline activities such as snorkeling/diving, paddling, shoreline fishing, and surfing. Roughly one-third of the shoreline fishing, snorkeling, and diving activity takes place in the Kohala area. Paddling is popular along various parts of the shoreline, particularly in Hilo Bay and along the North and South Kona coastline.

2.3.2 Big Island Visitors

In 1991, the average daily visitor census in 1991 was almost 18,900 visitors per day; the average visitor length of stay was about 5.8 days (Hawaii Visitors Bureau, Market Research Department, 1992). Visitors involved in shoreline activities spend some time during two days of their entire length of stay participating in shoreline-related recreation (Belt Collins & Associates and Community Resources, Inc., 1990). On an average day, up to 6,000 visitors (about 32 percent of average daily census) are typically involved in some form of shoreline recreation. Roughly 60 to 90 percent of all shoreline-related activities carried out by visitors occur in locations outside of established resort areas.
Shoreline activity by visitors primarily includes beach activities such as sunbathing and swimming. These activities, and other lesser activities such as picnicking and fishing activity, are engaged in by about 32 percent of all visitors on a given day. Interestingly, 43 percent of the visitors engaging in these activities do so at shoreline areas outside of resort areas. Forty percent participate in these activities within resort areas and 17 percent do so outside of local resort beach areas.

Almost 14 percent of all visitors participate in diving activities on a given day. About 60 percent engage in this activity outside of resort areas. About one-third of all diving by visitors occurs in the Kohala area.

Another popular shoreline recreational activity for visitors is bodyboarding (boogyboarding) and/or bodysurfing. About six percent of visitors are involved in this activity. Most visitors participating in this activity do so outside of the local resort areas; about 30 percent engage in this activity in the Kohala area, e.g., Hapuna.

Six percent of all visitors also play golf during two days of their stay on the Big Island. For visitors, golf clearly represents a shoreline activity as over 90 percent of the play occurs within resorts. Over 60 percent of all visitor golf activity takes place in the Kohala area.

2.4 SHORELINE RECREATION IN WEST HAWAII

2.4.1 County Beach Parks

In FY 1992, available information for Kahaluu, White (Magic) Sands, and Spencer Beach Parks indicates that these County beach parks provide beach-related opportunities for almost 3,000 people per day (Tables 2-1, 2-2, 2-3). Sunbathing is the predominant activity at all three beach parks even though good recreational opportunities for both bodysurfing and swimming are available. It is recognized that there is considerable overlap in these recreational opportunities as people on the beach move in and out of the adjoining inshore waters for swimming, bodysurfing or bodyboarding. Nevertheless, roughly 70 percent of the beach activities at these beach parks occur out of the water at any given time.

Significantly less shoreline activity occurs at Hookena Beach Park and Milolii Beach Park in South Kona. Use of Hookena Beach Park is increasing as a growing number of West Hawaii residents continue to seek less-crowded shoreline recreation environments. Milolii is almost exclusively used by residents of Milolii village.

Limited overnight tent camping opportunities are also available at Spencer Beach Park for about 68 persons. Smaller numbers of campsites are also available at County beach parks at Mahukona, Kapaa, Keokea, and Hookena. On a combined basis, these parks can provide camping opportunities for an additional 79 persons (Miyao, 1992).
TABLE 2-1
MONTHLY TOTAL AND AVERAGE DAILY BEACH ACTIVITY
FY 1992
(Number of Persons)

KAHALUU BEACH PARK

<table>
<thead>
<tr>
<th>Month</th>
<th>Activities</th>
<th>Sunbathing</th>
<th>Swimming</th>
<th>Surfing</th>
<th>Total All Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>Daily Average</td>
<td>Monthly Count</td>
<td>Daily Average</td>
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<td>470</td>
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<td></td>
<td>Aug</td>
<td>27,049</td>
<td>873</td>
<td>14,859</td>
<td>479</td>
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<tr>
<td></td>
<td>Sept</td>
<td>22,144</td>
<td>738</td>
<td>9,822</td>
<td>327</td>
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<tr>
<td></td>
<td>Oct</td>
<td>19,987</td>
<td>645</td>
<td>9,216</td>
<td>297</td>
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<tr>
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<td>9,183</td>
<td>306</td>
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<td></td>
<td>Dec</td>
<td>26,849</td>
<td>866</td>
<td>10,064</td>
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<td>Jan</td>
<td>22,128</td>
<td>714</td>
<td>7,198</td>
<td>232</td>
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<tr>
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<td>28,140</td>
<td>970</td>
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<td>24,341</td>
<td>785</td>
<td>8,992</td>
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<td>119,900</td>
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Source: County of Hawaii, Department of Parks & Recreation, 1992.
### TABLE 2-2
MONTHLY TOTAL AND AVERAGE DAILY BEACH ACTIVITY
FY 1992
(Number of Persons)

WHITE SANDS BEACH PARK

<table>
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<th>Swimming</th>
<th>Surfing</th>
<th>Total All Activities</th>
</tr>
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<td>Daily Average</td>
<td>Monthly Count</td>
<td>Daily Average</td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td></td>
<td>25,339</td>
<td>817</td>
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<td></td>
<td>26,543</td>
<td>856</td>
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<td></td>
<td>19,162</td>
<td>639</td>
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<td></td>
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<td>11,340</td>
<td>366</td>
<td>4,131</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>757</td>
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<td></td>
<td>189,549</td>
<td>85,828</td>
<td>1,875</td>
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</table>

Source: County of Hawaii, Department of Parks & Recreation, 1992.
### TABLE 2-3
MONTHLY TOTAL AND AVERAGE DAILY BEACH ACTIVITY
FY 1992
(Number of Persons)

**SPENCER BEACH PARK**

<table>
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<th>Month</th>
<th>Sunbathing</th>
<th>Swimming</th>
<th>Surfing</th>
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</thead>
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<td>Monthly Count</td>
<td>Daily Average</td>
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<td>1,137</td>
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<td>4,230</td>
<td>141</td>
<td>1,450</td>
<td>48</td>
</tr>
<tr>
<td>Dec</td>
<td>3,300</td>
<td>106</td>
<td>765</td>
<td>25</td>
</tr>
<tr>
<td>1992</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan</td>
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<td>Feb</td>
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<td>1,165</td>
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<tr>
<td>Mar</td>
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</tr>
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<td>May</td>
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<td>1,450</td>
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</tr>
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<td>June</td>
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<td>3,601</td>
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</tr>
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<td>Total</td>
<td>74,395</td>
<td>30,136</td>
<td>174</td>
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</tr>
</tbody>
</table>

Source: County of Hawaii, Department of Parks & Recreation, 1992.
2.4.2 State Recreation Areas

Aside from Hapuna, there are two other State recreation areas in West Hawaii: the Old Kona Airport State Recreation Area and Kona Coast State Park (Figure 2-1). A limited number of visitors and residents also use the black sand beach in Kealakekua Bay which has been designated as a State Marine Conservation District.

2.4.2.1 Old Kona Airport State Recreation Area

The Old Kona Airport State Recreation Area is an 80-acre complex that includes one larger community pavilion, two smaller picnic complexes, two restroom facilities, some 15 picnic sites, and portions of the former airport runway that provides vehicular access and parking. Some 34 acres of the south end of the Old Kona Airport State Recreation Area site have been leased by the State of Hawaii to the County of Hawaii for its Kailua Park facilities.

In terms of shoreline recreational activities, overall vehicular counts indicate a park visitation of 384,000 persons in FY 1991 assuming that each vehicle transported two persons. Deducting the participation of roughly 80,000 persons which participated in County sport and cultural programs and informal activities during the same year, the Old Kona Airport State Recreation Area could conceivably attract as many as 304,000 persons per year, or some 833 people per day.

The use of vehicular counts from the entrance of the Old Kona Airport State Recreation Area provides dubious information because of the multi-use nature of this overall recreation area and the presence of the County of Hawaii’s Kailua Park facilities. Visual observations of shoreline recreational activities along the less-developed beach and shoreline of this State recreational area suggest a limited use of the shoreline—less than 100 persons per day. Along the shoreline, snorkeling and diving are popular in the vicinity of Pawai Bay which is situated at the north end of the State recreation area. However, limited shoreline fishing, picnicking, and sunbathing occurs along the remainder of the Old Kona Airport State Recreation Area’s 1.5 mile shoreline. Local park caretakers say that the new Kona Coast State Park has generated a noticeable decline in the use of the shoreline beach at Old Kona Airport State Recreation Area shoreline area for general beach activities.

2.4.2.2 Kona Coast State Park

Kaelekuhulu Beach, located approximately 23 miles north of Kailua-Kona, was opened by the State Parks Division in April, 1992. The shoreline extends approximately 1,000 feet immediately south of Mahaeula Bay. Facilities consist of 22 picnic tables, 10 portable toilets, and a vehicular parking area for about seven vehicles.

The public response to the opening of this recreational area has been enormous. State Park caretaker, Mr. Tommy Lindsey, indicates that peak usage has drawn as many as 1,000 vehicles in one day to the new recreation area. Sporadic vehicular counts made by a traffic counter from May 7 through June 15, 1992 indicate that weekday attendance is more typically 150 to 350 cars while weekend attendance ranges from 300 to 725 vehicles per day. Assuming that each car carries an average of two persons, Kaelekuhulu Beach is already attracting peak visitations of roughly 720 people on weekdays and roughly 1,400 people during weekend days.
The park is apparently very attractive for sunbathing, which is the primary activity at Kaelehu-Hulu Beach. The presence of an extensive beach in closer proximity to Kailua-Kona is believed to be the primary factor influencing an early significant use of the beach by the general public. Mr. Lindsey reports that park users are probably 50 percent visitors and 50 percent residents. Other activities include some shoreline fishing, skimboarding, and bodyboarding.

2.4.2.3 Hapuna Beach State Recreation Area

During the past 25 years, Hapuna Beach State Recreation Area has gradually expanded to a 65-acre regional park that serves island residents from both West and East Hawaii, as well as an increasing number of visitors. The proportional use of Hapuna Beach State Recreation Area by visitors and residents has never been examined. Informal observations by lifeguards suggest that visitor use is greater during the week; weekends bring a greater number of residents, especially during higher nearshore wave conditions (Bowers, 1992). The exposure of this unique shoreline setting to both residents and visitors has significantly increased participation in a wide variety of shoreline recreational activities.

Present activities at Hapuna Beach State Recreation Area include sunbathing, bodysurfing, swimming, bodyboarding, volleyball, snorkeling and diving, picnicking, and overnight camping. Users of the overnight cabins are predominantly off-island visitors. However, intermittent beach counts made between 1985 and 1992 indicate that beach-related activities remain as Hapuna's primary attraction. A two-week survey of shoreline recreational activities in the park and proposed expansion area was made by Pedersen Planning Consultants in June, 1992. From June 5 through 18, the type of activities and number of participants occurring from Hapuna Beach to the Puako Boat Ramp (between the shoreline and the former Puako-Kawaihae Road) were recorded at five daily time intervals.

Results of the survey show that roughly 70 percent of all recreation in the project area occurs along existing beaches and adjacent nearshore waters. Roughly three-fourths of the beach activities take place at Hapuna Beach; the remainder occur at "Beach 68" and "Beach 69" in Waiakea Bay.

Mauka of Hapuna Beach are landscaped picnic areas, picnic shelters, picnic tables and barbecue pits, pavilions, restrooms and showers, and a food concession. This area accounts for roughly 30 percent of all recreational activity during both weekday and weekend periods.

With the exception of Waiakea Beach, the 1.4 mile shoreline between Hapuna and the Puako Boat Ramp is a rocky shoreline that is characterized by a variety of steep cliffs, small coves, shoreline caves, a sea arch, and small jagged points. Two to three percent of all recreational activities in the project area occur in these undeveloped shoreline areas, as well as the hilly grasslands between the shoreline and the former Kawaihae-Puako Road.
2.5 RECREATIONAL DEMAND

2.5.1 Anticipated Resident and Visitor Demands

The master plan for expansion of the Hapuna Beach State Recreation Area includes forecasts of anticipated resident and visitor demand for various recreational activities (Table 2-4 and Table 2-5).

By the year 2010, these forecasts indicate that about 2,430 persons will use the expanded park on weekdays; on weekends, daily park attendance will increase to approximately 4,175 persons. The predominant use of the park will include beach and inshore water activities such as sunbathing, picnicking, bodysurfing/bodyboarding, and snorkeling/diving. Secondarily, the expanded park will be used for camping, hiking, and golf.

The master plan for park expansion also provides assumptions concerning the relative attraction of Hapuna Beach State Recreation Area to other shoreline recreation areas on the Island of Hawaii. The assumptions used in the development of the recreational demand forecasts (Table 2-6) closely resemble the participation trends of residents and visitors that were identified during a 1989 State Comprehensive Outdoor Recreation Plan (SCORP) survey.

2.5.2 Market Attraction

The anticipated trends clearly indicate that an expanded Hapuna Beach State Recreation Area will continue to be a primary recreational attraction for both resident and visitors. West Hawaii is blessed with four State recreation areas (including Hapuna) and three shoreline beach parks that offer shoreline recreational opportunities. Once Hapuna is expanded, none of these shoreline areas will match the diversity of available recreational opportunities. This diversity will continue to draw park attendance from residents from all island districts. Visitors will continue to be attracted to this area. The opportunities offered by the expanded park will be exposed to a greater number of visitors who will learn of the park expansion via travel guide books, news articles, and hotel personnel.

The increased attraction to Hapuna may somewhat diminish attendance at other shoreline parks in West Hawaii. However, the proximity of the Kona Coast State Park to Kailua-Kona will, for example, continue to attract many West Hawaii residents and some visitors during weekdays because of a more convenient travel distance and the suitability of the shoreline for sunbathing. Likewise, County beach parks at White Sands, Kahalu'u, and Spencer will also continue to be popular destinations for sunbathing and bodysurfing, and Spencer Beach Park will also continue to provide camping opportunities. However, the capacity of the County beach parks will gradually be reached even though modest population growth is anticipated during the next 20 years.

2.6 EXISTING AND POTENTIAL USER FEES

2.6.1 General

State income tax and County property tax revenues currently provide the financial support for the development, operation and maintenance of public recreational facilities on the Island of Hawaii. User
<table>
<thead>
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<th>Year</th>
<th>Beach Activity</th>
<th>Bodybrdng/Bodysurfing</th>
<th>Surfing</th>
<th>Camping:</th>
<th>Golf</th>
<th>Hiking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Group</td>
<td></td>
<td></td>
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<th>b) bodiesurfing</th>
<th>c) Camping:</th>
<th>Golf</th>
<th>Hiking</th>
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</table>

a) Bodyboarding and bodiesurfing is an activity related to beach activities. Consequently, this data is presented to better understand how many beachgoers use the nearshore waters.

b) Surfing activity is expected to be performed almost exclusively by local residents who will continue to surf primarily during the winter months and when favorable surf conditions prevail.

c) Camping activity on weekdays is expected to be done almost exclusively by island visitors.

d) Hiking activity on weekdays is assumed to represent only visitor activity.

### Table 2-6
PROPORTION OF ISLAND-WIDE DEMAND ATTRACTED TO THE EXPANDED HAPUNA BEACH STATE RECREATION AREA

<table>
<thead>
<tr>
<th>Activity</th>
<th>Proportion of Island-Wide Participation</th>
<th>Proportion of Island-Wide Demand at Hapuna</th>
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<tr>
<td></td>
<td>Residents</td>
<td>Visitors</td>
</tr>
<tr>
<td></td>
<td>Week day</td>
<td>Weekend</td>
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<td>Beach</td>
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<td>1%</td>
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<td>Hiking</td>
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<td>0.6</td>
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<tr>
<td>Golf</td>
<td>0.7</td>
<td>1.4</td>
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</table>

fees associated with public recreational facilities on the Island of Hawaii have been limited to nominal charges by both the State Department of Land and Natural Resources and the County of Hawaii Department of Parks and Recreation. The price of existing user fees presently charged to residents and visitors (Table 2-7) suggest that fees have been imposed to control and monitor the number of users rather than an attempt to meet a portion of annual operation and maintenance expenditures.

2.6.2 Camping

Camping fees range from $1 for tent camping at Hawaii County beach parks to $15 for a three-person camping shelter at Hapuna Beach State Recreation Area. Variable rates are available for cabins at Mauna Kea State Park and Kalopa State Park. At Kalopa, for example, the overnight cabin rate for one person is $8, a party of three is $16.50 or $5.50/camper, and a maximum group of 32 persons is provided for a rate of $2.75 per person.

There is considerable variation in local user fees. The difference between State and County camping fees is not inappropriate as State camping opportunities include an enclosed shelter that has cooking facilities within individual cabins, i.e. Mauna Kea State Park, or a central kitchen and dining area, i.e., Kalopa State Park and Hapuna Beach State Recreation Area.

Present rates are clearly marketable to both resident and visitors. County beach parks are frequently booked to capacity. State cabins are typically booked to capacity on weekends for months in advance; mid-week usage is limited. It is believed that the County's more affordable tent camping fees could easily be increased, particularly if some centralized cooking facilities were provided for each campsite.

2.6.3 Picnicking

Future user fees for tent camping at Hapuna Beach State Recreation Area could initially be established at a rate of $5 per person and be competitive with existing County tent camping and State cabin rates. However, tent campsites would need to contain, at least, centralized cooking facilities, well-maintained restroom facilities, convenient vehicular parking, and onsite park security.

2.6.4 Golf

The only golf course being operated for only public play is the Hilo Municipal Golf Course in Hilo. Current green fees at this course represent an extremely affordable opportunity for golfers of all ages (Table 2-7). Unfortunately, existing fees ranging from three to six dollars for most golfers is not sufficient to meet existing operation and maintenance costs.

Discussions with golf course managers at two private courses in the South Kohala area suggest that a marketable price range at the proposed golf course in the park would be from $25 to $30 per round. An additional $15 per person would also be charged for golf cart rental which, from a management perspective, would be required during morning play to expedite the busier part of the day.
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<th>Type and Amount of Fees</th>
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<tr>
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<td>State Parks Division Concessionaire</td>
<td>$15/night/cabin</td>
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<tr>
<td>Kalopa State Park</td>
<td>State Parks Division</td>
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<tr>
<td>Mauna Kea State Park</td>
<td>State Parks Division</td>
<td>Variable: $8/person; $5.50/person (party of 3); $2.75/person (party of 32)</td>
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<td>County Beach Parks</td>
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<td>(Tent Camping)</td>
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<tr>
<td><strong>PICNICKING</strong></td>
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<tr>
<td>Pavilions</td>
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<td><strong>GOLF</strong></td>
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CHAPTER THREE
ECONOMIC ANALYSIS

3.1 INTRODUCTION

The purpose of this economic analysis is to evaluate the potential costs and benefits that will be generated by the proposed expansion of Hapuna Beach State Recreation Area. As stated in Chapter One, this economic analysis assigns monetary values to considerations often not included with the scope of conventional financial analyses. Consequently, reviewers are able to better determine the value of the project to the State economy.

3.2 METHODOLOGY

The initial focus of the analysis identifies potential benefits of the proposed expansion project. The proposed park expansion will establish increased opportunities for camping, beach activities, golf, and hiking. The anticipated availability of these opportunities was assumed to occur in the year following the planned construction of proposed park improvements (see Table 2-1 of the draft EIS).

Existing user fees and arbitrary economic values were assigned to each opportunity and multiplied by the number of anticipated users. Additional benefits were identified through the establishment of secondary multipliers for each recreational opportunity.

The second focus was to determine the costs of the proposed expansion which involves both capital or construction costs, as well as operational and maintenance costs. Preliminary construction costs were prepared by Belt Collins Hawaii. Park maintenance costs were coordinated with State park maintenance supervisors. Operation and maintenance costs for the proposed golf course were derived on the basis of discussions with golf industry professionals in East and West Hawaii who have extensive industry experience and are well acquainted with the operational requirements and consumer demands of the Big Island golf market.

Anticipated benefits were subtracted from costs to determine an annual cash flow to the economy. This dollar amount was discounted over a 21-year forecast period to reflect the changing value of money over time. A discount rate of 3.5 percent, beginning in 1994, was used for this analysis.

The discounted annual cash flow represents the annual net present value. A cumulative net present value was also calculated to determine the overall, long-term benefit of the project. However, the 1993-2000 period was also included to demonstrate the economic value of the existing park without the proposed project.

The overall calculation of net present value, and related intermediate calculations, were made through the use of Lotus 1-2-3, Release 5, for Windows, a software spreadsheet program. This approach facilitated the revision of shadow prices for benefits and updates to preliminary construction costs during the planning and subsequent review process.
3.3 DIRECT AND SECONDARY ECONOMIC BENEFITS

3.3.1 Camping

Expanded camping opportunities available in the year 2005 will generate about $286,000 in annual direct economic benefits to the Big Island economy (Table 3-1). By the year 2015, camping benefits will increase to about $356,000. These benefits will result from tent camping user fees that would be generated beginning in 2005. Each camping experience was assigned an economic value of $7 between 2005 and 2015. This value is based upon current user fees at State cabins and the assumption that tent camping fees could be comparable to cabin rentals if more amenities are made available.

Secondary retail expenditures by resident and visiting campers generate even greater and more significant economic benefits to the Big Island economy (Table 3-2). Each camping trip is dependent upon local food, fuel, and equipment purchases. It is estimated that the average secondary retail expenditure will be about $30 for each resident camper and about $40 for each visiting camper. Visitors are believed to expend more because the average size of each camping group averages about two persons while typical resident camping groups include, at least, six persons. A greater economy for food and fuel costs is achieved by the presence of more campers in each camping group.

3.3.2 Beach Activities

The direct benefits generated by expanded beach activities will represent an annual input of almost $4.4 million by the year 2015 (Table 3-3). While no user fees are anticipated for beach activities such as sunbathing, picnicking, swimming, bodyboarding, and snorkeling, a "shadow price" value of about $5 per person is believed to be appropriate.

Indirect economic benefits will also be created by beachgoers who purchase food, fuel and equipment purchases prior to and during their visit to the beach. In the year 2015, secondary benefits related to beach activities will account for almost $14 million per year (Table 3-4).

During daytime hours, roughly 40 percent of those who come to Hapuna Beach State Recreation Area spend their time out of the water on the beach or the adjoining back-up picnic area. These beachgoers usually bring food for a one-meal picnic before coming to the park, as well as gasoline required for transportation to the park. The per capita expenditure by those using the beach and back-up area for picnicking is expected to be about $14 for every resident or visitor.

Roughly 60 percent of beachgoers at Hapuna spend almost of their time in the nearshore waters as they participate in one or more water activities. However, they may purchase a snack at the park food concession and are more likely to occasionally purchase some recreational equipment in Hilo or Kona. Consequently, it is assumed that these beach users will each expend an average of about $3 for convenience food, two dollars for equipment, $12 for gasoline, or a total of $17 per person.
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<th>Subtotal Benefits</th>
<th>Others x60% Value</th>
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3.3.3 Golf Activities

Direct economic benefits from proposed golf opportunities will be derived from green fees, golf cart rentals, driving range user fees, as well as food and beverage and golf supply purchases at the proposed clubhouse. The cumulative direct benefits of these sales will represent about $4.9 million per year in the year 2015 (Table 3-5). This level of benefits is based upon the following assumptions:

1. The annual number of rounds played at the course will be 53,250 rounds or an average of about 150 rounds per day. This volume of play will gradually rise to 88,750 per year (approximately 250 rounds per day) by the fifth year of course operation.

2. A round of golf will initially cost $15 and gradually increase to $20 by the fifth year of operation (2014). This cost does not include a golf cart fee.

3. Seventy-five percent of the players will use carts rented for shared price of $15 per golfer; hand carts will be rented to 20 percent of the golfers for $5. The remaining golfers will use their own personal carts.

4. Seventy percent of all golfers coming to the golf course will purchase a bucket of balls and use the driving range prior to "tee-off". The remaining 30 percent will use the driving range on days when they do not play a round of golf.

5. Food and beverage sales will average about $9 to $10 per golfer.

6. Pro shop sales are estimated to be $10 for every round of golf. These sales will increase to $12 per round by the fifth year of operation.

Indirect economic benefits (Table 3-6) will include local retail sales for various types of golf equipment such as golf clubs, accessories, and clothing. Employment at the proposed golf course, which is a cost of the project, also generates other retail and service expenditures within the Big Island economy to landscape maintenance contractors, landscape architects, and others. No local data is available to assess the significance of these expenditures to the local economy. However, a recent National Golf Foundation study of the golf industry in Chicago concluded that every dollar of direct golf course employment generated another dollar of sales and income in the local secondary economy (FXM Associates, 1992). This assumption was used for the Big Island economy despite an increasing trend for more off-island, mail-order purchases because the same opportunity is available in Chicago.

3.3.4 Hiking Opportunities

The direct economic benefits will be the enjoyed experience of scenic walks along the coastline. Such benefits will begin to be realized in the year 2005 following completion of a shoreline and fishermen's trail development.

This benefit is assigned an economic value, or shadow price, of $2 per hiker. Consequently, hiking opportunities will provide direct benefits valued at about $250,000 in the year 2015 (Table 3-7).
<table>
<thead>
<tr>
<th>Year</th>
<th>No. Rounds Per Year</th>
<th>a) W/Golf Cart Value/Round Benefit</th>
<th>b) w/Hand Cart Value/Round Benefit</th>
<th>c) w/o Cart Value/Round Benefit</th>
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</table>

Notes:

a) 75% of total number of rounds per year are assumed to use golf carts.

b) 20% of total number of rounds per year are assumed to use hand carts.

c) 5% of total number of rounds per year are assumed to not use any carts.

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Notes:
(a) Indirect retail expenditure calculation assumes one dollar of indirect retail sales for every dollar of direct employment, as well as an inflation factor of 3.5%. (Table 3-10 1993 employment dollars)
Golf course opens in 2010.

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<td>125,261</td>
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3.4  COSTS

3.4.1  Introduction

The direct costs associated with the park expansion are capital costs incurred during construction and long-term operation and maintenance. Estimated capital costs are based upon 1993 dollars. However, these estimates have been inflated by an annual rate of 3.5 percent to account for future inflated costs associated with construction materials and labor.

An annual inflation rate of 3.5 percent was also applied to operation and maintenance costs. Base salary rates for both government and private industry labor, as well as other direct costs, primarily increase because of inflation.

3.4.2  Cumulative Costs

The overall expansion of the Hapuna Beach State Recreation Area will require the expenditure of about $40 million in capital expenditures over a 13-year construction period (Table 3-8). Upon completion of all facilities and improvements within the project area, operation and maintenance expenditures will require about $4.7 million per year. From the year 1998 through the year 2015, cumulative capital and operation/maintenance expenditures will cost an estimated $77 million.

3.4.3  Capital Costs

3.4.3.1  Phase One

The initial phase of construction will occur between 1998 and the year 2000. This phase of park expansion will represent a State expenditure of approximately $1,531,750 (1993 dollars) for the following improvements:

- Offsite development and improvement of water supply and transmission systems for both potable and irrigation water.

- Development of a new access road and vehicular parking area mauka of Wailea Beach, as well as the construction of restrooms, a small picnic area, and lifeguard stands along an existing 40-foot right-of-way in the Wailea Bay house lot area.
<table>
<thead>
<tr>
<th>Year</th>
<th>Capital Costs</th>
<th>Operations/ Maintenance Golf Course</th>
<th>Operations/ Maintenance Park Area</th>
<th>O/M Total</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>1995</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>1996</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
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<td>$0</td>
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<td>$0</td>
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<td>$1,680,079</td>
<td>$1,680,079</td>
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</tr>
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<td>$1,738,881</td>
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<td>$1,799,742</td>
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<td>$7,423,467</td>
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</tr>
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</tr>
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<td>$2,591,341</td>
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</tr>
<tr>
<td>2015</td>
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<td>$2,682,038</td>
<td>$2,369,917</td>
<td>$5,051,955</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$39,886,195</strong></td>
<td><strong>$14,791,582</strong></td>
<td><strong>$22,079,580</strong></td>
<td><strong>$36,871,162</strong></td>
<td><strong>$76,757,357</strong></td>
</tr>
</tbody>
</table>

Note: 1993 dollars have been inflated at the rate of 3.5%/annum.

3.4.3.2 Phase Two

Phase Two will primarily develop the infrastructure, sites and facilities makai of Queen Kaahumanu Highway for a new camping area, picnicking and hiking opportunities between the south end of Hapuna Beach to roughly Kanekanaka Point. These improvements will include the construction of a new primary roadway, water and electrical distribution systems, picnic rental grounds, family campsite clusters, group cabins, and a portion of a coastal trail between Hapuna Bay and Puako Bay.

Other improvements during Phase Two will include construction of a park headquarters east of the existing parking area and a new paved access to Wailea Beach.

Phase Two improvements will be constructed between 2001 and 2004 for a cost of approximately $7,016,700 (1993 dollars).

3.4.3.3 Phase Three

Construction of the golf course mauka of Queen Kaahumanu Highway will be completed between 2005 and 2009. Golf course development will include site preparation of the golf fairways and tees, the onsite development of all utility systems, site preparation and construction of a new clubhouse. It is estimated that the golf course development will require an estimated $16,595,750 (1993 dollars) for construction.

3.4.3.4 Phase Four

Phase Four, which is scheduled to occur in the year 2010, will involve the development of additional campsites for recreational vehicles or tent camping, as well as additional picnic sites. Other support facilities will include the construction of additional water distribution and roadway to the new camping area. Additional vehicular parking area will also be constructed mauka of Hapuna Beach. The anticipated cost of these improvements is $764,000 (1993 dollars).

3.4.4 Operation and Maintenance Costs

3.4.4.1 General Assumptions

Final determinations have not been reached concerning the use of private concessionaires for the operation and maintenance of the park areas makai of Queen Kaahumanu Highway and the public golf course mauka of the Highway. Nevertheless, a number of assumptions were used to derive an estimate for both park and golf course facilities. These assumptions include the following:

1. The park area makai of Queen Kaahumanu Highway will be managed, operated and maintained by the State Parks Division or a concessionaire, or a combination of public program management and supporting private operation and maintenance contractor.

2. Golf course management responsibility will be assigned to a separate management and maintenance organization which will develop and lease State lands for the operation of a public golf course.
3.4.4.2 Park Area Makai of Queen Kaahumanu Highway

The master plan for the park expansion indicates that the operation and maintenance of the park will require both program management and maintenance personnel. The size of the expanded park, resource management requirements, and the anticipated number of future users prompts the need for more comprehensive onsite management (Table 3-9).

Program management personnel will include a chief ranger, office manager/bookkeeper, reservations clerk, water safety director and three lifeguards. These personnel are estimated to generate about $617,000 in annual labor costs; other direct costs required to support these personnel will represent about $7,000 per year.

The maintenance of facilities will require a maintenance supervisor and 12 maintenance personnel (Table 3-9). The two tradesman, e.g., carpenter and plumber, envisioned for the Hapuna maintenance crew will also provide occasional support to the Kona Coast State Park and Old Kona Airport State Recreation Area (Supe, 1992). Labor and other direct costs relating to maintenance activities are estimated to cost about $488,000 per year.

The management and maintenance of the park area makai of Queen Kaahumanu Highway represents a combined or total cost of approximately $1,111,848 (1993 dollars) per year.

3.4.4.3 Golf Course

Similar to other park facilities, the golf course mauka of Queen Kaahumanu Highway will require both program management and maintenance personnel. The labor and other direct costs required to operate and maintain the proposed golf course will require a private expenditure of approximately $1,258,280 (Table 3-10).

Labor is expected to represent the greatest expense for the operation of the course and clubhouse, as well as the maintenance of the course. Labor costs associated with the course and clubhouse operations will be about $455,000 per year. Golf maintenance will require an expenditure of almost $600,000 for in-house maintenance personnel.

3.5 NET PRESENT VALUE ANALYSIS

3.5.1 Golf Course

The calculation of project benefits and costs over the 1993-2015 period indicates that the golf course development at Hapuna requires a sizable capital investment of approximately $16.6 million (1993 dollars) over a five-year period (Table 3-11). However, this investment is offset by a significant generation of direct project benefits derived from green fees, cart rentals, pro shop sales, as well as food and beverage sales. In addition, the golf course is expected to also generate additional project benefits via secondary retail expenditures in the local economy (all services and employment outside of the golf course and clubhouse) for landscape contracting, professional services, golf equipment and apparel, and other local sales.
<table>
<thead>
<tr>
<th>PROGRAM MGT Labor (Classif.)</th>
<th>No. of Positions</th>
<th>Base Hourly Rate</th>
<th>Fringe Benefits</th>
<th>Gross Wage Rate</th>
<th>Annual Cost Per Position</th>
<th>Annual Cumulative Cost</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
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<td>$3.47</td>
<td>$17.36</td>
<td>$36,114</td>
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<td>$36,114</td>
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<table>
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<th>Base Hourly Rate</th>
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<th>Gross Wage Rate</th>
<th>Annual Cost Per Position</th>
<th>Annual Cumulative Cost</th>
<th>Subtotal</th>
</tr>
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<tbody>
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<td>$33,618</td>
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<td>$33,618</td>
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<td></td>
<td></td>
</tr>
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<td><strong>TOTAL ESTIMATED ANNUAL PARK MANAGEMENT &amp; MAINTENANCE COSTS</strong></td>
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### TABLE 3-10

**ESTIMATED ANNUAL MANAGEMENT AND MAINTENANCE COSTS**

**GOLF COURSE MAUKA OF QUEEN KAAHUMANU HIGHWAY**

**1993 DOLLARS**

<table>
<thead>
<tr>
<th>PROGRAM MANAGEMENT Labor (Classified)</th>
<th>No. of Positions</th>
<th>Base Hourly Rate</th>
<th>Fringe Benefits</th>
<th>Gross Wage Rate</th>
<th>Annual Cost Per Position</th>
<th>Annual Cumulative Cost</th>
<th>Totals</th>
</tr>
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<tbody>
<tr>
<td>Golf Pro-Salaried</td>
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<td>$11.00</td>
<td>$2.75</td>
<td>$13.75</td>
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<td>$28,600</td>
<td>$45,000</td>
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<td>$12.50</td>
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<td>$26,000</td>
<td>$28,600</td>
</tr>
<tr>
<td>Office Manager/Bookkeeper</td>
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<td>$8.50</td>
<td>$2.13</td>
<td>$10.63</td>
<td>$22,100</td>
<td>$22,100</td>
<td>$44,200</td>
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<tr>
<td>Clerk</td>
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<td>$14.14</td>
<td>$3.54</td>
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<td>$36,764</td>
<td>$36,764</td>
<td>$36,764</td>
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</tr>
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</tr>
<tr>
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<td>$2.00</td>
<td>$10.00</td>
<td>$20,800</td>
<td>$20,800</td>
<td>$46,000</td>
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<td>$4.25</td>
<td>$13,000</td>
<td>$13,000</td>
<td>$26,000</td>
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</table>

**Labor Subtotal**

**Other Direct Costs**

| Office Supplies                       | $500              |
| Office Equipment                      | $1,000            |
| Telecommunications                    | $2,400            |
| Advertising                           | $3,000            |
| Postage & Delivery                    | $1,800            |

**Other Direct Costs Subtotal**

**TOTAL PROGRAM MANAGEMENT COSTS**

**$463,320**

### MAINTENANCE MANAGEMENT

<table>
<thead>
<tr>
<th>Labor (Classified)</th>
<th>No. of Positions</th>
<th>Base Hourly Rate</th>
<th>Fringe Benefits</th>
<th>Gross Wage Rate</th>
<th>Annual Cost Per Position</th>
<th>Annual Cumulative Cost</th>
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**Labor Subtotal**

**Other Direct Costs**

| Fertilizers/Chemicals          | $85,000          |
| Equipment Repair               | $35,000          |
| Petrol,Oil, Lubricants         | $12,000          |
| Sand Material, Top Drsg.       | $25,000          |
| Consumable Supplies           | $30,000          |
| Landscape Maintenance Svs.    | $9,000           |

**Other Direct Costs Subtotal**

**TOTAL MAINTENANCE MANAGEMENT COSTS**

**$794,960**

**TOTAL ESTIMATED ANNUAL MANAGEMENT & MAINTENANCE COSTS**

**FOR GOLF COURSE MAUKA OF QUEEN KAAHUMANU HIGHWAY**

**$1,258,280**

<table>
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<tr>
<th>Year</th>
<th>Total Direct Benefits</th>
<th>Total Indirect Benefits</th>
<th>Total Benefits</th>
<th>Total Costs</th>
<th>Present Value of Annual Net Benefits</th>
<th>Present Value of Annual Net Benefits *Accumulated</th>
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<td>$3,092,535</td>
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<tr>
<td>2005</td>
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<td>$13,444,951</td>
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<td>2007</td>
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<td>2009</td>
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<td>2011</td>
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<td>2012</td>
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<td>2013</td>
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<td>2014</td>
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<td>$17,583,712</td>
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<td>$4,881,116</td>
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<td>2015</td>
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<td>$5,051,955</td>
<td>$22,792,839</td>
<td>$340,945,970</td>
</tr>
</tbody>
</table>

*Note: All annual benefits and costs include a 3.5% annual discount rate beginning in 1994.

Within the first five years of operation, the direct benefits generated by the course are expected to offset capital costs required to build the golf course. By the year 2015, the golf course is expected to annually generate almost $5 million in direct project benefits which will represent 51 percent of all direct benefits created by the entire park expansion.

Anticipated project benefits will be somewhat offset by annual operation and maintenance expenditures which will cost an estimated $1.2 million per year. After deducting these expenditures, direct economic benefits gained at the golf course will still generate roughly $2.3 million of positive input to the local economy each year and about $2.2 million in secondary retail expenditures.

3.5.2 Park Expansion Makai of Queen Kaahumanu Highway

The expansion and improvement of camping, hiking, and beach-related opportunities will require a capital investment of almost $23.2 million over a thirteen-year construction period. Annual direct economic benefits of approximately $4.3 million will be generated via user fees for camping and increased public enjoyment for expanded beach and hiking opportunities. Consequently, estimated capital costs will be offset by direct primary benefits within six years of their completion.

The positive input of direct camping, hiking, and beach activity benefits will be somewhat diminished by park management and operation and maintenance costs of about $1.1 million per year. However, these costs will be offset by a significant contribution of secondary retail expenditures for food, fuel, and recreational equipment for camping and beach related activities. Indirect benefits for camping and beach activities in the local economy will generate roughly $15.7 million per year.

3.5.3 Cumulative Economic Value of the Park Expansion

The cumulative net present value of the project offers a significant positive generation of direct and indirect benefits to the local economy. Overall capital expenditures represent a public expenditure of about $40 million. However, these expenditures will generate direct and indirect retail sales and services fees of about $22 million annually. Using shadow prices assigned for public enjoyment, it is believed that resident and visitor enjoyment has an additional value of almost $3.8 million each year.

Through the discounting of future benefits and operation/maintenance costs to 1993 dollars, the overall project will generate a positive contribution of about $221 million in cumulative project benefits during the 2001-2015 period. The completion of the first phase of park improvements is anticipated in the year 2001.
CHAPTER FOUR
FINANCIAL ANALYSIS

4.1 INTRODUCTION

The potential economic benefits that would be derived from the operation of the proposed golf course prompt an examination of the potential economic opportunity for a private concessionaire to develop and/or operate the proposed golf course. The potential construction of a new golf course would defray an $16.6 million public investment for the construction of a public golf course. Use of a private concessionaire for golf course operations and maintenance would clearly provide direct benefits to the local economy and defray the State of Hawaii’s potential expenditure of $1.2 million for golf course operations and maintenance. In contrast, management of the course by a public agency would provide only indirect economic benefits and increase the operational cost of government.

Unlike the previous economic analysis in Chapter Three, the financial analysis examines the viability of private golf course development and operations from a conventional market perspective. This approach evaluates only costs and benefits that have an actual market value. The objective of the analysis is to identify profit potential and financial risk for private investor(s), as well as general cashflow requirements. Ultimately, the analysis of these factors provides the basis for assessing the prospects of the business opportunity.

4.2 MARKET SUMMARY

4.2.1 Demand

Chapter Two evaluates competing recreational areas, recreational demand, and the prospective range of user fees. Assuming a golf course opening in early 2010, the proposed golf course would initially open with a prospective demand of about 316 rounds of golf on weekdays and about 222 rounds on weekends. By the year 2014, weekday demand is expected to increase to about 400 rounds while weekends will draw about 285 rounds. These estimates, which indicate greater play on weekdays, presume that the predominant market will be resident players. Resident golf participation on the Big Island presently doubles on the weekends; however, most weekend play occurs closer to home. As the resident population of South Kohala and an expanded local golf demand emerges, weekend demands at the proposed course will clearly exceed weekday demands.

Golf industry professionals in the South Kohala area indicate that a desirable operating range for the course would be a maximum of about 250 rounds per day. Use of the course beyond this volume is not considered to be cost-effective as greater use will cause greater wear and deterioration of the golf course. From a marketing standpoint, resident players will feel rushed during play and likely frustrated by more frequent delays on the course (Bustamante, 1992).
This level of anticipated demands offers an ample market to operate the golf course. If the course is open for play about 355 days per year, an average of about 200 rounds per day will result in 71,000 rounds per year. While the opening of the course is not expected until 2010, golf demands presented in Chapter Two indicate that considerable demand for more affordable golf play already exists. Forecasts of golf course participation in 1995 suggest an existing demand ranging from 190 to 275 rounds per day.

4.2.2 Affordability

Despite extremely affordable green fees at Hilo Municipal Golf Course, golf course managers in the South Kohala area indicate that a range of $25 to $30 per round would be marketable to resident golfers. Resident golfers in West Hawaii presently cannot play for less than $38 at Waikoloa Village, $40 per round at Mauna Kea's new Hapuna course, $50 at Waikoloa Beach Resort, and $70 at Mauna Lani Bay Hotel.

Golfers in East Hawaii will likely continue to find cheaper rates at the Hilo Municipal Golf Course, Naniloa Country Club and Discovery Harbor Golf and Country Club. More comparable rates for residents golfers are available at Volcano Golf Course and Country Club and Sea Mountain Golf Club.

Consequently, a new public course at Hapuna that offers more affordable rates will be very attractive to resident golfers in West Hawaii. East Hawaii golfers who occasionally play in West Hawaii will also be attracted to more affordable rates.

The attraction to more affordable green fees is also dependent upon the quality of the course. The proposed golf course site is located in the vicinity of some of America's more prestigious courses. Fortunately, the proposed site offers an excellent opportunity to provide affordable golf opportunity in an extremely scenic recreational area. However, the quality of play will be directly dependent upon the level of course maintenance and the volume of play permitted by management.

4.3 PRO FORMA PROJECTION

4.3.1 Introduction

The pro forma projection provides a useful summary of the primary indicators of financial viability. For the purposes of this financial analysis, estimated revenues, expenses, cash flow, and profit (loss) have been incorporated into two separate five-year pro forma projections for the proposed golf course (Tables 4-1 and 4-2)

Table 4-1 examines the potential viability of a privately-financed investment for golf course development and operation. Table 4-2 considers private investment into only golf course operation. The only difference in the two pro forma projections lies in the anticipated debt service for construction of the golf course. It is assumed that the State of Hawaii would lease State land mauka of the Queen Kaahumanu Highway for one dollar per year.
<table>
<thead>
<tr>
<th></th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>YEAR 4</th>
<th>YEAR 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Rounds/Year</td>
<td>53,250</td>
<td>62,125</td>
<td>71,000</td>
<td>79,875</td>
<td>88,750</td>
</tr>
<tr>
<td>Green Fees</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$18.00</td>
<td>$20.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Golf Cart Fees</td>
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<td>$15.00</td>
<td>$15.00</td>
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<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
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<tr>
<td>Food &amp; Beverage</td>
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<td>Average Income Per Round:</td>
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<td>$43.50</td>
<td>$46.50</td>
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<td>W/O Cart (5%)</td>
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<tr>
<th>TABLE 4-2</th>
<th>PRO FORMA PROJECTION</th>
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<tr>
<td>GOLF COURSE OPERATION BY PRIVATE OPERATOR</td>
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<tr>
<td>HAPUNA BEACH STATE RECREATION AREA</td>
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<thead>
<tr>
<th>REVENUES</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>YEAR 4</th>
<th>YEAR 5</th>
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<tbody>
<tr>
<td>Total Rounds/Year</td>
<td>53,250</td>
<td>62,125</td>
<td>71,000</td>
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<td>$9.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>Pro Shop Supplies</td>
<td>$10.00</td>
<td>$12.00</td>
<td>$12.00</td>
<td>$12.00</td>
<td>$12.00</td>
</tr>
<tr>
<td>Average Income Per Round:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W/Golf Cart (75%)</td>
<td>$50.50</td>
<td>$53.50</td>
<td>$56.50</td>
<td>$58.50</td>
<td>$58.50</td>
</tr>
<tr>
<td>W/Hand Cart (20%)</td>
<td>$40.50</td>
<td>$43.50</td>
<td>$46.50</td>
<td>$48.50</td>
<td>$48.50</td>
</tr>
<tr>
<td>W/D Cart (5%)</td>
<td>$35.50</td>
<td>$38.50</td>
<td>$41.50</td>
<td>$43.50</td>
<td>$43.50</td>
</tr>
<tr>
<td>Green Fee Revenues</td>
<td>$798,750</td>
<td>$931,875</td>
<td>$1,278,000</td>
<td>$1,597,500</td>
<td>$1,775,000</td>
</tr>
<tr>
<td>Golf Cart Revenues</td>
<td>$652,313</td>
<td>$761,031</td>
<td>$869,750</td>
<td>$978,469</td>
<td>$1,087,188</td>
</tr>
<tr>
<td>Driving Range Revenues</td>
<td>$79,875</td>
<td>$93,188</td>
<td>$106,500</td>
<td>$119,813</td>
<td>$133,125</td>
</tr>
<tr>
<td>Food &amp; Bev Revenues</td>
<td>$479,250</td>
<td>$621,250</td>
<td>$710,000</td>
<td>$798,750</td>
<td>$887,500</td>
</tr>
<tr>
<td>Pro Shop Revenues</td>
<td>$532,500</td>
<td>$745,500</td>
<td>$852,000</td>
<td>$958,500</td>
<td>$1,065,000</td>
</tr>
<tr>
<td><strong>GROSS REVENUE</strong></td>
<td>$2,542,688</td>
<td>$3,152,844</td>
<td>$3,816,250</td>
<td>$4,453,031</td>
<td>$4,947,812</td>
</tr>
</tbody>
</table>

| Golf Course Maintenance   | $794,960 | $794,960 | $794,960 | $794,960 | $794,960 |
| Food Concession           | $321,805 | $358,725 | $381,800 | $404,875 | $427,950 |
| Pro Shop                  | $407,860 | $535,660 | $599,560 | $663,460 | $727,360 |
| Driving Range             | $22,090  | $22,090  | $22,090  | $22,090  | $22,090  |
| Golf Carts                | $199,520 | $199,520 | $199,520 | $199,520 | $199,520 |
| **TOTAL EXPENSES**        | $1,854,535 | $2,019,255 | $2,106,230 | $2,193,205 | $2,280,180 |

| NET OPERATING INCOME      |         |        |        |        |        |
| (CASH FLOW)               | $688,153 | $1,133,589 | $1,710,020 | $2,259,826 | $2,667,633 |
| DEV. DEBT SERVICE         | $0       | $0       | $0       | $0       | $0       |
| LAND DEBT SERVICE         | $0       | $0       | $0       | $0       | $0       |
| **PROFIT (LOSS)**         | $688,153 | $1,133,589 | $1,710,020 | $2,259,826 | $2,667,633 |

The detailed assumptions used to calculate anticipated revenues and expenses are explained more fully in the following paragraphs.

4.3.2 Revenues

4.3.2.1 Annual Volume of Play

Each year of the pro forma projections assume a different amount of play per year. Favorable weather conditions in the South Kohala area permit about 355 days of playable conditions at Hapuna during any given year. Further, it was assumed that year one play will average about 150 rounds per day. In subsequent years, the volume of play is expected to increase to 175, 200, 225, and 250 rounds per day. The maximum amount of play will be 250 rounds per day. While these incremental increases are very conservative given the extent of demand, they are arbitrary. However, they also provide a useful basis for eventually comparing overall profitability at different levels of potential use.

4.3.2.2 Green Fees

As indicated in Chapter Two, golf professionals managing public and private courses on the Big Island believe that an affordable round of golf at the proposed course should be in the $25 to $35 range (including a shared golf cart). However, if a quality course is established, these prices can somewhat exceed this level given the price of golf for resident golfers in West Hawaii.

The pro forma projection assumes a quality course will be established. Green fees are initially established at $15, and gradually rise to $20 in year 5 with greater demand. With a beginning cart rental fee of $15, the recommended marketable price range of $25-$35 can be achieved. In order to maintain this affordable cost range for the public, it is also recommended that a contract provision should be included in any agreement between the State of Hawaii and any prospective operator or developer-operator that would set a maximum cost for green, golf cart, and hand cart fees.

Green fees represent the primary revenue source for the proposed golf course. Anticipated green fees range from almost $0.8 million in year 1 to almost $1.8 million in year 5.

4.3.2.3 Golf Cart Rentals

The golf course will maintain a fleet of, at least, 90 motorized carts and a smaller number of hand carts. It is assumed that 75 percent of the golfers will share a $30 cart, or pay $15 per golfer. The warmer, dry environment is expected to encourage the use of the carts. Resident professionals recommend that, at least, morning play should require the use of two-passenger motorized carts.

Hand carts will be rented for $5. These carts will be permitted during a portion of afternoon play. It is assumed that 20 percent of the golfers will rent hand carts.

Five percent of the golfers will rent no carts. They will bring their own cart to the course, or they will be permitted to walk the course without a cart in the late afternoon.
4.3.2.4 Driving Range

It is assumed that every round of golf will produce one sale of a bucket of practice balls at the driving range. Roughly 70 percent of the driving range use will precede a round of golf; the remaining use will be golfers coming to the course for only practice. Discussions with local golf professionals on the Island of Hawaii suggest that this level of driving range use is achievable under private management (Acić, 1993).

Each bucket of practice balls is assumed to cost $1.50.

4.3.2.5 Food and Beverage

Each golfer coming to the course is expected to purchase between $9 and $10 for food and beverages. Typically, the golfer will purchase at least one beverage and lunch snack during the round of golf, as well as beverages and possibly a meal after completing his or her round of golf.

4.3.2.6 Pro Shop

Despite the growing availability of golf equipment and supply catalogues, local golfers like to obtain golf supplies from a local pro shop where they can receive some advice from their local golf pro (Acić, 1992). The manager of the pro shop at the Hilo Municipal Golf Course indicates that an average of $10 to $12 per round of golf is a likely revenue range given a reasonable aggressive marketing effort.

4.3.3 Expenses

4.3.3.1 Golf Course Maintenance

Based upon discussions with an experienced golf superintendent in the South Kohala area, maintenance of the golf course is expected to require a maintenance crew of 19 persons that will be headed by an experienced golf superintendent. Total maintenance costs are expected to be about $795,000 per year. Almost 75 percent of these costs will represent labor.

No increase in basic labor cost is expected other than inflation during the first five years of operation. The sluggish economy and lack of new job opportunities on the Island of Hawaii are not expected to require management to raise salary and wage rates to maintain original staff or replace job vacancies.

4.3.3.2 Administration

The overall golf course and clubhouse operation will be managed by a golf pro. The golf pro will be supported by an assistant golf pro and an office manager/bookkeeper.

Administration costs will include $99,600 in labor costs and about $8,700 in other direct costs. Other direct costs will include expenses for office supplies, equipment, telecommunications, advertising and postage and delivery.
During the first five years of operation, no increase in basic labor cost is expected other than inflation. The sluggish economy and lack of new job opportunities on the Island of Hawaii are not expected to require management to raise salary and wage rates to maintain original staff or replace job vacancies.

4.3.3.3 Food Concession

The operation of a food concession in the clubhouse will require a 9-person kitchen crew that is supervised by a head cook. The kitchen crew will include cooks, kitchen helpers, a cashier, dishwashers and waiters.

Labor costs are expected to be approximately $197,200 per year. Food and beverage costs will represent about 26 percent of food and beverage revenues.

4.3.3.4 Pro Shop

The pro shop operation will use four clerks, or two shifts of two clerks. The assistant golf pro will supervise the clerks; however, the assistant golf pro is considered as part of administrative expenses in light of his dual management role.

Labor costs for the pro shop will be approximately $88,360 per year. The cost of wholesale merchandise in the shop is assumed to be 60 percent of retail sales.

4.3.3.5 Driving Range

The operational cost of the driving range is minimal as the range turf, practice green, and rough will be part of the maintenance responsibility of the golf maintenance crew. In addition to selling retail golf supplies and collecting golf course fees and cart rentals, pro shop clerks will also sell buckets of balls. Consequently, the only clubhouse personnel assigned a labor cost for this operation will be one cart assistant who will spend a part of his day retrieving balls from the driving range.

The anticipated labor cost for the driving range will be $22,090 per annum.

4.3.3.6 Golf Carts

While cart rentals to the public will be handled at the pro shop, the primary cost associated with the rental of golf carts is their maintenance. It is assumed that the private concessionaire would lease 90 carts for about $95/cart per month from a local golf cart supplier and that a three-person crew at the course will handle maintenance (Acia, 1992).

The three-person crew consisting of a mechanic, mechanic assistant, and cart assistant will cost about $91,520 per year. The leasing of the carts, small parts and consumable supplies will expend approximately $100/cart/per month. Consequently, other direct costs will be approximately $108,000 per year.
4.3.4 Debt Service

This expense applies only to the potential private investment for golf course development and operation.

The annual debt service for golf course development is estimated to be approximately $468,000 per year. This rough estimate assumes a 40-year loan period, three points to a lending institution, and various expenses associated with loan closing, taxes, and insurance.

Given its potential relationship to the State of Hawaii, expenses relating to taxes and insurance may be reduced. The potential reduction of debt service costs will depend upon the types of guarantee provided by the golf course developer and, possibly, the State of Hawaii.

4.3.5 Cash Flow

4.3.5.1 Cash Flow Objectives

The proposed operation should attempt to maintain a cash flow position that is equal to the operating expenses of the following six months of operation. This approach will help ensure that the concessionaire is capable of meeting expenses during unexpected downturns in local golf play or other service revenues.

Since subsequent years of operation are expected to generate an increasing number of golf rounds, the golf course operator or developer-operator should expect to secure and input additional capitalization to maintain the desired six-month cashflow position. For example, the growth between year 1 and year 2 in the pro forma indicate a potential need to further capitalize the operation with some $322,000 before beginning year 2.

4.3.5.2 Cash Flow Requirements for Golf Course Operator

The maintenance of a six-month cash reserve to maintain timely payment of operational expenses will require initial startup capitalization of about $928,000. Initial profits in year one will require an additional $327,000 to maintain the six-month cash reserve. However, anticipated second year profits should cover cash flow needs for year three without additional capitalization.

4.3.5.3 Cash Flow Requirements for Developer-Operator

Greater cash flow requirements will be greater for the developer operator which must amortize long-term construction debt and ongoing golf course operations. In order to reduce project risk and maintain the financial capability to meet annual debt service for golf course development, the developer-operator should begin the first year of operation with an initial capitalization of $234,000 for six months of debt service. In addition, cash flow to support six months of golf course operation expenditures require about $928,000 for an expected 150 rounds per year. Consequently, the developer-operator will desirably begin with an initial capitalization of roughly $1,489,000.

4-8
If cost and revenue assumptions are close to actual future conditions, it appears that the cashflow of the operation will be self-sustaining once the course operation averages about 175 rounds per day.

4.3.6 Profitability

4.3.6.1 Golf Course Operator

The pro forma projection for the private concession operation indicates a good to excellent profit potential. The assumed annual rounds of play are conservative in light of the existing and future demands for more affordable golf. The anticipated golf course expenses and revenues are considered reliable because they have been derived from local market conditions and the experience of local golf industry professionals on the Island of Hawaii.

The extent of profitability is the amount of debt service which the private concessionaire may have to assume to capitalize the proposed concession operation. If private venture capital is available from a hui of investors, no debt service requirements may be necessary. Without incurring debt service, it is likely that the concessionaire and/or prospective investors may see returns-on-investment once the operation reaches an average of about 175 rounds per day in the second year of operation. By the end of year four, annual profits will be sizable enough to pay off any debt associated with initial capitalization or enable distribution of about $1 million of profits in dividends to the investor. Beyond year five, the operation will probably not generate distributable profits of over $1.5 million annually in order to maintain the recommended six-month cashflow position.

4.3.6.2 Developer-Operator

A profitable business opportunity is also available to a private investment group that wishes to develop and operate the proposed golf course. As stated earlier, this assumes, however, that a prospective developer-operator would not be burdened with any land lease cost, other than a nominal one dollar per year.

Early profitability, i.e., the end of year one, can be expected. Because of debt service requirements, the size of annual profits do not reach $2 million until the fifth year of operation. However, profit distribution would probably not begin until after the fourth year of operation in order to maintain a six-month cash reserve for operation expenses.

4.4 CONCLUSIONS

4.4.1 State Lease of Golf Course Operation to Private Operator

The State of Hawaii can feasibly lease the golf course operation to a private concessionaire. Local golf industry professionals caution that the concession should include both golf course maintenance and the clubhouse operation. Local golf industry representatives suggest that existing municipal golf course operations on the Island of Hawaii, which are maintained by County personnel, are somewhat inferior to private courses on the Island. More importantly, they warn that potential management problems are invited by mixing a private concessionaire operation with public employee maintenance crews.
Given the recent experience of the County of Hawaii at Kealakeke, it is recommended that the State of Hawaii pursue the use of a local, Hawaii-based concessionaire which is familiar with local market conditions and consumer demands. In addition, the financial capabilities of a Hawaii-based concessionaire and associated investors could also be better evaluated and monitored during the course of the lease agreement period.

On the basis of the pro forma projection and related assumptions, the proposed concession is expected to be a profitable venture during the first year of operation. Since the pro forma assumed an average of 150 rounds per day during the first year of operation, the potential for profits may be significantly greater given that daily rounds could be much higher.

While early profitability is expected, the concessionaire should be advised that additional capitalization may be required to sustain an adequate cashflow. As stated earlier, a recommended cashflow position would be the maintenance of funds adequate to pay the following six months of operating expenses.

4.4.2 State Lease of Lands to Developer-Operator

The State of Hawaii presently suffers from a growing deficit and lack of revenues that apparently are inadequate to meet government operations and modest capital improvements. In this context, the financial viability and realization of the proposed golf course would increase significantly with the State’s leasing of lands mauka of Queen Kaahumanu Highway for the private development and operation of the golf course.

For the prospective investor, the developer-operator option is somewhat less profitable at the outset and carries more risk. However, if anticipated levels of play and operational expenditures are realized, a self-sustaining investment with good growth potential can be realized within about four years of operation. A prospective developer-operator would also appreciate greater flexibility in its investment if the investor maintained greater control over initial golf course design and construction.
REFERENCES


APPENDIX B

Recreational Demand and Capacity Analysis
Hapuna Beach Recreation Area
RECREATIONAL DEMAND AND CAPACITY ANALYSIS
HAPUNA BEACH STATE RECREATION AREA

Prepared by:
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P.O. Box 22
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April 1993
RECREATIONAL DEMAND AND CAPACITY ANALYSIS
HAPUNA BEACH STATE RECREATION AREA

RECREATIONAL DEMAND

Introduction

The estimation of future recreational participation at Hapuna Beach State Recreation Area provides a statistical basis for determining the amount of land and water area needed to support coastal recreation, as well as the physical capacity of Hapuna Beach to provide these recreational opportunities. Ultimately, forecasts of anticipated recreational demand and available capacity need to be correlated with clear resource management objectives to identify practical strategies for future park management.

It should also be recognized that other recreational opportunities exist along West Hawaii's popular coastline, and that a portion of future activity by both residents and visitors will be directed to other coastal recreation areas. The dynamics of future recreational activity at Hapuna, in the context of other West Hawaii coastal areas, is discussed in the following paragraphs.

Anticipated Resident and Visitor Population

Resident Population

During the past 20 years, the Island of Hawaii resident population has grown from roughly 63,500 persons in 1970 to over 120,300 persons in 1990. This represents an increased growth rate of about four percent per year. The past two decades include a period characterized by a significant decline and virtual closure of most of the island's sugar industry which was followed by the emergence of an expanded visitor industry.

Forecasts of future resident population on the Island of Hawaii were developed by the State Department of Business and Economic Development and Tourism (DBEDT) in the late 1980's. These forecasts take into account variable social and economic factors and growth rates, and ultimately project a long-term growth rate of roughly 3.5 percent per year to the year 2010 (Table A-1).

These forecasts were developed during a period of somewhat greater optimism concerning the future economic growth of the State and, more specifically, the Island of Hawaii. The sluggish national economy and related adverse impacts upon Hawaii's fragile visitor industry suggest that future island growth may be more modest. Reduced discretionary income of the nation's population, uncertain national growth, and Hawaii's higher cost-of-living are expected to generate little investment and/or in-migration that would exceed the Big Island's natural growth rate and the impact of some limited economic growth.
### TABLE A-1

**DBED FORECAST**  
**DE FACTO POPULATION**  
**ISLAND OF HAWAII**

<table>
<thead>
<tr>
<th>Year</th>
<th>Residents</th>
<th>Visitors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>121,300</td>
<td>15,000</td>
<td>136,300</td>
</tr>
<tr>
<td>1995</td>
<td>142,500</td>
<td>16,100</td>
<td>158,600</td>
</tr>
<tr>
<td>2000</td>
<td>160,400</td>
<td>22,600</td>
<td>183,000</td>
</tr>
<tr>
<td>2005</td>
<td>180,800</td>
<td>30,200</td>
<td>211,000</td>
</tr>
<tr>
<td>2010</td>
<td>206,100</td>
<td>36,900</td>
<td>243,000</td>
</tr>
</tbody>
</table>

On this basis, the recreational demand analysis assumes a flat two percent growth rate for the 1990-2010 resident population (Table A-2). The use of a more conservative rate of growth is recommended in order to avoid costly over-expenditures for recreational facility development.

Visitor Population

One of the more useful visitor industry indicators is the average daily census which indicates the average number of visitors present on-island during any given day of the year. This indicator unites two of the most important visitor industry considerations: the number of visitor arrivals and the length of time they stay. Average visitor daily census can be simply calculated as follows:

<table>
<thead>
<tr>
<th>Average Daily Census =</th>
<th>Number of visitors per year x average length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of days in the year</td>
</tr>
</tbody>
</table>

Using available information concerning visitor participation in shoreline recreational activities, existing and future estimates of average daily visitor census can be used to calculate the prospective amount of visitor recreation at Hapuna Beach State Recreation Area.

Hawaii Visitors Bureau statistics show that the average daily census of incoming visitors to the State of Hawaii peaked in 1989, but has declined since that time. This decline is believed to be shorter lengths of stay by visitors. For example, the Statewide visitor length of stay dropped 1.3 percent between 1990 and 1991. In the face of uncertain economic times, this statewide trend represents a serious concern to the State of Hawaii’s primary industry.

While the Big Island visitor industry is clearly affected by the same economic factors, the average daily census figures for the Island of Hawaii differ somewhat. Total arrivals have increased on the Big Island since 1989; the average daily visitor census for the Big Island also increased in 1989 and 1991. However, the average daily visitor census decreased in 1990 when the average of length of stay decreased (Table A-3).

The prospects for a modest increase in the average daily visitor census are likely. The majority of visitors coming to the State are repeat visitors. Hawaii Visitor Bureau studies in 1989 indicate that frequent repeat visitors to Hawaii include the Big Island and Molokai in their travel itineraries. This factor is likely to increase the core market for the Island of Hawaii.

While the Big Island remains attractive to repeat visitors, uncertain economic times suggest that the number of visitor arrivals may be modest until national economic trends improve on a more long-term basis. The attraction of the Big Island to repeat visitors suggests that, in the long-term, the average length of stay may gradually increase. However, more difficult and uncertain economic conditions can also contribute to shorter vacation periods and decrease the average visitor length of stay.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>NUMBER OF RESIDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>120,317</td>
</tr>
<tr>
<td>1991</td>
<td>123,325</td>
</tr>
<tr>
<td>1992</td>
<td>126,408</td>
</tr>
<tr>
<td>1993</td>
<td>129,568</td>
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<tr>
<td>1994</td>
<td>132,807</td>
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<td>1995</td>
<td>136,128</td>
</tr>
<tr>
<td>1996</td>
<td>139,531</td>
</tr>
<tr>
<td>1997</td>
<td>143,019</td>
</tr>
<tr>
<td>1998</td>
<td>146,595</td>
</tr>
<tr>
<td>1999</td>
<td>150,259</td>
</tr>
<tr>
<td>2000</td>
<td>154,016</td>
</tr>
<tr>
<td>2001</td>
<td>157,866</td>
</tr>
<tr>
<td>2002</td>
<td>161,813</td>
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<tr>
<td>2003</td>
<td>165,858</td>
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<tr>
<td>2004</td>
<td>170,005</td>
</tr>
<tr>
<td>2005</td>
<td>174,255</td>
</tr>
<tr>
<td>2006</td>
<td>178,611</td>
</tr>
<tr>
<td>2007</td>
<td>183,077</td>
</tr>
<tr>
<td>2008</td>
<td>187,653</td>
</tr>
<tr>
<td>2009</td>
<td>192,345</td>
</tr>
<tr>
<td>2010</td>
<td>197,153</td>
</tr>
</tbody>
</table>

Note: Assumed 2% annual growth rate from 1990.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL VISITOR ARRIVAL</th>
<th>AVERAGE LENGTH OF STAY (DAYS)</th>
<th>AVERAGE DAILY VISITOR CENSUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>1,120,830</td>
<td>5.8</td>
<td>17,760</td>
</tr>
<tr>
<td>1990</td>
<td>1,170,830</td>
<td>5.2</td>
<td>16,970</td>
</tr>
<tr>
<td>1991</td>
<td>1,188,630</td>
<td>5.8</td>
<td>18,630</td>
</tr>
</tbody>
</table>

The uncertainty in the national economy and the lack of limited signals for future economic growth in the continental United States suggests considerable variability in future visitor arrivals and the average length of stay. Under these conditions, a forecast of the anticipated average daily visitor census was made for this analysis which assumes a modest to low growth scenario to the year 2010 (Table 3-14). More specifically, it was assumed that the average daily census will increase one percent per year between 1992 and 1995. From 1996 to the year 2000, the average daily census is anticipated to grow two percent per year. Beyond 2001, the growth in the average daily census is assumed to reduce to one percent per year (Table A-4).

The average length of stay is assumed to remain constant at 5.8 days per visitor per year. This assumption recognizes that variability will continue to occur throughout each year due to seasonal changes in potential marketability and changing national economic trends.

Recreational Participation Assumptions

Forecasts of anticipated resident and visitor population were applied to various recreational participation assumptions for both residents and visitors. These assumptions, which are identified in the following paragraphs, closely resemble the participation characteristics identified by the 1989 SCORP surveys. The assumptions also take into account other coastal recreational areas in West Hawaii where similar recreational opportunities are available.

However, the use of 1989 participation characteristics does not reflect potential changes in recreational trends that could occur with the growth in popularity or emergence of one or more new recreational activities during the next 15 years. The forecasts also represent the demand in recreational participation without the development of new or expanded recreational facilities in the Hapuna-Puako area; consequently, the potential impact of new facility development, or the lack of existing facilities, upon future demand is also not considered.

Forecasts were made for coastal recreation activities that are presently taking place at Hapuna and Wailea. Other potential activities, presently not occurring in the project area, were also considered on the basis of the physical characteristics of the nearshore waters and the lands contained in the project area. Jet skiing and windsurfing, were not considered as part of the forecast in light of their anticipated conflicts in nearshore water areas with other existing nearshore activities.

Beach Activities

Beach activities include sunbathing, swimming, picnicking on sand, shoreline fishing, and other beach games. Since these activities are frequently interrelated, it is assumed that future beachgoers in Hapuna and Wailea Bay will participate in one or more activities on the beach and the adjoining inshore waters.
<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Visitors</th>
<th>Average Length of Stay (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>16,680</td>
<td>5.2</td>
</tr>
<tr>
<td>1991</td>
<td>18,889</td>
<td>5.8</td>
</tr>
<tr>
<td>1992</td>
<td>19,078</td>
<td>5.8</td>
</tr>
<tr>
<td>1993</td>
<td>19,269</td>
<td>5.8</td>
</tr>
<tr>
<td>1994</td>
<td>19,461</td>
<td>5.8</td>
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<td>1995</td>
<td>19,656</td>
<td>5.8</td>
</tr>
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<td>1996</td>
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<tr>
<td>2001</td>
<td>21,919</td>
<td>5.8</td>
</tr>
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Assumptions:
1. Constant visitor length of stay
4. One percent growth in visitor arrivals from 2001-2010.

Future participation by residents is expected to represent seven percent of the anticipated resident population on weekend days and one percent on weekdays. The majority of residents engaging in beach activities will tend to use beaches closer to home; consequently, beaches in North and South Kona and Hilo will contain the most beach activity. Similar to 1989 participation and destination trends, it is assumed that 18 percent of the Big Island’s beach users will go to the Kohala district on weekend days; 21 percent will use Kohala beach areas on weekdays. It is assumed that 70 percent of the resident beach users coming to Kohala beach areas will go to Hapuna Beach State Recreation Area; the remaining residents will use beaches in Puako Bay and Spencer Beach Park.

For visitors, 32 percent of the average daily visitor census will participate in beach activities on any given weekend day or weekday. Roughly 45 percent of these beachgoers will go to beaches in Kona. Forty percent are expected to use Kohala beaches; the remaining will use beaches in Kau, Puna, and Hilo. Half of the visitors coming to Kohala district beaches will use existing and proposed beach areas at Hapuna Beach State Recreation Area; the other 50 percent will use beaches adjoining existing resort complexes in the Kohala district.

Bodyboarding and Bodysurfing

Bodyboarding and bodysurfing will be the most popular nearshore water activity and will continue to be inter-related with other beach activities. The segregation of this demand is useful to better differentiate the proportion of activities that are expected to occur in the inshore waters versus on the beach.

Roughly two percent of Big Island residents are assumed to participate in this activity on weekend days and 0.7 percent on weekdays. Approximately half of this activity will occur along shoreline areas in Hilo and the Puna districts; the other half will use coastal areas in West Hawaii. Roughly 26 percent of all residents engaging in this activity on weekend days will use the Kohala district shoreline on weekend days while 14 percent will use coastal areas in Kohala on weekdays. It was assumed that all resident bodyboarders and bodysurfers coming to the Kohala district will use the beaches at Hapuna and Waialea.

For Big Island visitors, it was assumed that six percent of all visitors will participate in this activity each day. Over half of the visitor bodyboarding and bodysurfing activity will take place at public beaches in North and South Kona. About 30 percent will participate in this activity in the Kohala district; the remaining in the Kau district. It is assumed that 80 percent of the visiting bodyboarders and bodysurfers using the Kohala coast will use Hapuna Beach State Recreation Area.

Camping

Camping will continue to be a weekend or holiday activity for roughly one percent (0.9 percent) of local residents. Few will camp during the week. Roughly 40 percent of all camping by residents will occur in the Kona area. Twenty percent of weekend camping is expected to take place in Puna, as well as in Kau. About 20 percent of future camping is assumed to occur in the Kohala area.

Less than one percent (0.8%) of visitors are expected to engage in camping activities. About one-third will occur in the Kohala area.
Diving/Snorkeling

Inshore diving and snorkeling activities are expected to maintain the present participation level (0.6%) by Big Island residents on weekend days and only 0.1% on weekdays. About one-third will carry out this activity in the Kohala district. Roughly 75 percent of the activity in the Kohala district will take place at the Hapuna Beach State Recreation Area.

Inshore snorkeling and diving is assumed to sustain its present popularity among visitors. Almost 14 percent of all visitors are expected to participate in diving activities on a given day. About one-third of all snorkeling and diving will occur in the Kohala area. About 65 percent of the Kohala activity will be performed at the Hapuna Beach State Recreation Area.

Golf

Golf will continue to represent an important form of coastal recreation in light of the presence of various private golf courses along the Big Island shoreline. Roughly 1.4% of local residents will participate in this activity on weekend days; however, less than one percent (0.7%) of residents will play golf during a typical weekday. Less than 10 percent of participating golfers are expected to play in the Kohala area during the weekends. On weekdays, over 25 percent of participating golfers will play on courses in the Kohala area.

The quality and number of golf courses available on the Big Island will continue to encourage significant visitor golf activity. Six percent of all visitors are expected to play golf during two days of their stay on the Big Island. Over 60 percent of all visitor golf activity will take place in the Kohala area. Roughly 96 percent of all visitor play will take place at private golf courses within existing resort areas.

Hiking

Hiking activity is expected to follow present trends that indicate significant participation by Big Island visitors and nominal hiking by residents on the weekends.

Approximately nine percent (9.1%) of all visitors are assumed to participate in hiking on any given day of their stay. About 14 percent of those participating in this activity will carry out their hikes in the Kohala district. It is believed that 95 percent of all hiking in the Kohala district would occur in an expanded Hapuna Beach State Recreation Area where coastal hiking opportunities could exist.

Hiking by local residents is expected to occur almost entirely on the weekend. A participation rate of 0.6 percent was assumed. It is assumed that an expanded Hapuna Beach State Recreation Area would attract roughly 10 percent of this weekend activity. While a limited amount of hiking occurs on weekdays, it is believed to be too small to reflect any recreational demand.

Surfing

Surfing activity will be seasonal and occur at several inshore sites in Wailea Bay. It is believed that surfing activity will take place only during favorable wave conditions and that significant demand will occur on weekends and holidays.
Other Activities

Other recreational activities such as skimboarding, shore fishing, volleyball will be carried out along the shoreline of the expanded Hapuna Beach State Recreation Area. No assumptions were made for other activities since they are not expected to generate any significant demand. These types of recreation will likely be related to other beach and nearshore water activities.

Forecasts of Future Recreational Demand

Anticipated recreational demand for Hapuna Beach State Recreation Area are presented in Tables A–5 through A–9. These forecasts reflect average daily recreational demands on weekdays and weekend days. Anticipated demands are also segregated by residents and visitors to clearly identify the primary user for various activities. No attempt was made to break down these forecasts on a monthly basis to reflect seasonal trends.

Using the assumptions presented in Section 3.6.3, the forecasts were calculated by multiplying anticipated resident and visitor populations by the 1989 rates of both weekday and weekend participation and related destination characteristics for each recreational activity.

Activities on the Beach and Nearshore Waters

The focus of future coastal recreation at Hapuna Beach State Recreation Area will continue to include activities such as sunbathing, swimming, picnicking and other beach related activities at Hapuna Beach, Wailea Beach, and Beach 68. Nearshore water activities will include bodysurfing/bodyboarding, snorkeling/diving, and shoreline pole fishing. Intertidal beach and water activities will account for about 76 percent of all recreational activities on weekends and approximately 68 percent on weekdays.

Bodyboarding and bodysurfing will continue to represent an important attraction to the Hapuna Beach State Recreation Area, particularly residents. About two-thirds of residents spending time at the beach will engage in these activities. In contrast, less than one-fourth of visitors using the beach will participate. When combined, bodyboarding and bodysurfing is believed to represent about 45 percent of the future weekend day demand for activities on the beach and inshore waters. During weekdays, the demand for bodysurfing is expected to decline to about 30 percent of beach and nearshore water activities when there is a greater proportion of visitor users.

Future weekend day use of the park will include some 3,100 people along the beach and adjoining inshore waters by the year 2010. During weekdays, anticipated use of these areas will decrease to about 1,650 persons. If present trends continue, roughly 40 percent of those coming to the beach will be in the water during any daytime period.

Peak beach use will continue to represent about 40 percent of the total daily demand, which suggests that an ultimate beach turnover rate of about 2.0 to 2.5 times per day. With park expansion, 85 percent of future beach and water activities will occur at Hapuna; the remaining will take place at Wailea Bay. Peak hour beach demands in the year 2010 will include about 1,479 persons at Hapuna Beach and 261 persons at Wailea Bay.
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* Assumes that virtually no residents will engage in camping activities on the weekdays.

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</tbody>
</table>

* Bodyboarding and bodysurfing is an activity related to beach activities. Consequently, this data is presented to better understand how many beachgoers use the nearshore waters.

* Surfing activity is expected to be performed almost exclusively by local residents who will continue to surf primarily during the winter months and when favorable surf conditions prevail.

<table>
<thead>
<tr>
<th>Year</th>
<th>Beach Activity</th>
<th>Bodyboarding/ Bodysurfing</th>
<th>Surfing</th>
<th>Camping</th>
<th>Golf</th>
<th>Hiking</th>
</tr>
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<td></td>
<td></td>
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<td>501</td>
<td>0</td>
<td>0</td>
<td>56</td>
<td>408</td>
</tr>
</tbody>
</table>

1 Bodyboarding and bodysurfing is an activity related to beach activities. Consequently, this data is presented to better understand how many beachgoers use the nearshore waters.
2 Surfing activity is expected to be performed almost exclusively by local residents who will continue to surf primarily during the winter months and when favorable surf conditions prevail.
3 Camping activity on weekdays is expected to be done almost exclusively by island visitors.
4 Hiking activity on weekdays is assumed to represent only visitor activity.

Camping

Group and family camping will continue to be a demand for both residents and visitors; group sizes will range from 10 to 200 persons. Group campers are expected to represent resident extended families, church groups, Scout organizations, trail clubs, and environmental organizations.

Family camping by smaller-extended family groups and nuclear families is expected to take place on weekends. Visitor camping will continue to primarily include couples.

The anticipated weekend recreational demands for this activity is estimated to be 300 persons per day in the year 2010. Roughly 80 percent of that demand is expected from local residents. Weekday camping will average about 56 persons per day and will almost exclusively include visitors. These forecasts should be viewed as conservative since they are, in part, based on 1989 participation rates. There may be a suppressed demand due to the limited availability of public campsites on the Island of Hawaii.

Hiking

If lands south of the present State recreation area are developed, it is expected that shoreline hiking opportunities along a designated trail will attract up to 420 persons on a given weekend day. During the week, shoreline hiking opportunities will generally be limited to about 300 persons per day; most of these hikers will be visitors.

Surfing

Wailea Bay will continue to be a popular surfing destination during the winter season. By the year 2010, weekend day demand will be about 60 surfers. However, this level of demand for surfing will occur only during favorable surf conditions.

Golfing

Established golf courses in the South Kohala area will continue to attract most visiting golfers. However, the affordability of a public course will clearly attract resident golfers who will be the primary users.

Assuming a continuation of 1989 resident recreational trends, an affordable public course in Kohala has a potential market for some 400 golfers on weekdays and 300 golfers on weekends. The anticipated trend of greater weekday play may reverse as more affordable weekend rates become available to resident golfers. The overall anticipated demand may also be conservative as the availability of a more affordable public course may stimulate considerably more play by West Hawaii resident golfers.
RECREATIONAL CAPACITY

Introduction

The determination of recreational capacity is a method of evaluating and correlating different factors influencing the development of recreational facilities. Typically, a recreational capacity analysis provides a technical basis for assessing the "capability" of an existing or expanded site to accommodate ongoing and/or future activities.

For the purposes of this project, the following factors were evaluated:

1. location and general size of existing and potential recreational areas;
2. spatial standards from Fogg and the 1990 State Comprehensive Outdoor Recreation Plan;
3. anticipated recreational demands of residents and visitors to the year 2010;
4. concerns expressed during a public information meeting on August 4, 1992;
5. correspondence from and informal discussions with several residents and property owners in the Wailea Bay area; and
6. existing resource management objectives.

Ultimately, this analysis provides State Parks Division planners and the Big Island community with some insight concerning how much of the proposed expansion area is needed to support future recreation in the Hapuna-Wailea Bay area.

The capacity analysis also provides a useful basis for identifying and selecting alternate strategies for future park management. Typically, the type and degree of park management reflect a response to the density of activities, potential user conflicts, human safety considerations, and natural resource management objectives.

Existing and Potential Recreational Opportunities

A preliminary August, 1992 master plan for the expansion of Hapuna Beach State Recreation Area was used to locate and determine the amount of available land area suitable for various recreational opportunities. This layout, prepared by Belt Collins & Associates, was based on an evaluation of variable site elevations; existing topographic features such as existing vegetation, roads and trails; existing recreational activities; and opportunities identified by State Department of Land and Natural Resources and County of Hawaii Department of Parks and Recreation. These analyses suggest the Hapuna Beach State Recreation Area could be used to feasibly provide the following recreational opportunities and support facilities:

* Beach and swimming activities at Hapuna Beach, Beach 68 and Wailea Beach
* Bodyboarding, surfboarding, and windsurfing
* Shorefishing
* Snorkeling and diving
* Overnight lodging
* Family picnicking mauka of Hapuna Beach, Wailea Beach, Ohai Point, and the northern end of Puako Bay
* Group picnic rental pavilions mauka of Ohai Point
* Family/group campground

A-17
* Organized group camp
* An 18-hole municipal golf course
* Small boat launching activity at Puako Bay
* Coastal hiking trails south of Hapuna Beach
* Park headquarters and maintenance base yard
* Wildland buffer areas
* Vehicular parking

**Determination of Selected Spatial and Capacity Standards**

Spatial and capacity standards were evaluated and identified for beach activities, picnicking, camping and golf using park planning criteria available from Mr. George Fogg, a recognized landscape architect and park planning consultant, and the 1990 Hawaii State Comprehensive Outdoor Recreation Plan (SCORP). These criteria and standards were evaluated in light of comments received at a public information meeting in August, 1992 and by mail. Based on these evaluations, spatial and capacity standards were modified and subsequently used to calculate the potential maximum capacity of both the existing and expanded Hapuna Beach State Recreation Area.

**Beach and Swimming Activities**

**Fogg Guidelines**

Guidelines for beach development, determined by Mr. Fogg, suggest low, medium, and high density standards which are expressed in the amount of square feet needed per person. Fogg's standards also provide recommended densities for nearshore water area, beach area, and adjoining back-up and buffer area (Table A-10). In addition, the guidelines indicate that the first 10 to 40 feet of dry beach area is an active use area that is not suitable for sunbathing or picnicking.

**Selected Standard**

The medium density standard was selected for Hapuna Beach and Wailea Beach. Due to its smaller size, location and general environs, the density standard for Beach 68 was established as low. It was also assumed that the initial 10-feet of dry beach area is not suitable for sunbathing or picnicking.

A modified set of beach, water, and back-up area standards was seriously considered for Wailea Beach based upon public expressions of preference for lower density uses, the observed density of existing activities, Wailea Bay's status as a Marine Life Conservation District, and recommendations contained in the 1990 Hawaii SCORP report. However, it is clear that the diverse coastal resources in the Hapuna-Puako area will gradually make Hapuna Beach State Recreation Area the State's primary recreation attraction during, at least, the next 15 years. As West Hawaii's resident and visitor populations continue to grow, the anticipated popularity of this recreational attraction will ultimately generate a higher density of beach use at both Hapuna and Wailea Bay. Consequently, the use of medium density standards was determined to be more practical for: 1) determining the physical capacity of existing beaches, and 2) estimating the capability of Wailea and Hapuna beaches to serve future beach activity demands.
### TABLE A-10

**MAXIMUM CAPACITY OF EXISTING HAPUNA BEACH STATE RECREATION AREA TO SUPPORT VARIOUS TYPES OF COASTAL RECREATION**

<table>
<thead>
<tr>
<th>Location</th>
<th>Land Area (Sq. Feet) or No. of Facilities</th>
<th>Selected Standard</th>
<th>Number of Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hapuna Beach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water*</td>
<td>370,000</td>
<td>40 sq ft/person</td>
<td>9,250</td>
</tr>
<tr>
<td>Beach</td>
<td>351,500</td>
<td>60 sq ft/person</td>
<td>5,858</td>
</tr>
<tr>
<td>Buffer</td>
<td>675,000</td>
<td>800 sq ft/person</td>
<td>844</td>
</tr>
<tr>
<td>Hapuna Picnic Shelters</td>
<td>8 shelters</td>
<td>8 persons/shelter</td>
<td>64</td>
</tr>
<tr>
<td>Hapuna Pavilions</td>
<td>2 pavilions</td>
<td>48 persons/pavillon</td>
<td>96</td>
</tr>
<tr>
<td>Hapuna Outdoor Picnic</td>
<td>8 tables</td>
<td>8 persons/picnic table</td>
<td>64</td>
</tr>
<tr>
<td>Tables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hapuna Cabins</td>
<td>6 cabins</td>
<td>4 campers/cabin</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong>*</td>
<td></td>
<td></td>
<td><strong>6,106</strong></td>
</tr>
</tbody>
</table>

* Total excludes number of persons in water since water users will also use the beach. At Hapuna, roughly 40 per cent of those going to the beach use the adjoining nearshore water area.

The capacity analysis of beach and water activities also requires the definition of peak hour criteria
given the nature of these activities at Hapuna and the potential use of two additional beaches in
Wailea Bay. Peak hour activity was assumed to represent 40 percent of the total daily demand on
weekdays or weekend days. It is expected that 85 percent of future users will go to Hapuna Beach
while the remaining 15 percent will use either Beach 68 or Wailea Beach.

Picnicking

Fogg and SCOPP Guidelines

NRPA guidelines suggest that approximately 225 square feet should be provided for a typical
family group of 3.5 to 8 people and that a minimum table spacing of 20 to 40 feet on-center is
desirable. The Hawaii SCOPP report suggests that roughly 80 to 100 square feet be provided for
each person, and typical picnic shelters should accommodate 8 persons.

For group picnicking, Fogg's standards recommend a minimum of 25 persons and a maximum
that should reflect local demands and available space. The typical size of extended family and other
social gatherings on the Big Island dictate the need for a larger sheltered facility that would be large
enough to accommodate 50 persons to 100 persons.

Selected Standards

It was assumed that shelters for family picnics would accommodate eight persons given the design
of existing shelters behind Hapuna Beach. Picnic shelters would be situated at least 100 feet apart.
Picnic tables, which typically seat approximately six persons, would be installed behind Wailea
Beach. Tables would be placed about 100 feet apart to encourage the low density feeling of the
area.

For group picnicking, the capacity analysis assumed the development of three shelters. Two of
these pavilions would accommodate 50 persons; the third pavilion would accommodate 100
persons.

Camping

Fogg Guidelines

According to Fogg's guidelines, family campsites should accommodate from four to eight persons
while groups may vary in size from 10 to 200 persons. Fogg's standards also provide some
guidance concerning maximum distances from campsites to support facilities such as restrooms
and showers, as well as recommended separation between adjoining campsites.

Selected Standards

Family Camping:

Family camping on the Island of Hawaii typically involves roughly two to six persons. The
majority of visiting campers are couples; resident camping by families and smaller groups typically
include a family of four plus two friends (Miyao, 1991). However, a somewhat larger family
campsite, with adequate area for about five small tents, could serve up to 10 campers. This
standard is recommended to meet the variable demands of both couples and smaller family groups.

The existing recreation area includes lodging in six A-frame shelters that can each accommodate
four persons. If incorporated into the proposed park expansion, it was assumed that the capacity
of future cabin shelters would remain the same.

Group Camping:

Hawaii County Department of Parks and Recreation staff indicate that there is considerable demand
for groups or larger extended family gatherings ranging from 30 to 40 persons, as well as larger
groups up to 100 persons (Iyo, 1992). Because of the variability in group sizes, group camping
areas should consist of several clusters of campsites that can accommodate several smaller groups
or one larger group.

For this reason, it was assumed that the State would develop one or more group campgrounds.
Each campground would contain three group camp sites. A typical group camp site would contain
from five to eight cabins. Each cabin would accommodate up to 16 persons; it is assumed that four
bunkbeds would be provided inside each cabin. Using this criteria, each group camp site would
accommodate 80 to 128 persons; used in combination, three group camp sites would be used by a
peak population of about 300 persons.

Golf

A comfortable operating capacity of up to 200 rounds per day was assumed for an 18-hole golf
course. This is a desirable maximum daily use based upon the experience of various public and
private golf courses in Hawaii (Wright, 1992).

Hiking

Various hiking guidelines and standards were examined to identify possible criteria for determining
the capacity of a hiking trail.

State Na Ala Hele Standards

The 1991 Na Ala Hele Program Plan provides no capacity standards for hiking trails. However,
the Plan provides trail guidelines for wheelchair, pedestrian, equestrian, and bicycle access. These
guidelines recommended tread width, materials, as well as horizontal and vertical clearances.

U.S. Forest Service Standards

The Design Guide for Accessible Outdoor Recreation (interim draft), published by the U.S.
Department of Agriculture, Forest Service, also provides useful trail design criteria and specifications
that are aimed to address the needs of disabled persons. These guidelines identify specific
criteria concerning distance, grade and cross slope, trail width, gates, surface material, rest areas,
curbs, and handrails. However, no guidelines are provided for establishing capacity criteria.
Staff and consultants working at the Bob Marshall Wilderness Complex in Montana developed a set of capacity criteria via a task force of researchers, Forest Service personnel and special interest group representatives. The capacity of wilderness trails in this recreational complex was determined by the task force which used a variable standard of the "number of trail encounters per day". The number of trail encounters ranged from 0 to 5 encounters per day for four recreational opportunity classes (Stunkey, McCool, and Stokes, 1984).

Selected Standard

The coastal trails between Hapuna and Wailea Bay is not comparable to the considerably more remote trails of the Bob Marshall Wilderness Complex. However, the standard does provide a sense of the potential type of recreational experience for an individual hiker. This type of standard can be applied to the project area; however, in order to determine the extent of available capacity, the definition of the number of users over a potential hiking distance is also required.

A variety of activities is feasible in the potential expansion area. Any potential hiking activity will not represent a highly remote experience. In addition, hiking will likely be a secondary activity to other activities such as camping. For this reason, the number of trail encounters would probably range from 5 to 7 encounters for each individual hiker. Given this type of recreational experience, a maximum capacity of 50 persons per 1,000 linear feet of trail is assumed to be a desirable and realistic density for future hiking activity.

Determination of Maximum Capacity

For the purposes of this analysis, maximum capacity refers to a desirable number of people that can be accommodated by existing and potential activity areas and/or facilities. Maximum capacity is an essential calculation needed to determine the amount of available recreational capacity at Hapuna.

Using the selected standards outlined in Table A-10, it was determined that the existing Hapuna Beach State Recreation Area is capable of serving up to 3,700 people who can enjoy existing recreational opportunities for sunbathing, swimming, picnicking, bodyboarding/body surfing, snorkeling/diving, and various beach activities. The potential number of users that can be accommodated for each of the primary activities are summarized in Table A-11.

If the Hapuna Beach State Recreation Area is expanded to incorporate lands south of Hapuna Beach and mauka of Queen Kaahumanu Highway, the maximum user population could increase to about 6,000 people. The potential number of users that could be accommodated for various recreational opportunities in an expanded Hapuna Beach State Recreation Area are presented in Table A-11.

Available Capacity Using Existing Recreation Area

Available capacity (AC) is the number of people that a recreational area can accommodate before reaching its estimated maximum capacity. Available capacity is expressed both as the number of people and as a percentage in order to help visualize what proportion of an area's capacity remains available for potential public use.
<table>
<thead>
<tr>
<th>Location</th>
<th>Land Area (Sq Ft) or No. of Facilities</th>
<th>Selected Standard</th>
<th>Number of Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hapuna Beach</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Water*</td>
<td>370,000</td>
<td>40 sq ft/person</td>
<td>9,250*</td>
</tr>
<tr>
<td>Beach</td>
<td>351,500</td>
<td>60 sq ft/person</td>
<td>5,858</td>
</tr>
<tr>
<td>Backup*</td>
<td>675,000</td>
<td>800 sq ft/person</td>
<td>844*</td>
</tr>
<tr>
<td>Hapuna Picnic Shelters</td>
<td>8 shelters</td>
<td>8 persons/shelter</td>
<td>64</td>
</tr>
<tr>
<td>Hapuna Pavilions</td>
<td>2 pavilions</td>
<td>48 persons/pavilion</td>
<td>96</td>
</tr>
<tr>
<td>Hapuna Outdoor Picnic Tables</td>
<td>8 tables</td>
<td>8 persons/table</td>
<td>64</td>
</tr>
<tr>
<td>Hapuna Cabins</td>
<td>6 cabins</td>
<td>4 campers/cabin</td>
<td>24</td>
</tr>
<tr>
<td>Group Cabins</td>
<td>19 cabins</td>
<td>16 campers/cabin</td>
<td>304</td>
</tr>
<tr>
<td>Family Campsite Clusters</td>
<td>80 campsites</td>
<td>10 persons/campsite</td>
<td>800</td>
</tr>
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<td>Group Picnic Rental Grounds</td>
<td>3 pavilions</td>
<td>50 persons/pavilion</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>100 persons/pavilion</td>
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<td>6 tables</td>
<td>8 persons/table</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tables 100 ft on-center</td>
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</tr>
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<td>Wailea Beach</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Water*</td>
<td>255,000</td>
<td>40 sq ft/person</td>
<td>6,375*</td>
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<tr>
<td>Backup*</td>
<td>15,000</td>
<td>800 sq ft/person</td>
<td>19*</td>
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<td>Beach 68</td>
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<tr>
<td>Water*</td>
<td>0</td>
<td>60 sq ft/person</td>
<td>0*</td>
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<tr>
<td>Beach</td>
<td>3,500</td>
<td>90 sq ft/person</td>
<td>39</td>
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<tr>
<td>Golf Course</td>
<td>18 holes</td>
<td>200 rounds/day</td>
<td>200</td>
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<tr>
<td>Coastal Trail</td>
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<td>50 persons/1000 LF</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
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<td></td>
<td><strong>9,584</strong></td>
</tr>
</tbody>
</table>

* Persons in water are excluded since water users will also use the beach. At Hapuna, 40 percent of beachgoers use the adjoining nearshore water area.
* Persons in beach backup areas usually represent about 35% of the persons in both the water and nearshore waters. Since the backup area includes considerable picnicking area, persons in these areas have been excluded to avoid double-counting.

Sources: James Pedersen, Planning Consultant, 1993; Clark, 1991; Fogg, 1990.
The capability of the existing recreation area to meet future recreation demands was calculated by subtracting anticipated weekday and weekend day demands (Tables A-8 and A-9) from the estimated maximum capacity of the existing recreation area (Table A-10).

\[ AC = \text{Future Recreation Demand (persons)} - \text{Maximum Capacity (persons)} \]

Remaining \( AC = \frac{\text{Peak Hour AC (persons)}}{\text{Maximum Capacity (persons)}} \)

Available beach capacities reflect the same calculations, as well as peak hour participation assumptions defined in the section on beach and swimming activities which begins on page A-17.

Peak Hour \( AC = \text{Maximum Beach Capacity (persons)} - \left( \text{Future Demand for beach activity (persons)} \times \text{Peak Hour Demand (40% on weekday or weekend)} \right) \)

Remaining \( AC = \frac{\text{Peak Hour AC (persons)}}{\text{Maximum Capacity (persons)}} \)

Available water capacities were calculated as follows:

Peak Hour \( AC = \text{Maximum Water Capacity (persons)} - \left( \text{Future demand for beach activity (persons)} \times \text{Peak Hour Demand (40% on weekday or weekend)} \times \text{Water Use (30% weekdays, 45% weekends)} \right) \)

Remaining \( AC = \frac{\text{Peak Hour AC (persons)}}{\text{Maximum capacity (persons)}} \)

The calculation of available capacity, assuming the use of only the existing recreation area, is summarized in Table A-12 and Table A-13 for each of the primary activities occurring in the Hapuna Beach State Recreation Area. This approach enables a more practical evaluation of the area's capability to serve future recreational demands.

Water and Beach Activities

This calculation demonstrates that the existing Hapuna Beach is physically capable of accommodating considerably more use than it presently receives and could provide adequate beach and inshore water area to meet beach activity demands to the year 2010. Weekday capacities suggest considerable remaining capacity while weekends indicate a potential need for somewhat greater management.

A significant amount of available nearshore water area at Hapuna provide sufficient capacity to accommodate future water activities such as bodyboarding and bodysurfing. Other water activities, e.g., snorkeling and diving, will absorb little of the remaining water capacity.
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Camping

The limited capacity of the existing cabins is inadequate to meet existing weekend and weekday demands which presently generate a shortage of camping opportunities for about 190 persons per day on weekend days and about 30 campers of weekdays.

Weekend camping demands in the year 2010 will increase the shortage of camping opportunities to approximately 285 persons per day. Unmet weekday demand in the year 2010 will be significantly less, about 41 persons per day.

Available Capacity for an Expanded Hapuna State Recreation Area

The same type of calculations of available capacity was made for an expanded Hapuna Beach State Recreation Area (Tables A-14, A-15 and A-16). The available capacity was generally calculated by subtracting anticipated recreational demands for weekend days and weekdays (Tables A-8 and A-9) from the estimated maximum capacity of the expanded recreation area (Table A-11).

\[ AC = \text{Future Recreation Demand (persons)} - \text{Maximum Capacity (persons)} \]

However, water and beach activities involved additional assumptions that were made for alternate beach and water destinations, peak hour participation, and the proportion of beach users involved in nearshore water activity. Available beach capacities were calculated as follows:

\[ \text{Remaining AC} = \text{Peak Hour AC (persons)} \times \text{Maximum Capacity (persons)} \]

Available water capacities were calculated as follows:

\[ \text{Remaining AC} = \text{Peak Hour AC (persons)} \times \text{Maximum Capacity (persons)} \]
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| 1991 | 304     | 780   | 94       | 62      | < 0    | 259      | 52      |
| 1992 | 304     | 779   | 94       | 68      | < 0    | 257      | 51      |
| 1993 | 304     | 779   | 94       | 74      | < 0    | 255      | 51      |
| 1994 | 304     | 778   | 94       | 80      | < 0    | 252      | 50      |
| 1995 | 304     | 778   | 94       | 87      | < 0    | 250      | 50      |
| 1996 | 304     | 777   | 94       | 93      | < 0    | 245      | 49      |
| 1997 | 304     | 776   | 94       | 101     | < 0    | 239      | 48      |
| 1998 | 304     | 775   | 94       | 109     | < 0    | 234      | 47      |
| 1999 | 304     | 774   | 93       | 116     | < 0    | 229      | 46      |
| 2000 | 304     | 773   | 93       | 124     | < 0    | 224      | 45      |
| 2001 | 304     | 772   | 93       | 131     | < 0    | 221      | 44      |
| 2002 | 304     | 772   | 93       | 138     | < 0    | 218      | 44      |
| 2003 | 304     | 771   | 93       | 147     | < 0    | 215      | 43      |
| 2004 | 304     | 771   | 93       | 155     | < 0    | 212      | 42      |
| 2005 | 304     | 770   | 93       | 163     | < 0    | 209      | 42      |
| 2006 | 304     | 770   | 93       | 172     | < 0    | 207      | 41      |
| 2007 | 304     | 769   | 93       | 180     | < 0    | 204      | 41      |
| 2008 | 304     | 769   | 93       | 190     | < 0    | 201      | 40      |
| 2009 | 304     | 768   | 93       | 199     | < 0    | 198      | 40      |
| 2010 | 304     | 768   | 93       | 208     | < 0    | 195      | 39      |


A-29
| Year | Camping | | | Golf | | | Hiking | | |
|------|--------|--------|--------|--------|--------|--------|--------|
|      | Group | Family |        | Group | Family |        | Group | Family |
|      | No. of Persons | % Capacity | No. of Persons | % Capacity | No. of Persons | % Capacity | No. of Persons | % Capacity |
| 1990 | 229 | 75 | 706 | 85 | -52 | < 0 | 287 | 57 |
| 1991 | 227 | 75 | 704 | 85 | -62 | < 0 | 259 | 52 |
| 1992 | 225 | 74 | 701 | 85 | -68 | < 0 | 257 | 51 |
| 1993 | 223 | 73 | 699 | 85 | -74 | < 0 | 255 | 51 |
| 1994 | 221 | 73 | 696 | 84 | -80 | < 0 | 252 | 50 |
| 1995 | 219 | 72 | 694 | 84 | -87 | < 0 | 250 | 50 |
| 1996 | 217 | 71 | 691 | 84 | -93 | < 0 | 245 | 49 |
| 1997 | 215 | 71 | 688 | 83 | -101 | < 0 | 239 | 48 |
| 1998 | 213 | 70 | 684 | 83 | -109 | < 0 | 234 | 47 |
| 1999 | 211 | 69 | 681 | 83 | -116 | < 0 | 229 | 46 |
| 2000 | 208 | 68 | 678 | 82 | -124 | < 0 | 224 | 45 |
| 2001 | 206 | 68 | 674 | 82 | -131 | < 0 | 221 | 44 |
| 2002 | 204 | 67 | 672 | 81 | -138 | < 0 | 218 | 44 |
| 2003 | 201 | 66 | 669 | 81 | -147 | < 0 | 215 | 43 |
| 2004 | 198 | 65 | 666 | 80 | -155 | < 0 | 212 | 42 |
| 2005 | 196 | 64 | 662 | 80 | -163 | < 0 | 209 | 42 |
| 2006 | 193 | 63 | 660 | 80 | -172 | < 0 | 207 | 41 |
| 2007 | 190 | 63 | 656 | 79 | -180 | < 0 | 204 | 41 |
| 2008 | 188 | 62 | 653 | 79 | -190 | < 0 | 201 | 40 |
| 2009 | 185 | 61 | 649 | 78 | -199 | < 0 | 198 | 40 |
| 2010 | 182 | 60 | 646 | 78 | -208 | < 0 | 195 | 39 |

Water and Beach Activities

With the proposed expansion, beach and water activities at Hapuna Beach would be supplemented by medium density uses at Wailea Beach. Enhanced recreational opportunities at Wailea Beach would encourage the future diversion of 15 percent of the users from Hapuna Beach.

Beach use at Beach 68 would be extremely low because of its limited beach capacity of less than 40 persons. Consequently, the potential use of this beach is considered insignificant to the available capacity at Wailea and Hapuna.

The distribution of beach activities to two major beaches, instead of only Hapuna, will help maintain a somewhat less-crowded recreational experience at Hapuna (Table A-14). The proposed park expansion would decrease the remaining capacity of beach activities at Hapuna from 85 percent in 1993 to about 80 percent available capacity in the year 2010. In contrast, the available beach capacity at Wailea Bay will only slightly diminish with increased public use. In 1993, Wailea Beach is estimated to have about 99 percent of available capacity. By the year 2010, the remaining capacity at Wailea Beach will remain about 99 percent since only 15 percent of all beach users at Hapuna Beach State Recreation Area are expected to use Wailea Beach. In a cumulative sense, the forecasts of available peak hour capacity suggest that both beaches will have considerable amount of remaining capacity that can be used to accommodate long-term public use. However, the use of medium-density standards for beach capacity also presumes a somewhat greater density of persons using the beach.

The proposed expansion would also maintain the existing capacity of nearshore water area at Hapuna. The limited number of future nearshore water users at Wailea Bay would not reduce the capacity of the nearshore water areas in the year 2010.

Camping

Camping opportunities would be greatly enhanced by the development of new group and family campsites. There will be ample remaining capacity on both weekdays and weekends (Tables A0-15 and A-16) with the addition of new camping facilities.

Golf

The presence of a new public golf course will clearly meet a portion of the West Hawaii resident and visitor demand. Residents are expected to be the primary users of the course. More of the available capacity of the course will be absorbed during the weekdays when most resident play occurs in the Kohala district.

An important assumption influencing the potential amount of remaining capacity is the potential marketability of the course to local residents. If, as expected, local residents primarily use this course rather than other private courses in the Kohala area, little remaining capacity will be available.

With the addition of a new public course at Hapuna, the forecasts of available capacity (Tables A15 and A-16) indicate that the golf course will quickly saturate its maximum capacity and that an unmet demand will still exist. It is important to note that the maximum capacity of the course is

A-31
assumed to be 200 rounds per day. Using this capacity standard, the potential development of an additional public course in West Hawaii, e.g. Kealakehe, would probably not be required until the year 2007; consequently, two public golf courses in West Hawaii are not warranted. In addition, the maximum capacity of the public golf course at Hapuna Beach State Recreation Area could reasonably be expanded to 250 rounds per day (Wright, 1992) when golf activity levels generate demands for more rounds of play.

When the proposed public course becomes too crowded and its maximum capacity is reached, nearby private courses offer an alternative. While these opportunities will be less affordable than the proposed public course, local golf demands will not be suppressed as long as these courses are open for some public play.

Hiking

The formal designation of a coastal hiking trail will address a substantial visitor demand for hiking opportunities on the Big Island. The amount of capacity remaining after development will be more than adequate to meet demands through the year 2010. However, the extent of long-term demand, particularly by visitors, is gradually expected to diminish the remaining capacity which assumes a low-density use of about 50 persons per 1,000 feet of trail.
APPENDIX C

Geotechnical Consultation
Hapuna Beach State Recreation Area Expansion
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I INTRODUCTION

This report presents an overview of the geologic characteristics, history and hazards of the Hapuna Bay and Waialea Bay area. We performed a two-day site reconnaissance to evaluate and record soil and geologic conditions and to produce a geologic map.

The project area, which is to be developed for passive recreation, consists of approximately 900 acres extending from the coastline at Hapuna Bay and Waialea Bay inland east of Queen Kaahumanu highway. The location of the area is shown on Plate 1, and the project boundaries are shown on the site map, Plate 2.

The site is on the lower northwest slopes of Mauna Kea. Elevations in the area range from sea level at the shoreline to a maximum elevation of about 320 feet above mean sea level. The average slope at the site is about 4.5 percent. The area is covered with sparse grass and occasional kiawe trees. Two drainage channels cut through the site and terminate at Hapuna Bay and Waialea Bay. These channels appear to flow only when there are heavy rains and are usually dry. They are overgrown with kiawe trees and brush.

II GEOLOGY

A. Regional Geology

A geologic map (Stearns, 1985) of the island of Hawaii is shown on Plate 3. Stearns and MacDonald (1946) classify the basaltic lava flows in the Hapuna and Waialea Bay area as part of the Hamakua Volcanic Series, capped with a thin layer of Pahala ash.

The volcanic rocks of Mauna Kea are divided into two series, the older Hamakua Volcanic Series and the younger Laupahoehoe Volcanic Series. The Hamakua series has been further divided into upper and lower members. The lower (oldest) member of the Hamakua series is exposed only in the lower part of the sea cliffs along the Hamakua Coast north of Hilo. The lower member grades upward into andesitic dike basalts, hawaiites and ankaramites that make up the upper member of the series. The Laupahoehoe series consists predominantly of thick, very hummacky hawaiite lavas. Eruptions of the Laupahoehoe series were usually restricted to the upper slopes of Mauna Kea, but several flows extend to the shoreline along the Hamakua coast.

A layer of Pahala ash blankets the upper member of the Hamakua series. Several different sources have probably contributed to the Pahala ash deposits. On the dry northwest flank of Mauna Kea near Waimea, some of the ash is fresh and has the same chemical composition as the late lavas of Mauna Kea. It is believed that most of the ash on Mauna Kea came from eruptions on that mountain, and that the ash layer becomes thinner toward the north because the trade winds carried most of the ash southwestward from the erupting vents. A map showing the distribution of Pahala ash on Hawaii (Macdonald et al., 1983) indicates that the ash is 4 feet or less thick near Waimea, the closest reported value to the project area.
B. Field Investigation

Aerial photographs covering the project area were flown earlier this year. The photos (with scales of 1 inch equals 300 feet, 1 inch equals 275 feet, and 6 inches equals 1,600 feet) and an older aero photo used map (with a scale of 1 inch equals 40 feet) were used to supplement our field observations. Based on our field reconnaissance and aerial photos, the lava covering the project area was found to be the a’a type. The U.S. Soil Conservation Service maps (Sato et al., 1972) indicate that the site is underlain by predominantly pahoehoe lava with 10 to 20 percent of the area underlain by a’a lava. This does not agree with our field observations.

In most places, the a’a has weathered to form a very stony, sandy silt soil that varies from 0 to 3 feet thick. Good exposures of the a’a rock were only found along the shoreline, the deepest drainage paths and along road cuts. Cross-sectional exposures of the a’a flows in this area commonly have 5 to 10 feet of dense, dark gray basalt with little to no vesicles, occasional phenocrysts of olivine, and few to many phenocrysts of plagioclase. The massive layer is underlain and overlain by discontinuous clinker layers composed of volcanic rubble. The rubble contains gravel-sized to large cobble-sized pyroclastic material such as red-brown and black pumice, scoria and fragments of dark-gray, highly vesicular basalt with abundant phenocrysts of olivine and plagioclase. Lava balls of dense, grey basalt up to 3 feet in diameter were also observed within the clinker layer. The clinker layers vary in thickness from 1 to 8 feet in roadway exposures.

A white- to cream-colored carbonate coating 1/8 to 2 inches thick covers the a’a rock along joints in many places. This travertine-like rock is dense, finely crystalline and layered. It is likely formed by precipitation of calcium carbonate from solution in infiltrating surface water.

Pockets of a yellowish, weathered volcanic ash layer were observed overlying the a’a basalt in several road cuts and along the shoreline. The ash layer varies from 1 to 4 feet thick and may be part of the Pahala ash deposits. The basalt that cover the project area are probably part of the upper member of the Hamakua Volcanic Series, as mapped by Stearns and MacDonald (1944).

A geologic map of the area is shown on Plate 4. No significant geologic structures such as faults, lava tubes, collapse areas or flow structures were found at the project site. Two caves were found at the site and are shown on the geologic map (Plate 4). The caves were found along a deeply cut drainage path and along the shoreline. In both cases, the caves appear to have formed from erosion of the less resistant clinker layer by wave action and surface water runoff. The cave at the shore is approximately 10 feet high, 30 feet wide and 15 feet deep. The cave along the drainage path is approximately 20 feet high, 15 to 20 feet wide and 10 to 15 feet deep. An arch structure formed in the same way was found along the shoreline and is also located on the geologic map. The arch is approximately 15 to 20 feet high and 10 to 15 feet wide. There may be other caves along the major drainage paths or along the steep shoreline that were not observed. Several sections of the drainage paths are very steep and thickly vegetated making them inaccessible.

C. Description of A’a Lava Flows

A’a basalt is deposited as a molten mass that moves so slowly that a rough, jagged clinker layer forms on its surfaces. The layer is carried forward and cascades down the front of the flow so that a clinker pavement typically is formed over which the molten interior flows. Thus, in cross-section, a’a basalt has a dense interior sandwiched between layers of volcanic clinker. The proportions of these two types of
material in an aʻe flow can vary greatly, however, so that it is impossible to anticipate exact subsurface conditions at a specific location. Cavities and lava tubes are uncommon in aʻe flows, although cinder pockets can consist of loose gravel- to cobble-sized fragments. The interior rock typically has fewer vesicles than pahoehoe and is therefore more dense; the vesicles are usually stretched as a result of the highly viscous nature of the lava before it solidified. Aʻe flows tend to be significantly thicker than pahoehoe flows, sometimes several tens of feet.

D. Soils

Two types of soil were reported at the site by the U.S. Soil Conservation Service (Sato, 1973). Their distribution is shown on the site map, Plate 2. Kawaihau extremely stony very fine sandy loam (KVC) covers the entire project area except at Hapuna Bay and Waiakea Bay where beach sand (BH) occurs near the shoreline. The sandy loam was reported (Sato, 1973) to average about 33 inches in depth in this region. In profiles, the Kawaihau loam consists of 2 inches of a dark reddish-brown extremely stony very fine sandy loam underlain by a dark reddish-brown and dusty red stony silt loam and loam (Sato, 1973). We interpret these soils to be a mixture of wind-deposited Pahala ash and weathered cinder on the aʻe flow surfaces. Our experience from nearby projects indicates that these soils contain soluble sulfates in concentrations great enough to be potentially detrimental to concrete in contact with them.

E. Groundwater

Mink and Sumida (1984) classified the aquifers of the Hawaiian Islands. The island of Hawaii is divided into sectors with similar hydrogeologic properties. The project site is located within the area of the Waikoloa-Kealakehe aquifer system which is part of the basal, unconfined aquifer in the flank lavas of Mauna Kea. Basal aquifers are those in which fresh water is floating on sea water. Stearns and MacDonald (1946) mapped the Hapuna area as having brackish basal groundwater.

Water wells located within a one-half mile radius of the project area are shown on Plate 2. Available information for each well from the Department of Land and Natural Resources and the U.S. Geological Survey is presented in the following table.

Macdonald et al. (1983) reported fresh groundwater springs discharging into the shallow surf at Hapuna Beach. These basal springs are probably fed by groundwater that becomes channelized in flow structures in the rock, such as lava tubes and large cracks.
### III GEOLGIC HAZARDS

The geologic hazards that could affect the site and its location with respect to active volcanism are discussed in the following sections. These hazards include lava flows, deposition of tephra (volcanic ash, pyroclastic surges [explosive eruptions], volcanic gases, ground fracture, subsidence and locally mapped cavities and collapse features. These hazards have been addressed and evaluated for the island of Hawaii in a recent publication (Mullineaux et al., 1987). In general, the site has not been significantly affected in historical times by any of these volcanic hazards.

#### A. Lava Flows

The site is located in Zone 8 (the eighth least hazardous of nine zones) relative to lava flow hazards. As defined by Mullineaux et al., Zone 8 is a large area on the lower flanks of Mauna Kea that has not been affected by lava flows for at least 10,000 years. Even though the hazard is low for this region, there still remains a remote possibility of future eruptions from Mauna Loa or Mauna Kea.

#### B. Deposition of Tephra

Mullineaux et al. placed the project site in Zone 3 (the least hazardous of three zones) for tephra fall hazards. Tephra is a general term that includes all fragmental volcanic products which are ejected through a vent into the air before deposition. On the island of Hawaii, tephra is produced most frequently by lava fountains in the summit areas and rift zones of Kilauea and Mauna Loa. Eruptions such as these have occurred at least once every few years in historical time, and they have produced tephra as much as 3.3 feet thick at a distance of 0.6 miles from the vent and 4 inches thick at about 1.2 miles (Richter et al., 1970). Tephra hazard Zone 3 includes areas in...
which only thin deposits of tephra erupted from Kilauea, Mauna Loa, or Huilulai are likely to fall.

C. Pyroclastic Surges

Deposits from pyroclastic surges have been recognized on Hawaii only adjacent to Kilauea's caldera, so Mullineaux et al. consider a hazard zone to exist only within 6 miles from the caldera of Kilauea which is nearly 35 miles from the project site.

D. Volcanic Gases

The hazard zones for volcanic gases shown by Mullineaux et al. are the same as for tephra falls. Gases are distributed by winds, and their effects decrease with distance. Volcanic gases are emitted primarily from the summit areas and rift zones of Kilauea and Mauna Loa, which are 35 and 50 miles, respectively, from the project site.

E. Fractures and Subsidence

Ground fractures, subsidence, and earthquakes commonly occur together as a result of magma movement. Most fractures on Hawaii of historical age are found in the summit areas and rift zones of Kilauea and Mauna Loa.

Ground subsidence occurs throughout Hawaii at different scales: 1) long-term gradual subsidence of the entire island; 2) subsidence of a volcano's flanks; 3) settling of small areas due to magma movement; and 4) local collapse of the roofs of lava tubes.

Long-term gradual subsidence is occurring on the entire island of Hawaii. The rate of subsidence, which differs from place to place on the island, has been calculated as 1.4 to 4.1 m/yr (Moore, 1987; Aapele and Macdonald, 1966; Moore and Fornari, 1984). With a worldwide rise in sea level of 1 to 2 mm/yr, the island is submerging at approximately 3 to 6 mm/yr or 1 to 2 feet per century.

Rapid subsidence of the flanks of volcanoes is most likely to occur on the most recently active Kilauea and Mauna Loa Volcanoes. Steep scarps and stair-step topography along fault zones on the flanks of both volcanoes were formed by the instability of the volcanoes' flanks caused in part by intrusion of magma into rift zones and in part by the load of the flanks of the growing volcanoes. Because the project site is located on the northwestern flank of the dormant Mauna Kea Volcano, it is considered to be in an area of low risk for this type of subsidence.

The subsidence caused by withdrawal of magma is restricted to summit areas and rift zones and also does not affect the Hapuna Beach area. Local areas associated with collapsed lava tubes or cavities are a minor subsidence hazard, and these small-scale features were not observed at the site.

F. Earthquakes

The island of Hawaii is seismically active and is in Seismic Zone 3 of the Uniform Building Code. Most Hawaiian earthquakes result from the movement of magma at shallow depth. The greatest number of earthquakes on the island of Hawaii originates beneath the summit areas or near the rift zones of Kilauea and Mauna Loa.

Although the most recent large earthquakes have taken place under the southern part of the island, a large earthquake offshore from Kailua Bay, roughly 37 miles south of the site, occurred on August 21, 1951. Its magnitude was between 6.75 and 7.0, and its Modified Mercalli intensity at the site was estimated to be IV (Macdonald and Wentworth, 1952). This intensity level corresponds to nondestructive ground motion felt by many people indoors. The closest large earthquake to the site probably
was the magnitude 6.5 event on October 6, 1929, centered under Hualalai Volcano. Intensity levels in the site vicinity for this earthquake were not recorded. Hualalai Volcano is approximately 20 miles south of the Hapuna Beach site.

Structures designed for the site should recognize the likelihood that they will undergo strong seismic ground motion. Design provisions required by the Uniform Building Code generally take this into account.

G. **Tsunamis**

Tsunamis, also called seismic sea waves, are large rapidly moving ocean waves associated with earthquakes. They are generated when an abrupt movement of the ocean floor displaces a large mass of water. They can originate at great distances from Hawaii (i.e., Alaska, Peru, Chile) and have destructive effects similar to those that originate locally. The maximum recorded height reached by a tsunami in Hawaii has been 53 to 56 feet (Tilling et al., 1976). Tsunamis have been reported in Hawaii about fifty times since the early nineteenth century (Macdonald et al., 1947).

Leomis (1976) reported tsunami runoff data for the shorelines of the Islands of Hawaii for the years 1946, 1952, 1957, 1960, and 1964. The closest runoff data to the Hapuna Beach site is reported for Wailua Point and Kawaihae. These areas lie along the shore approximately 2.5 to 3 miles north of Hapuna and Waialea Bays. At Wailua Point, the maximum intrusion of water onto the land is 10 feet above mean sea level in 1946. There were no reported values for the other four events. The maximum heights at Kawaihae were 12 feet in 1946; 2 feet in 1952; 5 feet in 1967; 9 feet in 1960; and 3 feet in 1964.

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APPENDIX D

Baseline Assessment of the Marine Environment
in the Vicinity of
Hapuna Beach Recreation Area
South Kohala, Hawaii
BASELINE ASSESSMENT OF THE MARINE ENVIRONMENT IN THE VICINITY OF THE HAPUNA BEACH RECREATIONAL AREA, SOUTH KOHALA, HAWAII

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INTRODUCTION AND PURPOSE

The State of Hawaii is currently preparing plans to augment recreational facilities at Hapuna Beach in the South Kohala District of the Island of Hawaii. The site for future development extends from the present northern boundary of Hapuna Beach (fronting the South Kohala Resort property) to the Pukoe boat ramp. The western border of this land parcel consists of approximately 1.25 miles of coastline. The property is currently in a planning stage for development of an 18-hole golf course, as well as other passive recreational uses. None of the planned land uses include any alteration of the existing shoreline or nearshore marine environments.

A concern regarding construction and operation of the planned development is the potential for environmental degradation of the nearshore ocean resulting from the project. This concern is especially critical for the South Kohala area owing to the pristine nature of the marine environment and the close proximity of the project site to Hapuna Beach, which is used extensively as a recreational facility by visitors and residents. The most important questions include the potential impacts from runoff of soil and leaching of fertilizers and other chemicals to groundwater which could cause alterations to water quality and marine life.

In the interest of addressing these concerns and ensuring maintenance of environmental quality, it has been deemed appropriate to conduct a marine environmental survey and potential impact analysis of the nearshore region in the vicinity of the Hapuna Recreational Area. In brief, the baseline survey is designed to establish the existing character of the marine environment at a single point in time. The characterization includes quantification of both water chemistry parameters that define water quality and biotic assemblages. It should be noted, however, that the baseline does not presently consider the effects of temporal (seasonal) variability. Seasonal differences can be evaluated by subsequent follow-up studies. These baseline surveys can also represent the initial increments in a continuing monitoring program designed to assess any alteration to the marine environment resulting from construction of the planned development. Presented below are the objectives, methods, and results of the initial phase of the baseline assessment program.

Objectives

1) To establish a quantitative baseline set of water chemistry parameters that delineate the present environmental conditions of the nearshore ocean offsite of the site planned for development. Chemical composition of the environment will be evaluated by analysis of all parameters specified by State of Hawaii, Department of Health (DOH) water quality standards, as well as several other parameters that are not listed by DOH, but provide important information. Particular attention will be given to evaluating the influence of groundwater entering the marine environment. Such a baseline will provide information as to the potential susceptibility of the area to the proposed project, as well as revealing if there are effects to nearshore water quality from factors associated with current land use. Identification of such existing conditions is important in order to accurately differentiate effects from the future land use. As changes in biotic community structure are frequently a result of altered water quality, identification of changes in chemical constituents provides an early warning of possible impending alterations to biota.

2) To establish a descriptive and quantitative baseline of biotic communities in the vicinity of the site where shoreline development may take place. Such characterization of biotic assemblages will provide a basis for assessing alteration of community structure as a result of changes in land use. This baseline will also serve to identify any specific biotic communities that may be especially susceptible to alteration, to the potential alterations that may result from the planned development.

3) To evaluate the degree of natural stresses (sedimentation, wave action, freshwater input, etc.) that influence the nearshore marine environment in the area that could be potentially influenced by the proposed project. Typically, water quality and the composition of nearshore marine communities are intimately associated with the magnitude and frequency of these stresses, and any impacts caused by the proposed project may either be mitigated in large part, or amplified, by natural environmental factors. Therefore, evaluating the range of natural stress is a prerequisite for assessing the potential for additional change to the marine environment owing to shoreline modification.

4) To utilize existing evaluations of water chemistry and biotic community structure that estimate the responses of marine environments to similar development projects in Hawaii. While minor site-specific differences will undoubtedly occur between the areas, comparing water quality and community structure data will allow the best possible assessment of potential effects from the proposed activity at the Hapuna site.

5) To offer recommendations on scheduling and construction procedures to minimize impacts, based on the characteristics of the environment determined by the baseline.
METHODS

Water Chemistry

Five survey stations were established in the vicinity of the Hapuna area: Stations C-1, C-2, and C-3 were located at the north, central, and southern portions of Hapuna Bay; Station C-IV was located off Waialea Bay, and Station C-V was located in the northern part of Puako Bay (see Figure 1).

Water quality was evaluated at each station on transects that were oriented perpendicular to the shoreline and depth contours. Water samples were collected at 6 locations on each transect from just seaward of the shoreline to approximately 250 meters landwards. Such a sampling scheme was designed to span the greatest range of salinity with respect to potential freshwater effluent at the shoreline. Sampling was more concentrated in the nearshore zone because this area is most likely to show the effects of shoreline modification.

With the exception of the two locations nearest to shore, samples were collected at two depths; a surface sample was collected within approximately 10 centimeters from the sea surface, and a bottom sample was collected within 1 m of the sea floor. When possible water samples were also collected from sources behind the shoreline at Station C-IV: a groundwater spring seeping from the beach above the low tide mark; at Station C-V a tide pool that was largely separated from the intertidal area; at Station C-V a drainage pipe that was apparently discharging groundwater. Groundwater from possible wells located upslope from the Hapuna area was also sampled.

Water quality parameters evaluated included the specific criteria designated for open coastal waters in Chapter 11-54, Section 06 (Open Coastal waters) of the State of Hawaii Department of Health (DOH) Water Quality Standards. These criteria include: total nitrogen (TN), nitrate + nitrite nitrogen (NO₂⁻ + NO₃⁻), ammonia nitrogen (NH₃), total phosphorus (TP), chlorophyll a (Chl-a), turbidity, temperature, pH and salinity. In addition, orthophosphate phosphorus (PO₄³⁻) and silica (SiO₂) were also reported because these parameters are sensitive indicators of biological activity and the degree of groundwater mixing.

All fieldwork was conducted on March 16-17 and 23-24, 1991, working from a small boat or swimming from shore. Water samples were collected by opening 1-liter polyethylene bottles at the desired depth at each sampling location. Subsamples for nutrient analyses were immediately placed in 125-milliliter ultrasonic-washed, triple rinsed, polystyrene bottles and stored on ice. Analyses for NH₄⁺, PO₄³⁻, and NO₃⁻ were performed using manual spectrophotometric techniques on a Beckman spectrophotometer. TN and TP were analyzed in a similar fashion following digestion. Dissolved organic phosphorus (DOP) was calculated as the difference between TN and dissolved inorganic N, and TP and dissolved inorganic P, respectively. The chemistry procedures were performed according to standard methods for seawater analysis (Strickland and Parsons 1968; Grasshoff 1983).

Water for all other analyses was subsampled from 1-liter polyethylene bottles and kept chilled until analysis. Turbidity was determined on 60 ml subsamples fixed with HgCl₂ to terminate biological activity. Fixed samples were kept refrigerated until turbidity was measured on a Wandel Model 21 nephelometer, and reported in nephelometric turbidity units (NTU). Chl-a was measured by filtering 300 ml of water through glass-fiber filters; pigments on filters were extracted in 90% aceton in the dark at 5°C for 12-24 hours. Fluorescence before and after acidification of the extract was measured with a Turner Designs fluorometer. Salinity was determined using an A.G.E. Model 2100 laboratory salinometer with a readability of 0.0001 "pr.".

In-situ field measurements included water temperature measured with a hand-held mercury thermometer readable to 0.1°C, and pH measured with portable meter with a readability of 0.01 pH unit.

Biological Communities

Marine biological community structure can be defined as the abundance, diversity, and distribution of benthic and pelagic species such as sanddams, and pelagic species such as reef fish. In the context of time-series surveys, the most useful biological assemblages for direct evaluation of environmental impacts to the offshore marine environment are benthic (bottom-dwelling) communities. Because benthos are generally long-lived, immobile, and can be significantly affected by aeuvogenous input of sediments and other potential pollutants, these organisms may either tolerate the surrounding conditions within the limits of adaptability or die. As members of the benthos, stony corals are of particular importance in nearshore Hawaiian environments. Corals compose a large portion of the reef biota and their skeletal structures are vital in providing a complex of habitat space, shelter, and food for other species. Since corals serve in such a keystone function, coral community structure is considered the most "relevant" group in the use of reef community structure as a means of evaluating past
and potential impacts associated with land development. For these reasons, and because alterations in coral communities are easy to identify, characterization of coral community structure is a major component of the baseline assessment. Observables change in coral population parameters is a practical and direct method for obtaining the information for determining the effects of stress in the marine environment. In addition, because they comprise a very visible component of the nearshore environment, detailed investigations of reef fish assemblages were also performed.

Biotic structure of benthic communities was evaluated by establishing a descriptive and quantitative baseline. Initial qualitative reconnaissance surveys covered the area off the Hapuna Recreation Area from the shoreline out to the 20 meter (66 ft) depth contour. The reconnaissance surveys were conducted by towing a diver at slow speed in a zig-zag pattern across the region of interest. Such surveys are extremely useful in making relative comparisons between areas, identifying any unique or unusual bologic resources, and providing a general picture of the physiographic structure and benthic assemblages occurring throughout the region of study.

Following the preliminary survey, three quantitative transect stations were selected offshore of the development area (see Figure 1). Station II was located near the southern boundary of Hapuna Bay; Station III was located off Waialea Beach; and Station III was located on the northern end of Puako Bay. At each station, three transect sites were selected, one in each of the dominant reef zones. Each transect was oriented parallel to depth contours so as to bisect a single reef zone. Care was taken to place transects in random locations within the zone that were not biased toward either peak or low coral cover. In total, nine quantitative transects were conducted.

Quantitative benthic surveys were conducted by stretching a 50-m long tape in a straight line over the reef surface. An aluminum quadrat frame, with dimensions of 1 m by 0.66 m, was sequentially placed in 10 random locations on the transect tape so that the tape bisected the long axis of the frame. At each quadrat location, a color photograph recorded the segment of reef area enclosed by the quadrat frame. In addition, a diver knowledgeable in the taxonomy of resident species visually estimated the percent cover and occurrence of organisms and substratum type within the quadrat frame. No attempt was made to disturb substrate to observe organisms, and no attempt was made to identify and enumerate cryptic species dwelling within the reef framework. Only macrofaunal species greater than approximately 2 cm were noted.

Following the period of fieldwork, quadrat photographs were projected onto a grid and units of bottom cover for each benthic faunal species and bottom type were recorded. Results of the photo-quadrats were combined with the in-situ cover estimates and community structure parameters (percent cover, species diversity) were calculated. The photo-quadrat transect method is a modification of the technique described in Kinzie and Snider (1978), and has been employed in numerous field studies of Hawaiian reef communities (e.g., Dollar 1979, Gregg and Maragos 1974), and has proven to be particularly useful for quantifying coverage of attached benthos such as corals and large sponges (e.g., sea urchins, sea cucumbers). While this methodology is quantitative for the larger exposed fauna, many coral reef invertebrates are cryptic or nocturnal. Coupled with the generally small size of cryptic invertebrates, quantitative assessment of these groups requires methodologies that are beyond the scope of the present baseline assessment.

Quantitative assessment of reef fish community structure was conducted in conjunction with the benthic surveys. As the transect tape was being laid along the bottom, all fish observed within a band approximately 2 meters wide along the transect path were identified by species name and enumerated. Care was taken to conduct the fish surveys so that the minimum disturbance was created by divers, ensuring the least possible dispersal of fish. Only readily visible individuals were included in the census. No attempt was made to seek out cryptic species or individuals sheltered within coral. This transect method is an adaptation of techniques described in Hobson (1974).

RESULTS

WATER CHEMISTRY ANALYSES

Horizontal and Vertical Stratification

Table 1 shows results of all water chemistry analyses for samples collected at the five stations off the Hapuna Recreation Area. Relationships of water chemistry constituents with respect to horizontal (distance from shore) and vertical stratification are shown in Figures 2-5.

Concentrations of eight dissolved nutrient constituents in surface samples are plotted as functions of distance from the shoreline in Figure 2. Values of salinity, turbidity, Chl a and temperature as functions of distance from the shoreline are shown in Figure 3. Several patterns of distribution are evident in Figures 2 and 3. It can be seen that the dissolved
nutrients Si, NO$_3^-$, PO$_4^{3-}$, TP and TN, display a marked elevation in concentration in the many of the samples collected within 100 m of the shoreline. Concentrations were markedly higher within the zone 10 m from the shoreline. Salinity displays the opposite trend, with sharply tower concentrations near the shoreline. These gradients were strongest at Station C-III, followed by Stations C-I and C-IV. At Station C-II, in the center of Hapuna Bay, horizontal gradients are weakest.

These patterns appear to be a result of concentrated input of groundwater at the shoreline. Low salinity groundwater, which contains high concentrations of Si, NO$_3^-$, and PO$_4^{3-}$ (see values for potable wellwater in Table 1), percolates to the ocean at the shoreline, resulting in a nearshore zone of mixing. Within the zone of mixing, groundwater percolation results in horizontal gradients of increasing salinity and decreasing nutrients moving seaward. It can also be seen in Table 1 that samples collected from behind the shoreline (spring, tidal pool, and drainpipe), which are composed primarily of groundwater, all contained high concentrations of Si, NO$_3^-$, and PO$_4^{3-}$.

Groundwater efflux also creates surface layers of lower salinity, higher nutrient content water "floating" on denser, more saline ocean water. Such vertical stratification is evident in Figures 4 and 5. Nutrient constituents listed above that are normally found in high concentrations in groundwater show the strongest vertical stratification in nearshore waters, especially at Station C-III.

Water chemistry parameters that are not associated with groundwater input do not show the same pattern of decreasing concentration with distance from the shoreline. At all of the stations except IV, NH$_4^+$ exhibits lower values at the nearshore sampling sites relative to the more oceanic samples. Likewise, DOP and DON appear to be lower in concentration in the samples collected very close to the shoreline. Beyond this distance, these constituents do not appear to display any recognizable pattern with respect to horizontal or vertical stratification, and are essentially invariant with distance from the shoreline (Figures 2 and 4). Data from well water (Table 1), and the low concentrations in the nearshore samples, indicates that these constituents are normally found in higher concentrations in coastal oceanic water than in groundwater.

Turbidity and Chl-$a$ exhibit highest concentrations at nearshore samples at Station C-III at the southern end of Hapuna Beach. The remainder of the sampling sites show no apparent pattern with respect to distance from shore or location in the water column. Temperature is lowest at the nearshore sampling sites, and increases moving offshore (Figure 3). Beyond the nearshore zone (10 m from the shoreline) the water column was slightly stratified with the surface layer slightly cooler than the deeper layer. The cooler surface layer may be a result of evaporative cooling caused by extremely strong trade winds that prevailed during the sample collection.

Conservative Mixing Analysis

A useful treatment of water chemistry data for interpreting the extent of material inputs from land is application of a hydrographic mixing model. In the simplest form, such a model consists of plotting the concentration of a dissolved chemical species as a function of salinity. Comparison of the curves produced by such plots with conservative mixing lines provides an indication of the origin and fate of the material in question. Figure 6 shows plots of concentrations of four constituents (Si, NO$_3^-$, NH$_4^+$, PO$_4^{3-}$) as functions of salinity for the samples collected off the Hapuna area. Each graph also shows conservative mixing lines that are constructed by connecting the endpoints concentrations of open ocean water and groundwater from a shallow well located in upstate South Kohala.

If the nutrient constituent in question displays purely conservative behavior (no input or removal resulting from any process other than physical mixing), data points should fall on, or near, the conservative mixing line. If, however, external material is added to the system through processes such as leaching of fertilizer nutrients to groundwater, data points will fall above the mixing line. If material is being removed from the system by processes such as biological uptake, data points will fall below the mixing line.

Dissolved Si represents a check on the model as this material is present in high concentration in groundwater, but is not a major component of fertilizer, and is not utilized rapidly within the nearshore environment by biological processes. It can be seen in Figure 6 that when Si concentrations are plotted versus salinity, data points fall in a relatively straight line, but slightly above, the conservative mixing line. The apparent straight line distribution and close agreement of the measured mixing line with the theoretical conservative mixing line indicates that the high concentrations of Si in the nearshore area are the result of mixing of groundwater and ocean water.

The plot of NO$_3^-$ versus salinity in Figure 6 reveals a similar distribution as Si. The overall distribution indicates that the samples with lower salinity have higher NO$_3^-$ concentrations. The close fit of the theoretical mixing line and the line created by the data points indicates that...
NO$_3^-$ in the nearshore zone is the result of input of uncontaminated groundwater, with no apparent additional sources or sinks.

The distribution of PO$_4^{3-}$ data points as functions of salinity reveals different patterns than Si and NO$_3^-$. Many of the data points, especially from Stations C-4, C-III, and C-IV fell below the conservative mixing line, while data points from Stations C-I and C-V are above the mixing line. These variations suggest that the PO$_4^{3-}$ content of water reaching the shoreline and mixing in the nearshore zone is either slightly different in composition between station locations, or is undergoing various processes of uptake and input in the nearshore zone. At the stations where data points fell well below the mixing line, it is possible that uptake by plants near the air-sea interface is responsible for the apparent draw down of PO$_4^{3-}$. Such a possibility of high uptake is corroborated by the relatively high concentrations of CH$_4$ at the nearshore area at Station C-II. It is apparent, however, that these processes are not resulting in a similar uptake of NO$_3^-$. The distribution of the other form of dissolved inorganic nitrogen, NH$_4^+$, does not show the linear inverse relationship with respect to concentration and salinity. The conservative mixing line is essentially "flat" with similar concentrations in groundwater and open ocean water. Most of the data points fell above the conservative mixing line, with some of the highest concentrations in samples of highest salinity (i.e. most oceanic). These factors indicate that the relatively high concentrations of NH$_4^+$ are not a result of input to the nearshore ocean from land. Rather, it is likely that the measured NH$_4^+$ concentrations are the result of biologically induced chemical reactions (e.g. metabolic processes) within the nearshore zone.

Compliance with DOH Criteria

Also shown in Table 1 are samples that exceed DOH water quality standards for open coastal waters under "wet" conditions. The criteria for wet conditions are applied to the Hapuna site as this area probably receives more than 3 million gallons of groundwater per mile per day if, hence, personal communication. Samples collected from behind the shoreline are not considered to have relevant coastal water standards.

Comparing water chemistry results from the Hapuna samples to DOH standards reveals that 27 measurements of NO$_3^-$ exceeded the "not to exceed more than 10% of the time" standards. As discussed above, NO$_3^-$ is a normal constituent of groundwater. Scaling NO$_3^-$ to salinity reveals that concentrations found in waters off the survey sites are the result of groundwater discharge at the shoreline. NO$_3^-$ measurements that exceed DOH standards occur at all of the sampling stations, and extend from the shoreline out to a maximum of 100 m from shore (Station C-V). While numerous NO$_3^-$ measurements exceed DOH standards, it is important to note that the highest value encountered in the ocean (15 pM) is only about 1.7% of the concentration found in discharging water.

Thus, by comparison of the water chemistry constituents with DOH criteria, it is apparent that under the present conditions (prior to any new construction activities), natural processes can cause measurements of water quality that exceed specified DOH limits.

BIOLICAL COMMUNITY STRUCTURE

Descriptive Assessment of Reef Structure

The main structural feature of the shoreline between Hapuna Bay and Puako Bay is a basaltic ledge of pahoehoe lava with interspersed pockets of white calcareous sand. In most of the area examined, the nearshore subtidal areas not fronting sand beaches are composed of basaltic boulders and sheep lava fingers. The seaward edge of the lava shoreline is composed of either a relatively flat basaltic bench, or vertical sea cliffs 1-2 m feet in height. Hapuna Beach, composed of a wide expanse of white sand is the major exception to the predominantly rocky shoreline.

The underwater zonation scheme consists of several predominant regions. Beginning at the shoreline and moving seaward, the shallowest zone beyond the shoreline is comprised of a seaward succession of the basaltic shoreline bench covered with a limestone veneer, along with scattered basaltic boulders that have entered the ocean after breaking off from the shoreline. Areas of sandy bottom are also common throughout the nearshore zone. A dominant characteristic of the bench is extensive pitting by the biocorrosional action of the sea urchins Echinoidea manahual, and Echinoidea aegyptiaca. The pitted structure of the nearshore reef platform is most pronounced in the inner areas of Waialea Bay. Also abundant on the shallow nearshore area is extensive encrustation of calcareous red algae. Pavillona meandrina, a sturdy hemispherical coral is the dominant colonizer of the nearshore area. This species is able to flourish in areas that are physically too harsh for most other species, particularly due to wave stress. Other coral species are limited in growth form to small, flat encrustations of several species. Water conditions are often turbid, and substantial freshwater input from groundwater discharge is evident. Within Puako Bay (Station B-I), the shallow...
neashore zone was most extensive, as was the degree of bioerosional activity. The relatively barren nature of the inner areas of Puako Bay suggest that the area may have recently been impacted by recent events which may have increased silution to the point of killing reef corals. The shallow transect at each station was conducted in the nearshore zone. In areas fronting sand beaches, the most shoreward reef zones are essentially absent, with bottom structure consisting of an expanse of white sand. Within 25-50 m of the shoreline, the reef platform undergoes a transition from a flat bench (0-3 m) to uneven hummocky surfaces separated by sand patches. Coral cover increases gradually with distance from shore. The predominant species are *Porites compressa,* and *P. lobata.* The former species is commonly known as “finger coral” and often occurs as interconnected mats that spread laterally over large areas of the sea floor. The latter species commonly occurs as large dome shaped hemispheres up to 2 m in height. The occurrence of such large colonies in the Kawaihae-Puako corridor indicates that this area does not appear to be subjected to periodic devastating wave forces that occur in other areas. In areas exposed to wave forces, coral reefs build and overtopping of living colonies, preventing corals from reaching the large size observed off the survey area. Off the hummocks extend approximately 1-3 m off the sand flats, and are covered predominantly with large colonies of *Porites lobata* and matts of *R. compressa.* The mid-depth transects were conducted in the hummocky area.

Beyond the reef platform described above, structure of the offshore environment between Kawaihae and Puako is very different from the general physiographic pattern that has been documented as characterizing much of the west coast of the island of Hawaii (Dooler 1982). The predominant pattern along most of the coast from South Kona to North Kohala consists of a narrow nearshore reef bench and steep reef slope. Between Kawaihae and Puako, however, bottom topography lacks the sharp nearshore reef slope. Instead, bottom topography consists of a gently sloping face from the shoreline out to abyssal depths. As a result, reef structure extends much further offshore than in areas to the north and south with sharp reef slopes. The broadened reef terrace is clearly evident in Figure 1. It can be seen that the horizontal distance between depth contours is substantially greater between Hapuna and Puako compared to the area south of Puako Point.

Without the reef slope, the outer reef area (greater than 10 m) displays a rather unique structure. Moving seaward, the coral hummocks gradually change orientation from random pattern to a series of elongated fingers with the long axes perpendicular to the shoreline. At the 10-20 m depth, the fingers have the appearance of elongated knolls or ridges that rise off the bottom by as much as 5 m. These ridges are up to 80 m long, and are generally 10 to 15 m wide. In cross-section the knolls are semi-circular, with rounded tops and sides. Such finger knolls are regularly spaced, and are separated by channels of fine white sand. *Porites compressa* covers the tops and upper flanks of the ridges; overlapping platelike colonies of *P. lobata,* **Stylophora pistillata,* and *Montipora spp.* occupy the vertical areas of the lower ridge walls. *R. compressa* branches are noticeably longer and thinner in this region compared to the shallow nearshore platform, where branches are shorter and thicker. It appears that the finger knolls are not composed of an underlying core of basalt, but are the result of biocumulation of calcium carbonate through active reef building processes. The deep transect at each station was conducted across a coral ridge.

Quantitative Analysis of Benthiic Community Structure

Table 2 shows abundance estimates of invertebrates observed throughout the region of study. The predominant taxa of macrobenthos (bottom dwellers) throughout the reef zones off the Hapuna area are scleractinian (reef-building) corals. Results of quantitative line transects conducted within the three dominant reef zones provide a data base characterizing coral community structure. Table 3 shows the quantitative summary of coral community structure, while Appendix A is comprised of individual transect results.

In total, 13 species of "stony" corals, and two "soft corals" were encountered on transects, while the number of coral species on a single transect ranged from 3 to 9. *Acropora sp.,”* *Porites brignami,* *Cyphastrea achatina,* and *Fungia scutaria* were observed in the study area, but did not occur on any transects (see Table 1). The dominant species on the transects were *Porites compressa,* which accounted for about 50% of total coral cover, and *P. lobata,* which comprised about 30% of coral cover. Thus, these two species comprised about 80% of living coral cover, and 44% of total bottom cover. "Torn" coral cover comprised about 50% of bottom cover for the areas transected, and represents a mean coral cover of the entire reef zonation pattern.

With respect to zonation of coral cover, the most abundant species on the shallow transects were *P. lobata* and *R. meandrum.* The exception was at Station BIII, where *R. compressa* was abundant in the nearshore shallow zone of Puako Bay. While having the lowest coral cover, the shallow zone had the highest species diversity, and among the highest numbers of species. The mid-depth hummock zone was dominated by *P. lobata,* with intermediate coral cover compared to shallower and deeper areas. Numbers of species in the mid-depth area was
the highest of all the zones. The deep finger knoll zone contained the highest percentage of living coral, predominantly in the form of mats of *A. compressa*. However, transects were oriented so as not to sample the wide sand channels separating the fingers.

Species diversity (see Table 3) showed an inverse relationship with depth. The shallow transects at each station had the highest diversity (lowest cover), while the deep transects had the lowest diversity (highest cover). Such a pattern indicates that on the shallow reefs, rigorous physical conditions prevent a single species from dominating coral cover. Conversely, on the deeper areas beyond the forces of wave stress and other physical factors that can limit coral growth, the fragile, but rapidly growing mats of *A. compressa* monopolize solid substrata, and reduce the equitability of species distribution.

The other dominant group of macroinvertebrates are the sea urchins (Class Echinoidea) (see Table 2). The most common urchin in *Echinoidea* mathaei, which occurred in all reef zones, E. mathaei are small urchins that are generally found within interstitial spaces bored into basaltic and limestone substrata. This species is most abundant in the shallow nearshore zone, and least abundant on the finger knoll transects where solid substrata was not common.

*Tripneustes gratilla* and *Heterocentrotus mammillatus* are other species of urchins that occurred throughout the reef. Both of these urchins occur as larger individuals (compared with *E. mathaei*) that are generally found on the reef surface, rather than within interstitial spaces. *Tripneustes gratilla* and *Echinothrix* sp. are the predominant echinoids found on the coral ridges, but overall urchin abundance is reduced compared to the shallower areas.

Sea cucumbers (Holothurians) observed during the survey consisted of three species, *Holothuria sp.*, *H. nobilis*, and *Acanthocephalus ocellata*. Individuals of these species were distributed sporadically across the mid- and deep reef zones, and were most abundant within Waialua Bay (Table 2). The most common starfish (*Asterias* sp.) observed on the reef surface were *Gomphus* sp. Several crown-of-thorns starfish (*Acanthaster planci*) were observed feeding on colonies of *Porites meandrina*. Numerous sponges were also observed, predominantly under ledges and in interstitial spaces.

Frosted benthic algae are conspicuously rare on many of the reefs of West Hawaii. The most common algae were the encrusting red calcareous genera (*Porolithon* spp., *Peyssonella rubra*, *Hydrotheca* spp.). These algae were abundant on bare limestone surfaces, and on the nonliving parts of coral colonies. Frosted algae observed on the reef included *Valonia* spp., *Lyngbya majacutes*, and *Halimeda* spp. *Lyngbya* was especially abundant on the shallow inshore reefs at Station B-11 in Puuoa Bay. In some areas of high groundwater flow at the shoreline, such as at the corners of Hapuna Bay, algae of several species (*Eire* spp., *Abalonea conchalis*) was observed on rocks in the intertidal zone.

The design of the reef survey was such that no cryptic organisms or species living within interstitial spaces of the reef surface were enumerated. Since this is the habitat of the majority of molluscs and crustaceans, detailed species counts were not included in the transecting schema. No dominant communities of these classes of benthos were observed during the reef surveys at any of the study stations.

**Reef Fish Community Structure**

Reef fish community structure was largely determined by the topography and composition of the benthos. Transect results are presented in Table 4. On individual transects, the number of individual fish ranged from 176 to 251, number of species ranged from 26 to 37, and species diversity ranged from 2.52 to 3.06. A total of 2,253 individuals representing 76 species were noted.

The reef fish community off the Hapuna area is typical of that found along most of the Kona Coast (Hobson 1974, Walsh 1984), and can be grouped into five general categories: juveniles, planktivorous damselfishes, herbivores, rubble-dwelling fish, swarming tetradontids, and surgeonfishes.

Juvenile fish belonged mostly to the family Acanthuridae (triggerfish family, with representatives from the families Lepididae (tassels), Mullidae (giant fish) and Chilodontidae (butterfly fish)). Juveniles were most abundant on the deepest transects (50-60 ft.) in areas dominated by finger coral (*Porites compressa*) or boulder rocks. The complex habitats created by the growth of *P. compressa* provided shelter for fish. Juvenile fishes were also common along the heads of Porites lobata. Many juvenile parrotfish (*Scarus* sp.) were noted at the inshore transect at Station B-11.

Planktivorous damselfish, principally of the genus *Chromis* were abundant in all areas surveyed. Agile chromis (*Chromis agilis*) were abundant along the margins of coral rich areas in deeper water, whereas blackfin chromis (*C. vanderbilti*) was the primary shallow water species.
Harbivores, primarily the yellow tang (kōʻunci), Zebrasoma flavescens, and gutting surgeonfish (kole, Ctenochaetus striatus) were also abundant. On the shallow reef terrace, adult whitebar surgeonfish (mokako, Acanthurus whitei), orangeband surgeonfish (A. olivaceus), brown surgeonfish (A. nigricans), and parrotfish (uhu, Scarus spp.) were also common. In areas where coral rubble was abundant, common fish included pacific angelfish (Centropyge multicolor), and several species of wrasses, notably fowline wrasse (Pseudochromis fowleri), sightline wrasse (P. acutifrons), and yellowtail wrasse (Sparisoma aurofrenatum), and Coiris gaimardi.

Fish directly adjacent to the shoreline were not quantitatively assessed because of the difficulty in working on the shallow wave-rolled habitat that these fish inhabit. Visual observations, however, revealed that this biotope supported a large number of fish, principally harpibores such as rabbitfish (‘A‘ai, Kyphosus bigibbus), surgeonfish (Acanthurus spp.), and unicornfish (mostly unambulatus, Naso flaviguttatus). Saddle wrasse (Thalassoma bifasciatum) and Burke’s wrasse (Thalassoma burkei) were also abundant in the surge zone. Large numbers of black dragon (Humuhumunukunukuamua), Abochichthys nigrofasciatus, and pinktail dragon (Humuhumunukunukuapua‘a, M. viola) were also observed in the water column over various parts of the reef platform.

Only a few species of “food fish” (taken by subsistence and recreational fisherman) were observed during the survey. A few schools of goatfish (ae’o, Mullidiichthys fulvolineatus), and blue-lined snapper (kapa, Lutjanus kasmira) were observed. A few grand-eye groupers (lua, Epinephelus grandis) were observed at some deeper locations. Large coral heads sheltered fair numbers of squirrelfish (lua, Myripristis berndti). Other food fish included parrotfish (uhu, Scarus spp. and greyer troi, Cephalopholis argus). None of these species were particularly abundant. Orange-banded surgeonfish (kole, Ctenochaetus striatus), while abundant, were generally not large enough to be considered suitable for “food fish”. The relative scarcity of food fish indicates that the area has been subjected to a fair amount of fishing pressure.

**DISCUSSION**

**Potential Impacts to the Marine Environment from Erosion**

An objective of this assessment is to estimate the potential for impact to the marine environment from construction and operation of a golf course at Hapuna. Implementation of the proposed project would involve grading, vegetation removal, new construction, and other land use changes. There are no plans, however, for any alteration of the shoreline or offshore environment. Because the project does not entail any shoreline modification, potential problems could arise only from changes in input to the marine environment from erosion of soils, or chemical substances from fertilizers and pest control agents.

A literature review compiled by the Golf Course Superintendent Association of America (GCUSA) (November 1988) summarizes the impacts of existing golf courses on environmental Quality. Overall, the findings indicate that golf courses do not pose a significant pollution threat to the nation’s water supplies. While respect to impacts from erosion, golf courses actually help reduce sedimentation by increasing soil stability through thick layers of grass thatch. Carefully managed golf course turf grasses have been found to have 15 times less runoff than does a lower quality lawn. Studies have also shown that golf courses experience 6 to 68 times less erosion than areas planted in wheat or corn (DeBustos and Gabrieli 1980). Golf courses can also greatly reduce erosion and runoff effects compared to other land uses, such as roadways, buildings, or parking lots.

Construction of the proposed golf course project may cause temporary increases in terrigenous sediment runoff during the period of grading, topsoil placement, and turf “grow-in.” While the potential for erosional impacts in the nearshore marine environment appears to be low, the “worst-case” situation must be considered where sediment input to the ocean does occur. As described above, the keystone component of the biota is reef corals. The effects of sediment stress to corals has been extensively reviewed by Johannes (1975), Dodge and Vains (1977), Bak (1978), Brown and Howard (1985) and Giigg and Dool (1990). In summary, these reviews indicate that increased sedimentation can have a detrimental effect on corals by restricting available light for photosynthetic activity and by burying living colonies. However, sediments must be considered components of normal environmental settings.

Because sediments are suspended by natural processes in many reef environments, most corals can withstand a certain level of sediment supply to the living surface. Many species have the ability to remove sediment from their tissues by distortion of the corals, or ciliary action which can nullify lethal effects of sedimentation (Yang 1931). Branching species appear to have a distinct advantage over flat platy growth forms in remaining viable in situations of prolonged sediment deposition.

In case studies of the effects of sedimentation, the range of environmental effects varies through the entire spectrum of stress. Several reduction of corals within a 1-mile radius of sugar mills on the Hamakua Coast of Hawaii has resulted from continual discharge of
wastewater containing high loads of particulate toxicogenous materials (Nira Tech 1989). The zone of influence, however, are limited to the areas where sediment buries corals, and has not changed in dimension since government regulations required removal of 90% of the particulate material. Other cases where effects of sedimentation have caused mortality have been generally limited to areas of confined circulation such as Castile Harbor, Bermuda (Dodge and Valinys 1977), and Kaneohe Bay, Hawaii (Bennet 1974).

In areas of unrestricted circulation such as South Kohala, however, there have been instances of increased sedimentation reported that do not appear to cause any substantial effects to reefs. Shepard (1980) reported that following dredging and filling for a military harbor in Diego Garcia Lagoon, coral cover appeared to show no effects from increased siltation. Roy and Smith (1970) assessed coral community structure in Fanning Lagoon which contains both areas of turbid and clear water. The presence of very turbid water and muddy bottoms did not prohibit the growth of visible reefs. Reefs in the turbid areas were ecologically different from those in clear water, but were nevertheless "normal" living reefs. Branching corals dominated the communities in the turbid water, while massive corals predominated in the areas of low sediment resuspension.

Several scenarios around the Hawaiian Islands can also be drawn upon to substantiate that impacts from sedimentation do not always result in substantial, irreversible damage to neighboring marine environments. Studies conducted at Punalu'u, Kaui (Gigg and Dollar 1980), French Frigate Shoals (Dollar and Gigg 1981), and Hilo Bay (Dollar 1985), all revealed no impacts to reef coral communities subjected to seemingly high levels of sediment stress. Monitoring of beach construction at Malakai Bay (Dollar 1987), located in South Kohala, Hawaii, showed that while substantial sediment plumes in the water column were created by excavation of the shoreline, there were no temporary or permanent negative effects to benthic and fish communities. Rapid flushing of the bay by normal current exchange, and the ability of bivalves to exercise sediment removal behavior appeared to prevent measurable changes in community structure parameters. Results of these studies indicate that Hawaiian reef communities possess the adaptive ability to maintain community integrity under conditions of substantial sediment loading, as long as corals are not continuously buried.

While the literature clearly documents that sediments subsidies do not necessarily result in deleterious impacts to corals, it is stressed that for the present project, all engineering and construction considerations should aim to exclude as much as possible the addition of sediment runoff to the coastal ocean. Such potential can be mitigated in part by minimizing acreage that is exposed at any one time, and timing of construction to avoid seasonal periods of heaviest rain.

While temporary increases may not result in any substantial or permanent alteration to the biotic communities, water chemistry analyses (as well as observational indicators) that water quality and clarity in the South Kohala area is of the highest order found in Hawaii. Inputs of terrestrial sediment would likely result in some temporary reduction in water quality that may affect neighboring areas of substantial recreational usage.

Effects From Fertilizer Chemicals

The development and operation of the proposed golf course will undoubtedly require some application of fertilizers to supply essential nutrients to turfgrasses, and pesticides to control weeds, plant diseases and insect pests. Fertilization may be accomplished either from commercial mixes, or application of treated sewage effluent. Under some conditions, these chemicals may be subject to movement from the site of application, primarily by leaching to the groundwater aquifer. As groundwater effluent to the ocean is a characteristic of the entire coast of Hawaii, consideration of the potential impacts to the marine environment from golf course operation are considered below. It is important to note, however, that the principal components of fertilizers are plant nutrients, which occur in abundance in uncontaminated groundwater. Thus, the considerations for these materials is clearly different than for pest control agents, which do not occur naturally in the environment. As such, pest control agents will not be considered in this discussion.

Fertilizer nutrients of concern for contamination of groundwater are nitrogen and phosphorus. Nitrogen is the nutrient of concern for several reasons; it acts as a major component of most fertilizers, its essential solubility in the nitrate-oxy anion form, and its potential role in the eutrophication of open bodies of water receiving high levels of nitrate from land. Ammonium-nitrogen (NH₄⁺) moves little in soils. Nlit⁺, however, is converted to nitrate (NO₃⁻) which is not bound tightly to soils, and moves readily with water. Normally, when golf course management matches evapotranspiration with irrigation, NO₃⁻ will be used rapidly after application in the production of new turfgrass. Usage of slow release nitrogen in fertilizers also reduces the potential for NO₃⁻ leaching to groundwater. Under some conditions, however, such as overirrigation and overfertilization, or when excessive rainfall occurs soon after application of a soluble nitrogen source, there is potential for excessive loss by surface runoff or by leaching below the root zone.
Phosphorus, primarily as orthophosphate (PO₄³⁻) is usually attached very tightly to soil colloid and moves little, if any, from the site of application. Because of the mineralogic composition, most of the salts used for golf courses in Hawaii can immobilize large amounts of phosphorus. However, the porous basin underlying the South Kohala area is more permeable to PO₄³⁻ than soil. As a result there is potential for phosphorus to leach to groundwater owing to golf course operation at the subject site.

Soil retention studies conducted on a golf course in Hawaii indicated that upwards of 90% of the applied fertilizer N and 100% of P is taken up by the thatch/root complex (Chang and Young 1977). Data from Brown et al. (1977) and Tavares (1983) showed that for soluble N sources at high rates of application and high irrigation rates, about 10% of the total N applied was leached in the first 2 to 4 days after application, after which the leaching loss dropped to about 2% of the applied N per day for about 2 to 3 weeks. Two to three weeks after application, essentially all of the applied N was used by plants, leached, or lost as gas (ammonia). A study by Brown et al. (1982) on highly porous sand golf greens in Texas compared the amount of nitrogen lost by leaching from various nitrogen sources and concluded that application was made at relatively high rates to provide leaching opportunity. Results of their study showed that over a five-month period, approximately 23% of the nitrogen applied as a soluble N source (ammonium nitrate) was leached.

Impacts from fertilization of golf courses using treated sewage effluent have been a subject of study as both an effective alternative to ocean sewage disposal and as a means of recycling fresh water. California grass (paspalum) irrigated with effluent from secondary treated domestic sewage showed excellent results as a means of disposal of large amounts of water, and for effective removal of nitrogen. Under irrigation rates as great as 90 mm/day, the monthly effluent nitrogen content ranged from 17 to 59 mg N with an average level of 34 mg N. Of the applied nitrogen, an average of 65% was harvested in the grass, 3% percolated, nearly 28% was denitrified, while the soil nitrogen status remained unchanged or decreased slightly. Even with the highest effluent irrigation rates, nitrate nitrogen levels in the percolate remained less than the 10 mg N recommended maximum for potable water (Handley and Eker 1981). The results of these studies suggest that there is potential for a relatively small percentage of fertilizer nitrogen to leach to groundwater.

A survey of the effects of existing golf course irrigation and fertilization on nearshore marine waters off the west coast of the Island of Hawaii showed that existing courses (Mauna Lani, Waikoloa, Mauna Kea) are not causing alteration in water quality or biological community function and structure (Dollar and Smith 1988, Marine Research Consultants 1990). Courses located upslope from open coastlines, such as at Hapuna, showed little effect on nutrient concentrations in the nearshore ocean. These results suggest that normal fertilization does not result in undesirable nutrient enrichment in nearshore waters. An exception, however, appeared in a semi-enclosed inlet (Kekaha Kai) located directly downslope from a 27-hole golf course. Owing to a residence time in the bay that is substantially longer than in an equivalent area of open coastline, and to the “focusing” of groundwater efflux, increases in dissolved nitrogen measured in Kekaha Bay appear to be attributable to golf course fertilization (Dollar and Smith 1988, Dollar and Akinson, submitted). However, the nutrient subsidy was restricted to a surface layer of low salinity water that is rapidly transported out of the bay. As a result, the benthos within the bay were never exposed to the excess nutrients, and plankton populations in the surface layer did not increase substantially owing to the short residence time within the bay.

It should also be stressed that naturally occurring groundwater contains extremely high concentrations of NO₃⁻ in relation to marine waters. Groundwater effluent is a natural phenomenon, and it must be assumed that the nearshore communities are adapted to nutrient concentrations contained in groundwater. It therefore follows that subsidies of NO₃⁻ to groundwater, should they occur as a result of golf course operation, do not change the qualitative nature of the groundwater, and do not necessarily represent a potential pollutant to receiving environments. Brock et al. (1987) presents evidence of such nutrient subsidy in anchialine ponds owing to the Waikoloa golf course; however the increases are within the natural range of fluctuations of nutrient content in the ponds, and native aquatic pond biota do not appear to be sensitive to the increased nutrient values.

It appears that golf courses constructed inland from open coastlines, or embayments that do not cause substantial reduction in water residence time (such as at Pukoo and Hapuna), do not cause potentially detrimental nutrient input into the nearshore region. If a proportion of nutrients added to the golf course situated on open coasts is reaching the shoreline, it appears that “normal” rates of water mixing are sufficient to reduce the increased input function to below detection limits within a short distance from the shoreline. As the golf courses sampled in the studies cited above have been operating for a time period of 10 to 25 years, it appears safe to conclude that any cumulative impacts, should they be occurring, would be discernible at the present time.

As long as nutrient loading rates from irrigation do not overwhelm the carrying capacity of the golf course (i.e. extreme over irrigation there does not appear to be any indication that the
quality of nearshore waters will be affected. Thus, with prudent management practices that preclude intense over-irrigation and fertilization, there does not appear to be potential for negative alteration of nearshore water quality.

It can be concluded that as long as reasonable steps are taken in construction practices and operational procedures, the project does not involve substantial changes in material delivery to the nearshore ocean, there should be no adverse impacts to the marine environment. It is recommended that this baseline assessment constitutes the first phase of an ongoing monitoring program conducted before, during, and after construction to assess if shoreline activities at the Hapuna Recreational Area are resulting in changes to nearshore water quality. Such changes in water quality would be warning signals of potential changes to marine community structure. Thus, any changes in water quality owing to shoreline development should trigger mitigative action, hopefully at a level below that capable of inducing change in biotic structure.

SUMMARY

1. Evaluation of nearshore water chemistry off the proposed Hapuna Recreational Area was carried out in March, 1991. Fifty-seven water samples were collected from five stations located offshore of the project. Water samples were collected on transects perpendicular to depth contours, extending from the shoreline to a distance of approximately 250 m offshore. Analysis of 13 water chemistry constituents included all parameters specified in DOH water quality standards.

2. Several dissolved nutrients (NO$_3^-$, TN, PO$_4^{3-}$, TP and SI) displayed horizontal gradients with highest values closest to shore and lowest values at the seaward sampling sites. Correspondingly, salinity was lowest closest to the shoreline. These patterns indicate that groundwater is entering the marine environment near the shoreline and mixing with oceanic water. This pattern was especially evident at Station C-I, the southern end of Hapuna Bay, and least developed at Station C-II in the center of Hapuna Bay.

3. Along with horizontal gradients in water chemistry constituents, there is an indication of vertical stratification within the water column. Such stratification is the result of incomplete mixing of a low density surface layer originating from groundwater and stream water, with an underlying layer of denser oceanic water.

4. Other water chemistry constituents that are not related to groundwater efflux (DOH, DOP, NH$_4^+$) do not display the steep gradients with respect to distance from the shoreline. Turbidity and Cl are elevated at Station C-II, possibly as a result of planktonic populations that may be trapped within the corner of Hapuna Bay.

5. Application of a conservative mixing model which relates the concentration of dissolved nutrients to salinity reveals most of the nutrient content (with the exception of NH$_4^+$) in the coastal area is the result of mixing of groundwater with ocean water. There is no indication of salinity of NO$_3^-$ to natural groundwater input from any activities on land. Scaling PO$_4^{3-}$ to salinity indicates uptake at Station C-II, corroborating the conclusion that increased Chlorophyll a concentrations may be a result of increased plankton growth.

6. Numerous water samples exceeded State DOH standards for NO$_3^-$. These samples appear to contain dissolved materials in excess of DOH standards primarily as a result of natural processes of nutrient input.

7. Assessment of the benthic and reef fish community structure off the Hapuna Recreational Area was conducted in conjunction with the water quality survey. Nine transects were evaluated at three stations located offshore of the property.

8. Physical structure of the nearshore region consists rocky basaltic shorelines that form the land-sea interface. Several small sand beaches also comprise sections of the shoreline. The reef area is divided into three major zones: a shallow nearshore zone characterized by a flat reef platform; a mid-reef zone composed of irregular bottom topography characterized by extensive reef growth, and a deep reef zone composed of dome-shaped elongated ledges composed of accumulated coral growth that are separated by sand channels. Such a zonation scheme is typical of the West Hawaii area in that a deep reef slope does not occur.

9. Coral community structure differs substantially in each zone. The shallow reef bench is typified by small encrusting corals that can withstand the rigors of sediment, freshwater input, and wave action. The mid-depth reef is characterized by very large coral colonies of P. lobata that indicate that the area is relatively protected from severe wave action. The deep reef ledges appear to be composed of biogenic accumulation of upward growth of predominantly one species (P. compressa). Coral cover of hard bottom area increases moving seaward, while diversity decreases.
10. Reef fish community structure at the Hapuna area is fairly typical of the assemblages found in undisturbed Hawaiian reef environments, and is characterized by six general categories: juveniles, plantivorous damselfishes, herbivores, rubble-dwellers, swarming tetradonts, and surge-zone fishes. The relative scarcity and timid behavior of some food fishes indicates that the area has been subjected to moderate fishing pressure.

11. Construction and operation of the proposed golf course does not appear to present the potential to cause permanent adverse impacts to the marine environment. The absence of plans to modify the shoreline or nearshore environment eliminates the potential for direct alteration of ecosystems. Stresses from natural forces that are presently factors in influencing community structure (e.g. freshwater and sediment input) may actually be reduced with shoreline development. Secondary impacts associated with runoff of materials associated with the development do not appear to present the potential for changes based on similar, existing projects. The successful elimination of such impacts, however, is predicated on proper construction and management scenarios.

12. While this evaluation does not present great potential for alteration of the marine environment from the proposed project, it is recommended that the present baseline survey serve as the initial increment in an ongoing monitoring program. The monitoring program should be designed to establish a preconstruction baseline of conditions in order to evaluate any changes that might occur during the construction and operational phases of the project. Such a monitoring program should also be designed so that if environmental alterations are identified, mitigative measures can be applied prior to degradation of water quality and benthic community structure.

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**TABLE 2.** Marine macroinvertebrate occurrence at Survey stations in the vicinity of the Hanpuna Beach Recreation Area. For station locations, see Figure 1.

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TABLE 3. Coral species percent cover, non-coral substrata cover, and coral community parameters for transects off the Hapuna Beach area.
For transect station locations, see Figure 1.

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TABLE 4. Reef fish abundance off the Hapuna Beach recreational area. For transect station locations, see Figure 1.

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FIGURE 1. Map showing location of Hanawa Beach Recreational Area. The open circles locations of water chemistry sampling stations (T1 through T5) and biological sampling stations (biological and zooplankton). The solid line indicates the location of the transect line.

FIGURE 2. Plots of surface water dissolved nutrient concentrations as functions of distance from the shoreline for the Hanawa Beach Recreational Area. Locations of sampling transects T1 through T5 are shown in Figure 1.
FIGURE 5. Plots of surface and deep-water chemistry constituents of all samples as functions of distance from shore of the Hana Beach sampling sites shown in Figure 1.

FIGURE 6. Plots of dissolved Si, PO₄²⁻, NO₃⁻, and H⁺ as functions of salinity. Dotted line is conservative mixing line constructed by connecting measured concentrations from groundwater (salinity = 0) and open ocean water (salinity = 35 ppt).
**REEF CORAL TRANSIENT DATA SHEET**

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**QUADRAT TOTAL:** 67 62 43 35 106 64 49 63 79 45 472

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<tr>
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<td>783</td>
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<td>1 1 1 1</td>
</tr>
<tr>
<td><em>Mangrove</em></td>
<td>1 1</td>
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**QUADRAT TOTAL:** 77 77 49 69 47 64 65 65 81 53 512

**REEF CORAL TRANSECT DATA SHEET**

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<td>22.4%</td>
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<th>SPECIES COUNT</th>
<th>SPECIES DIVERSITY</th>
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<tr>
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<td></td>
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<td>22.4%</td>
<td>3</td>
<td>1.561</td>
</tr>
</tbody>
</table>
APPENDIX E

Assessment of the Environmental Impact of Fertilizers and Pesticides on the Proposed Golf Course of the Hapuna Beach State Recreation Area Expansion, South Kohala, Hawaii
ASSessment of the
Environmental Impact of Fertilizers and
Pesticides

On the Proposed
Golf Course of the
Hapuna Beach State Recreation Area
Expansion, South Kohala, Hawaii

A Report To
Harrison Associates
May 28, 1991

Prepared By
Charles L. Murdoch, Ph. D
Richard E. Green, Ph. D.
I. INTRODUCTION

The proposed Hapuna Beach State Recreation Area Expansion, South Kohala, will include an 18-hole golf course to the east (makua) of Queen Kahanumoku Highway. The proposed golf course area is presently undeveloped and is covered with a variety of grass, brush, and tree species. Thus the land is not presently treated with pesticides or fertilizer. The 18-hole golf course will require application of fertilizers to supply essential nutrients to turfgrasses and ornamental plants. The plants, and pesticides to control their associated weeds, insects, and insect pests. The assessment provided in the report focuses principally on the potential for applied chemicals to move in surface runoff to streams and subsequently to shoreline waters, and also will address movement of chemicals to groundwater. Additionally, the potential for pesticide transport in the air and on bird activity is of concern to the area. The assessment is oriented toward understanding the potential for negative impact on birds in the area and is addressed briefly in the appendices. The toxicity and environmental behavior of pesticides which are likely to be used are considered in the analysis, as are soil, topographic and climatic factors which may impact on fertilizer and pesticide movement.

II. APPROACH

Key elements of the analysis are (1) calculation of quantities of applied chemicals (pesticides and fertilizer nutrients) which are likely to be used throughout the year, (2) compilation of soil, geologic and climatic information which will aid in the assessment of chemical movement, (3) estimation of water balance from rainfall, irrigation and evapotranspiration, (4) compilation of pesticide properties which may be of environmental significance, and (5) computation of the Attenuation Factor for pesticides used on golf courses, using properties of the chemicals and soil properties, in order to estimate the likelihood of chemical movement to groundwater.

A preliminary recreational activity planning map with project boundaries and an aerial photograph copy were provided by Harrison Associates. We visited the site in April, 1991.

III. ANALYSIS OF FACTORS IMPACTING ON CHEMICAL MOVEMENT

A. Site Factors

1. Topography, geology and soils

The project site is located in the South Kohala District of the Island of Hawaii, south and east of the new Hapuna State Beach Park. A variety of recreational activities are envisioned for various portions of the Park. The golf course is planned to occupy an area 1500 feet wide east of Queen Kahanumoku Highway at the north end and the intersection of Punau Road and Queen Kahanumoku Highway at the south end. The area for the golf course will be about 200 acres; the entire Park Extension, including the golf course, will be about 800 acres. Thus the golf course constitutes about 25% of the development and is located in the makua portion.

The makau boundary of the golf course is at about 280 feet elevation, while the maiakai boundary (adjacent to Queen Kahanumoku Highway) ranges from about 200 feet at the north end to about 140 feet elevation near the stream channel about 200 feet below the north end. The average slope toward the 2000 feet north of the south boundary of the property. The average slope to the south is about 5%. Two stream channels which originate in the watershed area of 280 feet above the golf course are extended to the coastline. The the planned golf course dissect the golf course area and extend to the coastline. The two stream channels which originate in the watershed area of 280 feet above the golf course are extended to the coastline. Thus, the planned golf course dissect the golf course area and extend to the coastline.

The soil type is classified as a sub-type UHollistic Cambisols, in the order Aridorthods, indicating the influence of the arid climate on the development of this ash-derived soil. According to Sato et al. (1973), the development of this soil is moderate, with a small degree of effect. The organic carbon content is relatively low, normally less than 0.5% throughout the soil profile. Thus erosion of the topsoil may be slight, with about 0.2% occurring throughout the soil profile. Thus, erosion of the topsoil may not be significant in much change in the organic carbon content. The soil type is generally high (75 to 100%). This soil can sustain excellent turf growth when adequate nutrients and water are supplied.

2. Rainfall, evapotranspiration and potential recharge

The Hapuna Beach Golf Course is located in the most arid area of the state of Hawaii. Total annual rainfall at the nearest rainfall station (Kawaihae) averages only approximately 9 inches. Mean monthly rainfall varies from approximately 2 inches in January to approximately 0.25 inches in July. Mean monthly rainfall amounts are given in Figure 1. There is no pan evaporation in the area. The pan evaporation is approximately 90 to 100 inches. Evaporation greatly exceeds rainfall throughout the period. Thus, with careful irrigation, there will be little net recharge of groundwater.

It is of interest that rainfall maska of the proposed Hapuna Beach Golf Course is much greater than that at the golf course site itself. Pan evaporation drops rapidly maska of the golf course site (Appendix Figure A-1). Pan evaporation drops rapidly maska of the golf course site. Since streams which drain the golf course have a much larger drainage area maska of the golf course and rainfall is greater and evaporation less in this area, stream water at the golf course site is much greater than at the golf course site itself.
flow to the shoreline comes primarily from undeveloped areas mauka of the golf course.

![Graph showing mean monthly rainfall for the Hapuna Beach Golf Course area.](image)

Figure 1. Mean monthly rainfall for the Hapuna Beach Golf Course area derived from Giambelluca et al., 1986.

3. Groundwater

The groundwater aquifer beneath the area has not been well characterized. The area is associated with the Waimea Aquifer System of the West Mauna Kea Aquifer Sector (Owen et al., 1999). The basal aquifer in the Hapakua formation is thought to contain brackish groundwater over a distance of four to five miles inland from the coast. Two wells on the nearby Mauna Kea Resort pump brackish water (Solt Collins & Associates, 1987).

B. Management Factors

1. Fertilizers

Fertilizers are applied to golf courses to supply those essential nutrients which are used in large amounts and which are deficient in most soils. In typical soils, the elements which are normally applied in a turfgrass fertilization program are nitrogen (N), phosphorus (P), and potassium (K). Fertilizers are normally applied to only the greens, tees, fairways, and part of the roughs of a golf course. Typical areas in each of these types of turf for a 18-hole golf course are estimated in the discussion below.

Turfgrasses use much more N than other elements. Based on turfgrass clipping composition, it has been shown that the turfgrasses grown in Hawaii use about twice as much N as K and about 4 times as much N as P.

The primary fertilizer elements of concern for contamination of ground and surface waters are nitrogen and phosphorus. Phosphorus is attached very tightly to soil clays and moves little if any from the site of application. Phosphorus, therefore, will not cause any problem with contamination of drainage water. Ammonium nitrogen (NH₄⁺) likewise moves little in soils. Nitrogen applied in the ammonium form, however, is rapidly converted to the nitrate form (NO₃⁻) which is not bound to the soil and moves readily with water. Because of high nitrogen use rates by turfgrasses, however, nitrogen will be used rapidly after application. Only under conditions where rainfall occurs soon after application of a soluble nitrogen source would there be excessive loss by surface runoff or by leaching below the root zone. Thus nitrogen movement can be mitigated by applying a slow-release nitrogen fertilizer in which the nitrogen is in an insoluble form when applied (Brown, et al., 1977) or by applying small amounts of soluble N through the irrigation system and irrigating only to replace soil moisture used by evapotranspiration (Snyder, et al., 1984).

Fertilizer use rates for the different golf course areas are shown in Table 1. Complete fertilizers (those containing N, P, and K) are usually applied. Because nitrogen is applied in large quantities and also because it is the only fertilizer element likely to cause contamination of ground or surface waters, only nitrogen application rates are given.

<table>
<thead>
<tr>
<th>Type of Turf</th>
<th>Area (acres)</th>
<th>Fertilizer amount (lb N/1000 sq ft)</th>
<th>Application frequency</th>
<th>Total annual application (lbs N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greens</td>
<td>3</td>
<td>0.5</td>
<td>2 weeks</td>
<td>0.45</td>
</tr>
<tr>
<td>Tees</td>
<td>3</td>
<td>1.0</td>
<td>3 weeks</td>
<td>3.15</td>
</tr>
<tr>
<td>Fairways</td>
<td>50</td>
<td>0.5</td>
<td>8 weeks</td>
<td>400</td>
</tr>
<tr>
<td>Roughs</td>
<td>20</td>
<td>1.0</td>
<td>3 months</td>
<td>260</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td></td>
<td></td>
<td>160</td>
</tr>
</tbody>
</table>
2. Pesticides

There are a number of weed, insect and disease pests of turfgrasses in Hawaii which sometimes require application of chemical pesticides. Pesticides are normally applied only in response to outbreaks of pests. There are few instances in which pesticides other than herbicides are applied in a regularly scheduled, preventative program. A typical pesticide program for golf courses in Hawaii is given in Table 2 below. There are several chemicals which may be substituted for certain ones in this suggested program. Properties of the chemicals listed in Table 2, as well as those of most chemicals used in turf in Hawaii, are given in Appendix A, Table A-1.

Table 2. Approximate pesticide use for an 18-hole golf course in Hawaii.

<table>
<thead>
<tr>
<th>Turfgrass area</th>
<th>Area (acre)</th>
<th>Chemical</th>
<th>Frequency</th>
<th>Rate/application</th>
<th>Annual total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Herbicides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Greens</td>
<td>3</td>
<td>MSMA</td>
<td>6 times/year</td>
<td>2 lb. at/acre</td>
<td>26 lb.</td>
</tr>
<tr>
<td>B. Tees</td>
<td>3</td>
<td>MSMA</td>
<td>6 times/year</td>
<td>2 lb. at/acre</td>
<td>32 lb.</td>
</tr>
<tr>
<td>C. Fairways</td>
<td>50</td>
<td>thiobencarb</td>
<td>2 times/year</td>
<td>1 lb. at/acre</td>
<td>72 lb.</td>
</tr>
<tr>
<td>D. Roughs</td>
<td>36</td>
<td>MSMA</td>
<td>2 times/year</td>
<td>1 lb. at/acre</td>
<td>72 lb.</td>
</tr>
<tr>
<td>2. Insecticides</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Greens</td>
<td>3</td>
<td>chlorpyrifos</td>
<td>As needed</td>
<td>1 lb. at/acre</td>
<td>18 lb.</td>
</tr>
<tr>
<td>B. Tees</td>
<td>3</td>
<td>chlorpyrifos</td>
<td>As needed</td>
<td>1 lb. at/acre</td>
<td>18 lb.</td>
</tr>
<tr>
<td>C. Fairways</td>
<td>3</td>
<td>chlorpyrifos</td>
<td>As needed</td>
<td>1 lb. at/acre</td>
<td>18 lb.</td>
</tr>
<tr>
<td>3. Fungicides</td>
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<td></td>
<td></td>
<td></td>
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<td>A. Greens</td>
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<td>metalaxyl</td>
<td>As needed</td>
<td>1.3 lb. at/acre</td>
<td>25 lb.</td>
</tr>
<tr>
<td>B. Tees</td>
<td>3</td>
<td>metalaxyl</td>
<td>As needed</td>
<td>1.3 lb. at/acre</td>
<td>25 lb.</td>
</tr>
<tr>
<td>C. Fairways</td>
<td>3</td>
<td>metalaxyl</td>
<td>As needed</td>
<td>1.3 lb. at/acre</td>
<td>25 lb.</td>
</tr>
</tbody>
</table>

3. Irrigation

Because rainfall is not uniformly distributed throughout the year, all golf courses are irrigated to supplement rainfall. Golf courses usually have permanent sprinkler irrigation systems with sophisticated control systems. Many are computer controlled, so that each sprinkler head on the golf course can be adjusted to apply a selected amount of water on each cycle.

Irrigation requirements of plants can be calculated from pan evaporation (PE) and rainfall (R) data if the water use requirement (transpiration plus evaporation) of the crop being grown is known. The water use requirement of warm-season turfgrasses is approximately 50% of pan evaporation (Handreck and Black, 1944). Irrigation systems are never completely efficient. If one assumes a 85% efficiency of water application, then irrigation requirement can be calculated as (0.85 PE - R). Water use requirement for warm-season turfgrasses was calculated for the Hapuna Beach Golf Course site from pan evaporation (Ekern and Chang, 1983) and rainfall (Gambrell et al., 1984) data, assuming 8 acres of the golf course will be irrigated. Since backflow water will likely be used for irrigation, at this site, calculated irrigation amounts were increased 20% for a leaching fraction to each accumulated salts from irrigation water through the rootzone. Based on these data, the total annual irrigation requirement for the Hapuna Beach Golf Course area averages approximately 145 to 170 million gallons. Even in this extremely arid area, this is considerably less than the commonly cited one million gallons per day required for golf courses in Hawaii. Murabayashi (1989) reported that irrigation amounts for 11 golf courses in the State varied from 0.002 to 0.003 million gallons per day per acre (mgd/acre) to 0.011 mgd/acre, a 478% difference. Average water use for the 11 golf courses was 0.006 mgd/acre. Based on Murabayashi's data, the average golf course with 86 acres of irrigated turf would require approximately 0.52 million gallons of water per day or 188 million gallons per year. The water budget method appears to be a more logical method of determining irrigation requirements, as it is apparent that there are differences in irrigation requirements between areas with different rainfall and evaporation amounts. Since the figures used here are long term averages, day to day (or year to year) irrigation needs may be much different, however, long term averages should predict the average irrigation needs. Daily irrigation scheduling will have to be done using current data.

Irrigation practices may have a large influence on the movement of soluble nitrogen fertilizers in soils. If excessive irrigation water is applied soon after application of soluble nitrogen sources, the likelihood of runoff or leaching of nitrogen below the root zone is increased. From the above it is apparent that basing irrigation amounts on calculated water use is much more efficient method of water utilization than is currently being practiced. The data reported by Murabayashi (1989) was from golf courses in areas ranging from very arid (the Kona Coast, Kailua to relatively wet (Princeville, Kauai). The Hapuna area is very arid, with an extremely high annual pan evaporation rate, yet the average annual irrigation requirement for turfgrasses at this location is less than the amount reported by Murabayashi. Basing irrigation scheduling on water use rates will not only result in large savings of water compared to present practices, but also reduce the likelihood of chemicals being leached from the rootzone.
IV. POTENTIAL FOR CHEMICAL MOVEMENT TO SURFACE WATERS AND GROUNDWATER

A. Surface Water Quality

The principal concern here is for water quality in Ha'apuna Bay and Waialea Bay, both of which receive stream flow from the two unnamed, intermittent streams which carry runoff from the golf course area. There is always a question of the extent to which land use practices impact on the quality of coastal waters which receive runoff from the land. However, there appears to be little cause for concern at this site. The USGS topographic map of the area (Puna Hinali, Hawaii Sheet, 1982) and the aerial photo indicate that the two principal streams drain large areas of the golf course, so that runoff from the golf course into the stream channels during the rainy season would be diluted substantially by runoff from upland areas outside the development. Thus, in major winter storms producing significant runoff, dilution of runoff from the golf course will likely diminish concentrations of applied chemicals in stream water so that no significant impact on coastal water is anticipated. An additional factor contributing to diminished impact is the relatively large buffer area between the golf course and the shoreline; the distance from the lower boundary of the golf course, east of Queen Kaahumanu Highway, and the coastline is over 5000 feet. Much of the runoff from the golf course in a major storm would not be carried by the two major stream channels, but would terminate in the buffer area above the coast. Thus it is highly unlikely that either fertilizer nutrients or pesticides used in golf course management would reach the bay in measurable quantities or at levels that would have any adverse effect on either marine organisms or people. Current requirements for monitoring shoreline waters receiving runoff from new developments on the Island of Hawaii will provide data to document water quality before, during, and after development.

B. Potential Impact on Groundwater Quality

1. Nitrogen from fertilizer

Monitoring results on the Mauna Kea Resort Golf Course, which is near Ha'apuna Beach State Park, have shown no apparent increase in nitrogen levels of near-shore waters in Konaı' Bay after 23 years of golf course fertilization (Green and Hardrock, 1987). This bay receives groundwater flow from an aquifer which lies immediately below the fertilized golf course; it would be a likely place to find nitrogen enrichment from leached nitrate if such enrichment were occurring. These results were consistent with the analysis and conclusions of Dollar and Smith (1988) who found no nitrate enrichment of shoreline waters under normal golf course fertilizer practices. Also, considering the nearly 3000-foot buffer area between the māla'ikai boundary of the proposed Ha'apuna public golf course and the nearest shoreline waters, it is very unlikely that nitrogen enrichment of shoreline waters will occur; the buffer area will cause additional dispersion and dilution of nitrate and other chemicals which may leach periodically during periods of high rainfall.

2. Pesticides

Because the area treated with pesticides on a golf course is small, the total amount of pesticide applied is relatively small also. Most pesticides used in golf course management in Hawaii (Table 2) are either rapidly degraded (half-life in soil of less than 60 days) or are tightly sorbed on soil organic matter (Koc exceeding 500), and move little from the site of application. The pesticides in Appendix Table A-1 which are most likely to move below the root zone are metribuzin, mecoprop, dichlobenil, simazine, and trichlorfon. The relative mobility of these chemicals can be quantified by computation of the Attenuation Factor (AF) of each chemical for an appropriate set of conditions. Attenuation of chemical movement by the soil includes both retardation of movement due to sorption on soil organic matter and degradation in the soil by both biologic and chemical pathways. The AF numerical index (Rao et al., 1985) is presently being evaluated (Chen and Liang, 1989; Lea et al., 1989) for use in an assessment methodology which the State of Hawaii will use in pesticide regulation. The AF index can have numerical values from AF = 0 (total attenuation) to AF = 1 (no attenuation). By definition, AF is the fraction of chemical remaining in the soil after a single application when the recharge is sufficient to carry the chemical to the bottom of a soil layer of a given depth (for example, 50 cm). For soil and water recharge conditions of practical interest in Hawaii, AF values for the five chemicals which are most likely to move beyond a depth of 50 cm are shown in Table 3. AF values range from 2.1 X 10^-6 for simazine (lowest contamination potential) to 7.1 X 10^-3 for trichlorfon (highest contamination potential). For comparison, DBCP, which was used for 25 years in pineapple and has contaminated groundwater at many locations, has AF = 4.6 X 10^-3, indicating a much higher likelihood for DBCP movement to groundwater than any of the chemicals listed in Table 3. Also, the total amounts of chemicals in Table 3 which are used on golf courses are relatively small. Trichlorfon is not used in Hawaii to our knowledge, although it is labeled. Mecoprop and dichlobenil are components of the herbicide Trimex®. Total annual mecoprop and dichlobenil application for the 18-hole golf course will be approximately 20 and 4 pounds, respectively. The total amount of metribuzin applied will be approximately 75 lb. annually. Simazine is used on few golf courses in Hawaii. If used, simazine application would not exceed 100 lb. annually.
Table 3. Attenuation factors (AF) for the most mobile pesticides labeled for use on golf courses.1

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metribuzin</td>
<td>3.5 x 10^{-6}</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>1.3 x 10^{-5}</td>
</tr>
<tr>
<td>Dicamba</td>
<td>7.1 x 10^{-5}</td>
</tr>
<tr>
<td>Simazine</td>
<td>2.1 x 10^{-6}</td>
</tr>
<tr>
<td>Trichlorfon</td>
<td>7.1 x 10^{-5}</td>
</tr>
</tbody>
</table>

1Based on the following conditions: soil organic carbon content = 1.5%; soil bulk density = 1.2 g/cm³; soil water content = 30% by volume; water recharge = 0.1 cm/day; depth of penetration = 50 cm.

If a groundwater aquifer is to be used for a potable water supply, the potential for contamination by agricultural chemicals used in turfgrass management requires more detailed analysis than when the water is likely to be used for irrigation or may not be used at all because of its salinity. A preliminary assessment has indicated that the aquifer beneath the project site is not suitable for human consumption. Hence, concern for groundwater quality is associated principally with the transport of leached chemicals to shoreline water by way of the groundwater. Lava areas with no soil mantle will require interception of soil to support turf growth and to retard movement of applied chemicals to groundwater. The imported soil should have an organic carbon content of about 1% or greater for adequate reduction of pesticide movement. Considering the negligible quantities of pesticides likely to move to groundwater and the potential for control of nitrate leaching by careful management of fertilizer and irrigation scheduling, there will be no significant concentrations of these chemicals in the groundwater.

The above assessment of the potential for pesticide contamination of groundwater at this site is necessarily qualitative. It is of some interest to note actual groundwater monitoring results for other locations considered vulnerable to groundwater contamination. A study of four golf courses on sandy soils in Cape Cod, Massachusetts by Cohen et al. (1990) revealed only a few occurrences (sixteen sampling wells observed quarterly over a period of one and a half years) of detection of pesticides that are currently registered for turf. Of the pesticides listed in our Table 2, Cohen et al. found 2, 4-D, dicamba and chlorpyrifos in only one well (different wells for each compound), and chlorothalonil in two wells. In each case the concentrations in the water were less than 0.3 ppb, far below the specified health guidance levels for these chemicals. Thus the Cape Cod results suggest that under conditions where leaching of pesticides is most likely there is little danger of groundwater being contaminated to the extent that it would endanger human life if the water were used as a potable water source. On the other hand, the results demonstrate that pesticides applied in golf greens and tees can be leached to shallow groundwater in soils that are vulnerable to leaching.

V. Irrigation of Possible Negative Impacts on Water Quality

A. Irrigation

Irrigation practices may have a large influence on the movement of soluble nitrogen fertilizers in soils. If excessive irrigation water is applied soon after application of soluble nitrogen sources, the likelihood of runoff or leaching of nitrogen below the root zone is increased. Raising irrigation scheduling on water use rates and leaching requirements will result in large savings of water and also reduce the likelihood of chemicals being leached from the rootzone. Determination of water use rates for irrigation scheduling can be accomplished by any of several methods, including the following:

1. U.S. Weather Bureau Class A Evaporation pan data.

A standard Class A evaporation pan should be placed on the golf course in an area representative of environmental conditions and in accordance with instructions for correct placement provided by the U.S. Weather Bureau. Water use of warm season grasses can be calculated as approximately 50% of class A pan evaporation. Additional water will be required to account for inefficiencies in coverage by the irrigation system (no irrigation system provides perfect coverage) and for the required leaching fraction to leach salts from the rootzone. Irrigation should be scheduled when soil water content of the rootzone is approximately one-half the available water storage capacity of a particular soil. The amount of water to apply at a given irrigation is that required to replenish the soil water storage capacity plus additional amounts to compensate for inefficiency of sprinkler coverage and to provide additional water for leaching of salts. One can assume that the depth of the rootzone for turf is approximately one foot. An example of how Class A pan evaporation data are used to schedule irrigation is given below.

Fairways with a silt loam soil store approximately 2.5 inches of available water per foot of depth. Greens and tees composed of a mixture dominated by sand hold approximately 0.75 inch of water per foot of depth. The Coefficient of Uniformity (a measure of the uniformity of sprinkler coverage) of the irrigation system is 85%. Brackish irrigation water is being used with an electrical conductivity of 1.25 mmhos/cm. Bermudagrass turf is being used throughout the golf course. Bermudagrasses are quite salt tolerant, therefore the salinity of the soil solution will be maintained at a salinity level no greater than 12 mmhos/cm. Leaching fraction required to maintain a given salinity of soil solution = (Salinity of Irrigation water - Desired salinity of the soil solution). Water use rate of the bermudagrass turf is approximately 50% of Class A pan evaporation.
a. Fairways should be irrigated when 2.5 inches of water is evaporated from the Class A pan (one-half of the water storage capacity of fairway soils = 1.75 inches/ft. depth; water use rate = 50% of pan evaporation, 1.75 + 0.50 = 2.5 inches).

The amount of water applied to fairways at each irrigation should be 1.75 + 1.75 x (0.00 - 0.85) + 1.75 x (1.12 - 0.10) = 1.75 + 0.26 + 2.19 inches.

b. Greens and tees should be irrigated when 0.75 inch of water has evaporated from the Class A pan (one-half the water storage capacity of greens and tees = 0.375 inches/foot; water use rate = 50% of pan evaporation, 0.375 + 0.50 = 0.75 inch).

The amount of water applied to greens and tees at each irrigation should be 0.75 + (0.00 - 0.85) + (0.00 - 1.12) + 0.75 + 0.375 = 0.75 + 0.11 + 0.08 = 0.94 inches.

2). State-of-the-art irrigation systems provide the option of environmental sensing instruments which calculate the water use rate of turf from climatic elements such as solar irradiation, temperature, relative humidity and wind speed. This type of equipment therefore eliminates the need to manually determine water use rates. The turfgrass manager will still need to program in the amount of water to be used before water is applied and the amount to be applied at each irrigation.

B. Nitrogen Movement

Fertilizer applications should always be scheduled so that additional water (leaching fraction) is not applied soon after application of soluble nitrogen fertilizers. Application of soluble nitrogen sources should also be avoided when heavy rainfall is expected. Use of only slow release N sources will ensure minimum N leaching. Petrovic (1990) reviewed the literature on fate of nitrogen applied to turfgrasses. The amount of applied N leached from turfgrass areas ranged from over 50% for soluble N sources to less than 1% for slow release sources. The amount leached was greatest when soluble N sources were applied to coarse textured soils and excessive irrigation or rainfall applied. Nitrogen leached from slow release fertilizers has generally been less than 1% of applied N, even when applied to porous soils and excessive irrigation or rainfall applied. Cohen et al. (1990) reported that nitrate content of leachate beneath golf greens, tees and fairways of golf courses on Cape Cod, Mass. was usually less than the Health Advisory Level of 15 ppm. Nitrate content of leachate was shown to decrease greatly on a golf course which changed from a soluble N source to a slow release N fertilizer.

C. Pesticide Movement

1. Soil cover

Most of the proposed development area has some soil cover, although it is shallow in some places and relatively low in organic matter in most places (see soil description in Section III A.1). To maximize the benefit from the existing soil cover, wherever land levelling is required, the topsoil should be stockpiled and later replaced to maintain as much organic matter in the surface soil as possible. Areas which do not have at least 1 foot of soil above the underlying lava and which will be planted to turf and treated with pesticides will require importation of soil having at least 1% organic carbon. The likelihood of pesticide movement through a shallow layer of soil will diminish with the development of a high-organic layer as the turf becomes well established.

2. Pesticide selection

Numerous pesticides are available for use on turf, as indicated in Appendix Table A-1. Principal considerations in the choice of which pesticides to use are (1) the efficacy of the chemical in controlling the pest of concern, (2) the environmental impact of the chemical, and (3) cost, for chemicals applied in larger amounts. Included in environmental impact is worker safety. An example of a possible alternative which might lessen the likelihood of a negative impact would be the choice of carbaryl rather than chlorpyrifos if a pond containing fish on a golf course were subject to receiving runoff from turf which is treated with the insecticide; carbaryl is less toxic to fish than is chlorpyrifos. In the Hapuna Recreation Area situation, substantial runoff is not expected, and chlorpyrifos is selected for its superior efficacy and resistance to leaching. The chemicals in Table 2 should have no adverse environmental effects with proper management.

3. IPM approach

Integrated Pest Management is the use of all known pest control tactics in design of a program to manage, not eradicate, pest populations, so that aesthetic or economic damage to turfgrass and harmful side effects to the environment are avoided. The goal of an IPM program is to manage pest populations in such a manner that high quality turfgrass can be produced economically, and in an acceptable and ecologically sound manner.

In an IPM approach, pesticide applications are made only when populations of pests reach predetermined damaging levels. Pesticides with the least detrimental environmental impact are utilized.
VI. CONCLUSIONS

Development of an 18-hole golf course in the mauka portion of the Hapuna Beach State Recreation Area is not expected to result in any adverse impact on the quality of either groundwater or nearby shoreline waters. The groundwater aquifer which will receive recharge from the area to be developed is brackish and thus will not be used for human consumption. The low rainfall and high evapotranspiration from turf in this area will preclude recharge of groundwater under normal rainfall conditions. Careful irrigation management will reduce the likelihood of recharge from irrigation of the turf. In the unlikely event that agricultural chemicals (e.g., nitrate from fertilizer application) did leach to groundwater during winter rains, the dilution and dispersion that would occur during groundwater flow through the 3200-foot buffer area between the golf course and the coast would likely reduce nitrate enrichment below levels of detection. Data from the nearby Mauna Kea Beach Golf Course, which has been established over 25 years, has not shown nitrogen enrichment of shoreline water even though the golf course at this site extends to the shoreline. The large buffer area between the golf course and the coastline at Hapuna will also tend to mitigate any negative impact of chemicals in surface runoff to shoreline water. In addition, the two major intermittent stream channels which will carry runoff from the golf course to the coastline originate in undeveloped areas mauka of the golf course; when runoff occurs from the golf course it will be diluted by water originating outside the golf course, further reducing the likelihood of significant concentrations of nitrate or pesticides reaching the coast in runoff waters.

Additional mitigation of chemical impacts on water quality can be accomplished by ensuring an adequate depth of surface soil in any areas planted to turf, use of slow-release nitrogen fertilizers, selection of pesticides which are effective against the pests but which are not likely to move from the site of application, and implementation of integrated pest management. Normal precautions in the use of pesticides registered for turf will also preclude negative impacts on wildlife (particularly birds) and air quality. The importance of good management requires the expertise of a well-qualified Golf Course Superintendent.

VII. LITERATURE CITED


### Appendix Table A-2: Toxicity classes of pesticides.

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
<th>Warning Statement</th>
<th>Oral LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Highly Toxic Skull &amp; Crossbones</td>
<td>DANGER</td>
<td>1-50</td>
</tr>
<tr>
<td>2</td>
<td>Moderately Toxic</td>
<td>DANGER</td>
<td>51-500</td>
</tr>
<tr>
<td>3</td>
<td>Low Toxicity</td>
<td>WARNING</td>
<td>500-5,000</td>
</tr>
<tr>
<td>4</td>
<td>Very Low Toxicity</td>
<td>CAUTION</td>
<td>&gt;5,000</td>
</tr>
</tbody>
</table>


APPENDIX B

IMPACT ON MIGRATORY BIRDS AND ENDANGERED HAWAIIAN WATERBIRDS.

The fertilizers, herbicides, and fungicides used in golf course maintenance pose little or no hazard to birds frequenting the grassed areas or ponds associated with golf courses. Fertilizers are relatively non-toxic unless ingested in large amounts. All herbicides and fungicides used in golf course maintenance in Hawaii are of low to moderate toxicity (Appendix A, Table A-1). The only chemicals used in golf course maintenance in Hawaii which are highly toxic to birds are the organic phosphate insecticides, especially chlorpyrifos.

Although chlorpyrifos is toxic to birds, it is strongly adsorbed on the thatch layer of turf and moves little from the site of application. One reason for its weakness in controlling soil infesting insects is the inability to get the insecticide through the thatch layer to the depth needed to contact these insects. Recent studies (Sears and Chapman, 1980; Tashiro, 1980) have shown that chlorpyrifos applied to turfgrasses does not penetrate more than 2 to 3 centimeters in the soil. In addition, resistance to movement in the soil, it has been shown that it is rapidly degraded in the soil, both by hydrolysis and microbial action (Kles et al. 1979).

Because of the adsorption of organic phosphate insecticides on organic layers in turf and their rapid breakdown, there is little chance of their movement from grassed areas into the ponds associated with the proposed golf course. Label instructions for application of these pesticides (which turfgrass managers are required by law to follow) specifically prohibit their direct application to streams and ponds.

The likelihood of bird injury by pesticides used in maintenance of the proposed golf course can be reduced by proper application of pesticides with reduced toxicity to birds. Appendix Table A-1 shows that carbaryl and trichlorfon are less toxic to birds than chlorpyrifos. In most cases these insecticides may be substituted for chlorpyrifos with little loss of effectiveness.

Golf courses are frequently visited by birds. As far as we are aware, there have been no reported incidents of bird kill in Hawaii from chemicals applied in golf course management. Waterfowl and fish appear to thrive in ponds and water hazards on golf courses in Hawaii. Many golf courses cultivate white amur fish in the ponds to control algae. Mosquito fish are generally stocked to prevent mosquito problems. We are aware of no incidents of fish or waterfowl injury from chemicals applied to golf courses.

The labeling of herbicides and pesticides by EPA for particular uses, enforced by the Hawaii Department of Agriculture, is perhaps the best assurance of protection of humans and wildlife from their hazards. All pesticides must be applied in compliance with federal and state laws regulating their use. Hazards to both humans and wildlife are included in the decision to label a pesticide for specific uses, including use on golf courses, and in developing regulations on allowable application procedures of the pesticide for various uses.
APPENDIX C

IMPACT ON AIR QUALITY

Most herbicides and pesticides used on golf courses are of relatively low mammalian toxicity, with LD50 values ranging from hundreds to several thousand mg/kg body weight (Appendix Table A-1). None of the chemicals listed in Table 2 in this report are highly volatile. A measure of volatility is the vapor pressure (VP). The compounds used in highest quantity, for which vapor pressure data is readily available, are chlorothalonil (VP=1.3 x 10⁻³ atm at 25°C) and chlorpyrifos (VP=2.4 x 10⁻⁴ atm at 25°C). In comparison, DBPC, which is known to be volatile, has a vapor pressure of 1.2 x 10⁻³ atm at 21°C, i.e., at least 100 times the vapor pressure of chlorothalonil and 100,000 times the vapor pressure of chlorpyrifos. In addition, pesticides are applied on golf courses in dilute sprays (50 to 100 gallons of spray solution per acre) to open areas. For these reasons there is little likelihood of volatility once the pesticides are applied.

If properly applied, there is also little potential for drift of spray particles from golf course spray equipment. The greatest danger of significant drift of pesticides is from aerial application. Golf course pesticides are applied with ground spray equipment. Boom height of spray equipment is less than one meter. Low spray pressures (30 to 65 psi) and coarse spray droplets further reduce the hazard of airborne fine droplets. Droplets larger than 100 micrometers diameter are not highly subject to drift.

Most of the spray volume from typical flat-fan nozzles used in agricultural spray equipment is from droplets larger than 100 micrometers. Appendix Table C-1 below shows a typical distribution of droplet sizes for a flat-fan nozzle (the type used in most golf course spray equipment). At the low concentrations used in pesticide application, this would not result in significant quantities of pesticides being carried downwind. High wind speeds would increase the likelihood of drift of fine spray droplets, however, because high wind speeds distort spray patterns and results in poor coverage; spraying in periods of high wind is not common practice. Appendix Table C-2 below shows the percent of spray application volume deposited at 4 and 8 feet downwind and the distance downwind for the volume to drop to 1% or below for flat-fan nozzles under different conditions. Even under high wind conditions (almost 10 mph) and spraying at 60 psi, the distance downwind at which 1% or less of the total spray volume was deposited was only 17 feet.

Appendix Table C-1. Droplet size range for a typical flat-fan nozzle at 20 and 40 psi. (From Holman et al., 1980)

<table>
<thead>
<tr>
<th>Droplet size range (microns)</th>
<th>Percent of spray volume</th>
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<tr>
<td>0-21</td>
<td>70 psi</td>
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<tr>
<td>21-63</td>
<td>3.0</td>
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<tr>
<td>63-105</td>
<td>10.7</td>
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<tr>
<td>105-147</td>
<td>16.2</td>
</tr>
<tr>
<td>147-210</td>
<td>36.7</td>
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<tr>
<td>210-294</td>
<td>27.5</td>
</tr>
<tr>
<td>&gt;294</td>
<td>5.8</td>
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</table>

Appendix Table C-2. Percent of spray volume deposited at 4 and 8 feet downwind and the distance in feet for the volume of spray solution to drop to 1% of the total spray volume (from Holman et al., 1980).

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Pressure (psi)</th>
<th>Wind speed (mph)</th>
<th>Percent deposits 4 ft.</th>
<th>Percent deposits 8 ft.</th>
<th>Distance to drop to 1% of volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>40</td>
<td>3.5</td>
<td>31.1</td>
<td>6.6</td>
<td>70</td>
</tr>
<tr>
<td>27</td>
<td>40</td>
<td>3.5</td>
<td>5.9</td>
<td>1.5</td>
<td>13.0</td>
</tr>
<tr>
<td>18</td>
<td>30</td>
<td>5.3</td>
<td>9.3</td>
<td>2.2</td>
<td>14.0</td>
</tr>
<tr>
<td>18</td>
<td>25</td>
<td>9.9</td>
<td>10.3</td>
<td>3.1</td>
<td>15.5</td>
</tr>
<tr>
<td>18</td>
<td>40</td>
<td>9.9</td>
<td>9.1</td>
<td>3.6</td>
<td>17.0</td>
</tr>
</tbody>
</table>

To facilitate spray operations and to comply with label instructions of some pesticides, spray applications are only made in late afternoon or early morning hours when golfers are not on the golf course. This reduces the risk of exposure of people to airborne spray particles. Sufficient buffer space with tall vegetation between the golf course and housing sites and facilities (such as the clubhouse) will be used by people will further reduce the chance of exposure to airborne pesticide particles.

The greatest danger of airborne pesticides is to the applicators of pesticides themselves. Mixing of wettable powder formulations and being in close proximity to airborne spray particles, particularly when operating spray equipment in a downwind position, places spray operators in particularly vulnerable positions. EPA and OSHA have strict standards which specify
that spray operators wear appropriate protective clothing and breathing apparatuses.
APPENDIX F

Botanical Survey
Hapuna Beach State Recreation Area Expansion
BOTANICAL SURVEY
HAPUNA BEACH STATE RECREATION AREA EXPANSION
SOUTH KOHALA DISTRICT, ISLAND OF HAWAI'I

by

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Prepared for: HARRISON ASSOCIATES

February 1994
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<tr>
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</table>
BOTANICAL SURVEY
HAPUNA BEACH STATE RECREATION AREA EXPANSION
SOUTH KOHALA DISTRICT, ISLAND OF HAWAI'I

INTRODUCTION

The project site consists of approximately 800 acres of State-owned land located within the ahupua'a of Lululilo, South Kohala, Hawaii island. Elevation ranges from sea-level to about 270 ft., above mean sea-level along its mauka boundary, with a small portion along the northeast corner somewhat higher at about 389 ft. elevation. The project site is divided into two parcels by the Queen Ka'ahumanu Highway. The mauka parcel consists of about 200 acres; an 18-hole golf course and ancillary facilities (driving range, golf clubhouse, maintenance area) are planned for this parcel. It is bounded by the Queen Ka'ahumanu Highway to the west, the Hapuna Golf Course to the north, undeveloped lands to the east, and the Lululilo Windfarm Road to the south. The makai parcel covers about 600 acres. It already supports the popular and well-used Hapuna Beach Park and an existing lodging (A-frames). In the Master Plan, more public facilities are planned for the makai parcel; these include an organized group camp area, car/ family campground, group picnic rentals, restrooms, parking, hiking trails, and picnic areas. The makai parcel is bounded by the ocean to the west, the recently completed Hapuna Resort area to the north, the Queen Ka'ahumanu Highway to the east, and Pu'uko to the south.

The vegetation throughout most of the 800-acre project site is dominated by two introduced species, buffel grass and kiawe trees. The topography is generally moderately sloping, but somewhat steeper and rolling on the upper, mauka parcel. The dark reddish-brown, extremely stony soils form a thin layer over very weathered and decomposed paleohoe bedrock; stones cover 50% or more of the surface. Annual rainfall is less than 20 inches.

Field studies to assess the botanical resources found on the Hapuna Beach State Recreation Area Expansion project site were conducted on 27 to 30 December 1993. A team of four botanists was used to gather the technical data contained in this report. The primary objectives of the survey were to: 1) describe the major vegetation types; 2) inventory the flora; 3) search for threatened and endangered species as well as rare and vulnerable plants; and 4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

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. Topographic maps, the preliminary Master Plan map, and a black and white aerial photograph were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. The mauka parcel was accessed from Lululilo Windfarm Road to the south, and to the north from the "water-tank road" located directly across from the Hapuna Beach Road entrance along Queen Ka'ahumanu Highway. On the makai parcel, a paved but rutted and well-traveled road, the Pu'uko Road, crosses the length of the parcel. A large number of dirt roads are also found on the makai parcel.

The less disturbed mauka parcel, which was more likely to harbor native plant communities and, perhaps, rare plants, was more...
Incentively surveyed. No detailed survey was made of the improved
and landscaped areas on the beach park, lodging area, and around
the homes by Wailea Bay.

A walk-through survey method was used. Notes were made on plant
associations and distribution, substrate types, topography,
exposure, drainage, etc. Plants which could not be positively
identified in the field were collected for later determination
by comparison with known specimens in the herbarium, and reference
with the most recent taxonomic literature. The species recorded
are indicative of the season ("rainy" vs. "dry") and the envi-
ronmental conditions at the time of the field survey. A survey
taken at a different time of the year and under varying envi-
ronmental conditions would no doubt yield slight variations in
the species checklist, especially of the weedy, annual plants.

DESCRIPTION OF THE VEGETATION

Except for the sandy beach areas at Hapuna and Wailea Bay, the
substrate throughout the project site has been mapped as "KHC",
Kawaihae extremely stony very fine sandy loam, 6 to 12% slopes,
on the soil maps (Sato et al., 1973). The thin dark reddish-brown
colored soil has numerous stones and rocky outcroppings which
cover anywhere from 50 to 60% of the soil surface. This soil type
overlays pahoehoe bedrock, although in places there are areas
with fragmental 'a'a lava. This substrate supports open, rolling
grasslands, primarily of buffel grass with scattered trees of
kiawe. Along the coastal section of the property, especially in
low lying areas, the soils become deeper and less stony. The fine
sandy loam is more yellow-brown in color, resembling Pahala ash
somewhat. These coastal areas support a dense kiawe forest. There
are several small gulches which cross the property. These support
grassland vegetation, except for the somewhat larger gulch
located on the southern boundary of the mauka parcel, near the
Lalumilo Windfarm Road. There are several seeps within this gulch
and this moister environment provides a microhabitat for a number
of species not found elsewhere on the project site.

The coastal kiawe forest, grassland, and gulch vegetation are
described in more detail below. A list of all the plants inven-
toried on the project site during the field survey is presented
at the end of the report.

Coastal Kiawe Forest

Coastal kiawe forest is found behind the sandy beaches at Hapuna
and Wailea Bay, on rocky headlands, and behind a few cobble
beaches - these beaches are composed of sun-bleached, white
coral fragments and water-worn basalt stones, about 1 to 3 inches
in diameter. The kiawe trees (Prosopis pallida) form a closed-
canopy forest, that is, the branches of the trees interlock and
the canopy cover is greater than 60%. The trees are about 18 to
20 ft. tall.

Under the kiawe trees, the ground cover is primarily buffel grass,
although in some places hairy merrema vines (Merrema sespyllia),
bristly foxtail grass (Setaria verticillata), and West Indian
beggar's tick (Bidens spathulata) are locally common during the
wetter months. 'Ahohe or 'awowow shrubs (Chenopodium cahverens),
an endemic member of the goosefoot family, is locally common
in the kiawe forest just north of the Puako boat ramp.

Along the seaward facing portions of the forest, a number of more
salt-tolerant species are found. These include aloha (Boerhavia
repens), Australian saltbush (Atriplex semibaccata), 'ilihi (Sida
Fallace), 'ihi (Portulace pilosa), kipukai or nana (Hulioegonium
exsaxescens), and the silvery-leaved pa'au o Hi'iaka (Jacquemontia
ovalifolius). A few tree species occur in this vegetation type; these are ironwood (Casuarina equisetifolia), tree heathrose (Thurneforthia argentea), kou (Cordia subcordata), and milo (Thespesia populnea).

Grassland

This vegetation type covers the majority of the project site. Its general physiognomy is of wide, open, low clumps of grass with very scattered, small trees. Buffalo grass (Buchu ciliaris) is the dominant grass species on the makai parcel and on the lower half of the nauka parcel. Buffalo grass, native to Africa and tropical Asia, is a perennial, mat to tussock-forming species. In Hawai‘i, it is naturalized and common in dry areas, from sea-level to about 360 ft. elevation, in a wide variety of disturbed habitats on all of the main islands except Ni‘ihau (Wagner et al. 1990).

On the project site, buffalo grass cover is about 50 to 60%, with the rest of the ground barren, stonily soil. Buffalo grass forms wiry clumps 1 to 2 ft. tall. Widely scattered throughout the grassland are small trees of kiaw, 6 to 10 ft. tall; tree cover is about 3 to 5%. The trees form somewhat taller stands in low-lying, swale areas. Common associates of the grassland are ‘‘ahoolo (Heterosporis indica), ‘‘ilima, hairy spurge (Chamaesyce hirta), pa‘u (H. hokia), and hairy nemersa. Disturbed areas bordering roads support a few clumps of fountain grass (Pennisetum setaceum), and a number of weedy, mostly annual species such as swollen fingergrass (Chloris barbata), threadstem carpetweed (Holcus lanatus), graceful spurge (Chamaesyce hypercifolia), Cuba jure (Eremogonum cuneatum), and Chamaesyce hypercifolia.

On the upper half of the nauka parcel, two native grasses, pili grass (Heteropogon haitiensis) and Eragrostis atropurpurea, are codominant with buffalo grass. That is, they occur in equal numbers. Eragrostis forms stiff, erect tussocks, 2 to 3 ft. tall, while pili grass forms loose, bluish-green colored tufts, up to 2 ft. tall. The native species — Eragrostis, pili grass, ‘‘ilima, ‘‘ahoolo, and pa‘u o H. hokia, tend to dominate the stonier knolls, while the swale areas with somewhat deeper soil are covered primarily by buffalo grass. Eragrostis is locally common on relatively flat areas with a pebbly soil texture.

Gulch Vegetation

On the upper half of the nauka parcel, just north of the Lalamilo Windfarm Road, is a gulch which contains several seeps and small pools of water, which unusually contain a few guppies in them. The gulch continues downslope where it quickly dries out and, like other gulches on the project site, is covered by buffalo grass grassland.

In the areas of the seeps and small pools, the gulch bottom is damp with moss-covered boulders. Woodfern (Chicorea parasitica), patera (Pteris vittata), hairy sword fern (Nephrolepis multiflora), maiden-hair fern (Adiantum pedatum), and the native kumu-nui or ‘iwa‘ienue (Pteropus decipiens) are found among the boulders and moist soil along the gulch walls. A number of species were only recorded from this area; they include kill-o‘opu (Nelumbo brevifolia), Galinsoga parviflora, guava (Psidium guajava), puulele (Epilobium sp.), cocklebur (Xanthium strumarium), peppergrass (Lepidium virginicum), and all the ferns.

This small section of the gulch is quite a contrast when compared to the other parts of the project site. The lush plant growth and cooler, moister conditions attract cattle to the area and much of the vegetation is browsed.
DISCUSSION AND RECOMMENDATIONS

The vegetation on the majority of the project site consists of grassland with scattered koa trees, bunchgrass-grass-dominated grassland on the makai parcel and the lower half of the mauka parcel, and a bunchgrass-grass-prostrate-liliopil grass association on the upper half of the mauka parcel. Coastal koa forest occurs as a narrow belt along the shoreline. Gulch vegetation is a minor vegetation type found only on the upper section of the gulch located north of the Lunalilo Windfarm Road; seeps and small pools of water provide a wetter microhabitat.

A Federal and State listed endangered species, the koʻolauʻula (Abutilon menziesii), is known from the nearby Hanalei Hawai'i Paako property which is being developed for residential use (U.S. Fish and Wildlife Service 1993). The koʻoolauʻula is a highly ornamental, diffuse branched shrub with heart-shaped, silvery-green leaves, and dark red to maroon flowers which resemble miniature hibiscus blossoms. Several populations of the poʻolēi fern (formerly Ophioglossum continentum, now O. polyphyllum), a Category 1 candidate endangered species, are known to occur on nearby lands at Puʻu o Kohola and the Huna Lani Resort (Char 1989, 1991). The fern has small, paddle-shaped leaves, 1 to 3 inches long, and becomes dormant during the dry season. Recent studies, however, indicate that the species is no longer an endemic Hawaiian species, but part of the more widely distributed and common Ophioglossum polyphyllum complex. The U.S. Fish and Wildlife Service has therefore removed the fern from its listing proposal.

An intensive search was made for the koʻoolauʻula, but no plants were found on the 1800-acre project site. The koʻoolauʻula on Hawai‘i Island is usually associated with ‘a‘a lava flows.

Of a total of 73 species inventoried on the project site, 61 (83%) are introduced or alien species, 11 (15%) are native. Of the natives, 7 are indigenous, that is, they are native to the Hawaiian Islands and elsewhere, and 4 are endemic, that is, they are native only to the Hawaiian Islands. The endemic species are: the kumi-niʻa or ‘iaulu fern (Bethypodium decipiens), the ‘ahinahina or ‘iawopo shrub (Chenopodium rhomboideum), Eriogonum atropilloides, and the silver-leaved paʻu o Hīlāka (Jacquemontia ovalifolia ssp. sandwicensis). None of the plants found on the property are listed threatened or endangered species, nor are any proposed or candidate for such status (U.S. Fish and Wildlife Service 1989, 1990, 1992). None of the plants are considered rare or vulnerable (Wagner et al. 1990).

Given the findings above, the development of the site as proposed in the Master Plan should not have a significant negative impact on the botanical resources of the site, or the greater South Kohala region.

As for recommendations, it is recommended that native plants be used for landscaping. The Hawai‘i legislature recently passed “Act 73” which mandates that any new or renovated landscapes for any building, housing, or other facility developed with State funds incorporate native Hawaiian plants wherever and whenever possible.

Native plants found in the area are already adapted to the local environmental conditions and require less water and maintenance, as well as very little soil. The Hapuna Beach Park already uses several native species, as well as Polynesian introduced or Polynesian heritage plants in its landscaping. These include paʻu o Hīlāka, nilo, kou, ‘ulei (Oncosiphon amblyfolia), coconut or niu (Cocos nucifera), hau (Hibiscus tiliaceus), beach...
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<tr>
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<th>Status</th>
<th>Vegetation type</th>
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<td><strong>Ferns</strong></td>
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<td>Adiantum raddianum Fresl</td>
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<td>Pteris spicata L.</td>
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<td><strong>Simplicitaeae</strong> (Simplicity Ferns)</td>
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<td><em>Euryophila decipiens</em> (Hook.) J. Sc.</td>
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<td><strong>Flowering Plants</strong></td>
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<td><em>Amaranthaceae</em> (Amaranth Family)</td>
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<td>Alternanthera paluens Kuntz</td>
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<td>EBRAGINACEAE (Borage Family)</td>
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<td>LEPTIUM (MUSTARD FAMILY)</td>
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<td>CAPRARACEAE (Caper Family)</td>
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<td>Cleome graminacea L.</td>
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<td>Chenopodium murale L.</td>
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<td>Leptinella alosifolia (Raf.)</td>
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<tr>
<td></td>
<td>pe'uo Hi'ilaka, kakua o Hi'ilaka</td>
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<td>S</td>
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<tr>
<td></td>
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<td>X?</td>
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<td>EUPHORBIACEAE (Spurge Family)</td>
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<td>Chamaesyce hirta (L.) Millsp.</td>
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<td>Chamaesyce prostrata (Alston) Small</td>
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<td>FABACEAE (Pea Family)</td>
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<td>Chamaecrista nictitans (L.) Moench</td>
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<td>Desmodium incanum DC.</td>
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<td>Leucophaea leucophaea (Lam.) de Wit</td>
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<td>Mimosa pudica var. unijuga (Sauvage &amp; al.) Griseb</td>
<td>X</td>
<td>S</td>
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<td></td>
<td>Prosopis pallida (Humb. &amp; Bonpl. ex Willd.) Kunth</td>
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<td>MALVACEAE (Mallow Family)</td>
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<td>Malvastrum coromandelianum (L.) Girecke</td>
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<td>Sida rhombifolia L.</td>
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<td>NOLLYGIRACEAE (Carpetweed Family)</td>
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<td></td>
<td>threadstem carpetweed</td>
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<td>Vegetation type</td>
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<td>horseweed, lani wela</td>
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<td>Tridax procumbens L.</td>
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<td>Xanthium strumarium var. canadense</td>
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<td>BORAGINACEAE (Borage Family)</td>
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<td>Cordia subcordata Lam.</td>
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<td>Heliotropium curassavicum L.</td>
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<td>Cleome gynandra L.</td>
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<td>monothina</td>
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<td>Articule semilascata R. BR.</td>
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<td>Articule semilascata R. BR.</td>
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<td>Chenopodium murale L.</td>
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<td>Chenopodium oahuense (Meyen) Aellen</td>
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<td>pa' u o h' iaka, kakou o h' iaka</td>
<td>E</td>
<td>+</td>
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<td>Leucaea leucolephas (Lam.) de Vdc</td>
<td>koa-ho'ole, koa</td>
<td>X</td>
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<td>Prosopis pallida (Hub. &amp; Bonpl. ex Willd.) Kunth</td>
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<td>+</td>
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<td>NALHACEAE (Mallow Family)</td>
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<td>Sida fallax Wulp.</td>
<td>'ilima</td>
<td>I</td>
<td>+</td>
<td>-</td>
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APPENDIX G

Phased Archaeological Inventory Survey
Hapuna Beach State Recreation Area Expansion Project
Phase III - Data Analyses and Final Report
Phased Archaeological Inventory Survey
Hapuna Beach State Recreation Area Expansion Project
Phase III - Data Analyses and Final Report

Land of Lalamilo
South Kohala District, Island of Hawaii

PJB
Paul M. Johnson, Ph.D. • Associate Senior Archaeologist

PREPARED FOR
Heritage Associates
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Honolulu, Hawaii 96813

FEBRUARY 1994

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PHRI
Paul H. Rosendahl, Ph.D., Inc.
Archaeological • Historical • Cultural Resource Management Studies & Services
Honolulu, HI • Kona, HI • Las Vegas, NV • Boulder, NV • Guam, CNMI • P.O. Box 99261 • Hawaii 96791
SUMMARY

At the request of Mr. Warren Harman, of Hawaiian Associates, on behalf of their client, the State of Hawaii, Paul H. Beaumont, Ph.D., Inc. (FHBU) recently conducted an archaeologi-
ical inventory survey of the 750-acre Hanalei Beach State Recreation Area Expansion projec-
tion area, located in the Leeward Coast, North Kohala District, Island of Hawaii. Phase I of the
area was undertaken in 1990 and involved initial site identification field work
(Northeast and Northeast 1990). The primary goal of Phase I was to gesture to identify
anarchological sites within the projection area, and to determine whether any of the
archaeological sites were affected by the扩张 project area. The Phase I sites identified are not
considered significant. When the surveys were complete, it was concluded that a minimal negative
impact would be generated in the EIS. The Phase I findings satisfied conformance with Phase
II of the archaeological inventory survey program.

Phase II of the inventory survey was undertaken in 1992 and involved completion of
inventory-level field work at those sites which required additional evaluation and data
acquisition. Phase II field work included the total number of projection area sites to 609 sites from the
original figure of 339. Completion of Phase II field work was followed by preparation of an
inventory report (Dunn 1993), which explained the basis for updating the number of project area
sites.

The purpose of this report is to summarize the results of the Phase III archaeological
inventory survey. Thesurvey has involved analysis of all recovered cultural materials, including site
and feature distributions, as well as description and analysis of recovered potsherds and cultural
remains. As noted, the overall objective of the three phased program was to provide
information appropriate to and sufficient for the preparation of an environmental impact
statement (EIS) which in being prepared in conjunction with the State's proposal to expand
existing park facilities.

One hundred twenty-five sites containing approximately 423 component features have been
identified and recorded within the project area. This total includes 121 of the 339 sites
that had originally been identified during the Phase I survey work (Dunn and Northeast 1990). Of the
remaining 118 previously identified sites, 13 were determined to be located outside the
project area, and 30 were determined to be either wholly contemporary housing
blocks or other recreational or residential facilities. The remaining 95 previously identified sites were
either not recorded or determined to be cultural features, or they had been detected during the
inventory survey. Phase I and Phase II field work to the 121 previously identified sites, 43 sites were
newly identified and recorded during the Phase II field work.

The sites included the following feature types: adjacent C-shaped, alignment, etc., Bain
with adjacent wall, cleared area, cleared alignments, circular area, cow, C-shaped, C-shaped
wall, C-shaped wall, C-shaped wall with adjacent wall, depression, enclosure, enclosure with
adjacent C-shaped, the, the, the, the, the, the, the, the, the, the, the, the, the, the, the, the,
adjacent C-shaped, the, the, the, the, the, the, the, the, the, the, the, the, the, the, the,
adjacent C-shaped, the, the, the, the, the, the, the, the, the, the, the, the, the, the, the,
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INTRODUCTION

BACKGROUND

As the request of the Hawaiian Heritage Association on behalf of their clients, the State of Hawaii, Paul H. Reed, Inc. (PHR) recently conducted an archaeological survey of the c. 750-acre Hapuana Beach State Recreation Area Expansion Project area, located in the Land of Lumeria, South Kona District, Island of Hawaii. The present document represents the final phase of a three-phased archaeological inventory survey program.

Phase I of the inventory survey was undertaken in 1986 and involved initial site identification field work (Burges and Reed, 1986). The primary goal of the Phase I work was to attempt to identify all archaeological sites within the overall project area, and to determine whether any of the identified sites might be of sufficient significance to warrant further study or be developed for public use and development. The Phase I work identified 259 sites and the complex was consisting an estimated 637 component features. None of the sites were considered extraordinary significant, and it was concluded that a minimal negative declaration could be rendered in the EIS. The Phase I findings justified continuing with Phase II of the archaeological inventory survey program.

Phase II of the inventory survey was undertaken in 1988 and involved completion of inventory-level field work at 176 sites which required additional evaluation and documentation. Phase II field work included the total number of project area sites that were the same from the original Phase II inventory survey. Completion of Phase II field work was followed by preparation of an Interim Report (PHR, 1992), which explained the results obtained from the number of project area sites (this issue is also addressed in the Findings section of the present report).

The present project represents Phase III of the archaeological inventory survey. This Phase has involved analysis of all recovered cultural materials, including site and feature distributions, as well as descriptions and analyses of recovrred potable cultural materials and cultural materials.

As noted, the overall objective of the three-phased program is to provide information appropriate and sufficient for the preparation of an environmental impact statement (EIS) which is being prepared in conjunction with the State's proposal to expand existing park facilities.

SCOPE OF WORK

The basic purpose of an inventory survey is to identify — to discover and locate on available maps — all sites and features of potential archaeological significance present within a specified project area. An inventory survey is an initial level of archaeological investigation, and as such is extensive rather than intensive in scope. The primary aim of an inventory survey is to determine the presence or absence of archaeological resources within a specified project area. A survey of this type indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. An inventory survey also provides a general significance assessment of identified archaeological resources and facilitates the formulation of recommendations and estimates for any mitigation work that might be necessary or appropriate. Such mitigation work typically includes further data collection (i.e., detailed recording of sites and features), and selected test excavations. In addition, mitigation work often involves data recovery research excavation, as well as construction monitoring, alternative planning and development, and the preservation of historical features with significant scientific research, interpretive, and/or cultural values.

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As noted, the overall objective of the three-phased program is to provide information appropriate and sufficient for the preparation of an environmental impact statement (EIS) which is being prepared in conjunction with the State's proposal to expand existing park facilities.
In order to ensure compliance with the rules and regulations of governmental review agencies, all aspects of the inventory survey were conducted in accordance with the standards for inventory-level survey recommended by the Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD). The significance of all archaeological remains identified within the project area was therefore assessed in terms of (a) the National Register of Historic Places eligibility criteria outlined in the Code of Federal Regulations (36 CFR Part 60) and (b) the criteria for evaluation of traditional cultural values prepared by the National Advisory Council on Historic Preservation. DLNR-SHPD and the Hawaii County Planning Department (HCPD) use these criteria to evaluate eligibility for both the Hawaii State as well as the National Register of Historic Places.

To further facilitate client management decisions regarding the subsequent treatment of identified resources, the general significance of all archaeological remains identified during the survey was also evaluated in terms of three FHWA Cultural Resource Management (CRM) value models, which are derived from the above criteria. These were then evaluated in terms of potential scientific research, interpretive, and cultural values. Scientific research value refers to the potential of the archaeological resource for producing information useful in the understanding of human history, past lifeways, and cultural processes which can be examined at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

PROJECT AREA DESCRIPTION

The Kaneohe State Park Expansion Area consists of approximately 710 acres of land situated along the seaward (southern) shore of the district of South Kohala. The project area is in the coastal zone and a portion of the intertidal zone of the land unit now identified as Keahole Point Unit (Kaneohe Point Unit). The project area includes portions of Kaneohe Bay, the southernmost half of the district of South Kohala, and its immediate coastal flat lands (the Keahole Point Unit). Although identified as Keahole Point Unit, early traditional accounts and mid-1800s land records generally identify the land as Puu O'ia (Kaneohe Point Unit), rather than Keahole Point. It appears that the name change had occurred by 1874, when territorial survey maps began identifying Keahole as the land unit rather than Puu O'ia. The circumstances surrounding this change are presently unknown.

The Phase I survey work involved a project area of approximately 700 acres. By the time the Phase II field survey work was undertaken, however, three additional areas contiguous to the original project area and totaling approximately 20 acres, had been added. One of these areas involved an examination of the southwest portion of the original project area, involving lands adjacent to the boat ramp at Kamehameha Highway. The second area was located in the far northeast corner of the original project area, Island of Oahu, Kamehamea Highway. The third area was in the far southwestern portion of the original project area, also Island of Oahu, Kamehamea Highway. These three areas had not been previously surveyed in Phase I, but were evaluated during the Phase II field work by walking a series of pediment elevations oriented north-south and east-west.

Figure 1 identifies all of the Phase I and Phase II project area lands. As currently configured, the project area is bounded along the west by the Pacific Ocean, along the north by the southern
portion of Hanauma Bay and the South Kohala Resort Complex, and along the south by the
boundary between Kamuela and Waikoloa. The eastern boundary roughly parallels Queen Ka'ahumanu Highway at a point c. 3,200 feet east of the highway.

The hot, dry climate of the project area is directly related to topographic and geographic phenomena associated with the position and relative position of Kohala Mountain, Mauna Kea, and Mauna Loa. These three land masses intercept the moist-laden northeasterly trade winds that penetrate much of the area, creating a "rain shadow" in the west and southwestern areas; annual rainfall is less than about ten inches, with approximately 75% occurring during the six-month winter season which typically starts in October-November and continues through March-April. Mean annual temperature is about 77 degrees F., with a maximum annual variation ranging from ca. 64 degrees in about 89 degrees F.

The geologic base of the project area consisted of Pliocene or Mauna Kea flows of the upper member of the Harunuma volcanics. These flows were shaped and accreted by lateral and central flows of Kilauea ash deposits in many areas. Extensive areas of beach sand are found along the coast, and outcrops of the underlying volcanogenic sediments are common throughout the project area. The limited surface water has developed the most prominent land forms in this area, which occur within moderately to greatly sloping pahoehoe flows and are represented by calderas, tuff cones, cinder cones, and spatter cones. As well, several pahoehoe drainage channels proceed roughly east-west through the project area.

The soil within the coastal zone consists primarily of a sparsely developed soil humus which represents an exposed pahoehoe bedrock and is covered by vegetation. The following zones of vegetation are found: Eucalyptus, Pinus, and Vetiver. In the upland areas, the vegetation is more varied, with a variety of bushes, trees, and shrubs. The upland areas are dominated by light to moderate stands of native species (Prosopis pallida Linnae and Dodea ex Willd.).

Little specific information is available concerning the local marine environment. Generally, however, this area consists of relatively shallow development of Littoral and marine shingles. Algae growth on the lava is common, and the intertidal zone is well developed, with a variety of sea life present. The offshore area is also well developed, with a variety of sea life present.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Extensive archaeological research has been undertaken within West Hawaii generally, including coastal and upland portions of several land uses within South Kohala, principally.

As in 1955 briefly investigated a number of sites at Kileaupuaa and conducted extensive excavations at a large shelter area (HA-81-300). Since the same period he also excavated a cave shelter (Ha-81-301) at Paiko. Although the results of these excavations were not published, Emory's findings are summarized in Kirch's "Notes On the Excavation of Site 1301, Paiko Shelter" (Kirch 1971:198). Kirch also summarizes an earlier study at Kealia, excavations conducted by Colin Stuart in 1961-62 at Kealaionialoha and Kealohoula. Kealohoula was used as a base for archaeological investigations at Paiko, including excavations conducted by Colin Stuart in 1961-62 and the Paiko Bay coastal middens (HA-81-302), as well as 1964 Bishop Museum study of the Paiko petroglyphs (E-2-1). Excavations at HA-81-301 yield a petroglyph site and coastal site with no absolute age estimates. During the study of the petroglyph field, the Bishop Museum team resurfaced and photographed c. 5,000 petroglyphs (E-2-1).

In 1975 Kitch conducted excavations at Kahiakapu on the western cove sites containing middens deposits. The site represented both coastal and inland environments, and the excavation sample was believed to represent approximately 70% of the shell-bearing 3,800-year-old occupation. The results of the survey and excavations were published in a report by Kitch (1977) and a monograph on the site (Kitch 1978). The site was occupied over a span of 8,000 years, with the earliest period of occupation occurring between AD 1100-1400.

In 1981 Welch conducted archaeological surveys at the site of the Pauoa River, located near the western project area (Welch 1981, 1988, 1989, 1990). At a number of the sites previously examined by the Bishop Museum, this work provided further insights into the period and duration of occupation, and suggested that the sites had been occupied continuously from the prehistoric period through the historic period. The work also suggested that the sites had been used primarily for agriculture, fishing, and shellfish gathering.

As a result of these surveys, a number of archaeological sites have been discovered and recorded over the past two decades. By 1990, over 40 sites containing cultural deposits had been identified within the Waiakea Heiau Nature Reserve (Nestle 1989). These sites are characterized by a high density of cultural deposits, and are located along the coastline. The survey also identified a number of sites that were not directly associated with the heiau, but were located in areas where cultural deposits were abundant. These sites are likely to be of archaeological significance, and may provide valuable information about the history and culture of the area.

In 1994 the Bishop Museum undertook a reconnaissance survey in the western area of Lakena, carried out by Dr. John M. Whalen and colleagues. The survey identified a number of sites that were not directly associated with the heiau, but were located in areas where cultural deposits were abundant. These sites are likely to be of archaeological significance, and may provide valuable information about the history and culture of the area.

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work and on their own reconnaissance survey, ARCH conducted "archaeological testing combined with active excavation of sites (15% until) in the coastal portion" (Chang and Hamann 1980:2). This work, along with additional reconnaissance survey, was conducted by ARCH/HL in 1980, and involved test excavations at 16 sites (Hamann and Fook 1980:41-45).

In December 1981, PHRI conducted additional intensive survey and test excavations in the coastal portion of the Land of Oli, between Hepuna Bay and Keanae Bay (Ronaldald and Kauhuan 1983). Of the 30 sites which had been identified in this area, subsequent testing was recommended for 15 of them. The Keanae Fossil Complex (Site 5635) had been tested previously (Ronaldald 1980), and had already indicated potential for more extensive work.

Following the Ronaldald and Kauhuan's survey and testing work along Oli coastal lands, Walker and Ronaldald completed additional intensive survey work in the waterfowl portion of the akapua'a of Oli (Walker and Ronaldald 1987). This work involved a 100% survey coverage of two land parcel testing c. 95.5 acres and comprising the South Kikaha Fossil Complex development project lands. This work is particularly relevant to the present project area as the two properties lie close to each other. Twenty-five test units consisting of at least 18 component features were identified within the overall project area. Of these, six sites had been previously recorded, and 19 sites were newly identified. The range of cultural feature types included trash deposit, l-shaped wall segment, wall segment, surface artifacts, concentration, wall, road, terrace wall, double C-shape, C-shape, rectangular mound, cairn, boulder alignment, recent human refuse, and hula mokole structure.

Following completion of the report on the South Kikaha Fossil project area (Walker and Ronaldald 1987), PHRI undertook additional intensive survey work. This involved testing potential cultural features at several of the sites that had been previously located within the Mauka Kai development lands adjacent to the north side of the South Kikaha Fossil parcel (Ronaldald and Geiss 1980). The previous intensive survey work had identified 16 features representing possible human burials. During 1980, the possible burial features included 11 platforms, three mounds, a surface feature, and an overlying midden. Antiquarian testing was conducted at all of the 16 features, three of which were found to contain human skeletal remains. The location of the excavated test units did not yield human skeletal remains, although in several instances unassociated cultural deposits and/or unexpected depth of cultural deposits were documented (Ronaldald and Geiss 1980:5).

Finally, limited previous research has been undertaken within the boundaries of the present project area. This work includes Reinecke's 1930 coastal survey for the Bishop Museum (Reinecke n.d.), and Van and Griffin's (1979) survey of an earlier proposal in 1975 to further develop the Hawai'i Beach Park property.

During his 1930 survey for the Bishop Museum, J.E. Reinecke inspected the coast from Kauhuan Bay, near Hana, to Kawaihae, passing through the present project area. Reinecke did not, however, record any archaeological sites within the present project area, except that coastal and several branching trails we noted on his map near Parka.

In June of 1979, staff archaeologists of the Department of Land and Natural Resources conducted archaeological reconnaissance surveys at Hupahe Bay (Van and Griffin 1978). The 1978 project area was considerably smaller than the present project, comprising c. 175 acres (less than the present project's c. 750 acres) and being bounded along the east by the old Parka Road. A total of 56 sites were identified during the survey, all of which were assigned temporary field designations (HUP-1 through HUP-35). Extensive military-related impacts to prehistoric features was noted, and the authors commented that many of the small surface features were likely constructed during military drills and maneuver.

In summary, the survey data identified native Hawaiian artifact types (several of the features, including moku and hula mokole (passage terraces), oral tradition, and additional items. Clearly, temporary and permanent occupation characteristics were not all of the area during prehistoric times, although no formal archaeological testing was undertaken to evaluate this assumption. Many of the areas originally identified by Van and Griffin were relocated during the present project survey, and an appropriate correlation table is presented in the Findings section of this report.

Table 1 provides a summary of some of the research efforts reviewed above in terms of their relevance to the current project.

### Table 1: Summary of Cultural-Historical Studies

<table>
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<th>Dates</th>
<th>Location</th>
<th>Relevant to Current Project?</th>
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<tr>
<td>Walker and Ronaldald (1987)</td>
<td>1987</td>
<td>Oli coastal lands</td>
<td>Yes</td>
</tr>
<tr>
<td>Ronaldald and Geiss (1980)</td>
<td>1980</td>
<td>Mauka Kai development lands</td>
<td>Yes</td>
</tr>
<tr>
<td>Van and Griffin (1979)</td>
<td>1979</td>
<td>Hupahe Bay</td>
<td>No</td>
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</table>

### Cultural-Historical Summary and Settlement Patterns

As noted in the discussion above, several of the previous archaeological studies of coastal, intertidal, and upland areas have established base-line data for much through evaluation of settlement and land use patterns in the region of West Hawaii. The following summary has been generated on the basis of archaeological data from Anahoomalu, Kauhuan Bay, the akapua'a, Oli, Kauhuan, and Waianae. As well, the syntheses have drawn from historic documentary research for the present project area undertaken by Kea'i Ali'i and included in the present report as Appendix A.

For the earliest time periods, it is possible to envision sporadic exploitation of the coastal and upland resources of West Hawaii by small groups who included fishermen and of whom, probably along the measurement coast (Innes 1988). Indeed, the early sites in the region of West Hawaii appear to be restricted to coastal and intertidal terrace areas. Several radiocarbon and tectonic dates, initial occupation of the region probably occurred c. AD 600 at Anahoomalu and was restricted to temporary habitation features. Innes (1988), following Kirch (1975, Cow (1971), and others, has suggested that early habitation likely exploitation of resources and exchanges, as well as construction of small, simple structures (i.e., C-shaped, small structures, etc.).

In addition to early use of the coastal environments at Anahoomalu (Innes 1988), settlements were also being established in coastal and upland areas. Further north in the akapua'a of Kawaihae 2nd (Queen's Land at Mauka Kaua), radiocarbon age determinations suggest initial occupation c. AD 810-900 (Colten and Ronaldald 1980), and the area between Puama Bay and Kawaihae Bay (Mauka Land Cove), a radiocarbon date suggesting initial settlement by c. AD 960 was reported by Innes (1991).

The early habitation of the area exploited the shoreline, shallow water areas, shellfish beds, and rising reefs and the coastal zone, although it has also been documented that terrestrial resources (i.e., birds, pigs, and dog) also supplemented their diet. There is little evidence for agricultural activity directly associated with the initial period of occupation, although small middens may have accumulated vegetative remains from the sea (sea urchin), provided limited agriculture at shellfish locations (if present), and/or imported vegetative items from inland sources.
### Table 1. Previous Archeological Work in Nearby Portions of South Kohala and North Kona

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
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<td>General</td>
<td>A</td>
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</tr>
<tr>
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<td>Jameson</td>
<td>South Kohala</td>
<td>General</td>
<td>E</td>
<td>Bishop Museum</td>
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<td>Swann</td>
<td>South Kohala</td>
<td>Lahaina</td>
<td>E</td>
<td>Bishop Museum</td>
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<tr>
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- A = reconnaissance survey
- E = intensive survey
- R = radiocarbon dating
- LE = laboratory evaluation

Kisch proposed that the overall population of West Hawaii was relatively low and remained fairly stable until c. AD 1200, at which point a significant increase began to occur (Kisch 1983:318). Prior to this time period, primary settlements may have been limited to coastal sites, as at Apanoa Kule, Halana Lani, Puupeho, Puakea, Puakea Bay, Kawaihae, etc. However, due to insufficient data, specific occupations for Kawaihae and Puakea Bay are presently lacking.

Corral with the beginning of population increase at c. AD 1200 may have been a shift toward increasing reliance on specific subsistence structures, at least at Apanoa Kule and Kahalu'ula (Kisch 1983:253). Puakea Bay (Dobyns and Taylor 1993), and within the present project area at Apanoa South (Dobyns 1995) as proposed by this study. The major implications of this trend — increased use of surface habitation structures such as enclosures, platforms, C-shaped, berms, and walled shelters — may reflect increased sedentism within these coastal environments. Despite these suggested trends, maintenance was probably still largely based on marine resources, although still supplemented with cultivated and gathered terrestrial crops. Significantly, archaeological features (fish ponds) have been documented in present at numerous coastal locations — e.g., Anaholahala (Johnson 1988) and Kahalu'ula (Kisch 1982).

The scarcity of agricultural features at coastal sites suggests that cash or productive agricultural products from elsewhere. It is possible that the upland agricultural complex of Waika, or the Sogi and Sogi agricultural complex at Pu'ukone near Kona may have been developed during this time period, perhaps in response to the result of the growing population proposed by Kisch (1983) and subsequent research (1987). This is supported by the presence of dispersed settlement patterns with the Waika uplands, several of which have been identified by AD 1300–1500 (Clark and Kisch 1983).

This pattern of coastal and upland areas supplying agricultural products from more upland areas may account for the residential nature of most of the recorded sites attributed to this time period. Remanent (1972) has shown that the archaeological evidence for the pre-Columbian occupation of the island is relatively sparse, and it is likely that the majority of sites are not currently known. The results of this study suggest that residential occupation of the island is relatively sparse, and it is likely that the majority of sites are not currently known. The results of this study suggest that residential occupation of the island is relatively sparse, and it is likely that the majority of sites are not currently known. The results of this study suggest that residential occupation of the island is relatively sparse, and it is likely that the majority of sites are not currently known. The results of this study suggest that residential occupation of the island is relatively sparse, and it is likely that the majority of sites are not currently known.
Finally, there is no question that prehistoric Hawaiian settlement and subsistence were radically altered by the influx of Europeans following Cook’s arrival (AD 1779). The European introduced nonnative plants and animals that not only changed the Hawaiian lifestyle but also altered the native vegetation (Brown 1970). Several indigenous plants and animals were heavily worked, including sugarcane, papaya, taro, and sheep. Large Hawaiian taro patches that were being cultivated by Hawaiians for some degree of all of the vegetation on the island of Hawaii. Several prominent, particularly the sugar cane, underwent complete changes. One of the most obvious consequences of introducing exotic plants and animals was architectural change. The Hawaiian farmers now had to build protective walls (mukau) around their fields to exclude animals. Evidence for this has been found throughout West Hawaii (e.g., Cahalan and Rosenblatt 1990).

The final phase of the precontact period was characterized by a decline in intensive agricultural practices. While the population may have increased, the intensity of land use and the extent of agricultural activities decreased. The decline was likely due to a combination of factors, including changes in climatic conditions, overuse of land, and the introduction of diseases carried by Europeans. These factors may have contributed to a decrease in agricultural productivity and a shift towards more diversified economies and subsistence strategies.

FIELD METHODS AND PROCEDURES

As noted in “Scope of Work,” above, field work was undertaken in two phases. Phase I involved a 100% coverage, low-level aerial survey of the entire project area, followed by limited pedestrian survey (Burgen and Rosenblatt 1999). The purpose of Phase I was to identify and record areas of site concentration, areas which might be deemed sites, and the general density and characteristics of the site group. This work resulted in identifying a total of 215 sites containing approximately 667 components of various sizes at or close to the project area boundary.

The Phase II survey work was followed by Phase II inventory survey work, which involved a complete coverage, variable intensity pedestrian survey of the entire project area in order to accurately identify, further sample, and record inventory-level standards all significant and potentially significant cultural resources and which are immediately adjacent to the project area. The findings of this second phase of field work are subject to the present final inventory survey report.

During Phase II, the temporary site numbers assigned during Phase I were retained if the site number differed from Phase I, the temporary number was prefixed with PHA site number (e.g., PHA-S100). Sites newly identified during Phase II were assigned temporary numbers prefixed by “EC” (e.g., EC-1). As discussed above, the Phase II findings of Phase II findings included in 164 sites during Phase II. This total includes 125 of the previously identified sites (S101-EC 124) and 15 newly identified sites (EC-1-EC 15). During the Phase II inventory survey, all project area sites were placed onto toposheets and more detailed project area maps (1:200). The sites were located using topographic maps and grid coordinates within and outside of the project area. Sites were then recorded on standard PHA site-rounded forms, scaled sketch maps were drawn, and the sites were...
photonographied with 35mm black-and-white film. To aid in identification, all features were
tagged with an aluminum strip bearing the temporary site number, feature letter, PHILS project
number (i.e., "50-1244"), the letter "PHILS", and the date.

As part of the inventory survey, test excavation units were placed at various features/sites
in the project area. The purpose of the units was to gather information on the nature and extent
of cultural deposits and to collect carbon samples for radiocarbon dating. The test units were
evacuated by natural layers unless cultural deposits were uncovered, in which case arbitrary
levels were excavated within layers. All test units were processed through 1/2 inch mesh screens to
facilitate recovery of portable artifacts and carbon. Plots of strata/unit features were
documented as part of the test excavation work, and cross-sections were documented graphically. All
site sections were described following the format used in the Site Survey Manual (Soil Survey Staff 1992).

Table 2 provides a correlation of all known site numbers for the 164 sites which have now been
formally recorded within the project area.

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*State inventory of historic places (SHIP) numbers. SHIP numbers are five-digit numbers prefixed by 50-10-11 (S-States of Hawaii; T-Island of
Hawaii; 11- GIS Grid 7.5' series quad map ("Puu Honua, Hawaii").)

Numbers preceded by 855 or 1445 are PHILS temporary site numbers.
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FINDINGS

One hundred forty four containing approximately 425 components features have been identified and recorded within the current project area. This total includes 121 of the 229 sites which had originally been identified during the Phase I survey work (Dorn and Bonsall 1970, site-preferred with temporary number designations of "-140"). Of the remaining 138 previously identified sites, 13 were determined to be located outside the project area, and 30 were determined to be either wholly contemporary hunting blinds or other recreational-related features. The remaining 95 previously identified sites were哪种 not relocated, were reviewed and determined to be cultural features, or they had been destroyed during the interval between Phase I and Phase II field survey work. In addition to the 131 previously identified sites, 42 sites were newly identified and recorded during the Phase II field work (Dorn 1972, sites preferred with temporary number designations of "-145").

As part of the inventory survey, 39 shorelines were excavated within Sites 1975, 1976, 1977, and 1978. In addition, 30 test areas involving a total of 267 square meters of surface area were excavated at 24 features distributed among 17 separate sites. Individually portable artifacts collected from the excavations and surface collections include ground stone tools, stone hoes, stone fragments, worked marine shell, coral bracelets, coral beads, shell, glass beads, and fired shell scrapes, discussed below under "Shell Analysis." 

As will be noted in the discussion below, many of the areas have been covered by buildings and/or "chain dragging" operations in the area. Included among the extensively impacted sites are the major coastal complexes which include most of the features believed to represent permanent temporary habitation within the project area. Nevertheless, substantial detailed descriptive information was recovered during the inventory survey work. This information is presented in detail for the 118 areas and their 415 component features recorded in this report (Appendix D) and is summarized in the Summary of Identified Sites and Features table (Appendix D). Site locations are shown below in Figure 2.

The descriptions in Appendix B include the following information:
1. Site number – Site inventory of Human Place (SIHP) number. SIHP number are four digit numbers prefixed by 30-80-86 or 10195-86 of Hawaii, 85-86 of Okha, 94-USGS quadrangle (Kahana), or 80-USGS quadrangle (Kaneohe).
2. A site type designation – Provides format for type of site consisting of a single feature, or designates the site as a complex if the site is composed of more than one feature. Also lists the total number of features present.
3. A description of site topography – A brief description of the terrain in the immediate vicinity of the site.
4. The listing of site vegetation – List principal components of the vegetation at and within the vicinity of the site.
5. A statement of site condition – Overall state of preservation of the site (poor, fair, good, excellent).
6. A measure of the site integrity — degree of post-abandonment modification by human agents (e.g., plowed, partially burned, and completely altered) and the nature of modifications, if any.

7. A probable age indicates plausibly probable (?) age of the site (i.e., 1st, 2nd, or 3rd century).

8. A functional interpretation — possible or probable function(s) for each site, i.e., a function cannot be determined, assume an indeterminate function. For sites with multiple possible functions, the functions are separated by "/".

9. A site description — a brief overall description of the site's use, features, or materials present, if any, and other information.

10. Feature dimensions — maximum length, width, and height or depth. Dimensions are immediately followed by a description of feature construction, associated portable remains, and other descriptive information.

SURFACE FINDINGS

A total of 165 sites have been identified in the project area (see Figure 2). Of this total, (45.6%) (295) consist of single structural features, with the remaining (54.4%) (358) representing complexes of two or more features. Several of the closest complexes contain accumulated cultural deposits at and around their residential habitation features and feature remains, all of which appear to represent permanent habitation during the prehistoric period. The largest of these groups of permanently occupied cultural sites (Site 13366) contains a total of 28 separately identified features and feature remains.

Despite the extensive impacts which have occurred to many of the surface features, a fairly wide range of functional feature types could be defined on the basis of surface observations of feature architecture and construction techniques. These functional feature types include the following:

- Aggregation, C-Site, E-Site, and W-Site with associated wall, circular wall, circular alignment, circular enclosure, and C-Shaped wall.
- C-Site with associated wall, depression, enclosure, and C-Shaped wall.
- C-Shaped wall, L-Shaped wall, and circular wall.
- L-Shaped wall, C-Shaped wall, and circular wall.
- C-Shaped wall, L-Shaped wall, and circular wall.
- C-Shaped wall, L-Shaped wall, and circular wall.
- C-Shaped wall, L-Shaped wall, and circular wall.

A range of functional interpretations have been made for these functional feature types, including aggregation, surface site, habitation, hunting, burial, occupation, market, military, post-abandonment, possible temporary habitation, recreation, temporary habitation, trail marker, transportation, and water transportation. Some cases more than one functional interpretation was assigned to a single feature.

As inferred from inventory-level data, the predominant functional activities represented appear to include temporary habitation, aggregation, habitation, and transportation produced by market, trade, and travel. Clearly, exploration of the site's marine resources, coupled with agricultural activity in the area, while operating from both permanently occupied feature complexes as well as temporarily occupied sites, represent important activities for Native Hawaiian occupants of the region. Equally clearly, however, is the fact that a variety of non-residential-related, non-indigenous, post-1940s activities are also represented among the project area's cultural remains.

Indeed, extensive "use" was introduced into the data by the existence of an additional group of artifacts that were found outside the site area and are considered to be "use" artifacts. These groups of artifacts are generally made of stone, wood, and metal, and are used for various purposes. The presence of these groups of artifacts suggests that the site area was not only used for residential purposes, but also for economic activities such as trade and transportation.

Table 3 provides a listing of 188 of the project area's 425 recorded features distributed among 131 recorded sites. These features represent post-1940's activities, including features associated with agricultural activities, such as plowing, andModern urban activities such as hunting, State Park maintenance, and excavation. A variety of possible activities are represented in this group of 188 features, including especially modern, C-shaped excavation, walled, and modern urban activities. The frequencies of occurrence of these various functional types are summarized in Table 4. As noted above, the functional assignments made on the basis of the associated artifacts and archaeological data are generally consistent with those features representing prehistoric and more recent activities. Approximately 24 features are associated with modern hunting, fishing, or plowing activities, while an additional 10 features have been assigned a "use" function, or possible modern activities. Additional features include artifacts associated with present-day activities, such as modern residential structures, roads, and water systems. These latter features have been assigned a "use" function, although it is not clear if they are related to modern activities. Also represented are modern water transportation features ("pumps"), as well as several "use" features that are believed related to Hawaiian State Park maintenance activities. An additional 15 features are associated with modern activities, including features with any degree of certainty, but the absence of typical indigenous artifacts does not suggest likely military or contemporary activities. The frequencies of occurrence of the various functional types are summarized in Table 4.

Many, but not all, of these features were mapped in inventory-level standards, during which representative dimensional data was obtained for each of the sub-types identified. Available metric information is summarized in Table 5, while additional descriptive details are provided in Appendix C.

Lastly, during the process of evaluating feature function, one of these features was subjected to surface and archaeological testing. A single structure (Feature 12) was excavated within Feature A mound at Site 1336. All structural materials were identified, and associated details of the feature led to the conclusion that it probably represents post-indigenous activities.
Table 2. Summary of Non-Indigenous Components, Grouped by Inferred Feature Function

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Table 6. Frequencies of formal feature types—Non-indigenous components.
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<td>Roadbed</td>
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Table 5. Frequencies of Functional Feature Types—Non-Indigenous Components

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<td>Military</td>
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<td>10.6</td>
<td>19295(B), 19317(D), 19339(A,B)</td>
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<td>Hunting blind</td>
<td>16</td>
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<td>19350(A,B), 19351, 19352, 19354, 19356, 19577(A,B), 19348(C), 19381, 19384, 19386, 19397, 19392, 19393, 19394</td>
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<tr>
<td>Indeterminate</td>
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<td>8.0</td>
<td>19208, 19208(A,B), 19315(C), 19315(D), 19322, 19321, 19327(G), 19338(F), 19339(G), 19340, 19444, 19445, 19467(A,B,G)</td>
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<tr>
<td>Temporary habitation/military</td>
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<td>19317(G), 19337(A-D,H), 19329(B), 19414(A-D), 19444, 19445(D,E), 19468(A,B)</td>
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<tr>
<td>Hunting blind/military</td>
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<td>4.3</td>
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<td>Possible military</td>
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<td>19273(B), 19287, 19288, 19329, 19345(H), 19348, 19382(A)</td>
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Table 5 (cont.)

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<th>Function Type</th>
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<th>SIHP</th>
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<td>2.2</td>
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<td>1931(B-C,F-H)</td>
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<td>1920(B),1935(A,B)</td>
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<td>Farm maintenance</td>
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<td>1930(A,B)</td>
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<td>1949(B,C)</td>
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<td>0.5</td>
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<tr>
<td>Total</td>
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The modern/contemporary features represented in the 188 features summarized above are clearly not significant for formation value, yet eligibility criteria of the National Register of Historic Places. The functional studies include those which are believed to be included in the World War II era and those which are part of the post-War era. In the absence of significant information values, these features are not further discussed or evaluated in this report, except that relevant treatment options have been considered in Appendix C (Summary of Identified Sites and Features), and Table 5B (Summary of General Significance Assessments and Recommended General Treatment).

Table 6 summarizes the second primary grouping of cultural features within the project area, in this case representing Hawaiian/Tahitian occupations. As further summarized in Table 5, a range of functional types is represented among the 32 features in this group, dominated by features 190, 199, 215, A-C, and C-shaped (15, 53, 75), modified structures (27, 10, 15), enclosures (30, 8, 35), and walls (11, 4, 65). The remaining 28 (87.0%) project area features attributed to indigenous activities include a few examples each of 28 additional feature types (see Table 5).

Tentative functional assignments have been made for all but four of the 327 indigenous features (see Table 5). The predominant functional categories are temporary habitation (10), 43, 75), agriculture (59, 16, 57, 6), and habitation (29, 12, 7). Combined, these three functional categories encompass 82% of the 233 features representing Hawaiian/Tahitian presence and occupation within the project area. The remaining 23 functional categories are listed in Tables 6 and 8 represent 77% of the total, and include possible agriculture (62, 9, 31, 6), transportation (3, 1, 7), heiau or possible recreational features (7, 2, 5), possible ceremonial (1, 1, 3), possible burial (2, 1, 5), and miscellaneous (6, 1, 7).

Habitation Features

As noted, 37 features are believed to represent habitation, possible habitation, or habitation in direct association with agriculture (see Table 5). Tenure, enclosure, and paved areas represent the most frequently occurring essential habitation types, although other patterns also present are a number of slight variations on these forms, as well as中级 and secondary features.

This functional assignment was based on the presence or absence of a number of attributes, including: (a) accumulated cultural debris consisting of food remains (middens), refuse, etc., and artifacts, and (b) an evaluation of the structural complexity of the feature and details of construction. It should be noted, however, that existing data allow only a preliminary evaluation of features, and it is possible that some assignments could change given additional data from one or more of the features.

While habitation was not the most common feature represented within the project area, it is in fact represented in a significant percentage of the features (37, or about 15.5%, of the 233 indigenous features). Significantly, the distribution of habitation features was generally predictable on the basis of existing models of prehistoric and historic patterns of land use and settlement. Throughout much of the dry, forested coastal zone of West Hawai'i, habitation features are frequently concentrated in the vicinity of fresh water ponds or freshwater springs near areas which also exhibit good irrigation or off-shore fishing. The present project area is no
### Table 6. Summary of Indigenous Components, Grouped by Inferred Feature Function

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<tr>
<th>Inferred Feature Function</th>
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<th>L178-179</th>
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<th>L181</th>
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<th>L183</th>
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<th>ANOVA</th>
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**Table 6 (cont.)**

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**Table 8**

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<th>ANOVA</th>
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**Table 9**

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Table 3. Frequencies of Formal Feature Types—Indigenous Components
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Table 7 (cont.)

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TOTAL 237 99.5
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| Temporary
habitation   | 104    | 43.9 | 19225,19246,19273(A),  
19281(C),19294(A-D),  
19296(A-C),19294(A-B),  
19302,19308(A,B,D),  
19315,19334(A-D)      |
|                   |        |     | (19314,B-D,I),19317(A,D),  
19318,19319,19326(B),  
19329(A,B),19331,19334,  
19335,19336,19338(E,F),  
19339(A,B,C),19341(E),  
19340(A,B,D),19344(A-D),  
19345(B,E),19346(A-C),  
19347(B,E),19348,1936(A,A),  
19365(B,F),19367(A,C),  
19368(A,B,D),19369(A,B1-B4),  
19370(A),19374(C),  
19371,19372,19373(A-B,C)  |
| Agriculture       | 39     | 16.5 | 19315,19335(F,G),  
19317(F),19324(A,C),  
19326(C,E),19334(E),  
19337(F),19337(O)19340(D),  
19354(B,C),19355,19360(C)  
19358(B,C),19362,  
19360(D),19364(W,Y,Z),  
A,B,B),19371(C,D),  
19374(C-1),19374(D),  
19380,19381(B),19383,  
19394(C),19400         |
| Habitats          | 30     | 12.2 | 19251,19354(A,F,G,1O),  
19344(A,E,G,L,M,O,P,R,  
T,J),19347(K,S,F,J,K  
L,J),19348(G,L)         |
| Possible
agriculture  | 23     | 9.7  | 19271(D-E,G),19281(D),  
19283(E),19284(E),  
19302(S),19304(C),  
19317(C),19340(G),  
19374,19376(A,B),19392(C)  
19396,19398(A,B,C),19399,  
19395(C),19399         |
| Marker            | 17     | 7.2  | 19241,19243,19271(A-D),  
19274,19275,19279,19280,  
19281(A),19282,19297,  
19297(G),19299,19301,19302,  
19303,19307,19309          |
| Transportation   | 8      | 3.4  | 19345(D,J,K),19346(J,K),  
19400,19410,19413          |
| Recreation       | 6      | 2.5  | 19334(D),19344(C,C),  
19362(D,1),19344          |
| Endeminate       | 2      | 1.7  | 19365(B,C),19405,19412           |
| Possible
ceremonial   | 3      | 1.3  | 19305,19364(F,J)           |
| Possible burial  | 2      | 0.8  | 19365(E,F)               |
| Hearst           | 1      | 0.4  | 19366(D)                 |
| Trail marker     | 1      | 0.4  | 19366(K)                 |
| TOTAL            | 237    | 100.0 |  |
exception. In Figure 3, the 12 sites containing all 37 habitation features have been plotted within the boundaries of the project area. Those twelve sites (19345, 19351, 19364, 19563, 19366, 19562, 19116, 19339, 19401, 19402, 19403, and 19108) dominate the rocky points or headlands overlooking Washoe and Paleo Bay, and all would have been easily accessed via the primary coastal trails. Indeed, it is this easy accessibility, combined with the long history of modern encroachment activities at and around Hupa, which accounts for the extensive surface and subsurface disturbances to which all of these sites have been subjected.

Habitation features were present in moderate to dense amounts at most of the habitation features, as were a variety of portable artifact types. In order to recover specialized artifacts and further evaluate middle to late occupation, and artifact type potential, many of the habitation features were subjected to a combination of surface test unit and excavation. The results of this research are presented below.

Site 19366 typifies the multi-functional feature complex dominated by a habitation function and located along the coastal bluffs at Hupa. This site happens to contain the greatest number of individual features of any project area site, although three other coastal habitation complexes (19567, 19367, and 19568) exhibit generally similar feature associations.

Extending a considerable length along the coastal cliffs, among rolling terrain (See Figure 3), this site contains 25 separate feature areas and was easily entered via the well-defined coastal trail system. Features present include terraces and surface remnants, walls, mounds, C-shaped, circular alignment, D-shaped alignment, cause, circular enclosures, a midden concentration, cleared area, and a well-defined fire hearth. Features extend into depths from 10 to over 60 cm and were excavated among various features throughout the site. These excavations yielded waterworn cobbles and coral, as well as artifacts and contextual remains consistent with the interpretation of habitation. Features 4, 5, and 6 are assemblages of sandstone midden areas, including Feature 4 (Figure 4), Feature 5 (Figure 5), and a series of contiguous cleared areas and other features accessed by a primary coastal trail system (Figure 6).

Temporary Habitation Features

As noted in the introduction, the discussion of surface findings, a total of 77 features are believed to represent temporary habitation or possible temporary habitation (see Table 6). A fairly narrow range of formal features types occur in association with these sites, including primarily C-shaped and various others, low circular walls, modified outlines, small terraces, and light surface midden scatters.

This functional assignment was based on the absence of high densities of charred features, the generally small size and simple architecture of individual features, and the absence of substantial accumulations of middens or portable artifact material. It should be noted, however, that a single data set only a preliminary evaluation of function, and it is possible that some sites or groups could change given additional data from one or more of the features.

Temporary habitation represents the most frequently encountered functional feature type within the project area, with 82 (or about 0% of the 327 individual features being recorded as this feature. As with the features described a permanent habitation function (see discussion). Above, the distribution of temporary habitation features was also generally predictable on the
basis of existing regional models of predominate and lessor patterns of land use. While permanent features within the area of Hawaii Island tend to cluster in coastal areas, these areas which also exhibit good coastal or off-shore fishing, temporary habitation features are typically much more extensive in their distribution (see, for example, Jones 1988, Kirk 1977). The present Hanapii Beach project area proved to be no exception.


As with all of the habitation features, most of the temporary habitation features have been subjected to extensive surface and sub-surface investigations. Most often as a result of having been re-erected during WWII training activities in this area.

Lined, usually surface-occurring midden structures are present at some of the features, particularly the smaller examples which provided some protection from tides. The walls of the features were subject to erosion by the surf and tidal action. To counteract these effects, some larger examples were lined with wire meshes, often in a manner similar to re-erected during WWII training activities in this area.

Site 19342 of the feature types occurring as small, multiple-component sites assigned a predominate temporary habitation function. In this case, a well-defined C-shape structure in present, and this structure was a small structure that maintained a small structure of broken. In apparent association was a short wall segment, which also contained at least one surface artifact and a very light surface-midden scatter (Figure 8).

Agricultural Features

As noted in the introduction to the discussion of surface findings, a total of 62 features are believed to represent agricultural or possible agricultural activities within the project area (Table 6). Among the temporary habitation features, a fairly narrow range of functional feature types represents the functional activity, including primarily poorly defined and poorly built terraces, cleared areas, modified midden, and wall segments which may be remains of surfaces or water systems, occasional mounds, and several low C-shape structures. Agricultural representation of the most frequently encountered functional feature type within the project area, with 62, or about 28.10%, of the 231 Indigenous features being assigned this function.

These features are typically found within temporary habitation or habitation complexes, and are especially concentrated at coastal sites and along the margins of the well-defined gulch system which proceeds along a narrow corridor through the north-central portion of the project area. The pattern of distribution conforms with expectations derived from data for other similar settings in West Hawaii. While permanent habitation features tend to cluster at coastal
locations in association with fresh-water seeps near areas which also exhibit good natural or offshore fishing. Agricultural activities and associated temporary habitation features are frequently found near occasional non-permanent, especially along certain

In Figure 9, the 36 sites containing the 82 agricultural features component have been placed within the boundaries of the project area.

As with all of the habitation features and many of the temporary habitation components as well, a variety of impacts have affected the agricultural features, including especially WWII training, subsequent recreation and road grading projects, and most recently fire suppression activities, and equipment used to engage the Fauquier State Forest via Haynes quarry roads.

**Other Features**

The remaining functional feature types include market, transportation, hearth/pot features, occasional, and unreliable. Together, these types total 41 separate features, or approximately 13.3% of the 323 features attributed to indigenous use and occupation of the project area.

Transportation among non-feature components located within the project area is similarly documented by a series of partially reconnected segments. Trends in these segments were recorded as separation of larger size examples (1934 and 1936), and in the smaller examples (1940 and 1941). A survey of the site segments directly associated with the transportation segments described in Table 5 (and Table 6) has been included in features assigned to cultural features (see Table 5). Lastly, while listed separately in Table 6, the three features described as "wells" during formal site recording may actually have served a "transportation" function since at least some appear to have been constructed to identify the locations of tools or habitation and temporary habitation features.

The location of trail segments depicted in Figure 2. It should be emphasized that much more extensive network may have been used within the project area, prior to impacts associated with military and subsequent recreational activities at and around Haynes.

As noted above, a possible ceremonial function has been assigned to three features, two of which are located at Site 19366 (Features 3 and 6), and one at Site 19355.

The Feature F1120 (Site 19366) is located near the forest edge and may have been constructed to drain off water from the stream. A road laid path into the forest from the northwest.
The Feature J alignments at this site are less formally constructed than Feature E, and does contain a cluster of watermelon cobbles near the center of the D-shaped alignment of palisade boulders and cobbles. Construction details and associated crest and trench wall suggest possible ceremonial activities were performed at these features. Finally, Site 19355 contains a modified line of constructed by stacking watermelon boulders and cobbles on top of a small cairn. Several large pieces of coral were incorporated into mixed boulders and cobbles, along with smaller coral pieces, several watermelon cobbles, and small quantities of marine shells.

Two additional project area features may represent basins. These include Features E and M at Site 19365. Feature E trench measured approximately 2 meters square and contained slightly more than 0.5 meters above the surrounding ground surface. There is a distinct area at the west end of the feature from which some of the cobbles appear to have been removed. Removal of the surface of this feature, 10 cm of coral debris and several tons of cobbles containing marine shell and coral fragments.

Feature M at Site 19365 is a mound constructed with angular-shaped coral cobbles, with large pieces of coral and watermelon cobbles incorporated into the feature. Remains facing it were along the north side. The mound itself is 3 meters above the surrounding ground surface. A small quantity of marine shell and coral debris are scattered over the surface. Figure 10 illustrates M at Site 19365 in plan view, and in the context of additional features located in the immediate vicinity of these two possible basins.

**SUBSURFACE EVALUATIONS**

As noted in the introduction to this block, subsistence evaluations were undertaken both within and outside of the boundaries of this project. The results are summarized below.

**Non-Site-Specific Subsurface Testing**

One of the goals of the site survey was to determine whether or not significant cultural deposits may have accumulated within and outside of the survey area. In order to evaluate this possibility, five soil excavations, each measuring approximately 300 square meters, were conducted. The trenches were excavated on a grid pattern that covered the surveyed portion of the property. Excavations were divided into two main areas: the test and the control. The test area contained 33 test pits, which were located using a grid system. The control area contained 31 control pits, which were located in the same grid pattern. Depths were measured using a steel tape, and ranged from 2 to 54 cm below the current ground surface. Very small quantities of shell made no impact on the excavation.

This work failed to identify any previously unknown prehistoric or historic sites or features. The work is believed to have satisfactorily achieved the objective of ensuring that significant cultural deposits were not likely to be present outside of the surveyed areas.
Site-Specific Subsurface Testing

As noted in the introduction to this section, 32 shallow test were excavated within Sites 19564, 19566, 19567, and 19568. In addition, 30 test units involving a total of 20.7 square meters of surface area were excavated at 24 features distributed among 17 separate areas. Indigenous portable artifacts collected from the excavations and surface collections include ground and tools, ground stone, grinding stone, worked marine shell, coral atlatl heads, puka shell, volcanic glass flakes, and obsidian scrapers. These are described below under "Data Analysis."

Generally, excavations were conducted at the presence of subsurface deposits of cultural material at several project areas. Although multiple layers were encountered at several of the features, along with burned features of various types (principally, hearths or hearth remains), deep, stratified deposits appear to be absent from the project area. Detailed stratigraphic descriptions for all of the excavations are presented in Appendix C.

Table 9 presents data that shows the percent and frequency at which various features and objects of specific age and type occur. The summary groups the data by site, and includes a general reference to the types that are uncommon or unique cultural material and specific samples recovered.
### Table 9. Summary of Excavation

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<th>(Presence &amp; Absence)</th>
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### Summary for Other

- 55 St's: 13.90 11.78 2 7 0 0

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**Note:**

- SHIP = Site Harbor Plan
- St = Stairway
- Pos = Position
- Size = Area in square meters
- Depth = Depth in inches
- Presence & Absence = Presence or Absence of artifact

**Summary for Other**

- 55 St's: 13.90 11.78 2 7 0 0

**Legend:**

- "A" = Absent
- "B" = Present
- "C" = Not Specified

**Notes:**

- All Stairs are located on the island of Oahu, Hawaii.
- All stairs are five-digit numbers prefixed by SHIP.
- *Presence & Absence" data is from an official survey of the site.

**Additional Notes:**

- All stairs are located on the island of Oahu, Hawaii.
- All stairs are five-digit numbers prefixed by SHIP.
- *Presence & Absence" data is from an official survey of the site.

**Legend:**

- "A" = Absent
- "B" = Present
- "C" = Not Specified
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**Notes:**
- * indicates presence of a finding.
- * indicates absence of a finding.
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DATA ANALYSES

AGE DETERMINATIONS

Objectives and Methods

The purpose of age determination analysis was to provide initial chronological data to aid in assessing the relative significance of sites in the project area. As part of the inventory survey investigations, four samples were selected from discrete cultural deposits within Sites 19391 and 19408 for age determination using radiocarbon analysis. Samples were selected based on the amount and nature of datable material present, stratigraphic context, and association with portable remains. The samples were submitted for radiocarbon analysis to Dose Analytic, Inc. of Cost Guard, Florida.

Using standard procedures, the samples were prepared with an acid, alkali, and series of washings to remove carbonates and humic acids. All of the samples except for sample BC-1416 were determined to contain sufficient carbon for further analysis. After purification, the samples were converted to form carbon dioxide gas, which was combusted with lithium to separate the carbon, and were hydrolyzed for conversion to liquid form. The liquid was then carried and was placed in a liquid scintillation counter to determine the amount of carbon 13 and carbon 12. The isotope value obtained during the counting process was then used to calculate the carbon 13/carbon 12 ratio for the sample, with the final result being determined relative to a standard or standard used in order to interpret ratios produced by carbon isotope fractionation. Proceding of samples BC-1414, -1415 and -1416 produced normally.

Results

The results of the radiocarbon age determinations are summarized in Table 10. The age for each sample is presented as a range corresponding to the calibrating 1σ to 2σ standard deviations. Ages were calculated using the formula (3 methods) provided in Stuiver and Reimer (1993), which correct for variations in marine and atmospheric carbon over time.

As shown in Table 10, Simple RC-1416 yielded a modern date (post AD 1950) while Sample RC-1414 and -1415 produced multiple calendar ages. Multiple ages are obtained by "wish" or noise in the calibration curve, which converged to periods when atmospheric carbon decreased at a rate greater than 1.2 ppm/10 years, resulting in more than one possible age. Each of these samples was more difficult to interpret as a single sample to the calibration curve. While multiple ages are more difficult to interpret as a single sample to the calibration curve, combined with evidence from archaeological site, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another, stratigraphically, generally provide a means of selecting one age as more probable than another.

The results of the age determination analysis span a 681-year period extending from AD 1269 to the present (AD 1950). Within this period, the results from specific samples can be grouped as three clusters. The five clusters consist of Samples RC-1414 and -1415 from
Table 10. Summary of Radiocarbon Age Determinations

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<td>Feature C, TUL-L1, Layer 2, Level 3</td>
<td>23-23 cm</td>
<td>580 ± 90</td>
<td>540 ± 90</td>
<td>1269-1515</td>
<td>1560-1617</td>
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<tr>
<td>SITE 19345</td>
<td>1415</td>
<td>55086</td>
<td>Feature C, TUL-12, TUL-11, HFR-1, Level 4</td>
<td>24-24 cm</td>
<td>580 ± 90</td>
<td>400 ± 90</td>
<td>1279-1556</td>
<td>1560-1630</td>
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<tr>
<td>SITE 19345</td>
<td>1416</td>
<td>51007</td>
<td>Feature A, TUL-14</td>
<td>Layer 1, Level 5</td>
<td>20-20 cm</td>
<td>104 ± 1.0%</td>
<td>105 ± 1.0%</td>
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* Calibrated according to Stuiver and Reimer (1993). Range at two sigma.

Feature C of Site 19395, both of which yielded prehistoric calendar ranges (AD 1269-1526). The samples were associated with trash middens, but no other portable remains. Feature C is a small structure, with adobe walls, and is interpreted as a temporary habitation. The second cluster consists of Sample RC-1414 from Feature A of Site 19395, which yielded a modern date (AD 1930). The sample was not associated with any portable artifacts. Feature A is an outside structure, interpreted as a permanent habitation. With the exception of Sample RC-1416, which appears to have been constructed by modern carbon, the interpreted age ranges for samples in all three clusters are consistent with known stratigraphic relationships, and do not appear to be affected by contamination.

Initial occupation of the project area must likely occurred during the mid-potassic period, indicating potential as early as AD 1269 as Feature C. The association of the dating sample from feature with intrusive midden remains support the interpretation of the feature, and indicate that the focus of initial occupation was temporary habitation, possibly for exploitation of marine resources. The presence of both prehistoric and historic artifacts at several other sites suggests the project area was utilized sporadically through the prehistoric and historic periods. Many of the sites have been interpreted as temporary habitations and, based on the presence of midden remains, were likely utilized in association with marine resource exploitation. Until more of these sites have been excavated, and during samples are advanced for analysis, however, ability to reconstruct the chronology of occupation within the project area remains limited.

PORTABLE ARTIFACTS

A total of 130 artifacts were recovered from the project area, with 30% of which are classified as indigenous artifacts. The remaining 12% are non-indigenous materials. All artifacts are classified as tools fabricated using traditional techniques, and are distributed throughout the site. The inventory of indigenous artifacts from the project area is fairly narrow in scope, and consists of fishing gear, tools, and a variety of implements, and several artifacts of uncertain function. A detailed tabulation of artifacts is presented in Table 11. The results of the artifact analysis are discussed below.

Fishing Gear

Three specimens of indigenous fishing gear (Cord 24, 12, and 4) were recovered from the project area during the current investigation. The artifacts are simple conch shells (Cymatium sp.) that have been perforated on opposing sides of the dorsal surface just above the oral umbilical closure of the shell (Fig. 12). Cord 24 is a finial and foot collected from the surface of the project area. It exhibits the double perforation noted above, but has not been modified by the removal of a bevelled portion from one or both ends in order to attach the lace to the toggle assembly. The specimens measure 6.8 x 4.4 x 3.3 cm. Cord 24 is also perforated on both ends, but lacks the mouth. It measures 4.5 x 3.0 x 1.3 cm. Cord 40 has only one perforation, and is notched. It measures 2.7 x 2.1 x 1.4 cm. Octopus horn books are comprised of a point and stock, generally manufactured from wood, which are held together in the base and attached to a handle. A perforated conch shell (Cymbium sp.), or octopus horn, is tied to one side of the toggle assembly, and a bone spike is attached to the opposite side of the toggle. According to Beck (1997-1998), the bowhead bone assemblage was
### Table 11. Detailed Distribution of Portable Remains

<table>
<thead>
<tr>
<th>Category</th>
<th>Q1 1932</th>
<th>Q1 1933</th>
<th>Q1 1934</th>
<th>Q1 1935</th>
<th>Q1 1936</th>
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**Figure 12. Octopus Luan (Neg. 4405-6a)**

**Dimensions:**

- Length: 3 cm
- Width: 2 cm
- Height: 1.5 cm
generally used on each object in water 80-120 feet deep, but was also used by navajos near each object for spot in very shallow water.

Flaked Lithics

A total of 94 flaked lithic artifacts were removed from Sites 19365 and 19370. Thirteen were manufactured from basaltic glacial, while 81 were manufactured from volcanic glass.

All flaked stone material was examined with respect to flake/core type. Following established procedures for examining flaked stone material (Plagem 1980), diagnostic primary flakes are defined as those flakes having an entire or partial striking platform and a bulge of percussion. Non-diagnostic secondary flakes are broken flakes or fragments which lack the platform and/or bulge. Shatter represents the debris associated with flaked stone tool manufacture, and may include partial flakes, or "flake-like" chips. Cores tend to be more rectilinear polygonal flakes dominated by one or more platforms, and typically show little evidence of subsequent use as tools. Primary cores exhibit only flake scars, while secondary cores are actually flaked with a flake from which other flakes have been removed. Based on the these criteria, the 94 specimens can be separated as follows: four primary and one secondary cores, five diagnostic flakes, and 84 pieces of shatter.

Cores - Conventionally, the four primary cores are manufactured from basalt and the secondary core is manufactured from volcanic glass. The primary cores range from 2.5 to 5.4 cm in length, 1.2 to 2.5 cm in width, and 1.6 to 2.1 cm in thickness, and they are generally polygonal in shape (Figure 13). The secondary core measures 3.3 x 1.2 x 1.7 cm and is distinctly contained in plan view. All five of the cores exhibit multiple platforms (2-3), the majority of which are intact and unmodified. The platforms are associated with two of the flake scars. Cores were found on the body of the primary core and the secondary core, suggesting that these specimens were utilized to a lesser extent than the other cores prior to discard.

Flakes - One of the diagnostic flakes and eight pieces of shatter were manufactured from basalt, while four of the diagnostic flakes and 26 pieces of shatter were manufactured from volcanic glass. The volcanic glass flakes are primarily trachytic in appearance (93%), and were noted in hand specimens to occur from Pan Anulak. The remaining flakes are manufactured from poor-quality volcanic glass and basalt, and could not be matched to a specific source area.

The diagnostic flakes range from 1.3 to 2.7 cm in length and 1.3 to 2.0 cm in width, while shatter ranges from 0.6 to 1.4 cm in length and 0.3 to 2.2 cm in width. Flakes and shatter manufactured from basaltic glass are generally larger than those manufactured from volcanic glass, due to the relative flaking properties of the materials.

Ideas for flaked lithic artifacts have been suggested by Thompson (1973) and Kitch (1973), who observed:

The possible functions ... are many and varied. Basaltic glass holds a fine sharp edge and the tools make excellent cutting and scraping implements. They may have been used as food preparation, for cutting and scraping plant materials, or for delicate woodworking. [Flake artifacts are generally common, being found in virtually every type of Kawaiapik stone. The suggestion, then, is that the ubiquitous basaltic glass flakes functioned as a prestigious "pocketstone", to use a modern analogy. (1973:185-6).}
Personal Adornment

Two artifacts identified as personal adornments (Cat 319) were recovered from Shell 486. Both artifacts are Amostra pula shells that have been perforated at one end, presumably for stringing (Figure 1c). Cat 319a measures 1.2 x 0.9 x 0.7 cm and Cat 319b measures 0.9 x 0.7 x 0.3 cm. Amostra shells were commonly used in Shell 486. As Buck (1975) notes:

"Amostra necklacelets (pulp) were popular because of their numerous shades of color and iridescent markings. In this shell, a hole was made through the large shell behind the shell aperture...the open surface of the shell was filled down into the hole bored through. Thus many of the holes are irregular in shape and show no signs of drilling. The cord or rope is threaded through the hole and the shell aperture to form a long single chain. In some instances the shells are turned alternately on the cord so that the aperture of each is opposite each other. The shell consistently used was Amostra pula (type A), but N. sylvestris and N. neglecta, both called "pulp" were used occasionally..." (1975:243).

Tools

Three artifacts identified as tools were recovered from Shells 1920A, 1913A, 1939A and from the surface of the project area. The tools include eight adzes and a whetstone. The tools are described by type and function below.

Abraiders: Coral and coarse abraders are evaluated according to the surface of the tools in plan view. The surface of the tools is described first, followed by the classification of the tools. Mostly used are those tools that were found in the Marquesas Islands and the South Pacific. In the classification of the tools, the surface of the tools is analyzed, measuring that the shape of the tools is generally determined, or formal, indicating that the characteristics of the tool material have been extensively modified by use. Cross-sections are generally taken perpendicular to the tip and butt of the abraider, while the number of abraiders is a distinctive feature of the abraider on a green surface.

Of the eight abraiders encountered in the project area, three are manufactured from coral and one is manufactured from stone. The abraiders are classified as follows: (Cat 17 and 31), one is a coral abraider (Cat 56a) (Figure 15 and 16). Cat 56 is a fragment in a coral abraider, a plane surface in cross-section and in the center, and this abraider is a daytime abraider. It has been used in cross-section and plan, and has been used in the center of the abraider. It measures 1.5 x 1.5 x 1.5 cm. Cat 36 is a fragment of an abraider. It is irregular in cross-section and plan, and has been used in the center of the abraider. It measures 1.5 x 1.5 x 1.5 cm.

The abraider abraiders include one complete specimen, one partial specimen, and three fragments. The complete specimen measures 3.2 x 2.7 x 0.6 cm, while the partial specimen and fragments range from 1.4 x 1.0 x 0.6 cm to 5.0 x 0.5 x 1.0 cm. The number of abraiders is a distinctive feature of the abraider on a green surface. All of the abraiders are in measure, but show a great deal of variation in the degree of abrasion represented.
Coral artifacts apparently served multiple purposes prehistorically, ranging from "rubber" used to finish corners and wooden bowls (Buck 1937), to stars or dyes used in the manufacture of bone and shell headdresses (Hester, 1969, and Stiles 1984). Suggs (1941). The variety of shapes, edges, and worn surfaces represented by the abraders in the assemblage suggest that the abraders served a multiple purpose. Use of a particular surface over a period of time might generate a sawing or filing edge, which in turn would wear down or use to a new shape which could serve a new purpose. Richard abraders, in contrast, are small and fairly soft, and were probably used for finishing and more specialized tasks.

Wheatstone - The wheatstone fragments manufactured from dark gray, elephantine sand and derived from the surface of Feature A of Site 91306 (Figure 17). It is friable in description and has an uneven surface. It is irregular in some sections and measures 10.5 x 5.5 x 4.5 cm, and is in good condition. Wheatstone was used for sharpening the cutting edges of other tools, such as adzes or flaked tools.

Uncertain Function

Modified Basalt - One modified basalt artifact was found from Site 91356. It appears to be manufactured from a white sandstone, polished and ground surfaces, which may have functioned as an abrader or a small pestle (Figure 18). It measures 10 x 4 x 2 cm.

Modified Glass - One modified glass artifact was found from the surface of the project area (SPR 2). It appears to be a portion of a small glass bottle or container, given the presence of an embossed "54" at one opening, but does not contain sufficient portions of the base to definitively identify (Figure 19). It measures 7.5 x 5.5 x 3.5 cm and is in fair condition.

Modified Shell - Twenty-six modified shell artifacts were found from Sit 91304, 91365, and 91368. All are dark-brown or brownish shells which have been perforated through the center (Figure 19). These shells are often washed from the beach, where the holes are created by progressive erosion in the surf rather than by human action, but they were occasionally collected and used as projectiles. They range in diameter from 0.5 to 6 cm.

Miscellaneous - Two small metal buttons (Cuff 13 and 35) were found from Sites 91306 and 91306. Both artifacts are small wares, possibly similar to those seen in "50" artifacts. Cuff 15 measures 2.5 x 1.5 x 1 cm, and Cuff 35 measures 2.8 x 2.6 x 1.1 cm.

Non-Indigenous Artifacts

Eleven artifacts of recent historic manufacture were recovered from the project area. The artifacts include metal, personal adorns, weapons and miscellaneous items recovered from Site 91306, 91306, 91308, and from SPR 2.

Miscellaneous - Miscellaneous items recovered from the project area include metal cans, wood claws, and plastic fragments. Three of these were recovered from Site 91306, and 91306, and, except for indicating historic period of recent activity at these areas, provide little information concerning place or date of manufacture or function.

Money - A nickel and two pennies were removed from Site 91306 and 91306, respectively. The nickel was minted in 1959. One of the pennies was minted in 1973, the other in 1975, and could not be dated.
Personal Adornment - Two items utilized for clothing or personal adornment (Cat. 10 and 45) were recovered from Site 1990F. Cat. 10 is a metal pendant (keychain ornament) manufactured from cast iron. One side is decorated with a relief design of a dog and a bird on a background of swirls and abstract shapes. Another item below the necklace is a hair comb. The back of the pendant has a maker's mark: "J.W. [date illegible] Ltd." Cat. 45 is a large metal safety pin, and based on the lack of rust noted on its surface, is probably a recent addition to the site.

Weapons - Two shell casings (Cat. 31a, b) were recovered from Site 1997F. Both are from 40-caliber shells and are in good condition.

Discussion

Analysis of the artifact assemblage encountered during the current excavation suggests that the human activities in the project area were focused primarily on subsistence. The range of artifact materials represented is limited and typically includes manufactured items of shell, stone, bone, and metal, as well as the production of fishing gear, although some types of artifacts were encountered in limited numbers. Stone tool manufacture and use is indicated by the presence of flaked stone tools, as well as the presence of stone tools and artifacts associated with fire, which might include a flaked stone tool. Woodworking, such as tool manufacture or wooden production, is suggested by the presence of a wooden object in the project area assemblage.

The non-native assemblage is also very narrow in context, and was most likely deposited in the project area through contact or dumping activities rather than occupation. These terms that could be identified, pendants were manufactured in the 21st century, the remaining artifacts are interpreted as recent based on condition.

Comparison of the project area assemblage with assemblage encountered elsewhere in West Hawaii indicates that a greater similarity in the range, but not abundance of artifacts, is present. The project area assemblage (Cat. 1960T) contains a higher proportion of fishing gear and artifacts manufactured from non-native materials (shell, iron, etc.), but also contains material manufactured from local materials. The relative abundance and variety of artifacts in the current assemblage is greater than that noted for Awata (where wave action has damaged many of the potential prehistoric sites), but in terms of the range of artifacts present, is reflective of the other areas. Based on this comparison, the current assemblage may indicate that the current project area was used for a more limited range of activities and more temporary occupations, or may indicate that the activities undertaken in the project area involved fewer formal artifacts and that local tasks.

ECOFACTUAL REMAINS

Objectives and Methods

Ecofacts are significant because they offer a number of levels, as the variety and context of food remains contained within a given cultural deposit provides useful information concerning prehistoric diet and subsistence practices. The analysis of ecofacts remains for inventory survey projects that has two primary objectives:
1. To determine the variety and distribution of faunal remains present in each cultural deposit encountered within the area, and

2. To provide an indication of dietary and resource exploitation patterns for each site, and for the project area as a whole.

All faunal remains recovered from the project area underwent detailed analysis in the laboratory. Detailed analysis involved splitting the sample into two classes based on size: small (less than 1/2 inch) and large (1/2 inch and over). One hundred percent of the material remaining in the 1/2-inch size was completely rechecked, while a percentage of the smaller size was rechecked by the investigator. The material remaining in the 1/2-inch size was subdivided for faunal remains and for taxa not encountered in the larger portion of the sample. Each category of faunal remains was then bagged, and individually weighed. Relative proportions of taxonomic types were calculated for each percentage, as well as for the one as a whole. Muscle sheath identifications were identified and augmented using Kay (1979). The unidentified faunal remains from HBI's investigations were submitted to Dr. Alan D'errico of Kansas, Oka for identification.

The sampling design outlined above is adapted from Kitch (1993), based on a variety of methods comparing the relative distribution of faunal and bone material recovered on each site. Kitch concluded that use of the screening process increased the speed of the survey process without decreasing either the accuracy or internal validity of the overall study. Thus, the taxonomic distribution and weight of material recovered on the 1/2-inch screen should thus be considered representative of the variety and relative percentages of each taxon present in the entire sample.

**Results**

- **Weight Data**: Faunal remains were encountered in the deposits in Sts. 32, 65, 1927, 1929, 1934, 1935, 1939, 1951, 1955, 1964, 1978, and 1979. The result of the analysis are presented in Table 12. Total weights for each known (i.e., identifiable) species, with substrates in parentheses, are included in the combined weight. For each larger taxon, these values are provided in the final column of each table, while the grand total represents the combined weight of all the faunal remains derived from the analyzed deposits.

- **By weight**: 98.7% of the 2,552.54 grams of faunal remains recovered from the project area was caused by marine gastropods, 12.7% by landbirds, 10.1% by other invertebrates, 0.07% by Transitomyia, 0.5% by Ochotona, 0.01% by other invertebrates, and 1.53% by vertebrates. Thirty-seven species representing 39 families were identified, including 12 gastropods (mollusks), three birds, seven Ochotonidae, three Mustelidae, and two segulidae. Members of the Family Ochotonidae were the most commonly identified vertebrate taxa. Vertebrate remains were comprised primarily of channeled, supplemented by small amounts of mammals (Mammalia, Mammalia), and unidentified. The faunal assemblages were collected with individual sites and features that are similarly to the size and space data shown in the taxonomic diagram above. All of the deposits, except those at Site 20, were dominated by marine gastropods (71-100% of the bone deposit by weight). The deposits at Sites 20 and 21 comprised entirely Ochotona remains. Of the bone...
deposits dominated by marine gastropods, three (1926, 1931, and 1936) contained a variety of marine gastropod shells (1926, 1931, and 1936) containing brachiopods and other invertebrates, two (1972 and 1982) contained brachiopods, one (1978) contained brachiopods, one (1951) contained brachiopods and other invertebrates, and one (1984) contained brachiopods and other invertebrates. One (1931) contained shell remains; one (1946) contained brachiopods and other invertebrates; one (1951) contained shell remains; one (1959) contained brachiopods, other invertebrates, and shell remains; and one (1984) contained brachiopods, other invertebrates, and shell remains.

Ubiquity Data - In addition to weight data, ubiquity values were calculated in order to correct for possible biasing of the data which can occur when weights alone are used to characterize importance of individual taxa in a site. Using weight calculations only, for example, a single large Turba shell would be accorded more importance than many smaller shells with lower weight, but which may have been equally important for a site. Further, differential preservation of archaeological remains results in the overrepresentation of some smaller mammals (like the bats, small rodents) in sites. As Hart and Pepper state:

"In sum, ubiquity analysis is useful, with limitations, for showing general trends when one has little control over the process of gathering in one's data. By measuring the frequency of occurrence instead of abundance, it reveals but does not eliminate the effects of differences in preservation and sampling" (Hart and Pepper 1986: 68).

Ubiquity calculations treat all samples as independent, and of equal value, just the presence or absence of a taxon is recorded. The number of samples in which a taxon appears is divided by the total number of samples from a site, giving a percentage of samples in which a taxon is represented. In other words, for all data sets, the number of samples from a site is uniformly equal.

In general, ubiquity values show a positive correlation with relative weight percentage (Table 3). Ubiquity calculations demonstrate that Turba and species of the family Cyprinidae, both of which contributed high percentages of the assemblage by weight, were also the most consistently represented groups. Other taxa with high ubiquity scores included Nerila, piura, Thalassia, and Conch.

Ubiquity calculations were additionally useful in highlighting instances where smaller shell taxa, such as Cerastrea, appear more often than characterized by weight percentage, but are present in more than 6% of the samples. The ubiquity of these taxa is important in terms of characterizing substantive patterns throughout the project area, and making comparisons between site assemblages, and suggest that shellfish may have been collected based on their availability, as well as amount of actual protein derived.

Discussion

The results of the faunal analysis indicate that subsistence patterns in the project area included the collection and consumption of a variety of shellfishes from the many taxa of marine gastropods and brachiopods. In general, the marine invertebrates included in the assemblage are common inhabitants of the shoal waters, shallow water areas, estuaries, and lagoons, and would have been easily available to local populations. The most common taxa are noted below, with comments on their occurrence and probable economic value (taken from Trimble et al. 1978: 237-253):

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Cypriididae - Members of the family Cypriididae were known as likely the Hawaiian and were of major importance to the economy of food, utensils, tools, and decorative fish bone. To prepare fish for consumption, the shells were broken open and the meat was removed and cooked with the fish. The flesh was then wrapped in leaves and cooked over coals. Some people merely boiled the shell and then removed the meat. For the shells, small yellow and white beads were reserved for the use as ornaments and were commonly used as currency. Larger shells were used to make scrapers for removing the skin from coconuts and breadfruit, and for grating coconut. Cowrie shells were used as a sharp, pointed edge was also used to make washdown to remove from the plant. This method and position of the cowrie shells were used as part of decorative items.

Intertidal habitat, the cowrie range from the intertidal to depths of 15 m. The most common species in the Hawaiian Islands are found in shallow water under kaneia and boulders along the shoreline and in crevices at the seaward edge of shallow reefs and living reefs.

Parasitidae - Members of the family Parasitidae, or biwets, are grouped together and called *spilidae* by the Hawaiians. The *spilidae* are extremely well adapted for their habitat and were reportedly the most commonly eaten shells. The favorite method of preparation was raw and cooked, either with or without sauce. They were sometimes salted alone and then cooked in the shell, using a kala-kali or hot stone. Shells were picked for their beauty. This method enabled the shell to be used, especially by the very young. The meat was also removed from the shell and sometimes soaked out with a small, empty *spilidae*. *Spilidae* were used as a source of food and were also associated with royalty. Although the examples of *spilidae* shells were encountered in the current project area, *spilidae* shells were often used for insulation, pelting, and scraping because of their sharp edges.

Within the Hawaiian island chain, Cellepa spp. are restricted in occurrence to the shoreline of volcanic islands. They are generally found on the beach from the high-tide line to the high-tide line. At the high-tide line, they are often submerged. Fish are recognized by the Hawaiians as *Cellepa* (spilidae) and *Cerepus* (spilidae) adults.

Heterididae - N. patrice and *Thouasina argens* are both known as the Hawaiians as *pipti*. Pipti is a general name for small mollusks used with modifying terms to indicate various species with habits and habitat similar to *pipti*. N. patrice is the most common species of *pipti*, as well as the dominant species along Hawaiian shores, and is a shellfish on all rocky shores from the high tide zone to the high water mark just above the limit of the littoral zone. *Thouasina argens* is a common shellfish and is found not only on seaweed edges, but also in shallow water amongst coral. They are found on the surface of the substrates and sandy rocks. Pipti was used as a food source, and required a needle or stick to remove the meat. Some were eaten as they were collected, while others were boiled or dried by watling the shell in leaves and boiling. Some people made a brush and added other shells for flavor. Empty shells were then commonly used for flower arrangements.

N. patrice, a larger species, was known as *hople*. *Hople* were used as food items, much in the way described for *pipti* above, but were more prized for their ornamental value. The Hawaiians had named *hople* to *hople* according to their color or markings: *hople* (red), *amore* (rainbow - red to black stripes), *balbina* (white to ivory - creamy white), *white* (black), *kanu* (vertical stripes), *malu* (*malu*’s helmet - white with red stripes) and the like. The most common *hople* were the 'ale, 'ama, 'amalani, and 'upe, and were used for fish. Dried and made into bracelets, the *hople* were an emblem of mourning for the *upe*. Kope’s occur beneath the surface of the sand among boulders at the high tide line and are generally nocturnal, swimming through the sand and digging up the algae covered rocks on which they feed.

Thalididae - Members of the Thalididae family were known variously as *kape*, 'amai, *malama*, and *papamakaua*. They were primarily used as a food source, but larger specimens with a long, sharp, strong spike were often made into small ida. *Malama* spp. are commonly found in the intertidal zone on hard substrates where there is strong wave action, while *Papamaka* spp. are common on reefs, reefs and reefs where there are heavy and exposed and on rocky substrates to depths of 15 m. The shells are often covered with a growth of coraline algae.

Condax - Members of the family Condax are known either as *papa* (a term that did not exist in the days in which they did exist). *Condax* are among the most conspicuous gastropods on reefs and boulders that fringe the shoreline, and occur in deeper water offshore. Of the 35 species identified in Hawaii, we are most common on marine shores and two are dominant on shallow reefs.

Biwets - While none of the more common biwets encountered in the current project area were extensively described by *Thouasina*, they refer to use of biwets as a general category. *Biwets* were not extensively used as food items, although members of the family Chondrus (red seaweed) *Biwets* and *Lutheus maritimus* (mushroom) were eaten when available. Most common uses of biwets included use as a raw material in fishhook manufacturing, or utilization for the decoration of pepe pole/lepo pole. *Biwets* are found near the shoreline and within living reefs, where there are sand bars across the bays.

Fish, urchins, and slabs of shells were gathered and collected, with the majority being obtained from deeper habitats. Reefs were generally obtained using a variety of techniques, including gathering, snorkeling, standing, standing, or shallow-water angling. While deeper reefs were obtained with long-line angling and trolling from canoes (Kines 1973:12). The actual composition of fish for the net cannot be determined, due to the differential penetration of fish remains in archaeological contexts. It should be noted that marine resources were neither absent by weight or in terms of数量, which suggests that investigations were the most important resources.

In addition to marine resources, the presence of terrestrial mammal and vegetal remains in the deposits from 1931, 1933, 1935, and 1939 indicate that terrestrial resources were also used by the local population. All of the terrestrial taxa included in these deposits, with the exception of *Lepus americanus* and *Melanostoma arginatum*, are probably introduced taxa, given their extensive use throughout the prehistoric and historic periods, provide little definitive information concerning age.
CONCLUSION

GENERAL SUMMARY OF FINDINGS

The project area includes the general survey of 40 acres in the course of an archaeological survey in the United States, which was assembled in 1968 by the National Park Service. The survey area is a roughly rectangular area measuring 500 by 1000 feet, with an average elevation of 200 feet above sea level. The survey area is located in the western portion of the Hawaiian Islands and is home to a number of archaeological sites and features that have been identified and recorded in previous surveys.

Despite these impacts, several features significant to the Native Hawaiian culture are preserved in the area. These features include burials, ceremonial structures, and other remains that were important to the Native Hawaiian culture. The survey area is home to a number of archaeological sites and features that have been identified and recorded in previous surveys.

In conclusion, the survey area is home to a number of archaeological sites and features that have been identified and recorded in previous surveys. These features include burials, ceremonial structures, and other remains that were important to the Native Hawaiian culture. The survey area is home to a number of archaeological sites and features that have been identified and recorded in previous surveys.
Figure 21: Graphical Portrayal of Percentage Distribution of Functional Feature Types Related to Indigenous Use and Occupation of the Project Area.

Figure 21: Graphical Portrayal of Percentage Distribution of Functional Feature Types Related to Indigenous Use and Occupation of the Project Area.

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

Significance categories used in the site evaluation process are based on the National Register criteria for evaluation, as outlined in the Code of Federal Regulations (36 CFR Pan 800). The DNR/HIP and the Hawaii County Planning Department use these criteria for evaluating cultural resources. Sites determined to be potentially significant for information content are evaluated under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites determined to be potentially significant as representative examples of site types are evaluated under Criterion C, which defines significant resources as "...those which are characteristic of organs, periods or methods of construction or serve to represent a significant and distinctive aspect of a culture or history with which the project is closely associated." Sites with potential cultural significance are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) and the "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (Draft Report, August 1988). The guidelines define cultural values as "...the contributions made by an historic property to an ongoing society or culture system. A traditional cultural value is a cultural value that has historical depth." The guidelines further specify that "[t]he property need not have been in consistent use since antiquity by a cultural system in order to be considered of cultural value."

To further facilitate management decisions regarding the appropriate treatment of resources, the general significance of the archaeological resources identified during the reconnaissance survey have also been evaluated in terms of potential scientific research, interpretive, and cultural values (SCHR Cultural Resource Management Value Model). Research value refers to the potential of archaeological remains for producing information useful in the understanding of cultural behavior, past lifeways, and cultural processes at the local, regional, and national levels of organization. Interpretive value refers to the potential of archaeological remains for public education and recreation. Cultural value, 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 value.

The project's findings and conclusions concerning general site significance and recommended general treatments are summarized in Table 14. These findings and recommended treatments may be summarized as follows:

Of the 164 sites identified and recorded within or immediately adjacent to the project area, 156 are found to have significant or potentially significant utility for information content. However, for 138 of these sites, the present level of documentation (detailed recording of sites and features, surface collection, and limited test excavations) is considered sufficient to have recovered all of the significant information values represented by these sites, and no further archaeological data collection is warranted or recommended. Moreover, since the use of these 138 sites represents unique, one-of-a-kind, or excellent site type examples, no preservation or interpretive development has been recommended for any of these 138 sites. These sites are listed in Table 14 under Significance Category "X" and Recommended Treatment Category "NWP."
### Table 14. Summary of General Significance Assessments and Recommended General Treatments

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**General Significance Categories:**
A = Importance for information content, further data collection necessary
X = Importance for information content, no further data collection necessary
B = Existing examples of site type at local, regional, State, or National level
C = Culturally significant

**Recommended General Treatments:**
FDC = Further data collection necessary
NFW = No further work of any kind necessary, sufficient data obtained
PID = No further work with some level of intervention required
PAI = Preservation "as is", with no further work

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Of the remaining 18 sites considered significant solely for information content, further data collection/recovery work is recommended. This recommendation is based on the finding that these sites, on a specific feature within the site complex, contain additional information which may be important in the understanding of local and regional prehistoric or historic cultural traditions. Implementation of additional data collection work is intended to result in a finding of "Adverse Effect Through Data Recovery" for the proposed State Park expansion project.

The remaining eight project areas are considered significant under multiple criteria, for which the following treatment recommendations have been made.

Coastal Complex Sites Significant for Information and Interpretive Value (1 site):

Site 19367 and 19368 represent two of four large coastal complex sites believed to contain prehistoric and historic burial complexes. Both contain significant additional information value, and each may possess feature configurations which warrant some level of preservation and interpretive development. For both of these sites, further data recovery work, followed by some level of preservation with interpretive development, has been recommended.

Coastal Complex Site Significant for Information, Interpretive, and Cultural Value (1 site):

Site 19368, as with Sites 19367 and 19368, represents a large coastal complex habitation site which contains significant information value and cultural value as a site type. As well, this site contains two trail segments and two possible prehistoric burials (Features B and M), making the site significant for cultural value as well. Additional data recovery work, followed by some level of preservation with interpretive development, is therefore recommended for this site.

Coastal Complex Site Significant for Information, Interpretive, and Cultural Value, and Possibly Containing Two Burial Features (1 site):

Site 19368, as with Sites 19366, 19367, and 19368, represents a large coastal complex habitation site which contains significant information value and cultural value as a site type. This site also contains a trail segment, rendering the site significant for cultural value as well. As well, this site contains two possible burials (Features B and M). Additional data recovery work, followed by some level of preservation with interpretive development and possible preservation as is for any identified human remains, has been recommended for this site. The conduct of any additional data recovery work is recommended. It is recommended that the procedure of Act 365, S. L. 1988 (Chapter 60, Sec. 43) - Historic Preservation, Haw. Rev. Stat., as amended—be followed.

Trails (3 sites):

These single-component sites consisting of trails or trail segments are assessed as being significant for information value as well as culturally significant (19365, 19410, 19413). For these three sites, the present level of recording is considered sufficient to have recovered all of the significant
information values represented by these sites, and no further data collection is warranted or recommended. Although culturally significant per criteria of DLNR, HPDPA, preservation is not considered essential because the trail sections present are not primary trail users nor are they excellent examples of a particular type. Moreover, additional, equally representative examples are already preserved elsewhere within the immediate vicinity of the project area, and specifically will be preserved within other project areas near for which preservation with interpretive development is being recommended (not above, since 19365 and 19150).

Single-Cabin Site Comprised of a Possible Communal Feature (1-11):

Site 19305 consists of a modified structure and has been assumed to be significant for residual informative values as well as potential cultural significance because the structure present may be ceremonial in nature. For this site, further data recovery work is recommended, with a provisional recommendation of preservation with interpretive development, pending the results of additional data recovery work.

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Hunnam, R.J.
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Jensen, P.M.
1984a

1981b

1994a


Kapua, E.A.

Kennedy, J.

Keck, P.V.


Plagone, C.J.

Reinecke, J.E.

Rosendahl, P.H.


Rosendahl, P.H., and M.W. Kanesale.

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Smither, M., and Reimer, P.J.

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Wetzel, D.


Yest, M., and A. Ratibko-Griffin
APPENDIX A: Site Descriptions

STATE NO.: 19204  
SITE TYPE: Complex (2 Features)  
PHILO TEMP NO.: 855-003  

TOPOGRAPHY: Undulating low ridges and swales. Much exposed and denuded bedrock.

VEGETATION: Moderate density of grass, sparse shrub.

CONDITION: Poor  
INTENSITY: Untested  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Hunting blind

DESCRIPTION: This site complex consists of two C-shapes (Feature A and B).

FEATURE A: C-shape  
ADJACENT TERRAIN: Undulating bedrock palochoe outcrops on a west facing slope.

VEGETATION: Short brown grass, shrub.

FUNCTION: Hunting blind

DIMENSIONS: 2.10 m (200-260 degrees) by 1.95 m by 0.41 m

CONDITION: Fair  
INTEGRITY: Untested  
DESCRIPTION: Palochoe cobbles stacked one to three courses high, one to seven courses wide.
The rocks are c. 0.41 m in length/width. The feature is located c. 150 m south of the highway, c. 36.00 m, 15 degrees from Feature B. Surface remains were not detected. A cultural deposit was not excavated. It sits on bedrock, travel was provided to a depth of c. 0.05 m.

FEATURE B: C-shape  
ADJACENT TERRAIN: Undulating bedrock palochoe outcrops on a west facing slope.

VEGETATION: Short brown grass, shrub.

FUNCTION: Hunting blind

DIMENSIONS: 1.50 m (200-260 degrees) by 1.53 m by 0.55 m

CONDITION: Fair  
INTEGRITY: Untested  
DESCRIPTION: Palochoe cobbles stacked one to three courses high. Rocks c. 0.25 m in length/width. Feature A is c. 36.00 m, 15 degrees from Feature B. Surface remains were not detected. A cultural deposit was not excavated. It sits on bedrock, travel was provided to a depth of c. 0.10 m.

STATE NO.: 19211  
SITE TYPE: C-shape  
PHILO TEMP NO.: 855-004  

TOPOGRAPHY: Knoll is located to the north. Undulating terrain sloping to the west with much exposed bedrock.

VEGETATION: Moderate density of grass, sparse shrub.

CONDITION: Poor  
INTEGRITY: Untested  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Hunting blind

DIMENSIONS: 2.60 m (034 degrees) by 1.40 m by 0.47 m

DESCRIPTION: A c-shape consisting of 20 angular boulders ranging in size from 0.10-0.25 m in diameter. Crudely stacked one to two courses high. Coveted over to the east. Height ranges from c. 0.05-0.15 m. Site is north of the southernmost gully/fish in project area, c. 100 m and 118 degrees. Also Site 3 Feature B is 185 degrees at 29.00 m from this site. Surface remains were not observable. The site was travel tested and no cultural deposit found.

STATE NO.: 19222  
SITE TYPE: C-shape  
PHILO TEMP NO.: 855-005  

TOPOGRAPHY: Undulating bedrock outcrops on a west facing slope.

VEGETATION: Moderate density of grass, sparse shrub.

CONDITION: Fair  
INTEGRITY: Untested  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Hunting blind

DIMENSIONS: 2.50 m (225-430 degrees) by 1.95 m by 0.75 m

DESCRIPTION: Palaohe small boulders and cobbles stacked one to three courses high. Largest rocks are c. 0.43-0.50 m in length/width. The feature sits on the highest part of a short ridge which runs W-E. Located c. 150 m west of the highway. Surface remains were not detected. Military debris present. House of cultural deposit was unexcavated. Travel was provided to this site, c. 0.10 m.

STATE NO.: 19213  
SITE TYPE: Complex (2 Features)  
PHILO TEMP NO.: 855-006  

TOPOGRAPHY: Undulating knobs and swales with much exposed bedrock, sloping to the west.

VEGETATION: Moderate density of grass, sparse shrub.

CONDITION: Good  
INTEGRITY: Untested  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Hunting blind/Military

DESCRIPTION: This site complex consists of two C-shapes (Feature A and B). The overall site dimensions are 20.0 m x 50 degrees by 5.00 m.

FEATURE A: C-shape  
ADJACENT TERRAIN: Hills and valley

VEGETATION: Sparse brown trees and mixed high grasses.

FUNCTION: Hunting/Military

DIMENSIONS: 1.90 m (224 degrees) by 1.20 m by 0.60 m

CONDITION: Good  
INTEGRITY: Untested  
DESCRIPTION: This feature consists c. 30 angular boulders ranging in size from 0.10-0.50 m in diameter. The entire feature is stacked three to four courses high. The feature opens to the east and is built north-south, longwise. It is located on top of a small ridge and slopes westward. Feature B is c. 36.00 m and 90 degrees from this feature. Site B is c. 100.0 m at 292 degrees. Site C is c. 60.0 m at 210 degrees. Surface remains were not observable. The feature was travel tested and no cultural deposit was found.
FEATURE B: C-shape
ADJACENT TERRAIN: Gently sloping from the NE, undulating with many low exposures of decomposing bedrock. Slope more steeply to the south where a small dry gully is oriented southwest.
VEGETATION: Low, dry grass. Sparse clump of low trees are located upslope; large tree is located c. 7 m to the SSE of feature.
FUNCTION: Hunting/Hide/Military
DIMENSIONS: 1.85 m (E-W) by 1.45 m to 0.43 m
CONDITION: Fair
INTEGRITY: Unaltered

DESCRIPTION: The feature is oriented SSE/NW, and opens to the SSE. Construction consists of angular basalt cobbles. The stacking range from two to three courses high and is fairly uniform. The SE section of the structure appears to be constructed on bedrock. The distance between the arm s take greater than the overall depth of the interior space of the feature. The feature is located c. 50-50-00 m ENE from Site 937, and c. 38.8 m at 90 degrees from Feature A. No surface remains or cultural deposits were noted.

STATE NO.: 19254
FISHER TEMP. NO.: 855-000
SITE TYPE: C-shape
TOPOGRAPHY: Undulating exposed bedrock within small area of arable land.
VEGETATION: Moderate density of grass, sparse brush.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting/Hide/Military
DIMENSIONS: 1.85 m (E-W) by 1.45 m to 0.43 m
DESCRIPTION: This C-shape was constructed with weathered angular basalt cobbles and small basalt blocks ranging in size c. from 0.15-0.23 m in diameter. It is stacked to four courses high. The feature opens to the east. The west side of the feature is partially colored by the bare of the cobbles are exposed and are c. 0.25 m high (E), 0.35 m high (W). The interior space is c. 0.70 m (N), and 0.70 m (E). The feature appears to have a good view of the surrounding terrain, but does not provide much protection from the prevailing wind. The feature is located to the SE portion of the mounds parcel. No surface remains or cultural deposits were noted.

STATE NO.: 19253
FISHER TEMP. NO.: 855-001
SITE TYPE: Mound
TOPOGRAPHY: Slope to the west. Undulating bedrock exposures.
VEGETATION: Moderate density of grass, brush.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting/Hide/Military
DIMENSIONS: 1.90 m (E-W) by 1.80 m by 0.53 m
DESCRIPTION: This site consists of a mound. Two cobbles, c. 0.49 m in diameter. Constructed mostly on bedrock. Located in the SE portion of the mounds parcel, c. 0.44 km to the southeast. The mounds parcel are c. 2.00 m (N-S) by 1.00 m (E-W). The large cobbles are c. 0.50 m (N-S) by 0.50 m (E-W).

FEATURE A: Mound
ADJACENT TERRAIN: Undulating hills, ridges, and ravines.
VEGETATION: Unknown grass.
FUNCTION: Military
DIMENSIONS: 2.00 m (N-S) by 1.00 m (E-W)
CONDITION: Good
INTEGRITY: Unaltered
<table>
<thead>
<tr>
<th>FEATURE A</th>
<th>DESCRIPTION</th>
<th>VEGETATION</th>
<th>FUNCTION</th>
<th>DIMENSIONS</th>
<th>CONDITION</th>
<th>INTEGRITY</th>
<th>PROBABLE AGE</th>
<th>FUNCTIONAL INTERPRETATION</th>
<th>STATE NO.</th>
<th>PHIRI TEMP. NO.:</th>
<th>SITE TYPE: Complex (3 Features)</th>
<th>TOPOGRAPHY: Undulating hills with brush overgrowing and brush rock scatter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature A</td>
<td>was a circular mound with uneven surface (i.e., not level or consistently sloping). It was constructed with subangular to subcircular cobble and boulder drainage to size from 0.30 to 0.40 m, piled one to five courses high. Feature A was one of five mounds located on the side slopes of a hill and ridge area. It was the largest of these mounds and was located downstream of all but one other similar mound located c. 0.80 m to the east of Feature B. The feature is located c. 19.00 m at 108 degrees (off TR). Surface remains are two erosion drifts and creases on mounds. The crease drifts may be the only remnant of prehistoric occupation in this area, but they may also be from ice or estate transportation. No cultural deposits were noted.</td>
<td>Unknown grass</td>
<td>Military</td>
<td>1.50 m (NS) by 0.90 m (EW) by 0.30 m</td>
<td>Good</td>
<td>Unknown</td>
<td>Historic</td>
<td>Military</td>
<td>92259</td>
<td>455-012</td>
<td>Complex (3 Features)</td>
<td>Undulating hills with brush overgrowing and brush rock scatter.</td>
</tr>
<tr>
<td>FEATURE B</td>
<td>DESCRIPTION</td>
<td>VEGETATION</td>
<td>FUNCTION</td>
<td>DIMENSIONS</td>
<td>CONDITION</td>
<td>INTEGRITY</td>
<td>PROBABLE AGE</td>
<td>FUNCTIONAL INTERPRETATION</td>
<td>STATE NO.</td>
<td>PHIRI TEMP. NO.:</td>
<td>SITE TYPE: Complex (3 Features)</td>
<td>TOPOGRAPHY: Undulating hills with brush overgrowing and brush rock scatter.</td>
</tr>
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</tr>
<tr>
<td>Feature B</td>
<td>was a circular shaped mound with an uneven surface (i.e., not level or consistently sloping) constructed with subangular to subcircular cobble and boulder drainage to size from 0.30 to 0.40 m, piled one to five courses high. It is located c. 19.00 m at 108 degrees (off TR) to Feature A. Surface remains or cultural deposits were not noted.</td>
<td>Unknown grass</td>
<td>Military</td>
<td>1.50 m (NS) by 0.90 m (EW) by 0.30 m</td>
<td>Good</td>
<td>Unknown</td>
<td>Historic</td>
<td>Military</td>
<td>92259</td>
<td>455-012</td>
<td>Complex (3 Features)</td>
<td>Undulating hills with brush overgrowing and brush rock scatter.</td>
</tr>
</tbody>
</table>

**State No.: 19260**

**Site Type:** Complex (3 Features)

**Topography:** Small ridges and brush sloping to the west.

**Vegetation:** Moderately sparse grass, sparse Elae, no trees in immediate area of features.

**Function:** Military

**Integrity:** Unknown

**Probable Age:** Historic

**Functional Interpretation:** Military

**Description:** This site complex consists of two cairns (Features A and C), and a mound (Feature B). The overall size dimensions are c. 4.00 m by 2.00 m.

**Feature A:** Cairn

**Adjoining Terrain:** Undulating hills and brush overgrowing, top of flatly high knoll.

**Vegetation:** Military

**Function:** Military

**Dimensions:** 1.50 m (NS) by 1.00 m by 0.60 m

**Condition:** Good

**Integrity:** Unknown

**Description:** Longest stacked subangular irregular rock, more than one mound or square. The cairn has a brush overgrowing. A bowl test revealed c. 0.35-0.55 m of gravelly soil. The feature is oriented at 332 degrees c. 32.00 m east of Feature B and c. 30.00 m from Feature C at 124 degrees. It is located in the central eastern portion of the prehistoric area from the main highway to the eastern boundary. No cultural remains were noted.

**Feature B:** Mound

**Adjoining Terrain:** Flatly flat, rock ridge top. Slopes to the W and H. Guch bottom to N, which is intersected roughly by TR.

**Vegetation:** Sparse grass.

**Function:** Military

**Dimensions:** 1.50 m (NS) by 1.00 m by 0.48 m

**Condition:** Fair

**Integrity:** Unknown

**Description:** Roughly linear mound of subangular irregular rock cobble. Cobble range from c. 0.14-0.48 m in diameter. The west portion of the feature is constructed on downsloping bedrock. Cobble are stacked one to two courses high; only horizontal construction. The feature is located c. 10.00 m NW from Feature A. Partial remains were not noted.

**Feature C:** Cairn

**Adjoining Terrain:** Small knoll. Flat to the east, gently sloping to the north and west, steep slope to the south.

**Vegetation:** Sparse grass.

**Function:** Military

**Dimensions:** 0.50 m (NS) by 0.54 m (EW) by 0.38 m
STATE NO.: 19246
SITE TYPE: Trench
TOPOGRAPHY: Gently sloping to the west. A gulch (oriented roughly NW) is located c. 2 m in the south.
VEGETATION: Thick grass, a small grove in center of feature.
CONDITION: Fair
INTEGRITY: Unobscured
PROBABLY AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 7.00 m (W) x 5.73 m
DESCRIPTION: Bedrock cutout with two low walls delineating off of it. The first wall cuts from the north and south end of the cutout, extending a maximum of c. 4.00 m from the cutout face. Another small wall segment is located c. 1.00 m downhill in the SW of the cutout. The low wall is constructed of medium to large cobbles and small boulders crudely stacked one to three courses wide and one to two courses high. The interior space is clear and fairly level. The site is located in the central portion of the high Placita area in the northern part of the north. A possible temporary habitation deposit is located in the area between the bedrock cutout and the first wall. A test pit was subsequently placed at the feature, To 4- and To-10. They revealed a very sparse deposit.

STATE NO.: 19248
SITE TYPE: Trench
TOPOGRAPHY: Undulating hill, ridges and ravines. Site 30 overlooks the north in a gulch.
VEGETATION: Unknown grass.
CONDITION: Good
INTEGRITY: Unobscured
PROBABLY AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting, Military
DIMENSIONS: 2.00 m (W) x 1.40 m (D) x 0.30 m
DESCRIPTION: Site 30 consists of an earth embankment built on a bedrock ledge at the northern edge of a ridge. It was constructed with angular plastered cobbles and boulders stacked two to three courses high. The wall was not to two courses wide. It is more extensively built than other wall (i.e. military or hunting blinds within the project area. The north edge included 2.00 m long by 0.30 m wide. The primary wall is oriented 145° (SW). The secondary wall was oriented 152° (SW). Located within center of southern half (1/3) of parcel is a small high. Site 31 is c. 23.00 m at 379 degrees SE, (Feature 30 east edge of Feature 31 west edge). The southernmost portion of the deposit was well.-

STATE NO.: 19249
SITE TYPE: Wall
TOPOGRAPHY: Undulating hill, ridges and ravines. Located on northern edge of ridges before drop-off.
VEGETATION: Unknown grass, leaves sheds to 30 m north.
CONDITION: Good
INTEGRITY: Unobscured
PROBABLY AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting, Military
DIMENSIONS: 1.40 m (W) x 125.46 degrees (D) x 1.50 m (H)
DESCRIPTION: This earth embankment was constructed with two to three courses of angular plastered cobbles and boulders (ranging from 0.10 to 0.40 m diameter). The north face was a wall of the earth embankment. The west face is the thickest (c. 0.90 m wide), but this is from an embankment or support wall. The wall itself is only one stone wide. The height is c. 0.25-0.50 m. The wall is located within the eastern section of the northern half of the parcel (east side).

STATE NO.: 19250
SITE TYPE: Pond
TOPOGRAPHY: Undulating hill, ravines, and elk tracks. Site 30 overlooks the north in a gulch.
VEGETATION: Sparse meadow of dry low grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABILIT Y: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 2.00 m by 1.14 m by 0.33 m
DESCRIPTION: Annapolis area of small medium-sized angular basalt cobbles placed one to two courses high on the south side of W1RE basin. Located in the central mesa parcel, c. 1000 ft east of highway. No portable remains or cultural deposits were noted.

STATE NO.: 19271
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Undulating hills, with scattered basalt outcroppings.
VEGETATION: Elm, dry grasslands.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Marker
DESCRIPTION: This site complex consists of two cairns (Feature A and B). The overall size dimensions are 1.50 m in diameter, 1.20 m (north), and 0.60 m (south).

FEATURE A: Cairn
ADJACENT TERRAIN: On the top of a hill that slopes to the NW in an open field area.
VEGETATION: Elm and short, brown sage-like grass.
FUNCTION: Marker
DIMENSIONS: 1.41 m (150 degree) by 1.18 m by 1.02 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Field of angular basalt cobbles ranging in size from c. 0.06-0.47 m appear to be concentrated on top of bedrock. Smaller cobbles are to the middle of the feature while the larger ones are towards the outside. The feature appears to be an area where the top of the hill is. It is circular in shape and three to four courses high. There is a cairn located c. 34.90 m to 150 degrees away from Feature B cairn. No surface remains or cultural deposits were noted.

FEATURE B: Cairn
ADJACENT TERRAIN: Undulating hills with basalt outcroppings (small and scattered).
VEGETATION: Elm trees, dry grassland.
FUNCTION: Marker
DIMENSIONS: 1.90 m by 1.30 m (north), 0.80 m (south)
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Basalt rock stacked seven to eight courses high and rounded in appearance. The cairn is located on the north side, with some sloping on the south side. Rocks are subangular and are stacked on basalt outcropping. Rock size ranges from 0.02-0.40 m length, with some fine-sized basalt cobbles. The surrounding soil is grey and sandy with intermittent basalt outcropping. The feature is located c. 33.00 m to 210 degrees from Feature A, c. 270 m north of the mesa, c. 60.80 m west of large gully. Surface remains are a pure white sandstone cliff (specimen) on ground right behind (west side) cairn (not collected). No cultural deposit was noted in a probe of the surrounding area.

STATE NO.: 19272
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: On a rise sloping gently to the north and south.
VEGETATION: Elm, grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting Blind
DESCRIPTION: This site complex consists of two walls (Features A and B). The overall size dimensions are c. 40.00 m by 0.34 m.

FEATURE A: Wall
ADJACENT TERRAIN: On top of the hill on a small rise just below anotherly sloping hill.
VEGETATION: Elm, brown sage-like grass.
FUNCTION: Hunting Blind
DIMENSIONS: 1.35 m (90 degrees) by 0.20 m by 0.35 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Angular basalt cobbles (ranging in size from c. 0.15-0.33 m) are roughly stacked three to four courses high on top of an outcropping. The ledge is c. 0.44 m above ground surface on the north side and level with the ground surface on the south side. The conformation appears to be present in that it is only one course wide and very thin. It was identified as a hunting blind due to the fact that the shungshung shells were not used by the military. It may have been a hunting blind due to the fact that the shungshung shells were not used by the military. It was built on a rise that sloped down to a gully to the north and it sloped gently on the south face. It is located c. 40.00 m at 200 degrees away from 835-366. Nine shungshung shells (from visitor 18) made in U.S.A. were the surface remains. A cultural deposit was not observed (minimal soil).

FEATURE B: Wall
ADJACENT TERRAIN: North side slopes down to the gully 60.00 m. The highway is 1 1/4 mile to the west.
VEGETATION: Elm, grass.
FUNCTION: Hunting Blind
DIMENSIONS: 1.50 m (150 degrees) by 0.30 m by 0.55 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Low wall three to four courses high, one course wide. It is constructed of angular/basalt basaltic basaltic, average size is 0.25 m. At the foot of the wall on the north side are flat-sized basaltic basaltic cobbles, no stacked, possibly adding support between the slope and the base of the wall. The wall is located on the north side of the ridge which runs E/W. The wall is 2.00 m from the crest, and is parallel to the ridge. Surface remains and cultural deposits were not noted.

STATE NO.: 19273
SITE TYPE: Complex (7 Features)
TOPOGRAPHY: Undulating palisade bedrock outcrop.
VEGETATION: Short brown grass, elm.
CONDITION: Fair
INTEGRITY: Unaltered
FEATURE A: Modified outcrop
ADJACENT TERRAIN: Rolling pahoehoe bedrock outcrop on a west-facing slope.
VEGETATION: Alkali, short brown grass.
FUNCTION: Temporary habitation
DIMENSIONS: 1.50 m (5′0.0) by 0.60 m (0′2.0)
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A small outcrop of bedrock sitting against the ground covered with a small boulder and numerous cobbles give rise to it. It is located within 100 m of the highway. Several marine shell fragments were scattered about. There was no trace of coral. 0.09 m by 0.06 m by 0.04 m thick. 7.05 m was exposed. The residual deposit was very sparse.

FEATURE B: Updraft area
ADJACENT TERRAIN: Rolling pahoehoe bedrock outcrop on a west-facing slope.
VEGETATION: Alkali, short brown grass.
FUNCTION: Possible military
DIMENSIONS: 0.80 m (2′6.0) by 0.50 m (1′8.0)
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Two small clumps of pahoehoe 0.50 m and 0.40 m long, placed in upright position, carry coral to each other. The area is located within 100 m of the highway. Surface remains were not noted. The feature was untraced, a trailer passed into soil around the feature into rock at c. 0.05 m.

FEATURE C: Cave
ADJACENT TERRAIN: Unusual pahoehoe bedrock outcrop on a west-facing slope.
VEGETATION: Alkali, short brown grass.
FUNCTION: Military
DIMENSIONS: 0.80 m (2′6.0) by 0.50 m (1′8.0)
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Pahoehoe cobbles stacked four courses high. Cobbles are 0.10 m in length/ diameter. The cave is located within 100 m of the highway. No marine remains were noted. The feature was untraced, a trailer passed into soil into rock at c. 0.05 m.

FEATURE D: Terrace (1)
ADJACENT TERRAIN: Unusual pahoehoe bedrock outcrop.
VEGETATION: Alkali, short brown grass.
FUNCTION: Possible agriculture
DIMENSIONS: 0.60 m (2′0.0) by 0.30 m (1′0.0)
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Four short terraces made from a single row of pahoehoe cobbles extending downhill in a zigzag pattern. The terrace is located within 100 m of the highway. No surface remains were noted. The feature was untraced, a trailer passed into soil into rock at c. 0.05 m.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Hibernian
FUNCTIONAL INTERPRETATION: Hauling boulders/military
DIMENSIONS: 1.38 m (E-W) by 0.56 m
DESCRIPTION: Bedrock outcrop oriented E-W with a single rectangular boulder stacked on top. Extending from the north side of the outcrop is a small, short wall. This portion of the feature is two courses wide and one to two courses high. It is of very rough construction, with a height of c. 1.55 m and c. 0.28 m high. The site is blocked in the central western portion of the mound panel, c. 300 ft east of the highway. No portable remains or cultural deposits were noted.

STATE NO.: 12179
PHR#: TEMP. NO.: 855-043
SITE TYPE: Modified outcrop
TOPOGRAPHY: Unpublished ridge with much decomposing bedrock.
VEGETATION: Condition: Good
INTEGRITY: Unaltered
PROBABLE AGE: Hibernian
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 0.82 m by 0.47 m by 0.67 m
DESCRIPTION: Six subangular boulder stones stacked two courses high atop a two, small bedrock outcrop. One of the stacked boulders has a piece of chipped rock on it. The site is located on the top-south edge of same the glacial ridge 855-44, located c. 40 000 ft east of the highway. No portable remains or cultural deposits were noted.

STATE NO.: 12179
PHR#: TEMP. NO.: 855-042
SITE TYPE: Mound
TOPOGRAPHY: Undulating flat ridge top on south side of steep glacial face.
VEGETATION: Sparse tundra-like density of grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: 10,000 yrs.
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 1.0 m by 1.0 m by 0.46 m
DESCRIPTION: Small circular mound, formally constructed, with no apparent facing. Subangular boulder stones (0.20 m in diameter) are stacked to three courses high, partially on a bedrock outcrop. Some collected cobble stones around the north, east, and west base of the mound. The feature could have possibly been a cairn or one time. It is located on the second glacial terrace of the Neche River at c. 600-200 ft north of the highway. Covered by snow as portable remains. No deposit was noted.

STATE NO.: 12180
PHR#: TEMP. NO.: 855-015
SITE TYPE: Cairn
TOPOGRAPHY: Flat wide ridge with smaller cairns on either side, oriented roughly E-W, much exposed bedrock.
VEGETATION: Sparse tundra-like density of grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 0.70 m (E-W) by 1.00 m by 0.31 m
DESCRIPTION: Circular overall construction, step bedrock. In four to five courses high, with subangular boulder cobble and small boulders. The center has a open cavity c. 0.30 m deep. The west side at base has a few minor mullings along the cairn. The cairn is located on the 800 ft portion of the project area by the water tank, c. 40 degrees 19 minutes and c. 5.260 ft east of the highway. No portable remains or cultural deposits were noted.

STATE NO.: 12181
PHR#: TEMP. NO.: 855-047
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Undulating pebbly bedrock outcrops on a W-facing slope. Site is on the E end of an E-W running cliff which is blocked by the highway.
VEGETATION: Clumps, shrubs, brown grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: The site complex consists of four features. A cairn (Feature A), modified outcrop (Feature B), wall (Feature C), and a terrace (Feature D). The overall site dimensions are c. 3.00 m by 6.00 m.
FEATURE A: Cairn
ADJACENT TERRAIN: Undulating pebbly bedrock outcrops.
VEGETATION: Clumps, shrubs, brown grass.
FUNCTION: Marker
DIMENSIONS: 1.20 m (N-S; 180 degrees) by 1.16 m by 0.82 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Pebble bedrock outcrop stacked five to six courses high. Cobblestones are c. 0.15 m length/diameter, mostly c. 0.25 m. The feature is located c. 30.00 ft east of the highway. It sits on the east end of a short ridge which is blocked by the highway. No surface remains were noted. The surface was weathered.
FEATURE B: Modified outcrop
ADJACENT TERRAIN: Undulating pebbly bedrock outcrops on a W-facing slope.
VEGETATION: Clumps, shrubs, brown grass.
FUNCTION: Possible post support
DIMENSIONS: 0.20 m by 0.47 m by 0.35 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A flat, flat-shaped depression in the ground, the rim of which is lined with gravel and small cobble. The long side of the opening is oriented west 25 degrees and east 70 degrees. The north side has a small overhang c. 0.34 ft deep. The east side has a small overhang c. 0.15-0.26 ft in length/diameter. The feature is located c. 50.00 ft east of the highway. It sits on the east end of a short ridge which blocks the highway. No portable remains were noted.
FEATURE C: Wall
ADJACENT TERRAIN: Undulating hills.
VEGETATION: Knoll, grass.

FUNCTION: Temporary habitation

DIMENSIONS: 6.00 m by 4.00 m (190 degrees) by 1.80 m by 0.84 m

CONDITION: Good

INTEGRITY: Unknown

DESCRIPTION: S-shaped wall constructed of subangular basalt rocks (two to four courses). Rocks are c. 0.10-0.20 m in size. It is situated on the south side of the ridge running E/W. The wall was along the slope which declines to the north. The highest point of the ridge is about 7.00 m on the S/W, where features A, B, and D are located. The feature is located in the central portion of the project area. It is 50.00 m west of the main highway. No portable remains were noted. The surface of the site consists of basalt rocks, cobbles, and scree. Very dry layer of soil is present.

FEATURE: B: Terrace

ADJACENT TERRAIN: Unstable rock bedrock occurs on a W-facing slope.

VEGETATION: Knoll, short brown grass.

FUNCTION: Possible agriculture

DIMENSIONS: 4.70 m (W) by 5.90 m by 4.00 m

CONDITION: Poor

INTEGRITY: Unknown

DESCRIPTION: Palaeo cobbles stacked one on three courses high. Cobbles are c. 0.45 m in length/diameter. One section runs W along the upper south slope of the ridge. All is west end, another section runs north perpendicular to the ridge. The long axis runs 270 degrees. The terrace is located at 50.00 m east of the highway. It is on the east end of the ridge which is bounded by the highway. No portable remains were noted. The feature was unpressed; a trowel poked into the soil around the feature is stopped by rock c. 0.03 m.

STATE NO.: 13192

SITETYPE: Knoll

TOPOGRAPHY: Ridge of exposed bedrock oriented E/W, N/S slope face to c. 10.00 m to W.

GUIDE NO. 20 and 5.

VEGETATION: Knoll, dry brown grass.

CONDITION: Good

INTEGRITY: Unknown

PROBABILITIES: Probable

FUNCTIONAL INTERPRETATION: Marker

DIMENSIONS: 0.30 m by 0.50 m by 0.50 m by 0.03 m

DESCRIPTION: Subangular basalt cobble cobbles averaging c. 0.23 m in diameter stacked three to four courses high on bedrock outcrop. The cobbles are only two courses wide. It is on the northern side of the turn-off to Hapuna. No portable remains were noted.

STATE NO.: 13193

SITETYPE: Knoll

TOPOGRAPHY: Undulating hills with basalt outcroppings and basalt rock marker.

VEGETATION: Knoll, dry brown grass.

CONDITION: Good

INTEGRITY: Unknown

FUNCTIONAL INTERPRETATION: Military

DIMENSIONS: 1.49 m (W) by 1.80 m (E/W)

DESCRIPTION: Subangular basalt rock stacked on bedrock outcrop. Some downhill sloping is on the east side, which is c. 0.80 m high. Towel left on east slope; c. 0.02-0.07 m on compact soil. The cowl is oriented as 90 degrees. It is located in the central portion of the project area at 50.00 m west of the main highway. No portable remains or cultural deposits were noted.

STATE NO.: 13194

SITETYPE: C-shaped wall

TOPOGRAPHY: Knoll, grass.

FUNCTIONAL INTERPRETATION: Military

DIMENSIONS: 1.25 m by 0.50 m

DESCRIPTION: C-shaped wall constructed of subangular basalt rocks (two courses). Rocks are c. 0.10-0.15 m in size. The wall is oriented in a ridge between the NE in a bedrock outcrop which is bared frack up. The wall is located in the center portion of the west parent, c. 300.00 m west of the highway. A large amount of 30 cal. cartridges was noted in portable remains.

STATE NO.: 13195

SITETYPE: Wall

TOPOGRAPHY: Undulating surface of soil and decomposing bedrock.

VEGETATION: Knoll, dry brown grass, sparse leaves.

FUNCTIONAL INTERPRETATION: None

DIMENSIONS: 1.80 m by 0.95 m

DESCRIPTION: Subangular basalt rocks stacked on bedrock outcrop. Some downhill sloping is on the east side, which is c. 0.80 m high. Towel left on east slope; c. 0.02-0.07 m on compact soil. The cowl is oriented as 90 degrees. It is located in the central portion of the project area at 50.00 m west of the main highway. No portable remains or cultural deposits were noted.

STATE NO.: 13196

SITETYPE: Terrace

TOPOGRAPHY: Ridge-located on top of hill (ridge) with steep slope south at north

VEGETATION: Grass

CONDITION: Fair

INTEGRITY: Unknown

FUNCTIONAL INTERPRETATION: Military

DIMENSIONS: 1.49 m (W) by 1.80 m (E/W)
DESCRIPTION: A small terrace is built off the south slope of a hill, with the north portion flush to ground surface. The terrace is on two courses high, resting on a natural bedrock outcrop. It is constructed of angular basalt cobbles and boulders (some with remnant cores) c. 0.65-0.75 m in diameter. The surface is fairly clean, paved. The terrace is located in the NE portion of the mukia parcel, 100 ft from the highway (D). No portable remains were noted.

STATE NO.: 19287  
PIERCE TEMP. NO.: 235-015  
SITE TYPE: C-slope  
TOPOGRAPHY: Very hilly. On top of hill with steep SW slope and gentle NE slope.  
VEGETATION: Algae in center of feature, grass all through and around.  
CONDITION: Good  
INTEGRITY: Unaltered  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Military  
DIMENSIONS: 1.80 m (310 degrees) by 1.80 m  
DESCRIPTION: C-slope wall built off and around a natural bedrock outcrop, of angular basalt cobbles and boulders two to five courses high. Width of the wall is c. 0.45 m. The NE wall is roughly faced. The wall continues from the NW up east to the SE. The SW portion has a small pile (six cobbles) in a square, stacked mound. The wall is built growing down a steep slope (D). It is located in the NE portion of the mukia parcel. No portable remains were noted.

STATE NO.: 19293  
PIERCE TEMP. NO.: 235-016  
SITE TYPE: Mixed  
TOPOGRAPHY: Hillside located on fairly flat hillside land with slope going S (downward to luxury mixed highway).  
VEGETATION: Algae, grass.  
CONDITION: Poor  
INTEGRITY: Unaltered  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Undetermined  
DIMENSIONS: 1.75 m (310 degrees) by 0.50 m  
DESCRIPTION: Piled angular cobbles and boulders arched up in a shape, incorporating bedrock in the SW portion. The east portion is destroyed by building. The site is located in the north portion of the mukia parcel, c. 35.00 m from west of highway. No portable remains were noted.

STATE NO.: 19299  
PIERCE TEMP. NO.: 235-017  
SITE TYPE: Bank  
TOPOGRAPHY: Moderately hilly built on N slope down, also sloping W.  
VEGETATION: Algae, grass.  
CONDITION: Good  
INTEGRITY: Unaltered  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Military  
DIMENSIONS: 2.10 m (NW) by 1.20 m (SW)  
DESCRIPTION: Rectangular shaped with wall constructed due NE and SW. The east wall is faced and c. 0.90 m thick and five courses high. The north and south walls slope down from c. 0.30 m to ground surface, and the west wall is at ground surface. The surface of the feature is paved with small (0.65-0.75 m in diameter) angular basalt cobbles. The perimeter of the base is made with angular basalt boulders, c. 0.20-0.30 m in diameter. The feature does not look milliared, but ramp-like. There is a small amount of soil by the NE corner, also a few pieces of coral scattered, on, and around the feature. It is located in the north portion of the mukia parcel, c. 20.00 m west of the highway, c. 50.00 m south of Hayman beach road. No portable remains were noted.

STATE NO.: 19329  
PIERCE TEMP. NO.: 235-034  
SITE TYPE: Cairn  
TOPOGRAPHY: Undulating hills with basalt outcroppings and basalt rocks scattered.  
VEGETATION: Algae, dry, desert-like grass.  
CONDITION: Good  
INTEGRITY: Unaltered  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Military  
DIMENSIONS: 1.00 m by 0.50 m  
DESCRIPTION: Undulating basalt rock stacked on basalt outcropping, c. 0.50 m high, oriented at 350 degrees. Trowel test c. 0.70 m of semi-compact soil. Located central section c. 100.00 m west of main highway. Mental fragment (possibly half of a clay found) c. 0.00 m west of site) was noted as portable remains.

STATE NO.: 19301  
PIERCE TEMP. NO.: 235-059  
SITE TYPE: Pylon (3)  
TOPOGRAPHY: Undulating pahoehoe bedrock outcrop on a W-facing slope.  
VEGETATION: Algae, chart brown grass.  
CONDITION: Good  
INTEGRITY: Unaltered  
PROBABLE AGE: Historic  
FUNCTIONAL INTERPRETATION: Water transport  
DESCRIPTION: This site complex consists of two features, two sets of three pylon (frames A and B). The overall size dimensions are 160.00 m by 3.00 m.  
FEATURE A: Pylon (3)  
ADJACENT FEATURE: Undulating pahoehoe bedrock outcrop on a W-facing slope.  
VEGETATION: Algae, chart brown grass.  
FUNCTION: Water transport  
DIMENSIONS: 11.30 m (55-195 degrees) by 1.42 m by 1.56 m  
CONDITION: Good  
INTEGRITY: Unaltered  
DESCRIPTION: Pahoehoe cobbles mortared together two to eight courses high. The three structures are in a line running 15-195 degrees. The line traverses a gently rolling E-W between two low ridges. Each structure has an indentation along the top which is a flat line with the indentations on the other two structures, as if they had once been holding up a single pipe. The tops of all three are roughly level with one another; the middle one is c. 0.15-0.15 m lower than the other two. The middle structure is c. 4.00 m (E-W) by c. 0.85 m by 0.60 m high on the north side. The middle structure is c. 1.42 m (E-W) by 0.65 m by 1.50 m high on the south side. The north structure is c. 0.75 m (E-W) by 0.60 m by 0.75 m high on the south side. The base of each is rectangular. The tops are also rectangular but smaller, as the walls are sloping at a
FEATURE B: Pyla (5)
ADJACENT TERRAIN: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass.
FUNCTION: Water transport
DIMENSIONS: 11.60 m (15-195 degrees) by 0.90 m by 1.31 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Polished cobble c. 0.26-0.40 m length/diameter, mantled (r)egular four to eight courses high. The three structures are directly in line with one another, traversing a small gully which runs roughly E-W. The south structure is c. 0.94 m (E-W) by 0.30 m by 1.21 m high on the north side. The middle structure is c. 0.80 m (E-W) by 0.82 m by 0.94 m high on the south side. The north structure is c. 0.87 m (E-W) by 0.60 m by 0.90 m high on the south side. The middle is slightly higher than the south structure. The north structure is c. 0.30 m higher than the middle. Each has an indentation across the piece which is in line with the other two, as if they were all carrying a single pipe. The distance between the north and middle structure is c. 5.70 m. The distances between the middle and south structure is c. 5.70 m. This feature is directly in line with Feature A, which lies c. 133.00 m north. Mantled rock and grit erratic are scattered between the two features. The structures are rectangular at the base but smaller in the top, with slight sides sloped on one approach. Constructions historically identified to Feature A. The feature is located c. 133.00 m west of the highway. Several #16 large shells were noted as portable remains. The feature is unexcavated; a trowel pecked in ground is rock at c. 0.90 m.

STATE NO.: 19292
SITE TYPE: C-slope
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
CONDITION: Unaltered
PROBABLE AGE: Holocene
FUNCTIONAL INTERPRETATION: Hunting/industrial activity
DESCRIPTION: 2.50 m (E-W) by 1.90 m (N-S)
DIMENSIONS: c. 10.00 m by 10.00 m
DESCRIPTION: Subangular paleo-humate and small boulders stacked two to six courses high. The opening of the C-shaped faces east, toward the highway. Cobble c. 0.15-0.35 m
in length/diameter. The sides are 1.80-2.70 m. The lowest height near the end is c. 0.35 m. It is located c. 5.00 m east of the highway. Portals remain not present. The site is unexcavated; a trowel pecked in soil is rock at c. 0.95 m.

STATE NO.: 19293
SITE TYPE: Terrace
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Hunting/industrial activity
INTEGRITY: Unaltered
DESCRIPTION: Subangular paleo-humate and small boulders stacked two to six courses high. The opening of the C-shaped faces east, toward the highway. Cobble c. 0.15-0.35 m in length/diameter. The sides are 1.80-2.70 m. The lowest height near the end is c. 0.35 m. It is located c. 5.00 m east of the highway. Portals remain not present. The site is unexcavated; a trowel pecked in soil is rock at c. 0.95 m.

STATE NO.: 19294
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Agricultural
STATE NO.: 8155-070
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Agricultural
DESCRIPTION: c. 4.00 m by 4.00 m (N-S) by 0.75 m
STATE NO.: 8155-070
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Agricultural
DESCRIPTION: Subangular paleo-humate and small boulders stacked two to six courses high. The opening of the C-shaped faces east, toward the highway. Cobble c. 0.15-0.35 m in length/diameter. The sides are 1.80-2.70 m. The lowest height near the end is c. 0.35 m. It is located c. 5.00 m east of the highway. Portals remain not present. The site is unexcavated; a trowel pecked in soil is rock at c. 0.95 m.

STATE NO.: 8155-070
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Agricultural
DESCRIPTION: Subangular paleo-humate and small boulders stacked two to six courses high. The opening of the C-shaped faces east, toward the highway. Cobble c. 0.15-0.35 m in length/diameter. The sides are 1.80-2.70 m. The lowest height near the end is c. 0.35 m. It is located c. 5.00 m east of the highway. Portals remain not present. The site is unexcavated; a trowel pecked in soil is rock at c. 0.95 m.

STATE NO.: 8155-070
TOPOGRAPHY: Rolling paleo-humate outcrop on a W-facing slope.
VEGETATION: Klasse, short brown grass
FUNCTION: Agricultural
DESCRIPTION: Subangular paleo-humate and small boulders stacked two to six courses high. The opening of the C-shaped faces east, toward the highway. Cobble c. 0.15-0.35 m in length/diameter. The sides are 1.80-2.70 m. The lowest height near the end is c. 0.35 m. It is located c. 5.00 m east of the highway. Portals remain not present. The site is unexcavated; a trowel pecked in soil is rock at c. 0.95 m.
FEATURE E: Terraced retaining wall
ADJACENT TERRAIN: Upstairing hills, ravines, and ridges.
VEGETATION: Function: Temporary habitation
DIMENSIONS: 15.75 m (W) x 5.00 m (D) by 0.75 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: At least two terraced retaining walls were constructed with angular cobbles and boulders ranging in size from 0.10-0.40 m. The stones were piled to form the retaining walls. The area between the retaining walls is fairly level. A wall extends south from the eastern end of the higher retaining wall. The lower retaining wall may have also joined this wall but know trees are currently growing at this point. This feature is similar to Feature A (with the wall consisting to the terraced retaining walls). The feature is located between Features A and B, between two ridge spurs on the side of the ridge slope. Portable remains were noted as waterworn cobbles. A small test trench revealed no subterranean deposits.

FEATURE C: Enclosure widening C-shape
ADJACENT TERRAIN: 15-16 degree slope to south.
VEGETATION: Klawe ridge, unknown grass and vines.
FUNCTION: Temporary habitation
DIMENSIONS: 3.50 m by 4.00 m by 0.84 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: A rectangular structure (C-shape) with two entrances on the long sides. The western wall (C-shaped) acts as a terracing wall for the interior of the structure, as does the eastern wall (mound) for the exterior, although there is a 5.6 degree slope in the west side the interior. The northern entrance opens onto an area partially enclosed by the west wall and a curved wall to the north and east from the hill corner of the mounds. Both parts of the structure are made of large, angularly piled cobbles, and small and large boulders (top of the structure are made of large, angularly piled cobbles, and small and large boulders (top of the structure are made of large, angularly piled cobbles, and small and large boulders (top). The western entrance opens onto an area partially enclosed by the west wall and a curved wall to the north and east from the hill corner of the mounds. Both parts of the structure are made of large, angularly piled cobbles, and small and large boulders (top of the structure are made of large, angularly piled cobbles, and small and large boulders (top). The western entrance opens onto an area partially enclosed by the west wall and a curved wall to the north and east from the hill corner of the mounds. Both parts of the structure are made of large, angularly piled cobbles, and small and large boulders (top of the structure are made of large, angularly piled cobbles, and small and large boulders (top). The western entrance opens onto an area partially enclosed by the west wall and a curved wall to the north and east from the hill corner of the mounds. Both parts of the structure are made of large, angularly piled cobbles, and small and large boulders (top of the structure are made of large, angularly piled cobbles, and small and large boulders (top).

FEATURE B: Enclosure widening B-shape
ADJACENT TERRAIN: Upstairing hills, ravines, and ridges.
VEGETATION: Klawe, unknown grass.
FUNCTION: Temporary habitation
DIMENSIONS: 4.75 m (N-D) by 3.30 m (E-W) by 0.86 m
CONDITION: Good
INTEGRITY: Altered
DESCRIPTION: Feature D is a circular enclosure constructed with piled angular cobbles and boulders. The stones range in size from 0.10-0.40 m. The stones are piled two to three stones high. The western half of the feature is more of a terrace than a wall. The stones are fairly level with the interior space, while the surrounding ground surface slopes down to the wall. The eastern half of the feature is more of a wall. Even so, it is not much of a wall, because of the surrounding downspouts. There is no stacking or careful construction. The possible entrance into the interior space is at the northern end and is c. 0.50 m wide. A waterworn cobble is located within this possible entrance. The cobble fragments are located on the stones within the SE, on the mound, and to the NE. Feature B is located on top of the hill, west of the eastern end of the site. Portable remains were noted as waterworn cobbles. A small test trench revealed no subterranean deposits.

STATE NO.: 19205
SUB FILE: NO.
SITE TYPE: Complex (5 Features)
TOPOGRAPHY: Upstairing hills, basin outcrops, and basin rock walls.
VEGETATION: Klawe, dry-fern-like grassland.
CONDITION: Fair-good
INTEGRITY: Altered
PRIMARILY AGED: Probogenic
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of five features: enclosure (Feature A), mound (Feature B), and C-shape (Feature C). They are all interconnected by the presence of Feature D, which is a circular enclosure located on top of the hill. The interior of the enclosure is flat, and the outer wall is sloping. The feature is located on the north side of the mound. Feature E is located on the south side of the mound. The feature is located in the central portion of the hill, overlooking the mound. Portable remains were noted as waterworn cobbles. A small test trench revealed no subterranean deposits.

FEATURE A: Enclosure
ADJACENT TERRAIN: Upstairing hills.
VEGETATION: Klawe, grass.
FUNCTION: Temporary habitation
DIMENSIONS: 4.00 m (N) by 3.00 m by 0.80 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Basalt rock facing enclosure on top of hill. The interior of the enclosure is flat, and the outer wall is sloping. There is a distinct entrance to the northwest and a smaller entrance to the southeast. The feature is located in the central portion of the hill, overlooking the mound. Portable remains were noted as waterworn cobbles. A small test trench revealed no subterranean deposits.

FEATURE B: Mound
ADJACENT TERRAIN: Upstairing hills.
VEGETATION: Klawe, grass.
FUNCTION: Military ceremonial plaza
DIMENSIONS: 4.00 m by 3.00 m by 0.80 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Stepped basalt rocks, three courses high. A bedrock outcrop is the center of the mound. This mound forms the west SW part of the enclosure (Feature A). The mound
is square shaped. It is located in the central portion of the west parcel, a quarter mile west of the highway. No portable remains were noted.

FEATURE C: Adjacent C-shape
ADJACENT TERRAIN: Adjacent grass.
FUNCTION: Temporary habitation
DIMENSIONS: 6.10 m x (330 degrees) by 6.05 m by 6.35 m
CONDITION: Good
INTEGRITY: Unbroken
DESCRIPTION: Three interconnected C-shapes form the east side of the enclosure (Feature A). One large C-shape is c. 3.00 m x 3.00 m. A smaller C-shape is located at the north end of the C-shape. Half of it is a form part of the enclosure, the other half extends to the interior of the enclosure. The C-shape is c. 2.00 m long, and both of these C-shapes are low and wide. There is another C-shape c. 2.00 m long, which is connected to the east side of the larger C-shape. It has a wall (see note field). It is the highest (two to four courses) than the other C-shapes. The feature is located in the central portion of the west parcel, a quarter mile west of the highway. Portable remains were noted as marl soil. A thin layer of soil deposit was present.

FEATURE D: C-shape
ADJACENT TERRAIN: Unisolating hills, bushy outcrop, scattered bushy rock.
VEGETATION: Adjacent dry grass
FUNCTION: Military
DIMENSIONS: 2.90 m x 2.64 m by 0.43 m
CONDITION: Poor
INTEGRITY: Intermittent
DESCRIPTION: Subangular basalt rock stacked on soil outcropping forming a half moon or "C" shape. Large basalt rocks are scattered within the enclosures area and the feature contains. A half-circle push wall is c. 0.65 m west. The highest stacking is two to three courses on the east end. A semi-arranged (circular) configuration of the basalt rocks has been placed within the upper center section of the structure. There is a small marl soil forming in the area surrounding the feature. A travel time of 0.10 m of very soft soil would suggest sutures for the soil. It is the highest (two to four courses) than the other C-shapes. The feature is located in the central portion of the west parcel, a quarter mile west of the highway. Portable remains were noted as marl soil. Soil deposit was present. Limited testing.

FEATURE E: Modified outcrop
ADJACENT TERRAIN: Unisolating hills, bushy outcrop, scattered bushy rock.
VEGETATION: Dry desert grass
FUNCTION: Possible agriculture
DIMENSIONS: 6.03 m x 0.85 m by 0.20 m
CONDITION: Good
INTEGRITY: Unbroken
DESCRIPTION: Irregular stacked and piled subangular basalt rocks on small bushy outcrop. No visible soil was noted. A 2.00 m diameter was observed within the fenced area. The feature is located c. 1.60 m or 3.00 degrees from the survey mark within Feature A Site 855-73 on a south slope and c. 0.80 m or 3.00 degrees of hill from Feature B. This feature is located in the central project area a quarter mile from the main highway. Portable remains were noted.

STATE NO: 10346
SITE TYPE: Complex (2 Feature)
TOPOGRAPHY: Unisolating hills.
VEGETATION: Adjacent dry grass
INTEGRITY: Poor
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: This site complex consists of two features. Feature A, a C-shape (Feature B), and a wall segment (Feature E). The overall site dimensions are c. 6.00 m by 3.35 m.

FEATURE A: C-shape
ADJACENT TERRAIN: Gentle sloping hill.
VEGETATION: Adjacent dry grass
FUNCTION: Temporary habitation
DIMENSIONS: 6.00 m x 4.35 m by 0.35 m
CONDITION: Poor
INTEGRITY: Unbroken
DESCRIPTION: No structures visible. This C-shape has not yet been visible. There is a large c. 3.00 m diameter area of soil. The feature is visible. To the north of the site is a wall segment (Feature E). The feature is located in the central portion of the project area c. 0.00 m or 3.00 degrees from Feature A. This feature is located in the central project area a quarter mile west of the highway. Portable remains were noted as marl soil. Soil deposit was present.
DESCRIPTION: This cairn is really a circular concentration of subangular cobbles and boulders piled one to three courses high with an empty area in the center (2 to 0.15 to 0.20 m diameter). The eastern side appears collapsed. The cairn is located in the center, eastern half of the western parcel. Portable remains were noted as a pit (ID #4) excavated at 14.40 m as 112 degrees from the center of F35-13 (SWNW), no other artifacts. A small test trench revealed no subsurface deposit.

STATE NO.: 19298
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Fairly flat, slight slope to the NW. Very rocky with low bedrock exposure.
VEGETATION: Grass.
CONDITION: Fair
INTEGRITY: Originally
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DESCRIPTION: This site complex consists of two features: an enclosure (Feature A), and an L-shape wall (Feature B). The overall site dimensions are c. 22.50 m (W) by 8.00 m.

FEATURE A: Enclosure
ADJACENT TERRAIN: Hilly, gentle slope in all directions.
VEGETATION: Grass.
FUNCTION: Military
DIMENSIONS: 1.00 m (GW) by 3.00 m (GW) by 0.30 m
CONDITION: Fair
INTEGRITY: Originally
DESCRIPTION: The enclosure has four sides but is rounded and built of subangular baulk cobbles and natural bedrock cobbles. The sides are irregular and natural bedrock cobbles. The enclosure is one to two courses high, two to four wide. It is located at c. 22.50 m of Feature A, stop a small hill. Portable remains are noted as flint flakes, and empty containers.

FEATURE B: L-shape wall
ADJACENT TERRAIN: Hill area; built on flat portion with gentle slope north.
VEGETATION: Grass.
FUNCTION: Military
DIMENSIONS: 1.00 m by 1.60 m by 0.40 m
CONDITION: Good
INTEGRITY: Originally
DESCRIPTION: The wall is constructed of subangular baulk cobbles and bedrock. The L-shape base of the wall is not well defined, off the southeast of the long side. The long axis is north to south, 160 degrees. The short side is 112 degrees from the center of Feature A, stop a small hill. Portable remains are noted.

STATE NO.: 19299
SITE TYPE: C-shape
TOPOGRAPHY: Hill, built on west slope (down) of hill.
VEGETATION: Grass.

CONDITION: Fair
INTEGRITY: Originally
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 2.00 m (330/330 degrees) by 0.90 m
DESCRIPTION: C-shape one to two courses high constructed of subangular boulder cobbles. Boulders show baulk cobbles. Very pushed boulders, but back side shows shape alignment. The site is located in the NE portion of the eastern parcel. A piece of marine shell (probably brought in by baulk cobbles) is noted as portable remains.

STATE NO.: 19300
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: On top of hill sloping WSW.
VEGETATION: Grass.
CONDITION: Good
INTEGRITY: Originally
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Indeterminate
DESCRIPTION: The site consists of two mounds (Features A and B). The overall length of the site is c. 42.00 m.

FEATURE A: Mound
ADJACENT TERRAIN: Steep slope down to N/S line up to S.
VEGETATION: Grass.
FUNCTION: Indeterminate
DIMENSIONS: 3.00 m (330 degrees) by 1.90 m by 0.30 m
CONDITION: Good
INTEGRITY: Originally
DESCRIPTION: The mound is oblong shaped, c. 3.00 m by 1.90 m. It is built of subangular boulder cobbles. Boulders stacked one to four courses high. Cobble shows evidence of baulk cobbles. The mound is located at c. 42.00 m SSW of Feature B, on top of hill. Cobble wire is noted as portable remains.

FEATURE B: Mound
ADJACENT TERRAIN: Desouching bedrock cobbles, current.
VEGETATION: Grass.
FUNCTION: Indeterminate
DIMENSIONS: 2.00 m by 1.60 m by 0.40 m
CONDITION: Fair
INTEGRITY: Originally
DESCRIPTION: The mound is oval shaped, two to three courses high and two to three wide. It is built of subangular cobbles. Cobble shows evidence of baulk cobbles. It is located on top of hill c. 42.00 m SSW of Feature A. No portable remains were noted.

STATE NO.: 19301
SITE TYPE: Circular enclosure
TOPOGRAPHY: Hill, built on west slope (down) of hill.
VEGETATION: Grass.
CONNECTION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 1.95 m by 1.95 m
DESCRIPTION: Subangular boulder cobbles and boulders built into circular shape. A natural bedrock outcrop is incorporated into the eastern portion. The enclosure is built on the downslope of a hill (west) on the east side it is built up higher to be even all around the top. Cobbles are stacked two to four courses high and range from c. 0.10 to 0.40 m in diameter. Cobbles also show buliding crust on them. The enclosure is located in the northeast portion of the null parcel (by campground). No portable remains were noted.

STATE NO.: 19332
FIRST TEMP. NO.: 851-012
SITE TYPE: Mound
TOPOGRAPHY: Located at the bottom of a large hill (on west side) fairly flat bulidized ground.
VEGETATION: Exxen, grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 1.50 m by 0.90 m
DESCRIPTION: The mound is a rectangular, built of subangular boulder cobbles and boulders one course high (c. 0.40 m in diameter) boulders as the central core, and smaller (c. 0.15-0.30 m in diameter) rocks filling the spaces. The mound is built on bedrocked land and out of scoured rocks, located in the NE portion of the null parcel (by campground). No portable remains were noted.

STATE NO.: 19303
FIRST TEMP. NO.: 855-018
SITE TYPE: Boulder concentration
TOPOGRAPHY: Boulder boulder bedrock outcrop on a W-facing slope.
VEGETATION: Exxen, grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 4.20 m by 2.20 m
DESCRIPTION: Potholes cobbles and gravel are aligned in a curved formation that may once have been a C-shaped. Rocks are c. 0.50 m in length/diameter. The site is located c. 1.00 m SW quadrant. W of Queen Katharina highway. No portable remains were noted. Unexcavated, a soil profile is in the soil at minimum point line of rock c. 0.10 m. The site has been considerably flamed by buliding.

STATE NO.: 19304
FIRST TEMP. NO.: 855-049
SITE TYPE: O-cm
TOPOGRAPHY: Undulating hills, broad outcrop.
VEGETATION: Exxen, grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 2.10 m by 2.10 m
DESCRIPTION: Raked subangular boulder rock cup against a course high forms a scooped "C" shape. Rocks are moderately large. There is a soil deposit c. 0.10 m. The interior surface of the structure is flat, soil deposit is softer and less gravely. A marine shell fragment concentration is c. 2.00 m south from the feature. The feature was noted noted with no evidence of cultural remains recorded. The site is situated on 258 degrees. The site is located in the southwest central project area, c. half mile east of Paule Road, at the west end of a ridge.

STATE NO.: 19305
FIRST TEMP. NO.: 851-091
SITE TYPE: Modified outcrop
TOPOGRAPHY: Undulating hills, broad outcrop, broad rock outcrop, semi-enclosed, steep slope immediately NW of feature.
VEGETATION: Exxen, grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible ceremonial
DIMENSIONS: 2.10 m (E-W)
DESCRIPTION: Irregular stacked waaewaeauu boulder rock and cobble on a boulder outcrop. Several large pieces of rock are incorporated into the buildup. There are also some smaller rock pieces in the area to the back of the outcrop. The area SE of the outcrop appears to have been cleared. Several waterways outlets are also included in the modification. The feature is located a quarter mile east of Paule Road, in the south central project area, on the ridge top (wasteband facing). Portable remains were noted as waaewaeauu rock (but pieces), waaewaeauu boulder cobble (tree), and marine shells.

STATE NO.: 19306
FIRST TEMP. NO.: 851-091
SITE TYPE: Complex (7 Features)
TOPOGRAPHY: Undulating boulder bedrock outcrop on a W-facing slope.
VEGETATION: Exxen, grass.
CONDITION: Poor-Gut
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Multiphase
DESCRIPTION: This site complex consists of seven feature enclosures (Feature A), wall (Features B), moat (Feature C), C-shaped (Feature D), and terrace (Feature E). The overall site dimensions are c. 50.00 m by c. 30.00 m.
FEATURE A: Enclosure
ADJACENT TERRAIN: Located on a point of land with slopeing sides to the west and south east.
VEGETATION: Exxen, forest growth.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m by 6.30 m by 0.48 m
FEATURE B: Wall
ADJACENT TERRAIN: Rolling pah-soke bedrock outcrops on a W-facing slope (10 degree slope)
VEGETATION: Foothills grass
FUNCTION: Temporary habitation
DIMENSIONS:
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: This feature is a rectangular mud wall. The top wall and corners are made of large boulders, while the base is made of smaller stones and soil. The wall is 6 m high and 3 m wide. It is located near a small stream.

FEATURE C: Cairn
ADJACENT TERRAIN: Rolling pah-soke bedrock outcrops on a W-facing slope
VEGETATION: Foothills grass
FUNCTION: Military
DIMENSIONS: 8.00 m by 0.50 m by 0.30 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: This cairn is a rectangular structure made of large boulders. It is 8 m high and 1 m wide. It is located near a small stream.

FEATURE D: Road
ADJACENT TERRAIN: Rolling pah-soke bedrock outcrops on a W-facing slope
VEGETATION: Foothills grass
FUNCTION: Temporary habitation
DIMENSIONS: 6.00 m by 2.50 m by 0.43 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: This road is a narrow, winding path made of large boulders. It is 6 m wide and 2.5 m long. It is located near a small stream.

STATE NO.: 1907
SITE TYPE: Wall
TOPOGRAPHY: Rolling hills, ravines, and ridges. Constructed on northern edge of plateau area before highland.
VEGETATION: Foothills grass
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible military
FEATURE A: Terrace
ADJACENT TERRAIN: Large unknown tree in center of feature.
VEGETATION: California grass.
FUNCTION: Park maintenance
DIMENSIONS: 3.40 m by 1.50 m by 0.50 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: C-shaped terrace around tree (to keep soil in) constructed of angular basalt cobble and boulders; 0.10-0.40 m in diameter. Three to four courses and fairly level all around. The SWW portion is flush with the ground surface; the east portion is c. 0.10 m above ground surface. Two courses thick (wide). The center portion is filled in with reddish/brown earth. The feature is located c. 0.05 m west (60 degrees) of Feature 6 on park grounds. No portable remains were noted.

FEATURE B: Terrace
ADJACENT TERRAIN: Gently sloping N.
VEGETATION: Grass.
FUNCTION: Park maintenance
DIMENSIONS: 3.20 m by 0.00 m by 0.10 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Terrace retaining wall to keep soil in. The south portion is flush with the ground surface. It is built of small angular basalt cobbles mostly c. 0.05-0.15 m in diameter. MaterialLooking into corner area west portion. Cobble is all stripped from background area. The feature is located c. 0.05 m east of Feature A (60 park grounds), c. 12.00 m south of the road. No portable remains were noted.

FEATURE C: Terrace
ADJACENT TERRAIN: Gently sloping N.
VEGETATION: Grass.
FUNCTION: Park maintenance
DIMENSIONS: 3.00 m by 0.00 m by 0.10 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Terrace retaining wall to keep soil in. The south portion is flush with the ground surface. It is built of small angular basalt cobbles mostly c. 0.05-0.15 m in diameter. MaterialLooking into corner area west portion. Cobble is all stripped from background area. The feature is located c. 0.05 m east of Feature A (60 park grounds), c. 12.00 m south of the road. No portable remains were noted.
STATE NO.: 19314  
SITE TYPE: Complex (6 Features)  
TOPOGRAPHY: Small gently rolling hills; more or less a valley.  
VEGETATION: Klee, grass.  
CONDITION: Fair  
INTEGRITY: Altered  
PROBABLE AGE: Prehistoric  
FUNCTIONAL INTERPRETATION: Multiple  
DESCRIPTION: This site complex consists of enclosures (Feature A, no feature form), L-shaped alignments (Features B and G), U-shape (Feature C, no feature form), and C-shapes (Features D, E, H). Feature A has a feature form, but is not listed on the site form.  

FEATURE B: L-shaped alignment  
ADJACENT TERRAIN: Small, gently rolling hills.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 5.50 m by 7.00 m by 0.31 m  
CONDITION: Fair-good  
INTEGRITY: Altered  
DESCRIPTION: An L-shaped alignment of single stones. Two upright stones are c. 1.00 m apart on the east side. The uprights appear as a doorway. The structure begins c. 2.50 m south of Feature A and continues east c. 7.00 m when it turns north, continuing to the gully on the north. Boulders and cobbles are somewhat set into the ground. The feature is located in the central part of the project area, e. a half mile west of the highway. It is 142 degrees south of Site 193-10A and north of Site 193-10C (c. 800 m north, c. 200 m west). Feature B is located c. 500 m north of Feature C (shown east side of Feature B to the two uprights). Shell middens, and waterworn cobbles were noted as possible remains. A surface scatter was noted out of the feature perimeter.  

FEATURE C: C-shape  
ADJACENT TERRAIN: AMS level area with ridges 70-50 m N, W, S.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.50 m (WS) by 2.75 m (DW) by 0.24 m  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: A C-shaped pile, two to three courses of angular basalt boulders (c. 0.23-0.35 m) and cobbles (c. 0.07-0.23 m) with a c. 1.22 m opening facing 200 degrees. Construction is random, i.e., not all of the large (c. 0.234 m) boulders are used for base alignment; the southern half is piled two to three courses while the northern half is one to two courses, with intermittent use of course areas in both halves. The interior is mostly level, with 15% covered with scattered cobbles. The southeast corner is stacked on a cemented basalt boulder; remaining disturbance, the feature was likely only two to three courses high. It is located north and southeast of a drainage (drainage run between, and regression Site 193-10A). From Site 193-10A, it is located c. 10.00 m from Site 10B; at a bearing of 120 degrees to the large white residence. A cuneal adz (LD 90), and one waterworn basalt cobbles were noted as possible remains. Reddish brown soil and remains from decomposing bedrock and colluvial deposit. Pencil grubbed revealed 0.05 m.  

FEATURE D: C-shape  
ADJACENT TERRAIN: Mostly level, decomposing basalt terrain with ridges. N, W, S, 70-50 m. Drainage c. 3.00 m in width.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.70 m (WS) by 1.80 m (DW) by 0.39 m  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: Constructed on bedrock, a rounded L-shaped alignment with an opening c. 2.00 m in diameter. There are c. 60 stones (c. 0.26-0.49 m) boulders, well-groomed, that form a base alignment. There is cleft stacking in two courses along the west wall (a few appear to be scoured and supported by shellmidden). The south wall is in two courses high, i.e., one large cobble supported by well-groomed base boulders. The feature is located c. 5.00 m NW of Feature G c. 1.00 m north of Feature F. No portable remains were noted. About 0.05 m of reddish brown silty clay loam, colluvium, is present.  

FEATURE E: C-shape  
ADJACENT TERRAIN: Undulating palaeo-b shave outcrop on a W-facing slope.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.13 m (WS) by 2.65 m (DW)  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: A C-shaped, crudely stacked wall of basalt boulders (c. 0.25-0.50 m) and cobbles (c. 0.16-0.25 m) with c. 1.40 m opening 110 degrees. The wall is stacked two to three courses high with intermittent use course area. Construction is random, i.e., along east wall, smaller boulder-cobble wall are supporting larger boulders (c. 0.35 m). The interior is level, with a few basalt cobble scattered. A slightly been shallow tree is located inside the structure, north end (not map). A large boulder in SW corner is large basalt of concrete. The feature is located c. 4.00 m west of Feature E (c. 3.00 m from drainage). No portable remains were noted. There was c. 0.05 m of reddish brown gravelly silty loam.  

FEATURE F: C-shape  
ADJACENT TERRAIN: Level decomposing basalt terrain.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.13 m (WS) by 2.65 m (DW)  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: A C-shaped structure of crudely stacked angular basalt cobbles and boulders, with a c. 1.22 m opening facing 200 degrees. About eight large (c. 0.26-0.49 m) angular basalt boulders are well-groomed, and few from the base are circular alignment. Portable angular cobbles (c. 0.16-0.25 m) are stacked two to three courses in the south portion, and the more oriented (disturbed) north and east sections are due to two courses. About 20 large cobbles are scattered in the interior of the structure. Likely a collapsed wall (colluviation portion). It is located c. 1.00 m west of Feature E, c. 4.00 m west of Feature G, c. 110.00 m east of Road 10. A metallic grass flake was noted as possible remains. A gravelly reddish brown silty loam, resulting from decomposing bedrock and colluvial deposit is present. About 0.05 m of deposit is inside the structure (determined by small finger probe).  

FEATURE G: C-shape alignment  
ADJACENT TERRAIN: AMS level area decomposing bedrock/soil.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.70 m (WS) by 1.80 m (DW) by 0.39 m  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: Constructed on bedrock, a rounded L-shaped alignment with an opening c. 2.00 m in diameter. There are c. 60 stones (c. 0.26-0.49 m) boulders, well-groomed, that form a base alignment. There is cleft stacking in two courses along the west wall (a few appear to be scoured and supported by shellmidden). The south wall is in two courses high, i.e., one large cobble supported by well-groomed base boulders. The feature is located c. 5.00 m NW of Feature G c. 1.00 m north of Feature F. No portable remains were noted. About 0.05 m of reddish brown silty clay loam, colluvium, is present.  

FEATURE H: C-shape  
ADJACENT TERRAIN: Undulating palaeo-b shave outcrop on a W-facing slope.  
VEGETATION: Klee, grass.  
FUNCTION: Temporary habitation  
DIMENSIONS: 2.13 m (WS) by 2.65 m (DW)  
CONDITION: Poor  
INTEGRITY: Altered  
DESCRIPTION: A C-shaped, crudely stacked wall of basalt boulders (c. 0.25-0.50 m) and cobbles (c. 0.16-0.25 m) with c. 1.40 m opening 110 degrees. The wall is stacked two to three courses high with intermittent use course area. Construction is random, i.e., along east wall, smaller boulder-cobble wall are supporting larger boulders (c. 0.35 m). The interior is level, with a few basalt cobble scattered. A slightly been shallow tree is located inside the structure, north end (not map). A large boulder in SW corner is large basalt of concrete. The feature is located c. 4.00 m west of Feature E (c. 3.00 m from drainage). No portable remains were noted. There was c. 0.05 m of reddish brown gravelly silty loam.
FEATURE A: Cairn
ADJACENT TERRAIN: Feat. A is on a flat riser with a gully to the N and S. A slope is immediately to its W. The land is flat to the east.
VEGETATION: Klawe, grass.
FUNCTION: Possible post support
DIMENSIONS: 1.30 m (5-1) by 1.10 m (4-5) by 0.34 m
CONDITION: Fair-good
INTEGRITY: Unaltered
DESCRIPTION: Feat. A is a low, cone-shaped cairn. It is built with boulders (c. 0.90 by 0.40 m to 0.10 by 0.15 m) placed in a circle with smaller boulders (c. 0.10 by 0.15 m to 0.20 by 0.25 m) placed on the outer edge of the circle. The boulders are tightly placed and the top of the cairn is flat. The feature is located on the west edge of a knoll that runs west to east. There is some visibility from the surface to the east.

FEATURE B: Cairn
ADJACENT TERRAIN: Feat. B is on the W edge of a knoll that runs W-E. There is a slope immediately to its west.
VEGETATION: Klawe, grass.
FUNCTION: Possible post support
DIMENSIONS: 1.00 m (6-2) by 0.85 m (4-5) by 0.35 m
CONDITION: Fair-good
INTEGRITY: Unaltered
DESCRIPTION: About nine boulders are arranged in a circle. The boulders are c. 0.20 by 0.20 m. Smaller boulders are placed inside. The bowl is visible from the east. The feature is located on the west edge of a knoll running west to east. The cairn is present on the surface to the east. Minimum middle present; mostly covers shell.

FEATURE C: Cairn
ADJACENT TERRAIN: Feat. C is on the SW corner of a knoll running W-E. A gully is adjacent to Feat. C to the S.
DESCRIPTION: Feature C is a small, low, circular pile of basalt cobble (c. 0.10 by 0.10 m). They are tightly piled. Several sherds shells are on the surface just south of the feature (Feature 16 GA).

FEATURE IN: Caia
ADJACENT TERRAIN: Fest. II is located just south of a gully running west to east.
VEGETATION: Blades, grass.
FUNCTION: Possible post-support/agriculture
DIMENSIONS: 0.90 m (W) x 0.09 m (D) by 0.51 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature H is a low, one course circular shaped area east of c. 1.5 m. The boulder is c. 0.30 by 0.20 m. On the southwest side is one larger boulder (0.37 by 0.41) standing upright. (Note: this is the direction of the sun). No portable remains were noted to be in the immediate area.

STATE NO.: 19315
PHH1 TEMP. NO.: 853-113
SITE TYPE: Circular enclosure
TOPOGRAPHY: Gently undulating hills.
VEGETATION: Blades, grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Indeterminate
FUNCTIONAL INTERPRETATION: Temporary habitation/hunting blind
DESCRIPTION: A circular enclosure of randomly piled basaltic boulders and cobbles partially incorporating a bedrock outcrop. Some very small pieces of oral art in the NE. A small scatter of sherds shells is left in the central. The enclosure is located east of the dump. Cords, sherds shells, and the cobbles were noted as portable remains.

STATE NO.: 19317
PHH1 TEMP. NO.: 853-115
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: A steep slope and rolling hills.
VEGETATION: Blades, grass, vines.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of four features: adjacent C-shapes (Feature A), monal (Feature B), C-shape with adjoining wall (Feature C), and C-shape (Feature E).

FEATURE A: Adjacent C-shapes
ADJACENT TERRAIN: Rolling hills, but roughly levelled on all around feature.
VEGETATION: Blades, grass, vines.
FUNCTION: Temporary habitation
DIMENSIONS: 0.75 m (20 degrees TH) by 0.25 m (120 degrees TH)
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Randomly piled cobbles and boulders c. 0.20 by 0.17 by 0.10 m in the shape of two C-shaped structures connected by a few cobbles. The eastern of the two appears to have a cupboard (or gun placement) leading into the space between the two (see map). This feature was previously called E-shape. It is located c. 42.50 m to 20 degrees TH to Feature B; c. 0.60 m to 340 degrees TH to Feature D. Two pieces of oral, and several sherds shells were noted as portable remains. No important cultural remains were discovered.

FEATURE B: Boulders
ADJACENT TERRAIN: Rolling hills, steep slope down to mud embankment.
VEGETATION: Blades, grass, vines.
FUNCTION: Military campsite pilots
DIMENSIONS: 3.00 m (54 degrees TH) by 2.00 m (214 degrees TH)
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Randomly piled cobbles and boulders (c. 0.30 by 0.20 by 0.10 m) on top of bedrock in the shape of a teepee. The feature is located c. 20.00-25.00 m north of Road 10 (new Peaks road east of road above dump). Marine shell (coral, and coral), and a can were noted as portable remains. A surface scattering was noted as a deposit.

FEATURE C: Colpse along jointing wall
ADJACENT TERRAIN: Rolling hills, steep slope down to mud embankment.
VEGETATION: Blades, grass, vines.
FUNCTION: Temporary habitation/military
DIMENSIONS: 7.00 m (54 degrees TH) by 5.00 m (14 degrees TH)
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Randomly piled cobbles and small boulders (c. 0.20 by 0.20 by 0.10 m) piled on soil and bedrock in a C-shape with a destroyed wall extending into the NW. The end of the wall is at 15.00 m south of Road 16 (near Peaks road) at the head above the dump. A C-shape can, and a scattering of marine shell (coral, and coral) were noted as portable remains. Surface scattering was noted as a deposit.

FEATURE D: Colpse
ADJACENT TERRAIN: Rolling hills, very gentle slope to the NW.
VEGETATION: Blades, grass, vines.
FUNCTION: Temporary habitation
DIMENSIONS: Poor
INTEGRITY: Altered
DESCRIPTION: Small c-shaped structures of randomly piled cobbles and two small boulders (c. 0.20 by 0.17 boulders) piled on soil and bedrock outcrop. The feature is located c. 9.00 m at 30 degrees TH to Feature A. No portable remains or cultural deposits were noted.

STATE NO.: 19318
PHH1 TEMP. NO.: 855-117
SITE TYPE: Marine scatter
TOPOGRAPHY: Very gently located on top of ridge and down south scarp slope including headland.
VEGETATION: Blades, grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: Several large hexagonal basalt blocks along top of ridge. The rest of the area appears to be featureless, and the southern portion has a distinct basaltic alignment. The site was destroyed by bulldozing. Origin (military) is assumed throughout the site, concentrated in the SE portion. The site is located in the central portion of the subject parcel between the highway and Road 86. A mixing amount of seaweed mortar is scattered in the southern half; sparse in the northern half. There are small basalt blocks along the southern portion of the site (on the south slope). There are prominent basalt blocks noted as being collected at ID #2. A deposit was noted as being present, implying to be less than 0.06 m of soil mixture with associated ash (but may be of later). The deposit surface is to 0.05 m from the basaltic road (2) and then picks up again in the push, but that part looks the surface and does not continue below. Most likely disturbed and eroded not from basaltic activity.

STATE NO.: 19319
SITE TYPE: Modified outcrop
TOPOGRAPHY: Steep hillside, built along top at north side.
VEGETATION: Sedge, grass.
CONDITION: Fair
INTEGRITY: Altered
PROBABLE AGE: Probabilistic
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: Subangular basalt cobble marsh fill (SE) off a natural basaltic bedrock outcrop (SEW). It is surrounded by a pit, and is built partially on top of the hill and working down. Downstream (NW), the feature is 0.80 m by 2.00 m, it is mostly due to two courses high. A bedrock block along the south portion is 0.15 m in length and 0.25 m in width. The feature is located in the southern quarter of the subject parcel, 100 m away from Road 86. Three cove in shells were noted on the original remains.

STATE NO.: 19320
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Steep hillside to N of site. Hilltop has an exposed decomposing bedrock, gravel, and cobble.
VEGETATION: Sedge, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DESCRIPTION: This site consists of two features: C-shape (Figure 1) and modified outcrop (Figure 3).

FEATURE A: C-shape
ARMAMENT: Decomposing bedrock, cobbles, and gravel
VEGETATION: Grass
FUNCTION: Military
DIMENSIONS: 4.30 m (SEW) by 1.80 m (N-S) by 0.10 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: C-shape composed of angular basaltic bedrock and cobble ranging from 0.05-0.40 m in diameter, including natural basalt. It is one to three courses, with the middle course the highest. In the center of the enclosed side is a flat piece of bedrock abutting the back wall on the ground surface. The feature is located in the SE corner of the subject parcel. No portable remains were noted.

FEATURE B: Modified outcrop
ARMAMENT: Steep slope to the north, gentle slope from the SE. Much exposed bedrock
VEGETATION: Moderate density of low dry grass, Sedges
FUNCTION: Military
DIMENSIONS: 2.80 m (E-W) by 1.30 m by 0.32
CONDITION: Poor fair
INTEGRITY: Unaltered
DESCRIPTION: The feature appears overall, as a small, informal retaining wall, running parallel along the slope, oriented southwest. Most of the feature is a bedrock outcrop with a few small basaltic hexagonal basaltic cobble placed of the site and west each. The placed stones are one to two courses high and a single course wide. The feature is located c. 0.50 m west of Feature A. No portable remains were noted.

STATE NO.: 19321
SITE TYPE: G-shape
TOPOGRAPHY: Steep slope to SW. All basaltic blocks are decomposing bedrock, gravel, and cobble.
VEGETATION: Sedge, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 1.30 m (E-W) by 1.00 m (N-S)
DESCRIPTION: Small C-shape one to two courses high, constructed of angular basalt cobbles and bedrock, incorporating a natural basaltic bedrock. It is located in the northeast quarter of the subject parcel, c. 100 feet north of Hesperus Beach road. No portable remains were noted.

STATE NO.: 19322
SITE TYPE: Modified outcrop
TOPOGRAPHY: Steep slope and steeply down west to road.
VEGETATION: Sedge, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 1.15 m (20 degree) by 1.00 m
DESCRIPTION: Circular bedrock outcrop that is carved along the SW portion and filled in with angular basaltic cobble. The center is slightly depressed and natural bedrock with decomposing bedrock gravel. It is located in the SE corner, SW central, c. 20 feet east of Hesperus Beach road, c. 109.60 m to south of road to campground. No portable remains were noted.

STATE NO.: 19323
SITE TYPE: Alignment
FIRE TEMP.?
VEGETATION?
Hesperus Beach road.
TOPOGRAPHY: Hills, located on hill sloping west (down) and gently north.
VEGETATION: Alkali, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DIMENSIONS: 1.61 m (5'W, 2.5'HD) by 0.27 m (9'E) off normal
DESCRIPTION: Subangular basalt cobble and boulders aligned parallel to bedrock. It is only one boulder wide (c. 0.27 m) and one to two courses high. It is built on a slope drying west. It is located on the north side of the road, c. 20.00 m west of Road 10. No portable remains were noted.

STATE NO.: 19324
PHIRE TEMP. NO.: 855-125
SITE TYPE: Complex (2 Feature)
TOPOGRAPHY: Sloping to the west, rock with expose decomposing bedrock.
VEGETATION: Alkali, grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Military
DESCRIPTION: This site complex consists of two walls (Features B and C). The previously identified Feature A is boulders rock wall.

FEATURE B: Wall
ADJACENT TERRAIN: Built on slope westward (down). 
VEGETATION: Alkali, grass.
FUNCTION: Military
DIMENSIONS: 1.61 m by 0.39 m by 0.29 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Wall is present N, constructed of subangular basalt cobble one to two courses high with slight curve east toward the center of the wall. Maximum height is c. 0.10 m and maximum width is c. 0.29 m. It is c. 1.10 m long and located c. 1.00 m SE of Feature C, c. 31.00 m east of Road 10. Military bullet casings were noted as portable remains.

FEATURE C: Wall
ADJACENT TERRAIN: On downslope west.
VEGETATION: Alkali, grass.
FUNCTION: Military
DIMENSIONS: 2.05 m by 0.23 m by 0.49 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Linear wall N, c. 2.00 m long, constructed of subangular basalt cobble c. 0.20-0.40 m in diameter. It is c. 0.35 m wide (one course) and c. 0.49 m high (two courses). It is located c. 1.00 m N of Feature B and c. 31.00 east of Road 10. Strontium, and 41 calibers bullet casings were noted as portable military remains.

STATE NO.: 19325
PHIRE TEMP. NO.: 855-127
SITE TYPE: Wall segment

TOPOGRAPHY: Outside slope to the west, undulating surface with a lot of bouldered earth.
VEGETATION: Alkali, grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting and military
DIMENSIONS: 1.24 m (4'H) by 0.33 m (9'E)
DESCRIPTION: Very small wall remains. Bedrock is broken into the feature. Subangular basalt cobble are stacked two courses high and one to two courses wide. The area under and around the feature lacks like it has been bouldered, and some fragments are scattered throughout the area. The site is located on the north side of the road, c. 53.00 m east of Pahska road (Road 10). No portable remains were noted.

STATE NO.: 19326
PHIRE TEMP. NO.: 855-136
SITE TYPE: C-shaped
TOPOGRAPHY: Rolling hills.
VEGETATION: Alkali, grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: This site consists of a C-shaped structure (Feature C). All other previously identified features are either military or boulder wall. The overall site dimensions are c. 3.10 m by 3.20 m.

FEATURE B: C-shaped
ADJACENT TERRAIN: Rolling hills and weathered outcrops.
VEGETATION: Alkali, grass.
FUNCTION: Temporary habitation
DIMENSIONS: Poor
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: The C-shape is roughly piled about two layers high in pots. The "C" is nearly closed on the west side. The mudclap has been removed by boulders. Some portions of the bouldering wall (uncovered) only exist at the bottom. The feature is located in the north half of the mudclap section east of Road 10. Military shell (howitzer) was noted as possible remains. Excavations were noted as being present on the surface.

STATE NO.: 19327
PHIRE TEMP. NO.: 855-140
SITE TYPE: Terrace
TOPOGRAPHY: Undulating low hills, ridges, and ravines.
VEGETATION: Alkali, grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Temporary habitation/military and hunting ground
DIMENSIONS: 0.75 m (6') by 2.00 m (6')
DESCRIPTION: Site construction is problematic. The surrounding area (NE, E, SE, and SW) has obviously been bulldozed. The waste pile from this activity was pushed upslope, which is in conflict with the rest of the project area. The only possible remains of prehistoric occupation (other than charcoal) are pebbles on the northern edge of the waste pile. These appear to be piled from a low terrace, as opposed to mechanically piled. A large stone within the area has been identified as a megalith. The terrace is located south of the dump, just west of the western boundary on top of a flat. Paper skyhook shells, "Pinto 12" R.V.; trade in U.S.A. 1/2", "On the 12 Victor trade in U.S.A.", unknown scalar, large shells, and sea urchin, "LV 68 E348", were used for siltwash, branch, other coastal, cowrie, and other shell fragments were present. All of these were noted as being possible remains. Small terracotta reveal no subsurface deposits.

STATE NO.: 19330
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Gently undulating hills, shallow ravine, eroded and bulldozed flat land.
VEGETATION: Algae, grass.
CONDITION: Fair
INTEGRITY: Unrated
PROBABLY AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agriculture
DESCRIPTION: This site complex consists of two features: a terrace (Feature A), and a modified outcrop (Feature C). Features B, D, F, and G are outside of the project area. The overall site dimensions are c. 250 m at 264 degrees by 12.60 m.

FEATURE A: Terrace
ADJACENT TERRAIN: Palaeo-hadak outcrops on a W-facing slope.
VEGETATION: Algae, grass.
FUNCTION: Agriculture
DIMENSIONS: 16.50 m (16-193 degrees) by 12.60 m by 0.60 m
CONDITION: Fair
INTEGRITY: Unrated
DESCRIPTION: A series of four terraces extending down a west-facing slope. Palaeo-cobbles and small boulders are stacked one to five courses high. No portable remains were noted.

FEATURE C: Modified outcrop
ADJACENT TERRAIN: Unrelated bedrock outcrops on a W-facing slope.
VEGETATION: Algae, grass.
FUNCTION: Agriculture
DIMENSIONS: 6.50 m (0-117 degrees) by 1.60 m by 1.60 m
CONDITION: Fair
INTEGRITY: Unrated
DESCRIPTION: A natural palaeo-outcrop with cobbles and small boulders placed along the top of its crest overlying the surface. Rocks are c. 0.25-0.66 m length/diameter. Most are c. 0.40 m, and stacked one course high. The feature is located on the quarry, c. a quarter mile from the beach. Marine shell fragments were noted as surface remains. The feature is not excavated, a trail led into it and around the feature is stopped by rock c. 0.60 m. 

STATE NO.: 19329
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Gently undulating hills, shallow ravine, eroded and bulldozed flat land.
VEGETATION: Algae, grass.
CONDITION: Fair
INTEGRITY: Unrated
PROBABLY AGE: Middle Pleistocene
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: This site consists of two C-shapes (Features A and B). The overall site dimensions are c. 6.23 m by 2.93 m.

FEATURE A: C-shape
ADJACENT TERRAIN: Gently undulating hills, shallow ravine, eroded, bulldozed flat land.
VEGETATION: Algae, grass.
FUNCTION: Temporary habitation
DIMENSIONS: c. 1.73 m by 2.45 m by 0.55 m
CONDITION: Fair
INTEGRITY: Unrated
DESCRIPTION: Randomly piled boulders incorporating a bedrock outcrop. The shelter is set on the base of a small ridge on the southeast end. A shallow ravine lies on the northwest. Feature A lies east to Feature B to the SW. No portable remains were noted.

FEATURE B: C-shape
ADJACENT TERRAIN: Gently undulating hills, shallow ravine, eroded, bulldozed flat land.
VEGETATION: Algae, grass.
FUNCTION: Temporary habitation
DIMENSIONS: 1.53 m by 2.45 m by 0.55 m
CONDITION: Fair
INTEGRITY: Unrated
DESCRIPTION: Randomly piled boulders incorporating a bedrock outcrop. The shelter is set on the base of a small ridge on the southeast end. A shallow ravine lies on the northwest. Feature B lies east to Feature A to the SW. No portable remains were noted.

STATE NO.: 19330
SITE TYPE: Circular enclosure
TOPOGRAPHY: On small hill. Hill to NE, sloping down SW.
VEGETATION: Algae, grass.
CONDITION: Fair
INTEGRITY: Allowed
PROBABLY AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Agricultural/ceremonial
DIMENSIONS: 3.36 m (256 degrees) by 4.39 m (344 degrees)
DESCRIPTION: Round-shaped enclosure constructed of subangular boulders with bases and boulders c. 0.10-0.35 m in diameter. It is built in three courses wide and one to two courses high. The opening is NW, with a narrow entrance. The entrance is marked by two stone slabs or stones. There are no portable remains or signs of habitation. The center is mostly clear with a few embedded or collapsed boulders scattered inside. The enclosure is located c. 30.50 m west of Road 10, c. 40.50 m east of Site 193, in the central portion of the natural park.
STATE NO.: 19331
SITE TYPE: Mound
TOPOGRAPHY: High, east and west sloping.
VEGETATION: Elbow, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Undetermined
DIMENSIONS: 1.25 m by 1.25 m
DESCRIPTION: A small circular mound, rough in shape. It is composed of angular basalt cobbles arranged in a ring shape, c. 0.50 m in diameter. No interior features were noted. A minimal soil deposit is present.

STATE NO.: 19332
SITE TYPE: C-shape
TOPOGRAPHY: On the south side of a hill sloping SE/W.
VEGETATION: Elbow, grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible military
DIMENSIONS: 2.60 m (327 degrees) by 1.30 m
DESCRIPTION: Loosely piled block weathered basalt cobbles one to three rocks high. Rocks are c. 0.15-0.50 m in size. The exterior is C-shaped and runs along the slope of the hill, with the interior facing uphill. No portable remains were noted.

STATE NO.: 19333
SITE TYPE: Modified outcrop
TOPOGRAPHY: Rolling hill sloping to the west.
VEGETATION: Elbow, grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 2.30 m by 1.10 m by 0.60 m
DESCRIPTION: Basalt outcrop with a few weathered, basalt rocks piled on top. Rocks are c. 0.20-0.45 m in size. Located on top of a small ridge, West of Road 10. No portable remains were noted.

STATE NO.: 19334
SITE TYPE: Modified outcrop
TOPOGRAPHY: NE slope, rocky terrace.
VEGETATION: Elbow, grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric

STATE NO.: 19335
SITE TYPE: U-shape
TOPOGRAPHY: Levelled (possibly mechanically) top of small knoll; decomposing bedrock.
VEGETATION: Elbow, grass.
CONDITION: Fair-good
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 14.60 m (E/W) by 9.00 m
DESCRIPTION: Three low piled walls of c. 0.15-0.50 m basalt cobbles/boulders. The U-shape is orientated 270 degrees. The north wall (facing 102.75 degrees) is one course high and two in course wide, and mostly composed of larger boulders (c. 0.40 m) and bedrock. The east wall (facing 102.75 degrees) is one course high and two courses wide, and mostly composed of smaller cobbles (c. 0.30 m) and bedrock. The south wall (facing 102.75 degrees) is one course high and one course wide, and mostly composed of smaller cobbles (c. 0.30 m) and bedrock. The east wall is composed of a large boulder alligative with some scattered cobbles between a single pile. The south wall is composed of small cobbles and bedrock. It possibly could have been an unworked feature or an area of construction material. A few segments appear placed (c. two courses high), but have no definite shape. Scattered marks that was found in the interior of the U-shape as well as the south edge of the accumulated cobbles. There is c. 0.40 m gap at the SW corner; the gap is bordered by cobble c. 1.00 m. It does not appear to be a collapsed corner; it is likely an interior opening. The site is 100 degrees at 150 degrees from Hapuna State Park entrance (southern parking lot). Metal pipe, rusted debris due to proximity to beach park and parking lot (c. 15.00 m) were noted and portable remains. Grease spill due to deteriorating bedrock, yellowish brown silty clay was noted. These yields indicate c. 0.07-0.10 m deposit in areas of concentrated marine shell (i.e. SW, NE, and center).

STATE NO.: 19336
SITE TYPE: C-shape
TOPOGRAPHY: Large gully with steep, sloping sides, running E-W.
VEGETATION: Elbow, grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 2.40 m (320 degrees) by 2.25 m
DESCRIPTION: Pitted subcircular basalt cobbles one to two courses high ranging in size from c. 0.15 m to 0.34 m. Piling is in the SW, NW, and NE corners. The E-W wall is slightly square in shape and mostly bedrock. Traces of shell fragments are seen in the piling at the NE corner. A larger concentration also runs along the eastern portion of the feature. Located c. 72.00 m SSW of Site 160, c. 15.00 m west of the gravel road. A c. 0.05 m soil deposit is on top of the feature.
DESCRIPTION: C-shape feature is constructed of weathered basalt cobbles c. 0.15-0.41 m in size. The rocks are piled one on three another high. The feature is built along the natural contour of the gully and opens towards the gully (downslope). The feature is located west of Road 18, on the southern edge of a large E-W flat. No portable debris were noted.

STATE NO.: 95433
FLR NUMBER: No.55-174
SITE TYPE: Complex (D Feature)
TOPOGRAPHY: Along long narrow ridge running E-W. Slopes N and S; billy area.
VEGETATION: Knew, grass.

CONDITION: Fair
INTEGRITY: Altered
PROBABLE AGE: Probabilistic
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of eight features: enclosure (Features A-C), C-shape (Features D-F, and H), and U-shape (Feature I). The overall site dimensions are c. 47.00 m by 15.00 m.

FEATURE A: Enclosure
ADJACENT TERRAIN: Built along ridge top running E-W.
VEGETATION: Knew, grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 3.75 m (NS) by 3.00 m (EW) by 0.23 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Circular enclosure constructed of weathered basalt cobbles without bedrock. The outer wall is built on the gully (downslope). The inside area is used for storage. There are two small holes in the wall that may be used as doors.

FEATURE B: Enclosure
ADJACENT TERRAIN: Built along ridge top running E-W with gentle slope on S and N.
VEGETATION: Knew, grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 3.00 m by 2.51 m by 0.32 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Circular enclosure constructed of weathered basalt cobbles without bedrock. The outer wall is constructed of basalt cobbles and has been weathered. The inside area is used for storage. There are two small holes in the wall that may be used as doors.

FEATURE C: Enclosure
ADJACENT TERRAIN: Built along upslope (E) of long ridge (E to W), with steeper slopes N and S.

VEGETATION: Knew, grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 3.00 m by 2.50 m by 0.41 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Oval, very damaged and weathered. It is constructed of angular basalt cobbles and natural bedrock outcrop. Bedrock is on the north and east portion, with a few cobbles piled around and on top of it. The SW portion is very damaged, with stumps of a perimeter distinguishable. The feature is located in two corners and one to three wide (mostly from upslope). It is located c. 0.50 m east of Feature C, c. 0.50 m west of Feature D, and is the central portion of the marsh area. Military debris is noted as portable remains.

FEATURE D: C-shape
ADJACENT TERRAIN: Build along ridge top E to W with slopes N and S.
VEGETATION: Knew, grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 3.75 m by 2.15 m by 0.90 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Subangular basalt cobbles and boulders c. 0.15-0.35 m in diameter, piled one to two courses high, and one to two wide. They are mostly piled on top of a natural bedrock outcrop. The south and east portions are mostly boulders, with upslope out toward the west. The outer is cleared, with cleared gravel. Batlife occurs in the entire feature. The feature is located c. 3.00 m east of Feature C and is located west of Feature D in the central portion of the marsh area. Military debris is noted as portable remains.

FEATURE E: C-shape
ADJACENT TERRAIN: Heavy concentration of subangular basalt cobbles in all directions.
VEGETATION: Knew, grass.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m by 2.15 m by 0.90 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Feature E is composed of subangular, small c. 0.10 m to medium c. 0.25 m) rocks piled one to three courses high upon an existing bedrock outcrop. The center section is the highest; the sides being only one to two courses high. There is a great deal of decomposed basalt cobbles and pebbles in all directions and portable remains extend on the entire site. There is storage and cobble piles to the north and to the south. The feature is located in the central marsh area. Feature E is c. 3.50 m from Feature D at 216 degrees. Feature E as well as Features A and D, and Features F and H are all atop a ridge of fairly flat basalt outcropping, running east to west and sloping to north and south. No trees are seen on top. No portable remains were noted.

FEATURE F: C-shape
ADJACENT TERRAIN: Vegetation: Grassy.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m by 2.15 m by 0.90 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature F is composed of subangular, small c. 0.10 m) rocks piled one to three courses high upon an existing bedrock outcrop. The center section is the highest; the sides being only one to two courses high. There is a great deal of decomposed basalt cobbles and pebbles in all directions and portable remains extend on the entire site. There is storage and cobble piles to the north and to the south. The feature is located in the central marsh area. Feature E is c. 3.50 m from Feature D at 216 degrees. Feature E as well as Features A and D, and Features F and H are all atop a ridge of fairly flat basalt outcropping, running east to west and sloping to north and south. No trees are seen on top. No portable remains were noted.
DESCRIPTION: Locally arranged (not piled or stacked) subangular basalt cobbles c. 7.25 m in diameter, possibly arranged in a C-shape. The feature appears to be the result of a slight circular clearing causing a C-shape effect. The feature is located in the central medial portion. Feature F is c. 8.03 m from Feature F at 215 degrees. Feature F is c. 11.88 m from Feature H at 90 degrees. Feature F is located on a ridge of basalt overtopping that rises east to west and slopes on the north and south sides. The ridge is quite level, and there are no trees east. A small quantity of marine shell midden is noted at portable location, c. 0.15 m of soil and subangular cobbles are subsurface.

FEATURE C: U-shape

ADJACENT TERRAIN: Heavy concentration of cobbles that is subangular basalt cobbles displaced by decomposition and possible machine disturbance.

VEGETATION: Sparse, grass.

FUNCTION: Temporary habitation/military

DIMENSIONS: Condition: Poor

INTEGRITY: Unaffected

DESCRIPTION: Subangular basalt cobbles c. 0.10-0.35 m in diameter, piled, not stacked upon a natural basalt outcrop. The highest portion of this feature is at its northeastern side; this is a single cobble stone c. 0.35 m in diameter. Located in the central medial portion, Feature H is c. 1500 m from the eastern end. The ridge is sloping on the north and south sides. These are not upon a slight circular clearing (whatever military subsistence), a plastic burrow (bore), and fragmented, and a slight quantity of marine shell midden is noted at portable location. About 0.5 m of portable soil are subsurface east of this rise.

STATE NO. 19335

SITE TYPE: Complex 24 Feature

TOPOGRAPHY: Site is on the top of a hill with slight slopes on all sides.

VEGETATION: Sparse, grass.

FUNCTION: Multiple

INTERPRETATION: Multiple
FEATURE C: L-shape
ADJACENT TERRAIN: Terril is sloping down to the south and west. Hills and valleys.
VEGETATION: Low and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 3.10 m (270 degrees) by 3.60 m by 0.45 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Small to medium size dark gray, paler core stones arranged in a L-shape one to three courses high. The stones range from c. 0.50 to 1.25 m in diameter. These stones are not flat or stacked, but there is a definite order to how the stones are placed. Site 115 (Feature D) is c. 3.23 m by 2.73 m (70). Site 209 (Feature A) is c. 3.20 m by 2.20 m (70). The orientation is c. 200.00 m in a west to east. Feature B of this site is c. 2.80 m by 2.68 m (70). Telephone poles parallel to the secondary road are due east at c. 310.00 m.

FEATURE D: C-shape
ADJACENT TERRAIN: Undulating hills.
VEGETATION: Low and grass.
FUNCTION: Possible agriculture
DIMENSIONS: 1.20 m (270 degrees) by 0.80 m by 0.33 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A small C-shaped component of medium to large basalt rocks, one to two courses high, average size c. 0.10 to 0.125 m. The opening is to the west. Feature E is c. 1.30 m by 2.74 m by 0.37 m (70). No possible remains or cultural deposits were observed on the surface of this feature.

FEATURE E: Circular alignment
ADJACENT TERRAIN: Undulating coastal hills.
VEGETATION: Low and grass.
FUNCTION: Possible agriculture
DIMENSIONS: 0.73 m by 0.10 m by 0.135 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: A small basin (c. 0.13 m) rock shaped in a circular alignment on the surface. There is broken stone shale scatter (possibly all fragments from shale) southeast of the feature. The feature is created east at 74 degrees. This feature is located in the central inland project area c. 1.40 m west of Toplonym 5 (Palma and Hapunang old road), and c. 1.50 m northeast of Feature D at 354 degrees.

FEATURE F: Modified outcrop
ADJACENT TERRAIN: Feature E is on top of a hill with slight sloping on all sides.
VEGETATION: Low and grass.
FUNCTION: Indeterminate
DIMENSIONS: 1.30 m (10 degrees-273 degrees) by 0.60 m by 0.54 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Field of medium to large basalt boulders one to two courses high. Ranga is c. 0.10 to 0.30 m. Placing occurs on top of bedrock. Bedrock overlying access to the east. This feature is located c. 10.00 m in a west direction from Feature A1 (crossed) and c. 5.50 m west of a small dirt road that connects to a larger one.

STATE NO.: 19319
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Deep sloping to all directions. Hills of palochoke bedrock on a west-facing slope.
VEGETATION: Low and grass.
CONDITION: Poor to fair
INTEGRITY: Unaltered
PROBABLE AGE: Probable
FUNCTION: Interpretation: Multiple
DESCRIPTION: This site contains at least one modified outcrop (Feature B and D) and one outcrop (Feature E). The overall site dimensions are c. 50.00 m by 30.00 m (45 degrees).
CONDITION: Poor/Fair
INTEGRITY: Unknown
DESCRIPTION: A roughly circular, amorphously shaped mound-like feature. It is constructed of subangular basalt cobbles and boulders piled in with red and grayish sandy soil. The east and south portions are the most extensive and high. The center is filled with gravel and soil. There is no discernible clearing in the center as well as no clear linear formation in terms of clear linear formation and remains of a structure. The mound has been impacted by build-up of soil. An old military trench runs near the feature from the blanket foot to the project. A large boulder (c. 2.0 m in diameter) was observed on the surface of the feature.

STATE NO.: 19540
SITE TYPE: Complex (1 Feature)
TOPOGRAPHY: Undulating hills
VEGETATION: Grass and brush
CONDITION: Poor/Fair
INTEGRITY: Unknown
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of a rectangular alignment (Brown A), two C-shapes (Features B and D), and two terraces (Feature C and E). The overall site dimensions are c. 22.00 m x 19.00 m.

FEATURE A: Rectangular alignment
ADJACENT TERRAIN: Undulating hills
VEGETATION: Grass and brush
FUNCTION: Temporary habitation
DIMENSIONS: 6.50 m x 8.50 m x 0.30 m
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: A rectangular-shaped rock alignment. The north side is squared off, and the south side is squared on. The entrance is in the east side. A large boulder (c. 2.0 m in diameter) was observed on the surface of this feature. More than c. 0.50 m of fine soil and gravel were also noted.

FEATURE B: C-shape
ADJACENT TERRAIN: Undulating hills
VEGETATION: Grass and brush
FUNCTION: Temporary habitation
DIMENSIONS: 6.00 m (8.00 m by 2.50 m by 0.30 m)
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: C-shape with a straight alignment at center which divides into two halves. It is composed of angular basalt rocks with a range of 0.30 to 0.60 m. The feature has little height, and there is little in the way of structure. The opening of the C-shape is to the west. Feature C is located c. 4.00 m away.

FEATURE C: Terrace
ADJACENT TERRAIN: SW-facing slope
VEGETATION: Grass
FUNCTION: Agricultural
DIMENSIONS: 5.50 m to 5.00 m by 1.00 m
CONDITION: Poor
INTEGRITY: Unknown
DESCRIPTION: Basalt cobble and small boulders piled on to three courses high and piled to form a series of terraces extending down a southwest-facing slope. Rocks are c. 1.90 m to 2.40 m long. The feature was originally called a C-shape. This feature is located in the west central portion of the project area. One small stone fragment (c. 1.05 m x c. 0.90 m) was observed on the surface of this feature. A trowel poke into soil and inside the terrace was stopped by rock at c. 0.10 m.

FEATURE D: C-shape
ADJACENT TERRAIN: Part of the basalt bedrock outcrop on a west-facing slope.
VEGETATION: Grass
FUNCTION: Temporary habitation
DIMENSIONS: 3.50 m to 2.50 m by 0.30 m
CONDITION: Poor
INTEGRITY: Unknown
DESCRIPTION: Basalt cobble and small boulders piled on to three courses high and piled to form a series of terraces extending down a southwest-facing slope. Rocks are c. 1.95 m to 2.40 m long. Feature D is located in the west central portion of the project area, c. 1.00 m west of the east. No portable remains or cultural deposits were observed on the surface of this feature. A trowel was pulled into soil and stopped by rock at c. 0.10 m.

FEATURE E: Terrace
ADJACENT TERRAIN: Basalt outcrop on a west-facing slope.
VEGETATION: Grass
FUNCTION: Agricultural
DIMENSIONS: 7.50 m by 4.50 m by 1.00 m
CONDITION: Poor
INTEGRITY: Unknown
DESCRIPTION: Basalt cobble and small boulders piled on to three courses high and piled to form a series of terraces extending down a southwest-facing slope. Rocks are c. 1.95 m to 2.40 m long. Feature E is located on the west central portion of the project area, c. 1.00 m east of the slope. No portable remains or cultural deposits were observed on the surface of this feature. A trowel was pulled into soil and stopped by rock at c. 0.10 m.

STATE NO.: 19340
SITE TYPE: Complex (1 Feature)
TOPOGRAPHY: Hilly with many valleys and ridges.
VEGETATION: Grass
FUNCTION: Agricultural
DIMENSIONS: 5.50 m to 5.00 m by 1.00 m
CONDITION: Poor
INTEGRITY: Unknown
DESCRIPTION: This feature is located in the west central portion of the project area. One small stone fragment (c. 1.05 m x c. 0.90 m) was observed on the surface of this feature. A trowel poke into soil and inside the terrace was stopped by rock at c. 0.10 m.
DESCRIPTION: This site complex consists of one enclosure (Feature A), one U-shape (Feature B), one mound (Feature C), and one truncated terrace (Feature E).

FEATURE A: Enclosure
ADJACENT TERRAIN: On north part of hill sloping down southward and gently up north.
VEGETATION: Klaeve and grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 6.50 m by 4.50 m by 0.30 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Oval shaped enclosure constructed with log walls on east-west. It is built of subangular basalt cobbles and boulders, slightly rounded, piled one to two courses high and one to three courses wide. The north-south portion is used; the collapsing center is nearly closed, with a few cobbles and boulders. Construction style is top of ground surface and historic looking, heavy, gneiss and form only suggested. Feature A is located c. 19.00 m of Feature B, c. 12.00 m uphill, and c. 12.00 m dirt road off Road #10, in the central portion of the natural park.

FEATURE B: U-shape
ADJACENT TERRAIN: Flat area sloping slightly west.
VEGETATION: Klaeve and grass.
FUNCTION: Temporary habitation/military
DIMENSIONS: 7.50 m by 7.50 m by 1.00 m
CONDITION: Fair-good
INTEGRITY: Altered
DESCRIPTION: Large U-shape feature constructed out of subangular basalt cobbles and boulders. The opening is west. The north and south walls are both very collapsed, two to six rocks wide, and one to three courses high, and very rubble filled. The highest wall (east) is piled three to six courses high. Very military style construction, set in well-arranged rocks (maybe they came later). The center is closed, and mound shell is present. Most rocks have been plowed over for use on farm. Most construction is left except maybe one shelf if anything. This feature is located 19.00 m north of Feature A, c. 13.00 m east of Feature E, and in the central portion of the mound park. A medium amount of mound shell is around the feature area. A small amount of cultural debris is present.

FEATURE C: Mound
ADJACENT TERRAIN: Low undulating coastal bluffs.
VEGETATION: Klaeve and grass.
FUNCTION: Military
DIMENSIONS: 1.00 m by 1.00 m by 0.10 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: One course of stacked basalt rock scattered except for semi-circular alignment on north and west sides. Stacked in on the surface, with some outcrop foundation. The feature was photographed but not mapped due to apparent construction association with historic military activity in this area. The feature is located at 150 degrees. This feature is in the central Inland project area c. 1.6 miles west of highway #10 (old Russian road) and c. 0.20 m south of Feature B at 190 degrees.

FEATURE E: Terrace
ADJACENT TERRAIN: Fairly flat with hills around it, gently sloping SW.
VEGETATION: Klaeve and grass.

FUNCTION: Agriculture
DIMENSIONS: 4.00 m (5/10 degrees) by 4.00 m (5/10 degrees) by 0.50 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Very remnant terracing. The fur alignment are in a square shape. They are one course high and two wide. There is much scattered rubble in and around the feature, but alignments are discernible. A few pieces of mosaic shell are around the feature area. This feature is c. 12.00 m west of Feature B and in the central portion of the natural park.

STATE NO.: 1942
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Gently undulating hills. Sills are on top of a hill surrounded by a steep ravine.
VEGETATION: Klaeve and grass.
CONDITION: Poor-fair
INTEGRITY: Altered
PHASEABLE AGE: Prehistoric
FUNCTION: INTERPRETATION: Temporary habitation
DESCRIPTION: This site complex consists of one wall (Feature A) and one C-shape (Feature G). The overall site dimensions are c. 120.00 m by 50.00 m.

FEATURE A: Wall
ADJACENT TERRAIN: Gently undulating hills. Feature overlooks a steep ravine.
VEGETATION: Klaeve and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 9.00 m by 1.00 m by 1.22 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Rundomly piled rocks are found here incorporating a bedrock outcrop at the top of a hill. The feature curves slightly back from the ridge to the southeast forming a line, one course high with well-rounded cobbles and boulders. Bedrock outcrop appears on sides of this feature. There is a small shell scatter mostly on the west and south of the feature. About 1.00 m west of the terrace are two large siltplains next to a bedrock outcrop. A stone tree is directly behind the outcrop. Another large food deposit just to the southeast of the siltplain and may have been part of it. The feature of this structure is an open-ended square. From Feature A dates as c. 12.00 m west at 212 degrees a drilled piece of metal was found (ID #9) which was picked up. This feature is located in the southwestern corner west of Road #10 c. 125.00 m. This feature is unexcavated.

FEATURE G: C-shape
ADJACENT TERRAIN: Gently undulating hills surrounded by a steep ravine.
VEGETATION: Klaeve and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 2.00 m by 1.00 m by 0.26 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Randomly piled cobbles and boulders incorporating a bedrock outcrop on the west end. There is a shell (siltplain) scatter on the south side. The feature is badly disturbed with rock scattered c. 5.00-8.00 m on the northwest and south. The feature lies on a relatively
STATE NO: 19340
SITE TYPE: Wall
TOPOGRAPHY: Undulating lower coastal hills.
VEGETATION: Kauai and grass.
CONDITION: Good
INTEGRITY: Unknown
PHRI TEMP.NO.:855-193

FUNCTIONAL INTERPRETATION: Fence line
DIMENSIONS: 45.00 m by 8.30 m
DESCRIPTION: Small subaqueous stacked basalt rock wall one to two meters high with intermittenly spaced (c. 5.00 m apart) fence posts, fence staples, fence post (not selected) and fence were found in association with the feature. The feature is oriented at 10 degrees. About 1.00 m breaks in the wall occur irregularly. Only historic cultural remains are associated with the feature. Surrounding soil is gray and all c. 0.85-0.75 m. Feature A that was associated with this wall was examined and referenced to be a military field enclosure (also remote historic). This site is located c. 20.00 m west of the old Pahoa-Kapoho road in the northeast portion of the project area, in a small dip below two gulles c. 100.00 m from the north of the new Paua Beach road.

STATE NO: 19344 Other: YE-24
SITE TYPE: Enclosure with/without C-shape
TOPOGRAPHY: Undulating
VEGETATION: Kauai and grass
CONDITION: Fair
INTEGRITY: Altered
PHRI TEMP.NO.:855-209

FUNCTIONAL INTERPRETATION: Prehistoric
DIMENSIONS: 4.50 m by 2.53 m
DESCRIPTION: Subaqueous wall boulders placed on existing boulders or bedrock, c. 0.15-0.25 m. Subaqueous boulders are used as fill. The evidence of military use is shell, scrapes and machine-carved rocks. This feature is possibly a modified outcrop. The outcrop is a steep slope at the highest elevations tending west. Up to 3.50 m in length and c. 0.30 m in width. Several large subaqueous boulders (c. 0.35 m in diameter) were placed three meters high on the north side. Large subaqueous boulders were placed on the west end and cobble were placed between two fillings, creating an enclosed enclosures with segmented spaces. The northwest end of this oval-shaped opening curves and continues c. 3.00 m to the north and five curves c. 3.00 m to the west, creating a C-shape. This combination is composed of subaqueous cobble and small boulders being placed one to two courses. There is no facing. There is a substantial number of boulders to the north and east, suggesting there was more construction than now exist. There are scattered rocks (possible machine impact). Overall view suggests an enclosed and a filling C-shape.

This site is located in the central coastal portion of the project area. Cornell shell fragments, several waist-high walls and two bull shell cuttings were observed on the surface of this feature area. Also there was a moderate midden concentration within the C-shape area. A trowel test within the oval-shaped area revealed c. 0.15 m of heavy shell and subaqueous beach pebbles and a trowel test within the C-shape area (north end) revealed sandy silt and subaqueous beach pebbles.

STATE NO: 19345
SITE TYPE: Complex (54 Features)
TOPOGRAPHY: Hills of palaeoheleakakoa on a W-facing slope.
VEGETATION: Dry grass high brown grass and brown algae.
CONDITION: Fair
INTEGRITY: Unaltered
PHRI TEMP.NO.:855-212

FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of two small circular walls (Features B, D), two enclosed (Features C, E), three structures (Features F, M, N), one modified outcrop (Feature G), three mounds (Features H, I, K), one alignment (Feature L), one C-shape (Feature M), and an unmarked terrace (Feature N). The overall site dimensions are c. 52.0 by 37.0 m with the long axis 80 to 100 degrees.

FEATURE B: Circular wall
ADJACENT TERRAIN: Rolling palaeoheleakakoa on a W-facing slope.
VEGETATION: Kauai and brown high brown grass.
FUNCTION: Temporary habitation
DIMENSIONS: 3.50 m by 2.90 m by 0.53 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Palaeoheleakakoa filled in a C-shape. The wall opens to E, toward Feature D c. 1.00 m away. The wall is 25.0 to 70.0 degrees. Cobble are 0.12 to 0.50 m in length/ diameter. The feature is located in the W central part of the project area, c. 185 m to the south. No possible remains were detected. The deposit was untracked. A trowel pulled into the soil inside the feature is mapped by rock less than 0.02 mbe.

FEATURE C: Enclosure
ADJACENT TERRAIN: Terraces are sloping down to the north and west. Hills and valleys.
VEGETATION: Grant and sparte Kauai.
FUNCTION: Temporary habitation
DIMENSIONS: 4.00 m by 4.00 m by 0.53 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Medium-sized angular polihehe rocks are placed in the area to form an enclosure. The concrete range is from c. 0.70 to 0.25 m in diameter. The stones are not faced, aligned, or stacked. They just appear to be piled and placed. There are few stones placed in a pile in the center of the enclosure c. 0.50 to 0.50 m. The enclosure itself is to two meters high. Also, one upright stone is found in the NW corner, standing c. 0.50 m high and c. 0.25 m wide. Feature B in 3.40 to 9.29 degrees (TNE). Feature B in 2.70 to 9.00 degrees (TNE). Feature B in 1.10 to 9.00 degrees (TNE). A fire occurred three weeks ago and burned in area c. 2.00 m to 3.25 m wide. After a trowel test, no cultural material was found. No partial remains were observed.
FEATURE D: Circular wall
ADJACENT TERRAIN: Rolling paleo-bone outcrop on a W-facing slope.
FUNCTION: Temple or religious site.
DIMENSIONS: 9.53 m by 7.89 m by 0.66 m
CONDITION: Poor
INTEGRITY: Unclarified
DESCRIPTION: A circular wall with a slightly sloped exterior and a flat interior. The wall is constructed from large stones, and the interior space is relatively small, possibly used for ceremonial or religious purposes.

FEATURE E: Enclosure
ADJACENT TERRAIN: Terraces sloping down to the north and west. Hills and valleys.
FUNCTION: Temple or religious site.
DIMENSIONS: 3.96 m by 23.43 degrees by 3.83 m by 0.36 m
CONDITION: Good
INTEGRITY: Unclarified
DESCRIPTION: A stone structure with a circular wall and an entrance at the center. The stones are irregularly shaped and arranged, forming a closed enclosure. The structure may have served as a ceremonial or religious site.

FEATURE F: Terrace
ADJACENT TERRAIN: North sloping terraces down to a small hill valley.
FUNCTION: Agricultural land.
DIMENSIONS: 4.00 m by 2.28 m by 0.37 m
CONDITION: Fair
INTEGRITY: Unclarified
DESCRIPTION: A small terrace or raised area for agricultural purposes. The stones are arranged in a pattern, possibly to enhance soil retention and water management.

FEATURE G: Modified outcrop
ADJACENT TERRAIN: Sloping south and west.
FUNCTION: Agricultural land.
DIMENSIONS: 4.76 m by 1.98 m by 0.60 m
CONDITION: Poor
INTEGRITY: Unclarified
DESCRIPTION: A modified outcrop with visible signs of human activity, possibly for agricultural purposes. The stones are arranged in a manner that suggests intentional modification for cultivation or other uses.

FEATURE H: Mound
ADJACENT TERRAIN: Located at the end of ridge sloping S, N, E.
FUNCTION: Possible military or ceremonial site.
DIMENSIONS: 1.28 m by 1.49 m by 0.46 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A small mound or raised area, possibly used for military or ceremonial purposes. The stones are arranged in a pattern, suggesting a deliberate construction.

FEATURE I: Mound
ADJACENT TERRAIN: On N slope of E to W ridge.
FUNCTION: Indeterminate
DIMENSIONS: 6.00 m by 0.83 m by 0.38 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: A small mound of stones, possibly for ceremonial or defensive purposes. The stones are arranged in a pattern, possibly indicating human activity.

FEATURE J: Mound
ADJACENT TERRAIN: On top of ridge running E to W, sloping N to S.
FUNCTION: Indeterminate
DIMENSIONS: 1.20 m by 1.40 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A small mound of stones, possibly for ceremonial or defensive purposes. The stones are arranged in a pattern, suggesting human activity.

FEATURE K: Mound
ADJACENT TERRAIN: Let of calcified rock partially affected from stream bed.
VEGETATION: Desert grass and browse.
FUNCTION: Military
DIMENSIONS: 10.56 m by 0.83 m by 0.65 m
CONDITION: Fair
INTEGRITY: Almost
DESCRIPTION: Linear wall alignment constructed of subangular basalt cobble and boulders (c. 0.05 to 0.50 m in diameter). Many large boulders are placed in spaces where bedrock extends. Much bedrock was used in construction. There is a narrow channel on either side. The feature rises to two courses high as well as one to two courses wide. It is constructed on a base of packed dirt and packed gravel. Near the base of the wall a small creek enters the feature. It is 3.25 m north of Feature 8, 1.64 m north of Feature 10, and 3.27 m north of Feature 5, the control portion of the wall panel. Most fragments and military debris and one watercourse cobble were noted in surface remains, with no surface deposit noted.

FEATURE M: Terrace
ADJACENT TERRAIN: North-facing terrace down into a small hilly valley.
VEGETATION: Small, sagebrush, brown grasses and sparse browse.
FUNCTION: Agriculture
DIMENSIONS: 4.95 m by 2.30 m by 0.56 m
CONDITION: Poor
INTEGRITY: Almost
DESCRIPTION: Subangular basalt cobble or course high ranging in size from c. 0.05 to 0.50 m. The feature is fairly flat and contains small (less than 0.05 m) rocks. It is actually void of any sizable rocks. It is similar in shape with the south wall flatter than the north. The south wall is 3.50 m south of Feature 1. This feature is located 4.45 m west of Feature H (1009), Feature P's terrace is just much and upape. No surface remains were noted but there appears to be a few centuries of soil and decaying bedrock.

FEATURE N: Terrace
ADJACENT TERRAIN: North-facing terrace down into a small hilly valley.
VEGETATION: Brown sagebrush-grasses.
FUNCTION: Agriculture
DIMENSIONS: 4.95 m by 4.40 m by 0.56 m
CONDITION: Fair
INTEGRITY: Almost
DESCRIPTION: Subangular basalt cobble or course high ranging in size from c. 0.07 to 0.50 m. The feature is similar in shape, with the outer relatively flat and void of large rocks. It contains a high number of small (less than 0.50 m) rocks. The south wall is an incline bedrock outcropping with a few cobble on it. The W, N portion is also mostly bedrock with some cobble pushed up against it. The feature is located 4.79 m west of Feature L alignment. No surface remains were noted but there appears to be a few centuries of soil and decaying bedrock.

FEATURE O: C-shape
ADJACENT TERRAIN: Rolling paleo-badlands on a W-facing slope.
VEGETATION: Sparse vegetation.
FUNCTION: Agriculture
DIMENSIONS: 6.30 m by 2.70 m by 0.65 m
CONDITION: Fair
INTEGRITY: Almost

DESCRIPTION: Spherical phallic cobble and small boulders piled one to two courses high to form a C-shape. A natural outcrop forms part of the structure. The long axis is at 270 to 290 degrees. The feature is located in the west central part of the project area, one-eighth mile east of the shore. Surface remains consist of one broken watercourse cobble measuring c. 0.15 m by 0.15 m, and several weathered fragments, the largest measuring c. 0.15 m by 0.15 m.

FEATURE P: Terrace
ADJACENT TERRAIN: Built on NW slope.
VEGETATION: Grass and desert grass.
FUNCTION: Possible agriculture/military
DIMENSIONS: 14.00 m by 2.30 m by 0.56 m
CONDITION: Poor
INTEGRITY: Almost
DESCRIPTION: 800 years standing construction of subangular basalt cobble and boulders built against and with natural bedrock outcropping. It is sited and piled on a slope up to a bedrock lip with the upper surface flat ground. There is water throughout all terrains. They range from one to five courses all along the same bedrock outcrop. Many rocks have fallen down to the bedrock lip as well as off to the bottom of the hill. Humans and military debris is all around the feature. It is located on the NW slope of edge c. 5.65 m west of Feature J in the central portion of the wall panel. Surface remains consist of military debris - granite fragments, glass, and metal fragments. No structural cultural deposits were noted.

STATE NO.: 41913
SITE TYPE: Complex (12 Features)
TOPOGRAPHY: Hilltop, on top of a ridge. W, E, and down slope, partially buried.
VEGETATION: Burned brush and desert grass (unburned).
CONDITION: Poor
INTEGRITY: Almost
FUNCTIONAL AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site consists of a remnant U-shape (Figure A), five C-shapes (Features B, D, E, G, Q), one circle (Feature C), one rectangular (Feature M), one remain C-shape (Feature L), one mound (Feature H), one truncated crescent (Feature U), and a wall (Feature P).
FEATURE C: C-shape
ADJACENT TERRAIN: Rolling phosphate outcrop on a W-facing slope.
VEGETATION: Sedge and bare high grass.
FUNCTION: Military
DIMENSIONS: 3.00 m by 3.10 m by 0.45 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Phosphate cobbles are stacked one to three courses high. The feature lies partly on a bedrock outcrop. Rocks are c. 0.15 m by 0.30 m in diameter. The long axis is 0.30 m by 0.10 m. It is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.

FEATURE C: C-shape
ADJACENT TERRAIN: Steep downslopes to the north and spillage up to the south.
VEGETATION: No vegetation.
FUNCTION: Military
DIMENSIONS: 1.40 m by 1.20 m by 0.87 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Feature C is located on the downslope of a ridge immediately below a white sand concentration associated with military and/or fighting activities. There are numerous abandoned cairns that are visible, either in natural bush-covered areas or military training areas. There is evidence of burnt grass and fire-resistant rocks. Round metal packaging appears below the cairn. There is no visible bedrock outcrop in part of the cairn on the north end. The cairn is constructed of subangular boulder cobble well stacked into eight courses high. The cairn is more than twice the size of the feature. The cairn is c. 0.80 m by 0.50 m in diameter. The cairn is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.

FEATURE D: C-shape
ADJACENT TERRAIN: Subangular boulder gravel, pebbles and small to large subangular boulders.
VEGETATION: Alkaline grass.
FUNCTION: Military
DIMENSIONS: 2.30 m by 1.60 m by 0.60 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Small (c. 0.10 to 0.50 m) subangular boulder cobbles are piled irregularly one to two courses high, beginning at the northern end and sloping with natural bedrock to the south. The feature is located on the downslope of a ridge immediately below the cairn. It is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.

FEATURE E: C-shape
ADJACENT TERRAIN: Rolling phosphate outcrop on a W-facing slope.
VEGETATION: Grassy and shrubland desert-like grass.
FUNCTION: Temporary hiking/military
DIMENSIONS: 3.10 m by 2.25 m by 0.47 m
CONDITION: Poor
INTEGRITY: Aged
DESCRIPTION: Fully-covered C-shape of subangular boulder cobbles and boulders ranging from c. 0.15 m by 0.30 m in diameter. The bedrock is completely covered with cairns. The feature is located on the top of a ridge. A 0.50 m by 0.10 m feature is 0.10 m from Feature D and c. 0.10 m from Feature E. It is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.

FEATURE F: Enclave
ADJACENT TERRAIN: Subangular boulder gravel, pebbles and cobbles.
VEGETATION: Barren/choked grass and alpine.
FUNCTION: Military
DIMENSIONS: 4.10 m by 2.80 m by 0.37 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Feature F is constructed with subangular boulder cobbles c. 0.15 to 0.40 m in diameter. The cairn is roughly stacked into one to three courses high. There is a visible bedrock outcrop in part of the cairn on the north end. The cairn is constructed of subangular boulder cobble well stacked into eight courses high. The cairn is more than twice the size of the feature. The cairn is c. 0.80 m by 0.50 m in diameter. The cairn is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.

FEATURE S: C-shape
ADJACENT TERRAIN: Subangular boulder gravel, pebbles and small to large subangular boulders.
VEGETATION: Adhered, bare and shrubland desert-like grass.
FUNCTION: Military
DIMENSIONS: 2.30 m by 1.60 m by 0.60 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Small (c. 0.10 to 0.50 m) subangular boulder cobbles are piled irregularly one to two courses high, beginning at the northern end and sloping with natural bedrock to the south. The feature is located on the downslope of a ridge immediately below the cairn. It is located in the central portion of the project area, one-fourth mile east of satellite Bay. Queen Elizabeth highway is a half mile SE. Subsurface deposit was unassessed. A travel above the ground at numerous points was stepped by soil at less than 0.10 m. No surface remains were noted.
FEATURE M: Blowed
ADJACENT TERRAIN: Elevation: Bush and grass like grass.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Blowed feature is composed of two to three natural elements of bushes and small plants. The feature is seen as a raised mound with a slight slope on one side. It is made up of dense vegetation and is surrounded by a low fence. The feature is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
FUNCTION: Military
DIMENSIONS: 1.0 m by 1.35 m by 0.36 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature is a raised mound of natural vegetation surrounded by a low fence. It is located on a slope in a natural environment.
VEGETATION: Grass and brush.
STATE NO.: 19.34
PIRATESHIP NO.: 835-214
TOPOGRAPHY: Undulating terrain with bushy areas.
FUNCTIONAL INTERPRETATION: Positioned at the foot of a hill or slope.
I-L and LI arc c. 45.00 m at 160 degrees (TH). This feature is the scar of a fire that occurred here three weeks ago. A pitch is c. 20.00 m at 216 degrees (TH). The feature was tested and no cultural deposit or surface remains were noted.

FEATURE C: U-shaped
ADJACENT TERRAIN: Termis is sloping down to quill and wet. Hills and valleys.
VEGETATION: Small grass and sparse burrs. A small hill is visible to the east. West function: Temporary habitation.
DIMENSIONS: 4.20 m by 2.20 m by 0.24 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: A shallow, oval-shaped, stone feature with a low mound in the center. The stones range from c. 0.10 to 0.20 m in diameter. The opening faces NNE. The wall is c. 0.80 m wide. The north wall consists of smaller stones that increase in size going south. There are smaller stones, but there is no alignment of all sides of the wall which matches the U-shaped feature. It appears to be a feature that is used for burning, possibly for a fire. Feature A is c. 13.00 m at 125 degrees (TH). Feature C is c. 21.00 m at 305 degrees (TH). The mound is the burn area from the fire that occurred three weeks ago. It is c. 13.00 m at 224 degrees (TH). The feature was tested and no cultural deposit or surface remains noted.

FEATURE D: O-shaped
ADJACENT TERRAIN: Termis is sloping down to the north and west. Hills and valleys.
VEGETATION: Unknown grass.
FUNCTION: Possible agriculture
DIMENSIONS: 2.80 m by 0.75 m (0.05 wall widths) by 0.34 m
CONDITION: Poor-good
INTEGRITY: Unaltered
DESCRIPTION: Originally (1992) a structure was identified as a C-shaped feature. After closer study, it was realized that the structure was a U-shaped feature. This feature was constructed with smaller, more regular, and smaller stones. The opening faces NNW. The wall is c. 0.80 m wide. The north wall consists of smaller stones that increase in size going south. This opening is used for burning, possibly for a fire. The feature was tested and no cultural deposit or surface remains noted.

FEATURE E: C-shaped
ADJACENT TERRAIN: Termis is sloping down to the north and west. Hills and valleys.
VEGETATION: Small grass and sparse burrs. A small hill is visible to the east.
FUNCTION: Temporary habitation
DIMENSIONS: 4.50 m by 4.30 m by 0.26 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: A small oval-shaped feature with a low mound in the center. The stones range from c. 0.10 to 0.20 m in diameter. The opening faces NNW. The wall is c. 0.80 m wide. The north wall consists of smaller stones that increase in size going south. There is some piling of stones to the east. At this feature, there is no evidence of burning. The feature was tested and no cultural deposit or surface remains noted.

FEATURE F: C-shaped
ADJACENT TERRAIN: Termis is sloping down to the north and west. Small hills and valleys.
VEGETATION: Small grass and sparse burrs. A small hill is visible to the east.
FUNCTION: Temporary habitation
DIMENSIONS: 6.80 m by 6.00 m by 0.54 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: A small oval-shaped feature with a low mound in the center. The stones range from c. 0.10 to 0.20 m in diameter. The opening faces NNW. The wall is c. 0.80 m wide. The north wall consists of smaller stones that increase in size going south. There is no evidence of burning. The feature was tested and no cultural deposit or surface remains noted.
FEATURE K: Cl-shape
ADJACENT TERRAIN: Termis is strolling down the S, W, and N on a small basin. Hills and valleys.
VEGETATION: Small grass and sparse live oaks.
FUNCTION: Temporary habitation
DIMENSIONS: 2.50 m (80 degrees) by 2.00 m by 0.21 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Medium-sized angular pebbles stones arranged in a C-shape around a rock to three courses high. The outer range from c. 0.21 to 0.23 m in diameter. The opening of the C-shape faces NW. There is a small waterway basin nearby just to the west of feature. Did not collect. The wall itself ranges from c. 0.50 to 0.65 m wide. No facing or alignment. It appears as if the stones were piled into a C-shape, horizontally. Feature 1 is c. 1.20 m in 80 degrees (TH). Feature A is c. 0.43 m at 125 degrees (TH). A medium-sized brown live oak c. 7.00 m at 80 degrees (TH). A fire occurred three weeks ago and burned an area c. 6.00 m at 180 degrees (TH). Surface remains consist of waterway basin stone (c. 0.07 by 0.07 by 0.04 m). Trowel tested and no cultural material found.

FEATURE L: Cl-shape
ADJACENT TERRAIN: Termis is strolling around the west. Hills and valleys.
VEGETATION: Sparse live oaks and small grass.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (120 degrees) by 2.10 m by 0.49 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Medium-sized angular pebbles stones arranged in a C-shape around a rock to two courses high. The outer range from c. 0.21 to 0.23 m in diameter. The opening of the C-shape faces SSW. The wall itself ranges from c. 0.50 to 0.65 m wide. No facing or alignment. It appears as if the stones were piled into a C-shape, horizontally. Feature 1 is c. 1.20 m at 155 degrees (TH). The southwest face is c. 5.00 m at 120 degrees (TH). A large brown tree c. 9.00 m at 180 degrees. A large white tree c. 5.00 m at 180 degrees. Surface remains consist of waterway basin stone (c. 0.07 by 0.07 by 0.04 m). Trowel tested and no cultural deposit found.

FEATURE M: Cl-shape
ADJACENT TERRAIN: Termis is strolling around the west. Hills and valleys.
VEGETATION: Small grass and sparse live oaks.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (90 degrees) by 1.50 m by 0.31 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Medium-sized angular pebbles stones arranged in a C-shape around a rock to two courses high. The stones range from c. 0.15 to 0.23 m in diameter. The opening of the C-shape faces SW. The wall itself ranges from c. 0.50 to 0.65 m wide. No facing or alignment. It appears as if the stones were piled into a C-shape, horizontally. Feature 1 is c. 1.20 m at 120 degrees (TH). Feature A is c. 4.00 m at 120 degrees (TH). A medium-sized brown tree c. 7.00 m at 80 degrees (TH). A fire occurred three weeks ago and burned an area c. 5.00 m at 180 degrees (TH). Surface remains consist of waterway basin stone (c. 0.07 by 0.07 by 0.04 m). Trowel tested and no cultural material found.

FEATURE N: Enclosure
ADJACENT TERRAIN: Termis is strolling around the west. Hills and valleys.
VEGETATION: Surface grass and sheave.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (90 degrees) by 2.00 m by 0.24 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Rounded rectangular, mostly piled angular basalt cobbles and boulders. East wall (c. 3.00-4.00 degrees) by 1.20 m by 0.24 m consists of porbtable basalt cobbles (c. 0.15 to 0.23 m), piled on one side to create a small wall. South wall is a long alignment (c. 3.00 to 0.20 by 0.88 m) of mostly base cobbles, with two well-piled cobbles marking the top. The SW corner is a rounded 90 degrees and tecked two courses with well-grounded basalt stones. Wall roughly parallel east wall and marks a corner (c. 0.50 by 0.20 by 0.17 m) of rocks. It consists of several eight well-piled basalt boulders (c. 0.15 to 0.30 m) with approximately twenty porbtable (c. 0.13 to 0.20 m) cobbles scattered around it. No facing or alignment (c. 0.05 by 0.20) and basalt piled into a C-shape, horizontally. Feature A is c. 1.20 m at 120 degrees. A large white tree c. 9.00 m at 180 degrees. Surface remains consist of waterway basin stone (c. 0.07 by 0.07 by 0.04 m). Trowel tested and no cultural deposit found. There are gaps in the enclosure: at the NE corner: a well-piled cobbles c. 0.10 m and 0.24 m by 0.40 m mid-wall. Surface remains consist of basalt cobbles and boulders. This feature is located on the westernmost "plug" of the site. The site contains 1,245 m of basalt deposit. The feature is clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders. This feature is also clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders.}

FEATURE O: Enclosure
ADJACENT TERRAIN: Termis is strolling around the west. Hills and valleys.
VEGETATION: Surface grass and sheave.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (90 degrees) by 2.00 m by 0.24 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Rounded rectangular, mostly piled angular basalt cobbles and boulders. East wall (c. 3.00-4.00 degrees) by 1.20 m by 0.24 m consists of porbtable basalt cobbles (c. 0.15 to 0.23 m), piled on one side to create a small wall. South wall is a long alignment (c. 3.00 to 0.20 by 0.88 m) of mostly base cobbles, with two well-piled cobbles marking the top. The SW corner is a rounded 90 degrees and tecked two courses with well-grounded basalt stones. Wall roughly parallel east wall and marks a corner (c. 0.50 by 0.20 by 0.17 m) of rocks. It consists of several eight well-piled basalt boulders (c. 0.15 to 0.30 m) with approximately twenty porbtable (c. 0.13 to 0.20 m) cobbles scattered around it. No facing or alignment (c. 0.05 by 0.20) and basalt piled into a C-shape, horizontally. Feature A is c. 1.20 m at 120 degrees. A large white tree c. 9.00 m at 180 degrees. Surface remains consist of waterway basin stone (c. 0.07 by 0.07 by 0.04 m). Trowel tested and no cultural deposit found. There are gaps in the enclosure: at the NE corner: a well-piled cobbles c. 0.10 m and 0.24 m by 0.40 m mid-wall. Surface remains consist of basalt cobbles and boulders. This feature is located on the westernmost "plug" of the site. The site contains 1,245 m of basalt deposit. The feature is clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders. This feature is also clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders. This feature is clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders. This feature is also clearly visible from the surrounding area. Surface remains consist of basalt cobbles and boulders.
FEATURE F: L-shape
ADJACENT TERRAIN: Surface grass, klee scattered.
FUNCTION: Temporary habitation
DIMENSIONS: 3.40 m (11/20 degrees) by 4.00 m (16/20 degrees) by 0.38 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Two (2), one to two course cobble piled walls meet at a rounded right angle. East wall runs 10/19 degrees, i.e., 1.80 by 0.60 by 0.24 m. Two large boulders (c. 0.35 m) are at N and S points with c. 0.15 to 0.20 m cobble in between. North wall runs 10/19 degrees measure c. 4.00 by 5.30 by 0.38 m. North wall is crudely piled three to four courses high with cobble c. 0.10 to 0.30 m in width from the eastern side wall. A cobble pile c. 2.50 by 0.10 to 0.20 m (one course high and wide) appears to parallel east wall. At 3.00 on this pile, loose alignment makes a right 90 degree turn and c. 1.20 m ending in middle of level interior associated with feature. Cobble pile is possibly habitation part or possibly could be post- or original structural modification. Interior is slightly sloping due to two degrees with decomposing bedrock gravel and few scattered cobbles. This feature is located close to west side boulder of Site 2.0, on top of contour 20.00 m at 90 degrees to Feature L, M. Surface remains consist of machine shed fragments. Subsurface deposits consist of c. 0.10 to 0.15 m yellowish-brown silt clay. A mixed L-shaped addition on west end of feature above a different construction. Cobble is not as grassy, suggests post- or original disturbance/construction type of disturbance is possibly occupational (habitation). A feature cannot be determined due to lack of material remains.

FEATURE G: C-shape
ADJACENT TERRAIN: Surface grass common, klee scattered.
FUNCTION: Temporary habitation
DIMENSIONS: 2.00 m (13/35 degrees) by 2.50 m (45/52 degrees) by 0.26 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Low, two to three courses, piled semicircular wall opening 310 degrees. Constructed as opposed hexagon HN corner and SW corner segments. The core stacking on west half (1/2) as opposed to core piling on east half (1/2). Loose alignment of cobbles appears to connect to each of the C-shape. These are scattered and are likely displaced from original position by habitation. Interior has many loose cobble and slope gravel (one to two degrees) to NW. Likely that east wall section has collapsed into feature. This feature is located on the west wall side of Site 2.14, down the NE slope, slightly to west c. 0.30 to 0.50 m of Feature L, M. No surface remains noted. Subsurface deposit, c. 0.03 to 0.15 m of a yellowish-brown sandy loam. No material culture suggests modifications. Condition is very deteriorated, integrity is indeterminate.

FEATURE A: Terrace
ADJACENT TERRAIN: Shoreline, rolling hills.
FUNCTION: Klee and scrap gravel.
DIMENSIONS: 3.00 m (66 degrees) by 3.50 m (334 degrees) by 0.41 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A loose pile of palmbo coarse boulders in a rough C-shape. Only the east side retains one to two courses. Most of the boulders are stones above the east side wall. Feature is located at the top of a small hill. It is 5.00 m at 250 degrees E at TM from Feature C. It appears the name is a blown-up military C-shape. This feature is located in the extreme west central project area at maul. Surface remains consist of grassy fragments, boulder shells. No surface deposit noted.

FEATURE B: Terrace
ADJACENT TERRAIN: Shoreline, rolling hills.
FUNCTION: Klee and scrap gravel.
DIMENSIONS: 3.00 m (66 degrees) by 3.50 m (334 degrees) by 0.41 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A loose pile of palmbo coarse boulders and cobbles. It appears to be two courses high, c. 0.25 m to the north side. There also appears to be a single course high, right angle of stones running to the NW. Feature lies near the top of a small hill. Feature B is c. 0.50 m at 335 degrees (TM) from Feature C. This feature is located in the extreme west central project area at maul. Surface remains consist of grassy fragments, boulder shells. No surface deposit noted.

FEATURE C: Wall
ADJACENT TERRAIN: Shoreline, rolling hills.
FUNCTION: Hunting blind
DIMENSIONS: 2.50 m (66 degrees) by 1.25 m (334 degrees) by 0.42 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Randomly piled see to two courses slightly curved wall of palmbo boulders.wall runs west to west with the lowest curve on the north. Feature is a type of booklet to a large flower. Site 337 Feature A c. 100.00 m NE at 40 degrees T51 from this feature. There is a large stone midden around the feature. There are, however, hand granite fragments. The top area wall but is obviously a barren blast. This feature is located in the extreme west central project area at maul. No surface deposit noted.
STATE NO.: 19334  OTHER NO.: 15
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
CONDITION: Balanced
INTEGRITY: Altered
PRESERVED AGE: Historic
FUNCTIONAL INTENT/PURPOSE: Multiple
DESCRIPTION: This site contains an enclosure (Feature A), two calxas (Feature B, C), and a modified outcrop (Feature D). This site is divided by water and 36 m.
FEATURE A: Enclosure
ADJACENT TERRAIN: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Temporary habitation
DIMENSIONS: 2.00 m (76 degrees) by 1.10 m (134 degrees)
CONDITION: Balanced
INTEGRITY: Altered
DESCRIPTION: A square, stone to five-cornered, enclosure formed by natural rocks. The enclosure is defined by a stone wall, with the entrance at the north. The interior contains artifacts and features of human activity.
FEATURE B: Cairn
ADJACENT TERRAIN: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Post support
DIMENSIONS: 1.40 m (76 degrees) by 1.60 m (76 degrees)
CONDITION: Balanced
INTEGRITY: Unaltered
DESCRIPTION: Randomly plated pahohelo boulders and a bedrock outcrop forming a cairn. A large square in shape. The cairn was used to build a fort post. Feature B is 233 degrees TN at 3.70 m.
FEATURE C: Cairn
ADJACENT TERRAIN: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Post support
DIMENSIONS: 2.00 m (76 degrees) by 2.00 m (76 degrees)
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Randomly plated pahohelo boulders and a bedrock outcrop forming a cairn which was used to build a fort post. Post itself visible. The cairn appears to have been partially pulled apart. Feature C is c. 3.50 m or 314 degrees TN from Feature B. Feature C site directly up 22 degree slope. This feature is located in the extreme west central project area at mahrul. Surface remains consist of furin post, cigarette pack, needles, tin, metal wire, and marr. Would have to tear it apart to test.
FEATURE D: Modified outcrop
ADJACENT TERRAIN: Shoreline.
VEGETATION: Knoll and scrub grass.
FUNCTION: Agriculture
DIMENSIONS: 2.00 m (76 degrees) by 0.70 m (76 degrees)
CONDITION: Balanced
INTEGRITY: Balanced
DESCRIPTION: Randomly plated pahohelo boulders and a bedrock outcrop. On and around the feature is a ground cover of cactus and unplanted weeds.
STAT N.: 191050
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Balanced
DIMENSIONS: 3.70 m (76 degrees) by 3.50 m (164 degrees)
CONDITION: Balanced
INTEGRITY: Balanced
FUNCTIONAL INTENT/PURPOSE: Multiple
DESCRIPTION: This site consists of two U-shapes (Features A, B). This feature site is divided by 314 degrees TN at 1.50 m. Features themselves are c. 3.20 m by 2.00 m.
FEATURE A: U-shape
ADJACENT TERRAIN: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Hunting blinds/visibility
DIMENSIONS: 3.70 m (76 degrees) by 3.50 m (164 degrees)
CONDITION: Balanced
INTEGRITY: Balanced
DESCRIPTION: Stacked pahohelo boulders and four courses high set in a U-shape. Feature lies at the bottom of a ravine. 2.00 m NE of Site 835-222. This feature site is divided by water. The site has been excavated to form a horizontally level area. Stacking of the boulders is in similar width. The majority of boulders are quite large. The site is located in the extreme west central project area at mahrul. The surface remains consist of one mud bucketed pig hole, historic trash - paper and plastic. No surface deposit noted.
FEATURE B: U-shape
ADJACENT TERRAIN: Shoreline, rolling hills.
VEGETATION: Knoll and scrub grass.
FUNCTION: Military-agriculture
DIMENSIONS: 3.35 m (114 degrees) by 2.75 m (140 degrees)
CONDITION: Balanced
INTEGRITY: Balanced
DESCRIPTION: This feature site is divided by water. The site has been excavated to form a horizontally level area. Stacking of the boulders is in similar width. The majority of boulders are quite large. The site is located in the extreme west central project area at mahrul. The surface remains consist of one mud bucketed pig hole, historic trash - paper and plastic. No surface deposit noted.
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: This feature is nearly the same as feature A which is a 100.00 m SSE of Feature B. The wall is angular, with standing stones to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color. The top is not clearly visible, with standing stones varying from 1.0 to 1.3 meters high, of pale brown color.

STATE NO.: 1935 I
SITE TYPE: Middle scatter
TOPOGRAPHY: Snowline, rolling hills
VEGETATION: Alkali and grass
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 48.00 m by 35.00 m
DESCRIPTION: Site has been disturbed by bulldozer. A middle scatter is located on the east side of the site. Feature D may be the remains of a structure that was built, accounting for the middle. Some of this middle has been collected. The building was probably a small building, since the post hole is small. There are also C values and chard scattered about. Features A, B, C, and D may be the remains of a middle scatters behind it. A new dirt road goes through where they are. Features E and F are probably the remains of a middle scatter behind them. These two features are on the east side of the site on a bedrock outcrop. The site is located on the west side of the site on a bedrock outcrop. The site is located on the west side of the site on a bedrock outcrop. The site is located on the west side of the site on a bedrock outcrop. The site is located on the west side of the site on a bedrock outcrop. The site is located on the west side of the site on a bedrock outcrop. 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VEGETATION: Slower and bare rock. Ballast and soil are not present.
FUNCTION: Agriculture
DIMENSIONS: 3.00 m by 3.00 m by 0.50 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A small area with vegetation and soil. The area is not affected by the presence of any other objects.

FEATURE C: Modified outcrop
ADJACENT TERRAIN: Site is on a gentle slope overlooking a cave to the north.
VEGETATION: Slower and dry brown grass.
FUNCTION: Agriculture
DIMENSIONS: 6.00 m by 2.00 m by 0.30 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: A gentle slope with vegetation and soil. The area is not affected by the presence of any other objects.

STATE NO.: 1935
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Rolling hills, shoreline.
VEGETATION: Slower and dry grass.
FUNCTION: None
DIMENSIONS: 6.00 m (200 degrees) by 3.00 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: A complex of features on the shoreline. The area is not affected by the presence of any other objects.

FEATURE B: Modified outcrop
ADJACENT TERRAIN: In a bare area.
VEGETATION: Slower and bare rock. Ballast and soil are not present.
FUNCTION: Military
DIMENSIONS: 3.00 m by 3.00 m by 0.30 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: A small area with vegetation and soil. The area is not affected by the presence of any other objects.

FEATURE A: Cairn
ADJACENT TERRAIN: In a bare area.
VEGETATION: Bare rock and some recent grass growth.
FUNCTION: Military
DIMENSIONS: 1.00 m by 1.00 m by 0.50 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A small area with vegetation and soil. The area is not affected by the presence of any other objects.

STATE NO.: 1915
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Rolling hills, shoreline.
VEGETATION: Slower and dry grass.
FUNCTION: None
DIMENSIONS: 6.00 m (200 degrees) by 3.00 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: A complex of features on the shoreline. The area is not affected by the presence of any other objects.

FEATURE E: Modified outcrop
ADJACENT TERRAIN: In a bare area.
VEGETATION: Slower and bare rock. Ballast and soil are not present.
FUNCTION: Military
DIMENSIONS: 3.00 m by 3.00 m by 0.30 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: A small area with vegetation and soil. The area is not affected by the presence of any other objects.
<table>
<thead>
<tr>
<th>STATE NO.</th>
<th>SITE TYPE</th>
<th>TOPOGRAPHY</th>
<th>FUNCTIONAL INTERPRETATION</th>
<th>VEGETATION</th>
<th>CONDITION</th>
<th>INTEGRITY</th>
<th>PROBABLE AGE</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>19337</td>
<td>Terrace</td>
<td>Undulating hills.</td>
<td>Agriculture</td>
<td>Klaue and shrub grass.</td>
<td>Good</td>
<td>Unaltered</td>
<td>Probable</td>
<td>Straight wall aligned along the north-south direction. This feature is located near the eastern end of the property area. Surface remains consist of gravel and dry soil.</td>
</tr>
<tr>
<td>19338</td>
<td>Terrace</td>
<td>Levelled areas with small basalt hills and valleys.</td>
<td>Agriculture</td>
<td>Klaue and shrub grass.</td>
<td>Good</td>
<td>Unaltered</td>
<td>Probable</td>
<td>Rectangular area with a flat, level surface. This feature is located near the northeastern end of the property area. Surface remains consist of gravel and dry soil.</td>
</tr>
<tr>
<td>19339</td>
<td>C-shape</td>
<td></td>
<td>Agriculture</td>
<td>Klaue and shrub grass.</td>
<td>Poor</td>
<td>Unaltered</td>
<td>Probable</td>
<td>Rectangular area with a flat, level surface. This feature is located near the northeastern end of the property area. Surface remains consist of gravel and dry soil.</td>
</tr>
</tbody>
</table>
VEGETATION: Alkali and brown grass.
FUNCTION: Agriculture
DIMENSIONS: 5.50 m by 4.50 m by 0.65 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A low mound of pumice cobbles and small boulders one to three courses high. Two terraces of pumice cobbles one to two courses high. One above the mound and projects west, the other is in back and slopes up to the west, on an outcrop. Surfacing on the terrace is very rough. East terrace is 2.00 m to 2.50 m long. Long axis 330 to 370 degrees and 215 to 335 degrees. Mound is oriented 345 to 165 degrees. This feature is located on NW quad of project area, c. 100.00 m E of coast. No surface remains or surface deposits noted.

FEATURE B: Modified outcrop
ADJACENT TERRAIN: Rolling hills on top of small rise.
VEGETATION: Burnt grass.
FUNCTION: Temporary habitation
DIMENSIONS: 5.50 m (190 degrees TNE) by 3.00 m (190 degrees TNE) by 0.30 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Several large cobbles of weathered pumice placed sparsely on a pumice outcrop in the form of a terrace, but with nothing to hold back. To the south, a small area has been cleared. A small mass of loose ash deposits (fractured caliche matrix by outer view members) is in the eastern section of the cleared area. This feature is located in the eastern central part of the vegetable section. No surface remains or surface deposits noted.

FEATURE C: Terrace
ADJACENT TERRAIN: Rolling hills on top of small rise.
VEGETATION: No vegetation.
FUNCTION: Agriculture
DIMENSIONS: 3.00 m (190 degrees TNE) by 2.00 m (190 degrees TNE) by 0.65 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Two alignments of large and small cobbles. One alignment has a corner at the SW, the other alignment has only one corner. Both have been submerged in the soil slightly. This feature is located on central western part of the vegetable section. Surface remains noted consist of one stone slab; no surface deposits noted.

STATE NO: 10361
PHRI TEMP. NO: 855-230
SITE TYPE: Complex (5 Features)
TOPOGRAPHY: Slightly hilly on downslope (II) of small ridge (Site 245).
VEGETATION: Burnt grass and desert grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Probable
FUNCTIONAL INTERPRETATION: Temporary habitation
DESCRIPTION: This also contains an encasement (Feature 3) and alignments (4) (Feature 3).
The overall site dimensions measure c. 10.00 m by 3.00 m.

FEATURE A: Enclosure
ADJACENT TERRAIN: Right southwest slant on N, E, and S sides of Feature A to the west. A short southwest slant then a strong rise to the west to Feature 248-C, which is located on a ridge.
VEGETATION: No vegetation.
FUNCTION: Temporary habitation
DIMENSIONS: CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Small subangular boulder and small and large cobbles, all between c. 0.10 to 0.20 m in diameter, piled one to two courses high with no visible facing. There is evidence of disturbance and damage on the western side where there are some scored rocks. Firefighting activity (7-4-22) has affected this feature; the base seems to be nearly intact. Due to this location, it is possible military activity has also disturbed this feature. This feature is located on the central plateau; Features A I.e. 34.18 at 35 degrees to Feature 248-C. No surface remains noted or no cultural evidence. Substrate, small pebbles and heavy grass notes to +0.10 m (towel tented).

FEATURE B: Alignment (4)
ADJACENT TERRAIN: VEGETATION: Burnt grass, desert grass, and mushrooms.
FUNCTION: Temporary habitation
DIMENSIONS: 1.80 m by 0.90 m by 0.35 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Four linear alignments composed of subangular boulders and boulders ranging from c. 0.10 to 0.40 m in diameter piled and stacked one to three courses high and one to four courses wide. The northern two are parallel to each other about 10 m apart while the southern two are staggered and existing SW. They all have bullock scars on the rocks and have probably been altered historically. There is a large surrounding rook bed and no signs of feature shell or mud present. This feature is located on the western central portion of a wash parallel to the west (alluvial fan gully) c. 30.00 m SW of Feature 248-C, c. 3.00 m N of Feature A. No surface remains or surface deposits noted.

STATE NO: 19362
PHRI TEMP. NO: 855-231
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Uncommon little and small basalt. Builded mud c. 20.00 m NW of site.
VEGETATION: Burnt grass and dry grass.
CONDITION: Poor
INTEGRITY: Altered
PROBABLE AGE: Probable
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site consists of an enclosure (Feature A), two terraces (Feature B, C), and a wall remnant (Feature D). The overall site dimensions measure c. 14.00 m by 7.00 m.

FEATURE A: Enclosure
ADJACENT TERRAIN: VEGETATION: Burnt grass and grass.
FUNCTION: Temporary habitation
FEATURE B: Terrace
ADJACENT TERRAIN: South slope of ridge.
VEGETATION: Brush, alder and desert grass.
FUNCTION: Agricultural
DIMENSIONS: 3.20 m by 1.15 m by 0.41 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Subangular boulders and cobbles arranged linearly on ground surface. Due to two quarries high and two to three narrow wide, crudely gabled and hillcrest affected. Sparse marram shell mound. This feature is located c. 1.00 m W of Feature A, c. 1.00 m S of Feature C, in eastern west portion of rock pile. No surface remains or surface deposits noted.

FEATURE C: Terrace
ADJACENT TERRAIN: Vegetation: Brush, alder, desert grass.
FUNCTION: Agricultural
DIMENSIONS: 3.00 m by 0.65 m
CONDITION: Poor-Fair
INTEGRITY: Altered
DESCRIPTION: Linear alignment of subangular boulders and cobbles built onto and on top of ground surface. Very remnant, one coarse high and two to three wide with some varying looking. Constructed using natural bedrock slab. Most large cobbles are partially below ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface.

FEATURE D: Wall
ADJACENT TERRAIN: Rolling paleocean outcrops on W-facing slope.
VEGETATION: Brush, alder and rare-high brown grass.
FUNCTION: Agricultural
DIMENSIONS: 2.00 m by 0.70 m by 0.80 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Subangular boulders stacked one on top of the other. Rock cobbles extending west from it suggest it was once much longer. Ski halfway along a low, short ridge running roughly E-W. This feature is located on the central west part of project area c. 100.00 m east of shore. No surface remains noted. Surface deposits not excavated; a trail cut into the ground at several points around feature bits rock c. 0.05 to 0.12 mab.

STATE NO.: 10936
SITE TYPE: Terrace
TOPOGRAPHY: Rolling paleocean outcrops on W-facing slope.
VEGETATION: Brush, alder and rare-high brown grass.
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Linear alignment of subangular boulders and cobbles built onto and on top of ground surface. Very remnant, one coarse high and two to three wide with some varying looking. Constructed using natural bedrock slab. Most large cobbles are partially below ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface. This feature is located c. 1.00 m E of Feature A, c. 1.00 m N of Feature B, on ground surface.

STATE NO.: 10936
SITE TYPE: Complex (5 Features)
TOPOGRAPHY: Intermittent area above waterworn boulder beach.
VEGETATION: Brush and brush.
CONDITION: Poor-Fair
INTEGRITY: Altered
FUNCTION: INTERPRETATION: Multiple
DESCRIPTION: This site consists of a linear trail (Feature A) and a second (Feature B) which have been completely destroyed by recent activity, a partial terrace remains (Feature C), and a small boulders (Feature D). The overall site dimension measure c. 2.00 m by 1.60 m.

FEATURE C: Paved terrace
ADJACENT TERRAIN: Relatively level N end. Sharp drop off to water c. 10.00 m to south c. 12.00 m to west.
VEGETATION:橈
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (I.00 degree 700) by 1.60 m (80 degrees) by 0.80 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Roughly gilled waters are and non-waterworn boulder cobbles and small boulders in a rough "L" shaped to three layers high on the east and middle side of an area of about 30 meters (across waterworn boulders) and cobble piling. The area is roughly leveld. This site consists of a linear trail (Feature A) and a second (Feature B) which have been completely destroyed by recent activity, a partial terrace remains (Feature C), and a small boulders (Feature D).

FEATURE D: Beach
ADJACENT TERRAIN: Undulating low hills and ridges to E. Ocean is to the west.
VEGETATION: Kivel and grass.

FUNCTION: Recreational

DIMENSIONS: 0.80 m (90 to 110 degrees) by 0.73 m (130) by 0.8 m

CONDITION: Good

INTEGRITY: Unaltered

DESCRIPTION: Approximately twelve waterways boulder cobbles were piled to form a modern beach. The cobble size is from c. 0.15 to 0.11 by 0.15 m. There are arranged in a circular pattern up to two courses high. This feature was constructed 87-272. The reason it has been denoted, is to illustrate current land use patterns, as requested by D. Davis. This feature is located on a terrace level and bedrock overtop outlooking small cove. Surface remains noted consists of a confused boulder field less than c. 1.0 m to the north of beach, two wooded points is located immediately in the east. Surface deposits noted as present; saline paper within beach, igs, not noted.

STATE NO.: 93545

PHU TERI#: NO. 355-255

SITE TYPE: Complex (13 Features)

TOPOGRAPHY: Located on edge of cliff flat area gently sloping outward outside of site.

VEGETATION: Kivel and desert grass.

FUNCTION: Undetermined

DIMENSIONS: 4.0 m by 1.50 m by 0.65 m

CONDITION: Fair

INTEGRITY: Altered

DESCRIPTION: Linear alignment running NE to SW Oriented at 243 degrees. Large boulder rock stacked on surface. Coral rock and marine shell incorporated in feature. SW end seaward to circle boulder. Some variety of cobbles also on feature. Trowel test yielded c. 0.10 m thick clay but with cobble intervention. Coral rock also within test. South of feature is located c. 0.15 m SW of feature B, c. 1.00 m NW of feature D and c. 0.80 m W of building road. Surface deposits noted as present per travel test.

FEATURE C: Wall segment

ADJACENT TERRAIN: Flat ground, coastal cliff plateau.

VEGETATION: Kivel and desert grass.

FUNCTION: Undetermined

DIMENSIONS: 4.05 m by 1.50 m by 0.65 m

CONDITION: Fair

INTEGRITY: Altered

DESCRIPTION: Linear alignment running NE to SW Oriented at 243 degrees. Large boulder rock stacked on surface. Coral rock and marine shell incorporated in feature. SW end seaward to circle boulder. Some variety of cobbles also on feature. Trowel test yielded c. 0.10 m thick clay but with cobble intervention. Coral rock also within test. South of feature is located c. 0.15 m SW of feature B, c. 1.00 m NW of feature D and c. 0.80 m W of building road. Surface deposits noted as present per travel test.

FEATURE D: Altered

ADJACENT TERRAIN: Coastal cliff plateau.

VEGETATION: Kivel and grass.

FUNCTION: Undetermined

DIMENSIONS: 1.50 m by 1.00 m by 0.65 m

CONDITION: Fair

INTEGRITY: Altered

DESCRIPTION: Algae shaped mound of stacked boulder rock, two to three courses high with coral rock included in construction. Oriented at 243 degrees. Trowel test c. 0.10 m but few light clay, coral rock noted at base. Waterways boulder cobbles also present in construction. This feature is located c. 1.50 (1/2) m south (200 degrees) from end of Feature C. Surface deposits noted as absent per travel test.

FEATURE E: Terrace

ADJACENT TERRAIN: Coastal cliff plateau.

VEGETATION: Kivel.

FUNCTION: Undetermined

DIMENSIONS: 3.00 m by 3.00 m by 0.65 m

CONDITION: Fair

INTEGRITY: Altered

DESCRIPTION: Large arm-aqueduct shaped mound of stacked boulder rock with coral rock and waterways cobbles included in construction. Feature oriented at 243 degrees to Feature A. There is a circular area at east end (c. 0.40 m round) where rock appear to have been removed. Trowel test c. 0.10 m but few clay deposits. Surface deposits noted as present per travel test.

FEATURE F: Terrace

ADJACENT TERRAIN: Coastal cliff plateau.
VEGETATION: Elbow and grass.
FUNCTION: Habitat
DIMENSIONS: 6.00 m (360 degrees) by 3.00 m by 1.00 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Stacked basalt rock, 0.20 to 0.40 m in size. Rocks are found on east side of bedrock and beach area. Beach slope to west c. 3.00 m until it comes to a small area of bald rock. Basalt rock on top of this area is covered with a layer of sand. Beach is wider at the east end. The beach is extended eastward to a point where it has little or no covering. This feature located c. 2.00 m east of shoreline; c. 0.00 m west of Feature L. Treads/track indicated along base of cliff with cultural remains included. Surface remains consist of marine shell with no surface deposit present.

FEATURE 1: Modified outcrop
ADJACENT TERRAIN: Coastal cliff plateau; beach fire-affected area.
VEGETATION: Elbow.
FUNCTION: Habitat
DIMENSIONS: 3.00 m by 0.50 m by 0.60 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: Stacked basalt rock (one course) on beach overtopping. Waterworn basalt and coastal rock included in construction. Oriented at 300 degrees. Area east of exposed beach fire-affected, and deposit appears to be pushed ash from fire on basalt. This feature located c. 3.00 m north of Feature P on downhill slope toward the beach. Surface remains of marine shell, with surface deposit noted as absent.

FEATURE 2: Alignment
ADJACENT TERRAIN: Coastal cliff plateau.
VEGETATION: Elbow and grass.
FUNCTION: Transportation
DIMENSIONS: 0.50 m (270 degrees) by 0.20 m by 0.10 m
CONDITION: Good
INTEGRITY: Altered
DESCRIPTION: Snake-like alignment of rock, no stacking, only one course; thick. Lies north side of path. Tread/tread indicated semi-compact cliff base with cultural remains present (marine shell and cord). This feature located c. 0.50 m north of Feature L, c. 3.00 m north of Feature K. Surface deposit noted as present.

FEATURE 3: Terrace
ADJACENT TERRAIN: Adjacent to the beach. Exposed bedrock. There is a gentle slope to the northwest.

VEGETATION: Elbow.
FUNCTION: Habitat
DIMENSIONS: 3.00 m (360 degrees) by 3.00 m by 0.70 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: This feature is roughly rectangular in overall shape and appears to have a paved surface. It contains the NW and SE. The southeast boundary consists of a beach outcrop standing c. 0.30 m above the surrounding surface. Feature consists of unaltered, basaltic, waterworn rock and waterworn basalt rubble. Size of rocks are small to medium from c. 0.10 to 0.40 m in diameter. Stacked and placed one to one course high. The NW boundary is very similar to the SW boundary with the exception of a large elbow area that has recently fallen across the center NW boundary and caused a collapse. The south and southeast boundary has been delineated by a rubble concentration. The paved flat area extends to the rubble. The south end cannot be defined. The surface of the terrace is relatively flat and consists of small 10/0 and angular gravel; boulders and boulders. Surface is located c. 3.00 m east of the coastal vegetation line. Features 1 and 2 are located c. 0.50 to 0.30 m south of the terrace. Feature K is located c. 0.50 m to the north. Surface consists of flatnose and a wide variety of marine shell. There is a great deal of charcoal which appears to be from the recent. There is a high probability of a habitation deposit of at least 0.10 m in thickness on the entire surface of the terrace.

FEATURE 4: Trail segment
ADJACENT TERRAIN: Small surrounding basalt, coastal cliff plateau.
VEGETATION: Barren.
FUNCTION: Transportation
DIMENSIONS: 0.00 m by 0.20 m by 0.30 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Linear stacked basalt rock (one to two courses) lying obliquely to the river course. Lies lower steepness to the south and ends abruptly on east end with large basalt boulders. Overall construction consists of debris from talus to larger basalt rock 1.00 to 2.00 m. Coral rock fragments are scattered along path at NW end. Feature oriented at 210 degrees. Tread track indicated on the eastern side the surface ash deposit (c. 0.10 to 0.30 m). No cultural remains noted. This feature is located c. 10.00 m east of Feature 3 on slight downhill slope toward coast.

FEATURE 5: Moss
ADJACENT TERRAIN: Coastal cliff plateau.
VEGETATION: Elbow.
FUNCTION: Possible burial
DIMENSIONS: 2.00 m by 0.20 m by 0.00 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Irregular, loosely stacked basalt rock with beach gravel and stone upturned and pushed into center of mound. Coral rock and waterworn basalt incorporated in construction. Feature oriented at 360 degrees. "B" shaped in overall appearance. Entrance facing along interior portion of feature. Stones wash build up along the exterior of feature. This feature is located c. 1.00 m north of Feature L. Surface remains consist of marine shell, broken boulder, and larger ones. Surface deposit noted as disturbed.
FEATURE D: Wall
ADJACENT TERRAIN: Steeply sloping west toward water, fairly level ground
FUNCTION: Habitat
DIMENSIONS: 3.00 m by 2.00 m by 0.54 m
CONDITION: Aslant
INTEGRITY: Altered
DESCRIPTION: Irregularly spaced and worn rock face with some vegetation (Figures D, E, F). The feature is located c. 2.00 m south of Feature A. Surface deposit consists of small gravel and sand. Surface deposit on the west side of the feature is composed of large gravel and sand.

FEATURE E: Wall
ADJACENT TERRAIN: Steeply sloping west toward water, fairly level ground
FUNCTION: Habitat
DIMENSIONS: 3.00 m by 2.00 m by 0.54 m
CONDITION: Aslant
INTEGRITY: Altered
DESCRIPTION: Irregularly spaced and worn rock face with some vegetation (Figures D, E, F). The feature is located c. 2.00 m south of Feature A. Surface deposit consists of small gravel and sand. Surface deposit on the west side of the feature is composed of large gravel and sand.
FEATURE: C: Shallow
ADJACENT TERRAIN: Shoreline
VEGETATION: Algae and sand grass
FUNCTION: Habitat
DIMENSIONS: 4.96 (318 degrees) m by 2.30 m (24 degrees) by 0.80 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A randomly placed patchwork of boulders high on the SW side while the south side is nearly flat. This structure sits on the base of the reef. The southeast side is less than 2 m high and is covered in sand. The northeast side is 3.00 m high and has an area of 0.30 m². This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present.

FEATURE: F: Shallow
ADJACENT TERRAIN: Shoreline
VEGETATION: Algae and sand grass
FUNCTION: Habitat
DIMENSIONS: 3.00 m (90 degrees) by 1.95 m (45 degrees) by 0.95 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: A randomly placed boulder close to the shore. The north side is less than 1 m high and is covered in sand. The south side is 0.60 m high and has an area of 0.30 m². This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present.

FEATURE: G: Shallow
ADJACENT TERRAIN: Shoreline
VEGETATION: Algae and sand grass
FUNCTION: Habitat
DIMENSIONS: 2.50 m (70 degrees) by 2.00 m (114 degrees) by 0.92 m
CONDITION: Fair
INTEGRITY: Altered
DESCRIPTION: A small boulder that is less than 2 m high and is covered in sand. The north side is less than 0.50 m high and is covered in sand. The south side is 1.70 m high and has an area of 0.30 m². This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present.

FEATURE: H: Shallow
ADJACENT TERRAIN: Shoreline
VEGETATION: Algae and sand grass
FUNCTION: Habitat
DIMENSIONS: 2.00 m (112 degrees) by 2.00 m (50 degrees) by 0.70 m
CONDITION: Excellent
INTEGRITY: Unaltered
DESCRIPTION: A small boulder that is less than 1 m high and is covered in sand. The north side is less than 0.50 m high and is covered in sand. The south side is 0.50 m high and has an area of 0.30 m². This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present. This feature is located on extreme west central at depth. Underwater and above water, there is a tremendous amount of species present.
FEATURE M: Terraced
ADJACENT TERRAIN: Downhill slope of small knoll
VEGETATION: Kevin and dry grass
FUNCTION: Habitat
DIMENSIONS: 1.50 m (3.00 m) by 1.50 m (9.00 m) by 0.10 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A nearly flat linear arrangement of small basaltic boulders and cobblestones. The feature is oriented on the west side of a small mound and extends about 50 m east to the east. The boulders and cobblestones are 0.50 m wide and range in size to over 2 cm in diameter. The area is a flat area on the north and 100 m edge. This feature may be composed of small scale or small scale slope.

FEATURE N: Cleft
ADJACENT TERRAIN: Gentle slope toward river
VEGETATION: Kevin and burned and harvested grass
FUNCTION: Habitat
DIMENSIONS: 1.20 m (3.00 m) by 1.30 m (3.00 m) by 0.85 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: A linear cleft or linear depression in a small slope. The depression is 0.50 m wide and 0.50 m wide in diameter. The area is a flat area on the north and 100 m edge. This feature is composed of small scale or small scale slope.

FEATURE O: Escarpment
ADJACENT TERRAIN: Steep western slope to river
VEGETATION: Burned Kevin and desert grass
FUNCTION: Habitat
DIMENSIONS: 5.00 m (9.00 m) by 4.35 m by 0.25 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A linear escarpment composed of angular basaltic boulders and cobblestones ranging from 0.10 to 0.40 m in diameter. Also incorporating natural bedrock along

western portion. East and 5 walls still approximately three to four courses high while the rest of the feature is reduced to about one course high. The center is clear of rocks. Small amounts of marine shell are found also. South wall, two to four six wide and contains a lot of rot. Surface deposit is present. FEATURE P: Cleft
ADJACENT TERRAIN: High western slope to water
VEGETATION: Kevin and grass
FUNCTION: Habitat
DIMENSIONS: 1.20 m (3.00 m) by 2.00 m (3.00 m) by 0.50 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A linear cleft or linear depression in a small slope. The depression is 0.50 m wide and 0.50 m wide in diameter. The area is a flat area on the north and 100 m edge. This feature is composed of small scale or small scale slope.

FEATURE Q: Cleft
ADJACENT TERRAIN: Kevin and desert grass
FUNCTION: Habitat
DIMENSIONS: 1.35 m (3.00 m) by 0.85 m
CONDITION: Good
INTEGRITY: Altered
DESCRIPTION: A linear cleft or linear depression in a small slope. The depression is 0.50 m wide and 0.50 m wide in diameter. The area is a flat area on the north and 100 m edge. This feature is composed of small scale or small scale slope.

FEATURE R: Terrace
ADJACENT TERRAIN: Flat area above and below feature; Gentle slope toward the sea
VEGETATION: Kevin and grass
FUNCTION: Habitat
DIMENSIONS: 5.00 m (9.00 m) by 3.00 m by 0.40 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A linear escarpment composed of angular basaltic boulders and cobblestones ranging from 0.10 to 0.40 m in diameter. Also incorporating natural bedrock along
an evening corner is a point near c. 10.0 m SSW or 1.3 m N\E (indicated). The eastern boundary is not discernible, marked by bushes and fallen trees. One long, low tree extends upward and is lost of human contact c. 3.0 m away. Feature II may be one time has been connected to Feature II is a possible core for Feature II. Feature II is located c. 6.0 m from the eastern boundary. It is located c. 1.0 m from Feature C and c. 3.0 m from Feature B, and c. 2.0 m from Feature N. Surface remains consist of brush, mud, and debris. Marine shell, two pieces, is rare. A likely chance of cultural deposit below the surface of the terrain as well as the SSW area.

FEATURE D: Middle concentration
ADJACENT TERMINAL: Rolling paleoearth on a W-facing slope.
VEGETATION: Kauai and Kauai grass.
FUNCTION: Habitation
DIMENSIONS: 3.50 m by 2.50 m by 0.00 m
CONDITION: Poor
INTEGRITY: Lost
DESCRIPTION: A scatter of various marine shells (possibly rocky) on reddish-brown mud. Site is a slight hill of Feature C, and extends down to c. 2.0 m of Feature D, in sections of zoned rainwater. A group of paleoearth cobbles are common with several pieces of coral is immediately S. Rocks c. 0.10 to 0.90 m in length/width. Long axis runs NE to SSW for 180 degrees. Feature is located on NW quad of project area, near a W-facing hill less than 25.00 m from shore. A towel probe into soil is stopped by rock at less than 0.00 m. Unexcavated.

FEATURE E: Enclosure
ADJACENT TERMINAL: Unexcavated.
VEGETATION: Kauai and scrub grass.
FUNCTION: Habitation
DIMENSIONS: 1.50 m (60 degrees) by 5.25 m (120 degrees) by 0.11 m
CONDITION: Poor
INTEGRITY: Lost
DESCRIPTION: A single cove rectangular enclosure of paleoearth boulders and cobbles. This structure is incorporated into Feature II (wall) on the north. There is no marine or terrestrial surface. Part of the path that leads to Feature E is located along the west side of Feature U but not part of it. Boulders are spread throughout the terraces but it doesn't appear as paving. The feature is in poor shape and many of the rocks may have been removed for other structures. This feature is located on the extreme west coastal portion of maluah. (SD #11)

FEATURE F: C-shape
ADJACENT TERMINAL: Habitation.
VEGETATION: Kauai and scrub grass.
FUNCTION: Military
DIMENSIONS: 4.00 m (7 degrees) by 1.40 m (105 degrees) by 0.35 m
CONDITION: Poor-fair
INTEGRITY: Lost
DESCRIPTION: A C-shaped structure of randomly piled paleoearth boulders and cobbles s to two concentric high. There is a lot of debris in this area. The cobbles and fragments are scattered in the area. The structure faces cast with the open side to the west. Feature F (wall) runs close by the north. It sits on the edge of a beach and a small shoreline is located on its south edge. Located on extreme west coastal portion at maluah section. Surface deposit noted as absent.

FEATURE W: Terrace
ADJACENT TERMINAL: This feature is situated on a flat area surrounded.
VEGETATION: Foxtails grass.
FUNCTION: Agriculture
DIMENSIONS: 1.20 m (NWS) by 10.50 m (EWS) by 0.02 m
CONDITION: Poor
INTEGRITY: Lost
DESCRIPTION: This feature has a round shape (very slightly rectangular) three-tiered area with three cleared areas here soil area-developed of mon. This feature comprises weeded area and paleoearth c. 0.83 to 0.95 m in length/width. Feature X, a trail, forms the N to SWS area boundary of this feature. The cleared areas are located in the eastern corner, the southern corner, as well as a cleared area (approximately centrally located in the feature). The north average size of the construction material is 0.15 m in length/width. The feature is piled (maximum) three courses high with the majority being not to two courses high. These "horse" are encountered mostly on the slope (NWS). The feature is located c. 28.10 m, 215 degrees to Feature II, downs from above at Feature W. Surface remains consist of waterworn coral, waterworn boulder, 218 caliber bullet casings, and one small bucket (AA). The nature of the deposit is unknown at this time.

FEATURE X: Trail
ADJACENT TERMINAL: This feature is situated on a flat area terrain.
VEGETATION: Grass, kauai nearby.
FUNCTION: Transportation
DIMENSIONS: 35.00 m (NWS) by 0.60 m
CONDITION: Fair
INTEGRITY: Lost
DESCRIPTION: This is a surprising trail feature connecting to and coming off the main pali/rock trail which wanders through the coastal portion of the project area. This branch trail leads roughly SW toward the ocean (c. 45.00 m away). This trail forms the N at SW boundary of the three-tiered terrace feature (W). This feature is intermittently filled with weeded area and paleoearth c. 0.83 to 0.95 m in length/width. This lining is piled one to two courses high. The "horse" surface of the trail is a zebra-brown soil, with small boulder gravel components littering the ground. This feature is immediately to the SW of Feature W. Surface remains consist of waterworn and fragmented coral, and one waterworn boulder. The surface deposit is unknown at this time.

FEATURE Y: Cleared area
ADJACENT TERMINAL: This feature is set on flat level ground (slight slope to the north).
VEGETATION: No vegetation.
FUNCTION: Agricultural
DIMENSIONS: 4.00 m (NWS) by 3.00 m (EWS) by 0.41 m
CONDITION: Fair
INTEGRITY: Lost
DESCRIPTION: This feature is roughly spherical in shape, with a small raised buildup of soil to the NE. The feature is intensively used and weeded area and paleoearth cobbles and small boulders c. 0.85 to 0.35 m in length/width. A flat rock pile wall within the lining of this feature, and flowers above the weeded soil deposit. This lining is piled one to two courses high. This feature is roughly 8.00 m in the W from Feature W. No surface remains encountered on this feature. Surface deposit is unknown at this time.
FEATURE Z: Cleared area
ADJACENT TERRAIN: This feature is set in a rolling flat terrain (0.45 m from terrain base). VEGETATION: Littoral and grass. FUNCTION: Agriculture. DIMENSIONS: 3.50 m (N-S), 2.00 m (E-W) CONDITION: Fair. INTEGRITY: Altered. DESCRIPTION: This feature is roughly circular in plan view, and is constructed of piled, weathered, and phosphate cobbles to small boulders. It comprises one to three courses and lies on a slightly raised and surfaced portion of the feature. The interior soil is very sandy with small UBZT-like basalt gravel. This feature is N to WNW of Feature Z, and E to W of Feature W. Surface remains consist of modern trash (wooden tails). WSV of this feature. Very shallow natural soil (gley soil) on the interior of this feature. Surface deposit noted as above.

FEATURE A: Cleared area
ADJACENT TERRAIN: This feature is situated on a flat level ground, with a slope (15-20 degrees) to the NW. VEGETATION: Littoral and grass. FUNCTION: Agriculture. DIMENSIONS: 6.40 m (W-E) by 4.50 m (N-S) CONDITION: Fair. INTEGRITY: Altered. DESCRIPTION: This feature is roughly circular in plan view and is constructed of piled, weathered, and phosphate cobbles to small boulders. It comprises one to three courses and lies on a slightly raised and surfaced portion of the feature. The interior soil is very sandy with small UBZT-like basalt gravel. This feature is N to WNW of Feature Z, and E to W of Feature W. Surface remains consist of modern trash (wooden tails). WSV of this feature. Very shallow natural soil (gley soil) on the interior of this feature. Surface deposit noted as above.

FEATURE BB: Cleared area
ADJACENT TERRAIN: This feature is situated on a flat level terrain, with a very slight slope to the W. VEGETATION: Agriculture. FUNCTION: Agriculture. DIMENSIONS: 1.30 m (N-S) by 4.50 m (E-W) CONDITION: Fair. INTEGRITY: Altered. DESCRIPTION: This is a semi-circular, slightly raised cleared area composed of weathered and phosphate cobbles (30° isobase). 0.50 m to 0.30 m in length/diameter. The basal material replaced generally one course high. It is possible this is two courses of basalt with three courses of basalt. The opening of this semi-circular is the SE portion of the feature. This feature is roughly 145.00 m to the east from Feature W (same to datum). No potable remains were noted at this feature. A thin soil deposit is at the interior of this feature.

FEATURE C: Beach
ADJACENT TERRAIN: Low undulating hills and ravines. VEGETATION: Alkali and grass. FUNCTION: Recreation. DIMENSIONS: 1.40 m (W-E) by 1.10 m (N-S) CONDITION: Fair. INTEGRITY: Unaltered. DESCRIPTION: This feature is a slightly raised and flat-topped beach, with a slope of 15-20 degrees to the WNW. Surface remains consist of modern trash (wooden tails). WSV of this feature. Very shallow natural soil (gley soil) on the interior of this feature. Surface deposit noted as above.

STATE NO.: 131471
SITE TYPE: Complex (12 Features)
TOPOGRAPHY: Low undulating hills and ravines on the coast. Slope is oriented to top of sides of ridges. VEGETATION: Littoral and grass. CONDITION: Poor. INTEGRITY: Altered. PROBABLE USE: Multi-use. FUNCTION: Multi-use. DESCRIPTION: This site consists of two features (Feature A, B), three U-shapes (Features D, E, F), two walls (Features G, H), two terraces (Features I, J), one green area (Features K), one modified canyon (Features L), and a terrace (Feature M).

FEATURE H: Mandala
ADJACENT TERRAIN: Burn area, extensively disturbed, fire affected. VEGETATION: Alkali and grass. CONDITION: Intermediate. DIMENSIONS: 1.00 m (N-S) by 4.50 m (E-W) CONDITION: Good. INTEGRITY: Unaltered. DESCRIPTION: This feature is a slightly raised and flat-topped beach, with a slope of 15-20 degrees to the WNW. Surface remains consist of modern trash (wooden tails). WSV of this feature. Very shallow natural soil (gley soil) on the interior of this feature. Surface deposit noted as above.

FEATURE B: Mandala
ADJACENT TERRAIN: Burn area, vegetation burned, trees uprooted by fire fighting equipment and placed to within ca. 30 m of the water's edge. VEGETATION: Alkali and grass. CONDITION: Intermediate. DIMENSIONS: 1.00 m (N-S) by 1.30 m (E-W) CONDITION: Good. INTEGRITY: Altered.
DESCRIPTION: Rectangular basin filled out to three courses (c. 20.00 m x 6.00 m in diameter) with boulders on the floor. Feature D is located at 159° from Feature A at 30° degrees on a coastal plain. Surface remains consist of material fragments and gravel. Surface deposits are covered with a thin layer of surficial material. Feature B shows a high and feature C is marked by a mound. No cultural evidence.

FEATURE D: U-shape
ADJACENT TERRAIN: Feature D is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION:Klove and grass.

FUNCTION: Habitation
DIMENSIONS: 6.10 m (W) by 2.35 m (L) by 0.00 m (H)
CONDITION: Fair
INTEGRITY: Unaltered

FEATURE E: U-shape
ADJACENT TERRAIN: Feature E is located approximately 200 m to the west of Feature D. It is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION: Klave and grass.

FUNCTION: Habitation
DIMENSIONS: 2.35 m (W) by 2.00 m (L) by 0.05 m (H)
CONDITION: Fair
INTEGRITY: Unaltered

DESCRIPTION: Feature E, a U-shape, is located on a coastal plain and consists of material fragments and gravel. Surface deposits are covered with a thin layer of surficial material. Feature E shows a high and feature F is marked by a mound. No cultural evidence.

FEATURE F: U-shape
ADJACENT TERRAIN: Feature F is located approximately 200 m to the west of Feature E. It is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION: Klave and grass.

FUNCTION: Habitation

DIMENSIONS: 7.20 m by 6.50 m by 6.50 m
CONDITION: Poor
INTEGRITY: Unaltered

DESCRIPTION: Boulder sized polygons, piled with soil in a U-shape, opening facing north. Long axis rotated 180° to 347° degrees. Rocks range from 0.60 m to small pebble-sized. This feature located on the NW end of Project Area, c. 10.00 m east of shore. Surface remains consist of a mound of loose gravel. Anchoring heavy line of rock, large boulders (c. 20 m), one masonry bottle cap, 0.50 g. glass bottle with paper label still intact. Feature of deposit is uncovered. A stone paved area will be located at least 0.10 m north of cultural deposit.

FEATURE G: Wall
ADJACENT TERRAIN: Feature G is located approximately 200 m to the west of Feature F. It is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION: Klave and grass.

FUNCTION: Agriculture
DIMENSIONS: 10.00 m by 1.10 m by 0.10 m (H to 100 degrees)
CONDITION: Poor
INTEGRITY: Unaltered

DESCRIPTION: Boulder sized polygons, piled with soil in a U-shape, opening facing north. Long axis rotated 180° to 347° degrees. Rocks range from 0.60 m to small pebble-sized. This feature located on the NW end of Project Area, c. 10.00 m east of shore. Surface remains consist of a mound of loose gravel. Anchoring heavy line of rock, large boulders (c. 20 m), one masonry bottle cap, 0.50 g. glass bottle with paper label still intact. Feature of deposit is uncovered. A stone paved area will be located at least 0.10 m north of cultural deposit.

FEATURE H: Terrace
ADJACENT TERRAIN: Feature H is located approximately 200 m to the west of Feature G. It is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION: Klave and grass.

FUNCTION: Agriculture
DIMENSIONS: 3.20 m by 1.20 m by 0.40 m (H)
CONDITION: Poor
INTEGRITY: Unaltered

DESCRIPTION: Boulder sized polygons, piled with soil in a U-shape, opening facing north. Long axis rotated 180° to 347° degrees. Rocks range from 0.60 m to small pebble-sized. This feature located on the NW end of Project Area, c. 10.00 m east of shore. Surface remains consist of a mound of loose gravel. Anchoring heavy line of rock, large boulders (c. 20 m), one masonry bottle cap, 0.50 g. glass bottle with paper label still intact. Feature of deposit is uncovered. A stone paved area will be located at least 0.10 m north of cultural deposit.

FEATURE I: Pond area
ADJACENT TERRAIN: Feature I is located approximately 200 m to the west of Feature H. It is situated on the southern boundary of coastal features. It is north of the moderately higher terrain.

VEGETATION: Grass

FUNCTION: Habitation
DIMENSIONS: 6.45 m by 1.20 m by 0.24 m
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: Feature J is approximately centered on ridge sparcetumae. The paved area consists mainly of basalt gravel, basalt pebbles, and small fragments of coral. The feature has been heavily disturbed and appears to have been a larger area at one time. Feature J is located 230 degrees south and c. 20.0 m to S W 85-216 Feature L, Appen. 1.0 m west of feature J is depression of uprooted tree (no tree) and a displaced pile of well, Appen. 1.0 m east is a pile of construction type large boulders, all of the rocks are fire-affected. Surface remains consist of karstic mats to bed, shell, and small fragments of coral, shark tooth (Amp. 102), and coral bivalves "B. M. " (Am. 113). Subsurface travel test: 0.10 m, stones and pebbles (see watermarks).

FEATURE K: Modified outcrop
ADJACENT TERRAIN: Vegetation: Lime and grass
FUNCTION: Submarine
INTEGRITY: Alternated
DESCRIPTION: Feature K is situated below a beach outcropping c. 0.60 to 0.70 m in height. Below this outcropping, an area of grassy slope c. 1.00 to c. 1.10 m below this slope is an outcrop overlying an area below which is Feature K. Approximately 15 large angular beach cobbles were placed and stacked on this outcrop. The extract portion of this terremor probably adjusted the NW section of Feature L. The firefighting tree path most likely separated the two. The decline of this feature is nearly vertical for a drop of c. 1.60 m in a total outcrop ending in the ocean. Feature K is 1.10 m north of Feature L at 109 degrees. Marine shells and coral noted in surface remains. Subsurface travel test: 0.10 m in depth; stony soil and small pebbles and marine shells.

FEATURE L: Wall
ADJACENT TERRAIN: Vegetation: Lime and grass
FUNCTION: Submarine
INTEGRITY: Alternated
DESCRIPTION: Feature L is composed of large boulders and submerged basalt small boulders c. 0.20 to 0.50 m in diameter. Stacked three to four courses high on a beach outcropping cliff. The wall has been altered by a large lime tree growing behind it, and the tree trash has displaced rocks, causing a heavy drainage to the west. This is due to recent firefighting activity (1.4-92). Above the wall is a great deal of marine shells and a gentle slope to the east, suggesting a possible terrace area. Below the low tree to the east is a large mound of large beach cobbles (c. 0.20 to 0.50 m) that appear to have been pushed horizontally. Feature L is located c. 4.20 m west of Feature M at 110 degrees. Marine shell and coral noted in surface remains. Subsurface travel test: 0.10 m in depth. Silty soil terminating on a small rocky deposit.

FEATURE M: Terrem
ADJACENT TERRAIN: Vegetation: Lime and grass
FUNCTION: Submarine
INTEGRITY: Alternated
DESCRIPTION: Two courses high in size of feature (s) J, E, three beach cobbles (Features D, M, N), and two coral areas (Features O, K). Subsurface travel test: 0.10 m in depth. Silty soil terminating on a small rocky deposit.

STATE NO.: 19148
SITE TYPE: Complex (5 Features)
TOPOGRAPHY: Vegetation
FUNCTION: Submarine
INTEGRITY: Alternated
PROJECT ORIGIN: Multiple
DESCRIPTION: This site consists of five terranes (Features C, E), three beach cobbles (Features D, M, N), and two coral areas (Features O, K).

FEATURE C: Termer (3)
ADJACENT TERRAIN: Railing palm tree outcrop on W-facing slope. Vegetation: Lime and grass. Subsurface travel test: 0.10 m in depth. Silty soil terminating on a small rocky deposit.

FEATURE D: Termer (3)
ADJACENT TERRAIN: Vegetation: Lime and grass. Subsurface travel test: 0.10 m in depth. Silty soil terminating on a small rocky deposit.

INTEGRITY: Alternated
DESCRIPTION: Subaqueous boulders have been boulders stacked one on another high in size of feature (s) J, E, three beach cobbles (Features D, M, N), and two coral areas (Features O, K). Subsurface travel test: 0.10 m in depth. Silty soil terminating on a small rocky deposit.
FEATURE D: Heath
ADJACENT TERRAIN: Shoreline.
VEGETATION: Kauai and grass.
FUNCTION: Recreation
DIMENSIONS: 1.50m (50 degrees) by 1.20m (60 degrees) by 0.47m (90 degrees to ground surface)
CONDITION: Excellent
INTEGRITY: Undamaged
DESCRIPTION: A squatish, rounded, moated, four-cone-high hana-ke'e fish pit. This was originally marked by tufa rings. The moat is covered with water-coral boulders and lava flows from Feature G. Location on the shoreline was noted as mokulei. No surface deposit noted.

FEATURE E: Terrace
ADJACENT TERRAIN: Shoreline.
VEGETATION: Kauai and grass.
FUNCTION: Recreation
DIMENSIONS: 1.00 m (90 degrees) by 2.00 m (210 degrees) by 0.35 m (90 degrees perpendicular to earth surface)
CONDITION: Fair
INTEGRITY: Undamaged
DESCRIPTION: A low, moated area to two conical terraces of water-coral boulders. Water-coral and cobble stones are scattered around the area. The moat behind the terrace is at slightly higher elevation than the earth. The terrace is c. 10.20 m by 9.14 m.

FEATURE F: Paved area
ADJACENT TERRAIN: Shoreline.
VEGETATION: Kauai and grass.
FUNCTION: Recreation
DIMENSIONS: 4.10 m (60 degrees) by 4.00 m (90 degrees to ground surface)
CONDITION: Poor
INTEGRITY: Altered
DESCRIPTION: A flat, paved area of water-coral and pebbles. Surrounding the circular area are water-coral boulders at irregularly spaced intervals. There are also some partially buried water-coral boulders. It appears as though there may have been a structure here, which is now gone, but most of the area has been cleared to make a paved walkway. Other damage was sustained to the fish pit. Two pole beats (SD 16 and 17) were found within the feature. Location on the shoreline was noted as mokulei. Surface deposit noted as mokulei.

FEATURE L: Paved area
ADJACENT TERRAIN: Rolling paleo-coral outcrop on a W-facing slope.

VEGETATION: Burned grass and shrub. 
FUNCTION: Recreation
DIMENSIONS: 1.50 m (90 degrees) by 1.80 m (long axis = 210 to 120 degrees)
CONDITION: Good
INTEGRITY: Undamaged
DESCRIPTION: A roughly oval-shaped area of ground with a covering of small pieces of coral and red grassy pebbles. The largest pebbles are c. 0.35 m long, most are much smaller. Surrounding ground is covered with pebbles and soil. A large tree stump at the northeast corner is encased in pebbles and soil. No surface deposit noted.
INTEGRITY: Unaltered

FUNCTIONAL INTERPRETATION: Possible military

DIMENSIONS: 10.39 m by 8.07 m

DESCRIPTION: Squat shaped enclosure. Walls are constructed of concrete filled with large rocks. Floor is concrete with a square shaped depression in the center. Large iron bolts are positioned (inserted in) within the confines of the depression. The floor is cracking and buckling. The corner of the left wall has been badly damaged, and a rubble pile now occupies the corner area. The north wall has some damage also. The outer facing of the top of the wall (at surface level) are deteriorating. This feature is located on central coastal portion c. 2.00 m east of coast, e. 48.90 m north of Zone 852-235. Some broken trash (trees and burnt leaves) is next to the site. Surface deposit absent.

STATE NO.: 19373
PHILO TEMP. NO.: 35-260
SITE TYPE: C-shaped

TOPOGRAPHY: Roughly level to north, 10-15 degrees slope everywhere else. Rolling hills above Puako Bay.

VEGETATION: Sparse to the NE and grass.

CONDITION: Poor fair

INTEGRITY: Altered

PROBABLE AGE: Probable

FUNCTIONAL INTERPRETATION: Temporary habitation

DIMENSIONS: 4.90 m by 4.60 m

DESCRIPTION: Randomly piled small boulders and cobbles in C-shape, about two layers of stones on top of packed soil. The C-shape opens to the west, north, and partially formed. Located near eastern edge, near white house with gray roof and long white wall. A feature A (cabin) was mentioned but noted as "missing, believed destroyed". Feature B was formerly called as enclosure. Rubble drains all around the site; that is probably what happened to Feature A, looks fairly recent. No surface remains or deposit noted.

STATE NO.: 19374
PHILO TEMP. NO.: 3245-261
SITE TYPE: C-shaped

TOPOGRAPHY: Unbroken bedrock outcrop (palaeo). A trail runs running roughly N-S is c. 5.00 m north of feature.

VEGETATION: Grass.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Probable

FUNCTIONAL INTERPRETATION: Temporary habitation

DIMENSIONS: 2.60 m by 1.50 m by 0.60 m (firing area room 32 to 323 degrees)

DESCRIPTION: Palaeo outcrop heavily stacked stone to three courses high. Most rocks are less than or equal to 0.30 m in length, 0.30 m in diameter, e. 6.60 m. Site atop small ridge which runs alongside a ravine immediately to the north. Located in 3.50 meter of project area inland above highway, above/below slope of water track. No surface remains or deposit noted.

STATE NO.: 19372
PHILO TEMP. NO.: 3245-262
SITE TYPE: Cabin

TOPOGRAPHY: A slope facing NE, over unbroken bedrock outcrop.

VEGETATION: Grass.

CONDITION: Fair

INTEGRITY: Unaltered

PROBABLE AGE: Probable

FUNCTIONAL INTERPRETATION: Temporary habitation

DIMENSIONS: 0.40 m by 0.40 m by 0.45 m (0.40 m diameter)

DESCRIPTION: Paved stone cobble sidewalk two to three courses high. Rocks are less than or equal to 0.20 m in length/diameter. Site on bedrock. No surface remains or deposit noted.

STATE NO.: 19374
PHILO TEMP. NO.: 3245-263
SITE TYPE: Tuia

TOPOGRAPHY: North-sloping hill terraces.

VEGETATION: Sparse and grass.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Probable

FUNCTIONAL INTERPRETATION: Marker

DIMENSIONS: 1.20 m by 0.60 m

DESCRIPTION: Piled and stacked pahoehoe cobble and basaltic cobble ranging in size from c. 0.50 to 0.35 m. Square in shape with four sides, east side shows signs of collapse. Smaller cobble at the middle of sides appear to be a possible cairn, but from its size and shape, could also be a small round. There to four courses high. No surface remains or deposit noted.

STATE NO.: 19374
PHILO TEMP. NO.: 3245-254
SITE TYPE: Terraces

TOPOGRAPHY: West-sloping hill terraces.

VEGETATION: Sparse and grass.

CONDITION: Good

INTEGRITY: Unaltered

PROBABLE AGE: Indeterminate

FUNCTIONAL INTERPRETATION: Possible agriculture

DIMENSIONS: 2.70 m by 0.30 m

DESCRIPTION: Piled and stacked sub-angular basaltic cobbles and basaltic cobble ranging in size from c. 0.20 to 0.40 m. One in two courses high. The back of the wall (north side) is almost level with the ground, while the north side is roughly 0.45 m above ground surface. This appears to be some sort of a retaining wall, it might extend further to either end. The wall is rising east to west. Some debris is observed on the south side of the wall. Wall is at the bottom of a small, weathered sloping hill. Location is project area is near southern central end of parcel, island of highway. No surface remains or deposit noted.

STATE NO.: 19374
PHILO TEMP. NO.: 3245-265
SITE TYPE: Subtle construction

TOPOGRAPHY: Flat open area, over cay off to the west.

VEGETATION: Sparse and grass.

CONDITION: Good

INTEGRITY: Altered

PROBABLE AGE: Probable

FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 8.40 m by 1.80 m
DESCRIPTION: Filed and marked mangled basalt cobbles and boulders ranging in size from c. 0.05-0.30 m and four to five courses high. Wall running north-south. Could be clearing for field that is east of it. The field is virtually void of any viable rocks. Could also be boulder waste. It is right next to an identified station. But there is a good amount of marine shell present around it. There is possible remnant stake on top of the wall at the south end. Stacking is two to three courses high, North end has possibly been high going through it. Right next to wall opening to the wall is a small wedge. Wall tapers down to one to two courses at the far northern end. This wall is east of and in the east of Site 365. Concentration of marine shell at far northern end; scattered marine shell along the rest of the wall.

STATE NO.: 19376
FISH TEMP. NO.: 01245-206
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Located on west bank of Will, slope 12 degrees downhill to head of rearing.
VEGETATION: Algae and grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Intermediate
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of one overhang (Feature A), one U-shape (Feature B), one terrace (Feature C), and one modified outcrop (Feature D).
FEATURE A: Overhang
ADJACENT TERRAIN: Low coastal, encroaching hills, basalt outcroppings, small walks-like gully below site area.
VEGETATION: Algae and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 2.60 m (30 degree) 2.60 m by 1.40 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Flat face of feature consists of basalt outcropping with a small "pocket area" extending into the outcropping. c. 0.60 m, creating an overhang appearance. A semi-circular wall encloses the overhang area. In addition, c. 1.10 m. Wall is constructed of basalt rock stacked on outcropping base. Marine shell occurs, two to three courses high on north. Rim of walk flat on one course in the remainder of the wall. Some down slope storage is noticeable. Feature A above Feature B wall. Wall with steps has a roughly c. 0.70 m wide at point and c. 0.20 m at narrow point. Site 365 is c. 3.00 m east of this feature, from top of overhang. Feature determination is vague; possibly storage area or used for temporary habitation. Feature A is located on the southwest corner of project area and immediately east of power station.
No portable remains were noted on the surface of this feature. Soil is very loose dirt, appears to have been blown in. Only c. 0.03-0.05 m on bedrock is upper portion; some loose rocks in lower portion, but mostly bedrock. Test Unit #1 placed within "exclusion" on July 23, 1992. No subsurface deposit encountered.

FEATURE B: U-shape
ADJACENT TERRAIN: Unasouched basalt bedrock outcrop. Area east and southeast of the site have been bulldozed level for the power station.
VEGETATION: Algae and grass.
FUNCTION: Temporary habitation

DIMENSIONS: 2.00 m by 1.40 m (10 degrees-190 degrees) by 0.65 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Basalt cobbles and small boulders stacked one to two courses high to form a U-shape. The "U" opens toward Feature C to the west. The ground inside is fairly level, and it is slightly higher than and immediately adjacent to the area formed by Feature C. Two areas of the "U" point directly to the ends of Feature C, terraces. Most rocks are c. 0.30-0.80 m length/diameter. Many are flat and have been set upright. The relationship of B and C suggests an enclosed space. It measures c. 0.90 m from outer edge of B to east side of C. This feature is located southeast of power station. No portable remains were detected. A gravel pit located in the site to the north and board rock at c. 0.10 m. Test Unit #7 placed within southern limit, revealing volcanic glass, woven textiles (possibly stringed), and ornamental materials.
FEATURE C: Terrace
ADJACENT TERRAIN: Unasouched basalt bedrock outcrop. Area east and southeast of the site have been bulldozed level for construction of power station in SW.
VEGETATION: Algae and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 4.20 m (10 degrees-190 degrees) by 1.10 m by 0.60 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Basalt cobbles and small boulders stacked one to two courses high. Largest rocks, c. 0.65 m length/diameter. Most are c. 0.45 m. The level area formed by the terrace extends c. 1.40 m east, where it meets Feature B. The ends of the terrace are flat with the area of Feature B, making an enclosed area. From east side of Feature C to eastern edge of Feature B measures c. 2.00 m. Small scatter of marine shell below (west) of rearing wall. A gravel pit located in the area between B and C. This rock at c. 0.10 m. Immediately west of Feature C there is scrape of spots c. 0.10 m, though most of this area is also very stony. Test Unit #7 was placed on side of gravel pit, which revealcd ornamental materials on both sides of the wall.
FEATURE D: Modified outcrop
ADJACENT TERRAIN: Unasouched basalt bedrock outcrop. Area east and southeast of the site have been bulldozed level for construction of power station. SW.
VEGETATION: Algae and grass.
FUNCTION: Agricultural
DIMENSIONS: 0.90 m (10 degrees-170 degrees) by 0.70 m by 0.60 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Basalt cobbles piled three courses high. A gravel pit, c. 0.5 m length/diameter. Feature line on a bedrock outcrop along a west facing slope. This feature is located northeast of power station. No portable remains or cultural deposits were observed on the surface of this feature.
STATE NO.: 19397
FISH TEMP. NO.: 01245-257
SITE TYPE: Complex (2 Features)
TOPOGRAPHY: Unasouched basalt bedrock outcrop. Area southeast of the site have been bulldozed level for construction of power station.
VEGETATION: Grass.
CONDITION: Fair
INTEGRITY: Unknown
PROBABLE AGE: Probable
FUNCTIONAL INTERPRETATION: Possible agriculture.
DESCRIPTION: This site complex consists of one alignment (Feature A) and one modified outcrop (Feature B). The overall site dimensions are c. 4.50 m (north-south) by 1.60 m (east-west).

FEATURE A: Alignment
ADJACENT TERRAIN: Undulating hills, ridges, and ravines.
VEGETATION: Grass.
FUNCTION: Possible agriculture
DIMENSIONS: 2.10 m (214 degrees-146 degrees) by 1.90 m (216 degrees-56 degrees)
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: This alignment was constructed with one course of unfinished boulders and cobble (c. 0.15-0.50 m long/height/diameter) which forms an edge separating an area (to the east) that appears clean of moza and an area (to the west) that has been eroded on surface. Feature A is located on top of hill within southwest corner of eastw (upland of high) parcel. Feature B is immediately to the west. No portable remains or cultural deposits were observed on the surface of this feature.

FEATURE B: Modified outcrop
ADJACENT TERRAIN: Undulating hills, ridges, and ravines.
VEGETATION: Grass.
FUNCTION: Possible agriculture
DIMENSIONS: 5.60 m (north-south) by 0.58 m (east-west) by 0.64 m
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: This large boulder was placed up out of what appears to have been a boulder that split. Cobble and small boulders are associated between Feature A and B. This modified outcrop is west of the alignment and a concentration of cobble and small boulders is located between the two. This appears to have been constructed by clearing the hilltop of stone to the north and east. It may have been done by building, but it is really too small to be building, but it is really too small to be building. It was merely constructed manually. Feature B is located on top of a hill within southwest corner of the eastern (upland of high) parcel. Feature A is immediately to the east.

STATE NO.: 19378
PRES TEMP. NO.: 1247-268
SITE TYPE: Complex (3 Features)
TOPOGRAPHY: Undulating hills, surface covered with boulders, rocks, cobbles, and cobble.
VEGETATION: Grass and grus.
CONDITION: Good
INTEGRITY: Excellent
PROBABLE AGE: Probable
FUNCTIONAL INTERPRETATION: Temporary habitation.
DESCRIPTION: This site complex consists of two C-shapes (Features A and B). The overall site dimensions are c. 3.00 m in length.

FEATURE A: C-shape
ADJACENT TERRAIN: Undulating hills, vegetated lowland. Associated with power plant. Small boulder outcrop at west end of site.
VEGETATION: Grass and grus.
FUNCTION: Temporary habitation
DIMENSIONS: 6.50 m (335 degrees) by 0.58 m by 0.38 m
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: Subangular boulder rock arranged in "C" shape with south extending westward. Rock is stacked two to three courses high with some slumping in northern half (probably due to over disturbance). No midden areas visible within or without feature confines. Feature A is associated with Feature B, which is c. 1.60 m at 199 degrees south (accessory property force). Area in front and behind of feature is relatively flat, feature is built up on small boulder outcrop. The opening of the "C" shape is facing at 900 degrees east.

This feature is located southwest portion of project c. 0.25 miles inland from highway c. 200.00 m west of power plant on west side of paved utility road and along a fence line. No portable remains were observed on the surface of this feature. Soil within the C-shape very silt, at least c. 0.15-0.11 m thick before hitting any rock. Behind the C-shape gravelly silt, c. 0.63-0.64 m before rock.

FEATURE B: C-shape
ADJACENT TERRAIN: Undulating hills. Surface has basalt rocks, cobbles, and cobble.
VEGETATION: Grass and grus.
FUNCTION: Temporary habitation
DIMENSIONS: 3.00 m (278 degrees) by 5.00 m by 0.60 m
CONDITION: Fair
INTEGRITY: Unknown
DESCRIPTION: Subangular boulder rock arranged in "C" shape with south extending eastward. Rock is stacked two to three courses high, C-shaped enclosure with wall extending c. 0.00 m north. At the end of the wall is c. 1.50 m open space, then c. 2.50 m wide (greater at right angle to wall) enclosed in C-shape. C-shape opening west. About 0.00 m to front of opening is concentration of basalt rocks. Area in front of C-shape opening lightly disturbed by mechanical means. Feature is just c. 5.00 m from highway out, the southwest parcel of project area, inland side of highway, c. 100.00 m east of highway, power transformer c. 150.00 m north-south of site. Portable remains were limited to mortars.

STATE NO.: 19379
SITE TYPE: Calix
TOPOGRAPHY: On top of hill among undulating hills. Basalt rocks, cobbles, and cobble on surface.
VEGETATION: Grass and grus.
CONDITION: Good
INTEGRITY: Excellent
PROBABLE AGE: Probable
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 8.00 m by 0.58 m by 0.10 m
DESCRIPTION: Stacked subangular boulder rocks on top of outcrop. Calix is about four courses high. Rock area c. 0.30 m in size. On west rim twice as high. This site is located on the southwest parcel of project area, inland side of highway, c. 100.00 m east of highway, c. 120.00 m north of power transformer.
VEGETATION: Dense and grassy.
FUNCTION: Possible military
DIMENSIONS: 2.20 m (Max-width) by 1.50 m by 0.75 m
CONDITION: Fair
INTEGRITY: Unchanged
DESCRIPTION: Feature A, a modified outcrop, was constructed with horizontal planks and a stone pedestal. It is circular with a diameter of 4.5 m. The stones are laid in a circular pattern around the pedestal, forming a semi-circular depression. The depression is filled with earth and some vegetation. The pedestal is made of large stones, and the base is covered with small stones. The feature is located on the north side of the hill at a distance of 0.5 km from the road.
DESCRIPTION: Stacked basalt rock six courses high at center, tapering to two courses on ends. Stacked from ground surface up. Some loose rock in front of uppermost course, but does not appear to be caused from slipping. Oriented at 290 degrees. Feature is very loosely constructed. Approximately 1/8 mile from main highway in southwest project area, c. 60.00 m north from main gully in rear. Specimen broken before collection.

STATE NO.: 11947
PHI TEMP.: NO.: 1140-279
SITE TYPE: Wall
TOPOGRAPHY: Undulating hills, small basalt outcroppings, scattered basalt rock.
VEGETATION: Slow and grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Holocene
FUNCTIONAL INTERPRETATION: Basalt wall
DIMENSIONS: 2.30 m by 0.80 m by 0.85 m
DESCRIPTION: Basalt basalt rock stacked loosely on basalt outcropping. Wall oriented at 310 degrees and located on upper edge of downhill slope of undulating hill overlooking coast. No visible cleared area in front or back such as basalt cobbles and gravel. This site is located on the edge of a hill. S. 25.00 m inland, above the main highway, c. 250.00 m north of power plant across road entrance from main highway. One small Jury rock e. 3.00 m east of wall (not collected). No other visible remains. One small broken wall (Winchester 2.30 g) with feature (not collected). This site is slightly e. 0.05 m thick before appearance of larger rock. No cultural remains noted.

STATE NO.: 11938
PHI TEMP.: NO.: 1140-280
SITE TYPE: Complex of 2 Features
TOPOGRAPHY: Rolling pahas in bedrock outcrops with small pachpsh.
VEGETATION: Slow and grass.
CONDITION: Poor
INTEGRITY: Unaltered
PROBABLE AGE: Holocene
FUNCTIONAL INTERPRETATION: Possible agriculture
DIMENSIONS: 3.20 m by 2.07 m
DESCRIPTION: This site consists of two modified outcrops (Features A and B) and one terrace (Feature B).
FEATURE A: Modified outcrop
ADJACENT TO SBWWH: At the south side of a small gully directly near the first gully at the southwest end of project. VEGETATION: Slow and grass.
FUNCTION: Basalt agriculture
DIMENSIONS: 1.90 m (288 degrees) by 0.40 m by 1.18 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Stacked basalt rock is protruding from the south side of the gully, and small basalt rounded stones are scattered on top of the basalt rock. There are five stones placed and they are c. 0.15 m in diameter. This feature is c. 3.15 m by 160 degrees-6 degrees. This feature is a small gully. No cultural remains were observed on the surface of this feature. Trowel turned and no cultural deposit found; not much soil visible.

STATE NO.: 11935
PHI TEMP.: NO.: 1140-277
SITE TYPE: Modified outcrop
TOPOGRAPHY: At the base of a NNE sloping hill.
VEGETATION: Slow and grass.
CONDITION: Fair-good
INTEGRITY: Unaltered
PROBABLE AGE: Holocene
FUNCTIONAL INTERPRETATION: Possible agriculture
DIMENSIONS: 3.20 m by 2.27 m
DESCRIPTION: This site consists of two basalt outcrops (Features A and B) and one terrace (Feature B).
FEATURE B: Modified outcrop
ADJACENT TO SBWWH: At the south side of a small gully directly near the first gully at the southwest end of project. VEGETATION: Slow and grass.
FUNCTION: Basalt agriculture
DIMENSIONS: 1.90 m (288 degrees) by 0.40 m by 1.18 m
CONDITION: Poor
INTEGRITY: Unaltered
DESCRIPTION: Basalt rock is protruding from the south side of the small gully, and small basalt rounded stones are scattered on top of the basalt rock. There are 15 stones placed and they are c. 0.15 m in diameter. This feature is c. 3.15 m by 160 degrees-6 degrees. This feature is a small gully. No cultural remains were observed on the surface of this feature. Trowel turned and no cultural deposit found; not much soil visible.
FEATURE B: Terrace
ADJACENT TERRAIN: Rooling paloche rock outcrop on a west facing slope.
VEGETATION: Elbow and grass.
FUNCTION: Possible agriculture.
DIMENSIONS: 2.20 m (614 degrees - 285 degrees) by 0.65 m by 0.40 m
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: Palaeoobike cobbles loosely stacked one to two courses high. This feature is located 1.1 m (538 degrees) north of the highway. Feature B is 5.30 m at 190 degrees downhill. No portable remains or cultural deposits were observed on the surface of this feature.

STATE NO.: 19389
SITE TYPE: Terrace
TOPOGRAPHY: Undulating paloche bedrock outcrop.
VEGETATION: Elbow and grass.
CONDITION: Poor
INTEGRITY: Unaffected
PROBABLE AGE: Prehistoric
FUNCTION: Interpretation: Undetermined
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.

FEATURE C: Modified outcrop
ADJACENT TERRAIN: Rolling paloche rock outcrop on a west facing slope.
VEGETATION: Elbow and grass.
FUNCTION: Possible agriculture.
DIMENSIONS: 0.70 m (282 degrees - 102 degrees) by 0.40 m by 0.50 m
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: Seven to eight large, flat, sandstone slabs form a bedrock outcrop. They are 0.30 m in thickness and 0.65 m in length. The feature is located 0.70 m (614 degrees) north of the highway. Feature C is 5.30 m at 190 degrees downhill. No portable remains or cultural deposits were observed on the surface of this feature.

STATE NO.: 19389
SITE TYPE: Terrace
TOPOGRAPHY: Undulating paloche bedrock outcrop.
VEGETATION: Elbow and grass.
CONDITION: Poor
INTEGRITY: Unaffected
PROBABLE AGE: Prehistoric
FUNCTION: Interpretation: Undetermined
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.

FEATURE D: Wall
ADJACENT TERRAIN: This feature is on top of a hill. Undulating paloche area.
VEGETATION: Elbow and grass.
FUNCTION: Temporary habitation
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.

STATE NO.: 19389
SITE TYPE: Terrace
TOPOGRAPHY: Undulating paloche bedrock outcrop.
VEGETATION: Elbow and grass.
CONDITION: Poor
INTEGRITY: Unaffected
PROBABLE AGE: Prehistoric
FUNCTION: Interpretation: Undetermined
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.

STATE NO.: 19389
SITE TYPE: Terrace
TOPOGRAPHY: Undulating paloche bedrock outcrop.
VEGETATION: Elbow and grass.
CONDITION: Poor
INTEGRITY: Unaffected
PROBABLE AGE: Prehistoric
FUNCTION: Interpretation: Undetermined
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.

STATE NO.: 19389
SITE TYPE: Terrace
TOPOGRAPHY: Undulating paloche bedrock outcrop.
VEGETATION: Elbow and grass.
CONDITION: Poor
INTEGRITY: Unaffected
PROBABLE AGE: Prehistoric
FUNCTION: Interpretation: Undetermined
DIMENSIONS: 4.50 m (285 degrees) by 1.25 m by 0.30 m
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Poor
INTEGRITY: Unaffected
DESCRIPTION: This feature consists of two courses of earth wall. It is 0.30 m wide and 0.65 m high. It is not a true wall, but a low mound. The mound is 1.25 m wide and 0.30 m high.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
DIMENSIONS: 1.40 m by 0.80 m
FUNCTIONAL INTERPRETATION: Hunting blind
DESCRIPTION: Stacked basalt rock (some fairly large at bottom) on basalt outcropping. Small rocks crownning wall with several larger rocks on ground in front (north of feature). Oriented at 210 degrees. Ground surface within confines of feature relatively clear (overgrown with grass). This area is raised somewhat higher than outside ground surface. This site is located c. 3.0 m west of fence line, c. 70.0 m east of main highway. The southwest project area is c. 100.0 m south of large gully, and on north side of small karst. No portable remains were noted on the surface of this site. A small amount of gravel/silt (c. 0.05-0.10 m thick) in spits on bedrock (both flake and oval). DBI NO.: 19393
PIRIT TEMP NO.: 1245-285
SITE TYPE: Wall
TOPOGRAPHY: Unbundling slope to the west with many small bedrock outcrops.
VEGETATION: Kwame and grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting blind
DIMENSIONS: 1.00 m (370 degrees) by 0.82 m
DESCRIPTION: Stacked basalt rock slightly masked on bedrock outcrop. Cobble average c. 0.30 m in diameter, with smaller cobble masked on larger cobble. This site is located c. 50.0 m east of high veg. c. 100.0 m south, south of large gully in southeast portion of muck creek, and c. 49.0 m southeast of Sites 1243+285. No portable remains or cultural deposits were noted on the surface of this site.
DBI NO.: 19394
PIRIT TEMP NO.: 1245-286
SITE TYPE: Wall
TOPOGRAPHY: Unbundling hills.
VEGETATION: Kwame and grass.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Hunting blind
DIMENSIONS: 2.00 m (360 degrees) by 0.80 m
DESCRIPTION: Stacked angular/subangular basalt rocks. Three to five courses high, one to two courses thick. Placed on bedrock outcrop. Outcrop is on edge of still overhanging gully. It is located on south side of gully, c. 50.0 m east of highway. Portable remains include sharpening stone (bone hand axe/earldy), "Phineas" points (10 gage).
DBI NO.: 19395
PIRIT TEMP NO.: 1245-287
SITE TYPE: Complex (14 Features)
TOPOGRAPHY: Unbundling a bedrock outcrop on a west-facing slope.
VEGETATION: Kwame and grass.
CONDITION: Fair
The feature is located c. 0.25 m east of the highway. No portable remains or cultural deposits were detected on the surface of the feature.

**FEATURE A: Middle midden**

**ADJACENT TERRAIN:** Quill is c. 15.00 m S of feature and a large hill is S of that. Slopes down to the W. On top of a hill.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Temporarily inhabited

**DIMENSIONS:** 4.00 m (300 degrees 90 degrees) by 3.00 m

**CONDITION:** Good

**INTEGRITY:** Unaltered

**DESCRIPTION:** A mud midden shell occurred in c. 4.00 m by 3.50 m area. One waterway boulder was also found. The feature is located in the same area as Feature A and c. 2.20 m west of Feature B. Boulders were found but not collected. Trowel tested and nothing found in the subsoil.

**FEATURE B:** Cairn

**ADJACENT TERRAIN:** Rolling outcrop of pholcchor bedrock.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 0.65 m by 0.60 m by 0.51 m

**CONDITION:** Good

**INTEGRITY:** Unaltered

**DESCRIPTION:** Pholcchor bedrock exposed one to three courses high. Cobble is c. 0.30 m long/4cm. Approximately eight small stones round the feature, in addition to Feature E. This feature is c. 0.25 m east (south) of the highway. Feature A is c. 4.00 m at 150 degrees. No portable remains or cultural deposits were observed on the surface of this feature.

**FEATURE C:** Cairn

**ADJACENT TERRAIN:** Rolling pholchchor bedrock outcrop.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 0.49 m by 0.54 m by 0.18 m

**CONDITION:** Good

**INTEGRITY:** Unaltered

**DESCRIPTION:** Pholchchor bedrock exposed one to three courses high. Cobble is c. 0.50 m long/4cm. This feature is c. 0.25 m east (south) of the highway. Feature B is c. 4.60 m at 150 degrees. Eight or less small stones are nearby. No portable remains were detected on the surface of this feature.

**FEATURE D:** Boulders (1)

**ADJACENT TERRAIN:** Undulating pholchchor outcrop on a west facing slope.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 15.20 m (east-west) by 4.50 m (north-south)

**CONDITION:** Poor Fair

**INTEGRITY:** Unaltered

**DESCRIPTION:** Pholchchor bedrock exposed one to three courses high. Cobble is up to c. 0.40 m diameter. Cobble is found in c. 0.25 m east of the highway. No portable remains were detected on the surface of this feature. Trowel tested areas of soil near rock in c. 0.25 m.

**STATE NO.:** 19326

**SITE TYPE:** Deposition

**TOPOGRAPHY:** Undulating pholchchor outcrop on a west facing slope.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 2.20 m by 2.20 m

**DESCRIPTION:** A ditch depression near the top of the southwest side of a hill. A ring of hard soil and rock soaks the ditched part of the feature. There is no grass growing in it. The ditch of the depression is c. 0.30 m below the present undisturbed soil surface. The downwind side of the feature is c. 0.90 m above the feature. This site is located c. 0.50 mile east of the highway. There were two ragged crows of midden, the largest c. 4.00 m by 4.80 m near the center on one side, and an eighth size on the other side. The smaller crows is c. 2.50 m by 1.50 m and is also located on one side.

**STATE NO.:** 19327

**SITE TYPE:** Complex (1 Feature)

**TOPOGRAPHY:** Located on southern edge of ditch (which contains B-W) with adjacent undulating hills and uneven.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 110.00 m (east-west) by 40.00 m (north-south)

**FEATURE A:** Boulders overhanding

**ADJACENT TERRAIN:** Undulating hills, ridges, and uneven.

**VEGETATION:** Grass.

**FUNCTION:** Military

**DIMENSIONS:** 2.70 m (north-south) by 2.10 m (east-west) by 0.61 m

**CONDITION:** Good

**INTEGRITY:** Unaltered

**DESCRIPTION:** Feature A was a low area, cut into the surface (i.e. not level or consistently deep) concentration of rectangular pholchchor bedrock and low boulders. Two to two courses high. Similar in construction to Feature B. This feature is c. 0.10 m thick. No portable remains were detected on the surface of this feature. Trowel tested areas of soil near rock in c. 0.10 m.

**FEATURE B:** Modified outcrop

**ADJACENT TERRAIN:** Undulating hills, ridges, and uneven.

**VEGETATION:** Limestone and grass.

**FUNCTION:** Military

**DIMENSIONS:** 2.30 m (north-south) by 2.50 m (east-west) by 0.41 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Feature B is a structure. It is a low, fairly level concentration of subangular subrounded cobbles and boulders piled to a two courses high around small bedrock outcrop on edge overlooking surrounding terrain. This feature is similar to Feature C in construction and type. This feature is located at northern edge of the south half of unit (upland) parcel on ridge, to west, highway and ocean to west. Located c. 31.0 m by 0.5 m at 210 degrees from Feature C. Feature A is c. 31.70 m at 210 degrees (center to center).
FEATURE C: Modified outcrop
ADJACENT TERRAIN: Undulating hills and beach outcroppings.
VEGETATION: Kneur and grass.
FUNCTION: Military
DIMENSIONS: 3.20 m by 0.50 m by 0.50 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Large, stratified beach rock on beach outcrop, positioned on edge of top of hill facing coast. Some sloping to downhill (downhill) side. This feature is located on the northern part of the project area, close to entrance to N. No parallel remains were noted on the surface of this feature.
FEATURE D: Modified outcrop
ADJACENT TERRAIN: Undulating hills.
VEGETATION: Kneur and grass.
FUNCTION: Military
DIMENSIONS: 3.20 m (010 degrees) by 2.50 m by 0.80 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Modified outcrop situated on southeastern edge of hilltop. Contains gullies on slope to north. Looming outcrop is sandstone. This feature is located on the south half of eastern parcel. Feature E is c. 30.0 m at 90 degrees. Feature C is c. 19.00 m at 210 degrees.
FEATURE E: Enclosure
ADJACENT TERRAIN: Located on low ridge extending parallel on path.
VEGETATION: Kneur and grass.
FUNCTION: Military
DIMENSIONS: 3.20 m (34 degrees 304 degrees) by 3.10 m (314 degrees - 114 degrees) by 0.48 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: This small, low, circular enclosure was constructed with subangular cobbles and boulders (largest size to c. 0.15 - 0.55 m in diameter/length) piled and stacked one to four courses high. Because of the slope of the hill, the north end and most of the south side is a retaining wall, not a standing wall. There appears to be an entrance (c. 1.00 m wide) on the western edge, and the walls are not high on the eastern edge, possibly forming another entrance (c. 0.40 m wide). The retaining wall is stacked on a ledge. This feature is located at the northern edge of the southern half of parcel east (upland) of the highway. Feature F is 210 degrees east. 12.00 m from SW opening. Feature G is c. 17.00 m at 120 degrees from eastern edge. No parallel remains include small cobbles (possibly M-1). Small test revealed no cultural deposits.
FEATURE F: Wall
ADJACENT TERRAIN: Edge of gully (south side). Hills rise to N and S. Gully declines to W as does general slope.
VEGETATION: Mixed species.
FUNCTION: Military
DIMENSIONS: 10.00 m by 8.00 m by 0.50 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Small, stratified beach rock on beach outcrop, which forms southeast side of gully. Stacking is one to two courses high and one course wide. Average size of rocks is c. 0.35 m. Feature F is actually two walls, forming an obtuse angle. The stacked rock portions of the wall are intermittent, but rest made up of beach outcrop. This wall may also be a modified outcrop, as the rocks fill in a natural wall of bedrock. This feature is located on the south half of the eastern parcel, at north side of gully which divides north half and west half of eastern parcel. No parallel remains or cultural deposits were observed on the surface of this feature.
FEATURE G: Road bed
ADJACENT TERRAIN: Undulating hills.
VEGETATION: Kneur and grass.
FUNCTION: Military
DIMENSIONS: 5.50 m by 0.50 m by 0.10 m
CONDITION: Fair
INTEGRITY: Unaltered
DESCRIPTION: Grooved and hilly, cobble road fill c. 1.20 m deep (judging from fill wall to gully slope). Surface is bucking and cracking. Some natural sloping from gully edges. Paved area for vehicle crossing. This feature is located on the southern project area in small gully toward eastern end of the project and c. 17.00 m from Feature E at 216 degrees. No parallel remains or cultural deposits were observed on the surface of this feature.
STATE NO.: 1939
SITE TYPE: Complex (4 Features)
TOPOGRAPHY: Located on top of hill overlooking undulating hills and reviews.
VEGETATION: Grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Multiple
DESCRIPTION: This site complex consists of one wall (Feature A), one modified outcrop (Features C), one trench (Feature E), and a parallel wall (Feature D). The overall site directions are c. 20.00 m (31 degrees) by 20.00 m.
FEATURE A: Wall
ADJACENT TERRAIN: Undulating hills; general slope descends to the sea (west).
VEGETATION: Kneur and grass.
FUNCTION: Military
DIMENSIONS: 3.20 m (30 degrees) by 1.00 m by 0.50 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Overwash extended stacked basalt rocks forming wall. East half of wall is overwash, west half wall consists of stacked basalt rocks (stone-encrusted with) about 0.40 m in size. Wall is on south side of hilltop and overlooks lower terrain below. About 1.00 m to the south of this concentration of military debris. North wall is two miliary electronic components of unknown type or function. This feature is located on the south half of the eastern parcel. Portable remains include military debris (food containers, bootees, casse, granite fine cans, ordnance containers, grenade, band-anaival type). M-4D2A.
FEATURE C: Modified outcrop
ADJACENT TERRAIN: Unaltered hill; general slope decreases to the sea (Vo).
VEGETATION: Kauai and grass.
FUNCTION: Military
DIMENSIONS: 1.87 m (200 degrees) by 1.10 m by 1.10 m
CONDITION: Good
INTEGRITY: Unaltered
DESCRIPTION: Freestanding outcrop on top of hill. Rocks stacked on south side. Sections of outcrop have been cut off and lie about 0.40 m, possibly as target. Small area on outcrop stripped, no vegetation. This feature is located on the south half of eastern parcel. Military debris (glass jar, grenade, fine case containers, and casse) were noted on the surface of this feature.
FEATURE D: Terrace
ADJACENT TERRAIN: Unaltered hill; basalt outcrop; basalt rock (fairly dense) scatterer.
VEGETATION: Kauai and grass.
FUNCTION: Apiculture
DIMENSIONS: 3.75 m (north-south) by 2.00 m by 0.30 m
CONDITION: Poor
INTEGRITY: Labidosemous
DESCRIPTION: Semi- intact basalt rock wall aligned two courses high, abutting gentle downhill slope. Most of wall discolored and scoured; impossible to extract whether discone is result of mechanical (alimentary) or natural cause. Area behind contains wide scatterings of basalt rock. Free of feature are relatively clear. Trench was dug (nearly). In 0.02-0.07 m on bedrock. This feature is located on the southern half of the easternmost project boundary.
FEATURE E: Parallel walls
ADJACENT TERRAIN: Basalt outcrop.
VEGETATION: Kauai and grass.
FUNCTION: Military
DIMENSIONS: Good
INTEGRITY: Unaltered
DESCRIPTION: Subgrade basalt rock and cobble- stacked parallel walls. Uplifted wall has southern and eastern parts at 0.35 m. Walls are c. 1.60-1.80 m apart and run diagonally at 349 degrees. The slightly slanted downhill wall shows no evidence of slumping. Trench was dug excavated to 0.60-0.65 m in depth in bedrock. This feature is located on the south side of the eastern half of the easternmost project boundary.
STATE NO.: 19399
SITE TYPE: Terrace
TOPOGRAPHY: Unaltered bedrock outcrop. Site sits on the slope of a dry creek bed.
VEGETATION: Kauai and grass.
CONDITION: Poor fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Abandoned settlement
DIMENSIONS: 11.60 m by 2.20 m
DESCRIPTION: Basaltic cobblestones stacked one to four courses high with long axis oriented 111 degrees-117 degrees, at an angle of 25 degrees. Terrace is divided into three segments which are c. 5.00 m, 1.50 m, and c. 3.30 m in length. East-west orientation. The lowest in horizontal scale. Site is 0.85 m high. The feature is located on the southeastern end of the project area, c. 150.00 m east of line. No portable remains were detected on the surface of this terrace. A trench was revealed c. 0.15 m in depth. Soil is very rocky.
STATE NO.: 19401
SITE TYPE: Terrace
TOPOGRAPHY: Unaltered bedrock outcrop. Site sits on the slope of a dry creek bed.
VEGETATION: Kauai and grass.
CONDITION: Poor fair
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Abandoned settlement
DIMENSIONS: 8.00 m by 0.30 m
DESCRIPTION: Basaltic cobblestones stacked one to four courses high. Long axis is at 139 degrees-117 degrees. Rectangular shaped. South wall is in almost vertical column. East wall is slightly better defined. North and west walls have been affected by erosion. Walls are c. 0.60-0.90 m thick. They consist of cobble/rocks making up an ensemble, with a thin layer of soil and 0.25-0.35 m in height. Sites were visited at site. This site is
loacted on the southwest quad, c. 200.0 m east of the ocean. Metal basket hoop, and a metal strip with four were noted associated with this site. Soil is deeper than a normal height length (more than 0.35 m).  

**STATE NO.** 21025  
**SITE TYPE:** Wall  
**TOPOGRAPHY:** Coastal slope (moderate), slight undulation, relatively flat area south of wall.  
**VEGETATION:** Alive and grass.  
**CONDITION:** Good  
**INTEGRITY:** Unaltered  
**PROBABLE AGE:** Historic  
**FUNCTIONAL INTERPRETATION:** Temporary habitation  
**DIMENSIONS:** 12.55 m by 4.60 m by 0.95 m  
**DESCRIPTION:** Stack of halei rock forming a wall (two sections) alignment. Rocks are very large overall, with smaller cobbles stacking horizontally. Large amount of coral are incorporated in construction (some coral rocks are pile-up). Some limestone/ash cobbles are also incorporated in construction. Wall extends east-west at 974 degrees, and c. 3.00 m gap separate the two sections of the wall. Soil deposits range from 0.01 to 0.30 m. No modern evidence of burial or any traces of truncation are notable apparent. This site is located on the southwestern project area c. 60.00 m north of boat ramp and behind c. 10.00 m.  

**STATE NO.** 21023  
**SITE TYPE:** Enclosure  
**TOPOGRAPHY:** Undulating palaeoohae outcrop. Site is in a gully with a dry stream bed.  
**VEGETATION:** Alive, dense live grass ground cover with very small leaves.  
**CONDITION:** Fair-good  
**INTEGRITY:** Unaltered  
**PROBABLE AGE:** Historic  
**FUNCTIONAL INTERPRETATION:** Temporary habitation  
**DIMENSIONS:** 13.00 m by 6.50 m  
**DESCRIPTION:** Flat palaeoohae boulders stacked one to two courses high with gravel, coral and cobbles fill in north half of feature. The boulders are roughly rectangular. North side is boxed out slightly. Long axis is at 305 degrees 20 degrees, facing north is c. 0.30-0.55 m in height/length. Highest point is on inner side of the wall (c. 1.34 m). North wall is level with outer ground surface. South end is open. Interior is level, with cobble fill over most of area. 

A couple of concentrations of coral fragments are near center of interior. This site is located on the southwest quad, c. 20.00 m from shore, and c. 100.00 m north of small concrete dock. 

Several modern beer bottles were observed on the southern end of the site. Trawl polishes are at 50 m north end and is unobstructed (not more than 0.13 m deep).  

**STATE NO.** 21024  
**SITE TYPE:** Circular enclosure  
**TOPOGRAPHY:** Gently undulating hill.  
**VEGETATION:** Alive and grass.  
**CONDITION:** Fair  
**INTEGRITY:** Unaltered  
**PROBABLE AGE:** Indeterminate  
**FUNCTIONAL INTERPRETATION:** Temporary habitation  
**DIMENSIONS:** 6.30 m by 4.50 m  
**DESCRIPTION:** A circular enclosure of moderately piled palaeoohae cobbles and boulders. Some outer sections have been sheared off. Slope is gently circular and average height is c. 0.35 m above ground surface. The outer section does not appear to have damaged the wall. Site sits on a small level flat that sits in a gentle slope going down to the south lower elevation of hills. Redrock outcrop are to the southeast and east. Chambers of flower trees are c. 0.40 m southeast and c. 10.00 m southeast. This site is located directly east of the dump. There is no shell or waterarray cobbles or coral visible near or in the structure.  

**STATE NO.** 21035  
**SITE TYPE:** Alignment  
**TOPOGRAPHY:** Undulating hills, ridges, and ravines. Located on level ridge above shallow ravine.  
**VEGETATION:** Grass.  
**CONDITION:** Fair  
**INTEGRITY:** Indeterminate  
**PROBABLE AGE:** Indeterminate  
**FUNCTIONAL INTERPRETATION:** Undetermined  
**DIMENSIONS:** 35.00 m (northwest-southeast) by 1.50 m  
**DESCRIPTION:** This site might be the remains of a hypothetical alignment or indications of military flying activity area. There is evidence of activity within the surrounding area. The area is characterized by rectangular palaeoohae boulders and cobbles near one corner high in a terrace, undulating pattern. Within several areas there are "path" alignments but spaced close together (c. 1.00 m). The large remains a possible prehistoric structural alignment has been noted because some of the objects appear to be "set" deep below the soil. This site is located east of the dump within the southern section below highway. No possible remains or cultural deposits were noted on the surface of this feature.  

**STATE NO.** 19166  
**SITE TYPE:** Trail  
**TOPOGRAPHY:** Rolling hills near coast.  
**VEGETATION:** Alive.  
**CONDITION:** Poor-good  
**INTEGRITY:** Altered  
**PROBABLE AGE:** Prehistoric  
**FUNCTIONAL INTERPRETATION:** Transportation  
**DIMENSIONS:** 1.00 m by 0.75 m (width)  
**DESCRIPTION:** Rail traveling and routed along most of the length. Sown grass scattered and for a short distance coastal lined. This site is located on the eastern portion of wall's effect. Hidden, olive shells, other military and service structures.  

**STATE NO.** 21047  
**SITE TYPE:** Caves whaling wall  
**TOPOGRAPHY:** Small valley parallel to water. Small hill between site and water.  
**VEGETATION:** Alive and grass.  
**CONDITION:** Good  
**INTEGRITY:** Altered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Marker
DIMENSIONS: 3.00 m (31 inches) by 1.00 m (39 inches) in total.
DESCRIPTION: Large section is stacked five in a row across course high, with three nicely fitted sides of sandstone blocks, 0.15 m by 0.25 m by 0.30 m, and cobble forming a rectangular base with a low (two courses high) back wall extending from the northeast side to the south. The site is located near the northeastern corner (west of North Point) of Waiakea Bay. Coral debris and three waterworn basalt (volcanic) and one pebble were observed on the surface of this site. No cultural deposits were noted.

STATE NO.: 19301
SITE TYPE: Enclosure
TOPOGRAPHY: MNW digging down to Heauana Beach Park.
VEGETATION: Sparse and grass.
CONDITION: Fair
INTEGRITY: Altered
FUNCTIONAL INTERPRETATION: Temporary habitation
DIMENSIONS: 3.00 m by 1.00 m
DESCRIPTION: Pitted mounds of sandstone blocks and one course high varying in size from 0.09 m to 0.22 m. Two walls meeting each other were 0.50 m apart. The short wall has corners at the east and west ends. From those corners, small remnants of wall exist toward the north and south. The north wall has no corners and is very straight. Toward the west end of the wall there is a modern glass bottle. Two walls were probably connected at our time. There is habitation activity throughout the area, a rock probably altered this feature. This site is located c. 300 m from the beach, c. 150 m north of Heauana Beach Park. One recent whole glass bottle was found on the site.

STATE NO.: 19409
SITE TYPE: Terrace
TOPOGRAPHY: Flat area, burned and cleared.
VEGETATION: Sparse and grass.
CONDITION: Normal
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Possible agriculture
DIMENSIONS: 2.50 m (8 feet) by 2.10 m (7 feet)
DESCRIPTION: Consists of two remnant rock alignments on the edge of a raised area. The two alignments are two courses high and measure 0.20 m by 0.30 m in size. The two alignments are almost perpendicular, and do not connect. A few pieces of concrete are in the wall alignments, and may have been a later modification. This site is located on a low flat area (burned) west of Road 10. No portable remains or cultural deposits were observed on the surface of this feature.

STATE NO.: 19140
SITE TYPE: Trail
TOPOGRAPHY: Shoreline, rolling hills.
VEGETATION: Sparse and grass.

CONDITION: Good
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Transportation
DIMENSIONS: DESCRIPTION: Trail with larger rocks removed. Trail is extremely worn down in some places. It is located in the extreme west central portion of outlet. Blown shell, coral, and black stone were observed on the surface of this site.

STATE NO.: 19411
SITE TYPE: Heiau
TOPOGRAPHY: Rolling Valerie mud on west facing slope.
VEGETATION: Sparse and grass.
CONDITION: Excellent
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Recreation
DIMENSIONS: 0.15 m by 0.25 m
DESCRIPTION: Angular pahoehoe cobbles and gravel stacked one to three courses high, and covering a gravel fraction. Roughly square in shape, with the sides at 90 degrees, this rock is located on the seaward side (northwest corner). A fragment of a flint spear point and a few small stones were observed at the site.

STATE NO.: 19412
SITE TYPE: Terraced area
TOPOGRAPHY: Flat area along coastal zone.
VEGETATION: Sparse and grass.
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Above mainline
DIMENSIONS: 2.50 m (94 feet) by 0.63 m
DESCRIPTION: Approximately thirty-eight (38) waterworn basalt cobbles arranged in a single area. The feature occurs in the upper portion of a beach area (see map). The site is located on the beach portion of a beach area (Beach 6), west of Honokaa, and c. 30 m from the beach. Two pieces of waterworn rock were observed on the surface of this feature.

STATE NO.: 19413
SITE TYPE: Trail
TOPOGRAPHY: Rolling Valerie mud on west facing slope.
VEGETATION: Sparse and grass.
CONDITION: Fair
INTEGRITY: Altered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Transportation
DIMENSIONS: 3.00 m by 0.30 m
DESCRIPTION: Trail with larger rocks removed. Trail is extremely worn down in some places. It is located in the extreme west central portion of outlet. Blown shell, coral, and black stone were observed on the surface of this site.
DESCRIPTION: A footpath running roughly northwest-southeast toward the coast. Extends out 0.20-0.30 m from shore. Trail identified by local informant (lived in house by Sweyp B). The ends of the trail are indistinct. Only 0.20-0.30 m section is extant within the center of the peninsula within the golf course addition parcel.

The trail is a cleared path through the grass. There are a few areas where the trail has worn down, but the majority of the trail is defined by the absence of grass and stones. There is no paving or lining evident. Similar trails noted (512, 318) indicate no construction, i.e. paving cylinders.

No portable remains or cultural deposits were detected on the surface of this feature.
**APPENDIX B: Summary of Identified Sites and Features**

<table>
<thead>
<tr>
<th>SIHP Site No.</th>
<th>Formal Site Feature Type</th>
<th>Testable Feature</th>
<th>Functional Interpretation</th>
<th>ACM Value Mode Access.</th>
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<th>C</th>
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* Note: Summary of Main Site Forms (SiHP) numbers. SiHP numbers are five-digit numbers prefixed by 50-16-6. 618315 Ortez/SiHP. See inserts 145 and 146. See Sauro et al. 3 7. Also good map (75th Annual, Honolulu).

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**Cultural Resources Management Value Mode Assessment**

- **Nature:**
  - A = artificial structure
  - B = natural feature
  - C = cultural

- **Degree:**
  - HI = high
  - M = moderate
  - L = low

- **Field Work Tests:**
  - DR = detailed recording
  - IC = surface collection
  - EC = extract evidence

**Number of component features within complex.
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<th>SHEP Site No.</th>
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<th>Tentative Functional Interpretation</th>
<th>CRN Value</th>
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# APPENDIX C: Stratigraphic Descriptions for Excavated Test Units

## SITE 19235,

TU-4, North Face

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<td>1</td>
<td>0-20 cmbs, 10 to 36 cm in thickness; very dark grayish brown (10YR 3/2 dry); firm sandy loam; structureless; bone dry to semi-dry; many roots; cultural.</td>
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TU-30, North Face

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<tbody>
<tr>
<td>1</td>
<td>0-20 cmbs, 8 to 30 cm in thickness; very dark grayish brown (10YR 3/2 dry); fine sandy loam; structureless; bone dry to semi-dry; many roots; cultural.</td>
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## SITE 19236,

TU-3, West Face

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<tbody>
<tr>
<td>1</td>
<td>10-35 cmbs, 33 to 49 cm in thickness; dark yellowish brown (10YR 5/4 dry); compact; structureless; bone very lithic consisence; many roots; non-cultural.</td>
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<td>II</td>
<td>35-48 cmbs, 0-12 cm in thickness; dark yellowish brown (10YR 5/4 dry); structureless; bone, very lithic consistence; many roots; non-cultural.</td>
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## SITE 19237, FEATURE A

TU-5, South Face

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<td>0-10 cmbs, 7 to 8 cm in thickness; very dark grayish brown (10YR 3/2 moist); dark yellowish brown (10YR 4/2 dry); gravelly silts; structureless; bone, very flexible; non-sticky, non-plastic consistency; common, fine, subangular; many fine vesicular pores; orange, wavy boundary; cultural.</td>
</tr>
<tr>
<td>II</td>
<td>5-14 cmbs, 2 to 6 cm in thickness; very dark brown (10YR 2/2 moist); dark yellowish brown (10YR 4/2 dry); gravelly silts; bone, very flexible; non-sticky, non-plastic consistency; few, fine, subangular; many, fine, vesicular pores; non-cultural.</td>
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## SITE 19234, FEATURE A

TU-5, South Face

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<td>0-48 cmbs, 35 to 48 cm in thickness; very dark grayish brown (10YR 3/2 moist); dark yellowish brown (10YR 3/2 dry); gravelly silts; structureless; bone, very flexible; slightly sticky, slightly plastic consistency; common, fine, subangular; many, fine to medium, vesicular pores; cultural.</td>
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</tbody>
</table>

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## FEATURE B

TU-9, North Face

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-10 cmbs, 45 to 50 cm in thickness; dark yellowish brown (10YR 3/4 moist); dark yellowish brown (10YR 3/4 dry); structureless; bone, very flexible, slightly sticky, slightly plastic consistency; many, micro to medium vesicular roots; gray; fine to medium, vesicular pores; cultural.</td>
</tr>
</tbody>
</table>

## FEATURE C

TU-13, South Face

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-32 cmbs, 45 to 49 cm in thickness; very dark brown (10YR 2/2 moist); dark yellowish brown (10YR 3/4 dry); moderate, very fine, crushed structure; soft, very flexible, slightly sticky, non-plastic consistency; many, fine to medium roots; abrupt, wavy boundary; cultural.</td>
</tr>
</tbody>
</table>

## SITE 19395

TU-12, East Face

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-4 cmbs, 1 to 4 cm in thickness; very dark brown (10YR 2/2 moist); dark yellowish brown (10YR 3/4 dry); silts; gravelly; structureless; bone, very flexible, slightly sticky, slightly plastic consistency; many, fine to medium pore; many, wavy boundary; cultural.</td>
</tr>
<tr>
<td>II</td>
<td>1-8 cmbs, 1 to 2 cm in thickness; very dark grayish brown (10YR 3/2 moist); dark yellowish brown (10YR 3/4 dry); silts; gravelly; structureless; bone, very flexible, slightly sticky, slightly plastic consistency; many, fine to medium; many, fine to medium pore; non-cultural.</td>
</tr>
</tbody>
</table>

## FEATURE C

TU-11, East Face

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-11 cmbs, 4 to 6 cm in thickness; brownish dark brown (10YR 4/2 moist and dry); gravelly clay loam; stony, medium, single grain structure; slightly hard, bone, slightly sticky, non-plastic consistency; common, very fine vesicular roots; cultural.</td>
</tr>
<tr>
<td>II</td>
<td>1-13 cmbs, 8 to 17 cm in thickness; very dark brown (10YR 2/2 moist); very dark grayish brown (10YR 3/2 dry); stony, fine, single grain structure; slightly hard, very flexible, slightly sticky, slightly plastic consistency; few, very fine, vesicular roots; abrupt boundary; cultural.</td>
</tr>
<tr>
<td>III</td>
<td>19-33 cmbs, 2 to 3 cm in thickness; very dark gray (10YR 2/2 moist); dark gray (10YR 4/1 dry); silty, very fine, crushed structure; soft, very flexible, non-sticky, non-plastic consistency; very few, vesicular roots; cultural.</td>
</tr>
<tr>
<td>SITE 19315, FEATURE I</td>
<td>TU-14, South Face</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>1 0-34 cmbd, 15 to 28 cm in thickness; very dark grayish brown (10 YR 3/2 moist), dark yellowish brown (10 YR 4/4 dry); gravelly soil; weak, very fine, gravelly structure; soft, very friable, slightly sticky, slightly plastic consistency; few, fine, vesicular roots; very few, very fine, interstitial pores; clear, cultural.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SITE 19314, FEATURE D</th>
<th>TU-23, North Face</th>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0-27 cmbd, 23 to 27 cm in thickness; dark yellowish brown (10 YR 7/4 moist), yellowish brown (10 YR 8/4 dry); silty, weak, very fine, granular structure; soft, very friable, slightly sticky, plastic consistency; many, minute to very fine, vesicular roots; many, very fine, interstitial pores; non-cultural.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FEATURE C</th>
<th>TU-23, North Face</th>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 13-43 cmbd, 16 to 28 cm in thickness; very dark brown (10 YR 2/2 moist), browndark brown (10 YR 4/2 dry); silty, weak, fine, granular structure; soft, very friable, slightly sticky, slightly plastic consistency; many, minute to fine, vesicular roots; common, very fine to fine, interstitial pores; non-cultural.</td>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SITE 19315, FEATURE I</th>
<th>TU-16, North Face</th>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0-40 cmbd, 25 to 40 cm in thickness; very dark brown (10 YR 2/2 moist), browndark brown (10 YR 7/2 dry); cobblely silt, moderate, very fine, granular structure; soft, very friable, non-sticky, non-plastic consistency; few, very fine, vesicular roots; few, fine, interstitial pores; gray, wavy boundary, cultural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 45-52 cmbd, 15 to 52 cm in thickness; very dark brown (10 YR 2/2 moist), browndark brown (10 YR 7/2 dry); silty, weak, very fine, granular structure; loose, slightly sticky, slightly plastic consistency; few, very fine to fine, vesicular roots; common, fine, interstitial pores; cultural.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SITE 19367, FEATURE G
TU-17, West Face
Layer Description
I 0-14 cmth, 8 to 15 cm in thickness; dark yellowish brown (10YR 3/4 moist), dark yellowish brown (10YR 4/4 dry), silty, weak, very fine, granular structure; soft, very friable, slightly sticky, non-plastic consistency; common, micro to fine, vesicular root; common, very fine to fine, interstitial pore; cultural.

SITE 19366, FEATURE G
TU-19, North Face
Layer Description
I 5-10 cmth, 3 to 4 cm in thickness; very pale pebbly pisate cultural
II 9-33 cmth, 22 to 12 cm in thickness; dark brown (2.5YR 3/2 moist), brownish dark brown (2.5YR 4/2 dry), silty clay, weak, very fine, crumb structure; slightly hard, friable, slightly sticky, slightly plastic consistency; common, fine, vesicular root; common, very fine to fine, interstitial pore; non-cultural.

SITE 19376, FEATURE A
TU-2, West Face
Layer Description
I 16-34 cmth, 12 to 17 cm in thickness; dark brown (10YR 3/4 moist), brownish dark brown (10YR 4/3 dry), very fine silty loam; arenaceous; loose, very friable, slightly sticky, non-plastic consistency; cultural.

FEATURE B
TU-2, South Face
Layer Description
I 0-22 cmth, 20 to 36 cm in thickness; very dark grayish brown (2.5YR 3/2 moist), dark yellowish brown (10YR 4/4 dry), very fine, crumb structure; soft, very friable, slightly sticky, slightly plastic consistency; common, micro to fine, vesicular root; many, fine, interstitial pore; cultural.

FEATURE C
TU-79, South Face
Layer Description
I 0-32 cmth, 33-32 cmth; dark yellowish brown (10YR 4/4 dry); silty loam, gravel, structureless; loose, very friable, slightly sticky, very fine plastic consistency; many fine root; cultural.

SITE 19289
TU-64, West Face
Layer Description
I 0-4 cmth, 7 to 14 cm in thickness; very dark grayish brown (2.5YR 3/2 moist), dark yellowish brown (10YR 4/4 dry); gravelly silt, structureless; loose, friable, slightly sticky, slightly plastic consistency; few, very fine root; many, fine, vesicular pore; non-cultural.

TU-68, East Face
Layer Description
I 0-8 cmth, 4 to 8 cm in thickness; very dark grayish brown (2.5YR 3/2 moist), dark grayish brown (10YR 4/4 dry); gravelly silt, structureless; loose, very friable, slightly sticky, slightly plastic; few, fine, tubular root; common, fine to medium, vesicular pore; non-cultural.

SITE 19391, FEATURE B
TU-30, East Face
Layer Description
I 0-19 cmth, 14 to 19 cm in thickness; very dark grayish brown (2.5YR 2/2 moist), dark grayish brown (10YR 4/2 dry); gravelly silt, structureless; loose, very friable, slightly sticky, slightly plastic consistency; common, fine, tubular root; many, very fine to fine, vesicular pore; sparse, very brannabey, non-cultural.
II 19-34 cmth, 4 to 12 cm in thickness; very dark brown (2.5YR 4/2 moist), dark brown (10YR 4/4 dry); structureless, soft, very friable, slightly sticky, slightly plastic consistency; few, very fine, tubular root; many, very fine, vesicular pore; non-cultural.

SITE 19404
TU-55, South Face
Layer Description
I 0-5 cmth, 3 to 5 cm in thickness; dark yellowish brown (10YR 4/4 moist), brownish dark brown (2.5YR 4/2 dry); gravel, clay, silt, strong, medium, disaggregated; very hard, very firm, non-sticky, slightly plastic consistency; very few, redbrown, vesicular root; very steep, smooth boundary, non-cultural.
II 3-10 cmth, 2 to 3 cm in thickness; dark yellowish brown (10YR 4/4 moist), yellowish brown (10YR 5/3 dry); weak, fine, crumb structure; soft, friable, slightly sticky, plastic consistency; very few, micro, vesicular root; non-cultural.
APPENDIX D: Historical Documentary Research
by Kepa Maly, Cultural Resources Specialist

BACKGROUND

This report is meant to provide readers with an overview of settlement patterns and cultural practices in the Hawaiian Islands. The research was conducted by Kepa Maly, a cultural resources specialist. The report is a compilation of information from various sources, including interviews, historical records, and archaeological studies. The information was gathered from the Easter Island, including the history of the island and its inhabitants.

The project area is located in the coastal area of the island, and it is known as the Littoral (or coastal) region. The area is characterized by low-lying terrain, with few elevations and a lack of natural barriers. The climate is tropical, with high temperatures and high humidity throughout the year.

The project area is characterized by a number of cultural features, including a number of ancient fishponds, traditional fishing tools, and traditional settlement patterns. These features provide important insights into the cultural history of the area and the way of life of the ancient inhabitants.

In the project area, there are several fishponds that were used for the cultivation of fish. These fishponds were typically constructed using natural features, such as natural rock formations, and were designed to create a microclimate that was conducive to the growth of fish.

The settlement patterns in the area are also characterized by a number of traditional practices, including the use of traditional fishing tools and techniques. These practices are still used today, and they provide important insights into the cultural history of the area.

Hawaiian Settlement

Current theory places Polynesian settlement voyages between Hawaii and Kauai (the ancestral homelands of the Hawaiian and Polynesian peoples) in the 14th century. This is based on various archaeological and historical evidence, including the presence of shell middens, stone tools, and other artifacts that suggest human activity dating back to this period.

The area around Kauai is known for its rich cultural history, including the presence of ancient sites, such as the Kula sites, which date back to the 13th century. These sites provide important insights into the cultural history of the area and the way of life of the ancient inhabitants.

Hawaiian Land Management Practices

The kula-o-loa (district) is the area where the ancient inhabitants of Kauai lived. The district is characterized by a number of cultural features, including a number of ancient fishponds, traditional fishing tools, and traditional settlement patterns. These features provide important insights into the cultural history of the area and the way of life of the ancient inhabitants.

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The project area is situated in Puʻuköle-Lāhaina, also known as Kāʻahumanu. Kāʻahumanu is the main town on the island of Maui. The region is famed for its rich culture, history, and natural beauty.

The Kāʻahumanu area is divided into smaller parcels. These units, such as the "Kula" or "Kula" units, are important for understanding the land use patterns and economic activities in the area. The Kula units are traditionally managed by the Kula Tribes, who are the primary caretakers of the land.

The Kula Tribes are divided into smaller groups, each with its own traditions and governance structures. These groups are known as the "Kula" units, which were historically used for managing the land resources.

In conclusion, the Kula Tribes play a crucial role in managing the land resources in the Kula area. Their traditional knowledge and cultural practices are essential for preserving the cultural heritage and natural resources of the region.
While Ko-Kibi was competing in a riddling contest with Pi'i-o-te-rerere, master son and riddler champion of the chief Pu-kibi, a Maori war's chief Pu-kibi, raids which described the various terraces of the island and caused devastation, famine, bad fortune, and, to some peri-statics exchanged. Two sides spoke of Kanakaua — "Ko Kibi's son, Kapahele, Kana, Kana-whai-te-rere, the son of his war's chief Pi'i-o-te-rerere. The head was established, the man was born, it was the head of Kanakaua. (1913).

Kanakaua was the husband of Pi'i-o-te-rerere, and he was the person of Ta'ule (a war god). In case of his death, his wife was the mother of Ličanul. Kanakaua's sister was the wind goddess Wakaheka.

Kanakaua was an expert waka (fast rowing war canoe) warrior, and he provided Lālāhilo with a boat and food in which he bought personal war canoe and Kahuheka. Whenever Lālāhilo left his canoe, his wife, Kanakaua, accompanied him. Wherever Lālāhilo was, Kanakaua's canoe was always with him. The canoe was named after Ku Kiaa, the god of the canoe, and Kaaka, the god of the canoe. Lālāhilo's canoe was made of ironwood. Now the canoe is kept in the canoe house. Lālāhilo's canoe is called the canoe of Lālāhilo.

Lālāhilo is named after the canoe of Lālāhilo, who was an expert, a good rower, and a war god. Through his wife Pakuhia, Lālāhilo came to possess the canoe and god's canoe, which he inherited from his father, and he, in turn, passed it on to his son, who then passed it on to his son, and so on. The canoe is named after Lālāhilo, who was a good rower and a war god. Lālāhilo's canoe was made of ironwood, and the canoe was named after Ku Kiaa, the god of the canoe, and Kaaka, the god of the canoe. Lālāhilo's canoe was made of ironwood.

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Wiai (disconnected water) where the rest with natives of that area, and was
introduced to the chieftain NI'ula, mother of the fishermen chief Liltimana.
When NI'ula learned that Pakau greatly revered her, she told Pakau that her
son was the foremost bow's 'Oloho' (octopus fisherman) of the region.
And because Pakau was so beautiful, NI'ula introduced her to Liltimana.
Liltimana saw Pakau, and compared her to the foremost 'He'e' he could
catch.

One day, after Liltimana and Pakau were married, Pakau went to the shore
to gather codfish and seaweed. It was her rule at Wiai, and she was
to go far out upon the reefs where she saw an octopus and spend one
upon the reef. Pakau presented it to He'e so that he could hunt it towards the shore. That he
was so heavy she could hardly carry it, and NI'ula saw Pakau and inquired
what had caused it when. Pakau told NI'ula how she had found the octopus on the
coast so tempting. NI'ula responded that he was a native of the place and had
ever before seen an octopus of that nature in the area (1915).

While Pakau and NI'ula were fishing, Liltimana returned from octopus
fishing and saw Pakau's octopus. Liltimana asked Pakau where she had
found that octopus and if she retained the octopus. Liltimana accused
her of lying, and asked how he could obtain another octopus to be fed on the reef.
Pakau then struck Pakau, thinking that she had never been sooor from
some other man. He smacked her so hard that her skin darkened, and NI'ula
interrupted saying that they should go to the police where the octopus came from.
NI'ula told Liltimana that perhaps what Pakau said was true, and that
they should seek help from the chief (i.e., Pakau). Liltimana then went to investigate why
she was omitted from the spot octopus. He looked and found a small fish with
something red like an 'Ohe' brought inside. He realized that it was a
beautiful local ono, which had been the octopus, and indeed it was the
foremost fisherman of all Hiana.

Liltimana broke the net and took the octopus, and from that time, once he
appeared on the reef. Liltimana took the octopus and cleared the
area from it. He then learned to pack, making the lure, and he kept it
close to him. Liltimana glued the lure in a container and went out to fish.
When he got to the laborious nook fishing site, Liltimana removed
the lure from the container and secured it into his back. In the meantime, he
caught and climbed upon the canoe, and when the lure was unloosed heunu
stayed coming onto the canoe. Liltimana caught 129 he'e in a short
time, and he returned to show his wife and mother the results. PK'ia
suggested that Liltimana take the lure and offer it to his
grandmother, the sea Pilii-a-mo'o.

Liltimana went to Pilii-a-mo'o and showed the lure to her. Pilii-a-mo'o
observed the nature of the lure and notified Liltimana that this was the
mysterious supernatural octopus being of the ocean depths. The being who

was the grandmother of two the mystic of Hiana at Kua'a, Kau'a. Pilii-
ala's were used to say that it was indeed mysterious that the owner of
He'e's attention came to dwell along the shore of NI'ula the chief's
drinking spring, the same when he asked for the octopus from Pakau and
picked up the sea snail, and where the three cannot sail to the winds of Atua,
NI'ula, and He'e's blue. Pilii-a-mo'o commanded the he'e and the he'e
which it unstrung. She also told Liltimana that the first he'e caught most
always brought to her as an offering. Pilii-a-mo'o then told Liltimana that
no one should be allowed to picture the He'e, and that anyone who sought to
see it had to be killed. As the force of the lure spread through the land, people
were curious about it, and many people were killed by Liltimana (1915).

If as in this place, that the narrative returns to Ra-Mahi and his successful
acquiring of the lure.

Because of her perception that something was amiss with the lure (see narrative from 7/21/1913 above), Liltimana returned to his home from the
uplands and found that the he'e had been snatched. Liltimana went empty
and went to Pilii-a-mo'o, and she showed him, thinking he had forgotten to
bring his offering of the first he'e caught he'e. Liltimana called Pilii-a-mo'o
lamenting the loss of the possessed possession of He'e's - man kahua.

E ala e Ho'okalani, E ke ilo e ho'okalani a ka Nalo, Ua kia e maana ke fe'e 'o no kai, Ua ka ho'opua ka 'ala Kia ka ma open e ia, Ua e ho'oto a loa Ka he'e a ki, Ua ho'oto a loa a He'e a ho'ohau a ho'ili, O wa'a nei a Liltimana O ke ho'ohau a Kanakalaka, Ia a Piliane'a Kona kahapu o waiheka olo'o a, olo'o a E ala ma

Aunui a Ho'okalani (Piliane'a, like the strong wind) O kula, Kia mau o laui Niua o malo' o no Pe'e Pe'}
returned to the house of Pili-a-mor. overlooking the shore of Kaua'a (in the shape of a 'Olii). Pili-a-mor told Lāilālimo to release the pig and chicken, and both of them entered the canoe, which Pili-a-mor had prepared as the method by which Lāilālimo would travel to Ka'a-o-Kanakanakabuli (the island of Ka'a), where he would find 'Iwa at Makaha, Kapa'a.

Pili-a-mor's canoe was called Lāilālimo saying, "The gods have approved your offerings, and here in your path (mauna) is sowing the offerings to 'Iwa, the mysterious raccoon of the land which watches the sun, 'Iwa the sacred hand of Hikianalia, the one who created the universe. With the offerings set in the canoe, and the sail raised, Pili-a-mor then prepared, an 'awa ceremony.

The pig was the meat, the 'awa seeds were used as the platform, the canoe set on the navigable sand, and the sail was placed at the stern of the canoe. After Pili-a-mor and Lāilālimo drank 'awa they stepped, and when half the night passed the canoe moved. Pili-a-mor's canoe was gone out of the house where she saw the navigators' star high above. Pili-a-mor then called Lāilālimo, "Arae great shark of the sea, a morning star of Hikianalia's, is hidden beneath Kaulua-i-o-Waikäa. Awaken for the height of the new HIll's maka'a-olufa, the Kukini (shower bearing wind) blow and the travels will reach Kaua'a." Lāilālimo wore, everywhere, to canoe and prepared to journey to Kaua'a (8/10/1917).

At the same time, a canoe journey to Kaua'a, and the return of Lāilālimo and 'Iwa to Kala. The two then began to sail off in search of fish with the net of the land. They went on in search of fish for the fisherman of the chief Pili-a-mor (as the next closest companion), and they caught and returned the 'awa (9/10/1917). At this time when Lāilālimo returned to his land, Pili-a-mor's brother, Pili-a-mor, arrived from Puna and Kūkanakalua and the two with them. Because the island of Kaua'a looked like provisions were being eaten, the canoe was now called Kaua'a, or Kaua'a (9/10/1917).

Additional information about Pili-a-mor has been documented by Hawaiian historian and author J.W.E. Bailey. He was a regular contributor to the Hawaiian newspaper 'Kūlana o halau. On September 12, 1914, Bailey authored an article entitled "Pili-a-mor: 1. Iwi 'Iwa, Kina mea Kūkini liloa" ("Pili-a-mor: the great son of the kanaka, with his Kukini life") in the following story about Pili-a-mor's family, and the transition of the land. On September 2, 1919, Bailey reported in an article entitled "Pili-a-mor: 2. Anahe'uma and Pili-a-mor, Kahakuloa's life story. From his dwelling place at Kahakolu, above Kukui, he was visited by his own son, watching for her needs. When a period of dryness came upon the land, Kahakuloa would send the 'Iwa into the land, reaching up to Pua'aua, and thus food plants were able to grow upon the land.

PILI A-MOR (erroneous translation: Red net seaweed, or common seaweed used for offerings to Kūkini for his fishing) means and red was named to Kaua'a, a site named along the coast of Pili-a-mor.

Kaua'a was named for the mother of Lāilālimo (7/19/1917). When Pili-a-mor arrived at Wāhah, at the desire of her own son, the wishes of that area took her to meet with 'Iwa the mother of the chief, Lāilālimo, who

came to the house of 'Iwa. Pili-a-mor carried Lāilālimo, and then became her wife.

One day, Pili-a-mor was casting short rods for fishing on the reef, and caught a small 'Iwa, and Lāilālimo was surprised and took the 'Iwa and killed it. They went to the place along the reef at Wāhah. They found that a deep red canoe, the one who 'Iwa's home was what was allowed to be the red canoe (7/19/1917): Lāilālimo above. The shore line of HI which where the canoe was hauled out of the water was then described as 'Iwa, or 'Iwa, 'Iwa was hauled out of the canoe by the land. The shore was hauled out of the HI which was Lāilālimo on which they grew, a tree planted along the shore, and the canoe was covered, the canoe which we also described, 7/19/1917.

WAIMEA (discovered water) Waimea (which) flowers when water is formed, a site identified as being along the coast of Pili-a-mor (7/19/1917).

Pili-a-mor described Anahenaenuka and arrived at the community of Kaua'a where he was greeted by the residents of the area. Pili-a-mor was introduced to the chiefess Hula, who upon introduction Pili-a-mor to his son Lāilālimo. Lāilālimo was an oceane fisherman, and because of his skill, he gained the beautiful Pua'aua, Pili-a-mor as his wife (7/19/1917). The compound of Lāilālimo's house was then described as 'Iwa, or the canoe landing (7/19/1917). One day at the reef, Pili-a-mor went to the shore of Wāhah when he gathered some fresh sea gravel, his little daughter became, and wanted 'Iwa into the land along the exposed reef. On this particular day, Pili-a-mor was surprised to see a large canoe placed on the reef. This was the canoe which led to the discovery of 'Iwa (7/19/1917). Pili-a-mor's canoe, which was called Kaua'a, was also described in the same place as the canoe hunting for the coastal area where water is formed into the sea, and where the canoe wades Wāhah, Kaua'a, and Waimea (7/19/1917).

One additional excerpt is included here in a research manuscript practiced in the region, and provides the reader with documentation of the relationship between coastal communities and those in the uplands.

PO'OPO'O (hollow, or a protected area used for agriculture) Po'o po'o was a moku (town and area) who served under the chief Pili-a-mor. Huku'ula. He watched over the Ewa field of Makaha, 'Iwa, Kaua'a, Pili-a-mor, Kauana, and Nalua. This upland region was well populated and in extensive agricultural use. Some issues and changes were important since the region (7/19/1917). Pau po'o and 'Iwa's population was maintained. This area's growth is remembered by the saying...

'Awa i lapa a Po'o po'o - (The) Melched 'awa growth of Po'o po'o (7/19/1917).
Aside from the recently translated text cited above, there are several other legendary or historic period accounts that briefly reference Puuik. An mentioned earlier, there has been confusion regarding the exact name of the Puuik variant. Mt. Puuik is often identified as one small village area, and it is within the reach of Puuik-Liliuokalani. In late 1939, Kamehameha I called many of his people to this region of Kula, to build Puuik toki. During this time, thousands of people were "encamped on the neighboring hillsides" (Fornander 1904:212). In 1939, Kamakau described the Hawaiian wars and Kalihi, and was sent out on guard control of the entire Hawaiian island group.

One account which may have involved the people and resources of Puuik is associated with the construction and dedication of the great l'ake Kawaikini, approximately 3 miles from the boundary of Puuik-Liliuokalani. In late 1939, Kamehameha I called many of his people to this region of Kula, to build Puuik toki. During this time, thousands of people were "encamped on the neighboring hillsides" (Fornander 1904:212). In 1939, Kamakau described the Hawaiian wars and Kalihi, and was sent out on guard control of the entire Hawaiian island group.

In a series of articles authored by Kamakau and printed in the Hawaiian newspaper "Kala'iaka," July 6, 1850, Kamakau's account is published. In "Haleiwa: Chief of Hawaii" (1850), Kamakau notes that Puuik was involved in the construction of additional events at Puuik (between c. 1730-1841) in the time of Kamehameha I. While Kamehameha was busy with the chiefs at Waimea (he was engaged in measuring the land for the Waimea town and the payment of taxes), the people of Puuik continued their work. When Kamehameha returned, the people had gathered again to continue the work. Kamehameha then spoke to the people, saying, "When you get to the town, send the news with people of the place, but do not tell them that Kamehameha helped carry the load on his back."

Between 1806 and 1870, John Pope, another early Hawaiian historian, included a note of Kamehameha's involvement in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In 1870, Pope described the construction of Puuik, noting that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameha was involved in the construction of Puuik. In "Kamehameha's Wars" (1870), Pope noted that Kamehameh
Historic Period References and Land Tenure

Within a year following the death of Kaunahana I (1819), American missionaries arrived in the Hawaiian Islands. By 1821, parish missions were being established throughout the islands. English missionary William Ellis visited Hawai'i between 1821-1823, during which time he and several others traveled around the island of Hawai'i. In his journal (1823), Ellis provided a brief description of the village at Pu'ukohola. Having traveled from the uplands of Polihe:

...in twilight of the evening reached Pu'ukohola, a considerable village, four or five miles to the southwest of Towanala (Kawahae), where he (Thomson) took up his lodging for the night... (Ellis 1823:289).

On July 16 1832, Lorenzo Lyon (Makua La'ian) one of the most feared and beloved missionaries of all those who came to Hawai'i, replaced Reverend Dwight Baldwin as minister at Waimanalo. Lyon’s “Church Field” was centered in Waimanalo, as was the present hospital.

One of Lyon’s journeys was from Lea (southern end) to the village of Pu'ukohola, the present structure was completed March 31, 1839 (Doyle 1945:68). Lyon kept a journal describing his journey and survival throughout the “tikal,” and in 1835 he briefly mentioned his journey from Kawahae to Pu'ukohola:

Rose at four a clock, and walked to Pu'ukohola, five or six miles distant. When it was light I gathered a few flowers. I walked along the stone plains. On one hand was the ocean, on the other a dry, sandy waste—rocks, lava, soil, and sand. I reached Pu'ukohola at an early hour. As I was alone carrying my own calabash, the natives took me for some wandering foreigner, and when I asked them in their own language how they wanted me... I elicited a great deal of curiosity. I then broke fast. That night on a stone and ate a banana. No water could be found but salt water. Around as the people could, we collected together I told them; examined their school, and after which I took a look at their salt works...

About Pu'ukohola Village Lyon said:

...Pu'ukohola village is very small. It has a small church in which some vessels anchor. Cotton grows give it a verdant aspect. No food grows in the place. The people make salt and catch fish. They exchange for vegetables grow elsewhere (Doyle 1945:68).

Another entry from Lyon’s journal, an entry made between the years of 1839-1846, offers the following narrative:

Not infrequently at Waikahue and Pu'ukohola there is no food to be had. The people live without food for days, except a little fish which prevents starvation. One in this case has a fish every day, the ocean being so rough they cannot fish, or a government waiting day in order, when the setting of a canoe in the town. The Owens kitchen is a fine. The waste of its three places is such that I cannot drink it. I would at noon drink a dose of Lyon's salt... On the way to Pu'ukohola, it is hot and still more drearre. After an hour's walk from my house, a human dwelling is to be seen. You reach the shore, which requires a walk of about five hours (Doyle 1945:106-109).

Lyon estimated the population of Kawahae-Pu'ukohola around this time period to be approximately 754 persons (Doyle 1945:122).

Citing other early foreign visitor’s accounts and the recollections of local informants (c. 1930), Handy (1940) and Handy and Handy (1972) provide a description of agriculture, fishing, and life in the South Kohala region. Among the references are the following narratives:

...From Pu'ukohola to Anahahoa at the southern end of Kohala and from Kapaula, at the northern corner of Kohala, there are no streams whatever, and certainly there were no terraces.

South Kohala produced much dry taro in the lower forest zone which formerly extended far down over what is now open pasture... (Handy 1940:110).

The coastal area of Kohala, now called South Kohala, has a number of small bays with sandy shores where fish are still fished, and where they probably cultivated taro in small patches. Anahahoa, Waikohaha, Kahanina, Pu'ukohola, and Pasue all have sandy strips along the coast, and there is an area of black sand near the lagoon where even paddies might be grown in early years. Pu'ukohola is notable fishing village some time there were unbelievably many weaver parrot-fishes... Between Waikohaha and the upland plantation of the village of Waikohaha there were many plantations on the flat lands from the coast to 2,000 feet as indicated by the stone walls and dry terraces on the hillsides... (Doyle 1945).

The author note that dry taro was planted along the lower slopes of the Kohala side of the Kohala Mountains (1972:32). It is likely that the taro-growing areas supplied coastal communities with vegetables, and the coastal communities supplied the uplands with taro and fish and other marine resources.

Missionaries (H. Handy and Handy 1972), a squire with Captain Vancouver in 1793 described his journey to the upland plantations of Waikohaha, and commenced on his encounters along the trail with people taking produce to the coast. He wrote:

...From the number of people I met laden with the produce of their plantations and bringing it down to the water side to market, for the consumption was now great, not only by this, but by the populace of people which was moving through in the vicinity of the bay (H. Handy and Handy 1972:32).

Land Tenure – Transitions In Land Use

Between 1792 and the 1840s, western ways continued to gain influence over the oli's (polo), and land management and use was changing radically. Following the death of Kaunahana I, American missionaries arrived and Hawaiian ways continued to erode away.
Western influence reshaped the Hawaiian society of the time. Hawaiian settlements of the period reflect missionary concepts regarding acceptable living, i.e., the "benevolent" living under the watchful eye of church leaders, close to, but not with, the diversification of villages and towns. After the arrival of the missionaries, churches were built in populated areas easily accessible to natives. The churches became social centers—the village centers. In 1818, a Western-style land ownership system was set in place. Prior to that time, every plot of land was held by the chief on behalf of the people (Chinden 1966:116; Chinden 1966:116). The chief held all land and managed the resources available to himself and his手下. The land's use was controlled by the chief (Chinden 1966:116; Chinden 1966:116), and their representatives or land agents (kamahānī), who were generally lesser chiefs as well.

This radical restructuring of the Hawaiian land management system is called "The Great Ali`i Chunukai (Division of Land)." The Ali`i Chunukai defined the land interests of the king (Kamehameha III), the high-ranking chiefs, and the people, who were organized through different types of land held on behalf of the king or chief (Chinden 1966:116; Chinden 1966:116). More than 250 of the highest-ranking chiefs and kamahānī in the kingdom journeymen Kalākaua III in this division. The first Ali`i Chunukai was signed on June 22, 1846, by Kamehameha III and Prince Jonah Kūhiō Kūhausta, and by his grandnephew Mānoa Kūhausta and it was John Papa 11. The last Ali`i Chunukai was signed by the king and Kealohi, on March 7, 1848 (Chinden 1966:116).

The Ali`i Chunukai did not convey title to any land. The chiefs and kamahānī required to prepare their claims to the Land Commission to receive awards for land they claimed through the Ali`i Chunukai. These were also required to pay taxes to the government to receive their royal patents on their lands. Until an award was issued, title remained with the government. The lands awarded in the top echelons and kamahānī became known as Kamalānā lands. Because there were few settlement plans in Hawaii at the time of the Ali`i Chunukai, the lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This expanded the work of the Land Commission and speeded the transfer of land (Chinden 1966:116).

During this process all land was placed in one of three categories: Crown Lands (the lands owned by the king or chief), Government Lands, and Kamalānā Lands. These were all subject to the rights of the native tenants (Chinden 1966:116; Chinden 1966:116). The Pen Kamehameha lands were the common Hawaiian people who lived on the land and worked it for their subsistence and the welfare of the chief. Questions concerning the nature of these native tenants rights began to arise at the king's court, and in 1849, the Pen Kamehameha lands were divided among the chiefs and the people. On December 21, 1849, the Privy Council attempted to clarify the situation by adopting four resolutions intended to protect the rights of native tenants referred to in the 1849 law (Chinden 1966:116). These resolutions (DH Kawaino 'Ihi Kapu) Kamehameha Hei 1852:112-124 authorized the Land Commission to award the same title to all native tenants who occupied and improved any portion of Crown, Government, or Kamalānā lands. These awards were to be free of commutation except for house lots located in the districts of Kailua, Lahainaluna, and Hilo (Chinden 1966:116). Before receiving their awards from the Land Commission, the native tenants were required to prove that they owned the land for a living. They were not permitted to acquire waste land. Land between two lands which they cultivated "with the earning intention of replacing their lands." Once a claim was confirmed, a survey was required before the Land Commission was authentically to a time. The lands of the native tenants became known as "Kamalānā Lands."
having purchased a parcel of this land was the absolute owner (Kalama and Wong Smith 1892-9). 

Pualo Sugar Plantation

Two Chinese immigrants began planting and processing sugar in 1827 in the upland portions of the Liholiho-Pukukahi, as Ati's, below Waihe'e Village. Though their efforts failed, the efforts were not forgotten (Beamer and Keli'i 1990-91). In 1868 Kaliki Sugar Company was incorporated in Hawaii, under Kohaleh. Through the 1890s, other plantations and milling operations were started, and around 1890, Robert McDade opened the Hilo Mill. In 1895-1896, Kohaleh leased land to the Pukukahi and began processing sugar canes in it. As noted in the report, John H. Murdock, a sugar company provider with a keen interest in the changing Kohale plantation and other sugar business interests, with insightful comments in the changing Kohale environment brought by the diminishing upland forests. Unfortunately, there are few dates accompanying the narrative, and approximate dates can only be estimated.

Mr. W.L. Veazie and his crew came to Hawaii in a year of considerable excitement, with four or five of the first buildings already under construction, which, as such, was described in Pukukahi before the closing trip. This case was given without regret, and he enthusiastically participated there as a large area of real good land as that on which their prominent smelters were to be. To make a long story short, conditions appeared extremely favorable for cane growing. Soil was analyzed, and found to be excellent, and in fact received special attention by Mr. Veazie, the Director of the H.S.P. Experimental Station. A well built sugar factory (Pllr. (text not legible)) was completed in accordance with the requirements of the Hawaii Sugar Planters Exchange, and an exchange for the land was finally agreed to by San Francisco, secured its rights in Waihe'e, in his right to Pukukahi.

A fine day, a fair little wind with all the appurtenances which with a good plantation was realized, on an ideal site, a hundred or so feet from the landing. (Text not legible)

Halden mentions how the first crop was growing exceedingly well when "orchestra and bees" caused considerable loss in the crop. Additionally, the high winds "proved disastrous" (Text not legible). Of the winds, Halden says:

During the first year or two we only had a few scarce varieties, but later, while we might have been minus for a few months, and everything flowering, we would have continued them, and the results would have been favorable. (Text not legible)

The winds so dried out the soils that the rain level was too high to be washed out in time by irrigation. Hawaii continued his description, saying:

We found a good rain fell very readily, and finally to distant hope, after keeping cool, on the Waihe'e system for some eighteen months, put in

Land Use Following the Mahale

After native Hawaiian owners were granted the opportunity to acquire their own parcels of land through the Mahale (1840), foreigners were also allowed the right to own land in Hawaii, provided they had been residents of the Hawaiian Islands for at least two years. This opened the door to foreign business interests, primarily American, and the stage was set for the full scale development of a variety of businesses, including Hawaii's sugar industry.

As recorded in a land documentation report by Kalama and Wong Smith (1992), the land use patterns of the area have been ongoing. "[Land Patents] contain the following information about the 'oil of Liliuokalani and a quarter of Pukukahi.'"

Interior Dept., Dec. 30, 1854

Tenantry given by Taka and Kolehu nanea [of Liliuokalani], that said freeholders belong to Win. C. Luminetta.

Aug. 31, 1854 Letter from S.C. Wilson to J.G. Darlington: "S.C. Davis claims that all the oil in the aloha at Kolehu [Pukukahi] on all his and being a part of his private property known as Waihe'e..."

July 19, 1858 Letter from John Y. Davis to Win. Webster: "Regarding that Liliuokalani and Waihe'e in Pukukahi not be given to Kolehu until they have talked the matter over together."

Kalama and Wong Smith also state:

Land Patents were granted to people who wanted to lease their claims to lands. Although the L.C.A.'s were generally regarded as a sign of tax liability, patent further indicated that no claim could be put against your land. Richard Smart of the Parker Ranch was the first to apply for a patent in the Pukukahi area (patent for a parcel in L.C.A. 8195 filed for in 1897; patents 1893-84). The patent verified that the land was originally the property of Luminetta and that it was given up for occupation to the government. (Further verified in the Laidley papers, page 22, and that Richard Smart,
eight mile flown, but strange as it may seem, the water felt just before the flame was finished. Mr. Carter, the manager of the Parker Ranch, in 1923* attributed the failure to the unseasonable dryness of the atmosphere. Just as the stream, after that, continued to flow with any degree of regularity, it would appear the drainage of forest area in the mountains was having an effect. Puakea, as a sugar proposition, I was satisfied, was hopeless, so finally was closed down, and parts gradually sold off at what they would bring. (Hid. ad. 49:50).

The Puakea sugar venture failed in 1914 (Crane and Beat 1973:115), and the plantation remains were described by Albert Baker when he visited the Puakea pekapuque fields in 1919.

Just before reaching Puakea one is surprised by overlooking vivid green irrigated alfalfa fields, the alfalfa being raised for feeding the pigs and a few cattle of the one-time sugar plantation, of which scarcely a suggestion now remains. (Baker 1904:44).

Portion of the land acquired by the Islands from Parker Ranch were a part of Lāhainā's Lāhainās' 'ai'āu (LCA 8599-20). In 1920, Robert Eld, Ltd., a Hawaiian Corporation and 74 acres of their Lāhainās' 'ai'āu to Parker Ranch Richard Smith. (Bureau of Conveyances in Lihue 2035:383-390) (Kahalu and Wong Smith 1922:26).

In 1974 Bevers and Kelly prepared a report describing regional land use and history, covering both the legendary and historic periods. Their report should be referred to for additional documentation particularly as related to upland "سا" areas of Lāhainās.

During this century, the coastal region of Lāhainā-Puakea has become a favorite retreat; the beaches of Puakea and Waialae are among the finest on Hawai'i. In addition to the Big Island, Clark (1965) refers to the modern Puakea community and also mentions some of the sites and events that occurred within the Puakea Lāhainās area.

The residential community of Puakea, which dates from the early 1960s, begins at Puakea Bay and extends for 3 1/2 miles of coastline along the peninsula level of Puakea Road.

A large wave-washed beach of rock fends almost the entire length of this long stretch of low-lying coast, but the irregular beach strains out many small ponds, coves, and tide pools, all of which are suitable for fish and shellfish, especially for the families of Puakea Bay and in marine areas, swimming...

Fresh water irrigation from shallow springs in the area are easy to reach, so they form a layer of cool, brackish water on the surface of the ocean. The only real fishing in this region is in the fish schools on the surface of the ocean, an excellent site for one's own fishing (Clark 1951:33).

Waves, commonly misinterpreted as a former site of the Big Island's most beautiful white sand beaches. The beach slopes gently into deeper waters offering and offer excellent opportunities for swimming.

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Board of Commissioners 1929 INDEXES, Aids made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Honolulu.


APPENDIX H

2010 Traffic Impact Assessment Report for Hapuna Beach State Recreation Area Expansion
2010 TRAFFIC IMPACT ASSESSMENT REPORT

FOR

HAPUNA BEACH STATE
RECREATION AREA EXPANSION

9 February 1995

Lahaina, South Kohala, Hawaii

Prepared for:

State of Hawaii
Department of Land and Natural Resources

Prepared By:

Pacific Planning & Engineering, Inc.
1221 Kapahulu Boulevard, Suite 61D
Honolulu, Hawaii 96814
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FOREWORD

The traffic forecasts shown within this report's figures and tables are the direct result of Pacific Planning & Engineering, Inc.'s proprietary analytical tools. For report editing and review purposes, the forecast values have been rounded to the nearest five vehicles from our mathematical results, although we do not imply this level of accuracy can exist in any forecast method. The rounded values, however, reasonably quantify the forecasted traffic volumes for the purposes of this study.

This report is an update to an initial draft completed in February 1994 for the Hapuna Beach Park Expansion. Since that date, the State Department of Transportation has begun work to update their Island-wide Transportation Plan. At the time of this writing, the Plan is still being prepared, and 2020 forecast results were not available. The results of this study should not be used in lieu of the DOT's 2020 forecasts, nor should the results be used to interpret the final improvement needs for Queen Kuhio Highway as this is a function of DOT's updated Long Range Plan. The forecasts contained in this report are based on land use information prepared for the 2020 transportation plan, as well as our research on available land use and project plans for the area.
EXECUTIVE SUMMARY

Pacific Planning & Engineering, Inc. (PPE) was engaged to identify and assess future traffic impacts during the year 2010 that would be caused by the proposed Hapuna Beach State Recreation Area Expansion. Additional traffic would impact Queen Kaahumanu Highway at the park's two access points.

Project Description

The State Department of Land and Natural Resources, Division of State Parks is proposing to expand the existing Hapuna Beach State Recreation Area located in the South Kohala District on the Big Island of Hawaii. The proposed improvements will be conducted in six phases and encompass a total of 937 acres, when completed by the year 2010.

The proposed improvements include: adding concession, outdoor shower and water safety facilities at the Waikaa Beach area; additional facilities for picnicking such as pavilions, picnic tables, and barbecue grills; additional camping area for groups and families; trail improvements; a new 18-hole golf course mauka of the highway; and realignment of the existing internal roadway.

Access to the project area from the rest of the island is provided by Queen Kaahumanu Highway, via Hapuna Beach Road and Punko Spur Road.

Methodology

Analysis was conducted at the unsignalized intersections of Queen Kaahumanu Highway with Hapuna Beach Road and Queen Kaahumanu Highway with Punko Spur Road to determine the relative impact of the proposed project on the local roadway system.

The time periods analyzed include the weekday morning and afternoon peak hour periods. The weekday peak periods were selected to identify project traffic impacts since the project traffic would have the largest impact during these times.

Future traffic without the project was forecasted by analyzing the following:

1) Year 2000 land use data for the current update study of the Island of Hawaii Long Range Highway Plan conducted by the State Department of Transportation. The forecasts from the study were not available as of this writing. However, 2000 land uses were made available for analytical purposes.


3) Year 2010 average daily traffic forecasts from the original Island of Hawaii Long Range Highway Plan completed in 1991 for Queen Kaahumanu Highway on sections adjacent to the project access points.

4) 1994 State DOT traffic counts for Queen Kaahumanu Highway.
EXECUTIVE SUMMARY

1) Directional and peak hour traffic factors derived from 1994 State DOT traffic counts.

2) Trend analysis of State DOT counts on Queen Kaahumanu Highway since 1976.

Conclusions and Recommendations

The proposed Hapuna Beach State Recreation Area Expansion project will not have a significant impact on traffic flow at the project access intersections of Queen Kaahumanu Highway with Punoa Spur Road and Hapuna Beach Road, when the project is completed in year 2010.

Queen Kaahumanu Highway is estimated to operate at Level of Service D during the 2010 afternoon peak hour even with the addition of the project’s traffic. Drivers entering or exiting the project access roads are expected to experience long to very long delays (LOS E or F) due to the increase in traffic volumes along Queen Kaahumanu Highway. Similar traffic conditions will be experienced by existing and future intersections along Queen Kaahumanu Highway, left turning vehicles will experience increasingly greater wait times before entering Queen Kaahumanu Highway traffic flows.

To provide a greater access to the park expansion project, the following actions might be taken:

* Signalize the intersections of Hapuna Beach Road and Punoa Spur Road with Queen Kaahumanu Highway when warranted. If signalized, the intersections will operate at LOS B during the afternoon peak hour, and higher during lower traffic volume hours.

* For the intersection of Queen Kaahumanu Highway and the Golf Course Access Road, provide a fully channelized intersection with exclusive left-turn lanes and acceleration and deceleration lanes.

The traffic volumes forecasted for year 2010 are based on future land uses contemplated in the Year 2020 Update to the State DOT's Island of Hawaii Long Range Highway Plan. The 1991 plan called for expanding Queen Kaahumanu Highway to four lanes divided, with a possibility of frontage roads and requirements for an access-controlled type facility. Clearly, the reduction in land use reflect the current economic situation on the Big Island and in the State. Major projects are not included in the 2020 update, that were included in previous forecast studies. As might be expected, the forecasts for 2010 are much lower than previous traffic forecasts estimated in other prior studies.
PROJECT DESCRIPTION

The State Department of Land and Natural Resources, Division of State Parks is proposing to expand the existing Hapuna Beach State Recreation Area located in the South Kohala District on the Big Island of Hawai‘i. The proposed improvements will be conducted in six phases and encompass a total of 537 acres when completed in the year 2010.

The project site is located along Queen Kaahumanu Highway about 15 miles west of Waimea and 50 miles north of Kailua-Kona. Access to the Hapuna Beach State Recreation Area is provided via Queen Kaahumanu Highway, Hapuna Beach Road and Puako Spur Road. There is an existing internal road, Kawaihae-Puako Road, within the project site. Figure 1 shows the project location and roadway network in the vicinity.

The existing park, located makai of Queen Kaahumanu Highway, is approximately 62 acres in size. The existing facilities include six overnight cabins, two pavilions, eight picnic shelters, eight outdoor picnic tables, three restroom facilities, caretaker’s house, maintenance building, and three outdoor showers. Parking is provided for about 237 vehicles. Additionally, there are a total of 21 privately owned residential lots located within the project area near Wailea Bay. Figure 2 shows the existing Hapuna Beach State Recreation Area.

There are three beaches located within the project area: Hapuna Beach, Beach 68 and Wailea Beach. However, easy access is available only for Hapuna Beach via Hapuna Beach Road. Access to Beach 68 and Wailea Beach is provided from the unimproved Kawaihae-Puako Road and dirt trails. Additionally, several trails to the coastline are provided makai of Kawaihae-Puako Road. Due to the terrain, access is primarily by 4-wheel drive vehicles.
Future Expansion of Hapuna Beach Recreation Area

The proposed expansion of the Hapuna Beach State Recreation Area consists of the construction of a combination food concession/water safety facility located behind Wailea Beach. Outdoor shower facilities would be installed behind Wailea Beach. Additional picnic facilities would be provided in the Wailea Beach area as well. The picnic facilities would include separate picnic tables with barbecue facilities and a fresh water supply.

Three pavilions for group picnic rentals would also be constructed to accommodate 200 persons. The location of the pavilions would be near Kawaihae-Pukoo Road near Wailea Bay.

Facilities would also be provided for organized group and family camping. Approximately 80 campsites would be constructed throughout the project site. Each campsite would accommodate approximately 10 persons per site. Additionally, 8 cabins accommodating up to 16 persons each would be provided for organized group camping.

Construction of an 18-hole municipal golf course and clubhouse would be included as part of the expansion. The golf course would be located near Hapuna Beach on a 208-acre site.

A 3,000-square-foot park headquarters facility would also be constructed. The park headquarters would house park personnel including: a park manager, administrative personnel, lifeguards, security officers, and maintenance personnel. Figure 3 shows the project site plan.
EXISTING CONDITIONS

An inventory of existing conditions was conducted to determine the current traffic conditions in the area and to provide a basis for estimating the potential traffic impact of the proposed project. The site investigation included the land uses in the area, roadway facilities, and existing traffic conditions.

Land Use

Presently, much of the land surrounding the project site consists of lava fields. There are several resort hotels located within the South Kohala District. Some of the hotels in the area of the project site include the Mauna Lani Hotel and the Waikoloa Hotels located to the south and the Mauna Kea Hotel to the north.

Located to the north are the towns of Kohala, Waimea and Honokaa. South of the project is Keahole Airport, which is the major State-owned airport serving the West Hawaii region. Further south is Kailua-Kona Town which is the main business center for West Hawaii and consists of offices, hotels, shopping malls, and businesses.

Existing Roadway Facilities

The existing roadway network in the vicinity of the project is shown in Figure 3. The major roadways in the area are Queen Kaahumanu Highway and Mamalahoa Highway. Queen Kaahumanu Highway and Mamalahoa Highway are parallel facilities.
Queen Ksahumanu Highway is the main highway in the South Kohala and Kona districts, running in a north-south direction along the coastline between Kailua-Kona and Kawaihae. It is a State maintained two-lane undivided highway with a 24-foot wide pavement and a posted speed limit varying between 35 to 55 miles per hour (mph).

Mamalahoa Highway is a two-lane State highway with a pavement width varying between 18 and 24 feet and a posted speed limit varying between 35 to 55 mph.

Hapuna Beach Road is a two-lane road with 12-foot lanes and 10-foot shoulders. Hapuna Beach Road provides access to the Hapuna Beach State Recreation Area and the Hapuna Beach Prince Hotel which is currently under construction.

Puako Spur Road is a two-lane road with 12-foot lanes and 10-foot shoulders. Puako Spur Road has a posted speed limit of 35 mph.

Hapuna Beach Road and Puako Spur Road, at their intersection with Queen Ksahumanu Highway, are channelized with left-turn storage lanes, deceleration and acceleration lanes. These intersections are located approximately 1 mile apart from each other. The posted speed limit along Queen Ksahumanu in the vicinity of these intersections is 55 mph. Figure 1 shows the existing laneages at these intersections.

Kawaihae-Puako Road varies in width from 10 to 16 feet. Kawaihae-Puako Road is well worn with several potholes and cracks within the pavement. Kawaihae-Puako Road provides access to the coastline via several dirt trails accessible by 4-wheel drive vehicles. Kawaihae-Puako Road also provides internal circulation within the project site between the existing Hapuna Beach State Recreation Area and the undeveloped land.
Existing Traffic Conditions

State Department of Transportation 24-hour traffic count data indicates the peak traffic periods along Queen Kashumanu Highway generally occurs from 6:00 to 8:00 in the morning and from 2:30 to 4:30 in the afternoon. Manual traffic counts were taken at the intersections of Queen Kashumanu Highway with Hapuna Beach Road and Queen Kashumanu Highway with Puako Spur Road. The counts were taken on Tuesday, January 25, 1994 from 2:30 to 5:00 pm and on Wednesday, January 26, 1994, from 6:00 to 8:30 am.

Manual counts were taken of passenger cars, trucks and buses by turning movements and approaches. During the field counts, the weather was sunny and the roadway pavement was dry. Figure 5 shows the present volume of traffic at the study intersections for the observed study periods. The manual traffic count data for the study periods is summarized in Appendix B.

Observed Traffic Conditions

The following observations were made during the field survey:

- Average speed in the area ranged from 45 mph to 65 mph.
- Slow moving heavy vehicles travelling along Queen Kashumanu Highway used the shoulder to allow faster vehicles to pass.
- Vehicular travel on Queen Kashumanu Highway would usually arrive in platoons of 3 to 7 vehicles.
- Midday observation of the Hapuna Beach park showed the parking lot to be approximately 75% full.

Figure 5
FUTURE CONDITIONS

Research was conducted of approved planned developments and improvements in the North Kona and Kohala areas which might directly affect traffic levels on Queen Kaahumanu Highway. Such developments are included in land use values that yield long range traffic forecasts given in the Island of Hawaii Long Range Highway Plan (IHLRP) published in May 1991.

Future Land Uses

The major developments within the immediate area of the project are shown below in Table 1:

<table>
<thead>
<tr>
<th>Development</th>
<th>Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anahulu Village</td>
<td>Residential, Golf Course</td>
</tr>
<tr>
<td>Kohala Plantation</td>
<td>Residential, Commercial</td>
</tr>
<tr>
<td>Mahukona Lodge</td>
<td>Residential, Golf Course</td>
</tr>
<tr>
<td>Mahuka Ridge &amp; Villas</td>
<td>Residential</td>
</tr>
<tr>
<td>Hanapii Plantation</td>
<td>Residential, Commercial</td>
</tr>
<tr>
<td>State Dept. of Hawaiian Home</td>
<td>Residential, Commercial,</td>
</tr>
<tr>
<td>Park</td>
<td>Commercial, Industrial,</td>
</tr>
<tr>
<td>Sandalwood</td>
<td>School</td>
</tr>
<tr>
<td>Hapuna Beach Prince Hotel</td>
<td>Resort</td>
</tr>
<tr>
<td>Mauna Lani Resort</td>
<td>Resort</td>
</tr>
<tr>
<td>Peakai Akua</td>
<td>Residential, Commercial</td>
</tr>
<tr>
<td>Peakai Residential Golf</td>
<td>Community</td>
</tr>
<tr>
<td>Mauna Lani Resort</td>
<td>Residential, Commercial,</td>
</tr>
<tr>
<td>Kona Village</td>
<td>Industrial, School, Golf Course</td>
</tr>
<tr>
<td>Waikoloa Beach Resort</td>
<td>Resort, Residential, Commercial</td>
</tr>
<tr>
<td>Kukuihulu Resort</td>
<td>Resort, Residential, Commercial</td>
</tr>
<tr>
<td>Kaupulehu Resort</td>
<td>Resort, Residential, Commercial</td>
</tr>
<tr>
<td>Kona Village</td>
<td>Resort, Residential, Commercial</td>
</tr>
</tbody>
</table>

The State Department of Transportation is completing work to update this Island-wide Highway Plan. At the time of this writing, the Plan is being prepared, and 2020 forecast results are not available. However, the 2010 forecasts contained in this traffic report are based on land use information prepared for the 2020 update study, as well as PP&Es research on available land use and project plans for the area.

Future Roadway Facilities

The State Department of Transportation and the County of Hawaii Department of Planning and Public Works prepared a report titled, Island of Hawaii Long Range Highway Plan (IHLRP) published in May 1991 to coordinate long-term transportation planning issues for the island.

This IHLRP report included recommendations to widen Queen Kaahumanu Highway to 4-lane, access controlled freeway from Kawaihae Road to Palani Road. Access to Queen Kaahumanu Highway would be limited to grade separated interchanges at locations to be determined by highway design criteria. Traffic between adjoining properties along the highway would be provided by a system of frontage roads that would also connect to the proposed grade separated interchanges.

The highway improvements are planned to be implemented by the year 2030, that coincides with the completion of the Hapuna Beach State Recreation Area Expansion. If these improvements are not completed by then, widening Queen Kaahumanu Highway to provide passing lanes in each direction is provided by the plan.
PROJECTED TRAFFIC CONDITIONS

Future traffic was forecasted for the year 2030 for traffic conditions without and with the proposed Helepa Beach State Recreation Area Expansion. Traffic forecasts were estimated for the year 2010 when the project is expected to be completed.

Future Traffic Without Project

Future traffic without the project was forecasted by analyzing the following:

1) Year 2020 land use data for the current update study of the Island of Hawaii Long Range Highway Plan conducted by the State Department of Transportation. The forecasts from the study are not approved and were not available as of this writing. However, land uses were made available for analytical purposes.


3) Year 2010 average daily traffic forecasts from the original Island of Hawaii Long Range Highway Plan completed in 1991 for Queen Kaahumanu Highway on sections adjacent to the project access points.

4) 1994 State DOT traffic counts for Queen Kaahumanu Highway.

5) Directional and peak hour traffic factors derived from 1994 State DOT traffic counts.

6) Trend analysis of State DOT counts on Queen Kaahumanu Highway since 1976.

Traffic Forecast From Island of Hawaii Long Range Highway Plan

The Island of Hawaii Long Range Highway Plan provided base year 1987 average daily traffic (ADT) volumes and forecasted ADT volumes for the year 2010. This information was used to extrapolate year 2010 forecast ADT volumes for this study from an estimated 2020 average daily traffic (ADT) forecast for Queen Kaahumanu Highway.

The 2020 ADT was estimated by forecasting the vehicle trips from the 2020 land uses that would be generated from traffic zones in the West Hawaii area, and added or subtracted from the Queen Kaahumanu Highway 2010 ADT forecasts contained in the HILRP. The land use differences in the Table 2 below.

<table>
<thead>
<tr>
<th>Table 2. Land Use Differences – 2020 vs 2010 (West Hawaii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td>2020</td>
</tr>
<tr>
<td>Difference</td>
</tr>
</tbody>
</table>

The results indicate that major development is forecast to be delayed or cancelled. For example, several major developments are not included such as the Hawaiian Home Lands Kawaihae planned development. This appears to be the current observation of the economic conditions for most major projects in the area. The effect on ADT on Queen Kaahumanu Highway should be a major reduction from previously forecasted values.
Vehicle trips were calculated based on rates used in the IHLP. Condo and hotel rates were estimated based on previous studies of resort trip generation. The rate of 9.55 trips per day for single family dwelling units outweighs the other uses to the extent that the net difference of trips would be 510 trips in 2020 than predicted for 2010. Again this is due to the change in land use forecasts for the area.

The 2020 ADT is estimated to be 22,310 vehicles per day (vpd) on Queen Kahanamoku Highway in this area. This estimate is calculated by adding the 2010 IHLP ADT forecast of 22,820 vpd with the calculated trip difference of -510 vpd.

Trend analysis of daily counts was conducted as a check for the reasonableness of the 2010 forecast. Ten State DOT counts at Station 11-2, on Queen Kahanamoku Highway at Kawaihae-Waimea Road from 1978 to 1994 was used as the base for prediction. Only ten counts are available since the DOT collects volume data every other year at this location. The results of the trend analysis and other ADT results are given below.

<table>
<thead>
<tr>
<th>COMPARISON OF FORECAST VALUES (Vehicles Per Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>2020 ADT</td>
</tr>
<tr>
<td>2010 ADT</td>
</tr>
</tbody>
</table>

To be conservative, the analysis assumes the higher trend value of 18,120 vpd for 2010 ADT on Queen Kahanamoku Highway. Based on this value, the two-direction peak hour volumes would be 1,260 vehicles per hour (vph) during the morning peak hour, and 1,480 vph in the afternoon.

The resulting weekday morning and afternoon peak hour traffic volume forecasts without the project in year 2010 are shown in Figure 6.
Future Traffic With Project

Future traffic with the project was forecasted by adding traffic generated by the proposed Hapuna Beach State Recreation Area Expansion to the forecasted traffic without the project. The standard three-step procedure of trip generation, trip distribution, and traffic assignment was used to estimate peak hour traffic from the proposed project.

The number of trips generated by the project was estimated based on two methods: the golf course traffic was generated based on data from the ITE Trip Generation Report, and the recreation area traffic was based on trip rates derived from manual traffic counts. The Hapuna Beach State Recreation Area Expansion report indicates the proposed park expansion will have an increased park capacity of 54%. Future park expansion traffic was forecasted by increasing existing traffic by 54%. Trips generated by the Park Headquarters were estimated based on total employees.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>AAA Peak</th>
<th>PPA Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enter</td>
<td>Exit</td>
</tr>
<tr>
<td>Park Expansion</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Park Headquarters</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Golf Course</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>40</td>
</tr>
</tbody>
</table>

The trip distribution step estimates the distribution of vehicle trips to their predicted origins and destinations. The trip distribution for the beach park traffic was based on existing trip distribution at the study intersections. The trip distribution for the beach expansion project is shown below in Table 4. The trip distribution for the golf course was estimated at

50% given the distances to major population areas.

<table>
<thead>
<tr>
<th>Table 4. Trip Distribution for Proposed Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
</tr>
<tr>
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The traffic assignment step assigns vehicle trips to specific routes on the roadway network that will take the driver from origins to destinations. Since Queen Kaaumano Highway is the only major roadway which carries north and southbound traffic in the immediate project area, all of the traffic entering and exiting the project was assigned to this roadway.

Year 2010 Traffic Forecasts With Project

The resulting weekday morning and afternoon peak hour traffic volume forecasts in year 2010 are shown in Figure 7.
TRAFFIC IMPACTS ANALYSIS

Analyses were conducted on the three project access intersections to determine the relative impact of the proposed Hapuna Beach State Recreation Area Expansion on the local roadway system and to determine improvements to mitigate the impact of the project, if necessary.

Analysis Methods

The analyses were conducted for the 1994, 2010 without project, and 2010 with project traffic conditions for the morning and afternoon peak periods. The roadway facilities were analyzed based on the existing roadway geometries.

The study intersections were analyzed using methods outlined in the Highway Capacity Manual\(^2\) for unsignalized intersections. The "level-of-service" (LOS) for unsignalized intersections is determined by the amount of reserve capacity for each turning movement. The reserve capacity is the amount of vehicles that could proceed through a conflicting traffic stream. LOS for unsignalized intersections is classified into six categories ranging from little or no delay (LOS A) to extreme delays (LOS F). These are described in the Appendix.

Project Impact Analysis

The results of the analysis for the study intersections are shown in Table 5, and are also described below.

---

TRAFFIC IMPACT ANALYSIS

Existing Conditions

Intersection of Queen Kaahumanu Highway and Hopuna Beach Road
All movements currently operate at level-of-service (LOS) D or better during the morning and afternoon peak hours. Most movements operate at LOS A.

Intersection of Queen Kaahumanu Highway and Puako Spur Road
All movements currently operate at level-of-service (LOS) D or better during the morning and afternoon peak hours. Most movements operate at LOS A.

Year 2010 Without the Project

Intersection of Queen Kaahumanu Highway and Hopuna Beach Road
During the morning and afternoon peak hour, the left-turning traffic out of the project are expected to operate with long delays LOS E. The other movements will encounter few, if any, delays.

Intersection of Queen Kaahumanu Highway and Puako Spur Road
The same level of service are expected for this intersection as for the Hopuna Beach Road intersection for the morning and afternoon peak hours. Again, the left-turning traffic out of the project are expected to operate with long delays LOS E.

Year 2010 With the Project

Intersection of Queen Kaahumanu Highway and Hopuna Beach Road
During the afternoon, the left-turn traffic out of the project are expected to operate with very long delays LOS F. The delays will worsen because of the increased traffic demand. The left turn movement into the project on Queen Kaahumanu Highway will worsen to LOS B, but this is still a high LOS. No other turning movement is expected to worsen.

Intersection of Queen Kaahumanu Highway and Puako Spur Road
The same slight worsening will occur for the left-turn traffic out of the project to LOS F. Except for the slight worsening for the left turn into Puako Spur Road, no other turning movement is expected to worsen.

Intersection of Queen Kaahumanu Highway and Golf Course Access Road
The access does not exist so no comparison with existing or without project is possible. Drivers exiting the golf course are expected to experience very long delays at LOS E, similar to the above intersections.
TRAFFIC IMPACT ANALYSIS

Improvement Analysis

While the number of vehicles generated by the project is relatively low, the future traffic conditions on Queen Kauhumau Highway will be such that the turn movements out of the project roads will incur delays, particularly during the afternoon peak period. A major issue in past forecasting studies was the need for a widened Queen Kauhumau Highway, however the 2010 forecast level does not indicate widening is required by that year. Based on HCM data, assuming an ideal of 2,800 vph, Queen Kauhumau Highway (at 1,625 vph) will operate at LOS D as a two-lane highway during the afternoon peak hour with the project. Pertinent data include: 4% trucks, level terrain, 12 foot wide lanes, paved shoulders.

Since Queen Kauhumau Highway is at LOS D, the only movement that would require mitigation are the left turn movements out of the project. One means to provide better access to Queen Kauhumau Highway would be signalization when warranted. The LOS results with signalization of the affected intersections are given in the table below.

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|                     |                     |
| Queen Kauhumau Highway with Pukuh Spur Road: | |
| Northbound Approach | B (8)              |
| Southbound Approach | A (8)              |
| Pukuh Road          |                   |
| Eastbound Approach  | C (10)             |
| Westbound Approach  | C (10)             |
| Overall Intersection|                   |
| Ave. Delay per Vehicle (seconds) | 5.72 (8.35) |
| Volume/Capacity    | 0.50 (0.34)        |
TRAFFIC IMPACTS ANALYSIS

Signalized Intersection Analysis Results

Intersection of Queen Kaahumanu Highway and Hapuna Beach Road
All movements will continue to operate at LOS C or better. The intersection will operate at a relatively high LOS B.

Intersection of Queen Kaahumanu Highway and Pukoa Spur Road
All movements will continue to operate LOS C or better. The intersection will operate at a relatively high LOS B.

CONCLUSIONS AND RECOMMENDATIONS

The proposed Hapuna Beach State Recreation Area Expansion project will not have a significant impact on traffic flow at the project access intersections of Queen Kaahumanu Highway with Pukoa Spur Road and Hapuna Beach Road, when the project is completed in year 2010.

Queen Kaahumanu Highway is estimated to operate at Level of Service D during the 2010 afternoon peak hour even with the addition of the project’s traffic. Drivers entering or exiting the project access roads are expected to experience long to very long delays (LOS E or F) due to the increase in traffic volumes along Queen Kaahumanu Highway. Similar traffic conditions will be experienced by existing and future intersections along Queen Kaahumanu Highway, left turning vehicles will experience increasingly greater wait times before entering Queen Kaahumanu Highway traffic flows.

To provide a greater access to the park expansion project, the following actions might be taken:

- Signalize the intersections of Hapuna Beach Road and Pukoa Spur Road with Queen Kaahumanu Highway when warranted. If signalized, the intersections will operate at LOS B during the afternoon peak hour, and higher during lower traffic volume hours.
- For the intersection of Queen Kaahumanu Highway and the Golf Course Access Road, provide a fully channelized intersection with exclusive left turn lanes and acceleration and deceleration lanes.

The traffic volumes forecasted for year 2010 are based on future land
CONCLUSIONS AND RECOMMENDATIONS

uses contemplated in the Year 2020 Update to the State DOT’s Island of Hawaii Long Range Highway Plan. The 1991 plan called for expanding Queen Kaahumanu Highway to four lanes divided, with a possibility of frontage roads and requirements for an access-controlled type facility. Clearly, the reduction in land uses reflect the current economic situation on the Big Island and in the State. Major projects are not included in the 2030 update, that were included in previous forecast studies. As might be expected, the forecasts for 2010 are much lower than previous traffic forecasts estimated in other prior studies.

APPENDIX A

LEVEL-OF-SERVICE DEFINITIONS
FOR
SIGNALIZED AND UNSIGNALIZED INTERSECTIONS
DEFINITION OF LEVEL-OF-SERVICE FOR SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period.

**Level of service A** describes operations with very low delay, i.e., less than 5.0 sec per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

**Level of service B** describes operations with delay in the range of 5.1 to 15.0 sec per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

**Level of service C** describes operations with delay in the range of 15.1 to 25.0 sec per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

**Level of service D** describes operations with delay in the range of 25.1 to 40.0 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or a high v/c ratio (volume of corner to capacity of intersection). Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**Level of service E** describes operations with delay in the range of 40.1 to 60.0 sec per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle length, and high v/c ratios. Individual cycle failures are frequent occurrences.

**Level of service F** describes operations with delay in excess of 60.0 sec per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

DEFINITION OF LEVEL-OF-SERVICE FOR UNSIGNALIZED INTERSECTIONS

The concept of levels of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with Level-of-Service A representing the best operating conditions and Level-of-Service F the worst.

Level-of-Service definitions—In general, the various levels of service are defined as follows for uninterrupted flow facilities:

Level-of-Service A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

Level-of-Service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

Level-of-Service D is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

Level-of-Service E represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level-of-Service F represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such a maneuver. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

Level-of-Service F is used to define forced or breakdown flow. This condition exists whenever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go wave, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-Service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of the vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow.
which causes the queue to form, and Level-of-Service F is an appropriate
designation for such points.

These definitions are general and conceptual in nature, and they apply
primarily to uninterrupted flow. Levels of service for interrupted flow
facilities vary widely in terms of both the user’s perception of service quality
and the operational variables used to describe them.


APPENDIX B

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**Date:** Jan 20, 1984

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